

YUBA COUNTY WATER AGENCY

Draft Environmental Impact Report

New Bullards Bar Dam
Atmospheric River Control (ARC) Spillway Project

STATE CLEARINGHOUSE NO. 2020110163

JUNE 2023

PREPARED BY

GEI Consultants

Draft Environmental Impact Report

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State Clearinghouse Number 2020110163

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Acronyms and Abbreviations

°C	degrees celcius
°F	degrees farenheight
AB	Assembly Bill
ADT	average daily trips
AFLA	Amended Final License Application
ARC	Atmospheric River Control
BA	biological assessment
Basin Plan	Sacramento River Basin and San Joaquin River Basin's
BMP	best management practice
BO	Biological Opinion
B.P.	before present
ca.	circa
CAA	Federal Clean Air Act
CAAQS	California ambient air quality standards
CAFE	Corporate Average Fuel Economy
CAHP	California Highway Patrol
Cal EMA	California Emergency Management Agency
CAL FIRE	California Department of Forestry and Fire Protection
Caltrans	California Department of Transportation
Cal/O SHA	California Occupational Safety and Health Administration
CARB	California Air Resources Board
CAS	Climate Adaptation Strategy
CBC	California Building Code
CCR	California Code of Regulations
CDFW	California Department of Fish and Wildlife
CEC	California Energy Code
Certification	Water Quality Certification
CESA	California Environmental Species Act
CEQA	California Environmental Quality Act
CFD	Computational Fluid Dynamics
CFGC	California Fish and Game Code
CFR	Code of Federal Regulations
cfs	cubic feet per second
CGC	California Govermnent Code
CGS	California Geological Survey

CHSC	California Health and Safety Code
cm	centemeters
CNDDB	California Natural Diversity Database
CO	carbon monoxide
CO_2	carbon dioxide
CH_4	methane
CRHR	California Register of Historical Resources
CRPR	California Rare Plant Ranks
CTR	California Toxics Rule
CWA	Clean Water Act
CWC	California Water Code
cy	cubic yards
Dam	New Bullards Bar Dam
dB	decibels
dBA	decibels expressed as
Delta	Sacramento-San Joaquin River Delta
DO	Dissolved Oxygen
DOC	California Department of Conservation
DOT	U.S. Department of Transportation
DPS	District Population Segment
DTSC	California Department of Toxic Substances Control
DSOD	California Division of Safety of Dams
DWR	California Department of Water Resources
EAP	Emergency Action Plan
EFH	Essential Fish Habitat
EIR	environmental impact report
ESA	Federal Endangered Species Ac
El.	elevation
EM	USACE Engineer Manuals
EOP	Emergency Operations Plan
EPA	U.S. Environmental Protection Agency
ESU	Evolutionarily Significant Unit
Feasibility Study	Yuba-Feather Supplemental Flood Control Project Feasibility Study
FERC	Federal Energy Regulatory Commission
FHWA	Federal Highway Administration
FIRO	Forecast-Informed Reservoir Operations
FL	fork length
FRAQMD	Feather River Air Quality Management District
FTA	Federal Transit Administration

GCB	gate control building
GEI	GEI Consultants, Inc.
GHG	greenhouse gas
GWP	Global warming potential
HDR	HDR Engineering
HFCs	hydrofluorocarbons
IPaC	Information, Planning, and Consultation
IPCC	Intergovernmental Panel on Climate Change
IRWMP	Integrated Regional Water Management Plan
KOP	key observation point
kVA	kilovolt-ampere
kW/m2	kilowatts per square meter
lb/day	pounds per day
LiDAR	Light Detection and Ranging
LRMP	Land and Resource Management Plan
MGD	million gallons per day
mm	millimeters
MLD	most likely descendants
MTP	metropolitan transportation plan
msl	mean sea level
N_2O	nitrous oxide
NAAQS	national ambient air quality standards
NAHC	Native American Heritage Commission
NEPA	National Environmental Policy Act
NMSF	National Marine Fisheries Service
NO_2	nitrogen dioxide
NOP	Notice of Preparation
NO_X	oxides of nitrogen
NPDES	National Pollutant Discharge Elimination System
NR	Natural Resource
NRCS	Natural Resources Conservation Service
NRHP	National Register of Historic Places
NTR	EPA National Toxics Rule
O_3	Ozone
O&M	Operation and Maintenance
OES	Office of Emergency Services
PCR	California Public Resources Code
PFCs	perfluorocarbons
PFMC	Pacific Fishery Management Council

PG&E	Pacific Gas and Electric
PM	particulate matter
PNF	Plumas National Forest
ppm	parts per million
PPV	peak particle velocity
PRC	Public Resources Code
RCNM	Roadway Construction Noise Model
Reservoir	New Bullards Bar Reservoir
RM	River Mile
RMT	River Management Team
ROG	reactive organic gases
RST	rotary screw trap
RWQCB	Regional Water Quality Control Board
SACOG	Sacramento Area Council of Governments
SCADA	Supervisory Control and Data Acquisition
SEIS	Supplemental Environmental Impact Statement
SF_6	sulfur hexafluoride
SGMA	Sustainable Groundwater Management Act
SHPO	State Historic Preservation Officer
SL	standard length
SO_2	sulfur dioxide
SHPO	State Office of Historic Preservation
SPCCP	Spill Prevention Control and Countermeasures Plan
SR	State Route
SRA	State Responsible Area
SVAB	Sacramento Valley Air Basin
SWRCB	State Water Resources Control Board
TAC	toxic air contaminant
TCR	Tribal Cultural Resources
TMDL	total maximum daily loads
TNF	Tahoe National Forest
µg/L	micrograms/liter
µg/m3	micrograms per cubic meter
U.S.	United States
USACE	U.S. Army Corps of Engineers
USBR	U.S. Bureau of Reclamation
USGS	U.S. Geological Service
USFWS	U.S. Fish and Wildlife Service
USFS	U.S. Forest Service

VMS	Visual Management System
VMT	vehicle miles traveled
VQO	Visual Quality Objectives
WCM	Water Control Manual
WY	water year
YCWA	Yuba County Water Agency
YRDP	Yuba River Development Project

Executive Summary

ES.1. Introduction

Yuba County Water Agency (YCWA) is proposing to design, construct, operate, and maintain the New Bullards Bar Dam (Dam) Atmospheric River Control (ARC) Spillway Project (project, or proposed project, or ARC Spillway). The proposed project would be operated conjunctively with the existing Primary Spillway at the Dam to efficiently release flows downstream, including earlier passage of flows during large storm events. The primary benefit of the proposed project is operational flexibility for managing outflow at the Dam, significantly reducing flood risk downstream at Marysville and the Feather-Yuba River confluence and providing public safety benefits. The existing concrete Dam and Primary Spillway would not be altered by the project.

The California Environmental Quality Act (CEQA) specifies that a public agency must prepare an environmental impact report (EIR) on any project that it proposes to carry out or approve that may result in a significant effect on the physical environment (California Public Resources Code, Section 21080[d]). Serving as the CEQA lead agency, YCWA has prepared this project-level EIR in accordance with CEQA and the State CEQA Guidelines (California Code of Regulations, Title 14, Division 6, Chapter 3, Section 15000 et seq.). This Draft EIR is an informational document which will inform public agency decision makers and the public of the significant environmental effects of a project, identify possible ways to minimize the significant effects, and describe reasonable alternatives to the project (State CEQA Guidelines, Section 15121(a)). The State Clearinghouse Number is 2020110163.

ES.2. Project Background

YCWA proposes to construct, operate, and maintain a second spillway, the ARC Spillway, at the Dam. The Dam is located on the North Yuba River, upstream of the lower Yuba River and Feather River. The Reservoir and Dam are the cornerstone of the multipurpose Yuba River Development Project (YRDP), which was constructed and is operated by YCWA under Federal Energy Regulatory Commission (FERC) License Number 2246. Flood control within the YRDP is mainly provided by 170,000 acre-feet of seasonally dedicated storage in the Reservoir. YCWA provides overall Reservoir operations although the United States (U.S.) Army Corps of Engineers (USACE) manages the Reservoir's flood control space through its Master Manual of Reservoir Regulation, Sacramento River Basin, California, and, specifically, by the *New Bullards Bar Reservoir Flood Control Manual* (Flood Control Manual). Operational flood rules dictate the amount of variable flood space made available seasonally. No flood space is required from June 1 to September 15. During the peak flood season (November 1 – March 31), the flood control space is a USACE-mandated 170,000 acre-feet.

The Yuba-Feather River system has a long history of catastrophic flood events. Since 1950, five major floods have resulted in loss of life, caused significant property damage, and constrained economic development in the region. Following the devastating 1997 Northern California floods, YCWA focused on incremental flood management improvements in the area with the eventual goal of protecting against a 1-in-500-year flood event for the Yuba River watershed. Over the years, many options were evaluated that addressed downstream levee improvements and possible changes to upstream storage infrastructure and/or operations. Recent operation studies indicated that substantial flood management benefits could be derived from modifying Reservoir operations. Further analysis indicated that the greatest flexibility and benefit would be provided by facilitating additional release capabilities at the bottom of the current flood pool level, at El. 1920.8 feet, and at higher reservoir stages/elevations. The proposed project provides this secondary release capacity.

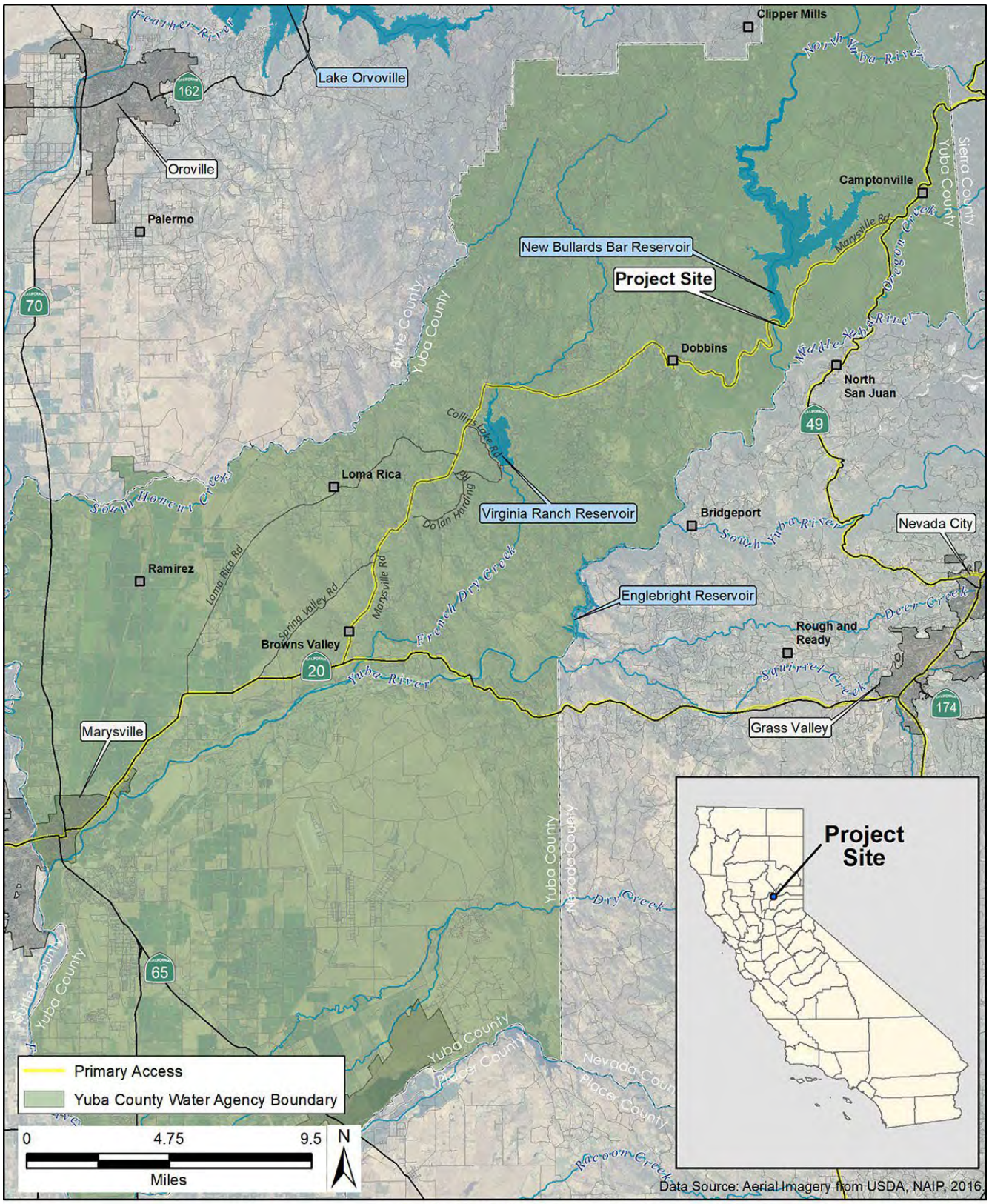
ES.3. Project Purpose and Objectives

The underlying project purpose is to improve flood protection and management and provide public safety benefits within the Yuba-Feather River system. The project objectives are to:

- Provide improved flood risk reduction in the Yuba-Feather River system.
- Provide operational flexibility and redundancy for Reservoir releases in high-flow events.
- Provide redundant spillway/Reservoir release capacity in the event of structural, operational, or other problems with the existing Dam or Primary Spillway.
- Avoid impacting Reservoir operations and recreation use during construction activities to the extent possible.
- Allow for adequate operation, inspection, and maintenance access to the ARC Spillway.
- Minimize the need to transport excavated soil and rock.
- Address and accommodate uncertainty in hydrologic predictions due to climate change and other factors and improve water conveyance flexibility and integrate enhanced operations to respond to these changes.

