APPENDIX C

Draft Technical Study Plans

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Appendix C
Draft Technical Study Plans

C.1 INTRODUCTION

Based on existing Rush Creek Project (Project) operation and maintenance activities (Section 2.0); Proposed Project alternatives (Section 3.0); summary of existing information (Section 4.0); and responses to the Project Information Questionnaire (Appendix B), Southern California Edison Company (SCE) developed the following 15 Draft Technical Study Plans for consideration in the relicensing proceeding. The overall objective of the Draft Technical Study Plans is to address data gaps in existing information such that sufficient information is available to evaluate potential Project impacts and collaborate on the Proposed Project included in the License Application.

The Draft Technical Study Plans are organized into five major resource areas – Aquatic, Cultural, Land, Recreation, and Terrestrial as identified below.

Aquatic Resources
AQ 1 – Instream Flow AQ 2 – Hydrology AQ 3 – Water Temperature AQ 4 – Water Quality AQ 5 – Geomorphology AQ 6 – Fish Population and Barriers AQ 7 – Special-status Amphibians
Cultural Resources
CUL 1 – Built Environment CUL 2 – Archaeology CUL 3 – Tribal
Land Resources
LAND 1 – Aesthetics LAND 2 – Noise
Recreation Resources
REC 1 – Recreation
Terrestrial Resources
TERR 1 – Botanical TERR 2 – Wildlife

The Draft Technical Study Plans for this Project include the evaluation of existing resource conditions under ongoing routine operation and maintenance of the Project, and analysis and/or development of models to support evaluation of potential protection, mitigation, and enhancement (PM&E) measures. In addition, the study plans have been expanded and are broader in scope due to the complexity of the actions under consideration in the relicensing proceeding, including:

- Continued operation and maintenance of the modified Project;[1]
- Either the partial or full removal of Agnew and Rush Meadows dams;[2]
- Dam modification and retrofitting of Gem Dam;
- Restoration of the former inundation zone of Waugh (Rush Meadows), Agnew, and Gem[3] lakes; and
- Enhancement of the Lower Rush Creek and South Rush Creek channels.[4]

Figure C-1 identifies the proposed schedule for implementation of the study plans (2022–2024) pending completion of the Federal Energy Regulatory Commission's (FERC) Study Plan Determination Process. Refer to the Relicensing Process Plan (Appendix A) for a detailed description of the study plan development/determination process.

The following sections describe the overall content and organization of each study plan and other required study plan components.

C.2 CONTENT AND ORGANIZATION OF TECHNICAL STUDY PLANS

The following presents the general content and organization of each Draft Technical Study Plan contained in Appendix C:

- Potential Resource Issues – This section identifies the environmental or cultural resource issues that are specifically addressed in the study.
- Project Nexus – This section describes potential direct and indirect effects on environmental and cultural resources of: (1) continued operation and maintenance of a modified Project; (2) decommissioning/retrofitting of Project dams; (3) restoration of the decommissioning/retrofitting construction areas and former

[1] The Proposed Project includes: (1) removal of Agnew and Rush Meadows dams such that no water is impounded, and (2) the lowering and retrofitting of Gem Dam. Overall storage in the Project reservoir under the Proposed Project is reduced from 23,315 acre-feet (ac-ft) to 10,752 ac-ft (reduction of 12,563 ac-ft). Operations of the Proposed Project in the future, only affects Gem Lake water levels and flows in the stream reaches downstream of Gem Dam. For more information, refer to Section 3.0, Proposed Project in the Rush Creek Pre-Application Document (PAD).

[2] In both alternatives for Rush Meadows and Agnew dams, the dams will no longer capture and store water resulting in upland habitat and an active stream channel within the former lakebed.

[3] Gem Dam will be lowered and retrofitted as part of the Proposed Project resulting in a reduced storage capacity resulting in upland habitat and an active stream channel within a portion of the former lakebed.

[4] The Proposed Project includes evaluating potential enhancement of the Rush Creek channel to address local flooding of residences during high runoff events.

lakebeds/stream channels no longer subject to inundation; and (4) potential enhancement of the lower Rush Creek channel.

- Relevant Information – This section describes available information that was reviewed to determine resource study needs.

- Potential Information Gaps – This section identifies information gaps that the study will fill.

- Study Objectives – This section describes the specific objectives of the study organized by action under consideration.

- Extent of Study Area – This section describes the specific area to be studied and clearly identifies the limits of the study area based on the potential Project Nexus.

- Study Approach – This section provides a detailed description of the study elements and methodologies proposed to meet each study objective.

- Schedule – This section presents a detailed schedule for implementation of each study, including data collection and stakeholder consultation; data analysis and report preparation; draft report distribution; stakeholder review and comment period; comment resolution; and final report distribution.

C.3 OTHER REQUIRED TECHNICAL STUDY PLAN COMPONENTS

The following sections describe four additional components that apply to all the Draft Technical Study Plans. These components are not addressed individually in each study plan in Appendix C to avoid redundancy.

C.3.1 CONSISTENCY WITH GENERALLY ACCEPTED PRACTICE IN THE SCIENTIFIC COMMUNITY

The proposed study methodologies (including data collection and analysis techniques, field schedules, and study durations) in the Draft Technical Study Plans are consistent with generally accepted practice in the scientific community. The study plans were developed by technical experts representing the licensee. Many of these technical experts have experience in multiple relicensing proceedings in California. The scope of each of the technical studies provided in the Pre-Application Document (PAD) are consistent with common approaches used for other relicensing proceedings in California and the nation and, where appropriate, reference specific protocols and survey methodologies.

C.3.2 CONSIDERATION OF LEVEL OF EFFORT

As discussed above, the overall objective of the technical studies contained in the PAD is to develop sufficient information to evaluate potential Project impacts and collaborate on the Proposed Project included in the License Application. Proposed technical study approaches were evaluated first to verify that the desired information was focused on potential impacts associated with the Project (i.e., Project Nexus), second to confirm that the information collected would substantially influence decisions on new license

conditions (i.e., clear linkage between information obtained and decision process), and third to substantiate that the study approaches and resulting level of efforts were consistent with generally accepted practices in the scientific community. The Draft Technical Study Plans included in the PAD meet these evaluation criteria.

C.3.3 PERIODIC PROGRESS REPORTS

Each Draft Technical Study Plan contains a detailed schedule for data collection and analysis; development and distribution of draft Technical Study Reports; and stakeholder review and comment. In general, a 90-day comment period is provided for stakeholder review of each draft Technical Study Report. An additional 60- to 90-day period has also been allocated in the schedule to resolve stakeholder comments on the draft Technical Study Reports and to develop and distribute the final Technical Study Reports.

In addition to the formal distribution of draft and final Technical Study Reports, SCE will also present an overview of the content and key findings of each Technical Study Report to stakeholders during regularly scheduled meetings. The timing of these meetings will be emailed to stakeholders in advance and posted on SCE's relicensing website at www.sce.com/RushCreek.

C.3.4 ANNUAL STUDY PLAN REPORT AND MEETING

During study implementation, SCE will file an initial and updated study report with FERC describing overall progress in implementation of the study plans, including data collected to date, any deviations in technical approaches or schedules, and a proposed schedule for completion of the remaining study plan components. The study report will also include a description of any proposed modifications to the approved studies or new studies proposed by SCE.

Within 15 days following filing of the study report, SCE will hold a meeting with stakeholders and FERC to discuss the study results and SCE's or other participant's proposals, if any, to modify the study plans in light of the progress of the study plan and data collected. Within 15 days following the meeting, SCE will file a meeting summary, including any modification to ongoing studies or new studies proposed by SCE. The timing of these activities will be emailed to stakeholders in advance and posted on SCE's relicensing website at www.sce.com/RushCreek.

FIGURES

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Figure C-1. Draft Technical Study Plan Implementation Schedule.

Technical Study Plan	2022												2023												2024												2025											
	J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D
AQ 1 - Instream Flow																																															
Select Project-affected stream segments for instream modeling, complete mesohabitat mapping, and select study sites									■	■	■																																				
Consult with the interested resource agencies and stakeholders													■	■	■	■																															
Conduct field data collection (topography, water surface elevations, velocities, substrate/cover)																■	■	■	■	■	■	■																									
Analyze data and prepare draft report																						■	■	■	■	■																					
Distribute draft report to stakeholders																										■																					
Stakeholders review and provide comments on draft report (90 days)																											■	■	■																	
Resolve comments and prepare final report																														■	■																
Distribute final report in Draft License Application																																■															
AQ 2 - Hydrology																																															
Collaborate with stakeholder modeling working group on Project hydrology									■	■	■																																				
Install temporary flow gages									■	■	■																																				
Develop Proposed Project hydrology and refine analysis of historical, existing, and unimpaired hydrology													■	■	■	■																															
Complete the hydrologic alteration analysis and flood-frequency analysis																■	■	■																													
Summarize data and prepare draft report (incorporating October 2022–September 2023 data)																			■	■	■	■	■	■																							
Distribute draft report to stakeholders																									■																					
Stakeholders review and provide comments on draft report (90 days)																									■	■	■																	
Resolve comments and prepare final report																											■	■																
Uninstall temporary flow gages																																													
Distribute draft final report in Draft License Application (incorporating October 2023–September 2024 data)																																■	■											
Distribute final report in Final License Application																																					■							
AQ 3 - Water Temperature																																															
Install and maintain temperature probes and meteorological stations																■	■	■	■	■	■																										
Analyze data and prepare draft report																						■	■	■	■	■																					
Distribute draft report to stakeholders																										■																					
Stakeholders review and provide comments on draft report (90 days)																											■	■	■																	
Resolve comments and prepare final report																														■	■																
Distribute final report in Draft License Application																																■															

Technical Study Plan	2022												2023												2024												2025											
	J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D
AQ 4 - Water Quality																																															
Conduct spring water quality in-situ and grab sampling																		■																															
Conduct monthly in-situ reservoir/lake profiling																		■	■	■	■	■																											
Conduct summer/fall water quality in-situ and grab sampling																					■																												
Analyze data and prepare draft report																						■	■	■	■	■																						
Distribute draft report to stakeholders																											■																						
Stakeholders review and provide comments on draft report (90 days)																												■	■	■																		
Resolve comments and prepare final report																														■	■																	
Distribute final report in Draft License Application																																■																
AQ 5 - Geomorphology																																															
Conduct channel surveys (e.g., mesohabitat and Rosgen mapping)									■	■																																						
Complete data analysis													■	■	■	■																																
Conduct field surveys																■	■	■	■	■	■	■																										
Analyze data and prepare draft report																						■	■	■	■	■																						
Distribute draft report to stakeholders																											■																						
Stakeholders review and provide comments on draft report (90 days)																												■	■	■																		
Resolve comments and prepare final report																														■	■																	
Distribute final report in Draft License Application																																■																
AQ 6 - Fish Population and Barriers																																															
Characterize fish barriers/migration in Project-affected stream reaches																	■	■	■	■																												
Conduct fish population sampling in Project-affected stream reaches and Project reservoirs																			■	■	■																											
Analyze data and prepare draft report																					■	■	■	■	■																						
Distribute draft report to stakeholders																											■																						
Stakeholders review and provide comments on draft report (90 days)																												■	■	■																		
Resolve comments and prepare final report																														■	■																	
Distribute final report in Draft License Application																																■																
AQ 7 - Special-Status Amphibians																																															
Complete habitat mapping and conduct VES surveys																	■	■	■																												
Complete quantification of habitat versus flow relationships, if needed																				■	■	■	■																								
Analyze data and prepare draft report																							■	■	■																						
Distribute draft report to stakeholders																								■																						
Stakeholders review and provide comments on draft report (90 days)																									■	■	■																		
Resolve comments and prepare final report																												■	■	■																
Distribute final report in Draft License Application																																■																

Technical Study Plan	2022												2023												2024												2025											
	J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D
CUL 1 - Built Environment																																																
Convene interested stakeholders to discuss Draft Study Plan and adequacy of the APE		■	■	■	■	■	■																																								
Consult with SHPO regarding adequacy of the APE					■	■	■																																								
Conduct archival research and background review													■	■	■	■	■																																
Conduct field inventory																		■	■	■	■																												
Analyze data and prepare draft report																						■	■	■	■																								
Distribute draft report to stakeholders																									■																								
Stakeholder review and provide comments on draft report (90 days)																										■	■	■																				
Resolve comments and prepare final report																												■	■	■																			
Distribute final report in Draft License Application																															■																	
CUL 2 - Archaeology																																																
Convene interested stakeholders to discuss Draft Study Plan and adequacy of the APE		■	■	■	■	■	■																																								
Consult with SHPO regarding adequacy of APE					■	■	■																																								
Conduct archival research and background review													■	■	■	■	■																																
Develop and obtain consensus on NRHP Evaluation Plan and Testing Plan													■	■	■	■	■																																
Conduct inventory surveys																		■	■	■																												
Acquire permits and conduct NRHP Evaluation Studies																					■	■																										
Analyze data and prepare draft report																						■	■	■	■																								
Distribute draft report to stakeholders																									■																								
Stakeholder review and provide comments on draft report (90 days)																										■	■	■																				
Resolve comments and prepare final report																												■	■	■																			
Distribute final report in Draft License Application																															■																	
CUL 3 - Tribal																																															
Engage Tribal groups to arrange meetings and establish protocols		■	■	■																																										
Meet with Tribal groups/resource agencies/stakeholders to discuss Draft Study Plan and adequacy of the APE					■	■	■	■	■																																							
Conduct archival research													■	■	■																																		
Conduct Tribal interviews to identify Tribal resources													■	■	■	■	■	■	■	■	■	■																										
Compile results of data gathered, evaluate Tribal resources, and prepare draft report																						■	■	■	■																								
Distribute draft report stakeholders																									■																								
Stakeholder review and provide comment on draft report (90 days)																										■	■	■																				
Resolve comments and prepare final report																												■	■	■																			
Distribute final report in Draft License Application																															■																	

Technical Study Plan	2022												2023												2024												2025											
	J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D
LAND 1 - Aesthetics																																																
Summarize land management direction and objectives, establish KOPs, and develop inventory forms													■	■	■																																		
Inventory, photo document, and assess Project facilities																		■	■	■																												
Photo document and characterize Horsetail Falls at three different flows, assuming spill flows are available																	■	■	■	■																												
Analyze data and prepare draft report																					■	■	■	■	■																						
Distribute draft report to stakeholders																									■																						
Stakeholders review and provide comments on draft report (90 days)																										■	■	■																		
Resolve comments and prepare final report																													■	■																
Distribute final report in Draft License Application																															■															
LAND 2 - Noise																																															
Identify sensitive receptors/ POI with resource agencies and stakeholders														■	■	■																																
Conduct noise surveys																	■	■	■	■	■																											
Analyze data and prepare draft report																					■	■	■	■																							
Distribute draft report to stakeholders																									■	■	■	■																		
Stakeholders review and provide comments on draft report (90 days)																										■	■	■																		
Resolve comments and prepare final report																													■	■																
Distribute final report in Draft License Application																															■															
REC 1 - Recreation																																															
Gather and analyze existing available use data													■	■	■																																		
Interview key information sources													■	■	■	■																																
Establish temporary self-registration box at the Rush Creek Trailhead, if needed															■	■	■	■	■	■	■	■																									
Analyze data and prepare draft report																					■	■	■	■																							
Distribute draft report to stakeholders																									■																						
Stakeholders review and provide comments on draft report (90 days)																										■	■	■																		
Resolve comments and prepare final report																													■	■																
Distribute final report in Draft License Application																															■															
TERR 1 - Botanical																																														
Conduct field surveys																	■	■	■	■																											
Analyze data and prepare draft report																					■	■	■	■																							
Distribute draft report to stakeholders																									■																						
Stakeholders review and provide comments on draft report (90 days)																										■	■	■																		
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Technical Study Plan	2022												2023												2024												2025											
	J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D
TERR 2 - Wildlife																																																
Consult with resource agencies to obtain information on Sierra Nevada bighorn sheep													■	■	■	■																																	
Conduct wildlife reconnaissance surveys, raptor nest surveys, and transmission line/power line pole evaluation																		■	■	■	■																											
Conduct bat surveys																			■	■	■																											
Analyze data and prepare draft report																						■	■	■	■																							
Distribute draft report to stakeholders																										■																						
Stakeholders review and provide comments on draft report (90 days)																											■	■	■																		
Resolve comments and prepare final report																														■	■																	
Distribute final report in Draft License Application																																■																

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DRAFT
AQ 1 – INSTREAM FLOW TECHNICAL STUDY PLAN

Rush Creek Hydroelectric Project
FERC Project No. 1389

December 2021

DRAFT TECHNICAL STUDY PLAN
AQ 1 – Instream Flow

POTENTIAL RESOURCE ISSUES

- Modification of aquatic and riparian habitat.
- Suitable channel maintenance flows (sediment scour/deposition).
- Rush Creek channel within the former lakebed of Waugh Lake.
- Localized flooding adjacent to the lower Rush Creek and South Rush Creek channels near State Route 158 (SR-158).

PROJECT NEXUS

- Project operations modify the flow regime in Project-affected stream reaches. The modified flow regime may affect the amount and distribution (temporal and spatial) of aquatic and riparian habitat, and channel maintenance (sediment scour/deposition).
- The Proposed Project would eliminate storage in Waugh Lake thereby reestablishing a permanent stream channel (Rush Creek) in the former lakebed (potential restoration site).
- The loss of reservoir storage under the Proposed Project may influence localized flooding adjacent to the lower Rush Creek and South Rush Creek channels near SR-158 in high-runoff years (potential enhancement site).

RELEVANT INFORMATION

The following information is available to characterize instream flows in the vicinity of the Rush Creek Project (refer to Southern California Edison Company's [SCE] Pre-Application Document [PAD] Section 2.7 for a summary of instream flow requirements [SCE 2021]):

- Section 2.0, Project Location, Facilities, and Operation, and Section 4.3, Water Use and Hydrology of the Rush Creek PAD, present a summary of Project operations and water use; available stream gage data; and daily historical, existing, and unimpaired hydrology for Project-affected stream reaches and Project reservoirs.
- PAD Section 4.5, Fish and Aquatics presents a summary of fish population and instream flow information.
- Federal Energy Regulatory Commission (FERC) Environmental Assessment for Hydropower License, Rush Creek Project, FERC Project No. 1389 (FERC 1992).

- FERC Relicensing Studies (EA Engineering Science and Technology 1986, 1987) related to instream flows.

- Gaging data from United States Geological Survey (USGS), SCE, and Los Angeles Department of Water and Power (LADWP).

POTENTIAL INFORMATION GAPS

- Updated information on the relationship between instream flow and aquatic and riparian habitat.

- Data on potential flow fluctuations in Rush Creek downstream of the Rush Creek Powerhouse Tailrace.

- Availability of appropriate channel maintenance flows.

- Hydraulic information necessary to evaluate: (1) potential restoration of the Rush Creek channel within the former lakebed of Waugh Lake; and (2) potential enhancement of the Rush Creek and South Rush Creek channels near SR-158 to address localized flooding.

- Hydraulic information necessary to evaluate potential scour/deposition of sediment in Rush Creek near the Silver Lake inlet.

STUDY OBJECTIVES

- The overall study objective is to:

    - Characterize aquatic and riparian habitat and channel maintenance as a function of flow using ecological principles and hydraulic/habitat modeling (e.g., Bovee et al. 1998), and

    - Provide hydraulic modeling data, as needed, to evaluate:

        - Potential restoration of the Rush Creek channel within the former lakebed of Waugh Lake;

        - Potential enhancement of the Rush Creek and South Rush Creek channels near SR-158 to address localized flooding; and

        - Sediment scour/deposition in Rush Creek near the Silver Lake inlet.

EXTENT OF STUDY AREA

- The study area for evaluation of the instream flow is the Project-affected stream reaches identified in Table AQ 1-1 and Map AQ 1-1.

- Studies will not be conducted at locations where access is unsafe (e.g., where there is very steep terrain) or on private property for which SCE has not received specific approval from the landowner to enter the property to perform the study.

STUDY APPROACH

INSTREAM FLOW MODELING

The following describes the instream flow habitat modeling approach which includes:

- Summary of the previous Instream Flow Incremental Methodology (IFIM) study;
- Selection of stream segments for modeling;
- Quantification of habitat versus flow relationships in the selected stream reaches including:
  - Characterization of flow versus aquatic habitat in selected stream reaches;
  - Characterization of flow versus riparian habitat stage-discharge relationship and high flow recession rates at selected transects; and
  - Characterize flow versus initiation of sediment movement and bankfull flow data for selected transects.

Previous IFIM Study

- Summarize the instream flow modeling that was developed during the previous relicensing effort (EA Engineering, Science, and Technology 1986) in Rush Creek below Rush Meadows Dam, including:
  - Data collection locations
  - Calibration flows
  - Target species and life stages
  - HAND-based Storage Capacity (HSC) curves
  - Weighted usable area (WUA) curves
  - Rationale/criteria for establishment of the current minimum instream flows, if available

Selected Stream Segments

- Model instream flow hydraulics and/or habitat in the following Project-affected stream segments (see Table AQ 1-1; Map AQ 1-1).

- Model additional locations/cross-sections identified in the TERR 1 – Botanical Technical Study Plan (TSP) and AQ 5 – Geomorphology TSP related to initiation of sediment motion / bankfull flow and riparian community inundation.

Quantification of Habitat Versus Flow Relationships

Target Species / Life Stages/ Habitat Suitability Criteria

- The target species and life stages for instream flow habitat modeling will be finalized in collaboration with interested resource agencies and stakeholders (Aquatic Technical Working Group meetings) based on management importance and/or sensitivity to Project operations.

    - SCE proposes to model rainbow trout life stages (juvenile rearing, adult rearing, and spawning/incubation life stages) and potentially brook trout life stages in the selected Project-affected stream segments as follows:

        - SCE proposes to use the rainbow trout HSC recently developed in collaboration with resource agencies for the Placer County Water Agency (PCWA) Middle Fork Project relicensing (PCWA 2011).

        - SCE proposes to evaluate available use data and/or HSC data for brook trout and determine if suitable brook trout HSC can be developed from the existing resources. Limited data is available for brook trout in western streams.

    - Sierra Nevada yellow-legged frogs (SNYLF) will only be modeled (using existing habitat information) if occupied breeding and rearing habitat is identified in Project-affected stream reaches as part of implementation of the AQ 7 – Special-status Amphibians TSP.

- Generate a species distribution map and life stage periodicity chart (i.e., season of occurrence) for fish, special-status amphibians, and riparian resources within Project-affected stream reaches based on existing information (e.g., literature and agency consultation) and results from implementation of the AQ 6 – Fish Population and Passage TSP, AQ 7 – Special-status Amphibian TSP, and TERR 1 – Botanical Resources TSP.

Data Collection and Sampling Approach for Hydraulic and Aquatic Habit Modeling

- Data collection for hydraulic and aquatic habitat modeling will be accomplished at representative mesohabitat types (see AQ 5 – Geomorphology TSP) to support one-dimensional hydrodynamics and habitat models (Table AQ 1-1). However, in some reaches two-dimensional models will be used, particularly where other issues such as channel enhancement/restoration or sediment scour/deposition are also being addressed (Table AQ 1-1). In plunge pool habitats, empirical hydraulic and habitat data will be collected.
    - Data from each mesohabitat type will be weighted and combined to develop a representation of hydrodynamics and habitat for the larger stream segment.
    - The weighting will be based on the percentage of each mesohabitat within the stream segment.
- Within a stream segment, mesohabitat types will be sampled approximately in proportion to their abundance.
    - Adjustments to the proportional sampling may be made based on the importance or variability of particular mesohabitat types.
    - Typically, ten units within a stream segment will be sampled (modeled). This provides enough sampling to replicate each major mesohabitat type (e.g., two mesohabitat samples of each type) and provides for additional sampling in abundant and/or important mesohabitat types (e.g., three or more mesohabitat samples of abundant and/or important types).
        - Each major mesohabitat type (greater than approximately 5–10% of the geomorphic/hydrologic reach) will be modeled.
        - Rare mesohabitat types (<5%) that provide unique or important habitat (e.g., spawning, passage) will be modeled, if present in the study site. In particular, patches of spawning gravel may be important habitat features to sample in the study sites.
        - Mesohabitat types (e.g., cascades, falls/chutes) that do not contain significant habitat for the primary target species or rare mesohabitat types (<5%) that do not have unique habitat importance will not be modeled.
    - SCE will make the initial selection of the mesohabitat units to sample based on selecting representative units in areas that facilitate access. Final selection of the mesohabitat units for modeling will be completed in collaboration with interested resource agencies and stakeholders. SCE does not recommend random sampling of mesohabitat units because unrepresentative results could occur due to small sample size.

- Data collection in mesohabitat units will incorporate the following approach:
  - Typically, one to three cross-sections will be placed in each mesohabitat unit to represent habitat over a range of flows for one-dimensional modeling.
    - Fewer cross-sections may be placed in simple mesohabitat units with little variability or where the cross-sections are being placed to sample a variety of mesohabitat units of a particular type and not necessarily to fully characterize a specific mesohabitat unit.
    - In some cases, additional cross-sections may be placed in highly variable mesohabitat units, if appropriate.
    - Where two-dimensional hydraulics and habitat modeling are conducted, the entire habitat units will be represented.
  - Channel topography will generally be in the form of cross-sections (1-D). Cross-sections will be marked with semi-permanent headpins and GPS locations will be recorded. In the case of two-dimensional modeling, topography will be collected as topographic surveys and break lines.
  - Empirical water surface elevations will be measured (surveyed) for at least three calibration discharges at each cross-section for one-dimensional modeling and at least two calibration discharges along the length of the two-dimensional modeling reaches. The discharges will span the range of flows of interest (Table AQ 1-1,). The calibration flows will be determined in consultation with interested resource agencies and stakeholders once the Project hydrology has been compiled (AQ 2 – Hydrology TSP). For reference, Table AQ 1-2 provides unimpaired flow at various exceedance values at four locations on Rush Creek.
  - Empirical velocity data will be collected across each cross-section (15-20 cells/locations) at typically the high calibration discharge for one-dimensional modeling and, validation velocity data (collected on cross-sections), will be collected for two-dimensional modeling. However, because of the difficult access and steep channels the medium calibration discharge will be used unless the high flow calibration flow is safe and to access (Table AQ 1-1).
    - All velocities will be collected with calibrated velocity meters. Discharges will be measured using standard gaging techniques (e.g., Rantz 1982).
- In steep gradient reaches, plunge pool mesohabitat units will be empirically mapped at the same calibration flows proposed for hydrodynamics modeling (Table AQ 1-1). The amount of the plunge pool rearing habitat for fish species will be mapped at each flow. A flow versus habitat area relationship will be estimated for each individual plunge pool and the habitat versus flow relationships will be integrated into the reach-wide habitat versus flow relationships.

- To access the effects of Silver Lake water surface elevations on upstream hydraulics (backwater effects) and flow fluctuations below the Rush Creek Powerhouse, develop an hourly time series of water surface and discharge as follows:

    - Install pressure transducers (≤15 minute data collection) at the Silver Lake outflow and in the Rush Creek channel in two locations upstream of Silver Lake (near SR-158 downstream of the powerhouse tailrace, near the instream flow site upstream of the Silver Lake inlet).

    - Verify that the LADWP Rush Creek gage above Grant Lake collects 15-minute data, if not, then install a pressure transducer at the gage location.

    - Develop a stage-discharge relationships at each stage recording location, as necessary.

Hydrodynamics Modeling

- PHABSIM (e.g., Milhous et al. 1989) or equivalent one-dimensional or two-dimensional hydraulics modeling procedures will be used for modeling water surface elevations and velocities across each cross-section. These procedures include stage-discharge regressions, Manning's equations, backwater step models (e.g., WSP, HEC-RAS), IFG4, and/or two-dimensional models.

- Hydrodynamics (depth, velocity, water surface elevations) will be modeled over a range of discharges, appropriate to the Project hydrology for each stream segment (AQ 1-1).

Habitat and Sediment Initiation of Motion Modeling

- Habitat modeling will be conducted using an approach consistent with the IFIM approach (Bovee et al. 1998). The general approach will be as follows:

    - Collect substrate and cover information for habitat modeling across each cross-section (1-D) or throughout the modeled channel (2-D) that is compatible with the HSC criteria.

    - Develop habitat modeling approaches appropriate for each selected species and life stage.

    - Develop habitat versus flow relationships for each species life stage over a wide range of flows (15-30 flows).

    - Complete a habitat time series analysis comparing the seasonal and daily distribution of habitat under Proposed Project, historical, existing, and unimpaired hydrology.

  - Compare and contrast the amount of habitat during different biologically significant time periods (e.g., reproduction, rearing) and identify potential habitat limiting factors and time periods.

  - In Rush Creek downstream of the Rush Creek Powerhouse, characterize the effects of flows and flow fluctuations on Silver Lake / Rush Creek stage. Also, develop a ≤1 hour time series analysis based on existing and Proposed Project operations to address potential effects of flow fluctuations on fish habitat.

- Develop wetted perimeter versus flow relationships in the selected stream segments to characterize available habitat for other aquatic species (i.e., macroinvertebrates and amphibians) under different flow regimes.

- Identify the time periods, flow conditions, and life stages when habitat may be a limiting factor for fish, special-status amphibians, benthic macroinvertebrates, and riparian resources under historical, existing, Proposed Project, and unimpaired hydrology.

- Develop analytical tools to quantify the potential effects of other alternative flow scenarios on aquatic and riparian habitat for use during preparation of the License Application.

- Characterize flow versus riparian habitat stage-discharge relationship and high flow recession rates at selected transects identified in the TERR 1 – Botanical Resources TSP.

- Characterize flow versus initiation of sediment movement and bankfull flow data at selected transects identified in the AQ 5 – Geomorphology TSP.

Empirical Plunge Pool Modeling

- Representative plunge pools will be selected (Table AQ 1-1) in steep gradient reaches and mapped at calibration flows for hydrodynamics modeling. The amount of the plunge pool that provides rearing habitat for fish species (not too shallow or turbulent) will be mapped. A flow versus suitable habitat area relationship will be estimated for each individual plunge pool and based on the average of all plunge pools mapped.

EVALUATION OF POTENTIAL RUSH CREEK CHANNEL RESTORATION IN THE FORMER LAKEBED OF WAUGH LAKE

The following describes the collection/analysis of information to evaluate potential restoration of the Rush Creek channel in the former lakebed of Waugh Lake including:

- Summarize the unimpaired hydrology developed in the AQ 2 – Hydrology TSP.
- Collect detailed topographic data for the channel using a combination of methods, including Light Detection and Ranging (LiDAR), aerial photogrammetry and supplemental total station surveys, as needed.
- Characterize/map the channel and floodplain substrate for hydraulic roughness characterization and erosion modeling.
- Collect model calibration water surface elevations along the channel at, at least two different flows.
- Use HEC-RAS 1D/2D and/or River2d modeling (or equivalent) to characterize channel hydraulics (stage-discharge relationships along the channel) and erosion potential over the range of unimpaired flows (e.g., 10% to 90% exceedance flows).

EVALUATION OF POTENTIAL ENHANCEMENT OF RUSH CREEK AND SOUTH RUSH CREEK CHANNELS NEAR SR-158

The following describes the collection/analysis of information necessary to identify/evaluate potential enhancement of the Rush Creek/South Rush Creek channels near SR-158 to address potential local flooding during high-runoff events including:

- Summarize local hydrology in Rush Creek and South Rush Creek near SR-158, Rush Creek Powerhouse Tailrace, Reversed Creek, and inflow to Silver Lake developed in the AQ 2 – Hydrology TSP for historical, existing, Proposed Project, and unimpaired hydrology.
- Collect detailed topographic information for South Rush Creek near SR-158 and the needed cross-sections/topography in the Rush Creek and powerhouse tailrace channels, using a combination of LiDAR, aerial photogrammetry, and total station surveys, as needed.
- Characterize/map the channel and floodplain channel substrate and riparian vegetation (see TERR 1 – Botanical TSP) suitable for hydraulic roughness characterization.
- Collect model calibration water surface elevations along the channel at, at least two different flows.

- Use the stage-discharge relationship of Silver Lake over a range of flows (developed above) to incorporate backwater effects in the channel hydraulic modeling.

- Identify current channel conditions (i.e., downed trees, sediment, riparian encroachment, culverts) which impede flows in Rush Creek and South Rush Creek near SR-158 (see TERR 1 – Botanical TSP for riparian vegetation characterization and AQ 5 – Geomorphology TSP for channel and large woody debris characterization).

- Use HEC-RAS 1D/2D and/or River2d modeling (or equivalent) to characterize channel and culvert hydraulics and identify potential flooding near SR-158 under the Proposed Project, existing, historical and unimpaired hydrology.

- Potential enhancements (e.g., berms, channel modification, clearing of the channel) for Rush Creek and South Rush Creek channels will be developed, as appropriate, during preparation of the License Application.

RUSH CREEK AT THE SILVER LAKE INLET

The following describes the collection/analysis of information necessary to evaluate hydrology related scour/deposition of sediment in the Rush Creek channel near the inlet of Silver Lake:

- Summarize the Rush Creek inflow hydrology to Silver Lake developed in the AQ 2 – Hydrology TSP for historical, existing, Proposed Project, and unimpaired hydrology.

- Collect detailed topographic information for Rush Creek near the inlet using a combination of LiDAR, aerial photogrammetry, total station surveys, and/or GPS tagged sonar, as needed.

- Characterize/map the channel and floodplain channel substrate and riparian vegetation (see TERR 1 – Botanical TSP) suitable for hydraulic roughness characterization.

- Collect model calibration water surface elevations along the channel at, at least two different flows.

- Use the stage-discharge relationship of Silver Lake over a range of flows (see above) to incorporate backwater effects in the channel hydraulic modeling.

- Use HEC-RAS 1D/2D and/or River2d modeling (or equivalent) to characterize channel hydraulics and identify potential sediment scour/deposition conditions under the Proposed Project, existing, historical and unimpaired hydrology.

REPORTING

- Study methods and results will be documented in an AQ 1 – Instream Flow Technical Study Report (TSR). The TSR will include summary tables and maps, as appropriate.

- Upon request, data will be provided to resource agencies and interested stakeholders in an Excel spreadsheet (electronic format).

SCHEDULE

Date	Activity
September–November 2022	Select Project-affected stream segments for instream modeling, complete mesohabitat mapping, and select study sites
January–April 2023	Consult with the interested resource agencies and stakeholders regarding: target species and life stages, habitat suitability criteria, and habitat modeling methods
April–October 2023	Conduct field data collection (topography, water surface elevations, velocities, substrate/cover)
October 2023–February 2024	Analyze data and prepare draft report
March 2024	Distribute draft report to resource agencies and stakeholders
April–June 2024	Resource agency and stakeholders review and provide comments on draft report (90 days)
June–July 2024	Resolve comments and prepare final report
August 2024	Distribute final report in Draft License Application

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TABLES

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Table AQ 1-1. Location of Selected Stream Segments for Instream Flow Modeling.