ES.4. Proposed Project

The project site location is shown in **Figure ES-1**. The proposed project components including the ARC Spillway and related facilities, except the permanent soil and rock disposal area, are shown in **Figure ES-2**. The permanent rock and soil disposal area and construction areas and access are shown in **Figure ES-3**.



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Figure Source: GEI Consultants, Inc. 2020.

Figure ES-1. Project Location

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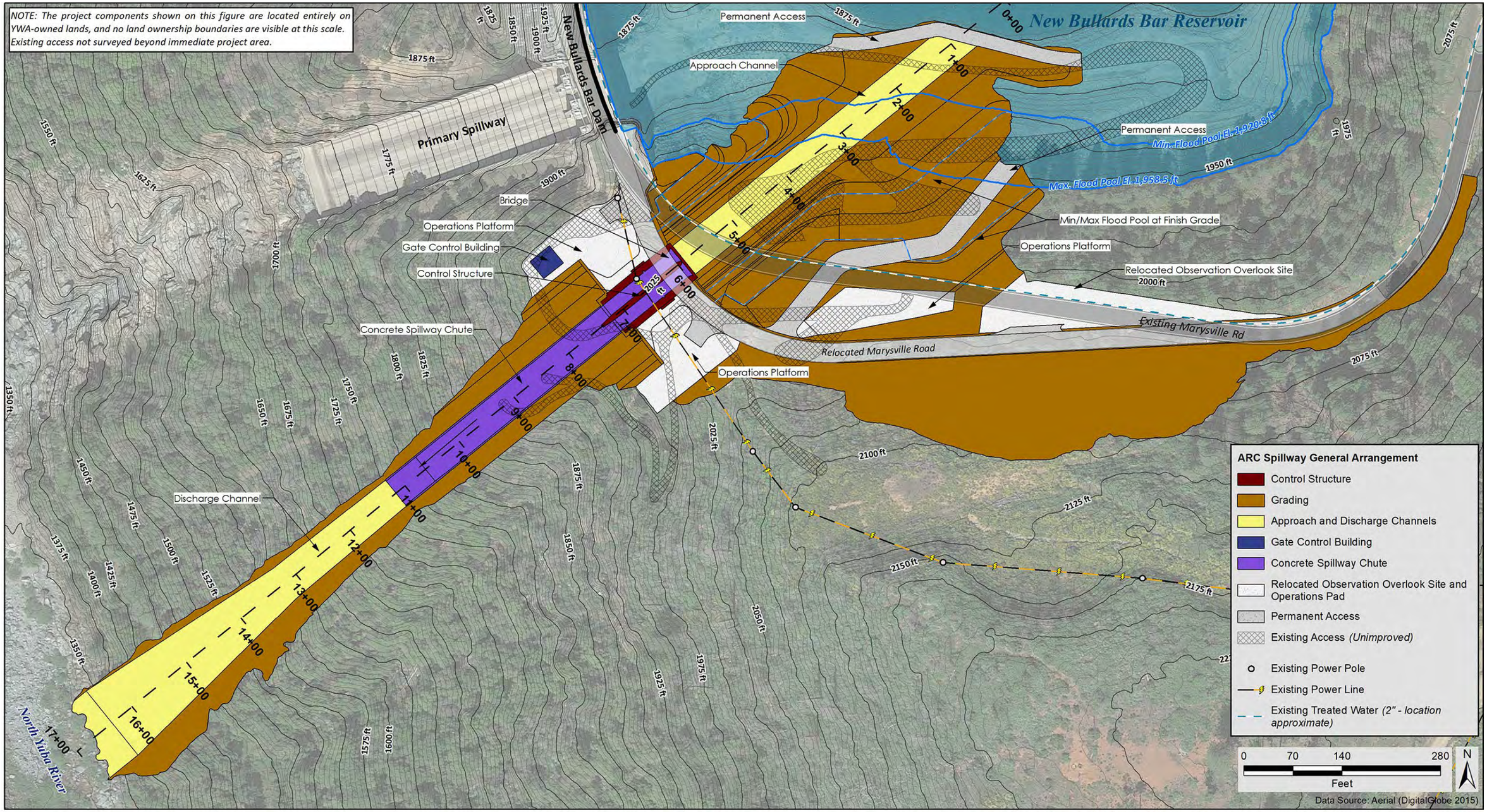


Figure Source: GEI Consultants, Inc. 2023.

Figure ES-2. ARC Spillway, Permanent Marysville Road Relocation, and Observation Overlook Site Relocation

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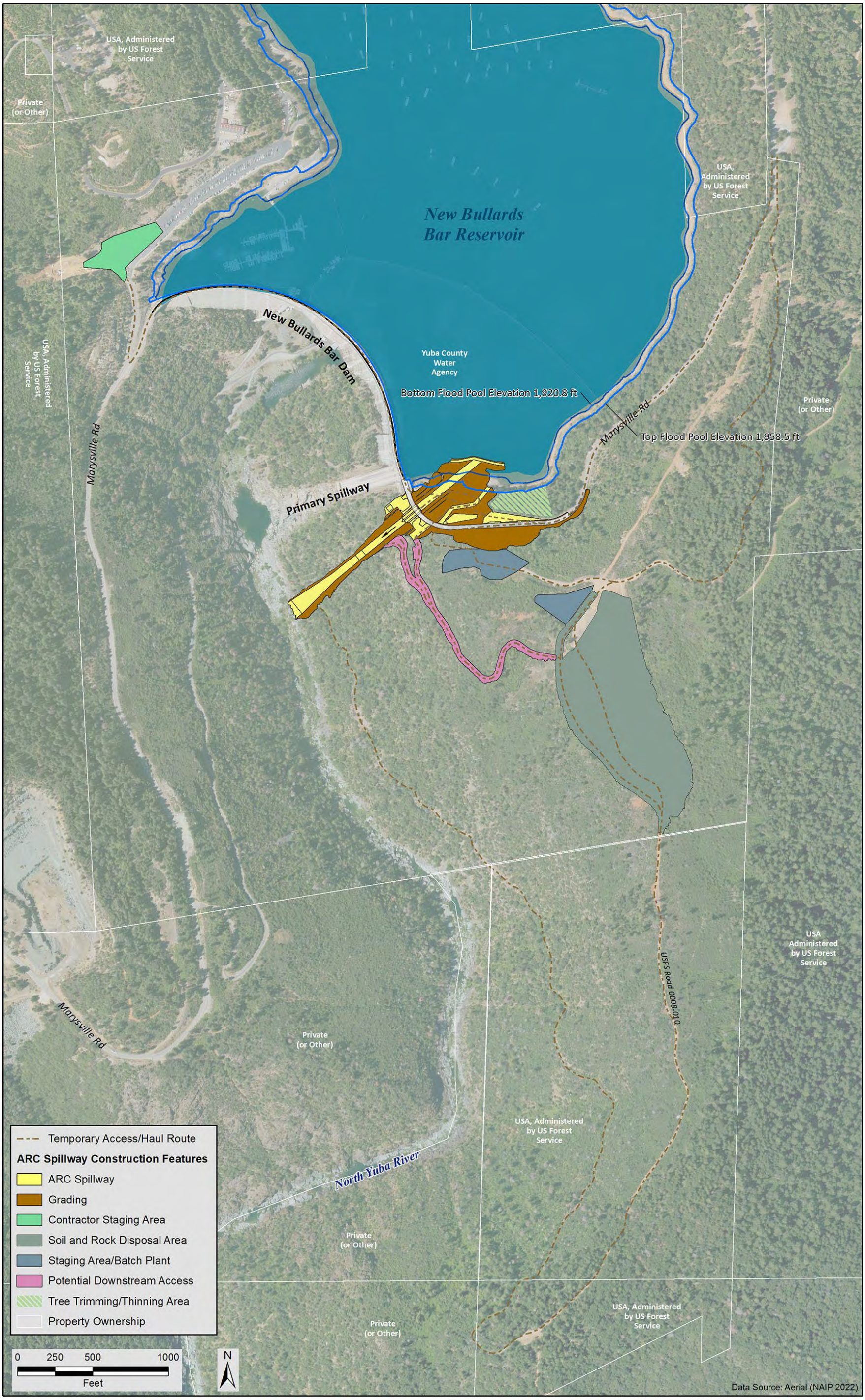


Figure Source: GEI Consultants, Inc. 2023.

Figure ES-3. Construction Areas and Access

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ES.4.1 Project Components and Characteristics

The proposed project includes the following components, as shown on Figure ES-2, below.

- **ARC Spillway.** Designing and constructing (including permitting and land and rights-of-way acquisition) the ARC Spillway, including the following facilities:

    - **Approach Channel.** An approximately 500-foot-long approach channel would be excavated adjacent to the Primary Spillway to connect the control structure and spillway chute to the Reservoir. The approach channel invert would be at Elevation (El.) 1873.0 feet and approximately 20 feet below the approach channel of the Primary Spillway.

    - **Control Structure.** A reinforced concrete hydraulic control structure with gates to control water releases from the approach channel. The control structure would have a height of approximately 103 feet from the invert of the approach channel. The control structure would include two parallel bays with submerged intakes and sills (the bottom) located approximately 31.5 feet below the sill of the Primary Spillway. The structure would also include an operations platform and gate control building (GCB), including access to spillway chute.

    - **Spillway Chute.** Downstream of the control structure, the water flow would be discharged through an open-cut, concrete-lined spillway chute with a concrete flip bucket designed to discharge flow away from the ARC Spillway foundation and towards the North Yuba River canyon. The spillway chute is designed with required freeboard for discharges up to approximately 64,000 cubic feet per second (cfs). A rock netting system would be installed to keep the left bench of the spillway chute clear of rocks.

    - **Discharge Channel.** An excavated discharge channel extending from the chute's flip bucket (El. 1745) down to the North Yuba River channel. The discharge channel would remove decomposed and severely weathered rock to reduce erosion downstream of the spillway chute and flip bucket. The discharge channel would measure approximately 690 feet along the hillside slope. The discharge channel slope is approximately 77.9 percent but would vary as it continues to the North Yuba River.

- **Permanent Marysville Road Relocation.** A segment of Marysville Road would be permanently relocated over the ARC Spillway. The approximate length of the road relocation would be 1,150 feet. The permanent road would be an asphalt-concrete paved road of similar width and characteristics to the existing road.

- **Permanent Overlook Site Relocation.** The existing Overlook Site would be relocated approximately 500 feet to the east of the existing Overlook Site along the relocated segment of Marysville Road. It would occupy an area that is now partially occupied by Marysville Road but would become available once the road is relocated to the south.

- **Permanent Soil and Rock Disposal Area.** A permanent 19-acre disposal area would be developed for surplus soil and rock excavated during project construction. The disposal area would be located approximately 0.3 mile southeast of the ARC Spillway at the top of an adjacent ridge. The permanent stockpile would extend up to approximately 25 to 50 feet above the existing ground surface to a maximum of approximately El. 2,230 feet.

ES.4.2 Project Construction

Project construction would be conducted over approximately 4 years and within the footprint of the ARC Spillway, Marysville Road relocation, Overlook Site relocation, soil and rock disposal area, and designated construction areas. To accommodate traffic needed for project construction activities, all overland roads within the project vicinity would be improved to accommodate construction vehicles. The following summarizes the key construction elements of the project.

- **Marysville Road Temporary Detour and Relocation.** A temporary detour of Marysville Road would be constructed approximately 70 feet north of the current alignment and left in place for approximately 3 years during project construction. This temporary detour would be an approximately 24-feet-wide, two-lane, asphalt-concrete paved road with 2-foot shoulders. Once the control structure has been completed, the permanent road relocation would be constructed over the top deck of the control structure, as described above.

- **Surface Water Control and Dewatering.** A natural cofferdam will be developed from soil and rock at the upstream left abutment to protect the control structure work while allowing uninterrupted Reservoir operations up to top of the flood pool. A hydraulic barrier would be installed through the soil and rock mass to reduce seepage from the Reservoir through the natural cofferdam and into deep excavations. The hydraulic barrier would be a 3-feet-wide, cement-bentonite cutoff wall constructed through the soil and decomposed rock down to the top of bedrock. Below the top of bedrock, a grout curtain would be installed. Due to the depth of excavation and project location adjacent to the Reservoir, dewatering is still anticipated to be needed prior to and after deep excavations.

- **Blasting.** Blasting would be used to help remove approximately 370,000 cubic yards (cy) of hard rock. Blasting would not be used for the discharge channel. Blasting would be conducted during up to 200 days of construction for other project components. After blasting, rock would be removed by excavator and hauled to the soil and rock disposal area.

- **Hauling to the Soil and Rock Disposal Area.** Approximately 720,000 cy of material generated from excavation activities would require permanent disposal at the soil and rock disposal area.