Reach Name	Reach Length (miles) / River Miles (RM)	Sampling Location River Mile / Site ID	Methods	Purpose	Flow Range of Interest[1]	Water Surface Elevation Calibration Flows (cfs)[2]	Velocity Calibration/ Validation Flows (cfs)[3]
Rush Creek							
Waugh Lake	1.51 (RM 22.24–23.75)	RM 22.24–23.75	HEC-RAS or River2d Model (or equivalent) entire reach	Hydraulic modeling for potential channel restoration	0.7–189 cfs	1–3 cfs* 7–12 cfs* 50–60 cfs*	7–12 cfs*
Rush Creek below Rush Meadows Dam	1.83 (RM 20.41–22.24)	RM 20.41–22.24	Cross-section hydraulic modeling	Sediment transport, bankfull flow, and riparian vegetation	0.7–189 cfs	1–3 cfs* 7–12 cfs* 50–60 cfs*	7–12 cfs*
Rush Creek Below Gem Dam to the Confluence with Reversed Creek	1.99 (RM 17.49–19.48)	RM 18.40–18.60 and RM 17.50–17.60	Cross-sections in 5 mesohabitat units (pool, run, low and high gradient riffle) in approx. proportion to availability	Hydraulic modeling, aquatic habitat modeling, sediment transport, bankfull flow, and riparian vegetation	1.0–279 cfs	1–4 cfs 13–20 cfs 70–85 cfs	13–20 cfs
		RM 17.65–18.40 and RM 19.18–19.46	• Cross-sections in 5 mesohabitat units (pool, run, low and high gradient riffle) in approx. proportion to availability • 5 empirical plunge pool habitats	• Hydraulic modeling, aquatic habitat modeling, sediment transport, bankfull flow, and riparian vegetation • Empirical aquatic habitat modeling			
		RM 17.50–17.60	HEC-RAS 2D or River2d (or equivalent)	Hydraulic modeling to evaluate potential enhancement of the Rush Creek Channel			
Rush Creek Powerhouse Tailrace	—	—	HEC-RAS 2D or River2d (or equivalent) or cross-section hydraulic modeling	Hydraulic modeling to evaluate potential backwater effects at the SR-158 culvert	0–100 cfs	10–20 cfs 40–60 cfs 90–100 cfs	— (not needed for this prismatic channel)
Rush Creek Above Silver Lake, including Lake Inlet	1.01 (RM 16.48–17.49)	RM 16.48–17.49	HEC-RAS 2D or River2d (or equivalent)	• Hydraulic modeling, aquatic habitat modeling, sediment transport, bankfull flow, and riparian vegetation • Hydraulic modeling to evaluate sediment scour/ deposition at Silver Lake Inlet	1.0–383 cfs	1–6 cfs 25–35 cfs 100–130 cfs	25–35 cfs
Rush Creek Below Silver Lake	2.69 (RM 13.20–15.89)	RM 13.20–15.89	Cross-sections in 10 mesohabitat units (e.g., pool, run, low and high gradient riffle) in approx. proportion to availability	Hydraulic modeling, aquatic habitat modeling, sediment transport, bankfull flow, and riparian vegetation	1.0–383 cfs	1–6 cfs 25–35 cfs 100–130 cfs	25–35 cfs
South Rush Creek							
South Rush Creek	0.46 (RM 0.0–0.46)	RM 0.0–0.2	HEC-RAS 2D or River2d (or equivalent) of channel above and below SR-158	• Hydraulic modeling, aquatic habitat modeling, sediment transport, bankfull flow, and riparian vegetation • Hydraulic modeling for potential enhancement of the Rush Creek and/or South Rush Creek channel	0–60 cfs	0.5–3 cfs* 10–20 cfs* 40–60 cfs*	10–20 cfs*

Notes:
cfs = cubic feet per second
RM = River Mile

[1] 5% to 95% unimpaired flow exceedance values
[2] Approximate/target flow ranges for hydraulic model data collection. Actual flows at time of data collection may be different.
* Flow data collection dependent on natural flow availability.
[3] If the high calibration flow is accessible and safe to collect velocity data, collect velocity data at high flow instead of the medium flow. Otherwise collect velocities at medium flow.

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Table AQ 1-2. Unimpaired Flow at Various Exceedance Values at Four Locations on Rush Creek

Exceedance Value (%)	Rush Creek Unimpaired Flow (cfs)			
	Below Waugh Dam	Below Gem Dam	Below Agnew Dam	Below Silver Lake Dam
95	0.7	1.0	1.1	6.5
90	1.2	1.8	1.9	8.2
80	2.5	3.7	3.9	12.0
50	8.9	13.1	13.8	25.5
20	51.7	76.4	80.9	112.6
10	116.0	171.5	181.4	234.2
5	188.5	278.8	294.7	382.9

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MAPS

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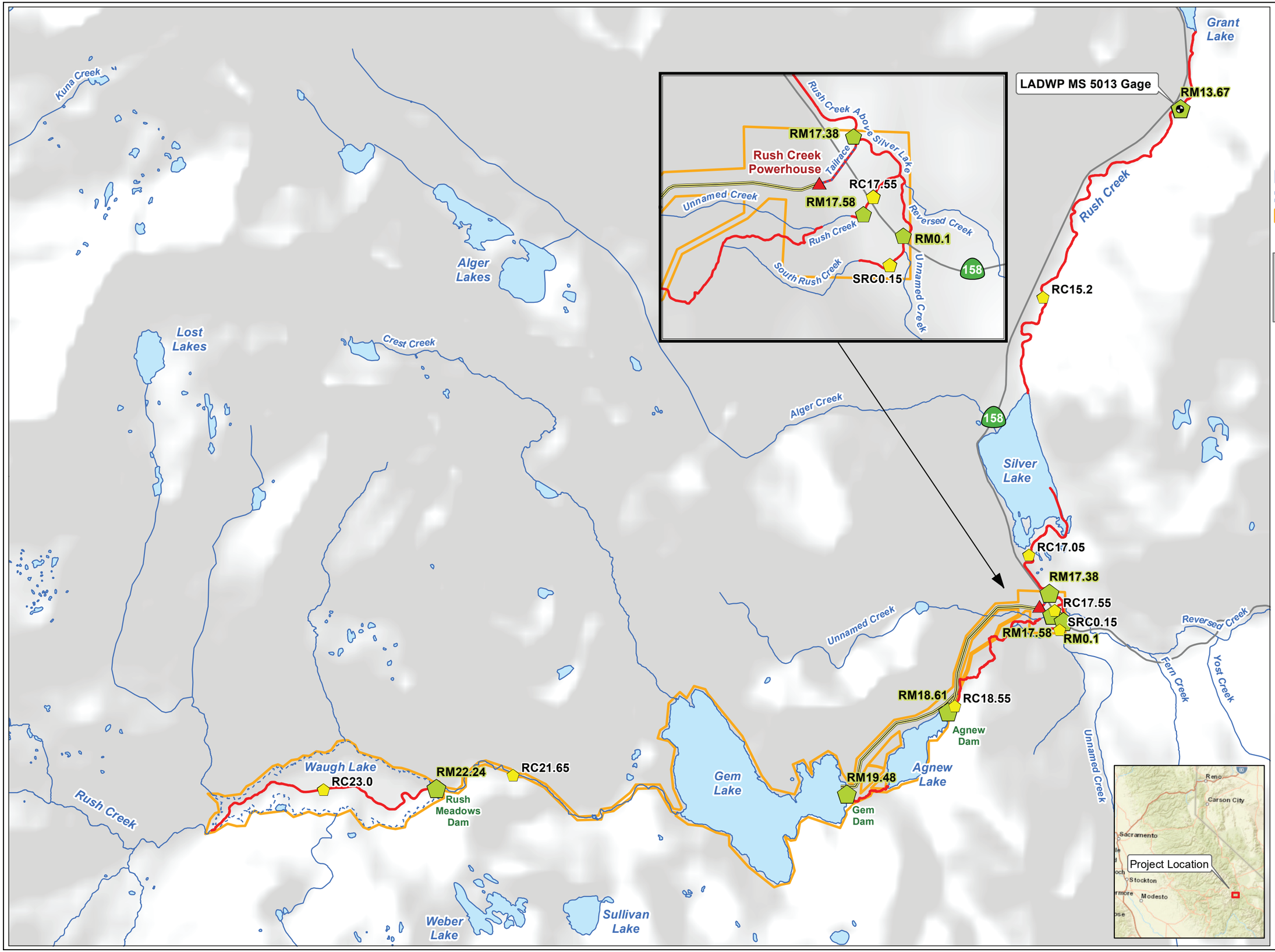

SCE Facilities
- Dam
- Powerhouse
- Flowline / Penstock
- Tailrace

Other Features
- Highway
- River/Stream
- Lake/Reservoir
- Dry Lake/Reservoir
- FERC Boundary

Study Sites and Reaches
- Hydrology Analysis Site
- Geomorphology/Riparian Site
- Instream Flow Modeling Reaches

SOUTHERN CALIFORNIA EDISON®
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Rush Creek Project (FERC 1389)

Map AQ 1-1

Analysis and Survey Locations

0 0.25 0.5 Miles

Projection: UTM Zone 11
Datum: NAD 83

Date: 11/3/2021

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DRAFT
AQ 2 – HYDROLOGY
TECHNICAL STUDY PLAN

Rush Creek Hydroelectric Project
FERC Project No. 1389

December 2021

DRAFT TECHNICAL STUDY PLAN
AQ 2 – Hydrology

POTENTIAL RESOURCE ISSUES

- Modification of Rush Creek hydrology.

PROJECT NEXUS

- Project operations modify the hydrology in Project-affected stream reaches and Project reservoirs.

RELEVANT INFORMATION

The following information is available to characterize hydrology in the vicinity of the Rush Creek Project (refer to Southern California Edison Company's [SCE] Pre-Application Document [PAD] Section 4.3 for a summary of water use and hydrology information [SCE 2021]).

- Gaging data from United States Geological Survey (USGS), SCE, and Los Angeles Department of Water and Power (LADWP).

- Section 2.0 Project Location, Facilities, and Operation, and Section 4.3, Water Use and Hydrology of the Rush Creek PAD, presents a summary of Project operations and water use; available stream gage data; and daily historical, existing, and unimpaired hydrology for Project-affected stream reaches and Project reservoirs.

- Hydrological analysis methodologies (Chen et al. 2017; England et al. 2018; Flynn et al. 2006; Gotvald et al. 2012; Richter et al. 1996; Veilleux et al. 2014).

POTENTIAL INFORMATION GAPS

- Modeled Proposed Project, historical, and existing hydrology, and refinement (as needed) of the analysis of unimpaired hydrology presented in the PAD Section 4.3 (SCE 2021).

- Hydrologic alteration analyses and high flow/flood-frequency analyses for the different flow regimes in Project-affected stream reaches.

- Hydrology of the lower Rush Creek and South Rush Creek channels near State Route 158 (SR-158) related to potential enhancement.

STUDY OBJECTIVES

- Model the Proposed Project, historical, and existing hydrology, and refine (as needed) the analysis of unimpaired hydrology presented in the PAD Section 4.3 (SCE 2021).

- Perform a hydrologic alteration analysis for the unimpaired, existing, and Proposed Project flow regimes in the select Project-affected stream reaches.

- Conduct a high flow/flood-frequency analysis for the different flow regimes in the select Project-affected stream reaches.

- Develop hydrology data for the lower Rush Creek and South Rush Creek channels near SR-158 to facilitate the evaluation of potential enhancements to address local flooding of residences during high-runoff events.

EXTENT OF STUDY AREA

- The study area for development of the Proposed Project, historical, existing, and unimpaired hydrology includes Project-affected stream reaches (Table AQ 2-1 and Map AQ 2-1). The locations for the hydrological alteration analyses and high flow/flood-frequency analyses are also included in Table AQ 2-1 and Map AQ 2-1.

- Studies will not be conducted at locations where access is unsafe (e.g., where there is very steep terrain) or on private property for which SCE has not received specific approval from the landowner to enter the property to perform the study.

STUDY APPROACH

The following describes the study approach for developing Project hydrology; conducting a hydrologic alteration analyses and flood-frequency analyses; developing potential channel enhancement hydrology; and reporting.

HYDROLOGY DEVELOPMENT

- Conduct stakeholder hydrological modeling working group meetings to review and help guide the hydrological modeling approach (development of an operations spreadsheet model).

- Use the 2000-2021 period of record (POR) for hydrological modeling based on data availability (historical gage data) (SCE 2021).

- Refine the modeled unimpaired (without the Project[1]) daily average flow hydrology presented in PAD Section 4.3 for the POR based on modeling working group input, as appropriate.

- Use the spreadsheet operations model, to characterize the Proposed Project (future operations[2]), historical (operations prior to reservoir seismic restrictions[3]),

[1] The unimpaired hydrology (2000–2019) presented in the PAD represents synthesized instream flows in Rush Creek without the influence of the Rush Creek Project.

[2] The Proposed Project hydrology is the modeled hydrology based on how the Project will be operated in the future with removal of Waugh Lake and the reservoir portion of Agnew Lake and modified operations (including maximum storage) at Gem Lake.

[3] The historical hydrology (2000-2011) will be used to develop / calibrate the historical hydrology model over the 2000–2021 POR. The historical hydrology represents instream flows and Project operation under the existing license conditions prior to implementation of the seismic restrictions in 2012.

existing (current operations under seismic restrictions[4]) daily average flow hydrology for the POR based on the modeling working group input, as appropriate.

HYDROLOGIC ALTERATION ANALYSIS

- Analyze and compare Proposed Project, historical, existing, and unimpaired daily average flows using the following data and approaches in select Project-affected stream reaches (Table AQ 2-1 and Map AQ 2-1) (e.g., Richter et al. 1996).
    - Monthly flow exceedance plots / tables for the POR.
    - Time-series plots for the POR.
    - January to December (annual) plots / tables showing mean daily and 95%, 90%, 75%, 50% (median), 25%, 10%, and 5% exceedance flows.
    - Tables and summary analysis showing differences in the following:
        - Monthly timing and magnitude of mean and median flow conditions (e.g., high and low flows).
        - Magnitude, duration, and timing of annual high flow and low flow conditions (1-day, 3-day, 7-day, monthly, etc.), including the presence of pulse flow events.
        - Rate, timing, and frequency of hydrograph changes (e.g., rate and timing of the declining limb of the spring high flow hydrograph).

FLOOD FREQUENCY

- Generate a flood-frequency analysis for the Proposed Project, historical, existing, and unimpaired flows using annual peak daily flow data and peak flow estimates in select Project-affected stream reaches.
    - Determine the best method to estimate peak flow from peak daily flow (e.g., Chen et al. 2017) and generate a 2000–2021 annual peak flow data set.
    - Use PeakFQ (Veilleux et al. 2014; Flynn et al. 2006), a software package developed by the USGS, which uses Bulletin 17c (England et al. 2018) procedures for flood-frequency analysis of streamflow records, or equivalent, and estimate flood magnitudes (annual daily average peak) and their corresponding annual exceedance probabilities.

[4] The existing hydrology (2012-2019) will be used to develop / calibrate the existing hydrology model over the 2000–2021 POR. The existing hydrology represents instream flows and Project operation under the existing license conditions and implementation of the seismic restrictions in 2012.

- Use regional flood-frequency curves (Gotvald et al. 2012) to develop an additional estimate of unimpaired peak flow magnitudes and their corresponding annual exceedance probabilities.

- Summarize any other peak flow or probable maximum flood (PMF) data available for the study area (e.g., PMF calculations for the SCE dams by Geotechnical Water Resources in 2011), including historical flow data.

POTENTIAL ENHANCEMENT HYDROLOGY

- Generate hydrological data for the lower Rush Creek and South Rush Creek channels near SR-158 to facilitate the evaluation of potential enhancements to address local flooding of residences during high-runoff events including:

  - Determine the Rush Creek/South Rush Creek percent flow split downstream of Horseshoe Falls over a range of flow conditions (e.g., minimum flow releases from Agnew Dam to peak flow events).

    - Use temporary gage data from South Rush Creek (see gage installation below) and data from USGS gage 10287289 (Rush Creek at Flume below Agnew Lake near June Lake, California) to determine the flow split relationship. Also, use any historical data collected to help determine the flow split relationship (e.g., 2017 empirical flow data).

  - Determine additional flows entering South Fork Rush Creek and Rush Creek near SR-158.

    - Install and operate[5] temporary gages (October 2022 to September 2024) at the following locations:

    - South Rush Creek upstream of SR-158 (River Mile [RM] 0.2).

    - Unnamed tributary entering South Rush Creek upstream of SR-158 (RM 0.12).

    - Unnamed tributary entering Rush Creek upstream of SR-158 (RM 17.66).

    - Reversed Creek upstream of the confluence with Rush Creek (RM 0.25).

    - Use the empirical data and watershed area to develop a time series of accretion to South Rush Creek, Rush Creek upstream of SR-158, and Reversed Creek to Rush Creek.

  - Estimate the peak design flow for each of the channels / culverts at SR-158 (South Rush Creek, Rush Creek, and Powerhouse Tailrace). Potential backwater effects from Silver Lake on the channels and culverts near SR-158

[5] During the winter time period the gages will be operated to the extent reasonably possible given the potential for ice and snow cover. The primary operation period will focus on fall, spring, and summer.

during spring high flows will be developed in the AQ 1 – Instream Flow Technical Study Plan.

REPORTING

- The study methods and results will be documented in an AQ 2 – Hydrology Technical Study Report (TSR). The TSR will include summary tables and maps, as appropriate.

- Upon request, data will be provided to resource agencies and interested stakeholders in an Excel spreadsheet (electronic format).

SCHEDULE

Date	Activity
September–November 2022	Collaborate with stakeholder modeling working group on approach for refining the historical, existing, and unimpaired hydrology (as appropriate); and developing the Proposed Project hydrology Install temporary flow gages
January–April 2023	Develop the Proposed Project hydrology and refine the analysis of the historical, existing, and unimpaired hydrology
April–June 2023	Complete the hydrologic alteration analysis and flood-frequency analysis
July–December 2023	Summarize data and prepare draft report (incorporating October 2022–September 2023 data)
January 2024	Distribute draft report to stakeholders
February–April 2024	Stakeholders review and provide comments on draft report (90 days)
April–May 2024	Resolve comments and prepare final report
August–September 2024	Uninstall temporary flow gages Distribute draft final report in Draft License Application (incorporating October 2023–September 2024 data)
January 2025	Distribute final report in Final License Application (incorporating comments by stakeholders on the draft final report filed with the Draft License Application)

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TABLES

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Table AQ 2-1. Hydrology Analysis Locations in Project-affected Stream Reaches.

Reach Name	Location (RM)	Proposed Project, Historical, Existing, Unimpaired Hydrology			Proposed Project Hydrology Potential Enhancement Hydrology Data Collection (2022–2023)
		Daily Average Hydrology (2000–2021 POR)	Hydrological Alteration Analysis (2000–2021 POR)	High Flow / Flood-Frequency Analysis (2000–2021 POR)	
Rush Creek					
Rush Creek at Rush Meadows Dam	RM 22.24	X	X	X	—
Rush Creek at Gem Dam	RM 19.48	X	X	X	—
Rush Creek Below Agnew Dam	RM 18.61	X	X	X	—
Rush Creek above SR-158	RM 17.58	X	X	X	X
Rush Creek Above Silver Lake	RM 17.38	X	X	X	—
Rush Creek Below Silver Lake	RM 13.67	X	X	X	—
South Rush Creek					
South Rush Creek	RM 0.1	X	X	X	X

Notes:
POR = Period of Record
RM = River Mile

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MAPS

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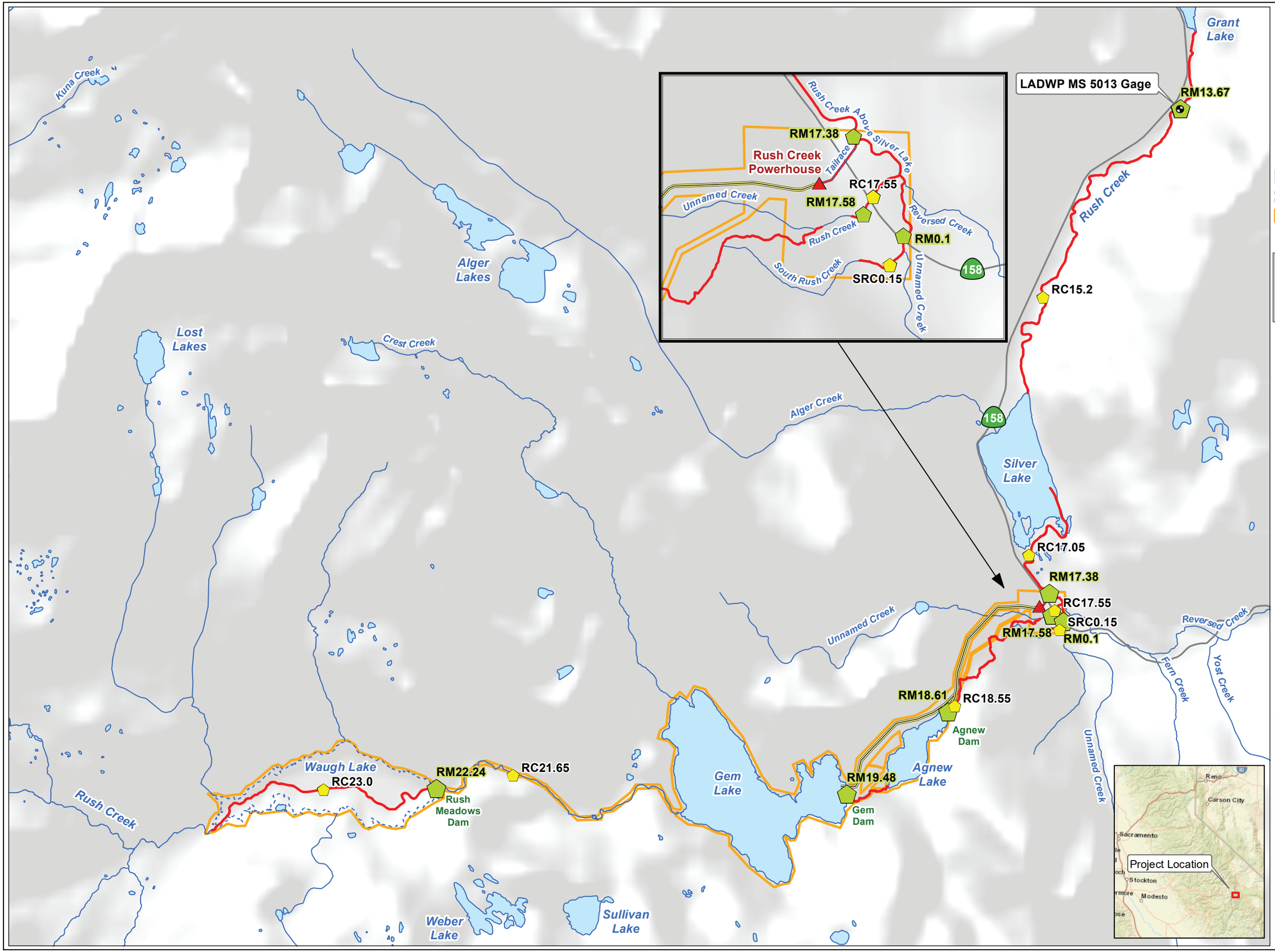

SCE Facilities
- Dam
- Powerhouse
- Flowline / Penstock
- Tailrace

Other Features
- Highway
- River/Stream
- Lake/Reservoir
- Dry Lake/Reservoir
- FERC Boundary

Study Sites and Reaches
- Hydrology Analysis Site
- Geomorphology/Riparian Site
- Instream Flow Modeling Reaches

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Rush Creek Project (FERC 1389)

Map AQ 2-1

Analysis and Survey Locations

0 0.25 0.5 Miles

Projection: UTM Zone 11
Datum: NAD 83

Date: 11/3/2021

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DRAFT
AQ 3 – WATER TEMPERATURE TECHNICAL STUDY PLAN

Rush Creek Hydroelectric Project
FERC Project No. 1389

December 2021

DRAFT TECHNICAL STUDY PLAN
AQ 3 – Water Temperature

POTENTIAL RESOURCE ISSUES

- Aquatic habitat quantity and quality.
- Basin Plan objectives compliance.

PROJECT NEXUS

- Project operations and reservoirs modify the flow regime in Project-affected stream reaches influencing instream water temperatures.

RELEVANT INFORMATION

The following information is available to characterize water temperature in the vicinity of the Rush Creek Project (refer to Southern California Edison Company's [SCE] Pre-Application Document [PAD] Section 4.4 Water Quality for a summary of water temperature information [SCE 2021]).

- Federal Energy Regulatory Commission (FERC) Environmental Assessment for Hydropower License, Rush Creek Project, FERC Project No. 1389 (FERC 1992).
- FERC Order Issuing New License, Rush Creek Project (FERC 1997).
- FERC Relicensing Studies (EA Engineering Science and Technology 1986 and 1988; Lund 1988) related to instream flows and reservoir water quality.
- Inland fishes of California, University of California Press, Berkeley (Moyle 2002).
- Water Quality Control Plan for the Lahontan Region (Basin Plan) (CRWQCB 2019).
- United States Geological Survey's (USGS) National Water Information System and the California Environmental Data Exchange Network (CEDEN) online databases provided water quality information.

POTENTIAL INFORMATION GAPS

- Water temperature conditions in Project-affected stream reaches and Project reservoirs.

STUDY OBJECTIVES

- Characterize existing water temperature and meteorological conditions in Project-affected stream reaches.
- Characterize existing water temperature information (profiles) in Project reservoirs and Silver Lake. This is developed and evaluated as part of the AQ 4 – Water Quality Technical Study Plan (TSP).

- Qualitatively assess the potential effects of increased air temperature due to global warming on water temperatures over the term of the new FERC license.

EXTENT OF STUDY AREA

- The study area for characterization of water temperature includes Project-affected stream reaches and Reversed Creek. Water temperature sampling locations are identified in Table AQ 3-1 and Map AQ 3-1.

- The study area also includes the Project reservoirs (Gem Lake, Agnew Lake) and Silver Lake (see AQ 4 – Water Quality TSP).

- Studies will not be conducted at locations where access is unsafe (e.g., where there is very steep terrain) or on private property for which SCE has not received specific approval from the landowner to enter the property to perform the study.

STUDY APPROACH

- Collect existing water temperature and meteorological conditions in Project-affected stream reaches and Reversed Creek identified in Table AQ 3-1 from May 15 to October 15, 2023, weather and access permitting.

    - Install and maintain redundant water temperature probes at nine locations in Project-affected stream reaches and one location in Reversed Creek.

    - Install and maintain meteorological stations (relative humidity, wind speed, solar radiation, air temperature) at two locations (Gem Dam and near Rush Creek Powerhouse).

    - Download data bi-monthly from the water temperature probes and meteorological stations.

    - Summarize temperature and meteorological data, including depiction of seasonal patterns and daily averages, minimums, and maximums as a function of time and location in Project-affected stream reaches and aquatic species requirements (e.g., Moyle 2002).

- Coordinate with the AQ 4 – Water Quality TSP to obtain water temperature profiles from Gem Lake, Agnew Lake, and Silver Lake.

- Review available literature predictions of changes in air temperature as a result of global warming to qualitatively evaluate the resulting effect on water temperature over the anticipated term of the new FERC license (30-50 years).

REPORTING

- Study methods and results will be documented in an AQ 3 – Water Temperature Technical Study Report (TSR). The TSR will include summary tables and maps, as appropriate.

- Upon request, data will be provided to resource agencies and interested stakeholders in an Excel spreadsheet (electronic format).

SCHEDULE

Date	Activity
May 15–October 15, 2023	Install and maintain temperature probes and meteorological stations
October 2023–February 2024	Analyze data and prepare draft report
March 2024	Distribute draft report to stakeholders
April–June 2024	Stakeholders review and provide comments on draft report (90 days)
June–July 2024	Resolve comments and prepare final report
August 2024	Distribute final report in Draft License Application

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.

EA Engineering, Science, and Technology. 1986. Instream flow and fisheries studies for the upper Rush Creek Hydroelectric Project. Lafayette, California, November 1986. 30 pp.

———. 1988. East side hydroelectric relicensing study: Fish populations on the upper Rush Creek Hydroelectric Project. Lafayette, California, January 1988. 35 pp.

FERC (Federal Energy Regulatory Commission). 1992. Environmental Assessment for Hydropower License. Rush Creek Project No. 1389. FERC eLibrary No. 19920604-0017.

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Lund, L. 1988. Water quality of Bishop Creek and selected eastern Sierra Nevada lakes. Report of Research for 1986 to 1988. SCE. 110 pp.

Moyle, P. 2002. Inland fishes of California. University of California Press, Berkeley. 502 pp.

SCE (Southern California Edison Company). 2021. Rush Creek Project (FERC Project No. 1389) Pre-Application Document. December.

USGS (United States Geological Survey). National Water Information System Online Database. Available at: https://waterdata.usgs.gov/nwis.

TABLES

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Table AQ 3-1. Water Temperature Sampling Locations.

Reach Name	Reach Length (miles) / River Mile (RM)	Sampling Location River Mile / Site ID
Rush Creek		
Waugh Lake	1.51 (RM 22.24–23.75)	RM 23.0 / RC23.0
Rush Creek Below Rush Meadows Dam	1.83 (RM 20.41–22.24)	RM 21.65 / RC21.65
Gem Lake	0.93 (RM 19.48–20.41)	GL-1 (mid-lake) GL-2 (near the dam) [Sampled as part of AQ 4 – Water Quality TSP]
Rush Creek Below Gem Dam	0.30 (RM 19.18–19.48)	RM 19.25 / RC19.25
Agnew Lake	0.58 (RM 18.60–19.18)	AL-1 (mid-lake) [Sampled as part of AQ 4 – Water Quality TSP]
Rush Creek Below Agnew Dam	0.40 (RM 18.2–18.60)	RM 18.55 / RC18.55
Rush Creek Horsetail Falls	0.54 (RM 17.66–18.2)	—
Rush Creek Powerhouse Tailrace	—	PHTR
Reversed Creek	—	100–200 feet upstream of the confluence with South Rush Creek / RVC0.03
Rush Creek Above Silver Lake	0.94 (RM 16.72–17.66)	RM 17.05 / RC17.05 RM 17.55 / RC17.55
Silver Lake	0.83 (RM 15.89–16.72)	SL-1 (mid-lake) SL-2 (near outlet) [Sampled as part of AQ 4 – Water Quality TSP]
Rush Creek Below Silver Lake	2.69 (RM 13.20–15.89)	RM 15.2 / RC15.2
South Rush Creek		
South Rush Creek	0.46 (RM 0.0–0.46)	RM 0.15 / SRC0.15

Notes:
RM = River Mile
TSP = Technical Study Plan

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MAPS

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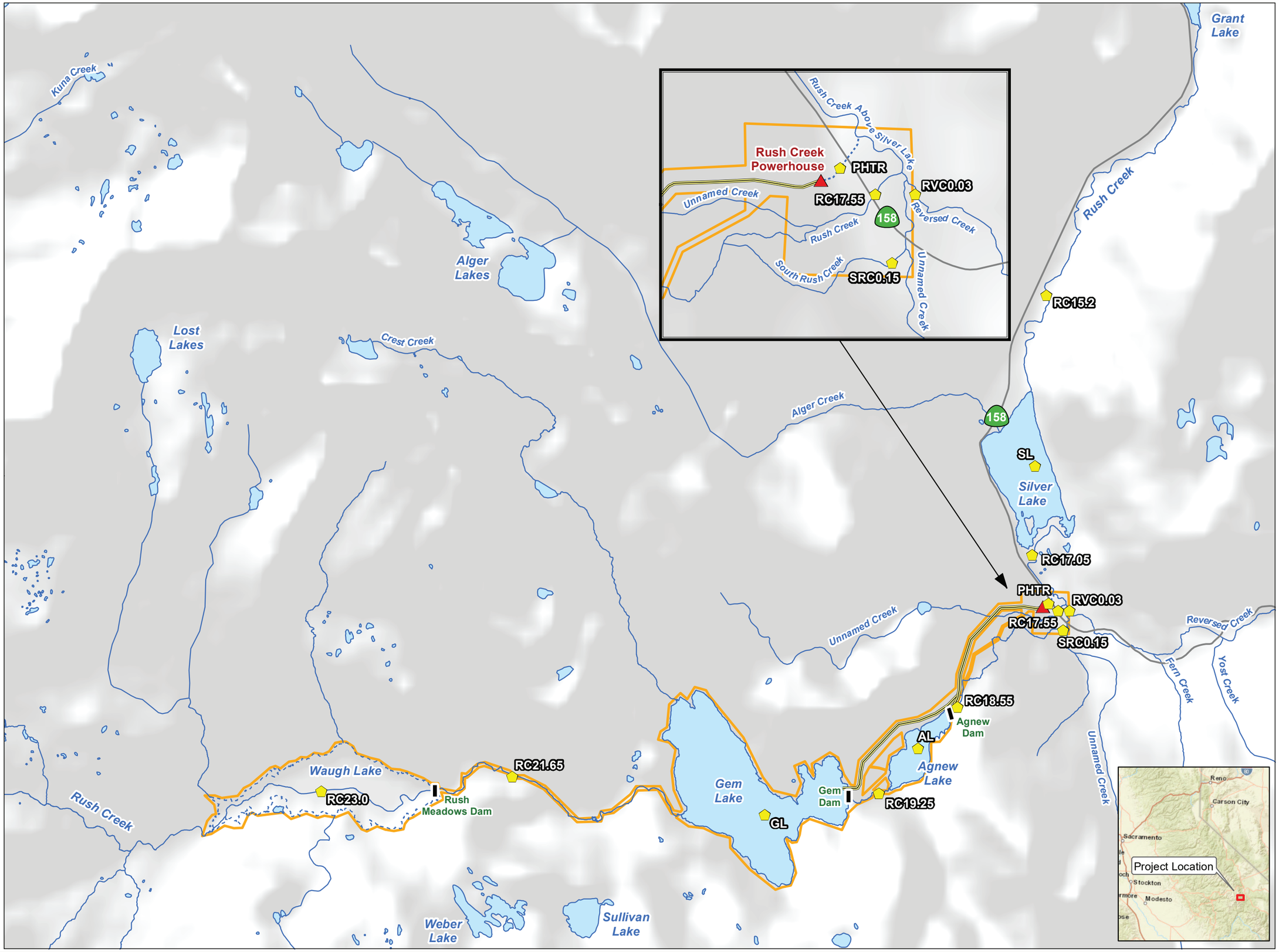

SCE Facilities

- Dam
- Powerhouse
- Flowline / Penstock
- Tailrace

Other Features

- Highway
- River/Stream
- Lake/Reservoir
- Dry Lake/Reservoir
- FERC Boundary

Sampling Locations

- Water Temp, Water Quality

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Rush Creek Project (FERC 1389)

Map AQ 3-1

Sampling Locations

0 0.25 0.5 Miles

Date: 10/25/2021

Projection: UTM Zone 11
Datum: NAD 83

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DRAFT
AQ 4 – WATER QUALITY
TECHNICAL STUDY PLAN

Rush Creek Hydroelectric Project
FERC Project No. 1389

December 2021

DRAFT TECHNICAL STUDY PLAN
AQ 4 – Water Quality

POTENTIAL RESOURCE ISSUES

- Water quality compliance with regulatory requirements.

PROJECT NEXUS

- Project operations and maintenance activities could affect water quality in Project-affected stream reaches and Project reservoirs.

RELEVANT INFORMATION

The following information is available to characterize water quality in the vicinity of the Rush Creek Project (refer to Southern California Edison Company's [SCE] Pre-Application Document [PAD] Section 4.4 for a summary of water quality information [SCE 2021]):

- 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).

- Federal Energy Regulatory Commission (FERC) Environmental Assessment for Hydropower License, Rush Creek Project, FERC Project No. 1389 (FERC 1992).

- FERC Order Issuing New License, Rush Creek Project (FERC 1997).

- National Toxics Rule (NTR) Water Quality Standards: Establishment of Numeric Criteria for Priority Toxic Pollutants" (Federal Register, 57 FR 60848, EPA 1992).

- Water Quality Control Plan for the Lahontan Region (Basin Plan) (CRWQCB 2019).

- United States Geological Survey's (USGS) National Water Information System and the California Environmental Data Exchange Network (CEDEN) online databases provided water quality information.

POTENTIAL INFORMATION GAPS

- Water quality conditions in Project-affected stream reaches and Project reservoirs.

STUDY OBJECTIVES

- Collect seasonal water quality data (physical, chemical, and bacterial) in Project-affected stream reaches and Project reservoirs.

- Compare water quality conditions to the objectives/criteria of the Basin Plan (CRWQCB 2019) and other water quality standards.

EXTENT OF STUDY AREA

- The study area for the water quality assessment includes Project-affected stream reaches and Project reservoirs. Water quality sampling locations are identified in Table AQ 4-1 and Map AQ 4-1.

- Studies will not be conducted at locations where access is unsafe (e.g., where there is very steep terrain) or on private property for which SCE has not received specific approval from the landowner to enter the property to perform the study.

STUDY APPROACH

- The following describes the water quality sampling field program which includes seasonal *in-situ* water quality measurements; seasonal water quality grab sampling; reservoir/lake profiles; and laboratory analysis and reporting.

WATER QUALITY SAMPLING LOCATIONS

- Water quality sampling locations are identified in Table AQ 4-1 and depicted on Map AQ 4-1.

- Exact sampling locations will be determined in the field based on sampling suitability (i.e., well-mixed and deep enough for representative sampling) and accessibility.

- Sampling locations will be documented using hand-held global positioning system (GPS) units.

SEASONAL *IN-SITU* FIELD MEASUREMENTS – STREAMS

- Collect *in-situ* water quality measurements, dissolved oxygen (DO) (mg/L and % saturation), pH, specific conductance (µS/cm), salinity (ppt), alkalinity (mg/L), turbidity (NTU), and water temperature (°C) in Rush Creek and Reversed Creek.

    - Samples will be collected once during the spring runoff (June, access permitting), and once during the late summer/early fall base-flow period (September, in coordination with AQ 6 – Fish Population and Passage Technical Study Plan).

    - At stream sampling locations, measurements will be made approximately 0.1 meter (m) beneath the surface in flowing, well-mixed riffle or run areas.