- **In-reservoir Construction.** Excavation for downstream ARC Spillway facilities would be separated from the Reservoir by the existing rock formation. Once the control structure has been completed and backfilled and Marysville Road has been relocated to the new permanent alignment, a natural rock cofferdam would be constructed from rock excavated onsite. Excavation into the Reservoir shoreline would be timed for the period of year when Reservoir water levels are lowest. No restrictions on recreation boat use or other recreational activities on the Reservoir would occur during construction.

- **Site Restoration.** After construction is complete, temporarily impacted areas, such as staging areas and additional construction areas, would be restored to approximate pre-existing contours and graded to match the adjacent land surface and topography.

ES.4.3 Project Operations

The ARC Spillway would operate conjunctively with the Primary Spillway and New Colgate Powerhouse to meet the Dam's overall target releases. The ARC Spillway would be able to release between 33,500 cfs at the Reservoir bottom flood water level (El. 1,920.8 ft) and 61,100 cfs at the normal maximum water surface elevation (El. 1,958.5 ft). The ARC Spillway would allow for releases from the Dam during high-flow events at a substantially lower Reservoir water elevation than is currently provided from the Primary Spillway. A high-flow event is defined based on forecasted encroachment of the Reservoir flood pool assuming the 7-day 25 percent exceedance forecast of the Reservoir inflow volume. Prereleases would be made before a high-flow event using either the ARC Spillway or Primary Spillway ahead of a storm up to 7 days in advance, but the ARC Spillway would only be used during the largest winter and spring events. Based on evaluation of historic flood events, the ARC Spillway would have been used before/during the 12 largest high-flow events over the 42-year period from 1970 to April 2022.

ES.4.3 Other YCWA Activities That Are Not Part of the Project

YCWA is involved in many activities on the Yuba River. In developing the project description for this Draft EIR, YCWA evaluated pending or proposed YCWA river-related activities to determine whether any of them should be incorporated as part of the Draft EIR project description. The following four major pending or proposed YCWA activities relating to the Yuba River were determined by YCWA to not constitute part of the proposed project (refer to Section 2.9 for an evaluation of these activities and the relationship to the proposed project).

- Yuba River Development Project FERC Relicensing
- USACE Water Control Manual Update
- Bay-Delta Voluntary Agreement Memorandum of Understanding
- Lower Yuba River Accord Water Transfer Program Extension

ES.5. Agency Roles and Responsibilities

YCWA, as the CEQA lead agency, has the principal responsibility for approving and carrying out the proposed project and for ensuring that CEQA requirements and all other applicable regulations are met. The following responsible and trustee agencies are anticipated to have jurisdiction over some aspects of the proposed project:

- California Department of Fish and Wildlife
- California Department of Water Resources
- State Office of Historic Preservation
- State Water Resources Control Board (SWRCB)

The following regional and local agencies are also potential responsible agencies under CEQA:

- Feather River Air Quality Management District (FRAQMD)
- Yuba County

Additionally, the following Federal agencies are anticipated to have permitting or review authority over portions of the proposed project:

- FERC
- National Marine Fisheries Service
- USACE
- U.S. Forest Service
- U.S. Fish and Wildlife Service

ES.6. Project Alternatives

CEQA requires that an EIR describe and evaluate a range of reasonable alternatives to the project or to the location of a projects that would feasibly attain most of the basic project objectives and would avoid or substantially lessen significant project impacts (CEQA Guidelines Section15126.6). The alternatives analysis must include the "No Project Alternative" as a point of comparison. In addition to the No Project Alternative, the alternatives to the proposed project considered in this Draft EIR were developed based on information gathered during the preliminary project design and are summarized below. Based on the comparison of relevant impacts of the alternatives, as described in Section 5.5 of this Draft EIR, the proposed project is considered the environmentally superior alternative among all alternatives.

ES.6.1 No Project Alternative

The ARC Spillway would not be constructed under the No Project Alternative and YCWA would not have the ability to release flows downstream in anticipation of large storms to provide increased capacity in the Reservoir during high-precipitation events. The Primary Spillway would continue to be used as it has in the past and the flood risk for the area would remain unchanged. The No Project Alternative would avoid all potentially significant and significant and unavoidable impacts of the proposed project because the ARC Spillway would not be developed and no construction activities would occur. However, existing conditions would likely remain unchanged and the beneficial effects of the proposed project to reducing flood risk and associated substantial environmental impacts potential would not occur. Without the proposed project and with the increasing threat of more frequent flooding from climate change, if a flood event occurred due to a levee failure that would not have otherwise occurred with the proposed project, there could be substantial environmental and other impacts to the local area flooded.

ES.6.2 Conveyance Tunnel Spillway Alternative

YCWA initially planned on developing a conveyance tunnel spillway design for the project instead of the proposed open-cut spillway design. This alternative would be operated similar to the proposed project and provide the same levels of flood risk reduction and operational flexibility and redundancy for the system Under this alternative, YCWA would not need to excavate the left abutment of the Dam, and as a result, Marysville Road would not be permanently relocated, no blasting would occur, and a substantially reduced amount of material would require hauling to the soil and rock disposal area. However, this alternative requires extensive and challenging work within the Reservoir over multiple years, primarily associated with the geologic conditions and unique approach to constructing a cofferdam to prevent flow of Reservoir water through the construction site. The conveyance tunnel design was abandoned as the preferred design due to constructability challenges, risks, and costs. While these risks and elevated costs make the project substantially more difficult to construct, it is possible to construct this alternative and it was not determined to be infeasible.

ES.7. Areas of Controversy

Pursuant to State CEQA Guidelines Section 15123(b)(2), a lead agency is required to include areas of controversy raised by agencies and the public in the EIR summary. Areas of controversy have been identified for the proposed project, based on comments made during the 30-day public review period in response to information published in the Notice of Preparation (NOP). YCWA issued the NOP for this Draft EIR on November 10, 2020 (see **Appendix A** of this Draft EIR). YCWA provided the NOP to local, State, and Federal agencies, organizations, and individuals that requested receipt of public notices.

During the NOP comment period, three State agencies and one non-profit submitted written comments, and two individuals submitted verbal comments during the scoping meeting. The primary area of controversy is the SWRCB assertion that "State Water Board staff is concerned that stand-alone environmental review of the Spillway Project could constitute piecemealing, which is impermissible under CEQA. Staff is further concerned that the Spillway Project description as presented in the NOP would not provide the State Water Board with a full analysis of the impacts of related activities associated with YRDP relicensing and alternatives that could support existing certification requirements or provide information for any future certification (e.g., should FERC's waiver finding not be overturned)." (SWRCB letter to YCWA dated Dec. 10, 2020.) Additional general topics raised during the public scoping period included: biological resources, water quality, flood management, recreation, geology and soils, consultation with California Native American tribes, as well as general permitting concerns.

ES.8. Issues to Resolve

There are no issues to resolve.

ES.9. Public Review and Final EIR

This Draft EIR is being distributed to responsible and other potentially interested agencies, stakeholder organizations, and individuals for a 60-day review period. This distribution ensures that interested parties have an opportunity to express their views regarding the project's environmental impacts and ensures that information pertinent to permits and approvals is provided to decision makers and CEQA responsible and trustee agencies by the lead agency.

A Notice of Completion for this Draft EIR has been filed with the State Clearinghouse, in accordance with the State CEQA Guidelines (Section 15085), and a Notice of Availability of this Draft EIR has been posted in accordance with State CEQA Guidelines (Section 15087). A public notice was posted in the Marysville Appeal-Democrat on June 27, 2023 and sent to all previous commenters that have requested information regarding the proposed project.

Copies of this Draft EIR are also available to review at the YCWA office any business day between the hours of 9:00 a.m. and 4:00 p.m. at the address below or on the project website at:
https://www.yubawater.org/252/ARC-Spillway-at-New-Bullards-Bar-Dam

Yuba County Water Agency
1220 F Street
Marysville, CA 95901

The public review period for providing comments on this Draft EIR is from June 23, 2023 until close of business at 5 p.m. on August 22, 2023. Written comments or questions concerning the Draft EIR must be directed to the name and address below via postal mail or email by no later than 4:00 p.m. on August 22, 2023:

John James
Yuba County Water Agency
1220 F Street
Marysville, CA 95901
jjames@yubawater.org

After the 60-day public review period, comments regarding environmental issues received in response to the Draft EIR will be addressed in a response to comments document, which, together with the Draft EIR and any changes to the text made in response to comments, or initiated by staff, will constitute the Final EIR. After a public hearing on the proposed project, YCWA will review the Final EIR, staff recommendations, and public testimony prior to certifying the EIR and deciding whether to approve or deny the proposed project.

If YCWA approves the project, even though significant impacts identified by the EIR cannot be mitigated, YCWA must state in writing the reasons for its actions. A Statement of Overriding Considerations must be included in the record of the project approval and mentioned in the notice of determination (CEQA Guidelines, Section 15093(c)).

ES.10. Summary of Potential Impacts and Mitigation

CEQA requires that the environmental analysis contained in the Draft EIR also include a summary of the proposed project and its consequences, including an identification of each potentially significant effect of the proposed project, the level of effect the proposed project may have, as well as any proposed mitigation measures. **Table ES-1** presents a summary of the impacts and mitigation measures identified for the proposed project. A full description of each impact and mitigation measure is found in Chapter 3, "Environmental Setting and Impacts."

Table ES-1. Summary of Impacts and Mitigation Measures

Impact	Significance Before Mitigation	Mitigation Measure	Significance After Mitigation
Hydrology and Water Quality			
Impact HWQ-1: Violate Surface Water Quality Standards from Ground Disturbance and Accidental Discharge of Wastes during Construction.	PS	Mitigation Measure HWQ-1: Prepare and Implement a Stormwater Pollution Prevention Plan and Best Management Practices to Reduce Erosion. Mitigation Measure HAZ-1: Implement a Spill Prevention Control and Countermeasures Plan and Other Measures to Reduce the Potential for Environmental Contamination during Construction Activities.	LTS
Impact HWQ-2: Violate Surface Water Quality Standard from Discharge of Water Encountered During Construction.	PS	Mitigation Measure HWQ-2: Obtain Coverage and Comply with Requirements of the General Order for Limited Threat Discharges to Surface Water.	LTS
Impact HWQ-3: Violate Surface Water Quality Standards from Drainage Water Discharges during Operations.	PS	Mitigation Measure HWQ-2: Obtain Coverage and Comply with Requirements of the General Order for Limited Threat Discharges to Surface Water.	LTS
Impact HWQ-4: Potential Long-Term Erosion from Development of the Project Site.	PS	Mitigation Measure HWQ-1: Prepare and Implement a Stormwater Pollution Prevention Plan and Best Management Practices to Reduce Erosion. Mitigation Measure HWQ-3: Implement Erosion Control Measures, Conduct Periodic Inspections, and Revise Measures as Needed.	LTS
Impact HWQ-5: Potential Long-Term Erosion Impacts from Use of the ARC Spillway.	LTS	Mitigation Measure HWQ-4: Regularly Inspect the ARC Spillway Discharge Channel for Erosion.	LTS
Impact HWQ-6: Changes in Reservoir Storage, Downstream Flows, and Flood Risk.	B	No mitigation required.	B
Impact HWQ-7: Potential Long-Term Erosion from Flow Changes Downstream.	LTS	No mitigation required.	LTS
Impact HYD-8: Changes in Agricultural Water Deliveries.	NI	No mitigation required.	NI
Impact HWQ-9: Risk of Inundation and Release of Pollutants from Seismic Seiche.	LTS	No mitigation required.	LTS
Fisheries Resources			
Impact FISH-1: Potential Construction-related Impacts on Fish and Their Habitats.	PS	Mitigation Measure HWQ-1: Prepare and Implement a Stormwater Pollution Prevention Plan and BMPs to Reduce Erosion. Mitigation Measure HAZ-1: Implement a Spill Prevention Control and Countermeasures Plan and Other BMPs for Storage, Use, and Transport of Hazardous Materials during Construction Activities.	LTS

NI = No Impact B = Beneficial LTS = Less than Significant S = Significant PS = Potentially Significant SU = Significant and Unavoidable

Impact FISH-2: Potential Impacts on Reservoir Coldwater Fishes and Their Habitats.	LTS	No mitigation required.	LTS
Impact FISH-3: Potential Impacts on Reservoir Warmwater Fishes and Their Habitats.	LTS	No mitigation required.	LTS
Impact FISH-4: Potential Impacts on Fish Species and Their Habitats in the North Yuba River.	LTS	No mitigation required.	LTS
Impact FISH-5: Potential Impacts on Chinook Salmon Essential Fish Habitat in the North Yuba River.	LTS	No mitigation required.	LTS
Impact FISH-6: Potential Impacts on Fish Species and Their Habitats in the Upper Yuba River.	LTS	No mitigation required.	LTS
Impact FISH-7: Potential Impacts on Chinook Salmon Essential Fish Habitat in the Upper Yuba River.	LTS	No mitigation required.	LTS
Impact FISH-8: Potential Impacts on Spring-run Chinook Salmon and Their Designated Critical Habitat in the Lower Yuba River.	LTS	No mitigation required.	LTS
Impact FISH-9: Potential Impacts on Steelhead and Their Designated Critical Habitat in the Lower Yuba River.	LTS	No mitigation required.	LTS
Impact FISH-10: Potential Impacts on Green Sturgeon and Their Designated Critical Habitat in the Lower Yuba River.	LTS	No mitigation required.	LTS
Impact FISH-11: Potential Impacts on Fall-run Chinook Salmon and Chinook Salmon Essential Fish Habitat in the Lower Yuba River.	LTS	No mitigation required.	LTS
Impact FISH-12: Potential Impacts on Pacific Lamprey in the Lower Yuba River.	LTS	No mitigation required.	LTS
Impact FISH-13: Potential Impacts on River Lamprey in the Lower Yuba River.	LTS	No mitigation required.	LTS
Impact FISH-14: Potential Impacts on Central California Roach in the Lower Yuba River.	LTS	No mitigation required.	LTS
Impact FISH-15: Potential Impacts on Hardhead in the Lower Yuba River.	LTS	No mitigation required.	LTS
Impact FISH-16: Potential Impacts on White Sturgeon in the Lower Yuba River.	LTS	No mitigation required.	LTS
Impact FISH-17: Potential Impacts on Striped Bass in the Lower Yuba River.	LTS	No mitigation required.	LTS
Impact FISH-18: Potential Impacts on American Shad in the Lower Yuba River.	LTS	No mitigation required.	LTS