    - Samples will be collected using a multi-parameter water quality meter (HydroLab, YSI, or similar DataSonde) and field kit (e.g., alkalinity).

    - Pre- and post-sampling calibration of in-situ instrumentation will be conducted following the manufacturer's instructions.

SEASONAL WATER QUALITY GRAB SAMPLES

- Collect water quality grab samples at Project-affected stream reaches and Reversed Creek; Project reservoirs; and Silver Lake.
    - Samples will be collected twice, once during the spring runoff and once during the late summer/early fall base-flow period in coordination with the in-situ water quality measurements to screen for potential water quality issues.
    - If potential water quality issues are identified, additional follow-up sampling may be necessary. Additional sampling, if necessary, will be determined in consultation with the resource agencies and other interested parties.
    - At stream sampling locations, grab samples will be collected approximately 0.1 m beneath the surface in flowing, well-mixed riffle or run areas.
    - At lake sampling locations, grab samples will be collected from the epilimnion (1 m deep) and hypolimnion (mid-depth between the thermocline and lake bottom). If the lakes are not stratified, then water grab samples will be collected approximately 1 m from the surface and at mid-depth from surface to lake bottom.
- Collect samples consistent with EPA protocols for each analyte (see Laboratory Analysis below) and consistent with general water quality sampling methods (National Field Manual for the Collection of Water-Quality Data; https://www.usgs.gov/mission-areas/water-resources/science/national-field-manual-collection-water-quality-data-nfm?qt-science_center_objects=0#qt-science_center_objects).
    - The sampling team shall employ a strict quality assurance/quality control (QA/QC) program, including the collection of equipment blanks, field blanks, and field replicates.
    - Water quality samples will be decanted into laboratory-supplied sample containers and analyzed at a State-certified water quality laboratory.
    - The sample containers will be labeled with the date and time that the sample is collected and the sampling site or identification label.
    - The sample container will be preserved (as appropriate), stored, and delivered to a State-certified water quality laboratory for analyses in accordance with maximum holding periods.
    - A chain-of-custody record will be maintained with the samples at all times.

RESERVOIR/LAKE PROFILES

- Collect reservoir/lake profiles (DO, pH, specific conductance, salinity, turbidity, and water temperature) at Gem, Agnew, and Silver lakes.[1]
    - Samples will be collected monthly in June, July, August, September, and October 2023.
    - Water quality profiles in the reservoirs/lake will be based on a ≤1 meter (m) sampling interval through the entire water column.
    - Secchi disk depth measurements of water clarity will also be collected in each reservoir/lake.
    - Samples will be collected using a multi-parameter water quality meter.
    - Pre- and post-sampling calibration of in-situ instrumentation will be conducted following the manufacturer's instructions.

LABORATORY ANALYSIS

- Water quality samples collected during the field program will be processed by a State-certified laboratory approved by the State Water Resources Control Board for chemical analysis.
- The parameters to be analyzed by the analytical laboratory are provided in Table AQ 4-2.
- The laboratory will report each chemical parameter analyzed with the laboratory method detection limit, reporting limit, and practical quantification limit. The laboratory will attempt to attain reporting detection limits that are at or below the applicable regulatory criteria.
- Compare results from the water quality sampling with the water quality objectives/criteria identified in the Basin Plan (CRWQCB 2019) and with other relevant water quality standards.

REPORTING

- Study methods and results will be documented in an AQ 4 – Water Quality Technical Study Report (TSR). The TSR will include summary tables and maps, as appropriate.
- Upon request, data will be provided to resource agencies and interested stakeholders in an Excel spreadsheet (electronic format).

[1] The low-level outlet at Rush Meadows Dam remains open such that little/no water is currently impounded in Waugh Lake. Rush Creek essentially flows unimpeded through the historic lake bed. Therefore, in this study, Waugh Lake is treated as a stream reach for water quality sampling.

SCHEDULE

Date	Activity
June 2023	Conduct spring water quality *in-situ* and grab sampling
June/July/August/September/October 2023	Conduct monthly *in-situ* reservoir/lake profiling
September 2023	Conduct summer/fall water quality *in-situ* and grab sampling
October 2023–February 2024	Analyze data and prepare draft report
March 2024	Distribute draft report to stakeholders
April–June 2024	Stakeholders review and provide comments on draft report (90 days)
June–July 2024	Resolve comments and prepare final report
August 2024	Distribute final report in Draft License Application

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.

EPA (Environmental Protection Agency). 1992. National Toxics Rule (NTR) Water Quality Standards: Establishment of Numeric Criteria for Priority Toxic Pollutants". Federal Register, 57 FR 60848.

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FERC (Federal Energy Regulatory Commission). 1992. Environmental Assessment for Hydropower License. Rush Creek Project No. 1389. FERC eLibrary No. 19920604-0017.

———. 1997. Order Issuing New License, Rush Creek Project. FERC Accession No. 19970210-0301. 78 FERC ¶ 61,109. February.

SCE (Southern California Edison Company). 2021. Rush Creek Project (FERC Project No. 1389) Pre-Application Document. December.

USGS (United States Geological Survey). National Water Information System Online Database. Available at: https://waterdata.usgs.gov/nwis.

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TABLES

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Table AQ 4-1. Water Quality Sampling Locations.

Reach Name	Reach Length (miles) / River Miles (RM)	Sampling Location River Mile / Site ID	Number of Sampling Locations	*In-situ* Field Measurements	Water Quality Grab Samples	Reservoir / Lake Profiles
Rush Creek						
Waugh Lake[a]	1.51 (RM 22.24–23.75)	RM 23.0 / RC23.0	1	X	X	—
Rush Creek Below Rush Meadows Dam	1.83 (RM 20.41–22.24)	RM 21.65 / RC21.65	1	X	X	—
Gem Lake	0.93 (RM 19.48–20.41)	GL-1 (mid-lake) GL-2 (near the dam)	2	—	X	X
Rush Creek Below Gem Dam	0.30 (RM 19.18–19.48)	RM 19.25 / RC19.25	1	X	X	—
Agnew Lake	0.58 (RM 18.60–19.18)	AL-1 (mid-lake)	1	—	X	X
Rush Creek Below Agnew Dam	0.40 (RM 18.2–18.60)	RM 18.55 / RC18.55	1	X	X	—
Rush Creek Horsetail Falls	0.54 (RM 17.66–18.2)	—	—	—	—	—
Rush Creek Powerhouse Tailrace	—	PHTR	1	X	X	—
Reversed Creek	—	100–200 feet upstream of the confluence with South Rush Creek / RVC0.03	1	X	X	—
Rush Creek Above Silver Lake	0.94 (RM 16.72–17.66)	RM 17.05 / RC17.05 RM 17.55 / RC17.55	2	X	X	—
Silver Lake	0.83 (RM 15.89–16.72)	SL-1 (mid-lake) SL-2 (near outlet)	2	X	X	X
Rush Creek Below Silver Lake	2.69 (RM 13.20–15.89)	RM 15.2 / RC15.2	1	X	X	—

Reach Name	Reach Length (miles) / River Miles (RM)	Sampling Location River Mile / Site ID	Number of Sampling Locations	*In-situ* Field Measurements	Water Quality Grab Samples	Reservoir / Lake Profiles
South Rush Creek						
South Rush Creek	0.46 (RM 0.0–0.46)	RM 0.15 / SRC0.15	1	X	X	—

Notes: RM = River Mile

[a.] The low-level outlet at Rush Meadows Dam remains open such that little/no water is currently impounded in Waugh Lake. Rush Creek essentially flows unimpeded through the historic lake bed. Therefore, Waugh Lake is treated as a stream reach for water quality sampling.

Table AQ 4-2. Parameters for Water Quality Monitoring and Laboratory Analysis

Parameter	Analysis Method	Sample Holding Times	Sample Locations to be Analyzed
Water Quality Monitoring Parameter			
***In-Situ* Measurements**			
Dissolved Oxygen (DO)	Water Quality Meter	Not Applicable	All
Secchi Depth	Secchi Disk	Not Applicable	Reservoir
PH	Water Quality Meter	Not Applicable	All
Water Temperature	Water Quality Meter	Not Applicable	All
Specific Conductance	Water Quality Meter	Not Applicable	All
Laboratory Analysis Parameter			
General Parameters			
Nitrate/Nitrite	EPA - 353.2	48 hours	All
Ammonia as N	EPA - 350.1	28 days	All
Total Kjeldahl Nitrogen	EPA - 351.2	28 days	All
Total Phosphorus	EPA - 365.2	28 days	All
Ortho-phosphate	EPA - 365.1	48 hours	All
Total Dissolved Solids	EPA - 160.1	7 days	All
Total Suspended Solids	EPA - 160.2	7 days	All
Total Alkalinity	EPA - 310.1	14 days	All

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MAPS

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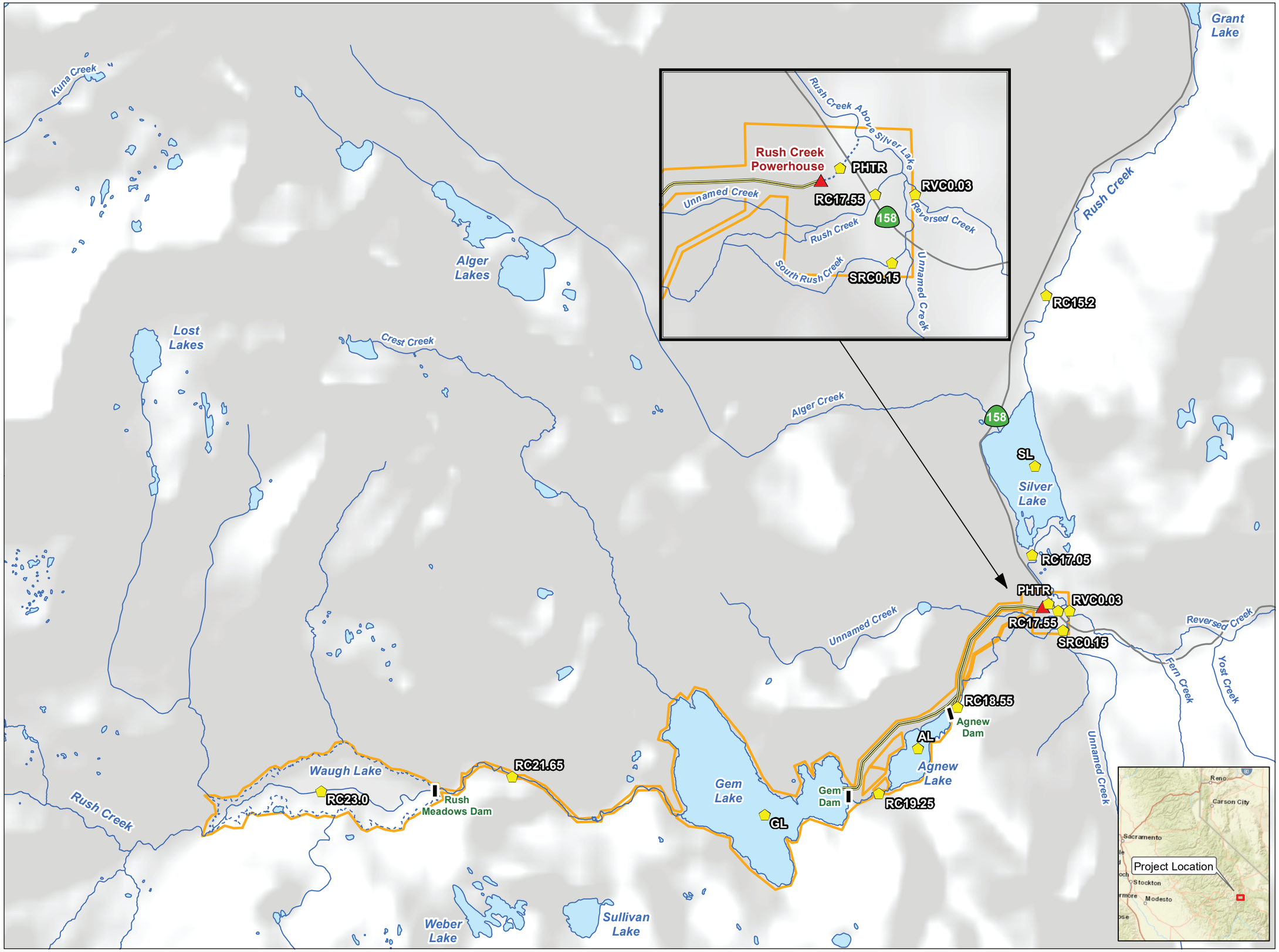

SCE Facilities

- Dam
- Powerhouse
- Flowline / Penstock
- Tailrace

Other Features

- Highway
- River/Stream
- Lake/Reservoir
- Dry Lake/Reservoir
- FERC Boundary

Sampling Locations

- Water Temp, Water Quality

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Rush Creek Project (FERC 1389)

Map AQ 4-1

Sampling Locations

0 0.25 0.5 Miles

Date: 10/25/2021

Projection: UTM Zone 11
Datum: NAD 83

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DRAFT
AQ 5 – GEOMORPHOLOGY
TECHNICAL STUDY PLAN

Rush Creek Hydroelectric Project
FERC Project No. 1389

December 2021

DRAFT TECHNICAL STUDY PLAN
AQ 5 – Geomorphology

POTENTIAL RESOURCE ISSUES

- Stable channel morphology and maintenance of fluvial processes.
- Project-related sources of sediment and erosion.
- Rush Creek channel within the former lakebed of Waugh Lake.
- Localized flooding adjacent to the lower Rush Creek and South Rush Creek channels near State Route 158 (SR-158).
- Sediment scour/deposition in Rush Creek near the Silver Lake inlet.

PROJECT NEXUS

- Project operations modify the flow and sediment regime in the Project-affected stream reaches and reservoirs potentially resulting in changes to channel morphology and fluvial processes.
- The proposed removal of Rush Meadows and Agnew dams will influence overall hydrology; sediment capture/transport; and potential erosion of the deposited sediment adjacent to the historic channels in the former lakebeds.
- The loss of reservoir storage under the Proposed Project may influence localized flooding adjacent to the lower Rush Creek and South Rush Creek channels near SR-158 in high-runoff years.

RELEVANT INFORMATION

The following information is available to characterize geomorphology in the vicinity of the Rush Creek Project (refer to Southern California Edison Company's [SCE] Pre-Application Document [PAD] Section 4.8 for a summary of geomorphology information [SCE 2021]):

- Section 2.0, Project Location, Facilities, and Operation, and Section 4.3, Water Use and Hydrology of the Rush Creek PAD, present a summary of Project operations and water use; available stream gage data; and daily historical, existing, and unimpaired hydrology for Project-affected stream reaches and Project reservoirs.
- Federal Energy Regulatory Commission (FERC) Environmental Assessment for Hydropower License, Rush Creek Project, FERC Project No. 1389 (FERC 1992).
- FERC Relicensing Studies (EA Engineering Science and Technology 1986, 1987) related to instream flows.

- Gaging data from United States Geological Survey (USGS), SCE, and Los Angeles Department of Water and Power (LADWP).
- Aerial imagery (Google Earth Pro 2019).
- Channel-reach morphology in mountain drainage basins (Montgomery and Buffington 1997).
- USGS 1:24,000 Topography Maps and Digital Elevation Models.
- California Fire Perimeters 1879-2019 Feature Layer (FRAP 2021).
- Rush Creek stream sediment survey Waugh Lake to Gem Lake (Hinkle 1988).

POTENTIAL INFORMATION GAPS

- Characterization of existing stream channels (morphology, mesohabitat types, and sediment conditions).
- Sediment capture in Project reservoirs.
- Identification of flows necessary to maintain geomorphic processes in the Project-affected stream reaches.
- Project-related sources of sediment and erosion.
- Geomorphic information necessary to evaluate:
  - Potential restoration of the Rush Creek channel within the former lakebed of Waugh Lake;
  - Potential enhancement of the Rush Creek and South Rush Creek channels near SR-158 to address localized flooding; and
  - Sediment scour/deposition in Rush Creek near the Silver Lake inlet.

STUDY OBJECTIVES

- Characterize the existing stream channels (morphology, mesohabitat types, and sediment conditions) in the Project-affected stream reaches.
- Characterize sediment capture/deposition in the Project reservoirs.
- Develop information to assist in the identification of flows necessary to maintain geomorphic processes in the Project-affected stream reaches.
- Identify historical and existing sources of sediment within and adjacent to Project-affected stream reaches, Project reservoirs, and other Project facilities, including major gullies; areas of vegetation and/or soil loss; hillslope destabilization; and erosion associated with ongoing operation and maintenance of the Project. Natural

sources of sediment unrelated to the Project will also be documented in the Project vicinity.

- Provide a geomorphic analysis, as needed, to evaluate:
  - Potential restoration of the Rush Creek channel within the former lakebed of Waugh Lake;
  - Potential enhancement of the Rush Creek and South Rush Creek channels near SR-158 to address localized flooding; and
  - Sediment scour/deposition in Rush Creek near the Silver Lake inlet.

EXTENT OF STUDY AREA

- The study area for geomorphology includes Project-affected stream reaches, Project reservoirs, and Project facilities. Geomorphology sampling sites are identified in Table AQ 5-1 and Map 5-1. Table AQ 5-2 provides a list of Project facilities.
- Studies will not be conducted at locations where access is unsafe (e.g., where there is very steep terrain) or on private property for which SCE has not received specific approval from the landowner to enter the property to perform the study.

STUDY APPROACH

The following describes the geomorphology study approach which includes data collection and analyses for: (1) characterizing channel conditions in the Project-affected stream reaches; (2) evaluating sediment capture/deposition in Project reservoirs; (3) identifying flows necessary to maintain geomorphic processes; (4) identifying historical and existing sediment sources and Project-related erosion areas; (5) development of potential restoration of the Rush Creek channel within the former lakebed of Waugh Lake; (6) development of potential enhancement of channels near SR-158; and (7) evaluation of sediment deposition/transport in Rush Creek near the Silver Lake inlet.

CHANNEL CONDITION IN THE PROJECT-AFFECTED STREAM REACHES

Reach Classification and Mesohabitat Typing

- In each of the Project-affected stream reaches (Table AQ 5-1):
- Refine the desktop channel characterization, as needed, of each reach (and within each reach) presented in Section 4.8, Geomorphology using the Montgomery-Buffington (1997) process-based categories.
- Estimate the Rosgen Level II classification (channel pattern, entrenchment ration, width/depth ratio, sinuosity, channel material, slope) for each reach using available data and data collected at the sampling locations in Table AQ 5-1 (Rosgen 1994).

In the Rush Meadows Dam to Gem Lake Reach, there are lower gradient and steeper gradient sub-reaches, collect the data necessary to characterize both sub-reaches.

- Mesohabitat map (type) (either by helicopter, high resolution aerial photographs, and/or foot travel) all river reaches using the detailed level of mesohabitat typing outlined in McCain et al. (1990) (i.e., a potential of 22 mesohabitat types).

    - These habitat types will be collapsed into a lower level of detail to facilitate river stratification for instream flow modeling. SCE proposes to aggregate the McCain et al. (1990) mesohabitat types into approximately six types (pool, run, low-gradient riffle, high-gradient riffle, cascade, and falls/chutes) for stratification of the study sites and stream segments.

Sediment Conditions in the Project-affected Stream Reaches

The amount of fine sediment in pools and the particle size composition and fine sediment content in spawning gravels will be determined in the Project-affected stream reaches, as described below.

Fine Sediment in Pools

A quantitative analysis of fine sediment in pools, V* (Hilton and Lisle 1993), will be conducted.

- Conduct quantitative visual estimates of residual fine sediment in five pools, V* (Hilton and Lisle 1993), at each of the sampling locations (selected stream segment) in the Project-affected stream reaches and in the reference reach (Table AQ 5-1 and Map 5-1).

    - Visual estimates of V* will be made using a snorkel and mask, as necessary. The visual surveys will be supported by a combination of photographic documentation of pool bottom sediments and sketch maps, and measurements of the surface area and depth of any fine sediment patches observed.

    - Pools with V* values that are relatively low (less than 0.1) can be reasonably approximated by visual estimation (Hilton and Lisle 1993). If there are problems completing the V* estimates (for example, due to excessive pool depths or V* values exceed 0.1), the issue will be communicated to the resource agencies for further consultation.

Particle Size Composition and Fine Sediment Content in Spawning Gravels

- Determine particle size distribution and fine sediment content of spawning gravels in the selected stream segments within the Project-affected stream reaches using bulk sampling techniques (McNeil and Ahnell 1960). The locations are listed in Table AQ 5-1 and Map 5-1.

    - Collect bulk samples using a modified McNeil sampler (i.e., bottomless bucket) to depths that approximate that of a trout egg pocket. Coarse sediments will be sieved and weighed on-site. Finer sediments will be packaged for transport from the field site and later dried, sieved, and weighed.

    - One "side-by-side" replicate pair of bulk samples will be taken in each of the study sites to provide a measure of the variability in particle size composition within the same gravel deposit to characterize an expected range of natural variability.

- Plot particle size composition of spawning gravel samples as cumulative distribution curves and histograms. Statistically analyze the particle size composition as represented by the D50, D16, and D84.

- Compare particle size composition and fine sediment content to standards from the scientific literature (Kondolf 1988, 2000) and, where applicable, to the relevant comparison streams.

SEDIMENT CAPTURE/DEPOSITION IN PROJECT RESERVOIR

The capture/deposition of sediment in Project reservoirs (Waugh, Gem, and Agnew lakes) will be evaluated based on a review of existing sediment management information and data collected from field studies.

- Summarize any existing sediment management conducted by SCE Operations and Maintenance personnel.

- Map sediment facies in the exposed reservoir bed areas and determine the depth of the fine sediment deposition facies to estimate sediment volume.

- In Waugh Reservoir, use tree stump mapping (completed during implementation of the TERR 1 – Botanical Technical Study Plan [TSP]) to assist in identification of sediment deposition.

IDENTIFY FLOWS NECESSARY TO MAINTAIN GEOMORPHIC PROCESSES IN PROJECT-AFFECTED STREAM REACHES

Information regarding flows that are necessary to maintain geomorphic processes in the Project-affected stream reaches will be developed by comparing impaired and unimpaired hydrologic regimes and modeling sediment transport conditions under different flow regimes.

Compare Impaired and Unimpaired Hydrologic Regimes

- Compare Proposed Project, historical, existing, and unimpaired hydrologic regimes (high-flow magnitude, duration, and frequency) in Project-affected stream reaches using peak flow data developed in the AQ 2 – Hydrology TSP.

Evaluate Initiation of Sediment Transport under Different Flow Regimes at Selected Stream Segment Study Sites

- Different stream reaches have different levels of hydraulic modeling (Table AQ 5-1).
  - At the locations where only sediment transport and riparian vegetation cross-sections are being modeled, select three representative cross-sections (in coordination with implementation of the AQ 1 – Instream Flow TSP and TERR 1 – Botanical TSP) and collect the following information:
    - Survey topography (including floodplain);
    - Approximate bankfull elevation, water surface elevation slope, and elevation of riparian vegetation;
    - Conduct a pebble count; and
    - Collect three water surface elevations at flows identified in AQ 1 – Instream Flow TSP.
  - At the locations where instream flow habitat modeling is proposed (multiple mesohabitats) either with cross-section or two-dimensional hydrodynamics modeling (AQ 1 – Instream Flow TSP), select three riffles and collect bankfull elevations, water surface slopes, elevations of riparian vegetation, and pebble counts. Water surface elevations will be collected as part of the AQ 1 – Instream Flow TSP.
- Identify initiation of sediment transport (motion) and bankfull flows at the study sites in the selected stream segments using the hydraulic models developed in the AQ 1 – Instream Flow TSP.
  - Derive channel hydraulic conditions, including flow depth, velocity, energy slope, and bed shear stress, from the models over a range of high flows.
  - Determine flows necessary for initiation of sediment transport (motion) using a range of critical shear stress and corresponding range of discharge values for a given particle size.
  - Estimate bankfull flow using the water surface elevations modeled over a wide range of flows at each cross-section (AQ 1 – Instream Flow TSP) and the bankfull elevations identified in the field.

IDENTIFY HISTORIC AND EXISTING SOURCES OF SEDIMENT AND PROJECT-RELATED EROSION AREAS

- Document the location and relative volume of historic and existing sediment recruitment to channels from hillslope mass wasting and bank erosion processes in the Project-affected stream reaches.
    - Significant sediment recruitment, mass wasting, and/or bank erosion sites will be mapped via aerial reconnaissance, ground survey, and/or aerial photography.
    - Identify whether the sources of sediment are derived from natural watershed process or Project-related effects.
    - Generalize whether sediment sources are actively or inactively contributing sediment and if so by how much (e.g., low, moderate, high delivery potential to the stream channel).
- Historic and/or ongoing erosion at the Project facilities (including Project reservoirs) will be mapped via aerial reconnaissance, ground survey, and/or aerial photography (Table AQ 5-2).

EVALUATION OF POTENTIAL RUSH CREEK CHANNEL RESTORATION IN THE FORMER LAKEBED OF WAUGH LAKE

- Coordinate with the AQ 1 – Instream Flow TSP, which includes Light Detection and Ranging (LiDAR), aerial photogrammetry, and/or total station channel surveys and hydraulic modeling of the channel in the Waugh Lake lakebed to assist in the evaluation of potential channel change related to sediment erosion/deposition.
- Use this information to assist in the evaluation of potential restoration of the Rush Creek channel within the former lakebed of Waugh Lake.

EVALUATION OF POTENTIAL ENHANCEMENT OF RUSH CREEK AND SOUTH RUSH CREEK CHANNELS NEAR SR-158

- In coordination with implementation of the TERR 1 – Botanical TSP and AQ 1 – Instream Flow TSP, characterize and map large woody debris/downed trees and riparian vegetation within the stream channels related to conveyance blockage and creation of potential flow backwater effects during high-flow events.
- Coordinate with the AQ 1 – Instream Flow TSP, which includes LiDAR, aerial photogrammetry, and/or total station surveys of the channel and hydraulic modeling of the channel to assist in development of potential enhancements (e.g., berms, channel modification, clearing of the channel) and evaluation of fluvial geomorphic change in the Rush Creek and South Rush Creek channels.

EVALUATE OF SEDIMENT DEPOSITION/TRANSPORT IN RUSH CREEK NEAR THE SILVER LAKE INLET

- Coordinate with the AQ 1 – Instream Flow TSP, which includes LiDAR, aerial photogrammetry, and/or total station surveys of the channel and hydraulic modeling of the channel to evaluate sediment scour/deposition and potential fluvial geomorphic change at the Silver Lake inlet under the Proposed Project, historical, existing, and unimpaired hydrology conditions.

REPORTING

- Study methods and results will be documented in an AQ 5 – Geomorphology Technical Study Report (TSR). The TSR will include summary tables and maps, as appropriate.

- Upon request, data will be provided to resource agencies and interested stakeholders in an Excel spreadsheet (electronic format).

SCHEDULE

Date	Activity
September–October 2022	Conduct channel surveys (e.g., mesohabitat and Rosgen mapping)
January–April 2023	Complete data analysis
April–October 2023	Conduct sediment capture/deposition surveys, sediment transport field surveys, sediment source surveys, and evaluation of potential restoration/enhancement measures in coordination with instream flow surveys
October 2023–February 2024	Analyze data and prepare draft report
March 2024	Distribute draft report to stakeholders
April–June 2024	Stakeholders review and provide comments on draft report (90 days)
June–July 2024	Resolve comments and prepare final report
August 2024	Distribute final report in Draft License Application

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TABLES

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Table AQ 5-1. Geomorphology Study Sites.

Reach Name	Reach Length (miles) / River Miles (RM)	Sampling Location River Mile / Site ID	Sampling Method
Rush Creek			
Waugh Lake	1.51 (RM 22.24–23.75)	RM 23.0 / RC23.0	V*, Spawning Gravel, Initiation of Motion, Bankfull Elev., sediment deposition, restoration analysis, and Project facility sediment sources
Rush Creek Below Rush Meadows Dam	1.83 (RM 20.41–22.24)	RM 21.65 / RC21.65	V*, Spawning Gravel, Initiation of Motion, Bankfull Elev.
Gem Lake	0.93 (RM 19.48–20.41)	—	Sediment deposition / Project facility sediment sources
Rush Creek Below Gem Dam	0.30 (RM 19.18–19.48)	—	—
Agnew Lake	0.58 (RM 18.60–19.18)	—	Sediment deposition / Project facility sediment sources
Rush Creek Below Agnew Dam	0.40 (RM 18.2–18.60)	RM 18.55 / RC18.55	V*, Spawning Gravel, Initiation of Motion, Bankfull Elev.
Rush Creek Horsetail Falls	0.54 (RM 17.66–18.2)	—	—
Rush Creek Above Silver Lake	0.94 (RM 16.72–17.66)	RM 17.05 / RC17.05 RM 17.55 / RC17.55	V*, Spawning Gravel, Initiation of Motion, Bankfull Elev.
		RM 17.50–17.60 / RC17.50–17.60	Map downed trees / riparian vegetation within channel
Silver Lake	0.83 (RM 15.89–16.72)	—	—
Rush Creek Below Silver Lake	2.69 (RM 13.20–15.89)	RM 15.2 / RC15.2	V*, Spawning Gravel, Initiation of Motion, Bankfull Elev.
South Rush Creek			
South Rush Creek	0.46 (RM 0.0–0.46)	RM 0.15 / SRC0.15	V*, Spawning Gravel, Initiation of Motion, Bankfull Elev.
		RM 0.0–0.46 / SR0.0–0.46	Map downed trees / riparian vegetation within channel

Notes: RM = River Mile

Table AQ 5-2. Rush Creek Project Facilities

Rush Meadows Dam Area
Dams
Rush Meadows Dam
Reservoirs
Waugh Lake
Valve House
Rush Meadows Dam Valve House
Stream Gages
Rush Creek below Rush Meadows (Waugh Lake) (USGS No. 10287262; SCE No. 359r)
Reservoir Gages
Waugh Lake (USGS No. 10287260; SCE No. 359)
Trails
Rush Meadows Dam Access Trail
Rush Meadows Dam/Waugh Lake Ancillary and Support Facilities
Rush Meadows Dam Equipment Shed
Rush Meadows Dam Gage House
Rush Meadows Dam Solar Facility
Gem Dam Area
Dams
Gem Dam
Reservoirs
Gem Lake
Flowline
Gem Dam to Agnew Junction Flowline
Valve House
Gem Valve House and Cabin
Gem Dam Arch 8 Valve House
Gem Flowline Valve House
Stream Gages
Rush Creek below Gem Lake (USGS No. 10287281; SCE No. 352r)
Reservoir Gages
Gem Lake (USGS No. 10287280; SCE No. 352)

Gem Dam Area (continued)
Communication Lines
Communication Line from Rush Creek Powerhouse to Gem Lake Dam
Communication Line from Gem Valve House to Arch 8 Valve House
Communication Line from Gem Tram Hoist House to Gem Valve House
Trams and Hoist Houses
Gem Tram
Gem Tram Hoist House
Gem Tram Lower/Upper Landing
Trails
Lower Gem Dam Access Trail
Gem Dam Arch 8 Access Trail
Upper Gem Dam Access Trail
Gem Dam/Lake Ancillary and Support Facilities
Gem Lake Dock
Gem Lake Motor Barge
Gem Bunkhouse
Gem Outhouse
Gem Cookhouse
Gem Dam Compressor Shed
Gem Dam Storage Shed
Gem Dam Overhead Hoist House for Dam Length
Gem Dam Overhead Hoist House
Gem Fish Release Footbridge
Gem Tram Landing Footbridge
Gem Tram Bridge
Gem Weather Station
Gem Satellite Dish
Gem Solar Facility
Gem Valve House Tunnel

Agnew Dam Area
Dams
Agnew Dam
Reservoirs
Agnew Lake
Flowline
Agnew Dam to Agnew Junction Flowline
Valve House
Agnew Junction (Valve House and Stand Pipe)
Agnew Dam Valve House
Stream Gages
Rush Creek below Agnew Lake (USGS No. 10287289; SCE No. 357)
Reservoir Gages
Agnew Lake (USGS No. 10287285; SCE No. 351)
Power Lines
4 kV Rush Creek Powerhouse to Agnew Dam Power Line
4 kV Agnew Lake Dam Power Line
4 kV Upper Agnew Boat Dock Power Line (non-operational)
Communication Lines
Communication Line from Agnew Hoist House to Agnew Boathouse
Trams and Hoist Houses
Agnew Tram
Agnew Tram Hoist House
Agnew Tram Landing
Trails
Agnew Stream Gage Access Trail
Agnew Dam/Lake Ancillary and Support Facilities
Lower Agnew Lake Boathouse/Dock
Upper Agnew Lake Boathouse/Dock
Agnew Lake Motor Barge
Agnew Cabin
Agnew Weather Station
Agnew Flume (downstream of Agnew Dam)

Rush Creek Powerhouse Area
Penstocks
Agnew Junction to Rush Creek Powerhouse Penstock (No. 1)
Agnew Junction to Rush Creek Powerhouse Penstock (No. 2)
Powerhouse
Rush Creek Powerhouse
Gages
Rush Creek Powerhouse (USGS No. 10287300; SCE No. 367)
Transmission Lines
2.4 kV Switchyard to Powerhouse Transmission Line
Powerhouse Ancillary and Support Facilities
Rush Creek Powerhouse Complex Access Road
Cottages (2)
Garages (4)
Warehouse and Dock
Machine Shop
Pump House
Woodshed (2)
Helicopter Landing Site
Tank (propane)
Bridge over Powerhouse Tailrace
Bridge over Rush Creek

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MAPS

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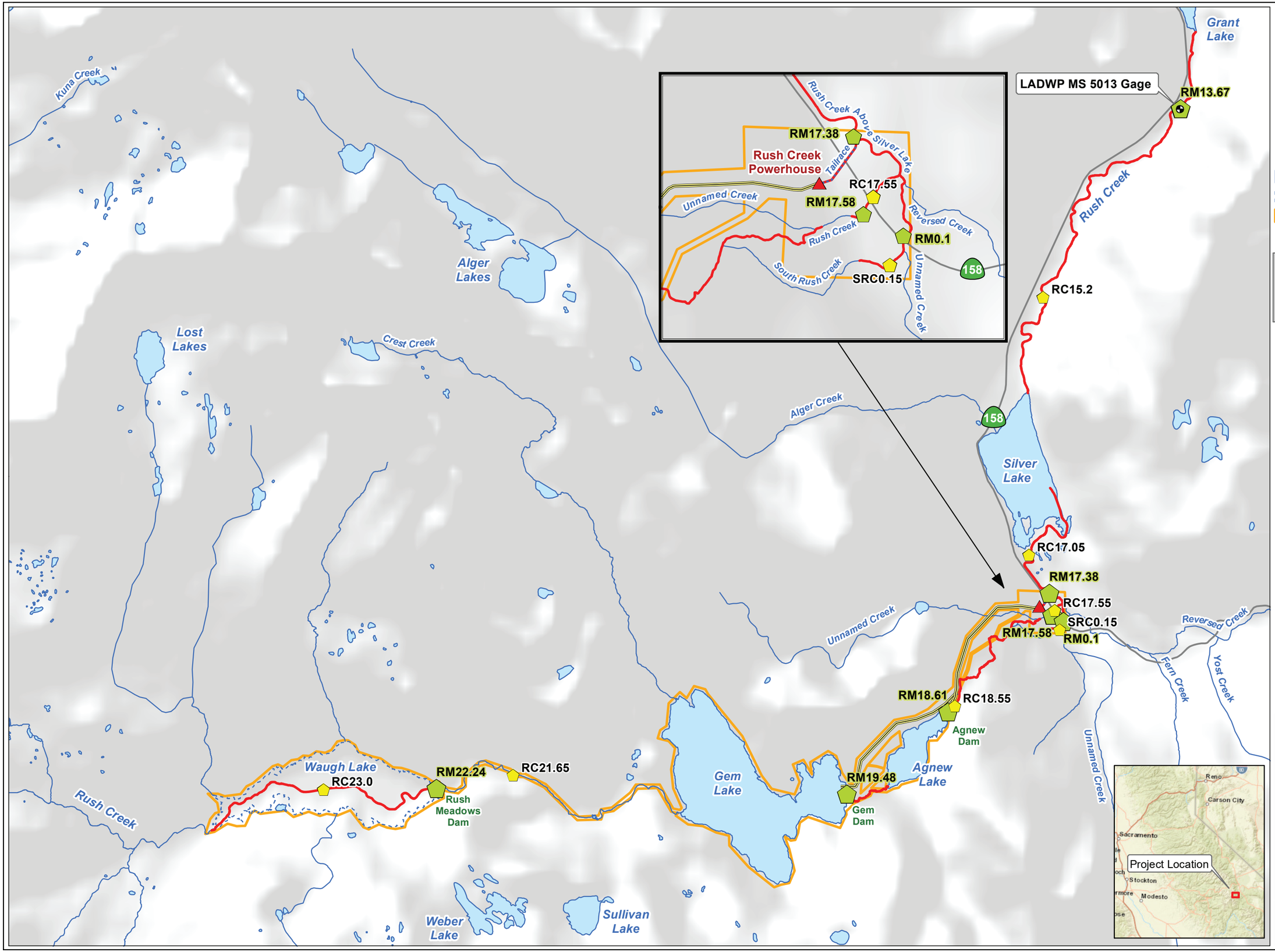

SCE Facilities
- Dam
- Powerhouse
- Flowline / Penstock
- Tailrace

Other Features
- Highway
- River/Stream
- Lake/Reservoir
- Dry Lake/Reservoir
- FERC Boundary

Study Sites and Reaches
- Hydrology Analysis Site
- Geomorphology/Riparian Site
- Instream Flow Modeling Reaches

SOUTHERN CALIFORNIA EDISON®
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Rush Creek Project (FERC 1389)

Map AQ 5-1

Analysis and Survey Locations

0 0.25 0.5 Miles

Projection: UTM Zone 11
Datum: NAD 83

Date: 11/3/2021

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DRAFT
AQ 6 – FISH POPULATION AND BARRIERS TECHNICAL STUDY PLAN

Rush Creek Hydroelectric Project
FERC Project No. 1389

December 2021

DRAFT TECHNICAL STUDY PLAN
AQ 6 – Fish Population and Barriers

POTENTIAL RESOURCE ISSUES

- Fish species composition, distribution, and abundance.
- Fish barriers/migration.

PROJECT NEXUS

- Project operations modify the flow regime in Project-affected stream reaches and Project reservoirs. The modified flow regime could affect the amount and distribution of fish habitat.
- Project facilities and operations may affect fish barriers/migration.

RELEVANT INFORMATION

The following information is available to characterize fish population and passage in the vicinity of the Rush Creek Project (refer to Southern California Edison Company's [SCE] Pre-Application Document [PAD] Section 4.5 for a summary of fish population and passage information [SCE 2021]).

- Federal Energy Regulatory Commission (FERC) Environmental Assessment for Hydropower License, Rush Creek Project, FERC Project No. 1389 (FERC 1992).
- FERC Relicensing Studies (EA Engineering Science and Technology 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 (Moyle 2002).
- California Department of Fish and Wildlife data and data sources (Eastern Sierra Back Country Fishing Guide, High Mountain Lake Project data, stocking data).

POTENTIAL INFORMATION GAPS

- Fish composition, distribution, and abundance.
- Upstream fish barriers.

STUDY OBJECTIVES

FISH POPULATIONS

- Document fish species composition, distribution, and relative abundance in Project-affected stream reaches and Project reservoirs.

- Characterize fish growth, condition factor, and population age structure in Project-affected stream reaches and Project reservoirs.

FISH BARRIERS/MIGRATION

- Document the location, nature, and characteristics of fish barriers in Project-affected stream reaches.

- Identify Project facilities and operations (e.g., dam, reservoir operations, instream flow releases) that may affect fish migration.

EXTENT OF STUDY AREA

- The study area for the assessment of fish population and migration includes Project-affected stream reaches and Project reservoirs.

    - Fish population sampling locations are identified in Table AQ 6-1 and Map AQ 6-1.

    - Barrier surveys will include the entire length of the Project-affected stream reaches.

- Studies will not be conducted at locations where access is unsafe (e.g., where there is very steep terrain) or on private property for which SCE has not received specific approval from the landowner to enter the property to perform the study.

STUDY APPROACH

FISH POPULATIONS – SELECTED STREAM SEGMENTS

- The locations of selected stream segments for developing fish species composition, distribution, and relative abundance estimates (fish per mile and/or pounds [lbs.] per acre) are shown in Table AQ 6-1 and Map AQ 6-1.

- Stream sampling sites (electrofishing and/or snorkeling) will generally be a minimum of 100 meters (m) long to include multiple habitat types.

    - The AQ 5 – Geomorphology Technical Study Plan (TSP) mesohabitat mapping will be used to identify representative sampling sites with mesohabitat types in similar proportion to the larger geomorphic stream reach.

  - Where possible, sampling sites will be chosen that overlap with the instream flow study sites (see the AQ 1 – Instream Flow TSP) and/or historic fish sampling sites.

  - Table AQ 6-1 identifies the sampling location, length, and methods proposed in the selected stream segments and Project reservoirs.

- Quantitative stream sampling will be conducted during the late summer/early fall base-flow period using a combination of electrofishing (shallow water) and/or snorkeling (deep water) (Table AQ 6-1).

  - Multi-pass electrofishing (e.g., Reynolds 1996; Van Deventer and Platts 1989; Rexstad and Burnham 1992) will be used to sample and estimate fish populations in shallow stream habitats (<1.5 m) at each selected stream segment study site. Where possible, the representative study sites will be partitioned into mesohabitat types for sampling using block nets.

  - Captured fish from each pass will be kept in separate live wells or buckets. Fish will be anesthetized (carbon dioxide [CO_2]), enumerated, identified to species, measured (fork length and weight), and scale samples will be obtained. Fish will be returned to the study site when the sampling is completed.

  - Sampling protocols and field data forms will be consistent with those in Flosi et al. 1998. The lengths and widths of the habitat units sampled will be recorded to calculate fish abundance by length and area (density) of stream sampled.

- Snorkeling (e.g., Dolloff et al. 1996) will be used to assess fish populations in deep water habitats (≥1.5 m) at each representative study site (Table AQ 6-1).

  - Snorkeler(s) will survey in lanes along the stream to identify, count, and estimate the length of each fish observed. Fish data will be recorded by habitat unit type.

  - Snorkeling protocols and field data forms will be consistent with those in Flosi et al. 1998. Very small fish of all species that cannot be identified will be recorded as fry.

FISH POPULATIONS – PROJECT RESERVOIRS

- Characterize fish species composition, relative abundance, and size in the Project reservoirs using gillnets.

- Sample in each Project reservoir once during the late summer/early fall using variable mesh gillnets at three sampling locations.

  - Two nets will be placed vertically or sloping along the gradient of the reservoir bottom, depending on the depth of water, at each sampling locations.

- The sampling locations will be distributed along the length of the reservoir with the goal of sampling both deep water and littoral zone habitats. If possible, historical California Department of Fish and Wildlife sampling sites and methods will be incorporated into the survey.

- Gill nets will be set in the afternoon of one day, and retrieved and processed the morning of the following day.

- Fish will be enumerated, weighed, and measured (fork length).

FISH BARRIERS/MIGRATION

- Identify and classify potential fish barriers in Project-affected stream reaches and drawn down Project reservoirs.

  - Use the AQ 5 – Geomorphology TSP mesohabitat mapping to identify the location and nature (natural or Project-related) of potential barriers (e.g., natural falls, tributary junctions, road crossings, shallow riffles, and dams) in Project-affected stream reaches and drawn down Project reservoirs.

  - Classify each potential barrier identified in the field or from aerial methods mapping (e.g., helicopter, aerial photographs) into the falls, chute, and cascade types defined by Powers and Orsborn (1985) or as critical riffles (Thompson 1972).

  - For stream road crossings, use a classification approach consistent with Flosi et al. (2010).

  - Summarize fish data collected at the barriers during field mapping or aerial methods (e.g., fall height, plunge pool depth, photographs, and field biologist observations).

    - Estimated potential for fish at Project-related fish barriers during the base-flow (low-flow) period using the following information:

    - The general fish barrier assessment methodology outlined in Powers and Orsborn (1985) and Thompson (1972) modified, where necessary, for the specific species (e.g., rainbow trout and brook trout) and barriers within the study area.

    - Leaping and swimming capabilities of the fish based on the literature (Powers and Orsborn 1985; Hoar et al. 1978) and fish size and water temperature information from the AQ 6 – Fish Population TSP and the AQ 3 – Water Temperature TSP.

- Physical and hydraulic characterization of potential barriers based on measurements or aerial estimates and/or Project engineering drawings.

- For stream road crossings, evaluate fish migration consistent with Flosi et al. (2010).

REPORTING

- Study methods and results will be documented in an AQ 6 – Fish Population and Barriers Technical Study Report (TSR). The TSR will include summary tables and maps, as appropriate.

- Upon request, data will be provided to resource agencies and interested stakeholders in an Excel spreadsheet (electronic format).

Fish Population – Project-Affected Stream Reaches

- Summarize fish standing crop estimates for each species at each study site in terms of density (e.g., fish/feet^2 and fish/mile) and biomass (lbs/acre and lbs/mile).

- Identify appropriate fish standing crop comparison datasets in collaboration with interested resource agencies.

- Develop a fish life stage periodicity chart (or life history chronology chart by month) for each species for each study reach based on available literature, consultation with qualified fisheries biologists, and the fish population sampling data.

- Develop length frequency histograms of sampled fish and examine distribution modality, in conjunction with scale data, to determine the age structure of fish populations.

- Summarize fish growth and age data using length frequency and scale analysis.

- Calculate fish condition factors using measured weight and length data.

Fish Population – Project Reservoirs

- Summarize fish composition, size, and relative abundance in each Project Reservoir.

Fish Barriers/Migration

- Provide description and map of potential fish barriers in Project-affected stream reaches.

SCHEDULE

Date	Activity
June–September 2023	Characterize fish barriers/migration in Project-affected stream reaches
August–October 2023	Conduct fish population sampling in Project-affected stream reaches and Project reservoirs
October 2023–February 2024	Analyze data and prepare draft report
March 2024	Distribute draft report to stakeholders
April–June 2024	Stakeholders review and provide comments on draft report (90 days)
June–July 2024	Resolve comments and prepare final report
August 2024	Distribute final report in Draft License Application

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TABLES

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Table AQ 6-1. Fish Population Sampling Locations.

Reach Name	Reach Length (miles) / River Miles (RM)	Sampling Location River Mile / Site ID	Site Length[a] (meters [m])	Sampling Method
Rush Creek				
Rush Creek Above Waugh Lake (reference reach)	0.5 (RM 23.8–24.3)	RM 23.9 / RC23.9	100 m	Electrofishing/ Snorkeling
Waugh Lake	1.51 (RM 22.24–23.75)	RM 23.0 / RC23.0	100 m	Electrofishing/ Snorkeling
Rush Creek Below Rush Meadows Dam	1.83 (RM 20.41–22.24)	RM 21.65 / RC21.65	100 m	Electrofishing/ Snorkeling
Gem Lake	0.93 (RM 19.48–20.41)	Three Sampling Locations (determined in field)	—	Gill nets
Rush Creek Below Gem Dam	0.30 (RM 19.18–19.48)	—	—	—
Agnew Lake	0.58 (RM 18.60–19.18)	Three Sampling Locations (determined in field)	—	Gill nets
Rush Creek Below Agnew Dam	0.40 (RM 18.2–18.60)	RM 18.55 / RC18.55	100 m	Electrofishing/ Snorkeling
Rush Creek Horsetail Falls	0.54 (RM 17.66–18.2)	—	—	—
Rush Creek Above Silver Lake	0.94 (RM 16.72–17.66)	RM 17.05 / RC17.05 RM 17.55 / RC17.55	100 m each site	Electrofishing/ Snorkeling
Silver Lake	0.83 (RM 15.89–16.72)	—	—	—
Rush Creek Below Silver Lake	2.69 (RM 13.20–15.89)	RM 15.2 / RC15.2	100 m	Electrofishing/ Snorkeling
South Rush Creek				
South Rush Creek	0.46 (RM 0.0–0.46)	RM 0.15 / SRC0.15	100 m	Electrofishing/ Snorkeling

Notes:
m = meters
RM = River Mile

[a] Sampling in reservoir and lakes is measured in terms of effort - placement of overnight gills at three locations.

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MAPS

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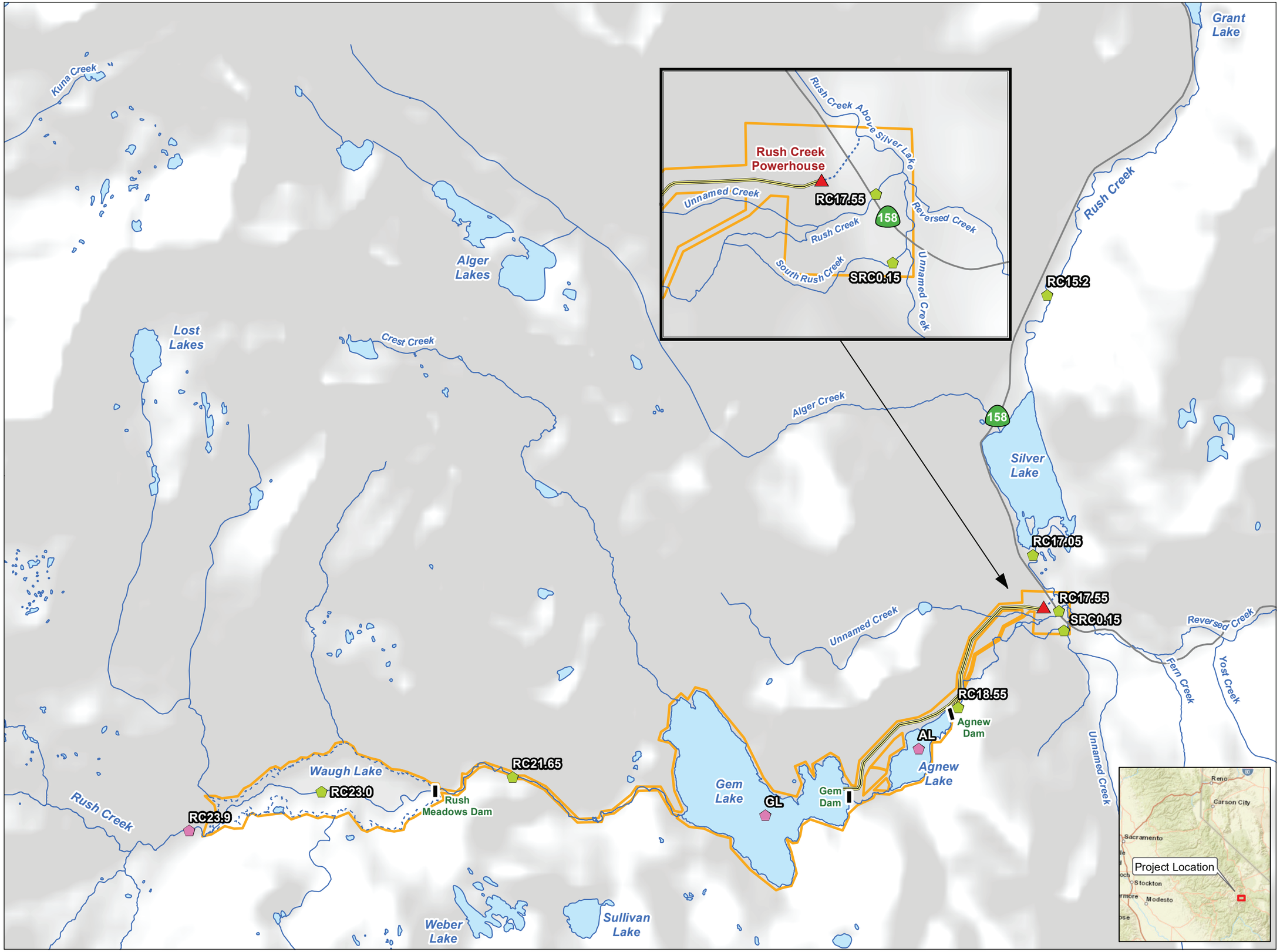

SCE Facilities

- Dam
- Powerhouse
- Flowline / Penstock
- Tailrace

Other Features

- Highway
- River/Stream
- Lake/Reservoir
- Dry Lake/Reservoir
- FERC Boundary

Sampling Locations

- Fish Population
- Fish Population, Amphibians

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Rush Creek Project (FERC 1389)

Map AQ 6-1

Sampling Locations

0 0.25 0.5 Miles

Projection: UTM Zone 11
Datum: NAD 83

Date: 11/3/2021

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DRAFT
AQ 7 – SPECIAL-STATUS AMPHIBIANS TECHNICAL STUDY PLAN

Rush Creek Hydroelectric Project
FERC Project No. 1389

December 2021

DRAFT TECHNICAL STUDY PLAN
AQ 7 – Special-Status Amphibians

POTENTIAL RESOURCE ISSUES

- Special-status amphibians and their habitats.

PROJECT NEXUS

- Direct loss or degradation of habitat.
- Disturbance or direct loss of special-status amphibians.

RELEVANT INFORMATION

The following information is available regarding special-status amphibians in the vicinity of the Rush Creek Project (refer to Southern California Edison Company's [SCE] Pre-Application Document [PAD] Section 4.5 for a summary of fish and aquatic resource information, including special-status amphibians [SCE 2021]):

- Floodplain, littoral zones, and associated wetland and riparian habitats present at Project reservoirs and Project-affected stream reaches (SCE's PAD Section 4.9, Riparian; SCE 2021).
- Known occurrences of special-status amphibians in the vicinity of the Project based on the California Natural Diversity Database (CNDDB) (CDFW 2020); California Department of Fish and Wildlife (CDFW) High Mountain Lake (HML) Rush Creek Management Unit, Herps Dataset (CDFW 2016); U.S. Fish and Wildlife Service (USFWS) Information for Planning and Consultation (IPac) (USFWS 2020); and U.S. Forest Service (Forest Service) Natural Resource Information System observation data (Forest Service 2017).
- Critical Habitat located in/near the Federal Energy Regulatory Commission (FERC) Project boundary for the Sierra Nevada Yellow-legged Frog (SNYLF) and the Yosemite toad (YT), as shown on Map AQ 7-1 (USFWS 2016).
- Supplemental information (e.g., habitat descriptions and special-status species occurrences) from the following Project-specific sources:
    - FERC's Environmental Assessment for the 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 the Gem Dam Valve Upgrade (SCE 2020).

POTENTIAL INFORMATION GAPS

- Updated information on potential SNYLF habitat, including Primary Constituent Elements (PCE).
- Information on the presence of SNYLF within potential breeding habitat.
- Updated information on potential YT habitat, including PCEs.
- Information on the presence of YT within potential breeding habitat.

STUDY OBJECTIVES

- Identify and map potential habitat (including PCEs) for SNYLF and YT.
- Conduct visual encounter surveys (VES) to determine the presence of SNYLF and YT.

EXTENT OF STUDY AREA

- Refer to Map AQ 7-2 for the special-status amphibian study area. The study area for:
  - Documentation of SNYLF habitat (including PCEs) includes areas within, and/or immediately adjacent to, Project-affected stream reaches, Project reservoirs, and the potential enhancement area (i.e., portions of the Lower Rush Creek and South Rush Creek).[1]
  - SNYLF VES includes select stream segments (Table AQ 7-1), and meadows and meadow systems adjacent to Project-affected stream reaches, Project reservoirs, and the potential enhancement area.
    - If the selected stream segments do not contain suitable habitat (PCEs), the sampling sites will be moved to another location (within the Project-affected stream reach) which contains suitable habitat/PCEs.
  - Documentation of YT habitat (including PCEs) includes meadows and meadow systems adjacent to Project-affected stream reaches, Project reservoirs, and the potential enhancement area.

[1] The potential enhancement area includes portions of the Rush Creek and South Rush Creek channels upstream and downstream of the State Route 158 crossing. The purpose of the potential enhancement is to address local flooding of residences during high-flow events. Refer to Map AQ 3-5.

  - YT VES includes meadows and meadow systems adjacent to Project-affected stream reaches, Project reservoirs, and the potential enhancement area that contain suitable habitat (PCEs).

- Studies will not be conducted at locations where access is unsafe (e.g., where there is very steep terrain) or on private property for which SCE has not received specific approval from the landowner to enter the property to perform the study.

STUDY APPROACH

For the purposes of this study, special-status amphibians include SNYLF (Federal Endangered, State Threatened) and YT (Federal Threatened, California Species of Special Concern). The study approach for special-status amphibians is provided below.

SIERRA NEVADA YELLOW-LEGGED FROG

- Prepare preliminary maps of potential SNYLF breeding/rearing, overwintering, and dispersal habitat in the study area, based on existing data and agency habitat definitions.

- Conduct a field survey to document the presence of PCEs (as defined by USFWS [2016]) within potential SNYLF habitat in the study area.

- Develop a Geographic Information System (GIS) map of habitat and overlay information on Project facilities, construction areas, restoration areas, and the potential enhancement area.

- Conduct VES to determine the presence of SNYLF in the study area.

- Surveys will be conducted consistent with the Standardized Protocol for Surveying Aquatic Amphibians (Fellers and Freel 1995).

  - Two diurnal visits will be completed in the period between the onset of the breeding season (shortly after snowmelt) and when tadpoles are beginning to metamorphose (late summer).

  - Surveys will follow the visual search methods.

    - Binoculars will be used to scan aquatic habitats for individuals while walking slowly. The banks, rocks, logs, bottom, surface, and any floating vegetation will be scanned for the presences of SNYLF.

    - After walking 10-15 meters (33 to 49 feet), biologists will stop and scan ahead with binoculars before advancing further.

    - Adjacent meadows will be surveyed by walking slowly along the main channel and circling all potholes and pools of water.

- An SNYLF survey datasheet will be completed for each study site. A copy of the datasheet is provided as Attachment 1.
- If SNYLF are observed, the individual or populations will be documented and recorded with a global positioning system (GPS) unit.
- For all SNYLF observed, a California Native Species Field Survey Form will be completed and submitted to the CNDDB.
- A table and map will be developed summarizing the results of surveys and the location of SNYLF.

- If occupied breeding/rearing habitat for SNYLF is identified in the selected stream segments evaluated as part of implementation of the AQ 1 – Instream Flow Technical Study Plan (TSP), quantification of habitat versus flow relationships will be developed.
- Incidental sightings of SNYLF observed during implementation of other technical studies will be recorded.

YOSEMITE TOAD

- Prepare preliminary maps of potential YT breeding/rearing, overwintering, and dispersal habitat in the study area.
- Conduct a field survey to document the presence of PCEs (as defined by USFWS [2016]) within potential YT habitat within the study area.
- Develop a GIS map of YT habitat and overlay information on Project facilities, construction areas, restoration areas, and the potential enhancement area.
- Conduct VES to determine the presence of YT within potential breeding habitat (e.g., meadows and meadows systems) in the study area.
- Surveys will be conducted consistent with the *Sierra Nevada Forest Plan Amendment Final Supplemental Environmental Impact Statement – Record of Decision Attachment D* (ROD Attachment D; Forest Service 2004).
  - Surveys will be timed to maximize the detection of tadpoles (when they are large enough to identify easily).
  - Two diurnal visits will be completed during the period beginning shortly after snowmelt and ending approximately 6 to 8 weeks into the summer.
  - Surveys will follow the visual search methods.
    - Binoculars will be used to scan aquatic habitats for individuals while walking slowly along mainstream channels and circles all potholes and pools of

water (including shallow pools and seeps as shallow as 2 centimeters [0.78 inch] deep).

- When not following an obvious channel, a zig-zag path through meadows (with 10-meter [32-foot] wide sweeps) may be utilized.

- A YT survey datasheet will be completed for study site. A copy of the datasheet is provided as Attachment 2.

- If YT are observed, the individual or populations will be documented and recorded with a GPS unit.

- For all YT observed, a California Native Species Field Survey Form will be completed and submitted to the CNDDB.

- A table and map will be developed summarizing the results of surveys and the location of YT.

- Incidental sightings of YT observed during implementation of other technical studies, will be recorded.

REPORTING

- Study methods and results will be documented in an AQ 7 – Special-Status Amphibians Technical Study Report (TSR). The TSR will include summary tables and maps, as appropriate.

- Upon request, data will be provided to resource agencies and interested stakeholders in an Excel spreadsheet (electronic format).

SCHEDULE

Date	Activity
June–August 2023	Complete habitat mapping and conduct VES surveys
September–December 2023	If occupied breeding/rearing habitat for SNYLF is identified in stream segments evaluated as part of implementation of the AQ 1 – Instream Flow TSP, quantification of habitat versus flow relationships will be developed
December 2023–February 2024	Analyze data and prepared draft report
February 2024	Distribute draft report to stakeholders
March–May 2024	Stakeholders review and provide comments on draft report (90 days)
May–July 2024	Resolve comments and prepare final report
August 2024	Distribute final report in Draft License Application

REFERENCES

CDFW (California Department of Fish and Wildlife). 2016. HML Rush Creek Management Unit, Herps Dataset. October 10, 2016.

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TABLES

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Table AQ 7-1. Special-Status Amphibian Sampling Locations.

Reach Name	Reach Length (miles) / River Miles (RM)	Sampling Location River Mile / Site ID
Rush Creek		
Waugh Lake	1.51 (RM 22.24–23.75)	RM 23.0 / RC23.0
Rush Creek Below Rush Meadows Dam	1.83 (RM 20.41–22.24)	RM 21.65 / RC21.65
Gem Lake	0.93 (RM 19.48–20.41)	—
Rush Creek Below Gem Dam	0.30 (RM 19.18–19.48)	—
Agnew Lake	0.58 (RM 18.60–19.18)	—
Rush Creek Below Agnew Dam	0.40 (RM 18.2–18.60)	RM 18.55 / RC18.55
Rush Creek Horsetail Falls	0.54 (RM 17.66–18.2)	—
Rush Creek Above Silver Lake	0.94 (RM 16.72–17.66)	RM 17.05 / RC17.05 RM 17.55 / RC17.55
Silver Lake	0.83 (RM 15.89–16.72)	—
Rush Creek Below Silver Lake	2.69 (RM 13.20–15.89)	RM 15.2 / RC15.2
South Rush Creek		
South Rush Creek	0.46 (RM 0.0–0.46)	RM 0.15 / SRC0.15

Notes: RM = River Mile

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MAPS

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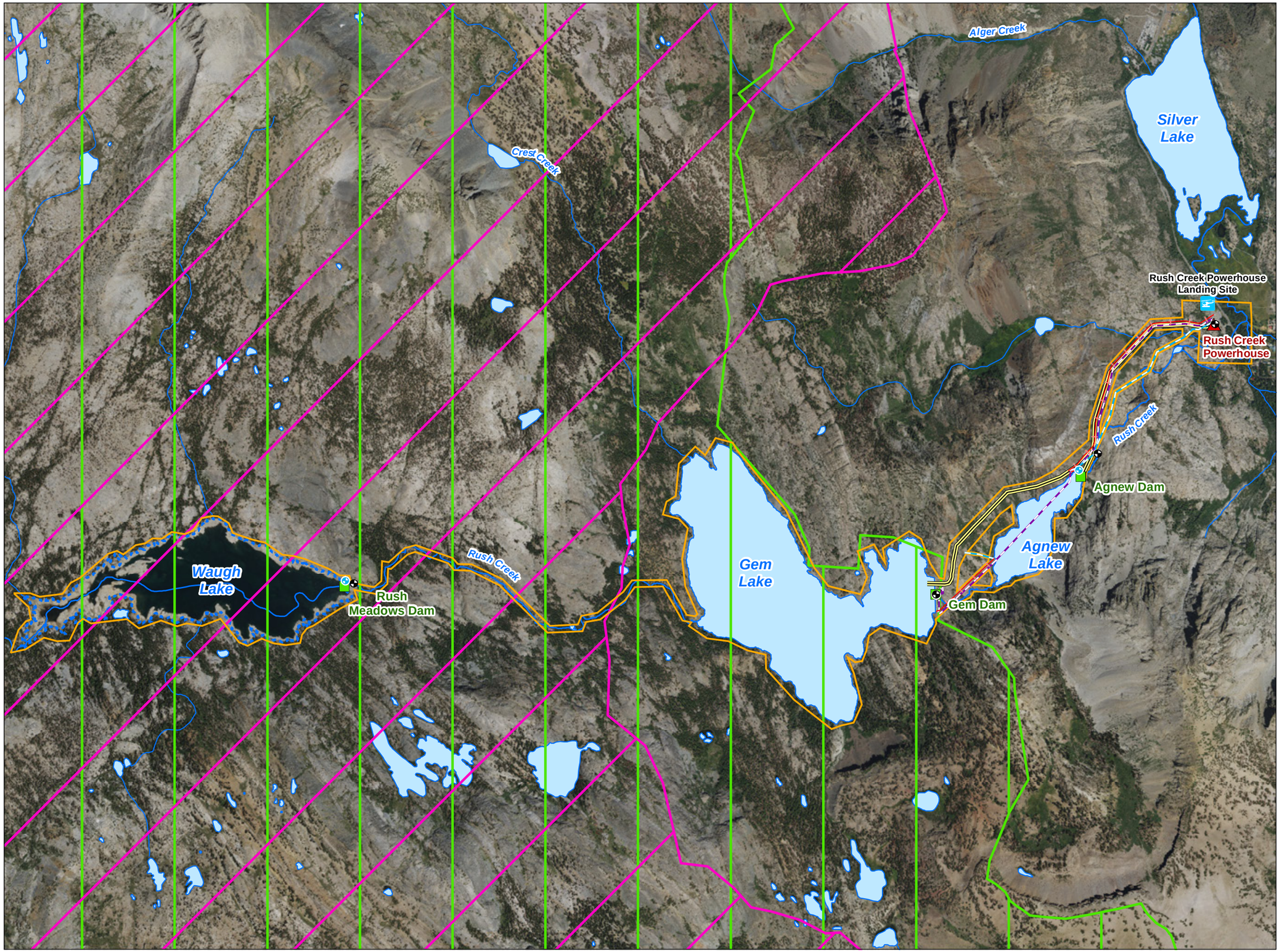

SCE Facilities

- Dam
- Powerhouse
- Flowline / Penstock
- Stream Gage
- Reservoir Gage
- Helicopter Landing Site
- Power Line
- Communication Line
- Tramway
- FERC Boundary

Other Features

- Highway
- River/Stream
- Lake
- Dry Lake/Reservoir

Final Critical Habitat*

- Sierra Nevada Yellow-Legged Frog
- Yosemite Toad

*Source: U.S. Fish and Wildlife Service (2016)

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Rush Creek Project (FERC 1389)

Map AQ 7-1

SNYLF and YT Critical Habitat in/near the FERC Project Boundary

0 0.125 0.25 Miles

Projection: UTM Zone 11
Datum: NAD 83

Date: 11/3/2021

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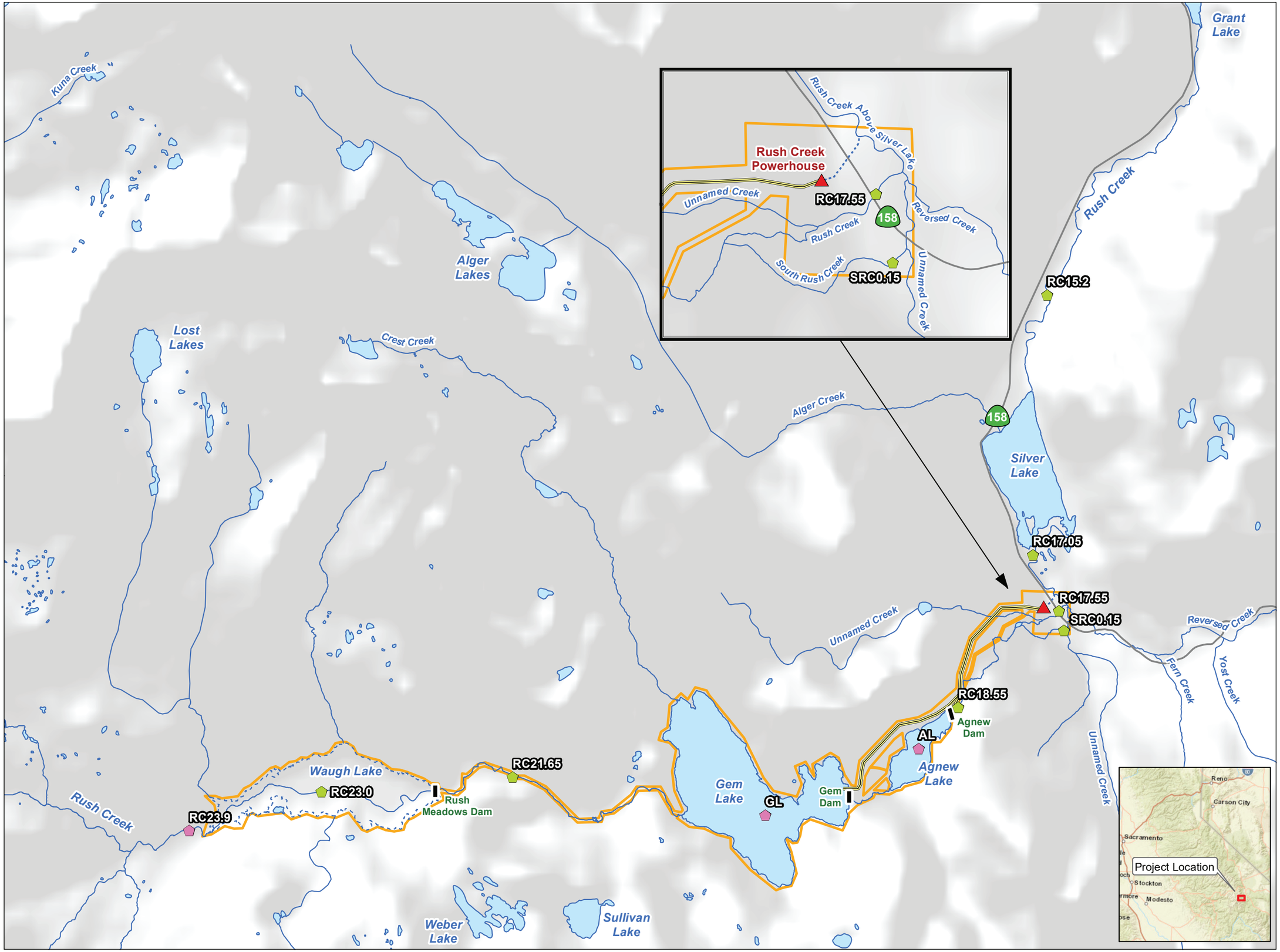

SCE Facilities

- Dam
- Powerhouse
- Flowline / Penstock
- Tailrace

Other Features

- Highway
- River/Stream
- Lake/Reservoir
- Dry Lake/Reservoir
- FERC Boundary

Sampling Locations

- Fish Population
- Fish Population, Amphibians

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Rush Creek Project (FERC 1389)

Map AQ 7-2

Sampling Locations

0 0.25 0.5 Miles

Projection: UTM Zone 11
Datum: NAD 83

Date: 11/3/2021

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ATTACHMENT 1

Sierra Nevada Yellow-legged Frog Datasheet

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Aquatic Survey Data Sheet

Site: _____

Date: (mm-dd-yy)	Begin Time:	Total Time: min	Observer(s): 1 2 3 4
Locality:			Owner: ? NPS FS BLM St. Pvt. Oth.
County:	Elevation: m ft	North UTM: GPS Map	East UTM: 10 3 4 5 6 7 8 11
Topographic Map: 7.5' 15'		North UTM: GPS Map	East UTM: 10 3 4 5 6 7 8 11
Distance to Mapped trail: km	Distance to Public dirt road: km	Distance to Public paved road: km	

Weather: Clear Pt. Cloudy	Overcast Mostly Cloudy	Rain Snow	Wind: (mph) 0 < 5	5 - 20 > 20	Air Temp.: (at 1 m) C F	Water Temp.: (0.5 m out) C F

Habitat: Natural 1 2 3 4 5 Altered	Description: Lake River Woodland Meadow/Wetl. Ditch Pond Stream Grassland Spring	Drainage: Permanent Seasonal

Site Length: m	Aver. Width: m	Aver. Depth: m	Max. Depth: m	Water Flow sec./10 ft. 0 < 7 sec. 7-11 sec. >11 sec.
Water Turbidity: Clear 1 2 3 4 5 Turbid	Mid-day Shade: %	Emergent Vegetation: %	Floating Vegetation: %	
Water-shed: ____ Natural ____ Urban ____ Grazed ____ Agricul. ____ Logged (last 15 yr.) ____ Other _____	Substrate: ____ Silt ____ Bedrock ___ < 2 mm ___ 2 - 75 mm ____ 75 - 300 mm ____ >300 mm			
Predominant Vegetation:				

Fishing Tackle: Yes No	Fish Present: Yes No ?	Species and Approx. Number:

Species	Adults	Subadults	Larvae	Eggs	DNA #	Survey Method(s)		Other
					N A	Visual Aural Dip Net	Hand TCS Seine	Voucher Pathology Photo
					N A	Visual Aural Dip Net	Hand TCS Seine	Voucher Pathology Photo
					N A	Visual Aural Dip Net	Hand TCS Seine	Voucher Pathology Photo
					N A	Visual Aural Dip Net	Hand TCS Seine	Voucher Pathology Photo
					N A	Visual Aural Dip Net	Hand TCS Seine	Voucher Pathology Photo
					N A	Visual Aural Dip Net	Hand TCS Seine	Voucher Pathology Photo

Site: _____ Date: _____

	Species	Tiss.	Sex	Weight (g)	Length (cm)
1					
2					
3					
4					
5					
6					
7					
8					
9					
10					
11					
12					

	Species	Tiss.	Sex	Weight (g)	Length (cm)
1					
2					
3					
4					
5					
6					
7					
8					
9					
10					
11					
12					

Comments:

Return to: Dr. Gary M. Fellers, National Biological Service, Point Reyes National Seashore, Point Reyes, CA 94956

Revised: April 1995

ATTACHMENT 2

Yosemite Toad Datasheet

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Yosemite Toad Data Sheet

Date: __________(mm/dd/year) Observers ____

Location Information:

Location Description: ___________________________________ Elevation:_____________feet or meters

R5 ID#: **Meadow #:** **Meadow/Lake Name:**

Meadow Type: **Meadow/Lake Acres:**

Wilderness: **Allotment:**

Subwatershed #: **Quad Map #:**

Township: **Range:** **Section:**

GPS Coordinates - center of meadow: **NAD 83** **Accuracy: + - ________ ft or m**

East UTM: **North UTM**

East UTM: _______________________________ **North UTM: ________________________________**

Survey Information:

Survey Start Time: _________ am or pm

Survey End Time: _________ am or pm

Survey Total Time: _________ minutes

Weather (circle all that apply): clear partly-cloudy cloudy light-rain heavy-rain snow no-wind light-wind very-windy

Temperature - Air Start: _________ (C)

Temperature - Air End: __________ (C)

Temperature - Water Start: _________ (C)

Temperature - Water End: __________ (C)

Habitat Information:

Water Present? Yes or No Ephemeral or Intermittent or Perennial?