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Impact FISH-19: Potential Impacts on Fish Species and Their Habitats in the Lower Feather and Sacramento Rivers.	LTS	No mitigation required.	LTS
Impact FISH-20: Potential Impacts on Fish Species and Their Habitats in the Sutter and Yolo Bypasses.	LTS	No mitigation required.	LTS
Terrestrial Biological Resources			
Impact BIO-1: Impacts to Special-status Plants and Fungi.	PS	Mitigation Measure BIO-1: Avoid and Minimize Impacts on Butte County Fritillary and Other Special-status Plants not Documented during Previous Surveys.	LTS
Impact BIO-2: Impacts on the Monarch Butterfly	LTS	No mitigation required.	LTS
Impact BIO-3: Impacts on California Red-legged Frog.	LTS	No mitigation required.	LTS
Impact BIO-4: Impacts on Foothill Yellow-legged Frog.	PS	Mitigation Measure HWQ-1: Prepare and Implement a Stormwater Pollution Prevention Plan and BMPs to Reduce Erosion. Mitigation Measure HAZ-1: Implement a Spill Prevention Control and Countermeasures Plan and Other BMPs for Storage, Use, and Transport of Hazardous Materials during Construction Activities.	LTS
Impact BIO-5: Impacts on Coast Horned Lizard.	LTS	No mitigation required.	LTS
Impact BIO-6: Impacts on Western Pond Turtle.	PS	Mitigation Measure BIO-2: Minimize Potential for Destruction of Western Pond Turtle Nests and Death of Individuals during Construction Activities. Mitigation Measure HWQ-1: Prepare and Implement a Stormwater Pollution Prevention Plan and BMPs to Reduce Erosion. Mitigation Measure HAZ-1: Implement a Spill Prevention Control and Countermeasures Plan and Other BMPs for Storage, Use, and Transport of Hazardous Materials during Construction Activities.	LTS
Impact BIO-7: Impacts on Bald Eagle.	PS	Mitigation Measure BIO-3: Implement Bald Eagle Protection Measures During Construction.	LTS
Impact BIO-8: Impacts on American Peregrine Falcon.	PS	Mitigation Measure BIO-4: Implement American Peregrine Falcon Protection Measures During Construction Activities.	LTS
Impact BIO-9: Impacts on Golden Eagle, Northern Goshawk, and Great Gray Owl.	LTS	No mitigation required.	LTS
Impact BIO-10: Impacts on California Spotted Owl.	PS	Mitigation Measure BIO-5: Avoid Construction-related Impacts on Active California Spotted Owl Nest Sites.	LTS
Impact BIO-11: Impacts on Olive-sided Flycatcher, Yellow Warbler, and Other Nesting Birds.	LTS	No mitigation required.	LTS
Impact BIO-12: Impacts on Ringtail.	PS	Mitigation Measure BIO-6: Minimize Potential for Project-related Death or Injury of Ringtail During Construction Activities.	LTS

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Impact BIO-13: Impacts on Special-status Bats.	PS	Mitigation Measure BIO-7: Minimize Potential for Project-related Loss or Disturbance of Roosting Special-status Bats.	LTS
Impact BIO-14: Impacts on Riparian Habitat and Sensitive Natural Communities.	LTS	No mitigation required.	LTS
Impact BIO-15: Chaparral, Woodland, and Forest Removal.	LTS	No mitigation required.	LTS
Impact BIO-16: Impacts on Federal- and State-Protected Waters.	PS	Mitigation Measure HWQ-1: Prepare and Implement a Stormwater Pollution Prevention Plan and Best Management Practices to Reduce Erosion During Construction Activities. Mitigation Measure HAZ-1: Implement a Spill Prevention Control and Countermeasures Plan and Other Measures to Reduce the Potential for Environmental Contamination During Construction Activities.	LTS
Impact BIO-17: Impacts on Fish and Wildlife Movement Corridors and Nursery Sites.	LTS	No mitigation required.	LTS
Cultural and Tribal Cultural Resources			
Impact CUL-1: Substantial Adverse Change in the Significance of a Historical Resource or an Archeological Resource pursuant to CCR Section 15064.5.	PS	Mitigation Measure CTR-1: Implement Procedures for Inadvertent Discovery of Cultural Material. Mitigation Measure CTR-2: Conduct Cultural Resource Awareness and Sensitivity Training.	LTS
Impact CUL-2: Disturbance of Human Remains, including Remains Interred Outside of Dedicated Cemeteries.	PS	Mitigation Measure CTR-3: Avoid Potential Effects to Previously Unknown Human Remains.	LTS
Impact CUL-3: Substantial Adverse Change in the Significance of an Unidentified TCR, as defined in PRC 21074.	PS	Mitigation Measure CTR-1: Implement Procedures for Inadvertent Discovery of Cultural Material. Mitigation Measure CTR-2: Conduct Cultural Resource Awareness and Sensitivity Training. Mitigation Measure CTR-3: Avoid Potential Effects to Previously Unknown Human Remains.	LTS

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Air Quality			
Impact AIR-1: Conflicts with Applicable Air Quality Plan from Construction Activities.	PS	Mitigation Measure AIR-1: Implement FRAQMD Construction Phase Mitigation Measures. Mitigation Measure AIR-2: Reduce Construction Related Exhaust Emissions. Mitigation Measure AIR-3: Purchase of Off-Site NOx Mitigation Fees.	SU
Impact AIR-2: Conflicts with Applicable Air Quality Plan for Operations, Maintenance, and Inspections.	LTS	No mitigation required.	LTS
Impact AIR-3: Results in Cumulatively Considerable Net Increase of Any Criteria Pollutant from Construction Activities.	S	Mitigation Measure AIR-1: Implement FRAQMD Construction Phase Mitigation Measures. Mitigation Measure AIR-2: Reduce Construction Related Exhaust Emissions. Mitigation Measure AIR-3: Purchase of Off-Site NOx Mitigation Fees.	SU
Impact AIR-4: Result in Cumulatively Considerable Net Increase of Any Criteria Pollutant from Operations.	LTS	No mitigation required.	LTS
Impact AIR-5: Expose Sensitive Receptors to Substantial Pollutant Concentrations.	LTS	No mitigation required.	LTS
Impact Air-6: Other Emissions (Such as Those Leading to Odors) Adversely Affecting a Substantial Number of People.	LTS	No mitigation required.	LTS
Greenhouse Gas Emissions			
Impact GHG-1: Generation of GHG Emissions from Construction Activities.	PS	Mitigation Measure GHG-1: Implement Construction GHG Emissions Reduction Best Management Practices. Mitigation Measure GHG-2: Purchase Off-Site GHG Construction Mitigation Credits.	LTS
Impact GHG-2: Generation of GHG Emissions from Operations.	LTS	No mitigation required.	LTS
Impact GHG-3: Conflict with a GHG Reduction Plan.	PS	Mitigation Measure GHG-1: Implement SMAQMD Construction GHG Emissions Reduction Best Management Practices. Mitigation Measure GHG-2: Purchase Off-Site GHG Construction Mitigation Credits.	LTS
Aesthetics			
Impact AES-1: Temporary Visual Changes from Construction Equipment.	SU	No mitigation required.	SU
Impact AES-2: Temporary Visual Changes from Construction Activities.	S	Mitigation Measure AIR-1: Implement FRAQMD Construction Phase Mitigation Measures.	SU

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Impact AES-3: Permanent Alteration of the Visual Character or Quality of the Project Area, including Scenic Vistas.	S	Mitigation Measure AES-1: Paint Gate Hoist and Gate Control Building Structure to Blend with Surroundings. Mitigation Measure AES-2: Revegetation of the Soil and Rock Disposal Area Side Slopes.	LTS
Impact AES-4: Introduce New Sources of Light and Glare from Construction Activities.	PS	Mitigation Measure AES-3: Provide Shielding from Nighttime Construction Activities.	LTS
Impact AES-5: Introduce New Sources of Light and Glare from New Facilities and Operations.	LTS	No mitigation required.	LTS
Agriculture and Forestry Resources			
Impact AGF-1: Conflict with Existing Zoning or Cause Rezoning of Forestland.	LTS	No mitigation required.	LTS
Impact AGF-2: Convert Forestland to Non-Forestland or Result in the Loss of Forestland.	LTS	No mitigation required.	LTS
Energy			
Impact EN-1: Cause Wasteful, Inefficient, or Unnecessary Consumption of Energy Usage.	LTS	No mitigation required.	LTS
Geology and Soils			
Impact GEO-1: Adverse Effects from Seismic Groundshaking or Soil Hazards.	LTS	No mitigation required.	LTS
Impact GEO-2: Adverse Effects from Blasting Vibrations During Construction.	PS	Mitigation Measure GEO-1: Prepare and Implement Blasting Plan.	LTS
Impact GEO-3: Potential Destruction of Unique Paleontological Resources.	LTS	No mitigation required.	LTS
Impact GEO-4: Potential Destruction of Unique Geologic Features.	LTS	No mitigation required.	LTS
Hazards and Hazardous Materials			
Impact HAZ-1: Create a Significant Hazard to the Public or the Environment Through the Routine Transport, Use, or Disposal of Hazardous Materials.	PS	Mitigation Measure HAZ-1: Implement a Spill Prevention Control and Countermeasures Plan and Other BMPs for Storage, Use, and Transport of Hazardous Materials During Construction Activities.	LTS
Impact HAZ-2: Potential to Create a Significant Hazard to the Public or the Environment Through Reasonably Foreseeable Upset and Accident Conditions Involving the Release of Hazardous Materials into the Environment.	PS	Mitigation Measure HAZ-1: Implement a Spill Prevention Control and Countermeasures Plan and Other BMPs for Storage, Use, and Transport of Hazardous Materials During Construction Activities.	LTS
Impact HAZ-3: Impair Implementation of an Emergency Response Plan or Evacuation Plan.	PS	Mitigation Measure TR-1: Implement a Traffic Safety Plan and Coordinate with Local Emergency Service Providers.	LTS

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Land Use and Planning			
Impact LUP-1: Consistency with Applicable Land use Designation and Zoning and Land Use Plans.	LTS	No mitigation required.	LTS
Noise			
Impact NOI-1: Temporary Construction-related Increases in Ambient Noise Levels in Excess of Yuba County Standards.	S	Mitigation Measure NOI-1: Implement Feasible Measures to Reduce Construction Noise Effects. Mitigation Measure NOI-2: Notify Nearby Residences and Lake Recreationalists of Construction Work Activities. Mitigation Measure GEO-1: Prepare and Implement Blasting Plan.	SU
Impact NOI-2: Increases in Ambient Noise Levels in Excess of Yuba County Standards from Operations and Maintenance Activities.	LTS	No mitigation required.	LTS
Impact NOI-3: Generate Excessive Ground Vibration or Groundborne Noise Levels from Construction Activities.	LTS	No mitigation required.	LTS
Impact NOI-4: Generate Excessive Ground Vibration or Groundborne Noise Levels from Operations and Maintenance Activities.	LTS	No mitigation required.	LTS
Public Services			
Impact PS-1: Service Disruptions for Fire Protection.	LTS	No mitigation required.	LTS
Recreation			
Impact REC-1: Require the Temporary Closure or Relocation of Recreational Facilities.	LTS	No mitigation required.	LTS
Impact REC-2: Adverse Effect to Recreation Facilities During Operations and Maintenance.	LTS	No mitigation required.	LTS
Transportation			
Impact TR-1: Temporary Increase in Vehicle Miles Traveled During Construction.	LTS	No mitigation required.	LTS
Impact TR-2: Result in Inadequate Emergency Access along Marysville Road During Construction.	PS	Mitigation Measure TR-1: Implement a Traffic Safety Plan and Coordinate with Local Emergency Service Providers.	SU
Impact TR-3: Increase Hazards Due to Relocating Marysville Road	LTS	No mitigation required.	LTS

NI = No Impact B = Beneficial LTS = Less than Significant S = Significant PS = Potentially Significant SU = Significant and Unavoidable

Utilities and Service Systems			
Impact UTL-1: Relocation of Existing Utility Infrastructure.	PS	Mitigation Measure UTL-1: Verify Utility Locations, Coordinate with Affected Utility Providers, Prepare and Implement a Response Plan, and Conduct Worker Training with Respect to Accidental Utility Damage.	LTS
Impact UTL-2: Have Sufficient Water Supply.	LTS	No mitigation required.	LTS
Impact UTL-3: Inadequate Wastewater Service Capacity.	LTS	No mitigation required.	LTS
Impact UTL-4: Generation of Solid Waste Potentially Exceeding Permitted Capacity of Local Landfills.	LTS	No mitigation required.	LTS
Wildfire			
Impact WF-1: Substantially Impair an Adopted Emergency Response Plan or Emergency Evacuation Plan During Construction	PS	Mitigation Measure TR-1: Prepare and Implement a Traffic Safety Plan and Coordinate with Local Emergency Service Providers.	LTS
Impact WF-2: Expose People or Structures to a Significant Risk of Loss, Injury or Death Involving Wildland Fires or Uncontrolled Spread of Wildfire.	PS	Mitigation Measure WF-1: Implement BMPs for Wildland Fire Prevention. Mitigation Measure WF-2: Prepare and Implement Fire Safety Plan.	LTS
Impact WF-2: Installation or Maintenance of Infrastructure that May Exacerbate Fire Risk.	LTS	No mitigation required.	LTS

NI = No Impact B = Beneficial LTS = Less than Significant S = Significant PS = Potentially Significant SU = Significant and Unavoidable

Chapter 1. Introduction

Yuba County Water Agency (YCWA) has prepared this Environmental Impact Report (EIR) to provide decision makers, the public, and responsible and trustee agencies with information about the potential environmental impacts of the New Bullards Bar Dam Atmospheric River Control (ARC) Spillway Project (project, or proposed project, or ARC Spillway). This Draft EIR was prepared in compliance with the California Environmental Quality Act of 1970 (as amended) and the State California Environmental Quality Act (CEQA) Guidelines (California Code of Regulations [CCR] title 14, Section (§) 15000 et seq.) (collectively CEQA).