% of Meadow Wet: ______________ % Slope of Meadow: _____________

Fish Present? Yes or No Signs of Cattle? Yes or No Signs of Packstock? Yes or No

Comments about habitat condition: ____

____

____

____

____

____

Species Information:

Species Code	Life Stage	#	Sex	Obs Method	Disease	Comments
____________	*E / T / J / A / M*	____	*M / F*	*Visual / Call*	*Y / N*	______________________
____________	*E / T / J / A / M*	____	*M / F*	*Visual / Call*	*Y / N*	______________________
____________	*E / T / J / A / M*	____	*M / F*	*Visual / Call*	*Y / N*	______________________
____________	*E / T / J / A / M*	____	*M / F*	*Visual / Call*	*Y / N*	______________________
____________	*E / T / J / A / M*	____	*M / F*	*Visual / Call*	*Y / N*	______________________
____________	*E / T / J / A / M*	____	*M / F*	*Visual / Call*	*Y / N*	______________________
____________	*E / T / J / A / M*	____	*M / F*	*Visual / Call*	*Y / N*	______________________
____________	*E / T / J / A / M*	____	*M / F*	*Visual / Call*	*Y / N*	______________________

DRAFT
CUL 1 – BUILT ENVIRONMENT
TECHNICAL STUDY PLAN

Rush Creek Hydroelectric Project
FERC Project No. 1389

December 2021

DRAFT TECHNICAL STUDY PLAN
CUL 1 – Built Environment

POTENTIAL RESOURCE ISSUES

- Built environment historic properties affected by the Project.

PROJECT NEXUS

The Federal Energy Regulatory Commission's (FERC) decision to issue a new license is considered an "undertaking" pursuant to 36 Code of Federal Regulations (CFR) § 800.16(y). The National Historic Preservation Act (NHPA) requires Federal agencies to consider the effects of undertakings on historic properties and to provide the Advisory Council a reasonable opportunity to comment on those undertakings.

Proposed Project activities could potentially affect built environment historic properties as follows:

- Removal of and/or alteration to a built environment historic property.

- Change in use of a built environment historic property.

- Alteration to the contributing resources of a National Register of Historic Places (NRHP) historic district including the Rush Creek Hydroelectric System Historic District.

RELEVANT INFORMATION

The following information is available regarding built environment cultural resources and historic properties in the vicinity of the Rush Creek Project (refer to Southern California Edison Company's [SCE] Pre-Application Document [PAD] Section 4.13 for a summary of available cultural resource information [SCE 2021]):

- California Historical Resources Information System (CHRIS) Eastern Information Center (EIC) Records Search, received on March 16, 2021. The CHRIS provides detail regarding previous survey and documentation in the vicinity of the Project (inclusive of FERC Project boundary and a quarter-mile record search study area).

- Management Plan for Historic and Archaeological Resources Associated with the Rush Creek Hydroelectric Project, (FERC Project No. 1389), Mono and Inyo Counties, California (SCE 1990). The Management Plan provides documentation and background information on the known historic properties in the Project Boundary and current SCE responsibilities and requirements for managing historic properties.

- "Evaluation of the Historic Resources of the Lee Vining Creek (FERC Project No. 1388) and Rush Creek (FERC Project No. 1389) Hydroelectric Systems, Mono County, California" (Williams and Hicks 1989). This Evaluation Report details the NRHP criteria and themes of significance for the previously documented Rush

Creek Hydroelectric System Historic District, eligible for the NRHP and a historic property under Section 106 of the NHPA.

POTENTIAL INFORMATION GAPS

- Updated physical documentation and information on known built environment cultural resources located within the Area of Potential Effects (APE).
- Intensive built environment surveys of the APE using current protocols.
- NRHP evaluations or updated evaluations of historic period built environment resources that could be potentially affected by the Proposed Project (Undertaking).
- Updated NRHP evaluation of the Rush Creek Hydroelectric System Historic District that documents the current status and condition of the District contributors and includes Project facilities that were not documented as part of previous District recordation.

STUDY OBJECTIVES

- Identify all built environment cultural resources within the APE.
- Evaluate or, as appropriate, provide update evaluation under the criteria of the NRHP for built environment cultural resources in the APE to determine whether built environment historic properties may be affected by potential actions implemented in the Proposed Project.

EXTENT OF STUDY AREA AND AREA OF POTENTIAL EFFECT

- For built environment cultural resources, the study area includes the area within 0.5 mile of the FERC Project boundary (Map CUL 1-1).
    - This study area will be used for records searches and archival research to develop contextual and background information.
- Under 36 CFR Part 800, the APE is defined as “the geographic area or areas within which an undertaking may cause changes in the character or use of historic properties” (36 CFR 800.16[d]). Changes may be direct or indirect.
    - The proposed APE for the purposes of study implementation is defined as the entire area within the FERC Project boundary plus a buffer of 200 feet (Map CUL 1-1).
    - Rush Creek Project facilities are identified in Table CUL 1-1. All Project facilities will be considered as part of study implementation as part of the study survey population. Detailed maps showing the location of Project facilities are available in Section 2.0 of SCE’s PAD for the Rush Creek Project (SCE 2021).

- Studies will not be conducted at locations where access is unsafe (e.g., where there is very steep terrain) or on private property for which SCE has not received specific approval from the landowner to enter the property to perform the study.

- The study area and APE may be expanded during the relicensing proceeding, in consultation with interested stakeholders, if any refinement/modification of the Proposed Project results in utilizing additional lands outside the FERC Project boundary or current APE.

STUDY APPROACH

The Built Environment Technical Study will involve a multi-step process that includes: (1) establishing the APE; (2) a detailed review of previous studies and site records; (3) archival research; (4) field surveys/inventory, including recording and mapping resource locations and resource condition assessments; (5) NRHP/California Register of Historical Resources (CRHR) evaluations and update of previous evaluations, as appropriate; and (6) technical study reporting and consultation with stakeholders regarding technical study products. Specific tasks that will be implemented during each step are described below.

ESTABLISH APE

- Submit the proposed APE on the behalf of FERC to the State Historic Preservation Officer (SHPO) and interested stakeholders for comments on the adequacy of the APE pursuant to 36 CFR § 800.16[d]). The APE may be expanded during the relicensing proceeding if any refinement/modification of the Proposed Project results in utilizing additional lands outside the FERC Project boundary.

REVIEW OF PREVIOUS STUDIES AND SITE RECORDS

- Review previous investigations, survey reports, and site records to identify the methods and protocols that were used to inventory built environment resources in the APE and whether there are previously identified built environment resources that require updated documentation to align with current standards for adequacy.

ARCHIVAL RESEARCH

- Conduct supplemental background research to develop an appropriate historical context for the Project, including a general history of the contextual study area framing the APE. This research will utilize and build upon the existing studies documenting the Project APE, most notably, “Evaluation of the Historic Resources of the Lee Vining Creek (FERC Project No. 1388) and Rush Creek (FERC Project No. 1389) Hydroelectric Systems, Mono County, California” (Williams and Hicks 1989), to support necessary NRHP evaluation and update evaluation of built environment resources in the APE. Archival research may include the following sources and other sources and repositories identified through research undertaken as part of the study:

    - California State Archives

- California State Library
- Contextual research regarding utility and hydroelectric development
- Mono Basin History Museum
- Mono County Historical Society
- Online research, including general and engineering periodicals
- Records of the United States Forest Service (Forest Service), Inyo National Forest (INF)
- SCE Engineering and Photographic Records
- United States Geological Survey (USGS) Historical Topographic Map Collection
- Other data repositories as identified through the research program

BUILT ENVIRONMENT INVENTORY

- Conduct field inspection and documentation of historic period (i.e., 50 years old or older) built environment resources (i.e., buildings, structures, and objects) and resources that will be historic in age at the time of relicensing (i.e., minimally 45 years old at the time of the study) located within the APE.
  - The inventory will be conducted by qualified, professional individuals meeting the Secretary of the Interior's Professional Qualification Standards for Architectural History and History (36 CFR Part 61).
- Record historic period built environment resources to current California Department of Parks and Recreation standards (DPR 523 series). This will include digital color photography and sketch maps of individual features that show the relationship between buildings and structures.
- Assess historic period built environment resources identified during the study as a system/district, as well as on an individual basis.
- Create record updates for resources already determined eligible for the NRHP to ensure there are no data gaps related to integrity or status of built environment resources as historic properties under Section 106 of the NHPA.

NRHP EVALUATION ELIGIBILITY

- Evaluate historic period built environment resources in the Project APE for eligibility to the NRHP under the criteria for listing. Evaluation will include consideration of both individual eligibility and eligibility as a multi-component district.

- Updated evaluation will consider previous recordation of the Rush Creek Hydroelectric System Historic District (Williams and Hicks 1989). Evaluation will include any Rush Creek Project facilities that may not have been evaluated during the previous relicensing effort.

- Evaluation will be documented on appropriate DPR 523 series forms and will utilize appropriate guidance including *NRHP Bulletin 15: How To Apply the NRHP Criteria for Evaluation* (NPS 1995).

REPORTING AND CONSULTATION

- Study methods and results from the Built Environment Technical Study will be documented in a *CUL 1 – Built Environment Technical Study Report* (TSR). To ensure compliance with FERC reporting requirements and with the standards of Section 106 of the NHPA, the TSR will include the following sections: (1) Study Goals and Objectives; (2) Study Methods; (3) Study Results (including eligibility recommendations); and (4) Variances from the FERC-approved Study Plan. In addition, the TSR will include the following information, as appropriate:

    - Project location and description

    - Regulatory nexus

    - Historic context for the study area

    - Mapping depicting the location of built environment cultural resources within the APE

    - NRHP inventory and evaluation of all historic period built environment resources in the APE

    - An appendix containing updated and/or new DPR Series 523 forms for each built environment cultural resource, individually and collectively as a district, as appropriate

A Draft TSR will be distributed to interested stakeholders for review and comment. Comments on the Draft TSR will be addressed in a Final TSR, which will be included in the Draft License Application.

SCHEDULE

Date	Activity
February–July 2022	Convene interested stakeholders to discuss Draft Study Plan and adequacy of the APE
May–July 2022	Consult with SHPO regarding adequacy of the APE
January–May 2023	Conduct archival research and background review
June–September 2023	Conduct field inventory

Date	Activity
October 2023–January 2024	Analyze data and prepare draft report
January 2024	Distribute draft report to stakeholders
February–April 2024	Stakeholder review and provide comments on draft report (90 days)
April–June 2024	Resolve comments and prepare final report
August 2024	Distribute final report in Draft License Application

REFERENCES

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TABLES

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Table CUL 1-1. Rush Creek Project Facilities

Rush Meadows Dam Area
Dams
Rush Meadows Dam
Reservoirs
Waugh Lake
Valve House
Rush Meadows Dam Valve House
Stream Gages
Rush Creek below Rush Meadows (Waugh Lake) (USGS No. 10287262; SCE No. 359r)
Reservoir Gages
Waugh Lake (USGS No. 10287260; SCE No. 359)
Trails
Rush Meadows Dam Access Trail
Rush Meadows Dam/Waugh Lake Ancillary and Support Facilities
Rush Meadows Dam Equipment Shed
Rush Meadows Dam Gage House
Rush Meadows Dam Solar Facility
Gem Dam Area
Dams
Gem Dam
Reservoirs
Gem Lake
Flowline
Gem Dam to Agnew Junction Flowline
Valve House
Gem Valve House and Cabin
Gem Dam Arch 8 Valve House
Gem Flowline Valve House
Stream Gages
Rush Creek below Gem Lake (USGS No. 10287281; SCE No. 352r)
Reservoir Gages
Gem Lake (USGS No. 10287280; SCE No. 352)

Gem Dam Area (continued)
Communication Lines
Communication Line from Rush Creek Powerhouse to Gem Lake Dam
Communication Line from Gem Valve House to Arch 8 Valve House
Communication Line from Gem Tram Hoist House to Gem Valve House
Trams and Hoist Houses
Gem Tram
Gem Tram Hoist House
Gem Tram Lower/Upper Landing
Trails
Lower Gem Dam Access Trail
Gem Dam Arch 8 Access Trail
Upper Gem Dam Access Trail
Gem Dam/Lake Ancillary and Support Facilities
Gem Lake Dock
Gem Lake Motor Barge
Gem Bunkhouse
Gem Outhouse
Gem Cookhouse
Gem Dam Compressor Shed
Gem Dam Storage Shed
Gem Dam Overhead Hoist House for Dam Length
Gem Dam Overhead Hoist House
Gem Fish Release Footbridge
Gem Tram Landing Footbridge
Gem Tram Bridge
Gem Weather Station
Gem Satellite Dish
Gem Solar Facility
Gem Valve House Tunnel

Agnew Dam Area
Dams
Agnew Dam
Reservoirs
Agnew Lake
Flowline
Agnew Dam to Agnew Junction Flowline
Valve House
Agnew Junction (Valve House and Stand Pipe)
Agnew Dam Valve House
Stream Gages
Rush Creek below Agnew Lake (USGS No. 10287289; SCE No. 357)
Reservoir Gages
Agnew Lake (USGS No. 10287285; SCE No. 351)
Power Lines
4 kV Rush Creek Powerhouse to Agnew Dam Power Line
4 kV Agnew Lake Dam Power Line
4 kV Upper Agnew Boat Dock Power Line (non-operational)
Communication Lines
Communication Line from Agnew Hoist House to Agnew Boathouse
Trams and Hoist Houses
Agnew Tram
Agnew Tram Hoist House
Agnew Tram Landing
Trails
Agnew Stream Gage Access Trail
Agnew Dam/Lake Ancillary and Support Facilities
Lower Agnew Lake Boathouse / Dock
Upper Agnew Lake Boathouse / Dock
Agnew Lake Motor Barge
Agnew Cabin
Agnew Weather Station
Agnew Flume (downstream of Agnew Dam)

Rush Creek Powerhouse Area
Penstocks
Agnew Junction to Rush Creek Powerhouse Penstock (No. 1)
Agnew Junction to Rush Creek Powerhouse Penstock (No. 2)
Powerhouse
Rush Creek Powerhouse
Gages
Rush Creek Powerhouse (USGS No. 10287300; SCE No. 367)
Transmission Lines
2.4 kV Switchyard to Powerhouse Transmission Line
Powerhouse Ancillary and Support Facilities
Rush Creek Powerhouse Complex Access Road
Cottages (2)
Garages (4)
Warehouse and Dock
Machine Shop
Pump House
Woodshed (2)
Helicopter Landing Site
Tank (propane)
Bridge over Powerhouse Tailrace
Bridge over Rush Creek

MAPS

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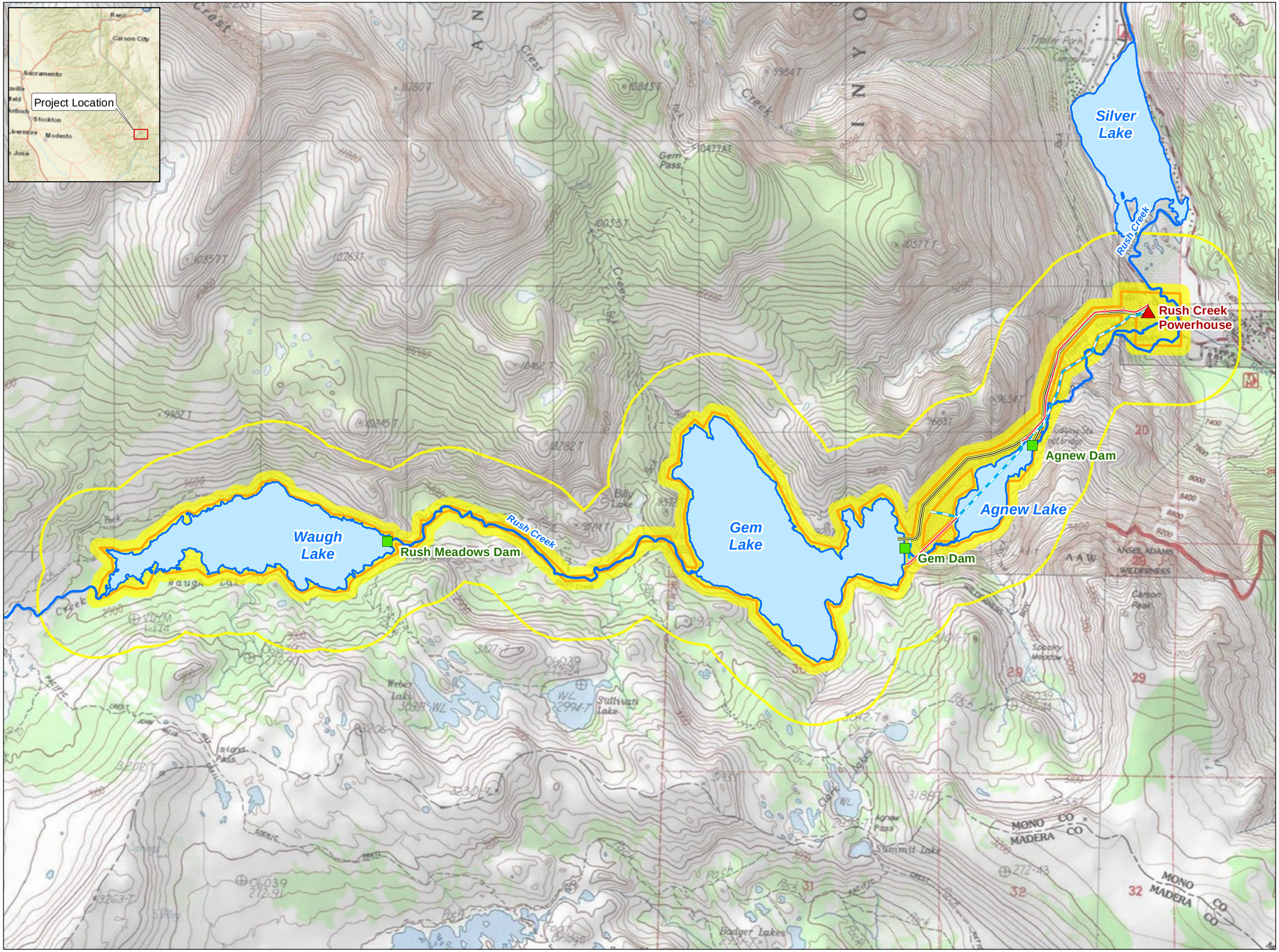

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Rush Creek Project (FERC 1389)

Map CUL 1-1

Built Environment APE and Study Area

0 0.25 0.5 Miles

Projection: UTM Zone 11
Datum: NAD 83

Date: 9/2/2021

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DRAFT
CUL 2 – ARCHAEOLOGY
TECHNICAL STUDY PLAN

Rush Creek Hydroelectric Project
FERC Project No. 1389

December 2021

DRAFT TECHNICAL STUDY PLAN
CUL 2 – Archaeology

POTENTIAL RESOURCE ISSUES

- Archaeological resources and other historic properties within the Project's Area of Potential Effect (APE).

PROJECT NEXUS

The Federal Energy Regulatory Commission's (FERC) decision to issue a new license is considered an "undertaking" pursuant to 36 Code of Federal Regulations (CFR) § 800.16(y). The National Historic Preservation Act (NHPA) requires Federal agencies to consider the effects of undertakings on historic properties and to provide the Advisory Council a reasonable opportunity to comment on those undertakings.

Proposed Project activities could potentially affect archaeological resources by:

- Endangering those qualities that make the property eligible for inclusion in the National Register of Historic Places (NRHP).
    - Adverse effects are codified in 36 CFR 800.5 and can be direct, indirect, or cumulative.

RELEVANT INFORMATION

The following information is available regarding archaeological resources and historic properties in the vicinity of the Rush Creek Project (refer to Southern California Edison Company's [SCE] Pre-Application Document [PAD] Section 4.13 for a summary of available cultural resource information [SCE 2021]):

- California Historical Resources Information System (CHRIS) Eastern Information Center (EIC) Records Search, received on March 16, 2021. The CHRIS provides detail regarding previous survey and documentation in the vicinity of the Project (inclusive of FERC Project boundary and a quarter-mile record search study area).

- Native American Heritage Commission (NAHC) Sacred Lands File (SLF) for the Project area, received on November 6, 2020 (NAHC 2020). The NAHC SLF provides an inventory of Native American resources and sacred sites.

- "Archaeological Data Recovery Program Rush Meadow Archaeological District, Ansel Adams Wilderness, Inyo National Forest, California" (Thomas Jackson 1999). Additional archaeological data recovery report for sites inundated by Rush Meadows Reservoir.

- "Archaeological Data Recovery Program - Rush Meadow. Investigations at CA-MNO-2440/H, MNO-2459, MNO-2460, MNO-2461, and MNO-2463" (Thomas Jackson 1997). Archaeological data recovery report for sites inundated by Rush Meadows Reservoir.

- Management Plan for Historic and Archaeological Resources Associated with the Rush Creek Hydroelectric Project, (FERC Project No. 1389), Mono and Inyo Counties, California (SCE 1990). The Management Plan provides documentation and background information on the known historic properties in the Project Boundary and current SCE management responsibilities and requirements for cultural resources.

- "Evaluation of the Historic Resources of the Lee Vining Creek (FERC Project No. 1388) and Rush Creek (FERC Project No. 1389) Hydroelectric Systems, Mono County, California" (William and Hicks 1989). This Evaluation Report details the NRHP criteria and themes of significance for the previously documented Rush Creek Hydroelectric System Historic District, eligible for the NRHP and a historic property under Section 106 of the NHPA.

- Background cultural studies include several major archaeological overviews and studies conducted in the Mono Basin, Long Valley and broader region by E.L. Davis (1964), Bettinger (1982), Busby et al. (1980), and Jackson's (1985) survey reports for timber compartments on the United States Forest Service (Forest Service) Inyo National Forest.

POTENTIAL INFORMATION GAPS

- Updated physical documentation and information on known archaeological resources located within the APE.

- Intensive archaeological surveys of the APE using current protocols.

- NRHP evaluations or updated evaluations of cultural resources that could be potentially affected by the Proposed Project (Undertaking).

- Updated NRHP evaluation and condition assessment of the Rush Meadows Archaeological District (RMAD).

STUDY OBJECTIVES

- Identify all known and currently undiscovered cultural resources within the APE.

- Evaluate or, as appropriate, provide update evaluation under the criteria of the NRHP for archaeological resources in the APE to determine whether archaeological resources may be affected by potential actions implemented in the Proposed Project.

EXTENT OF STUDY AREA AND AREA OF POTENTIAL EFFECT

- For archaeological resources, the study area includes the area within 0.5 mile of the FERC Project boundary (Map CUL 2-1).

    - This study area will be used for records searches and archival research to develop contextual and background information.

- Under Section 106 of the NHPA, the APE is defined as "the geographic area or areas within which an undertaking may directly or indirectly cause alterations in the character or use of historic properties, if any such properties exist" (36 CFR § 800.16[d]). Additionally, the Advisory Council on Historic Preservation and the California Office of Historic Preservation has provided guidance for Federal agencies and their delegated licensees to consider potential effects that:
  - May occur immediately and directly;
  - Are reasonably foreseeable or may occur later in time;
  - Are farther removed in distance and potentially affected indirectly; and
  - Include cumulative effects that may result from the undertaking.
- The proposed APE for the purposes of study implementation is defined as the entire area within the FERC Project boundary (Map CUL 2-1).
- Studies will not be conducted at locations where access is unsafe (e.g., where there is very steep terrain) or on private property for which SCE has not received specific approval from the landowner to enter the property to perform the study.
- The study area and APE may be expanded during the relicensing proceeding, in consultation with interested stakeholders, if any refinement/modification of the Proposed Project results in utilizing additional lands outside the FERC Project boundary or current APE.

STUDY APPROACH

The Archaeology Technical Study will involve a multi-step process that includes: (1) establishing the APE; (2) a detailed review of previous studies and site records; (3) archival research; (4) field surveys/inventory, including recording and mapping resource locations and resource condition assessments; (5) NRHP evaluations and update of previous evaluations, as appropriate; and (6) technical study reporting and consultation with stakeholders. Specific tasks that will be implemented during each step are described below.

ESTABLISH APE

- Submit the proposed APE to on the behalf of FERC to the Tribes, the State Historic Preservation Officer (SHPO), and interested stakeholders for comments on the adequacy of the APE pursuant to 36 CFR § 800.16[d]). The APE may be expanded during the relicensing proceeding if any refinement/modification of the Proposed Project results in utilizing additional lands outside the FERC Project boundary.

REVIEW OF PREVIOUS STUDIES AND SITE RECORDS

- Review previous investigations, survey reports, and site records to identify the methods and protocols that were used to inventory archaeological resources in the

APE and whether there are previously identified archaeological resources that require updated documentation to align with current standards for adequacy.

ARCHIVAL RESEARCH

- Conduct archival research at the following repositories to obtain additional information specific to the prehistory, ethnography, and history in the vicinity of the Project. This research will build upon the existing studies to support necessary NRHP evaluation of archaeological resources in the APE. Archival research may include the following sources and other sources and repositories identified through research undertaken as part of the study:
    - EIC, University of California Riverside
    - Huntington Library, SCE Collection: Records, Documents, and Photos
    - Native American Heritage Commission
    - Paiute-Shoshone Cultural Center, Bishop
    - Southern California Edison, Rosemead Office
    - Southern Mono Historical Society, Mammoth Lakes
    - Records of the Forest Service, Inyo National Forest
    - University of Nevada, Reno, Special Collections
    - Other online repositories as applicable

ARCHAEOLOGICAL INVENTORY

- As described in 36 CFR § 800.4(b)(1), a field survey will be performed in accordance with the *Secretary of the Interior's Standards and Guidelines for Identification* to verify locations of previously recorded archaeological resources and to examine all accessible lands not previously surveyed or that need to be resurveyed to meet current professional standards (NPS 1983).

- Qualified professional archaeologists (i.e., individuals who meet the Secretary of the Interior's Professional Qualifications Standards for Archaeology [NPS 2021]) will supervise and participate in all field work.
    - During the survey, archaeologists will walk parallel transects spaced at no more than 30-meters as vegetation and terrain allow.

- Previously recorded archaeological sites will be relocated, and their site records will be updated only if the existing documentation does not meet current standards for recording or if the condition and/or integrity of the property has changed since its previous recording.

- Newly discovered archaeological resources, including isolated finds, will be documented following the documentation procedures outlined in *Instructions for Recording Historical Resources* (OHP 1995), which utilizes California Department of Parks and Recreation (DPR) Forms 523 A through L. Sketch maps will be drawn to-scale, and the resource will be photographed.

- Field personnel will use a Global Positioning System (GPS) receiver to document the location of cultural resources (including isolates), which will be plotted onto the appropriate U.S. Geological Survey (USGS) 7.5-minute topographic quadrangle using the Universal Transverse Mercator (UTM) coordinate system.

    - GPS data collection will adhere to the Inyo National Forest specifications for accuracy and site-specific procedures where applicable. Additionally, the areas examined will be plotted onto the appropriate USGS 7.5-minute topographic quadrangle for comparison with previous survey coverage maps.

- Archaeological surveys that occur on Inyo National Forest lands will require valid Organic Act permits. Any ground disturbing testing that occurs on Inyo National Forest lands will require valid Archaeological Resources Protection Act permits. SCE or their consultants will obtain all required permits prior to beginning field work and will notify the Inyo National Forest when field work is scheduled.

- Representative examples of time diagnostic artifacts will be photographed and described. All artifacts encountered during the field survey will be left in place; no artifacts will be collected during the field survey.

- A field report will be submitted to the Forest Service, which enumerates re-recorded and newly recorded resources within 90 days of a completion of inventory efforts. Within 15 days after submittal, the Forest Service will provide pertinent Forest Service site designations to newly recorded sites on lands under their jurisdiction.

NRHP ELIGIBILITY EVALUATION

- Utilize the results of the Archaeological Inventory to prepare, in collaboration with the Inyo National Forest, Tribes, and interested stakeholders, an Evaluation Plan that will be executed to evaluate the eligibility of archaeological sites for the NRHP.

- Evaluations will be documented on appropriate DPR 523 series forms and will utilize appropriate guidance including *NRHP Bulletin 15: How To Apply the NRHP Criteria for Evaluation* (NPS 1995).

REPORTING AND CONSULTATION

- Study methods and results from the Archaeology Technical Study will be documented in a *CUL 2 – Archaeology Technical Study Report* (TSR). To ensure compliance with FERC reporting requirements and with the standards of Section 106 of the NHPA, the TSR will include the following sections: (1) Study Goals and

Objectives; (2) Study Methods; (3) Study Results (including eligibility recommendations); and (4) Variances from the FERC-approved Study Plan. In addition, the TSR will include the following information, as appropriate:

- Project location and description;
- Regulatory nexus;
- Prehistoric, ethnographic, and historic-era context for the study area;
- Generalized maps showing the location of archaeological resources with respect to the APE;
- Detailed maps that depict the following on USGS 1:24,000 topographic maps: survey area and coverage types (intensity); and the locations of all resources identified during the study; and
- An appendix containing updated and/or new DPR Series 523 forms for each archaeological resource in the APE.

A Draft TSR will be distributed to interested stakeholders for review and comment. Sensitive information will be included in a confidential appendix withheld from public disclosure, in accordance with Section 304 (16 USC 4702-3) of the NHPA. Comments on the Draft TSR will be addressed in a Final TSR, which will be included in the Draft License Application.

SCHEDULE

Date	Activity
February–July 2022	Convene interested stakeholders to discuss Draft Study Plan and adequacy of the APE
May–July 2022	Consult with SHPO regarding adequacy of APE
January–May 2023	Conduct archival research and background review
January–May 2023	Develop and obtain consensus on NRHP Evaluation Plan and Testing Plan
June–August 2023	Conduct inventory surveys
September–October 2023	Acquire permits and conduct NRHP Evaluation Studies
October 2023–January 2024	Analyze data and prepare draft report
January 2024	Distribute draft report to stakeholders
February–April 2024	Stakeholder review and provide comments on draft report (90 days)
April–June 2024	Resolve comments and prepare final report
August 2024	Distribute final report in Draft License Application

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Williams, James C., and Robert A. Hicks. 1989. Evaluation of the Historic Resources of the Lee Vining Creek (FERC Project No. 1388) and Rush Creek (FERC Project No. 1389) Hydroelectric Systems, Mono County, California. Submitted to Environmental Affairs Division, Southern California Edison Company, Rosemead, California. July 1989.

MAPS

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SCE Facilities

- Powerhouse
- Dam
- Flowline / Penstock
- Power or Communication Line
- Tramway
- FERC Project Boundary

Other Features

- Rush Creek
- Lake

Cultural Data

- Area of Potential Effects (APE)
- Study Area

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Rush Creek Project (FERC 1389)

Map CUL 2-1

Archaeological APE and Study Area

0 0.25 0.5 Miles

Projection: UTM Zone 11
Datum: NAD 83

Date: 9/1/2021

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DRAFT
CUL 3 – TRIBAL RESOURCES TECHNICAL STUDY PLAN

Rush Creek Hydroelectric Project
FERC Project No. 1389

December 2021

DRAFT TECHNICAL STUDY PLAN
CUL 3 – Tribal Resources

POTENTIAL RESOURCE ISSUES

- Tribal resources affected by the Project, including resources of traditional, cultural, or religious importance, and Traditional Cultural Properties (TCP[1]).

PROJECT NEXUS

The Federal Energy Regulatory Commission's (FERC) decision to issue a new license is considered an "undertaking" pursuant to 36 Code of Federal Regulations (CFR) § 800.16(y). The National Historic Preservation Act (NHPA) requires Federal agencies to take into account the effects of undertakings on historic properties and to provide the Advisory Council a reasonable opportunity to comment on those undertakings.

Proposed Project activities could potentially affect Tribal resources by:

- Endangering those qualities that make the property eligible for inclusion in the National Register of Historic Places (NRHP) or that hold significant cultural value.

RELEVANT INFORMATION

The following information is available to characterize Tribal resources in the vicinity of the Rush Creek Project (refer to Southern California Edison Company's [SCE] Pre-Application Document [PAD] Section 4.13 for a summary of available cultural resource information and Section 4.14 for a summary of available Tribal information [SCE 2021]).

- Native American Heritage Commission (NAHC) Sacred Lands File (SLF) for the Project area, received on November 6, 2020 (NAHC 2020).

- Ten cultural affiliations/heritage associations were identified based on information provided by the NAHC, review of the NAHC Digital Atlas, plus a sample of relevant ethnographic and linguistic papers (Golla 2011; Goode 2020; Levy 1978; U.C Berkeley 2019), and information from SCE's Lee Vining PAD (FERC Project No. 1388).

- Additional ethnographic literature includes Emma Lou Davis (1965), Fowler and Liljeblad (1986), Frederick Hulse (n.d.), C. Hart Merriam (n.d.), Willard Park (1933-1940; see also Fowler, 1989), unpublished notes from Davis, Warren d'Azevedo, Sven Liljeblad, Omer Stewart, Margaret Wheat, and others.

- Data on trails and other nearby resources conducted by Davis-King and Snyder (2010).

[1] A TCP is a property that is eligible for inclusion in the NRHP based on its associations with the cultural practices, traditions, beliefs, lifeways, arts, crafts, or social institutions of a living community. TCPs are rooted in a traditional community's history and are important in maintaining the continuing cultural identity of the community (Parker and King 1990, 1998).

- Synthesis of information on Mono County American Indians in Davis-King (2007, 2010).

- Initial research found no investigations to date of: (1) an American Indian ethnography in the vicinity of the Project; (2) the potential for American Indian TCPs; or (3) the potential for other American Indian resources, some of which may be eligible for listing in the NRHP.

- Research has indicated there are no American Indian Federal trust lands/allotments in the vicinity of the Project. There are some Indian allotments in the region, but they are not proximate to the Project.

- Based on the information available, there is potential for Tribal resources to be located in the vicinity of the Project, as the local American Indian communities continue to access medicine plants, food plants, materials for tools, and many other items as part of their ongoing traditional cultural lifeways. These communities also have a connection with certain biological species, such as bighorn sheep; critical habit for bighorn sheep is immediately adjacent to the FERC Project boundary.

These background data are applicable to a broader territory than lands in the vicinity of the Project, as there has not been an American Indian ethnographic investigation to date of the Rush Creek Project. Previous ethnographies focused on nearby Tribal groups.

POTENTIAL INFORMATION GAPS

- Ethnohistory of lands in the vicinity of the Project (study area).

- Archival research and interviews to identify Tribal resources within the Area of Potential Effects (APE).

- Evaluation of Tribal resources for the NRHP.

- NRHP evaluations of Tribal resources that could be potentially affected by the Proposed Project (Undertaking).

STUDY OBJECTIVES

- Communicate and consult with Tribes regarding the Project.

- Develop an ethnohistory associated with lands in the vicinity of the Project (study area), which will be used to identify and evaluate Tribal resources.

- Identify and document Tribal resources in the vicinity of the Project. Characterize Tribal values and resources from a Tribal perspective through outreach and contact with Tribal governments and their representatives.

- Evaluate Tribal resources, as appropriate, to determine if they are eligible for listing on the NRHP and determine whether these resources will be affected by actions of the Proposed Project.

EXTENT OF STUDY AREA AND AREA OF POTENTIAL EFFECT

- For Tribal resources, the study area includes the area within 5 miles of the FERC Project boundary (Map CUL 3-1).

    - This study area will be used for archival research and interviews to develop contextual and background information.

- Under Section 106 of the NHPA, the APE is defined as "the geographic area or areas within which an undertaking may directly or indirectly cause alterations in the character or use of historic properties, if any such properties exist" (36 CFR § 800.16[d]). Additionally, the Advisory Council on Historic Preservation (ACHP) and the California Office of Historic Preservation (OHP) has provided guidance for Federal agencies and their delegated licensees to consider potential effects that:

    - May occur immediately and directly;

    - Are reasonably foreseeable or may occur later in time;

    - Are farther removed in distance and potentially affected indirectly; and

    - Include cumulative effects that may result from the undertaking.

- The proposed APE for the purposes of study implementation is defined as the entire area within the FERC Project boundary (Map CUL 3-2).

- Studies will not be conducted at locations where access is unsafe (e.g., where there is very steep terrain) or on private property for which SCE has not received specific approval from the landowner to enter the property to perform the study.

- The study area and APE may be expanded during the relicensing proceeding, in consultation with interested stakeholders, if any refinement/modification of the Proposed Project results in utilizing additional lands outside the FERC Project boundary or current APE.

STUDY APPROACH

The Tribal Resources Technical Study involves a multi-step process that includes: (1) meet with Tribal groups and resource agencies/stakeholders to discuss Proposed Study Plan and adequacy of the APE; (2) archival research; (3) meetings with Tribal governments; (4) interviews; (5) documentation and evaluation; and (6) technical study

reporting and consultation. Specific tasks that will be implemented during each step are described below.

ESTABLISH APE

- Submit the proposed APE, on behalf of FERC to the Tribes, the State Historic Preservation Officer (SHPO), and interested stakeholders for comments on the adequacy of the APE pursuant to 36 CFR § 800.16[d]). The APE may be expanded during the relicensing proceeding if any refinement/modification of the Proposed Project results in utilizing additional lands outside the FERC Project boundary.

ARCHIVAL RESEARCH

- Conduct archival research at the following repositories to obtain additional information specific to the prehistory, ethnography, and history associated with the study area. The results of the archival research will: (1) provide primary data to create an American Indian ethnohistory; and (2) develop the Tribal resources historic context which will be used in identification and evaluation of Tribal resources for the NRHP. The Tribal resources expert will conduct background archival research of the study area, which may include the following:

    - Autry Museum of the American West, Los Angeles
    - California State Archive, Sacramento
    - California State Library, California History Room, Sacramento
    - Emma Lou Davis Archive, Bishop
    - Hulse and Essene (Bancroft Library, Berkeley and elsewhere)
    - Huntington Library
    - Inyo National Forest, Bishop
    - Merriam and Harrington notes
    - National Archive and Records Administration, San Bruno
    - Tuolumne County Carlo M. De Ferrari Archive, Sonora
    - University of California, Berkeley, Bancroft Library
    - University of California, Berkeley, Jepson Fieldnotes
    - University of California, Davis, C. Hart Merriam Collection
    - University of Nevada, Reno, Special Collections
    - Yosemite National Park Research Library

MEETINGS WITH TRIBAL GOVERNMENTS

Meetings with Tribal governments/administrators and/or attendance at Tribal Council meetings, (if approved), will provide Project information to Tribal groups, elicit areas of interest, identify appropriate Tribal informants, and establish protocols for conveying information gathering activities. To date, ten American Indian Tribes have been identified as having potential interests in the Project. These are:

- American Indian Council of Mariposa County (also known as Southern Sierra Miwuk Nation)
- Big Pine Paiute Tribe of Owens Valley
- Bishop Paiute Tribe
- Bridgeport Indian Colony
- Mono Lake Indian Community (Mono Lake Kukzadikaa Tribe)
- North Fork Mono Tribe
- North Fork Rancheria of Mono Indians
- Tuolumne Band of Me-Wuk Indians
- Walker River Reservation
- Washoe Tribe of Nevada and California

The Tribal resource investigation will make a good-faith effort at proper communication with Tribal leaders as laid out in FERC's Policy Statement on Consultation with Indian Tribes in Commission Proceedings, issued July 23, 2003 (Docket No. PL03-4-000; Order No. 635; FERC 2003). The investigation will also follow the FERC regulations at 18 CFR § 2.1c, which added a policy statement on consultation with Tribes in FERC proceedings.

INTERVIEWS

Interviews are critical for identification of, description of significance, and evaluation of Tribal resources. Interviews with Tribal experts gain understanding about what is important to them and why. Knowledgeable individuals from each of the interested Tribes will be interviewed. The methods and nature of the interviews are expected to vary from person to person: some may be held in the field, others held in private homes, and still others held via telephone/teleconference. Interview records are similarly likely to be variable regarding confidentiality protocols and the Tribal expert's willingness to share. Recording methods (handwritten notes, video, audio tape, etc.) will be determined by consulting with the informant.

All phases of the Tribal resource investigation will be conducted in accordance with the American Indian community consultation standards outlined by the implementing regulations of Sections 101 and 106 of the NHPA and discussed in the 2012 ACHP publication *Consultation with Indian Tribes in the Section 106 Review Process: A Handbook*.

DOCUMENTATION AND EVALUATION

Three main categories of Tribal resources may be present and documented as described below.

- **Tribal Places** are locations associated with the ancestral past, places related to current gathering and/or hunting practices, or be other resource types. Those that qualify as potential historic properties will be documented on California Department of Parks and Recreation (DPR) 523 forms as appropriate and with Tribal permission, while others will be described in the CUL 3 – Tribal Resources Technical Study Report (TSR).

- **TCPs** will be documented on DPR 523 forms.

- **Tribal Government Resources** such as documentation of Indian allotments located within the study area will be documented in the CUL 3 – Tribal Resources TSR.

Because Tribal resources include both natural and cultural resources, coordination with other resource studies may be necessary in order to fully identify and evaluate Tribal resource. These will be considered in the study analysis such as the examples listed below.

- The location of culturally important plant species identified by American Indian Tribes will be incorporated into the CUL 3 – Tribal Resources TSR, as appropriate, and shared with the botanical resources study team.

- Information about culturally important aquatic species, including fisheries, identified by American Indian Tribes will be incorporated into the CUL 3 – Tribal Resources TSR, as appropriate, and shared with the proposed aquatic resources study team.

- Information about culturally important terrestrial animal species identified by American Indian Tribes will be incorporated into the CUL 3 – Tribal Resources TSR, as appropriate, and shared with the proposed terrestrial resources study team.

- The locations of culturally important plant and/or animal species will be considered in the recreation and land use studies, to the extent possible without divulging confidential information.

- Information on sites associated with prehistoric and ethnographic-period American Indian occupation and use of the landscape will be identified in both the CUL 2 – Archaeological Resources TSR and CUL 3 – Tribal Resources TSR.

All resources within or adjacent to the APE will be documented and described according to Tribal values and submitted for review to Tribal representatives. NRHP evaluation of Tribal resources suitable for DPR 523 documentation will use site-specific procedures to identify historic context of the resource, the boundaries, the jurisdiction or land ownership, the Tribal significance, integrity from a Tribal perspective, and contributing characteristics. Evaluation of other resource types may occur at the managerial or agency level.

NRHP evaluations will be conducted in adherence with National Register Bulletin No. 15, *How to Apply the National Register Criteria for Evaluation* (NPS, 1995) and National Register Bulletin No. 38, *Guidelines for Evaluating and Documenting Identification of Traditional Cultural Properties* (Parker and King 1990, 1998).

TECHNICAL STUDY REPORTING AND CONSULTATION

A Draft TSR will be distributed to interested stakeholders for review and comment. Comments on the Draft TSR will be addressed in a Final TSR, which will be included in the Draft License Application. The Draft and Final TSR will include a summary of the information and findings of the technical studies.

The TSR will include: (1) regulatory, environmental, and cultural contextual statements; (2) a discussion of research methods; (3) a discussion of Tribal resources; (4) a description and evaluation of resources that are assessed as potential historic properties; and (5) management considerations.

Tribal resource documentation and other sensitive information may be included in a confidential appendix withheld from public disclosure, in accordance with Section 304 (16 USC 4702-3) of the NHPA. The California Public Records Act similarly exempts site data from disclosure while Public Resources Code Section 21082.3(c) contains provisions specific to confidentiality related to any information submitted by an American Indian Tribe during the environmental review process, including, but not limited to, the location, description, and use of the Tribal cultural resources.

SCHEDULE

Date	Activity
February–April 2022	Engage Tribal groups to arrange meetings and establish protocols
May–September 2022	Meet with Tribal groups and resource agencies/stakeholders to discuss Draft Study Plan and adequacy of the APE
January–March 2023	Conduct archival research
January–October 2023	Conduct Tribal interviews to identify Tribal resources
October 2023–January 2024	Compile results of data gathered, evaluate Tribal resources, and prepare draft report
January 2024	Distribute draft report stakeholders
February–April 2024	Stakeholder review and provide comment on draft report (90 days)
April–June 2024	Resolve comments and prepare final report
August 2024	Distribute final report in Draft License Application

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MAPS

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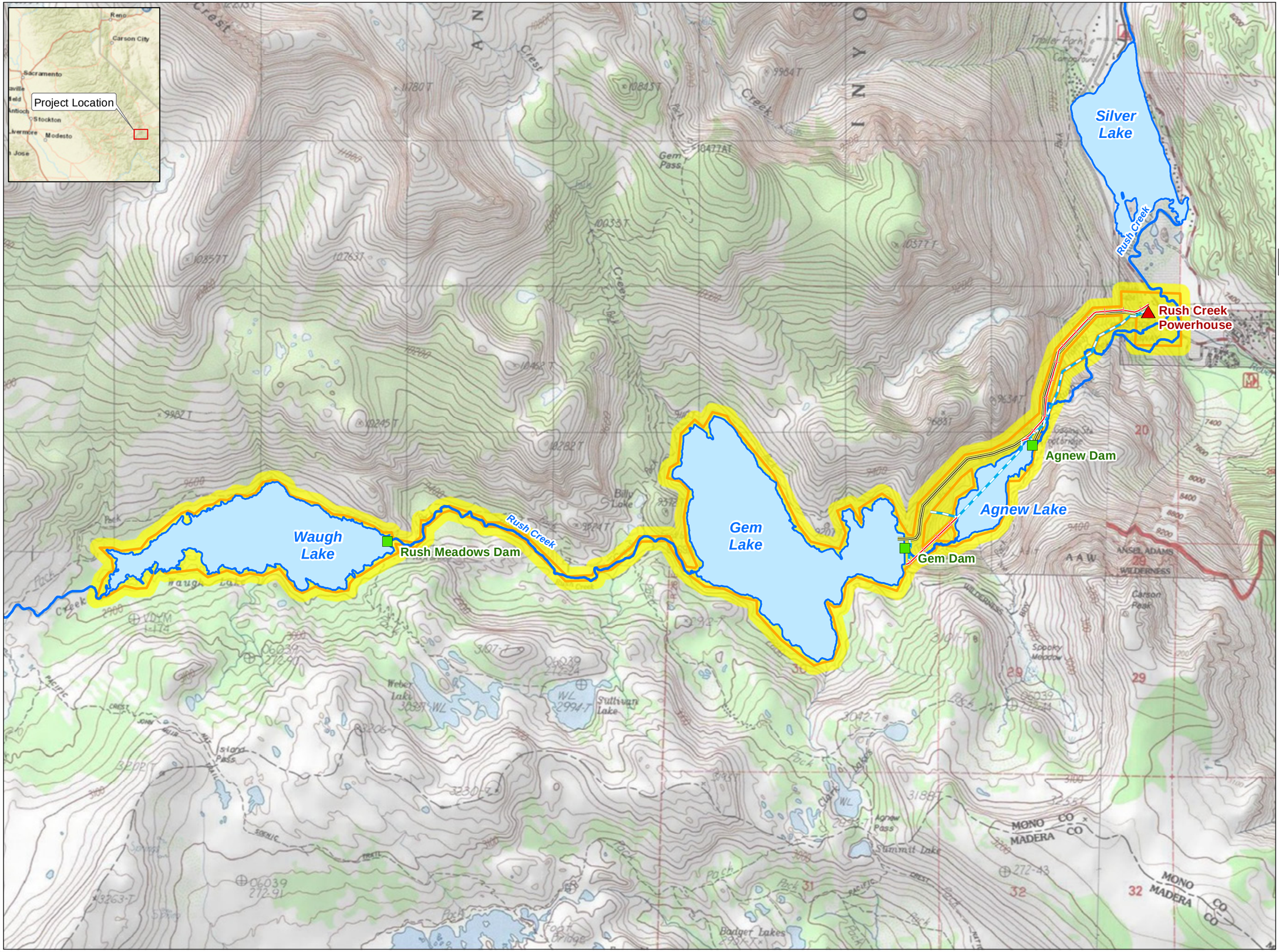

SCE Facilities

- Powerhouse
- Dam
- Flowline / Penstock
- Power or Communication Line
- Tramway
- FERC Project Boundary

Other Features

- Rush Creek
- Lake

Cultural Data

- Area of Potential Effects (APE)

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Rush Creek Project (FERC 1389)

Map CUL 3-1

Tribal Resources APE

0 0.25 0.5 Miles

Projection: UTM Zone 11
Datum: NAD 83

Date: 9/1/2021

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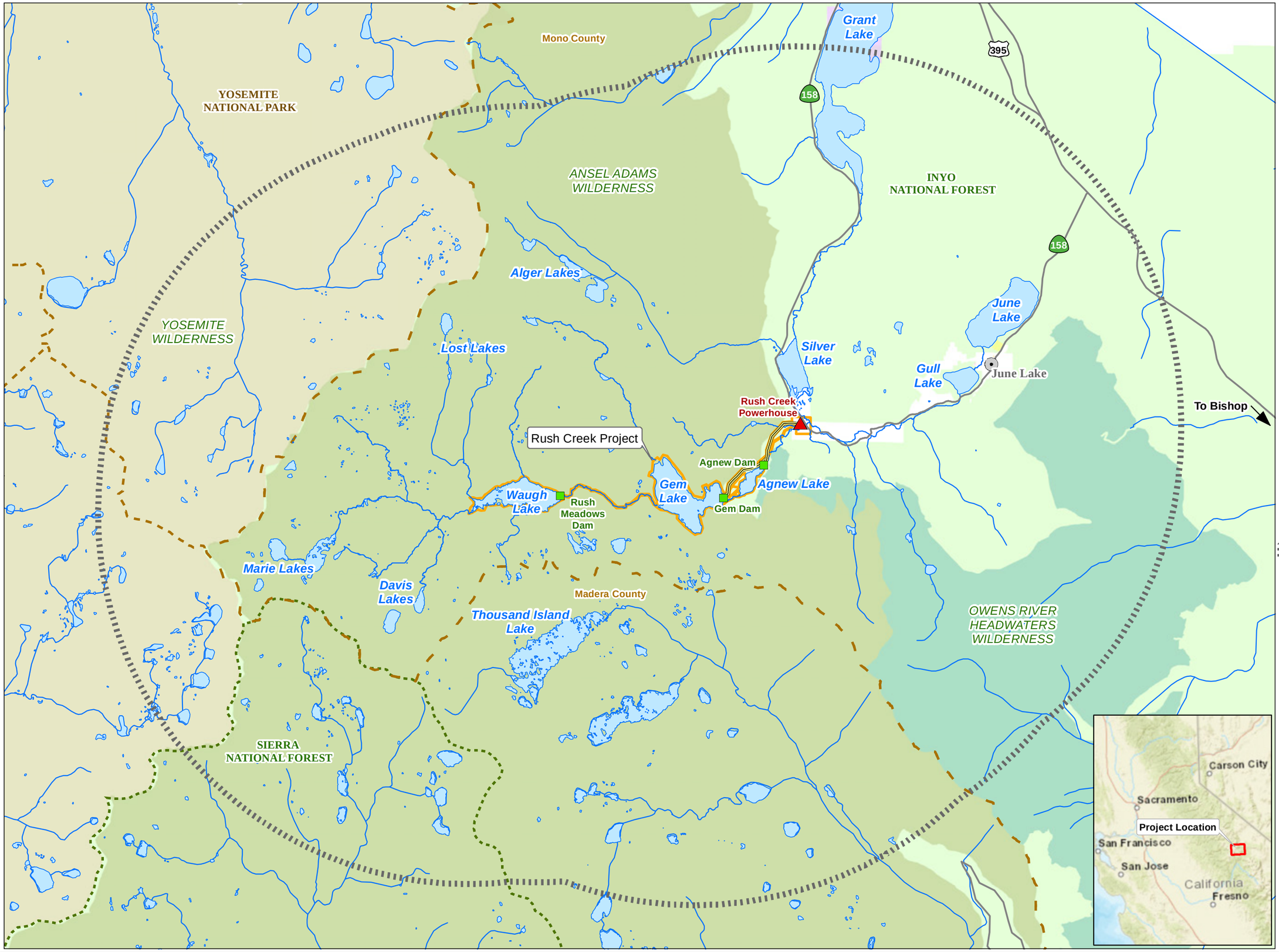

SCE Facilities

- 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.

Cultural Data

- Tribal Resources Study Area

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Rush Creek Project (FERC 1389)

Map CUL 3-2

Tribal Resources Study Area

0 0.5 1 Miles

Projection: UTM Zone 11
Datum: NAD 83

Date: 9/1/2021

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DRAFT
LAND 1 – AESTHETICS
TECHNICAL STUDY PLAN

Rush Creek Hydroelectric Project
FERC Project No. 1389

December 2021

DRAFT TECHNICAL STUDY PLAN
LAND 1 – Aesthetics

POTENTIAL RESOURCE ISSUES

- Visual quality.

PROJECT NEXUS

- The presence of Project facilities and/or Project operations could potentially affect visual quality.

RELEVANT INFORMATION

The following information is available regarding aesthetics in the vicinity of the Rush Creek Project (refer to Southern California Edison Company's [SCE] Pre-Application Document [PAD] Section 4.12 for a summary of aesthetic information [SCE 2021]).

- Forest Service Handbook, Landscape Aesthetics – A Handbook for Scenery Management (Forest Service 1995), which describes the Forest Service Scenery Management System (SMS), a system to inventory and analyze aesthetic values of National Forest System (NFS) land.

- Management prescriptions and direction included in the Land Management Plan (LMP) for the Inyo National Forest (INF) (Forest Service 2019) that pertain to Project facilities located in the INF.

- The Wilderness Management Plan for the Ansel Adams, John Muir, and Dinkey Lakes Wildernesses (Forest Service 2001), which includes management directives applicable to visual resources in the Ansel Adams Wilderness.

- Visual resource management goals and policies identified in the Mono County General Plan (Mono County 2015) that pertain to Project facilities located on private (SCE) land.

POTENTIAL INFORMATION GAPS

- Characterization of the existing scenic integrity (ESI) of the Project facilities on NFS land compared to surrounding landscape conditions and scenic integrity objectives (SIO) established by the INF.

- Characterization of the existing visual condition of the Project facilities on private land compared to visual resource management goals and policies established by Mono County.

- Visual character of Horsetail Falls under different flow conditions.

STUDY OBJECTIVES

- Establish Key Observation Points (KOP) from which the Project facilities are visible by the public.
- Document the ESI of the existing Project facilities on NFS land and their associated viewsheds relative to the Forest Service SIOs.
- Document the visual condition of the existing Project facilities on private land relative to Mono County goals and policies that pertain to visual resources.
- Document the visual character of Horsetail Falls under different flow conditions.

EXTENT OF STUDY AREA

- The study area for the visual resource assessment includes the Project facilities identified in Table LAND 1-1 and their associated viewsheds.
    - For the purposes of this study, a viewshed is defined as an area of the landscape that is visible from a particular location or series of points (e.g., an overlook or a trail, respectively). The viewsheds include the primary travel routes and recreation areas from which the existing Project facilities are visible to the public.
- Studies will not be conducted at locations where access is unsafe (e.g., where there is very steep terrain) or on private property for which SCE has not received specific approval from the landowner to enter the property to perform the study.

STUDY APPROACH

The majority of Project facilities are located on federal land within the INF and Ansel Adams Wilderness Area and managed by the Forest Service. The INF LMP (Forest Service 2019) established SIOs for INF lands using the Forest Service SMS (Forest Service 1995). The SIOs identify the desired level of scenic quality and diversity of a landscape based on physical and sociological characteristics of an area. Therefore, Project facilities located on NFS land will be assessed with respect to the management objectives established by the INF. Forest Service SIOs do not apply to private land.

Some Project facilities are located on private land within Mono County. Project facilities on private lands will be assessed relative to the goals and policies outlined in the Mono County General Plan that pertain to visual resources, to the extent these goals and policies apply to the Project.

Section 4.13, Aesthetic Resources of the PAD (SCE 2021) includes information about visual resources in the vicinity of the Project. The visual resource study steps described below will build on the information presented in the PAD.

ESTABLISH KOPS AND DESCRIBE THE LANDSCAPE CHARACTER OF THE PROJECT FACILITY VIEWSHEDS

- Select representative KOPs and define the Project facility viewsheds from each KOP.
    - The KOPs will be selected at locations along primary travel corridors (i.e., State Route 158 [SR-158]) and Rush Creek Trail) from which the Project facilities are readily visible by the public. KOP selection will be completed in consultation with the INF and Mono County, as applicable.
    - The location of each KOP will be recorded using a sub-meter Global Positioning System (GPS) unit for mapping purposes. If allowed by the Forest Service and/or Mono County, select KOP locations will also be physically marked with a pin so that they can be easily and accurately relocated, if necessary.
    - The location of each KOP will be depicted on a map(s) with respect to the Project facilities and INF SIOs (where applicable).
- Develop a standardized inventory form in consultation with INF. The standardized inventory form will be developed to prompt a consistent descriptive account of the Project facility viewsheds from each KOP in terms of landscape attributes (forms, lines, colors and textures that comprise the view); ecological unit descriptions; and scenic attractiveness.
- Narratively document the Project facility viewsheds from each KOP utilizing the standardized inventory form. Documentation shall take place during the summer.
- Photo document the Project facility viewsheds from each KOP. Documentation shall take place during the summer and should be concurrent with the narrative documentation.
- Synthesize, in writing, a description of the landscape character of the Project facility viewshed from each KOP utilizing data collected on the standardized inventory form.

DOCUMENT THE ESI OF THE EXISTING PROJECT FACILITIES RELATIVE TO FOREST SERVICE SIOS

- Based on the landscape character description, establish an ESI rating for each Project facility viewshed using the same rating system as used in the SMS for scenic integrity: very high, high, moderate, low, and very low.
- Based on the ESI ratings, assess the compatibility of Project facilities with surrounding landscape conditions and determine whether the Project facilities conform to established Forest Service SIOs.

DETERMINE CONSISTENCY OF THE EXISTING PROJECT FACILITIES WITH RELEVANT MONO COUNTY GOALS AND POLICIES

- Based on the landscape character description, determine whether the Project facilities viewsheds are consistent with established Mono County General Plan (Mono County 2015) visual resource goals and policies.

CHARACTERIZE HORSETAIL FALLS UNDER VARIOUS FLOW CONDITIONS

- Identify two-three locations (i.e., KOPs) from which Horsetail Falls is readily visible by the public (e.g., from SR-158 and from the Rush Creek Trail).
    - To facilitate comparison over time, the location of each KOP will be recorded using a sub-meter GPS unit and the view angle will be recorded with a compass. In addition, each KOP will be physically marked with a pin (as allowed) so it can be accurately relocated.
- Proposed target flows for characterization include: (1) a spill event[1]; (2) 70-85[2] cubic feet per second (cfs); (3) 13-20[3] cfs; (4) 5-8 cfs; and (5) 1 cfs (current minimum instream flow release requirement).
- Photo document visual conditions of Horsetail Falls from the established KOPs at the three target flows, using the same camera/lens settings and view angle during each flow.
- Utilize the photographs to describe and characterize the view of Horsetail Falls under different flow conditions.

REPORTING

- Study methods and results will be documented in a LAND 1 – Aesthetics Technical Study Report (TSR). The TSR will include summary tables and maps, as appropriate.

[1] Assuming a spill events occurs during study implementation.
[2] This evaluation will be conducted in coordination with the AQ 1 – Instream Flow Technical Study Plan.
[3] This evaluation will be conducted in coordination with the AQ 1 – Instream Flow Technical Study Plan.

SCHEDULE

Date	Activity
January–March 2023	Summarize land management direction and objectives, establish KOPs, and develop inventory forms
June–August 2023	Inventory, photo document, and assess Project facilities
May–August 2023	Photo document and characterize Horsetail Falls at three different flows, assuming spill flows are available
September 2023–January 2024	Analyze data and prepare draft report
February 2024	Distribute draft report to stakeholders
March–May 2024	Stakeholders review and provide comments on draft report (90 days)
June–July 2024	Resolve comments and prepare final report
August 2024	Distribute final report in Draft License Application

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TABLES

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Table LAND 1-1. Project Facilities

Rush Meadows Dam Area
Dams
Rush Meadows Dam
Reservoirs
Waugh Lake
Valve House
Rush Meadows Dam Valve House
Stream Gages
Rush Creek below Rush Meadows (Waugh Lake) (USGS No. 10287262; SCE No. 359r)
Reservoir Gages
Waugh Lake (USGS No. 10287260; SCE No. 359)
Trails
Rush Meadows Dam Access Trail
Rush Meadows Dam/Waugh Lake Ancillary and Support Facilities
Rush Meadows Dam Equipment Shed
Rush Meadows Dam Gage House
Rush Meadows Dam Solar Facility
Gem Dam Area
Dams
Gem Dam
Reservoirs
Gem Lake
Flowline
Gem Dam to Agnew Junction Flowline
Valve House
Gem Valve House and Cabin
Gem Dam Arch 8 Valve House
Gem Flowline Valve House
Stream Gages
Rush Creek below Gem Lake (USGS No. 10287281; SCE No. 352r)
Reservoir Gages
Gem Lake (USGS No. 10287280; SCE No. 352)

Gem Dam Area (continued)
Communication Lines
Communication Line from Rush Creek Powerhouse to Gem Lake Dam
Communication Line from Gem Valve House to Arch 8 Valve House
Communication Line from Gem Tram Hoist House to Gem Valve House
Trams and Hoist Houses
Gem Tram
Gem Tram Hoist House
Gem Tram Lower/Upper Landing
Trails
Lower Gem Dam Access Trail
Gem Dam Arch 8 Access Trail
Upper Gem Dam Access Trail
Gem Dam/Lake Ancillary and Support Facilities
Gem Lake Dock
Gem Lake Motor Barge
Gem Bunkhouse
Gem Outhouse
Gem Cookhouse
Gem Dam Compressor Shed
Gem Dam Storage Shed
Gem Dam Overhead Hoist House for Dam Length
Gem Dam Overhead Hoist House
Gem Fish Release Footbridge
Gem Tram Landing Footbridge
Gem Tram Bridge
Gem Weather Station
Gem Satellite Dish
Gem Solar Facility
Gem Valve House Tunnel

Agnew Dam Area
Dams
Agnew Dam
Reservoirs
Agnew Lake
Flowline
Agnew Dam to Agnew Junction Flowline
Valve House
Agnew Junction (Valve House and Stand Pipe)
Agnew Dam Valve House
Stream Gages
Rush Creek below Agnew Lake (USGS No. 10287289; SCE No. 357)
Reservoir Gages
Agnew Lake (USGS No. 10287285; SCE No. 351)
Power Lines
4 kV Rush Creek Powerhouse to Agnew Dam Power Line
4 kV Agnew Lake Dam Power Line
4 kV Upper Agnew Boat Dock Power Line (non-operational)
Communication Lines
Communication Line from Agnew Hoist House to Agnew Boathouse
Trams and Hoist Houses
Agnew Tram
Agnew Tram Hoist House
Agnew Tram Landing
Trails
Agnew Stream Gage Access Trail
Agnew Dam/Lake Ancillary and Support Facilities
Lower Agnew Lake Boathouse / Dock
Upper Agnew Lake Boathouse / Dock
Agnew Lake Motor Barge
Agnew Cabin
Agnew Weather Station
Agnew Flume (downstream of Agnew Dam)

Rush Creek Powerhouse Area
Penstocks
Agnew Junction to Rush Creek Powerhouse Penstock (No. 1)
Agnew Junction to Rush Creek Powerhouse Penstock (No. 2)
Powerhouse
Rush Creek Powerhouse
Gages
Rush Creek Powerhouse (USGS No. 10287300; SCE No. 367)
Transmission Lines
2.4 kV Switchyard to Powerhouse Transmission Line
Powerhouse Ancillary and Support Facilities
Rush Creek Powerhouse Complex Access Road
Cottages (2)
Garages (4)
Warehouse and Dock
Machine Shop
Pump House
Woodshed (2)
Helicopter Landing Site
Tank (propane)
Bridge over Powerhouse Tailrace
Bridge over Rush Creek

DRAFT
LAND 2 – NOISE
TECHNICAL STUDY PLAN

Rush Creek Hydroelectric Project
FERC Project No. 1389

December 2021

DRAFT TECHNICAL STUDY PLAN
LAND 2 – Noise

POTENTIAL RESOURCE ISSUES

- Protection of noise sensitive receptors (i.e., residences, businesses, recreation areas, and wildlife areas).

PROJECT NEXUS

- Routine operation of the Rush Creek Project Powerhouse may create excessive noise impacting sensitive receptors.

- Use of helicopters, construction equipment, and trucks to support construction and restoration activities associated with retrofitting/removal of Project dams, and potential enhancements in the lower Rush Creek channel may create excessive noise impacting sensitive receptors.

RELEVANT INFORMATION

The following information is available and was reviewed to determine Project noise study needs:

- Noise level limitations and definitions identified in the Mono County Code, Chapter 10.16, Noise Regulation (Mono County 2015a).

- Goals, objectives, and policies designed to control and abate environmental noise and to limit community exposure as outlined in the Mono County General Plan, Noise Element (Mono County 2015b).

- California Department of Transportation guidance on identifying potential for adverse effects due to noise or vibration (Caltrans 2020a, 2020b).

- Guidance for screening air traffic actions for potential noise impacts outlined in the Federal Aviation Administration's Desk Reference (FAA 2020).

POTENTIAL INFORMATION GAPS

- Ambient noise (no generation at powerhouse) and noise emanating from the Rush Creek Powerhouse under different generation loads.

- Information on ambient noise and anticipated noise levels associated with use of helicopters, construction equipment, and trucks during construction and restoration activities associated with retrofitting/removal of Project dams, and potential enhancements in the lower Rush Creek channel.

STUDY OBJECTIVES

Characterize ambient and Project-generated noise at sensitive receptor areas (i.e., residences, businesses, recreation areas, and wildlife areas) and compare to applicable state and local noise regulations/ordinances associated with the following activities:

- Routine operations of the Rush Creek Powerhouse
- Retrofitting/removal of dams and potential enhancement of the lower Rush Creek channel
    - Helicopter use
    - Construction equipment use
    - Truck use

EXTENT OF STUDY AREA

- Refer to Map LAND 2-1 for the noise assessment study area. The study area for the noise assessment includes sensitive receptors:
    - In the vicinity of the Rush Creek Powerhouse (powerhouse noise).
    - Along the helicopter flight path from June Mountain Ski Area Parking Lot to top of ridge near Agnew Dam (helicopter noise).
    - Adjacent to the June Mountain Ski Area Parking Lot and the potential enhancement area in lower Rush Creek channel (construction equipment noise).
    - Along State Route 158 (SR-158) from June Mountain Ski Area Parking Lot to U.S. Highway 395 (US-395) (truck noise).
- Studies will not be conducted at locations where access is unsafe (e.g., where there is very steep terrain) or on private property for which Southern California Edison (SCE) has not received specific approval from the landowner to enter the property to perform the study.

STUDY APPROACH

GENERAL APPROACH

Identify Noise Sensitive Receptors/Points of Interest

Residences, businesses, recreation areas, and wildlife areas represent locations most at risk to noise impacts and are considered noise sensitive receptors or Points of Interest (POI). The identification of applicable POI for the noise analysis will consider the local terrain, existing land uses, recreational activities, and wildlife occurrences. For each of

the study components, selection of POI will identified in consultation with resource agencies and interested stakeholders.

Field Characterize of Ambient/Project-Induced Noise

Accurately field characterizing of ambient/Project-induced noise requires measurements at or near identified POI using appropriate equipment for the level of accuracy desired. To accomplish this goal, field measurements will utilize an integrating sound level meter similar to a Larson Davis 824/831 and associated pre-amplifier and microphone. The entire system will be certified by an independent authority attesting to the accuracy of the equipment meeting the following performance standards describing tolerance limits and operational temperature range:

- IEC 61672-1:2013, Class 1 (IEC 2013)
- ANSI S1.4, ANSI S1.43 Type 1 (ANSI 1983, ANSI 1997)

A separate acoustic calibrator will be used before and after field measurements to ensure proper equipment function.

The goal is to capture typical conditions at each POI. Summer through fall comprises the primary vacationing period within the study area with numbers of visitors peaking roughly July and August. Because noise generating activity associated with recreation (primarily vehicle traffic) fluctuates based on numbers of visitors, a single ambient noise measurement would be inadequate to fully describe the existing noise environment and potential for impacts. Therefore, ambient noise measurements would be performed at each site during the following three periods:

1. June: Early in the recreation season with fewer visitors and lower anticipated ambient noise levels.
2. August: Peak recreation season with the most visitors expected and the greatest ambient noise levels.
3. October: End of recreation season with fewer visitors and lower anticipated ambient noise levels.

For each study component, the noise study team will engage the resource agencies and interested stakeholders for background information to guide the planning of these measurements, particularly in determining the most appropriate deployment dates.

Analysis Metrics

Noise metrics quantify sounds so they can be compared with each other, and with their effects, in a standard way. This noise study will rely upon the following metrics to describe the noise environment in the study area.

- ***Maximum Sound Level (L_{max})*** represents the highest A-weighted sound level measured during a single event in which the sound changes with time. L_{max} is the maximum level that occurs over a fraction of a second so it does not fully describe the noise, because it does not account for how long the sound is heard.

- ***Equivalent Sound Level (L_{eq})*** is a "cumulative" metric that combines a series of noise events representing the decibel average of all sounds in the time period. The time period of an L_{eq} measurement is usually related to some activity and is given along with the value. Periods of 1 hour provide an appropriate assessment period for many environmental measurements with the time period often shown in parenthesis ($L_{eq(1)}$ for 1 hour).

- ***Community Noise Equivalent Level (CNEL)*** is a variation of the Day-Night Average Sound Level (DNL) that is prescribed by the State of California for airport noise rating and building code standards (California Code of Regulations, title 21 Public Works, subchapter 6; California Administrative Code, Title 25, Building Standards, Chapter 2.5). CNEL is a cumulative metric that accounts for all noise events in a 24-hour period. Similar to $L_{eq(24)}$ except DNL contains an evening and nighttime noise penalty of 4.77 and 10 dB, respectively, to account for the added intrusiveness of environmental noise during those periods.

SPECIFY STUDY COMPONENTS

- The following describes the approach for each study component.

Powerhouse Operation

- Identify noise sensitive POI in the vicinity of the Rush Creek Powerhouse.
  - SCE currently proposes to establish the following POI:
    - Within 100 meter (m) of the Rush Creek Powerhouse, and
    - Two to three POI in the vicinity of the powerhouse (pending landowner permission) to be identified in consultation with resource agencies and interested stakeholders.
- Characterize ambient noise (no generation at the powerhouse) and noise emanating from the Rush Creek Powerhouse under different generation loads at noise sensitive POI.
  - Ambient noise levels will be characterized, in terms of L_{max} and $L_{eq(1)}$, at each POI.
  - Because CNEL requires at least 24-hours to measure directly at each POI, which may be impractical, the level will be approximated from $L_{eq(1)}$ with the appropriate period adjustments prescribed by the CNEL metric. If it is observed at any POI that the captured $L_{eq(1)}$ includes significant human contributions

likely to vary throughout the day (i.e. people or vehicular traffic) then additional evening or nighttime Leq(1) measurements at that POI may be captured as well to refine the CNEL approximation of the ambient noise.