1.1 Project Background

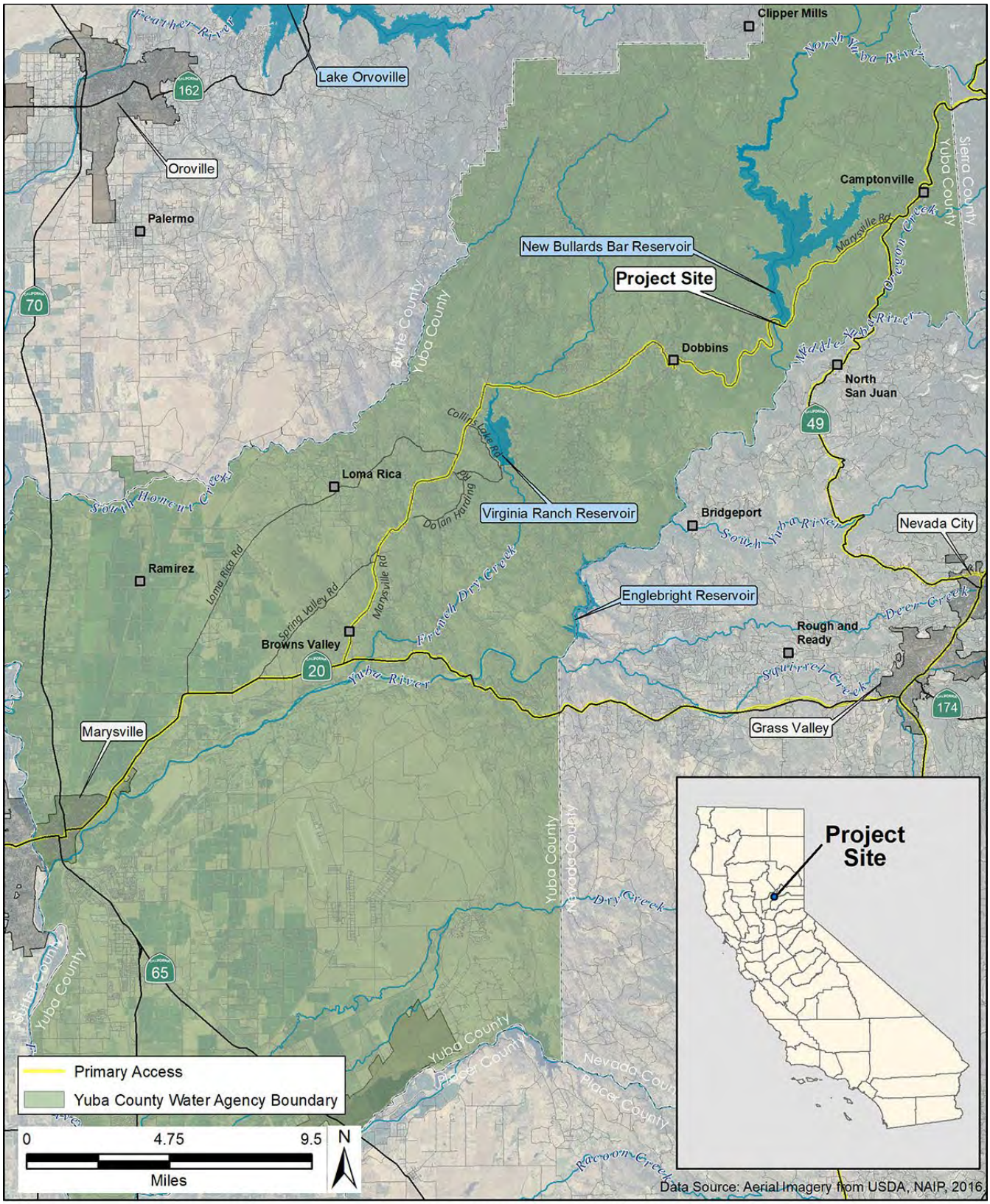
YCWA proposes to construct, operate, and maintain a second spillway – the ARC Spillway – at New Bullards Bar Dam (Dam). The Dam is located on the North Yuba River, upstream of the lower Yuba River and Feather River. The Yuba-Feather River system has a long history of catastrophic flood events. Since 1950, five major floods have resulted in loss of life, caused significant property damage, and constrained economic development in the region. The primary benefit of the proposed project is operational flexibility for managing flood-related outflow at the Dam, which would significantly reduce flood stage and flood risk downstream at Marysville and the Yuba-Feather River confluence. The existing concrete Dam and Primary Spillway would not be altered by the project.

1.1.1 Yuba River Development Project

The New Bullards Bar Reservoir (Reservoir) and Dam are the cornerstone of the multipurpose Yuba River Development Project (YRDP) constructed and operated by YCWA under Federal Energy Regulatory Commission (FERC) License Number 2246. Principal features of the YRDP include: the Reservoir and Dam on the North Yuba River; the 4.7-mile-long New Colgate Tunnel, the 0.7-mile-long penstock, and the 340-megawatt New Colgate Powerhouse; the Narrows 2 Powerhouse at Englebright Dam; and, diversion facilities including Our House Dam on the Middle Yuba River, the Lohman Ridge Tunnel, Log Cabin Dam on Oregon Creek, and the Camptonville Tunnel, which jointly divert waters from the Middle Yuba River and Oregon Creek into the Reservoir. Flood control within the YRDP is mainly provided by 170,000 acre-feet (ac-ft) of seasonally dedicated storage in the Reservoir. The five primary purposes of the YRDP are flood control, water conservation and supply, fisheries enhancement, hydroelectric power generation, and recreation.

1.1.2 New Bullards Bar Reservoir and Dam

The Dam impounds waters of the North Yuba River to form the Reservoir (**Figure 1-1**). The existing Dam is the fourth dam constructed on the Bullards Bar site, succeeding diversion dams built in 1899 and 1900, as well as a 200-foot concrete arch dam built by the Yuba River Power Company and later transferred to Pacific Gas and Electric Company in 1922. The previous dam generated power from 1924 until its inundation by the Reservoir in 1969. The 1899 diversion dam was washed away during a flood, but the dam constructed in 1900 is still in place, one-quarter mile downstream of the current Dam.



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25Nov2020 RS/SI

Figure Source: GEI Consultants, Inc. 2020.

Figure 1-1. Project Location Map

The Dam has a direct tributary catchment of 485 square miles. The Reservoir controls water flows from the North Yuba River, and the Middle Yuba River and Oregon Creek via diversion tunnels. Our House Diversion Dam, on the Middle Yuba River, diverts water into a 5.5-mile tunnel with a capacity of 810 cubic feet per second (cfs), running northwest to Log Cabin Diversion Dam on Oregon Creek. From here the combined waters of the Middle Yuba River and Oregon Creek are sent west into a shorter 1.3-mile tunnel with a capacity of 1,100 cfs into the eastern (Willow Creek) arm of the Reservoir. The diversions add 174 square miles to the effective catchment area of the Reservoir. Additionally, water from the Reservoir is supplied under pressure through the 26-foot-diameter, 5-mile-long New Colgate Tunnel, to the New Colgate Powerhouse on the mainstem Yuba River.

YCWA provides overall Reservoir operations although the United States (U.S.) Army Corps of Engineers (USACE) manages the Reservoir's flood control space through its Master Manual of Reservoir Regulation, Sacramento River Basin, California, and, specifically, by the *New Bullards Bar Reservoir Flood Control Manual* (Flood Control Manual). The Flood Control Diagram and the Emergency Spillway Release Diagram (USACE 1959, 1972) contained in the Flood Control Manual together govern the flood control releases from the Reservoir. Operational flood rules dictate the amount of variable flood space made available seasonally. No flood space is required from June 1 to September 15. During the peak flood season (November 1 – March 31), the flood control space is a USACE-mandated 170,000 ac-ft.

1.1.3 Yuba-Feather River System Flood Protection Planning

Studies by USACE and the California Department of Water Resources (DWR) circa 1960 concluded that meeting objective flow levels (i.e., maximum allowable flows for flood control purposes) on the Feather River would require flood storage in Lake Oroville (750,000 ac-ft), in the Reservoir (170,000 ac-ft), and in a proposed Marysville Reservoir (240,000 ac-ft). The proposed Marysville Reservoir, which would have been located on the lower Yuba River, has never been constructed. Without the Marysville Reservoir flood storage and given that the Middle Yuba and South Yuba rivers are unregulated, meeting the Feather River flow objective below the mouth of the Yuba River is challenging during large flood events. The proposed project would help to better meet this flow objective and reduce flood risk.

Following the devastating 1997 Northern California floods, YCWA has focused on incremental flood management improvements in the area with the eventual goal of protecting against a 1-in-500-year flood event for the Yuba River Watershed. Over the years, many options were evaluated that addressed downstream levee improvements and possible changes to upstream storage infrastructure and/or operations. Previously conducted operation studies indicated that substantial flood management benefits could be derived from modifying Reservoir operations (YCWA 2003). Further analysis indicated that the greatest flexibility and benefit would be provided by facilitating additional release capabilities at the bottom of the current flood pool level, at elevation 1920.8 feet (ft.), and at higher reservoir stages/elevations. The proposed project provides this secondary release capacity.

1.1.4 Proposed Project

The proposed project would be constructed at the Dam and releases from the ARC Spillway would be made in anticipation of large storms to provide increased capacity in the Reservoir during high-precipitation events. The ARC Spillway would have a discharge capacity of approximately 35,000 cfs and operate conjunctively with the Primary Spillway and New Colgate Powerhouse to meet the Dam's overall target releases. The ARC Spillway will primarily be used during small- and medium-sized flood events to maintain the designated flood space as well as during larger floods to evacuate a portion of the conservation storage (i.e., reservoir storage space below USACE-mandated flood space) to manage flood flows. During smaller flood events, flood releases may be made using only the Primary Spillway or only the ARC Spillway. The proposed project does not include any changes to the existing Flood Control Manual; the new ARC Spillway would be operated under the existing Flood Control Manual's requirements to better meet the specified downstream target flow objectives. However, YCWA expects that USACE will update and amend the Flood Control Manual during and/or following construction of the ARC Spillway, further discussed in Chapter 2, "Project Description."

The proposed project includes designing and constructing the ARC Spillway and related facilities, relocating the Dam Overlook Observation Site at the left abutment of the Dam, relocating a small segment of Marysville Road over the ARC Spillway, developing a permanent soil and rock disposal area, and operating and maintaining the ARC Spillway and related facilities pursuant to the current Flood Control Manual and other applicable rules and guidelines.

The proposed project is described in more detail in Chapter 2, "Project Description."

Yuba River Development Project, Federal Energy Regulatory Commission Relicensing

The Dam and Reservoir are part of the YRDP, a hydroelectric project operated by YCWA pursuant to License 2246 issued by FERC. In 2014, YCWA filed an application for a new license with FERC. The construction and operation of the ARC Spillway were included in the YCWA FERC license application. FERC is reviewing and considering that license application. In 2019, FERC completed a Final Environmental Impact Statement for the license application under the National Environmental Policy Act (NEPA). In March 2021, FERC announced that it plans to prepare a Supplemental Environmental Impact Statement (SEIS). Following completion of the SEIS, FERC will continue consultation with Federal fish and wildlife agencies in accordance with the Federal Endangered Species Act (ESA). FERC is expected to issue the new license following completion of the pending SEIS and ESA Section 7 consultation. At this time, the precise timing of the new license issuance is uncertain.

Because it will be part of the YRDP, the proposed project construction and operation require FERC approval. YCWA will apply to FERC for a non-capacity amendment to the existing FERC license to authorize the project.

1.2 Purpose and Intended Uses of this EIR

CEQA specifies that a public agency must prepare an EIR on any project that it proposes to carry out or approve that may result in a significant effect on the environment (California Public Resources Code [PRC], Section 21080(d)). Serving as the CEQA lead agency, YCWA has prepared this project-level EIR in accordance with CEQA to evaluate the potential environmental impacts associated with implementing the proposed project. An EIR is an informational document used to inform public agency

decision makers and the general public of the significant environmental impacts of a project, identify feasible ways to avoid or minimize the significant impacts, and evaluate a reasonable range of alternatives to the project that could feasibly attain most of the basic project objectives while substantially lessening or avoiding any of the significant environmental impacts (State CEQA Guidelines, Section 15121(a)).

CEQA requires that State, regional, and local government agencies consider the environmental impacts of projects over which they have discretionary authority before taking action on those projects. CEQA also requires that each public agency avoid or reduce to less-than-significant levels, wherever feasible, the significant environmental impacts of projects it approves or implements. If a project would result in significant and unavoidable environmental impacts that cannot be feasibly reduced to less-than-significant levels, the adverse environmental impacts may be considered "acceptable" if the specific economic, legal, social, technological, or other benefits, including region-wide or Statewide environmental benefits, of the project outweigh the unavoidable adverse environmental impacts. In this case, the project can be approved if the lead agency makes a written "Statement of Overriding Considerations" explaining the specific reasons to support its action.

Additionally, at FERC's discretion, information developed for this EIR may be used directly or incorporated by reference into subsequent NEPA documentation for the YRDP, which would be completed by FERC. USACE may also rely upon information contained in this EIR during development and evaluation of permit applications or other consultations.

1.3 Agency Roles and Responsibilities

According to the State CEQA Guidelines (Section 15064(f)(1)), an EIR must be prepared whenever a project may result in a significant environmental impact. The State CEQA Guidelines (Section 15367) identify the lead agency as the public agency that is responsible for approving and implementing a project. YCWA is both the lead agency and the project proponent. YCWA is responsible for providing documentation and implementing steps necessary to satisfy CEQA requirements for the proposed project. As the lead agency, YCWA has prepared this Draft EIR, will be responsible for preparing the Final EIR, and is responsible for ensuring that the EIR is available for review by the public and interested agencies and parties. YCWA also will be responsible for EIR certification and project approval.

A CEQA responsible agency is a State agency, board, or commission or any local or regional agency other than the lead agency that has a legal responsibility for reviewing, carrying out, approving, or permitting aspects of a project. Responsible agencies must actively participate in the lead agency's CEQA process and review its CEQA document. This EIR will be used by responsible agencies as a substantial basis in deciding whether to approve or permit project elements over which they have authority. A CEQA trustee agency is a State agency that has jurisdiction by law over natural resources that are held in trust for the people of the State of California. The following responsible and trustee agencies are anticipated to have jurisdiction over some aspects of the proposed project:

- California Department of Fish and Wildlife
- DWR
- State Office of Historic Preservation
- State Water Resources Control Board (SWRCB)

The following regional and local agencies are also potential responsible agencies under CEQA:

- Feather River Air Quality Management District
- Yuba County

Additionally, the following Federal agencies are anticipated to have permitting or review authority over portions of the proposed project:

- FERC
- National Marine Fisheries Service
- YCWA
- U.S. Forest Service
- U.S. Fish and Wildlife Service

1.4 EIR Scoping, Preparation, and Review Process

State CEQA Guidelines do not require formal hearings at any stage of the environmental review process (State CEQA Guidelines Section 15202(a)). However, they do encourage "wide public involvement, formal and informal, to receive and evaluate public reactions to environmental issues" (State CEQA Guidelines Section 15201).

1.4.1 Notice of Preparation and Public Scoping

In accordance with the State CEQA Guidelines, YCWA issued a notice of preparation (NOP) for this EIR on November 10, 2020 (**Appendix A**). The NOP concluded that the project may have significant impacts on the environment, and informed agencies and the general public that an EIR was being prepared. The NOP was circulated for 30 days, as mandated by CEQA, and the public comment period for the NOP closed on December 10, 2020.

The NOP invited comments on the scope and content of the EIR and invited participation at a virtual public scoping meeting. The NOP was sent by mail and electronically to agencies and members of the public and was also posted on YCWA's public notices web page and the CEQAnet Web Portal. The virtual public scoping meeting for the proposed project was held online on November 17, 2020 via Zoom. The comments received by YCWA on the NOP and at the public scoping meeting were considered in the preparation of the Draft EIR. The scope of the Draft EIR included the potential environmental impacts identified in the NOP, as well as any issues raised by agencies and the public in response to the NOP and public scoping meeting. The NOP and comments received during the NOP comment period and at the public scoping meeting are contained in Appendix A, **"**Notice of Preparation and Public Scoping."

1.4.2 Draft EIR Comment Period

This Draft EIR is being distributed to responsible and other potentially interested agencies, stakeholder organizations, and individuals for a 60-day review period. This distribution ensures that interested parties have an opportunity to express their views regarding the project's environmental impacts and ensures that information pertinent to permits and approvals is provided to decision makers and CEQA responsible and trustee agencies by the lead agency.

A Notice of Completion for this Draft EIR has been filed with the State Clearinghouse, in accordance with the State CEQA Guidelines (Section 15085), and a Notice of Availability of this Draft EIR has been posted in accordance with State CEQA Guidelines (Section 15087). A public notice was posted in the Marysville Appeal-Democrat on June 27, 2023, and sent to all previous commenters that have requested information regarding the proposed project.

Copies of this Draft EIR are also available to review at the YCWA office any business day between the hours of 9:00 a.m. and 4:00 p.m. at the address below or on the project website at:
https://www.yubawater.org/252/ARC-Spillway-at-New-Bullards-Bar-Dam

Yuba County Water Agency
1220 F Street
Marysville, CA 95901

The public review period for providing comments on this Draft EIR is from June 23, 2023 until close of business at 5 p.m. on August 22, 2023. Written comments or questions concerning the Draft EIR must be directed to the name and address below via postal mail or email by no later than 4:00 p.m. on August 22, 2023:

John James
Yuba County Water Agency
1220 F Street
Marysville, CA 95901
jjames@yubawater.org

1.4.3 Preparation of the Final EIR and EIR Certification

Comments regarding environmental issues received in response to the Draft EIR will be addressed in a response to comments document, which, together with the Draft EIR and any changes to the text made in response to comments, or initiated by staff, will constitute the Final EIR. After a public hearing on the proposed project, YCWA will review the Final EIR, staff recommendations, and public testimony prior to certifying the EIR and deciding whether to approve or deny the proposed project.

If YCWA approves the project, even though significant impacts identified by the EIR cannot be mitigated, YCWA must state in writing the reasons for its actions. A Statement of Overriding Considerations must be included in the administrative record of the project approval and mentioned in the Notice of Determination (State CEQA Guidelines, Section 15093(c)).

1.5 Issues to be Resolved and Areas of Known Controversy

As mentioned previously, Appendix A, "Notice of Preparation and Public Scoping" contains the NOP and copies of comments that were received. Three State agencies and one non-profit submitted written comments, and two individuals submitted verbal comments during the scoping meeting. These comments discussed various topics recommended for consideration in the Draft EIR and potential required permits and authorizations. The only known area of controversy and issue to be resolved is the SWRCB assertion that "State Water Board staff is concerned that stand-alone environmental review of the Spillway Project could constitute piecemealing, which is impermissible under CEQA. Staff is further concerned that the Spillway Project description as presented in the NOP would not provide the State Water Board with a full analysis of the impacts of related activities associated with YRDP relicensing and alternatives that could support existing certification requirements or provide information for any future certification (e.g., should FERC's waiver finding not be overturned)." (SWRCB letter to YCWA dated Dec. 10, 2020.)

1.6 EIR Organization and Standard Terminology

In accordance with State CEQA Guidelines Section 15126.2, this Draft EIR identifies and focuses on the significant direct, indirect, and cumulative environmental impacts of the proposed project, considering both its short-term and long-term impacts. Short-term impacts are generally those associated with project construction, while long-term impacts are generally those associated with operation of the proposed project.

This Draft EIR is organized as follows:

- Executive Summary. Summarizes the findings and conclusions of this Draft EIR.

- Chapter 1, Introduction. Describes the purpose of the Draft EIR and associated agency roles and responsibilities, provides an overview of the CEQA and Draft EIR review processes, outlines the scope and focus of the Draft EIR, and describes its organization and terminology.

- Chapter 2, Project Description. Describes the project location, background, and context; discusses the project purpose and objectives; and describes the project components, including specific features, construction sequencing and methods, and labor force.

- Chapter 3, Environmental Setting and Impact Analysis. Includes 18 environmental issue area sections pertinent to the project, each of which presents a discussion of the environmental setting; regulatory background; thresholds of significance, issues not discussed further in the EIR, and analysis methodology; environmental impact analysis; mitigation for potentially significant impacts; and residual impacts remaining significant after implementing mitigation. The following resource topics are addressed in Chapter 3.

3.1. Hydrology and Water Quality
3.2. Fisheries Resources
3.3. Terrestrial Biological Resources
3.4. Cultural and Tribal Cultural Resources
3.5. Air Quality
3.6. Greenhouse Gas Emissions
3.7. Aesthetics
3.8. Agriculture and Forestry Resources
3.9. Energy
3.10. Geology and Soils
3.11. Hazards and Hazardous Materials
3.12. Land Use and Planning
3.13. Noise
3.14. Public Services
3.15. Recreation
3.16. Transportation
3.17. Utilities and Service Systems
3.18. Wildfire

- Chapter 4, Other CEQA-required Sections. Describes the project's potential for growth-inducement, summarizes significant and unavoidable impacts and irreversible environmental changes, and describes the cumulative impacts of implementing the project with impacts of related past, present, and reasonably foreseeable future projects.

- Chapter 5, Alternatives Analysis. Describes CEQA requirements to consider alternatives to the proposed project, summarizes alternatives that were considered but rejected from detailed analysis, analyzes and presents environmental impacts of alternatives evaluated in detail, and identifies the "environmentally superior alternative."

- Chapter 6, Report Preparers and Reviewers. Names the individuals who have contributed to preparation or review of this Draft EIR.

- Chapter 7, References. Lists the sources of information cited throughout this Draft EIR.

- Appendix A. Notice of Preparation and Public Scoping

- Appendix B. Water Balance/Operations Modeling

- Appendix C. Water Surface Elevation Modeling

- Appendix D. Stream Power and Erodibility Assessment

- Appendix E. Water Temperature Modeling

- Appendix F. Biological Database Searches

- Appendix G. Air Quality and Greenhouse Gas Emissions Modeling

This Draft EIR uses the following defined standard terms:

- project, proposed project, or ARC Spillway Project. Refers to the design, construction, operation, and maintenance of the ARC Spillway and related facilities and activities as described in Chapter 2, "Project Description."

- project site. Refers to the area where project components are located and where construction, operations, or maintenance activities would occur.

- project area. Refers to areas immediately adjacent to the project site.

- project vicinity. Generally, refers to an area that is broader than the project area but shares similar characteristics.

Chapter 2. Project Description

Yuba County Water Agency (YCWA) proposes to design, construct, operate, and maintain the New Bullards Bar Dam Atmospheric River Control (ARC) Spillway Project (project, proposed project, or ARC Spillway Project). The ARC Spillway would be operated conjunctively with the existing Primary Spillway to efficiently release flows downstream, including earlier passage of flows during large storm events. The primary benefits of the proposed project are operational flexibility for managing outflow at the Dam, reducing flood flows and flood stages downstream at Marysville and the Feather-Yuba River confluence and providing public safety benefits. The proposed ARC Spillway would have a discharge capacity of approximately 33,500 cubic feet per second (cfs) at the bottom of the flood pool at Elevation (El.) 1,920.8 feet at mean sea level (msl)[1] and approximately 61,100 cfs at the top of the flood pool/normal maximum water surface elevation at El. 1,958.5 feet.

2.1 Project Location

The New Bullards Bar Dam (Dam) impounds waters of the North Yuba River to form the New Bullards Bar Reservoir (Reservoir). The Dam and Reservoir are located in unincorporated Yuba County, California, 35 miles northeast of the City of Marysville along Marysville Road (Figure 1-1). The ARC Spillway would be located at the upper left abutment area of the Dam, approximately 280 feet south of the existing Primary Spillway. The existing concrete Dam and Primary Spillway would not be altered by project construction. A new permanent site for disposal of surplus soil and rock material excavated during project construction would be located on a ridge approximately 0.3 mile southeast of the ARC Spillway.

2.2 Project Purpose and Objectives

The underlying project purpose is to improve flood protection and management and provide public safety benefits within the Yuba-Feather River system. The project objectives are to:

- Provide improved flood risk reduction in the Yuba-Feather River system.
- Provide operational flexibility and redundancy for Reservoir releases in high-flow events.
- Provide redundant spillway/Reservoir release capacity in the event of structural, operational, or other problems with the existing Dam or Primary Spillway.
- Avoid impacting Reservoir operations and recreation use during construction activities to the extent possible.
- Allow for adequate operation, inspection, and maintenance access to the ARC Spillway.