- When capturing the powerhouse noise contribution, the loudest condition may occur at the greatest equipment load or potentially at a reduced load if such a condition excites the equipment's resonant frequency. Due to this uncertainty, coordination with the powerhouse operators and local stakeholders will be conducted to determine the appropriate load conditions to capture. Analysis of historical load conditions at the Rush Creek Powerhouse can guide this consideration.

- Consistent with the ambient condition, L_{max} and L_{eq} will be measured at each POI for various powerhouse operating loads. If the powerhouse equipment noise dominates the ambient noise and is stable over time, a full 1-hour measurement of L_{eq} will not be required and can be shortened to 1 to 2 minutes for each condition. CNEL will then be calculated for the various powerhouse load conditions based upon L_{eq}.

- Compare noise levels to applicable state and county regulations/ordinances.

  - Both the ambient and power generation noise levels will be compared to state and Mono County noise level standards, which describe maximum allowable exterior noise exposure by land use in terms of CNEL.

Helicopter Use

- Identify noise sensitive POI in the vicinity of the helicopter flight path.

  - SCE currently proposes to establish the following POI:

    - Within 100 m of the June Mountain Ski Area Parking Lot, and

    - Two to three POI along the flight path (pending landowner permission) to be identified in consultation with resource agencies and interested stakeholders.

- Characterize ambient and Project-induced noise levels at each sensitive POI.

  - Ambient noise levels will be captured in terms of L_{max} and $L_{eq(1)}$. The captured $L_{eq(1)}$ values will be used to calculate ambient CNEL at applicable POI along the helicopter flight path.

  - Helicopter noise from Project activities will be characterized using noise modeling software. The Department of Defense NOISEMAP suite of computer programs for aircraft noise modeling and analysis includes the Rotorcraft Noise Model (RNM) (Wyle 1998; Wasmer Consulting 2006a, 2006b). The RNM will

be used to predict far-field noise for single or multiple flight operations while calculating the effects of sound propagation over varying ground terrain.

- Noise levels are computed in the time domain and with a variety of integrated metrics, including L_{max}, L_{eq}, and CNEL, at receiver positions on or above the ground at specific POI and over a uniform grid. Software noise modeling is accomplished by determining and building each aircraft's flight tracks (paths over the ground) and flight profiles (which include data such as altitude, airspeed, power settings, and other flight conditions). RNM includes a database of noise spheres for various helicopters. If the specific airframe that will be used for this Project is not available a surrogate will be selected. RNM will be used to calculate L_{max}, L_{eq}, and CNEL at POI along the flight path for helicopter operations.

- Compare noise levels to applicable state and county regulations/ordinances.
  - Results will be compared with state and Mono County noise level standard for maximum allowable exterior noise exposure by land use in terms of CNEL. Single event L_{max} levels will be discussed in terms of the context and intensity of the existing environment.

Construction Equipment

- Identify noise sensitive POI adjacent to the June Mountain Ski Area Parking Lot and the potential enhancement area in the lower Rush Creek channel.
  - SCE currently proposes to establish the following POI:
  - Within 100 m of the June Mountain Ski Area Parking Lot,
  - On SCE land near SR-158 and the potential enhancement area, and
  - Two to three POI adjacent to the June Mountain Ski Area Parking Lot and the potential enhancement area to be identified in consultation with resource agencies and interested stakeholders.

- Characterize ambient and Project-induced noise levels at each sensitive POI.
  - Ambient noise levels to be captured in terms of L_{max} and $L_{eq(1)}$. The captured Leq(1) values will be used to calculate ambient CNEL at applicable POI.
  - Noise associated with construction equipment activity will be calculated using the Federal Highway Administration's (FHWA) software tool, the Roadway Construction Noise Model (RCNM) (FHWA 2006).
    - Input requires identification of the types of equipment (i.e., front end loader, dump truck, etc.) to be operated and the hours of operations. If such details are not available, then conservative assumptions will be made.

  - The software includes the ability to compute L_{max} and L_{eq}. With knowledge of the equipment operating hours, the construction equipment CNEL will be approximated, and the results compared to the Mono County noise level standard.

- Compare noise levels to applicable state and county regulations/ordinances.
  - Results will be compared with state and Mono County noise level standard for maximum allowable exterior noise exposure by land use in terms of CNEL. Single event L_{max} levels will be discussed in terms of the context and intensity of the existing environment.

Truck Use

- Identify noise sensitive POI along SR-158 from June Mountain Ski Area Parking Lot to US-395.
  - SCE currently proposes to establish the following POI:
    - Two POI located adjacent to Silver Lake (at Silver Lake Campground and Silver Lake Resort).
    - These POI are in addition to the POI previously identified for assessment of construction equipment use.
- Characterize ambient noise levels at each sensitive POI.
  - Ambient noise levels to be captured in terms of L_{max} and $L_{eq(1)}$ at each of the POI along SR-158. The captured $L_{eq(1)}$ values will be used to calculate ambient CNEL at applicable POI.
  - Recent environmental studies will be reviewed to determine if existing noise levels have already been measured or calculated along SR-158.
  - If not available, the FHWA provides the following guidelines for establishing baseline conditions through measurement:
    - Noise measurements are usually taken at Level of Service C (LOS C) or better. LOS C is the point where traffic is as congested as it can be but moving the fastest speed allowable by law (LOS A = virtually no traffic, LOS D = gridlock).
    - Noise readings should be taken on a Tuesday, Wednesday, or Thursday.
    - Three noise readings should be taken per site in 20-minute increments and then averaged.
- Characterize Project-induced noise levels at each sensitive POI.

- The FHWA provides the Traffic Noise Model (TNM) for road vehicular noise analysis. TNM Version 2.5 includes a Low Volume Tool as a simple noise calculator for a single roadway (FHWA 2004).
    - This study will utilize the TNM Low Volume Tool to calculate the $L_{eq(1)}$ at POI along SR-158 due to the proposed truck hauling noise. $L_{eq(1)}$ values will be used to calculate CNEL at applicable POI with the addition of truck hauling noise.

- Compare noise levels to applicable state and county regulations/ordinances.
    - Results will be compared with state and Mono County noise level standard for maximum allowable exterior noise exposure by land use in terms of CNEL. Single event L_{max} levels will be discussed in terms of the context and intensity of the existing environment.

SCHEDULE

Date	Activity
March-May 2023	Identify sensitive receptors/ POI with resource agencies and stakeholders
June–October 2023	Conduct noise surveys
October 2023–January 2024	Analyze data and prepare draft report
February 2024	Distribute draft report to stakeholders
March 2024–May 2024	Stakeholders review and provide comments on draft report (90 days)
June–July 2024	Resolve comments and prepare final report
August 2024	Distribute final report in Draft License Application

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MAPS

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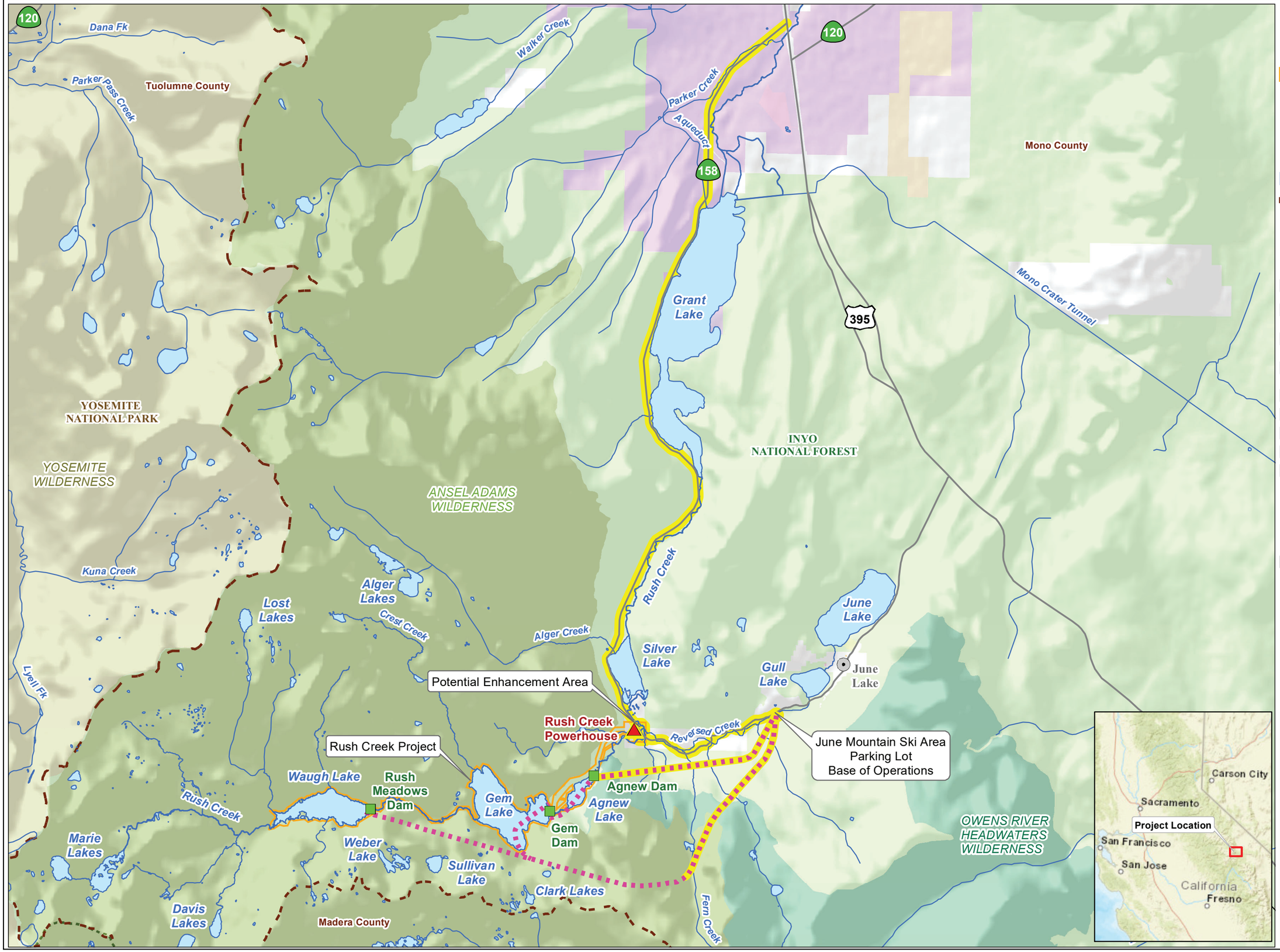

SCE Facilities

- Dam
- Powerhouse
- FERC Boundary

Other Features

- Major City/Town
- Highway
- River/Stream
- Lake
- County Boundary
- Approximate Helicopter Flight Path

Land Jurisdiction and National Wilderness Areas/Parks*

- 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)
- Local Government
- LADWP
- State Government
- Bureau of Land Management
- Private (Blank)

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

LAND-2 Study

- Noise Assessment Study Area

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Rush Creek Project (FERC 1389)

Map LAND 2-1

Overview of Study Area

0 0.5 1 Miles

Date: 10/11/2021

Projection: UTM Zone 11
Datum: NAD 83

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DRAFT
REC 1 – RECREATION
TECHNICAL STUDY PLAN

Rush Creek Hydroelectric Project
FERC Project No. 1389

December 2021

DRAFT TECHNICAL STUDY PLAN
REC 1 – Recreation

POTENTIAL RESOURCE ISSUES

- Recreation use and opportunities in the vicinity of the Project.
- Public safety.
- Flow fluctuations in Rush Creek downstream of the Rush Creek Tailrace.

PROJECT NEXUS

- Maintaining recreation opportunities and public safety associated with operations and maintenance of the Project.

RELEVANT INFORMATION

The following information is available regarding recreation in the vicinity of the Rush Creek Project (refer to Southern California Edison Company's [SCE] Pre-Application Document [PAD] Section 4.11 for a summary of recreation information [SCE 2021]).

- Management prescriptions and direction relevant to recreation included in the Land Management Plan for the Inyo National Forest (INF) (Forest Service 2019).
- Management directives applicable to recreation in the Ansel Adams Wilderness in the Wilderness Management Plan for the Ansel Adams, John Muir, and Dinkey Lakes Wildernesses (Forest Service 2001a).
- Programmatic direction and management strategies for the Ansel Adams Wilderness in the Final Environmental Impact Statement (FEIS) (and FEIS appendices): Management Direction for the Ansel Adams, John Muir and Dinkey Lakes Wildernesses (Forest Service 2001b).
- Goals, policies, and objectives identified in the Mono County General Plan (Mono County 2015) that pertain to outdoor recreation opportunities in the County.
- Section 2.0, Project Location, Facilities, and Operation, and Section 4.3, Water Use and Hydrology of the Rush Creek PAD, present a summary of Project operations and water use; available stream gage data; and daily historical, existing, and unimpaired hydrology for Project-affected stream reaches and Project reservoirs.
- SCE's Public Safety Plan for the Rush Creek Project (SCE 2016).
- Safety-related information that may be included in the Federal Energy Regulatory Commission (FERC) Environmental Inspection Reports for the Project.

- Safety Incident Reports that may have been filed by SCE, as required by Title 18 of the Code of Federal Regulations §12.10.

POTENTIAL INFORMATION GAPS

- Non-commercial recreation use data for the Rush Creek Trail, including day and overnight trips, and destination.
- Commercial recreation use data for the Rush Creek Trail and the pack station camps in the vicinity of the Project, including the Billy Lake Stock Camp, and Frontier Pack Station Camp.
- Data on flow fluctuations in Rush Creek downstream of the Rush Creek Tailrace.
- Recreation trends and potential future recreation demand.
- Project facility conditions, and operation and maintenance activities relative to public safety.

STUDY OBJECTIVES

- Characterize the recreation setting and opportunities in the Rush Creek Watershed and in the immediate vicinity of the Project.
- Characterize non-commercial recreation use along the Rush Creek Trail and in the vicinity of the Project, including day and overnight use.
- Characterize commercial use along the Rush Creek Trail and in the vicinity of the Project, including day and overnight trips.
- Characterize hourly changes in water surface elevation in Rush Creek downstream of the Rush Creek Powerhouse Tailrace associated with Project operations (peaking).
- Estimate potential future recreation use in the vicinity of the Project using existing use data and published recreation trends information.
- Document potential public safety issues and existing programs and measures that are implemented by SCE to protect public health and safety.

EXTENT OF STUDY AREA

The study area includes the Rush Creek Watershed from its headwaters near Mt. Lyell to Rush Creek confluence with Grant Lake (see PAD Map 4.2-1). The study area will be used when developing general information about the recreation resources in the vicinity

of the Project for contextual purposes. The following areas will be the primary focus of the study:

- The trail network in the vicinity of the Project, including: the Rush Creek Trail from a developed trailhead located near Silver Lake to its intersection with the Pacific Crest Trail; and the trails that connect to the Rush Creek Trail (e.g., Spooky Meadows Trail, Clark Lakes Trail, Alger Lakes Trail, and Weber Lake Trail).

- Project-affected stream reaches from Waugh Lake to the confluence of Rush Creek and Grant Lake. Table REC 1-1 identifies the Project-affected stream reaches.

- The three Project reservoirs (Waugh, Gem, and Agnew lakes) and Silver Lake (non-Project natural lake) including the area immediately surrounding these reservoirs/lakes.

- Commercial pack stations camps located along the Rush Creek Trail, including the Billy Lake Stock Camp, and Frontier Pack Station Camp.

These areas are shown on Map REC 1-1 with respect to the primary Project facilities, FERC Project boundary, and land jurisdiction.

- Studies will not be conducted at locations where access is unsafe (e.g., where there is very steep terrain) or on private property for which SCE has not received specific approval from the landowner to enter the property to perform the study.

STUDY APPROACH

Section 4.11, Recreation Resources of the PAD (SCE 2021) characterizes the recreation setting and opportunities in the vicinity of the Project (including with narrative descriptions accompanied by maps and tables), based on data and information readily available from existing information sources. The study elements described below will build on the information presented in the PAD.

CHARACTERIZE NON-COMMERCIAL RECREATION USE ALONG THE RUSH CREEK TRAIL AND IN THE VICINITY OF THE PROJECT

- Interview INF Wilderness Rangers familiar with the Rush Creek Watershed regarding trail use in the vicinity of the Project and popular backcountry destinations.

- Utilize overnight use data (five most recent years) collected by the INF under their wilderness permit system to develop the following information regarding use along the Rush Creek Trail and in the vicinity of the Project reservoirs. Wilderness

permits are only required from May 1 through November 1. Therefore, use estimates will cover this period.

- Identify common overnight destinations that are accessed from the Rush Creek Trailhead.
- Identify other trailheads used to access the Rush Creek Watershed.
- Estimate the number of overnight visitors who use the Rush Creek Trail, starting from the Rush Creek Trailhead or other connected trailheads.
- Identify destination, average group size, and length of stay, focusing on use in the vicinity of the Project- affected stream reaches and Project reservoirs.
- Estimate weekday, weekend and holiday use, if possible given the information available on the wilderness permits.
- Document the number of times the overnight quota at the Rush Creek Trailhead was met or exceeded.
- Identify the area of origin of the visitors who utilize the Rush Creek Trail.

- Consult with INF staff to obtain estimates of day use along the Rush Creek Trail based on observations made by Forest Service staff.
- If information available from the INF is insufficient to estimate day use, establish a temporary self-registration box at the Rush Creek Trailhead to collect day use information.
  - The self-registration box will be maintained from May 1 through November 1, commensurate with the quota system.
  - The self-registration box will consist of a painted steel weatherproof box mounted on a painted steel post (or existing information board/kiosk).
  - Signage encouraging/directing day users (whether entering or exiting) to complete a short survey will be mounted adjacent to the box.
  - The box will contain forms and writing implements. The forms will be used to collect the following information: name, area of origin (i.e., zip code), date, time, number in party, and destination.
  - The completed forms will be regularly collected, and the self-registration box will be resupplied with writing implements and new forms, as needed.
  - Information collected at the self-registration box will be used to estimate and characterize day use along the Rush Creek Trail, and destinations identified.

CHARACTERIZE COMMERCIAL RECREATION USE ALONG THE RUSH CREEK TRAILHEAD AND IN THE VICINITY OF THE PROJECT

- Interview the Frontier Pack Station outfitter to identify the most popular pack routes and most popular backcountry destinations in the vicinity of the Project.

- Obtain and compile the most recent five years of overnight use data from the pack station outfitters and/or the INF to characterize commercial use along the Rush Creek Trail and at the overnight pack camps located in the vicinity of the Project.

CHARACTERIZE FLOW FLUCTUATION IN RUSH CREEK DOWNSTREAM OF THE RUSH CREEK POWERHOUSE TAILRACE

- To characterize flow fluctuations in Rush Creek below the Rush Creek Powerhouse Tailrace related to Project operations (peaking), an hourly time-series of water surface and discharge will be developed as part of implementation of the AQ 1 – Instream Flow Technical Study Plan (TSP).

- The hourly time-series will characterize flow fluctuation in Rush Creek under both existing and Proposed Project operations to characterize stream-based recreation opportunities and constraints.

ESTIMATE FUTURE RECREATION USE AND DEMAND

- Estimate future recreation needs in the vicinity of the Project.

    - Utilize census data and information available in current relevant federal, state, and local comprehensive plans to identify population projections and to document outdoor recreation use trends and needs.

    - Utilize use estimates along with trends and population projections to estimate future recreation needs over the license period (assumed to be 50 years).

    - Determine whether future recreation needs can be met in the vicinity of Project.

DOCUMENT PUBLIC SAFETY

- Identify and describe existing programs and measures implemented by SCE to protect public health and safety (i.e., buoy lines, fencing, signage, and alarms). The inventory will include a description of the condition of the existing safety features.

- Characterize the number, type, and location of safety incidents related to recreation that have occurred in the vicinity of the Project over the past ten years. This effort will be conducted by reviewing existing records and databases maintained by the FERC and by consulting with SCE staff.

REPORTING

- Study methods and results will be documented in an REC 1 – Recreation Technical Study Report (TSR). The TSR will include summary tables and maps, as appropriate.

SCHEDULE

Date	Activity
January–March 2023	Gather and analyze existing available use data
January–April 2023	Interview key information sources (i.e., INF, Frontier Pack Station Outfitter, local guides and outfitters, and June Lake homeowner's association representatives)
April–November 2023	Establish a temporary self-registration box at the Rush Creek Trail Trailhead and collect day-use information, if needed
October 2023–January 2024	Analyze data and prepare draft report
February 2024	Distribute draft report to stakeholders
March–May 2024	Stakeholders review and provide comments on draft report (90 days)
June–July 2024	Resolve comments and prepare final report
August 2024	Distribute final report in Draft License Application

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TABLES

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Table REC 1-1. Stream Reaches.

Reach Name	Reach Length (miles) / River Miles (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
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

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MAPS

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SCE Facilities

- Dam
- Powerhouse
- Flowline / Penstock
- FERC Boundary

Other Features

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

Land Jurisdiction and National Wilderness Areas/Parks*

- 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.

Developed Recreation Facilities and Trails

- Boat Launch
- Marina
- Car Top Boat Launch
- Campground
- Day-Use Area and/or Picnic Area
- Pack Station
- RV Park
- Resort
- Ski Area
- Pacific Crest Trail
- Other Major Trail

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Rush Creek Project (FERC 1389)

Map REC 1-1

Recreation Setting in the Vicinity of the Rush Creek Project

0 0.25 0.5 Miles

Projection: UTM Zone 11
Datum: NAD 83

Date: 10/26/2021

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DRAFT
TERR 1 – BOTANICAL RESOURCES TECHNICAL STUDY PLAN

Rush Creek Hydroelectric Project
FERC Project No. 1389

December 2021

DRAFT TECHNICAL STUDY PLAN
TERR 1 – Botanical Resources

POTENTIAL RESOURCE ISSUES

- Vegetation alliances.
- Jurisdictional waters of the United States (U.S.) and the state.
- Special-status plant, moss, and lichen populations.
- Introduction or spread of non-native invasive plant (NNIP) populations.

PROJECT NEXUS

- Direct loss or degradation of vegetation alliances, including communities afforded special recognition by state and federal agencies (e.g., riparian communities and jurisdictional Waters of the U.S./State).
- Removal or disturbance of special-status plant, moss, and lichen populations.
- Introduction or spread of NNIPs.

RELEVANT INFORMATION

The following information is available regarding botanical resources in the vicinity of the Rush Creek Project (refer to Southern California Edison Company's [SCE] Pre-Application Document [PAD] Section 4.6 for a summary of wildlife resource information and to Section 4.9 for a summary of wetland, riparian and littoral habitat resource information [SCE 2021]):

VEGETATION ALLIANCES

- Classification and Assessment with land satellite (LANDSAT) imagery of Visible Ecological Groupings (CALVEG) United States Forest Service (Forest Service) Region 5.

SPECIAL-STATUS PLANTS

- Inyo National Forest (INF) Forest Service Plants of Conservation Concern (FSCC) list (Forest Service 2019a).
- California Native Plant Society (CNPS) Inventory of Rare, Threatened and Endangered Plants (CNPS 2020).
- U.S. Fish and Wildlife Service (USFWS) Information for Planning, and Conservation System (IPaC) list of federal endangered and threatened species (USFWS 2020).
- California Natural Diversity Database (CNDDB) (CNDDB 2020).

- Federal Energy Regulatory Commission's (FERC's) Environmental Assessment, Rush Creek Project (FERC Project No. 1389) (FERC 1992).

- Rush Creek Emergency Project (FERC No. 1389) Pre-release Survey and Assessment Report (SCE 2017a).

- Rush Creek (Phase II) Project (FERC No. 1389) Pre-construction Biological Survey and SCE's Survey Report for Phase I and Phase II Projects (SCE 2017b, 2018).

NON-NATIVE INVASIVE PLANTS

- INF list of invasive plants of management concern for the Forest (Forest Service 2017).

- Final Environmental Impact Statement (FEIS) for the revision of the INF Land Management Plan (Forest Service 2019b).

- California Invasive Plant Inventory (Cal-IPC 2020).

RIPARIAN RESOURCES

- Classification of Wetlands and Deepwater Habitats of the United States (Cowardin et al. 1979).

- Environmental Assessment for Hydropower License, Rush Creek, FERC Project No. 1389-001, California (FERC 1992).

- Baseline Riparian Monitoring of Lee Vining and Rush Creeks, Year 1 (1999) Annual Report (Psomas 2000).

- Rush and Lee Vining Creeks Riparian Monitoring Baseline Summary (Psomas 2004).

- Biological Resources Evaluation Technical Report for the SCE South Lake Dam, Agnew Lake Dam, Saddlebag Lake Dam, and Tioga Lake Dam, and Auxiliary Dam Maintenance and Geo-membrane Lining Projects (Psomas 2010).

- Analysis of Riparian Vegetation Phase 2 (Year 1) and Comparison to Baseline (Read 2010).

- Vegetation Transect Survey Memorandum for California Department of Fish and Wildlife Temporary Variance of License Article 401 Curtailing Water Level Requirements for Gem and Waugh Lakes for Seismic Concerns, SCE Rush Creek Hydroelectric Project (Psomas 2017).

- Rush Creek Emergency Project (FERC No. 1389) Pre-release Survey and Assessment Report (SCE 2017a).

- Rush Creek (Phase II) Project (FERC No. 1389) Pre-construction Biological Survey and Assessment Report Rush Meadows Dam Project Area (SCE 2017b).
- Analysis of Riparian Vegetation and Aquatic Habitat: 2018 Field Season and Comparison to Previous Years (Read and Salamunovich 2019).
- The USFWS National Wetlands Inventory (NWI) (USFWS 2021).

POTENTIAL INFORMATION GAPS

- Updated information on vegetation alliances, including riparian alliances.
- Updated information on special-status plant, moss, and lichen populations.
- Updated information on NNIPs.
- Information on historic and existing botanical resources within the inundation zones of the Project reservoirs.
- Characterization of the riparian community within selected stream segments, including the relationship between the riparian community and stream flow.
- Detailed mapping of wetland and riparian communities within the potential enhancement area.[1]

STUDY OBJECTIVES

- Update vegetation alliances, including the riparian community, within 1 mile of the FERC Project boundary.
- Document special-status plant, moss, and lichen populations within the FERC Project boundary.[2]
- Document NNIP populations within the FERC Project boundary.[3]
- Characterize historic and current botanical resources in the historic inundation zones of Project reservoirs, including:
    - Document the historic location, distribution, and size of trees within the inundations zones; and

[1] The potential enhancement area includes portions of the Rush Creek and South Rush Creek channels upstream and downstream of the State Route 158 crossing. The purpose of the potential enhancement is to address local flooding of residences during high-flow events. Refer to Map TERR 1-2 and PAD Map 3-5.

[2] Special-status plant, moss, and lichen populations along the Project-affected stream reaches will only be documented within select stream segments.

[3] NNIPs along the Project-affected stream reaches will only be documented in select stream segments. This includes documentation of invasive aquatic plants and algae (i.e., Didymo [*Didymosphenia geminate*]).

  - Document current plant species composition, distribution, and abundance in the historic inundation zones.

- Characterize riparian resources along selected stream segments, including the relationship between the riparian community and stream flow.

- Document the riparian community and wetlands in the potential enhancement area.

EXTENT OF STUDY AREA

- Refer to Map TERR 1-1 for the botanical resources study area. The study area for:

  - Vegetation alliances, including riparian communities, includes areas within 1 mile of the FERC Project boundary.

  - Special-status plant, moss, and lichen populations includes lands within the FERC Project boundary.[4]

  - NNIP populations includes lands within the FERC Project boundary.[5]

  - Historic and existing botanical resources includes the historic inundation zones of Project reservoirs.

  - Characterization of the riparian community in selected stream segments (Table TERR 1-1 and Map TERR 1-2).

  - Documentation of the riparian community and wetlands in the potential enhancement area.

- Studies will not be conducted at locations where access is unsafe (e.g., where there is very steep terrain) or on private property for which SCE has not received specific approval from the landowner to enter the property to perform the study.

[4] Special-status plant, moss, and lichen populations along the Project-affected stream reaches will only be documented within select stream segments.

[5] Special-status plant, moss, and lichen populations along the Project-affected stream reaches will only be documented within select stream segments.

STUDY APPROACH

VEGETATION ALLIANCES AND WILDLIFE HABITATS

The study approach for vegetation alliances and wildlife habitat is provided below.

- Develop vegetation alliance maps of the study area based on CALVEG mapping and vegetation alliance descriptions.[6]
    - Preliminary vegetation alliance information is presented in the PAD, Section 4, Existing Resource Information (SCE 2021), including the following:
        - Section 4.6, Botanical and Wildlife Resources provides a draft map of CALVEG vegetation alliances within 1 mile of the FERC Project boundary; and
        - Section 4.9, Riparian Resources provides a draft map showing CALVEG riparian vegetation alliances along the Project-affected stream reaches and Project reservoirs.
- Verify the accuracy of CALVEG data and update vegetation alliances using recent aerial photographs.
- Conduct ground-truthing of vegetation alliances within 1 mile of the FERC Project boundary, concentrating in areas where concerns about vegetation community identification or boundaries arise from review of aerial photographs.
    - Ground-truthing will include documentation of small-scale riparian alliances along Project-affected stream reaches and around Project reservoirs.
- Develop a final Geographic Information System (GIS) map of vegetation alliances and overlay information on Project facilities, construction areas, restoration areas, and the potential enhancement area.
- Develop a final GIS map of riparian vegetation alliances and overlay information on the Project-affected stream reaches and Project reservoirs.

SPECIAL-STATUS PLANTS

For the purposes of this study plan, a special-status plant is defined as any plant, moss, or lichen species that is granted protection by a federal or state agency. Federally listed plant species granted status by the USFWS under the Federal Endangered Species Act (ESA) include threatened (FT), endangered (FE), proposed threatened or endangered

[6] The CALVEG system was developed by U.S. Forest Service (Forest Service) 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 were updated by the Forest Service in 2014 (Forest Service 2014).

(FPT, FPE), candidate (FC), or listed species proposed for delisting (FPD). Special-status plants designated by the INF as FSCC are also included.

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

Under the California Environmental Quality Act (CEQA), special-status plants are also defined to include those species identified in the CNPS California Rare Plant Rank (CRPR) system as rare, threatened, or endangered plants in California. This includes the following CRPR:

- 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 study approach for special-status plants is provided below.

- Identify and map known occurrences of special-status plants within the study area, based on agency consultation and a review of existing information. Preliminary information is presented in the PAD Section 4.6, Botanical and Wildlife Resources (SCE 2021).
- Develop a list of special-status plant species potentially occurring in the study area based on literature review and agency consultation. A preliminary list is provided in the PAD Section 4.6, Botanical and Wildlife Resources, Table 4.6-2 (SCE 2021).
- Conduct focused special-status plant surveys, according to the *Protocols for Surveying and Evaluating Impacts to Special Status Native Plant Populations and Sensitive Natural Communities* (CDFW 2018).
    - Field surveys will be conducted at the proper time of year when rare, threatened, endangered species, or forest species of conservation concern species are both evident and identifiable. Generally, this is when the plants are flowering. Based on the blooming periods for plants known or potentially occurring within the vicinity of the Project, two surveys will be conducted during the appropriate bloom period (Table TERR 1-2).
    - Timing of surveys will be verified based on reference population monitoring. SCE will coordinate with resource agencies to identify reference populations and conduct reference population monitoring. The results of reference population monitoring will be provided to agencies to verify the appropriate survey timing.

- Systematic field techniques will be implemented (e.g., zigzag patterns, random meandering, and linear transects) in the study area.
- If a special-status plant species population is identified on the perimeter of the study area, the study area will be expanded to document the full extent of the population.
- Surveys will be floristic in nature and taxonomy will be based on The Jepson Manual (Baldwin et al. 2012). A comprehensive list of species observed during field surveys will be compiled.
- Digital photographs, Global Positioning System (GPS) information, an estimate of the number of individuals present, and a description of associated vegetation alliance will be collected for each special-status plant population observed.
- Moss and lichen specimens will be collected and labeled with the date and collection location. Moss and lichen specimens will later be identified to species by a qualified bryologist.

- Develop a comprehensive species list, and a map (i.e., GIS layers) of special-status plant populations; and overlay information on Project facilities.
- Prepare and submit California Native Species Field Survey Forms for all special-status plant populations recorded to CNDDB.

NON-NATIVE INVASIVE PLANTS

The FEIS for the revision of the INF Land Management Plan 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” (Forest Service 2019b).

The study approach for NNIPs is provided below.

- Identify and map known occurrences of NNIPs based on agency consultation and a review of existing information. Preliminary information is presented in the PAD Section 4.6, Botanical and Wildlife Resources (SCE 2021).
- Develop a list of priority NNIPs for focused NNIP surveys in consultation with the Forest Service.
- Conduct focused NNIP surveys in conjunction with special-status plant surveys.
- Collect data and report survey results as follows:
  - Date collected will include species, location, and number of acres infested by NNIPs.

- If a NNIP population is identified on the perimeter of the study area, the study area will be expanded to document the extent of the population.

- Levels of infestation will be reported as: low (<5% cover); moderate (6-25% cover), and high (>25% cover). Areas that have been surveyed and found to be weed-free will also be identified.

- Develop a comprehensive species list, and a map (GIS layer) of NNIPs, and overlay information on Project facilities.

HISTORIC AND EXISTING BOTANICAL RESOURCES WITHIN THE INUNDATION ZONES OF PROJECT RESERVOIRS

The study approach for documenting historic and existing botanical resources within the inundation zone of Project reservoirs is provided below.

- Obtain information on the historic location, distribution, size, and species of trees within the historical inundation zone of Project reservoirs:

  - Use Light Detection and Ranging (LiDAR) imagery to develop a map (GIS layer) showing the location and distribution of tree stumps within the inundation zones.

  - Obtain information on the size class and species of stumps within inundation zones.

    - Establish transects within the inundation zones of Project reservoirs, from the base (waterline) to the top of the historical inundation zone.

    - Collect the following data for each stump within 5 meters on either side of the transect line:

      - GPS coordinates

      - Photograph of stump

      - Diameter of stump at ground level

      - Species composition

        > Obtain cross-sections of tree stumps (maximum of five per transect, focused on stumps with highest structural integrity) and compare to tree cores of representative living trees (at least one core for each species that comprise the tree assemblage in the vicinity of the reservoir, selecting the oldest possible trees). Note: This is dependent on Forest Service authorization to obtain cores from live trees within the Wilderness Area.

- Develop a map (GIS layer) of the location of stumps within the inundation zones, and a table summarizing the number and size of stumps.

- Compare the tree stump cross-sections to the live tree cores and develop a table of the species composition along the transects.

- Obtain information on current plant species composition, distribution, and abundance within the inundation zones of Project reservoirs:

  - Review LiDAR imagery to identify areas within the historic inundation zone that currently support plant communities.

  - Establish transects in areas within the plant communities.

    - To the degree possible, studies at Waugh Lake and Gem Lake will incorporate transects previously established by SCE as part of riparian vegetation studies (Psomas 2017).

    - Transects will begin at the current waterline and extend to the top of the historical inundation zone.

    - Both ends of the transect will be temporarily marked (e.g., with rebar stakes), recorded with a GPS unit with sub-meter accuracy, and photo-documented.

    - 5 x 5-meter sampling plots will be collected along transect. The number and location of plots will vary depending on the length of the transect. The following data will be collected within each sampling plot:

      - GPS coordinates (center point of plot)

      - Photograph of plot

      - List of all plant species/estimated number of individuals of each species

      - Percent cover within each sampling plot for graminoids, shrubs, and trees

      - Live tree and shrub species, dbh (for trees), or number of stems and approximate height (for shrubs)

  - Develop a map (GIS layer) showing the location of transects and sampling plots, and lists/tables documenting plant species composition, distribution, and abundance.

AQUATIC RESOURCES (WETLAND) DELINEATION

Provided below is the study approach for determining jurisdictional waters of the U.S./state (e.g., wetlands) within the potential enhancement area.

- Conduct an aquatic resources delineation consistent with U.S. Army Corps of Engineers (USACE) protocols:
  - USACE Wetlands Delineation Manual (Environmental Laboratory 1987).
  - A Field Guide to the Identification of the Ordinary High Water Mark (OHWM) in the Arid West Region of the Western United States (Lichvar and McColley 2008).
  - Regional Supplement to the USACE Wetland Delineation Manual: Arid West Region (Version 2.0) (Environmental Laboratory 2008).
- Develop an aquatic resources delineation report and maps consistent with the Minimum Standards for Acceptance of Aquatic Resources Delineation Reports (USACE 2016).

CHARACTERIZATION OF RIPARIAN COMMUNITY ALONG PROJECT-AFFECTED STREAM REACHES

The study approach for the characterization of riparian community along Project-affected stream reaches is provided below:

- Provide an overview of life history requirements of dominant woody riparian species and associated riparian vegetation processes along stream corridors similar to the Rush Creek.
  - Based on a review of existing literature, summarize the life history requirements of the dominant woody riparian species occurring along Rush Creek, including: seed initiation (e.g., dispersal, germination, and initial seed/root growth); microsite characteristics necessary for germination (e.g., water table depth, substrate); establishment (survival and growth until maturity); and maturation (e.g., age of maturity, rooting depth, and tree height).
  - Summarize patterns of riparian vegetation establishment, including the role hydrological events (magnitude, frequency, timing, flow recession, inundation) in the establishment and/or scouring of riparian vegetation.
- Conduct a field assessment of the riparian communities along Project-affected stream reaches:
  - Map the extent of riparian vegetation along the selected stream segments (Table TERR 1-1 and Map TERR 1-2) on high-resolution aerial imagery. Based on the species observed, classify riparian communities based on A Manual of California Vegetation (Sawyer et al. 2009).

- Establish survey transects as described below:
  - Establish a minimum of three transects at each selected stream segment listed in Table TERR 1-1.
  - Re-establish transects associated with long-term riparian monitoring along Rush Creek from Rush Meadows Dam to Gem Lake.[7]
- 5 x 5-meter sampling plots will be collected along each transect. The number and location of plots will vary depending on the length of the transect. The following data will be collected within each sampling plot:
  - GPS coordinates (center point of plot)
  - Photograph of plot
  - Percent cover and Age class[8] for each dominant woody riparian trees/shrubs, by species
  - Size classes of the substrate present (bedrock, boulder, cobble, gravel, sand, silt)

- Characterize the relationship between the riparian vegetation and flow conditions in each selected stream segment included in AQ 1 – Instream Flow studies:
  - Using the historical,[9] existing,[10] Proposed Project,[11] and unimpaired[12] hydrology (developed in the AQ 2 – Hydrology TSP) at each of the selected stream segments, complete the following hydrology analyses:
    - Annual Hydrology Patterns – Annual hydrographs of the monthly average daily flows by water year type;
    - Recurrence Intervals – Flood frequency curves for each flow condition to compare the magnitude and frequency of peak high flow events;

[7] Long-term baseline riparian monitoring transects that have historically been monitored consistent with Forest Service Final 4(e) Condition No. 7 – Monitoring (FERC 1997).

[8] Age class structure will be determined based on categories of shrub stem densities per individual and tree diameters, as follows: Young (Y): shrubs with less than 10 stems per individual or trees with diameters (diameter at breast height (DBH) less than 3 inches; Medium-aged (M): shrubs with between 10 and 60 stems per individual or trees with DBHs between 3 and 9 inches; and Old/Mature (O): shrubs with more than 60 stems per individual or trees with DBHs greater than 9 inches.

[9] The historical hydrology (2000-2011 POR) represents instream flows and Project operation under the existing license conditions prior to implementation of the seismic restrictions in 2012.

[10] The existing hydrology (2012-2019 POR) represents instream flows and Project operation under both the existing license conditions and implementation of the seismic restrictions in 2012.

[11] The Proposed Project hydrology (2000-2019) represents synthesized instream flows and Project operations under the Proposed Project.

[12] The unimpaired hydrology (2000-2019) represents synthesized instream flows in Rush Creek without the influence of the Rush Creek Project.

- Timing of High Flows – The numbers of days that the impaired and unimpaired flows are exceeded (1) by month, (2) by water year type and (3) all years combined; and

- Recession Rates (rate of change in stage over time [days]) – Recession rates of spring/early summer flows during the time of spring seed release and seed setting (during the receding limb of the hydrograph) by water year type.

  - Flows will be converted to stage using the stage-discharge relationships developed for the AQ 1 – Instream Flow studies.

- Develop a summary of relationship between existing inundation characteristics (e.g., frequency, depth, and width of inundation) and the distribution of dominant riparian species across the floodplain at each of the selected Project-affected stream segments in coordination with the AQ 1 – Instream Flow TSP.

DOCUMENTATION OF RIPARIAN COMMUNITY WITHIN THE POTENTIAL ENHANCEMENT AREA

- Conduct a field assessment to document riparian communities within the potential enhancement area (refer to Map TERR 1-1)

  - Map the extent of riparian vegetation within the potential enhancement area on high-resolution aerial imagery. Based on the species observed, classify riparian communities based on A Manual of California Vegetation (Sawyer et al. 2009).

  - Conduct an inventory of dominant woody riparian shrubs and trees within the enhancement area. Data collected will include:

    - Overall percent cover;

    - Percent cover and age class[13] for all dominant woody riparian trees/shrubs, by species.

- Develop a final map of riparian communities and tables summarizing the results of the inventory.

[13] Age class structure will be determined based on categories of shrub stem densities per individual and tree diameters, as follows: Young (Y): shrubs with less than 10 stems per individual or trees with diameters (diameter at breast height (DBH) less than 3 inches; Medium-aged (M): shrubs with between 10 and 60 stems per individual or trees with DBHs between 3 and 9 inches; and Old/Mature (O): shrubs with more than 60 stems per individual or trees with DBHs greater than 9 inches.

REPORTING

- Study methods and results will be documented in a TERR 1 – Botanical Resources Technical Study Report (TSR). The TSR will include summary tables and maps, as appropriate.

- Upon request, data will be provided to resource agencies and interested stakeholders in an Excel spreadsheet (electronic format).

SCHEDULE

Date	Activity
June–September 2023	Conduct field surveys
October 2023–January 2024	Analyze data and prepare draft report
February 2024	Distribute draft report to stakeholders
March–May 2024	Stakeholders review and provide comments on draft report (90 days)
June–July 2024	Resolve comments and prepare final report
August 2024	Distribute final report in Draft License Application

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TABLES

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Table TERR 1-1. Riparian Vegetation Study Sites.

Reach Name	Reach Length (miles) / River Miles (RM)	Sampling Location River Mile / Site ID
Rush Creek		
Waugh Lake	1.51 (RM 22.24–23.75)	RM 23.0 / RC23.0
Rush Creek Below Rush Meadows Dam	1.83 (RM 20.41–22.24)	RM 21.65 / RC21.65 (includes long-term baseline riparian monitoring sites)1
Gem Lake	0.93 (RM 19.48–20.41)	—
Rush Creek Below Gem Dam	0.30 (RM 19.18–19.48)	—
Agnew Lake	0.58 (RM 18.60–19.18)	—
Rush Creek Below Agnew Dam	0.40 (RM 18.2–18.60)	RM 18.55 / RC18.55
Rush Creek Horsetail Falls	0.54 (RM 17.66–18.2)	—
Rush Creek Above Silver Lake	0.94 (RM 16.72–17.66)	RM 17.05 / RC17.05 RM 17.55 / RC17.55
Silver Lake	0.83 (RM 15.89–16.72)	—
Rush Creek Below Silver Lake	2.69 (RM 13.20–15.89)	RM 15.2 / RC15.2
South Rush Creek		
South Rush Creek	0.46 (RM 0.0–0.46)	RM 0.15 / SRC0.15

[1] Includes long-term baseline riparian monitoring sites that have historically been monitored consistent with Forest Service Final 4(e) Condition No. 7 – Monitoring (FERC 1997).

Table TERR 1-2. Blooming Periods for Special-Status Plants Identified by Resource Agencies as Potentially Occurring in the Rush Creek Project Vicinity.

Scientific/Common Name	Blooming Period											
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Claytonia megarhiza fell-fields claytonia							■	■	■			
Pinus albicaulis whitebark pine							■	■				
Sabulina stricta bog sandwort							■	■	■			
Agrostis humilis alpine bentgrass							■	■	■			
Arabis repanda var. *greenei* Greene's rockcress							■	■				
Astragalus johannis-howellii Long Valley milk-vetch						■	■	■				
Astragalus lemmonii Lemmon's milk-vetch					■	■	■	■				
Astragalus monoensis Mono milk-vetch						■	■	■				
Astragalus serenoi var. *shockleyi* Shockley's milk-vetch					■	■	■					
Boechera bodiensis Bodie Hills rockcress						■	■					
Boechera cobrensis masonic rockcress						■	■					
Boechera tularensis Tulare rockcress						■	■					

Scientific/Common Name	Blooming Period											
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Botrychium ascendens upswept moonwort							■	■				
Botrychium crenulatum scalloped moonwort						■	■	■	■			
Botrychium lineare slender moonwort												
Botrychium lunaria common moonwort								■				
Botrychium paradoxum paradox moonwort								■				
Calyptridium pygmaeum pygmy pussypaws						■	■	■				
Carex davyi Davy's sedge						■	■	■				
Carex idahoa Idaho sedge							■					
Carex petasata Liddon's sedge					■	■	■					
Carex praticola northern meadow sedge					■	■	■					
Carex scirpoidea ssp. *pseudoscirpoidea* western single-spiked sedge							■	■	■			
Carex stevenii Steven’s sedge								■				
Carex vallicola western valley sedge							■	■				

Scientific/Common Name	Blooming Period											
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Cinna bolanderi Bolander's woodreed							■	■	■			
Cusickiella (=Draba) quadricostata Bodie Hills cusickiella					■	■	■					
Cymopterus globosus globose cymoptera			■	■	■	■						
Draba asterophora var. *asterophora* Tahoe draba							■	■				
Draba cana canescent draba							■					
Draba cruciata Mineral King draba						■	■	■				
Draba incrassata Sweetwater Mountains draba							■	■				
Draba praealta tall draba							■	■				
Dryoptera filix-mas male fern							■	■	■			
Erigeron aequifolius Hall's daisy						■	■	■				
Erigeron uncialis var. *uncialis* limestone daisy					■	■	■					
Eriogonum mensicola Pinyon Mesa buckwheat							■	■	■			
Eriogonum nutans var. *nutans* nodding buckwheat					■	■	■	■	■			

Scientific/Common Name	Blooming Period											
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Festuca minutiflora small-flowered fescue							■					
Hackelia brevicula Poison Canyon stickseed							■	■				
Hulsea brevifolia short-leaved hulsea					■	■	■	■				
Hulsea vestita ssp. *inyoensis* Inyo hulsea				■	■	■						
Jamesia americana var. *rosea* fivepetal (rosy-petalled) cliffbush					■	■	■	■	■			
Kobresia myosuroides (= bellardii) seep kobresia								■				
Lupinus duranii Mono Lake lupine					■	■	■	■				
Lupinus lepidus var. *culbertsonii* Hockett Meadows lupine							■	■				
Lupinus padre-crowleyi Father Crowley's lupine							■	■				
Meesia uliginosa broad-nerved hump moss							■	■	■	■		
Mentzelia torreyi Torrey's blazing star						■	■	■				
Monardella beneolens sweet-smelling monardella						■	■	■	■			
Parnassia parviflora small-flowered grass-of-Parnassus								■	■			

Scientific/Common Name	Blooming Period											
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Pedicularis crenulata scalloped-leaved lousewort												
Petrophyton caespitosum ssp. *acuminatum* marble rockmat												
Phacelia monoensis Mono County phacelia												
Physaria ludoviciana silver bladderpod												
Polyctenium williamsiae Williams' combleaf												
Potamogeton praelongus white-stemmed pondweed												
Potamogeton robbinsii Robbins' pondweed												
Potentilla pulcherrima beautiful cinquefoil												
Ranunculus hydrocharoides frog's-bit buttercup												
Salix brachycarpa var. *brachycarpa* short-fruited willow												
Sclerocactus polyancistrus redspined fishhook cactus												
Silene oregana Oregon campion												
Sphaeromeria potentilloides var. *nitrophila* fivefinger chickensage (alkali tansy-sage)												

Scientific/Common Name	Blooming Period											
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Tetradymia tetrameres dune horsebrush												
Thelypodium integrifolium ssp. *complanatum* foxtail thelypodium												
Thelypodium milleflorum many-flowered thelypodium												
Trichophorum pumilum little bulrush												
Trifolium bolanderi Bolander's clover												
Trifolium dedeckerae (= kingie ssp. *dedeckerae)* Dedecker's clover												
Triglochin palustris marsh arrow-grass												
Viola pinetorum ssp. *grisea* gray-leaved violet												
Viola purpurea ssp. *aurea* golden violet												

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MAPS

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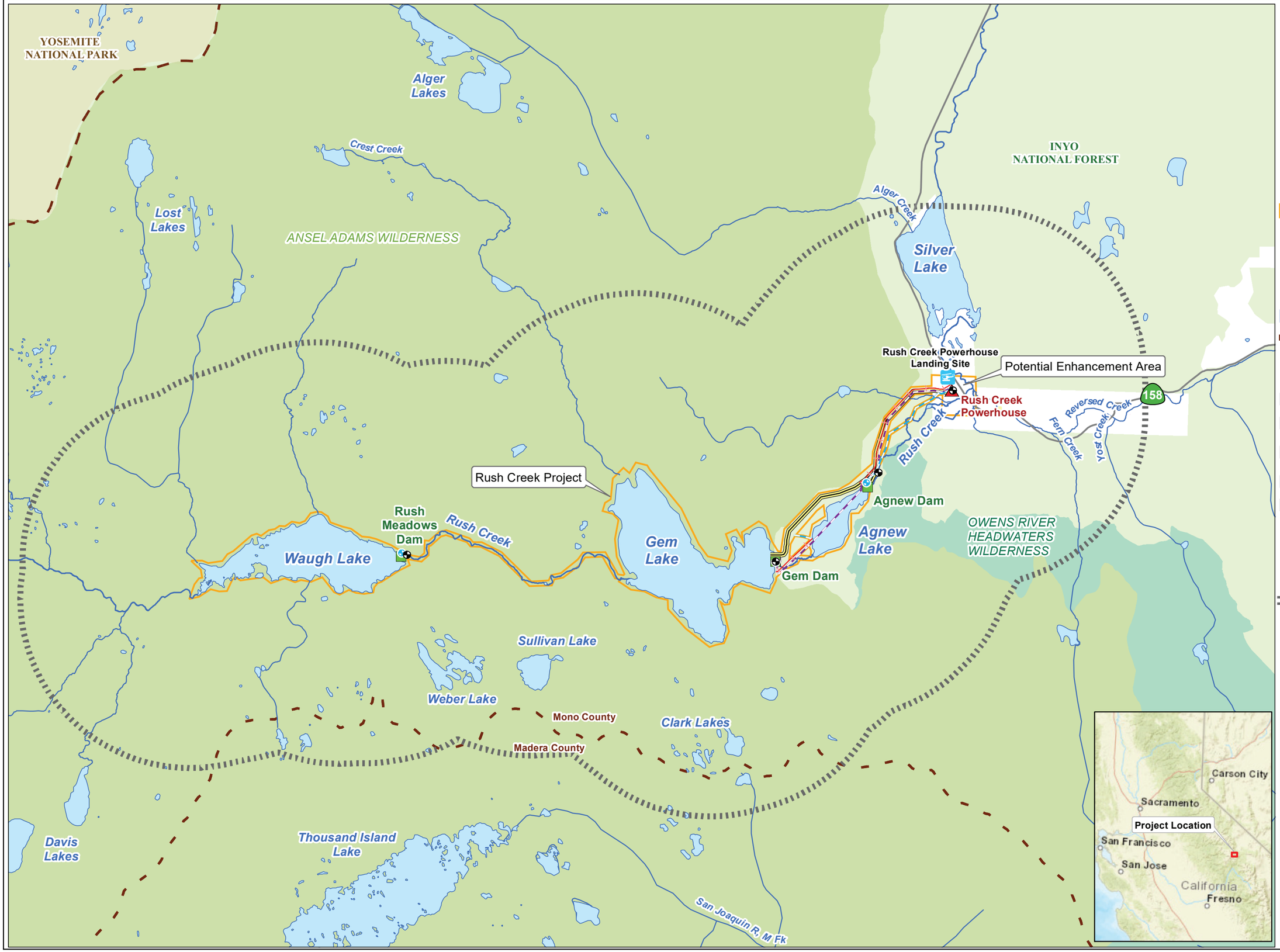

SCE Facilities

- Dam
- Powerhouse
- Flowline / Penstock
- Stream Gage
- Reservoir Gage
- Helicopter Landing Site
- Power Line
- Communication Line
- Tramway
- FERC Boundary

Other Features

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

Land Jurisdiction and National Wilderness Areas/Parks*

- 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.

TERR-1 Study

- TERR-1 Study Area (1-Mile Buffer of FERC Boundary)

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Rush Creek Project (FERC 1389)

Map TERR 1-1

Study Area

0 1,250 2,500 Feet

Projection: UTM Zone 11
Datum: NAD 83

Date: 9/10/2021

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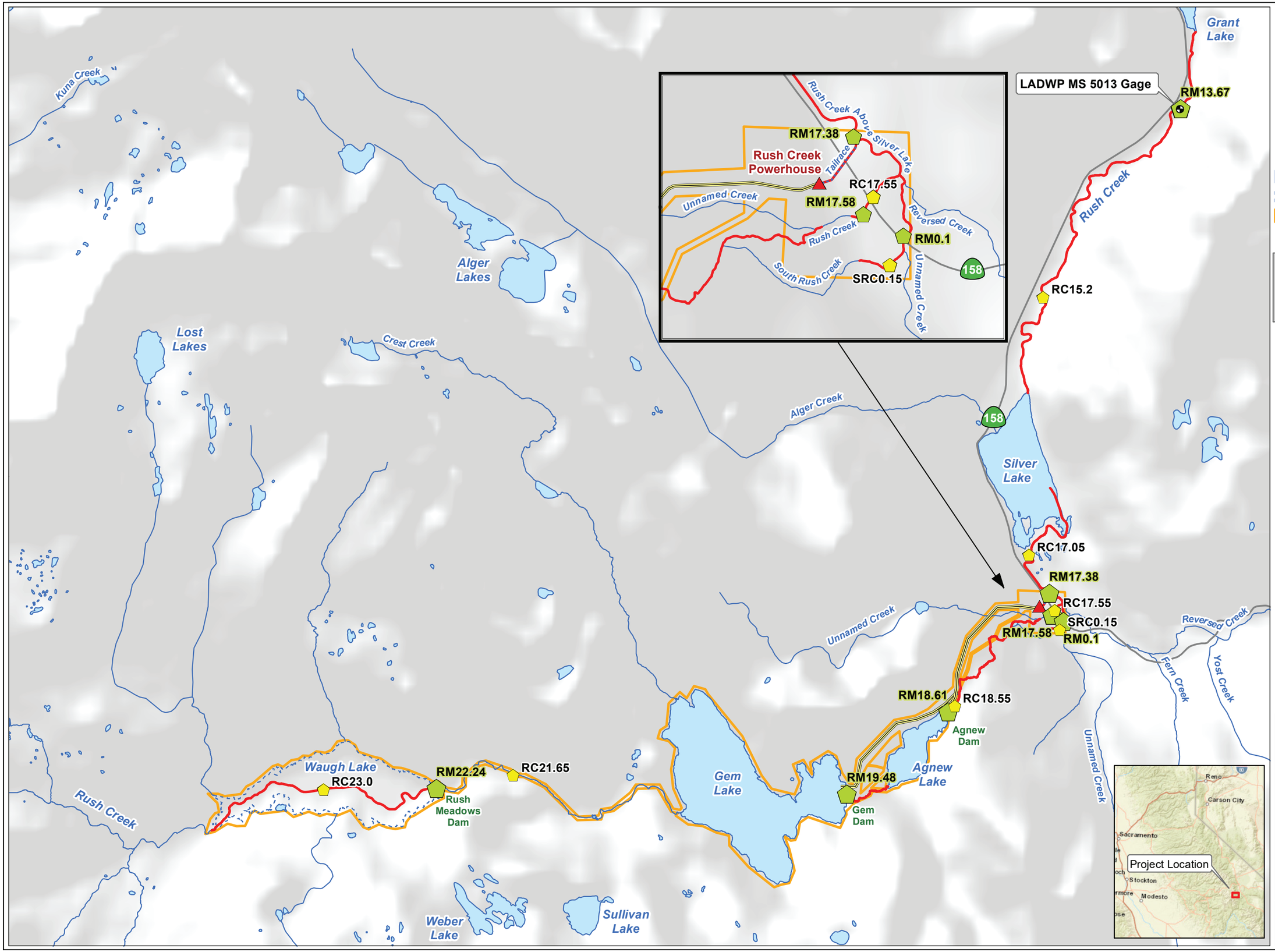

SCE Facilities
- Dam
- Powerhouse
- Flowline / Penstock
- Tailrace

Other Features
- Highway
- River/Stream
- Lake/Reservoir
- Dry Lake/Reservoir
- FERC Boundary

Study Sites and Reaches
- Hydrology Analysis Site
- Geomorphology/Riparian Site
- Instream Flow Modeling Reaches

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Rush Creek Project (FERC 1389)

Map TERR 1-2

Analysis and Survey Locations

0 0.25 0.5 Miles

Projection: UTM Zone 11
Datum: NAD 83

Date: 11/3/2021

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DRAFT
TERR 2 – WILDLIFE RESOURCES
TECHNICAL STUDY PLAN

Rush Creek Hydroelectric Project
FERC Project No. 1389

December 2021

DRAFT TECHNICAL STUDY PLAN
TERR 2 – Wildlife Resources

POTENTIAL RESOURCE ISSUES

- Special-status wildlife species and their habitats.

PROJECT NEXUS

- Direct loss or degradation of wildlife habitats.

- Disturbance or direct loss of special-status wildlife species.

RELEVANT INFORMATION

The following information is available regarding wildlife resources in the vicinity of the Rush Creek Project (refer to Southern California Edison Company's [SCE] Pre-Application Document [PAD] Section 4.6 for a summary of wildlife resource information [SCE 2021]):

- Wildlife habitats and common wildlife species present within 1 mile of the Federal Energy Regulatory Commission (FERC) Project boundary based on a crosswalk from U.S. Forest Service's (Forest Service) Classification and Assessment with Landsat of Visible Ecological Groupings (CALVEG) alliances (Forest Service 2009) to California Department of Fish and Wildlife's (CDFW) California Wildlife Habitat Relationship (CWHR) wildlife habitats (CDFW 2020a).

- Known occurrences of special-status wildlife in the vicinity of the Project based on the CDFW California Natural Diversity Database (CNDDB) (CDFW 2020b); CDFW list of species considered California Fully Protected under the California Fish and Game Code (CDFW 2020c); CDFW Sierra Nevada Bighorn Sheep Recovery Program Annual Reports (CDFW 2015, 2018); Forest Service Pacific Southwest Region 5 Inyo National Forest (INF) species of conservation concern list (Forest Service 2019); U.S. Fish and Wildlife Service (USFWS) Sierra Nevada Bighorn Sheep Recovery Plan (USFWS 2007).

- Special-status wildlife species potentially occurring within CWHR designations based on *A Guide to Wildlife Habitats of California* (Mayer and Laudenslayer 1988).

- Critical Habitat present in the vicinity of the Project for Sierra Nevada Bighorn Sheep (USFWS 2008).

- Location of Project facilities, including transmission lines and power lines.

- Supplemental information (e.g., habitat descriptions and special-status species 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, 2018a); and
- SCE's Survey Report for Gem Dam Value Upgrade (SCE 2020).

POTENTIAL INFORMATION GAPS

- Updated information on wildlife habitats within 1 mile of the FERC Project boundary.
- Updated information on wildlife use within the FERC Project boundary, along helicopter flight paths, and within the potential enhancement area.[1]
- Information on Sierra Nevada bighorn sheep distribution and use of the FERC Project boundary and adjacent Critical Habitat areas.
- Data on Project transmission line pole and power line pole configurations to determine if they are consistent with guidelines for avoidance of avian mortalities.
- Information on the location of bat roost in Project facilities.

STUDY OBJECTIVES

- Update CWHR habitats within 1 mile of the FERC Project boundary based on CALVEG vegetation alliances developed as part of the TERR 1 – Botanical Resources Technical Study Plan (TSP).
- Update information on special-status wildlife species potentially occurring in CWHR habitats within 1 mile of the FERC Project boundary.
- Consult with resource agencies to determine Sierra Nevada bighorn sheep distribution and use of lands within the FERC Project boundary and adjacent Critical Habitat.
- Conduct wildlife reconnaissance survey to characterize wildlife use within the FERC Project boundary[2] and within the potential enhancement area.
- Document raptor nests along the proposed helicopter flight paths.
- Determine whether Project transmission line and power line pole configurations are consistent with guidelines for the avoidance of avian mortalities.

[1] The potential enhancement area includes portions of the Rush Creek and South Rush Creek channels upstream and downstream of the State Route 158 crossing. The purpose of the potential enhancement is to address local flooding of residences during high-flow events. Refer to Map TERR 2-1 and PAD Map 3-5.

[2] Wildlife reconnaissance along the Project-affected stream reaches will only be documented within select stream segments.

- Document the presence of bat roosts at Project facilities.

- Proposed studies (objectives) for special-status amphibians are provided in AQ 7 – Special-Status Amphibians TSP. The Project is outside the range of any special-status reptiles.

EXTENT OF STUDY AREA

- Refer to Map TERR 2-1 for the wildlife resources study area. The study area for:

  - Updating CWHR habitat and special-status wildlife species occurrence includes lands within 1 mile of the FERC Project boundary.

  - Sierra Nevada bighorn sheep distribution and use of lands includes lands within the FERC Project boundary and adjacent Critical Habitat.

  - Wildlife reconnaissance survey includes lands within the FERC Project boundary[3] and within the potential enhancement area.

  - Documentation of raptor nests extends 300 feet on either side of the proposed helicopter flight paths.

  - Evaluation of potential avian mortality includes Project transmission lines and power lines.

  - Bat surveys include Project facilities with the potential to support roost sites.

- Studies will not be conducted at locations where access is unsafe (e.g., where there is very steep terrain) or on private property for which SCE has not received specific approval from the landowner to enter the property to perform the study.

STUDY APPROACH

For the purposes of this study, a special-status wildlife species is defined as any animal species that is granted status by a federal or state agency. Federally listed species granted status by the USFWS under the Endangered Species Act (ESA) include Federal Threatened (FT), Federal Endangered (FE), Federal Proposed Threatened or Endangered (FPT, FPE), candidates for listing (FC), or proposed for delisting (FPD). Special-status wildlife designated by INF as Forest Species of Conservation Concern (FSCC) are also included.

State of California listed wildlife species which are granted status by CDFW under the California Endangered Species Act (CESA) include threatened (ST), endangered (SE), Fully Protected species (CFP), and California Species of Special Concern (CSC).

[3] Wildlife reconnaissance along the Project-affected stream reaches will only be documented within select stream segments.

The study approach for special-status wildlife surveys, evaluation of Project transmission line tower and power line pole configurations, and special-status bat surveys is provided below.

SPECIAL-STATUS WILDLIFE

- Cross-reference CALVEG vegetation alliances identified as part of the TERR 1 – Botanical Resources TSP with CWHR System wildlife habitats, using the CALVEG–CWHR Crosswalk (Forest Service 2014). This crosswalk was developed by the Forest Service and the CDFW as a way to determine which wildlife habitats are likely to be present based on existing vegetation alliances and forest structural characteristics. Develop an updated CALVEG–CWHR Crosswalk table.

- Develop an updated Geographic Information System (GIS) map of wildlife habitats and overlay information on Project facilities, construction areas, restoration areas, and the potential enhancement area.

- Consult with resource agencies to obtain information on Sierra Nevada bighorn sheep distribution and use of lands within the FERC Project boundary and adjacent Critical Habitat.

- Conduct wildlife reconnaissance survey within the study area.

    - Survey methods will include both zigzag and linear transects depending on the survey area and terrain. Zigzag transects cover more ground and work well in larger habitat areas (e.g., mixed conifer forest) while linear transects work well in narrow habitats (e.g., riparian).

    - Species will be recorded as present if they are observed, species-specific vocalizations are heard, or if diagnostic field signs are found (e.g., scat, tracks, pellets).

    - Wildlife taxonomy will be based on the CDFW's Special Animals List and cross-referenced with SCE's Master Species List (CDFW 2021; SCE 2018b).

    - For each special-status species observed, a CNDDB field survey form will be completed and submitted to CDFW.

    - Provide an electronic database (Excel spreadsheet) of special-status wildlife observed to resource agencies and interested stakeholders.

- Conduct a helicopter survey during the nesting season to document raptor nests within 300 feet on either side of the proposed helicopter flights paths.

- Collect and summarize incidental observations of any special-status species during all field surveys completed in support of the relicensing of the Rush Creek Project.

- Develop an updated list of special-status wildlife species potentially occurring in CWHR habitats.

EVALUATION OF PROJECT TRANSMISSION LINE AND POWER LINE POLE CONFIGURATIONS

- Document the configuration of transmission line and power line poles and evaluate their consistency with Avian Power Line Interaction Committee (APLIC) guidelines (APLIC 2012).

- Document any past avian electrocutions and mortalities on Project transmission lines and power lines based on SCE and resource agency consultation.

- Provide an electronic database (Excel spreadsheet) of any avian electrocutions and mortalities to resource agencies and interested stakeholders.

SPECIAL-STATUS BATS

Identify Facilities Potentially Supporting Bat Roosts

- Conduct an initial desktop assessment of Project facilities to determine each facility's potential to support bat roosts. Information to be reviewed includes:

  - Existing photographs of Project facilities

  - Descriptions of Project facilities from Section 2.0 of the PAD (SCE 2021)

- Conduct a preliminary visual assessment of Project facilities, during wildlife reconnaissance surveys, to determine the potential to support bat roosts.

- Develop a list of Project facilities potentially supporting bat roosts.

Conduct Roost Survey

Visual Roost Survey

- Conduct a visual roost survey at Project facilities identified as potentially supporting roosting bats. The assessment will be conducted during the maternity roosting period when maternal colonies may be present, and the Project area is accessible (July–September).

- Facilities will be closely inspected for bat roost sign (e.g., skeletons, dead young, placentas, guano deposits, urine staining, and culled insect parts) and/or live bats. Spotlights and high-powered flashlights will be used in combination with binoculars for more detailed examination of potential roost sites.

- To prevent the introduction of *Pseudogymnoascus destructans*, a fungal pathogen causing the emerging white-nose syndrome responsible for widespread mortality in North American bats, methods described in the National White-nose Syndrome Decontamination Protocol (White-nose Syndrome Response Team 2018) will be implemented to decontaminate clothing and equipment prior to entering potential roosts.

- A map and table will be developed documenting the location of bat roosts and species present, if applicable.

- If bat roosts are present but the species cannot be determined visually, then species will be determined using guano DNA sampling (if suitable fresh guano is available). Specific methods for guano DNA sampling are provided below.

Guano DNA Sampling

- DNA samples will be collected at roost sites where fresh guano is available and bat species could not be determined visually during the roost survey.

- The samples will be stored in a stabilizing solution to prevent DNA degradation and submitted to the Genidaqs SM Molecular Biology and Genetics Lab (Cramer Fish Sciences) for DNA sequencing and species identification.

- DNA sequences will be compared to species-specific genetic markers developed by Walker et al. 2016 and further verified by comparison to samples at the National Center for Biotechnology Information DNA sequence database.

- A map and table will be developed identifying the location of guano DNA sampling and species present, if applicable.

REPORTING

- Study methods and results will be documented in a TERR 2 – Wildlife Technical Study Report (TSR). The TSR will include summary tables and maps, as appropriate.

- Upon request, data will be provided to resource agencies and interested stakeholders in an Excel spreadsheet (electronic format).

SCHEDULE

Date	Activity
January–April 2023	Consult with resource agencies to obtain information on Sierra Nevada bighorn sheep
June–September 2023	Conduct wildlife reconnaissance surveys, raptor nest surveys, and transmission line/power line pole evaluation
July–September 2023	Conduct bat surveys
October 2023–January 2024	Analyze data and prepare draft report
February 2024	Distribute draft report to stakeholders
March–May 2024	Stakeholders review and provide comments on draft report (90 days)
June–July 2024	Resolve comments and prepare final report
August 2024	Distribute final report in Draft License Application

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MAPS

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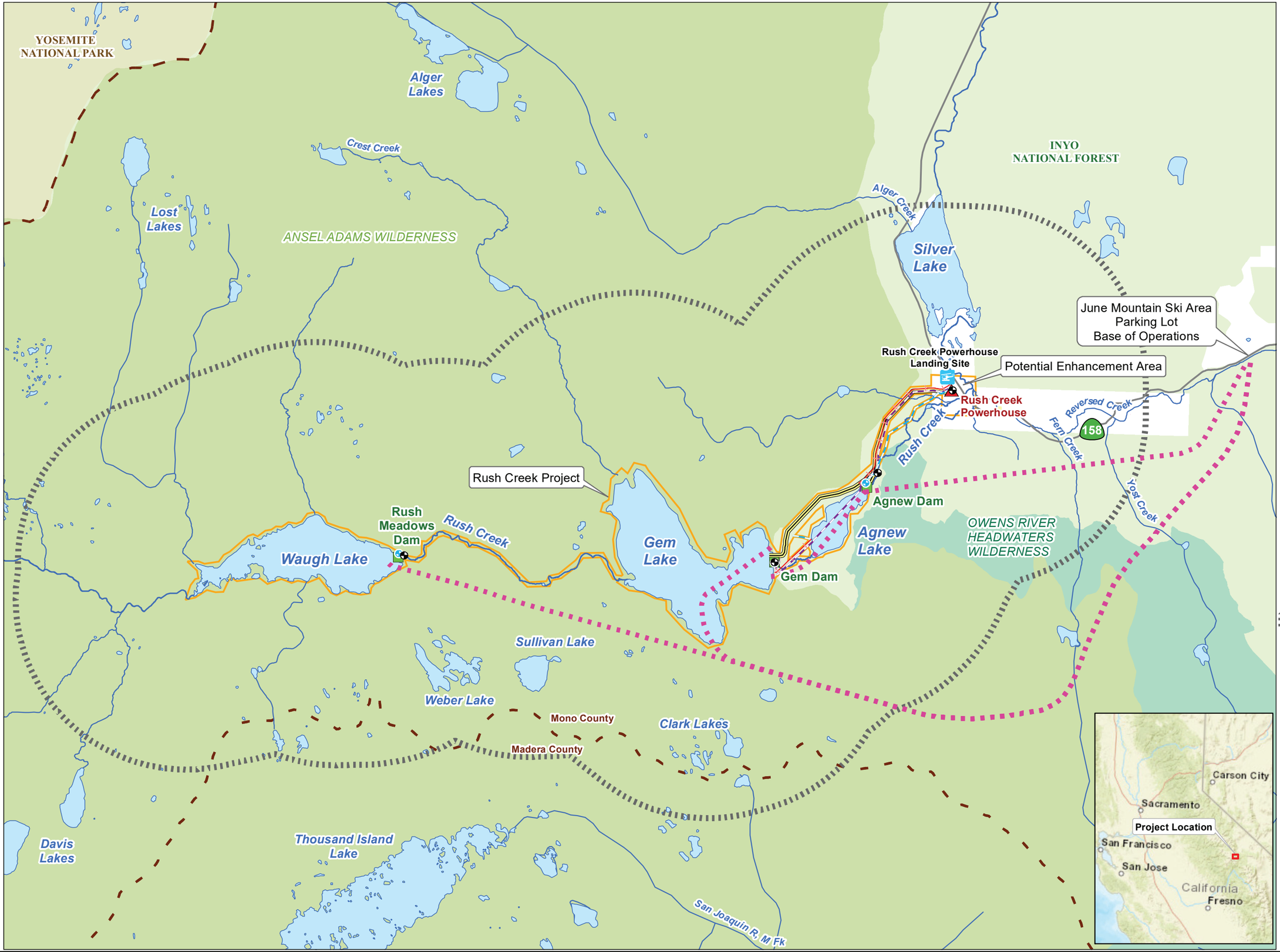

SCE Facilities

- Dam
- Powerhouse
- Flowline / Penstock
- Stream Gage
- Reservoir Gage
- Helicopter Landing Site
- Power Line
- Communication Line
- Tramway
- FERC Boundary

Other Features

- Major City/Town
- Highway
- River/Stream
- Lake
- County Boundary
- Approximate Helicopter Flight Path

Land Jurisdiction and National Wilderness Areas/Parks*

- 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.

TERR-2 Study

- TERR-2 Study Area (1-Mile Buffer of FERC Boundary)

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Rush Creek Project (FERC 1389)

Map TERR 2-1

Study Area

0 1,250 2,500 Feet

Projection: UTM Zone 11
Datum: NAD 83

Date: 9/10/2021

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