[1] Note: 1) The vertical datum for the project is NAVD88 using Geoid 12B, and as a result, there is a +2.5-foot difference between the NAVD88 and vertical datum NGVD29 (used in other YCWA documents for the Dam and Reservoir) in the project area; and 2) all project design and construction dimensions, measurements, and elevations are considered approximate.

- Minimize the need to transport excavated soil and rock.
- Address and accommodate uncertainty in hydrologic predictions due to climate change and other factors and improve water conveyance flexibility and integrate enhanced operations to respond to these changes.

2.3 Project Overview

The proposed project includes the following components, described further in Section 2.4 below:

- Designing and constructing (including permitting and land and rights-of-way acquisition) a new second spillway, including the following facilities:
    - An excavated approach channel in the Reservoir at the left Dam abutment to guide water into the ARC Spillway.
    - A control structure with gates to control water releases from the approach channel.
    - An open-cut, concrete-lined spillway chute with a concrete flip bucket designed to discharge flow away from the ARC Spillway foundation and towards the North Yuba River canyon.
    - An excavated discharge channel extending from the chute's flip bucket down to the North Yuba River channel.
    - An operations platform and gate control building (GCB) to house equipment and monitoring systems for operating the ARC Spillway.
    - An electrical system for operating the spillway gates and monitoring equipment.
    - New permanent access features to the ARC Spillway.
- Relocating the Overlook Site at the left abutment of the Dam.
- Relocating a small segment of Marysville Road over the ARC Spillway.
- Establishing a permanent disposal area for surplus soil and rock excavated during project construction.

Project construction would be conducted over approximately 4 years and within a designated construction area, as described in Section 2.5, "Project Construction." The project includes operating and maintaining the ARC Spillway and related facilities pursuant to United States (U.S.) Army Corps of Engineers (USACE's) Master Manual of Reservoir Regulation, Sacramento River Basin, California (and specifically the New Bullards Bar Reservoir Flood Control Manual) and other applicable rules and guidelines, as described in Section 2.6, "Project Operations."

2.4 Project Components and Characteristics

2.4.1 ARC Spillway Components

Figure 2-1 shows an overview of the ARC Spillway arrangement and **Figure 2-2a** and **2-2b** show the ARC Spillway profile upstream and downstream of Marysville Road, respectively. The ARC Spillway would cover approximately 10 acres from all spillway project components (discussed below), relocation of the Overlook Site, relocation of Marysville Road, and permanent grading.

Approach Channel

An approximately 500-feet-long approach channel would be excavated adjacent to the Primary Spillway to connect the control structure and spillway chute to the Reservoir. The approach channel is geometrically designed to maximize hydraulic efficiency, minimize excavation volumes, and reduce potential erosion during project operations. In addition, the approach channel arrangement is designed to separate flows between the Primary Spillway and the ARC Spillway to minimize interactions when both spillways are operating at the same time. The ARC Spillway approach channel invert would be at El. 1873.0 feet and approximately 20 feet below the approach channel of the Primary Spillway.

The approach channel bottom would be approximately 52.5-feet-wide. Side slopes would be a maximum slope of 2 horizonal (H):1 vertical (V) in soils and 0.5H:1V in rock. Hardscape slope protection, such as rip- rap or concrete, may be used to protect the channel and adjacent slopes against excessive scouring due to water flows and damage due to wave action and water impact forces. Use of slope protection would be limited to locations where specifically needed to reduce erosion and scour. Most of the smaller floating debris would probably pass through the ARC spillway openings and avoid the radial gates. However, to address potential waterlogged debris or floating debris bypassing the main dam logboom, a dedicated debris boom would be incorporated across the approach channel.

Control Structure

The control structure would be a reinforced concrete hydraulic structure, as shown in **Figure 2-3**, with a height of approximately 103 feet from the invert of the approach channel to the top deck/operations platform. The control structure would include two parallel bays with submerged intakes and sills (the bottom) located approximately 31.5 feet below the sill of the Primary Spillway. The bays would be gated and ultimately converge into the concrete-lined spillway chute. Each gate bay would contain an upstream guard gate and a downstream service gate.

The control structure would include maintenance access stairs, ladders, and platforms to access various levels within the control structure for inspection and routine maintenance to be conducted for the guard and service gates. The control structure would include an operations platform and GCB, including for access to the spillway chute, discussed further below in this section. Concrete retaining walls would extend from the right and left sides of the control structure at the downstream end.

Service gates and emergency gates would be operated by means of dedicated wire rope hoists. The wire rope hoist for the service gate would be housed on a platform supported on the piers, below the top deck/operations platform. The wire rope hoist for the emergency gate would be fixed above a gate hoist structure spanning the width of the spillway (approximately 50 ft) adjacent to the relocated alignment of Marysville Road (Figure 2-2b). The gate hoist structure is an approximately 12-feet-wide, metal-framed structure extending approximately 40 feet above the operations platform with an enclosure at the top to house the wire rope hoist. The emergency gates, when not deployed, would normally sit below ground inside the control structure and would only be held in the hoist tower frame for maintenance.

Within the thick concrete walls of the control structure, an access and inspection gallery would be constructed extending across the spillway below the invert. The gallery would be accessed from the top deck, from either side of the structure. The gallery would provide access for curtain grouting of the control structure foundation, to reduce the hydraulic conductivity of the rock mass surrounding the structure. The gallery would also include a foundation drainage system designed to intercept and collect seepage water that makes it past the grout curtain, thus reducing water pressures under the control structure. Seepage flows intercepted by the drainage system would be collected in sumps and either:

1) pumped back into the Reservoir,
2) discharged to the chute for the ARC Spillway downstream of the gates, or
3) discharged by gravity though a drilled and lined drain hole to the chute of the Primary Spillway.

Construction of the control structure requires excavating the existing hillside at the left Dam abutment. After construction, hard rock from the excavated hillside would remain visible, just as the rock slope is now visible along the south side of Marysville Road.

Spillway Chute

Downstream of the control structure, the water flow would be discharged through a rectangular spillway chute with side walls, as shown in Figure 2-3. The spillway chute is designed with required freeboard for discharges up to approximately 64,000 cfs. The spillway chute would be approximately 365-feet-long by 48-feet-wide by 33-feet-high concrete-lined channel excavated in rock. The spillway chute would have a 5 percent slope from the end of the control structure for about 95 feet, then transition through a 105-feet-long vertical curve to a steep chute with a 50 percent slope for about 165 feet. The spillway chute side walls would be anchored to the bedrock, which will be excavated at a 1H:10V slope, with grouted, pre-stressed rock anchors. An approximately 0.5H:1V slope would be excavated on the adjacent rock slope.

A rock netting system would be installed to keep the left bench of the spillway chute clear of rocks and protect maintenance personnel and vehicles accessing the bench for maintenance and inspection. The rockfall mitigation would consist of anchored rock netting to stabilize partially detached rocks and to reduce the potential for stones and blocks to break out and fall.

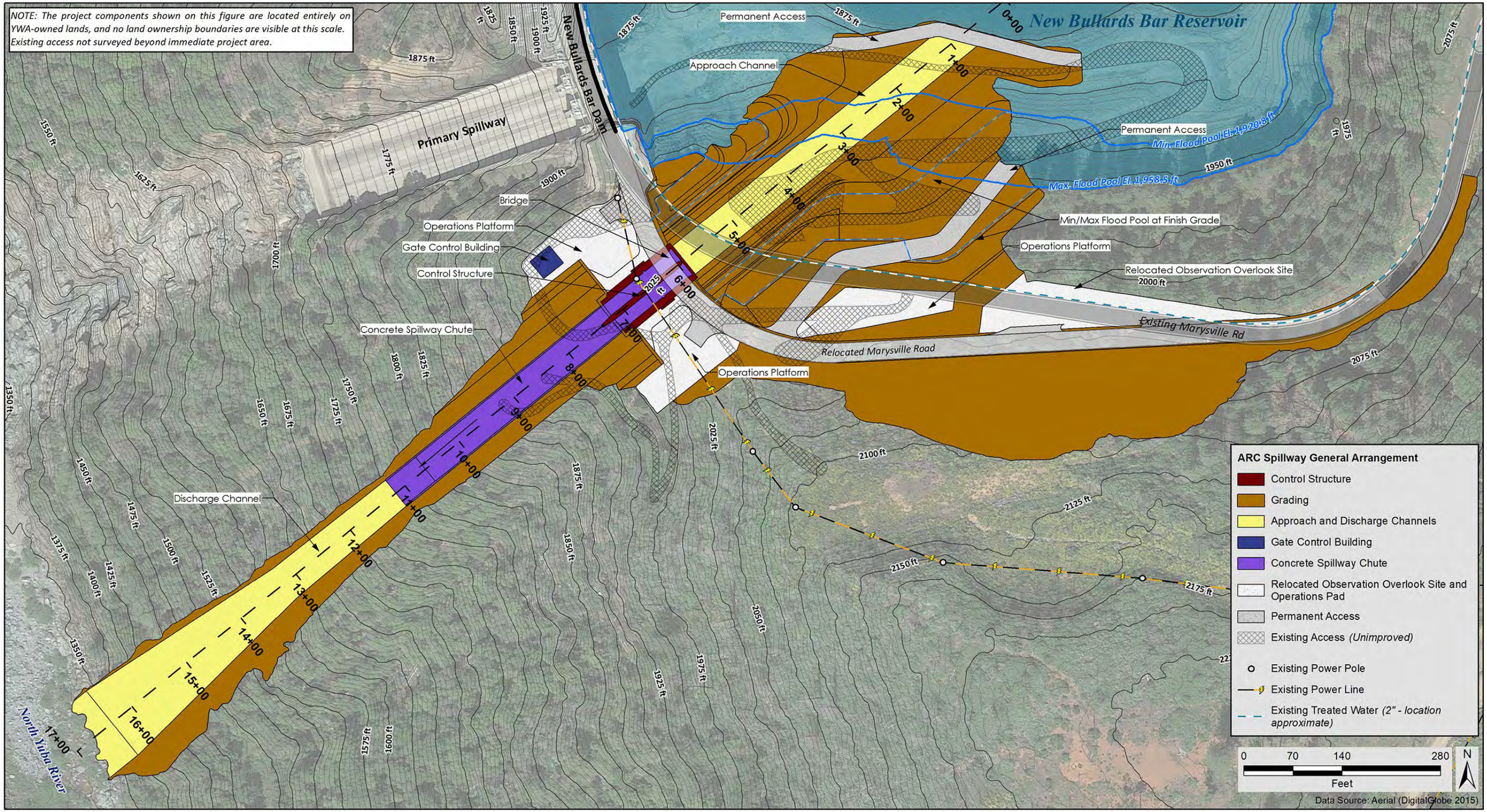
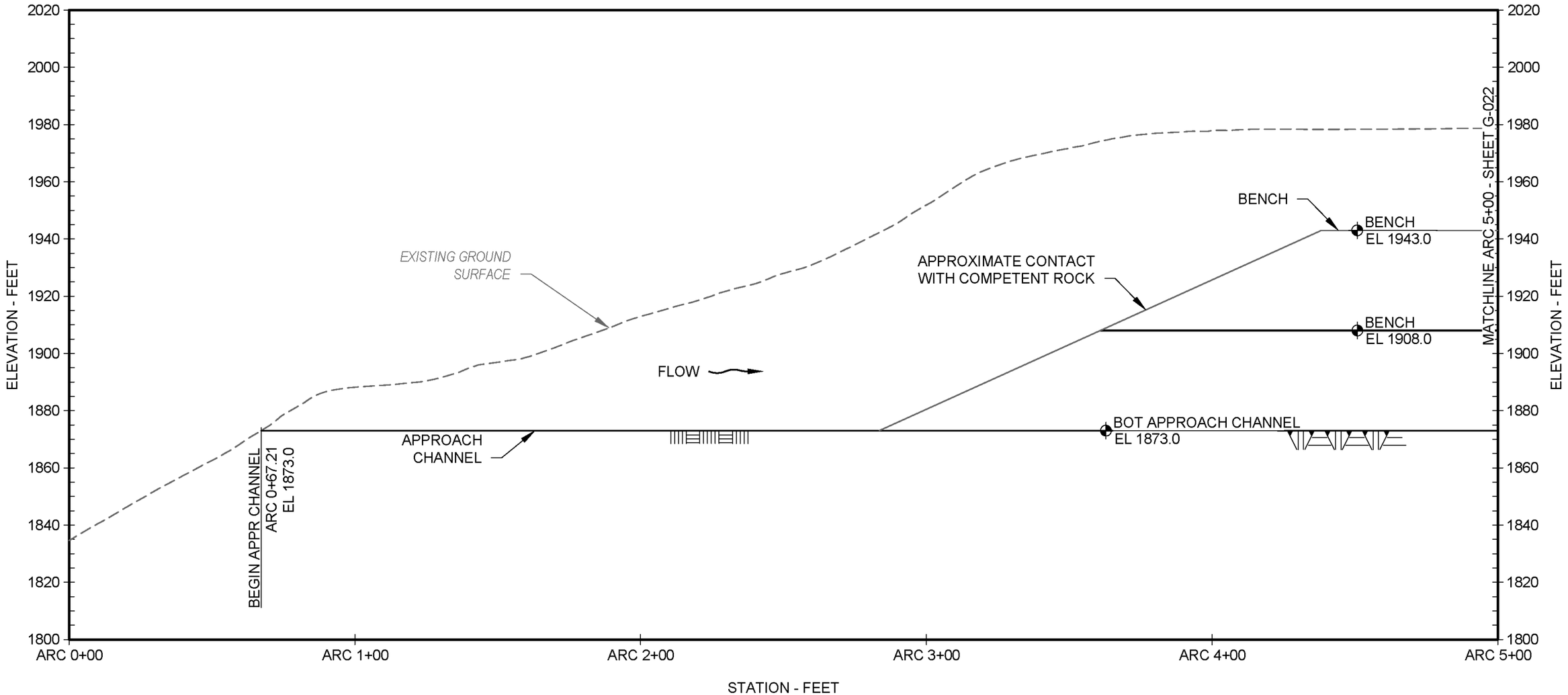


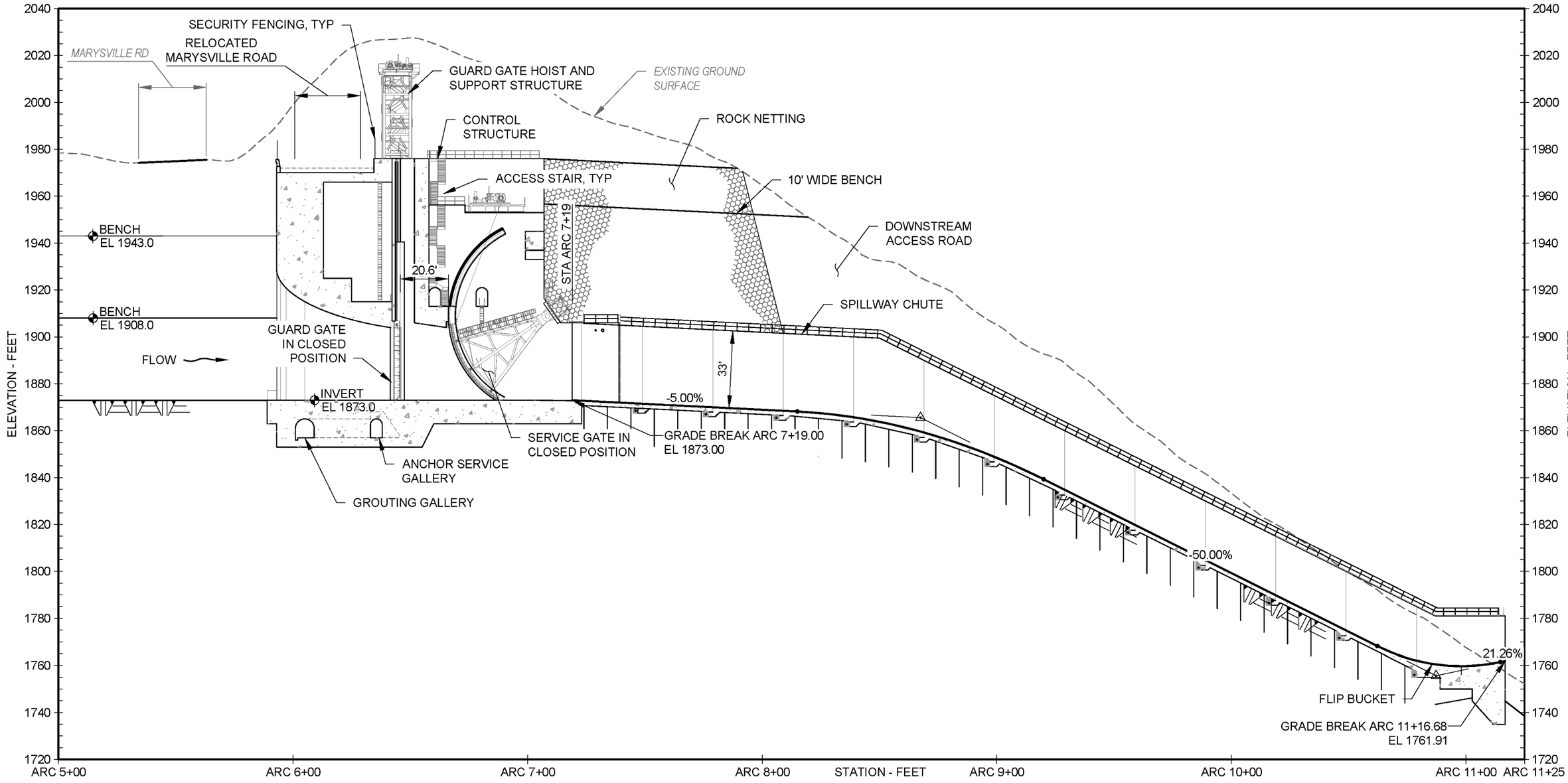
Figure Source: GEI Consultants, Inc. 2023.

Figure 2-1. ARC Spillway, Permanent Marysville Road Relocation, and Observation Overlook Site Relocation



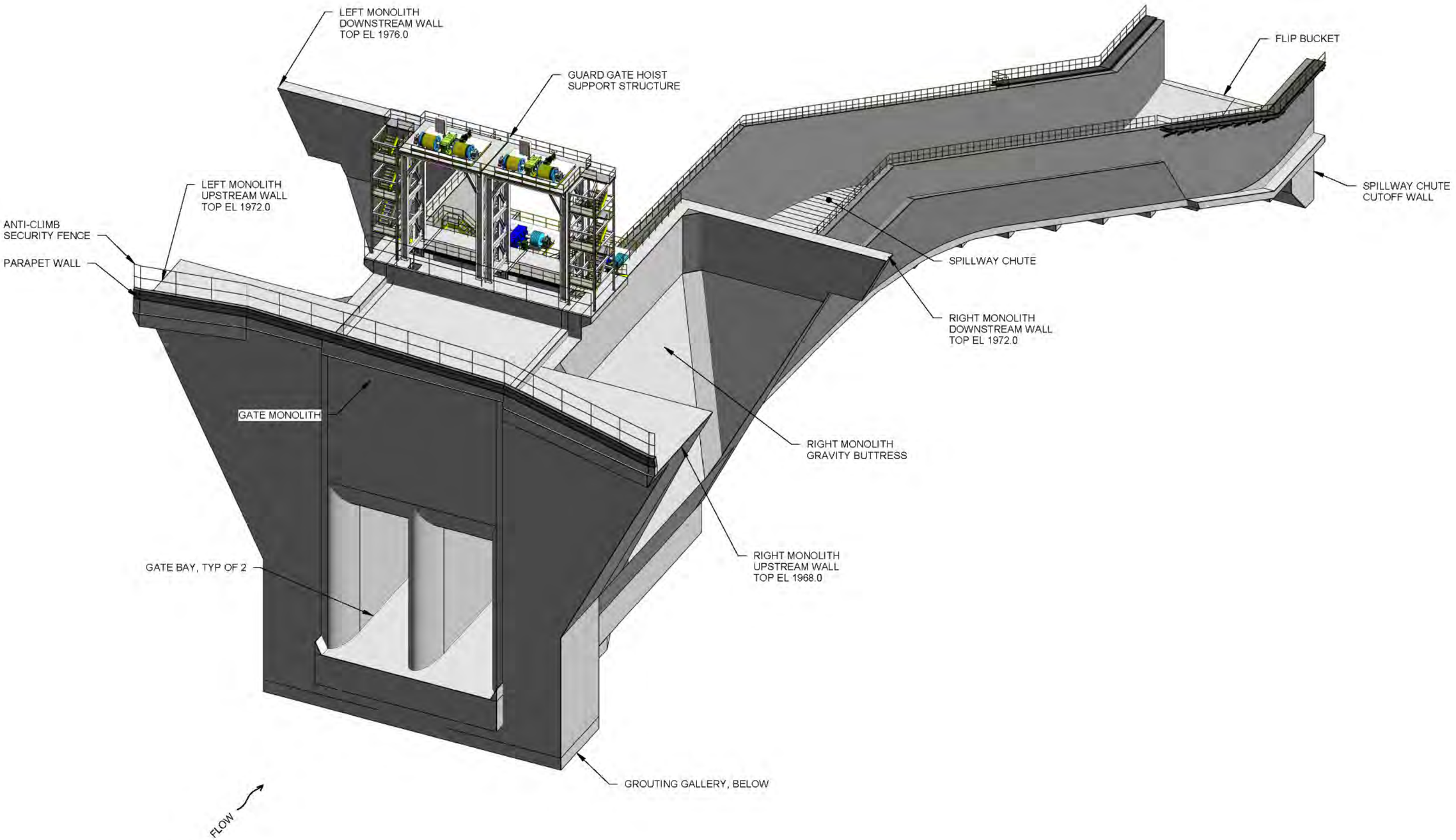
Source: GEI Consultants 2022.

Figure 2-2a. ARC Spillway Profile – Approach Channel



Source: GEI Consultants 2022.

Figure 2-2b. ARC Spillway Profile – Control Structure and Spillway Chute



Source: GEI Consultants 2022

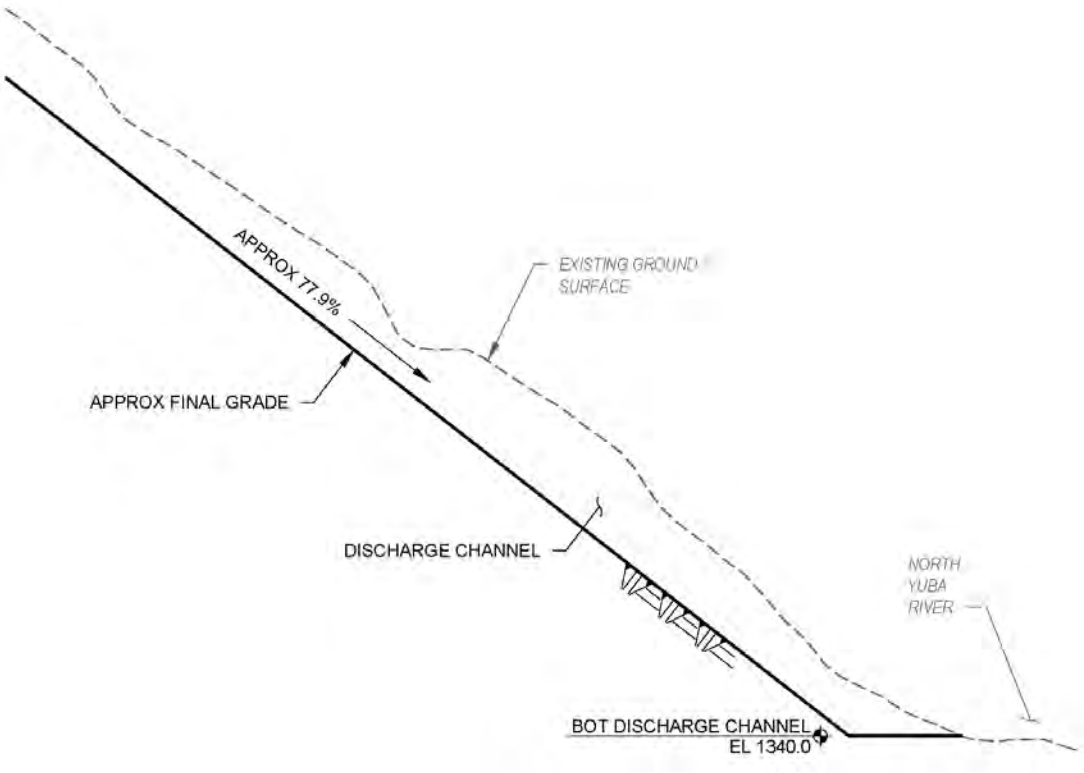
Figure 2-3. Control Structure, Gate Hoist, and Spillway Chute Conceptual Design

A concrete flip bucket would be located at the downstream end of the spillway chute to discharge water away from the ARC Spillway foundation and into the discharge channel, which extends down toward the North Yuba River canyon. At high flows, the flip bucket will discharge directly to the North Yuba River. A cutoff wall would be provided to protect the flip bucket foundation from scour. The flip bucket would have a radius of approximately 80 feet and a takeoff angle of 12 degrees.

A system of drains would be installed beneath the spillway chute bottom and in the side walls to collect drainage water. This drainage water would be discharged by gravity to the discharge channel downstream of the chute for the ARC Spillway. A cutoff wall would be provided on the downstream side of the spillway chute and below the flip bucket, to prevent backward progression of head cutting from water spilling in the discharge channel.

Discharge Channel

A discharge channel would be excavated to remove decomposed and severely weathered rock to reduce erosion downstream of the spillway chute and flip bucket, as shown in Figure 2-4. The discharge channel would measure approximately 690 feet along the hillside slope. Excavation is based on geologic conditions and erosion observed in the Primary Spillway discharge channel and modeling of stream power and erosion potential conducted for the project. The discharge channel would begin below the spillway chute's flip bucket at approximately El. 1745 feet. The discharge channel slope is approximately 77.9 percent but would vary as it continues to the North Yuba River. The width would be approximately 55 feet from the flip bucket down to El. 1585 feet and then taper out on both sides at an approximately 5.7-degree angle to an ultimate bottom width of approximately 118 ft at El. 1340 feet. No excavation is planned within the North Yuba River for the discharge channel design. Discharge channel side slopes would have an approximately 1H:1V inclination.



Source: GEI Consultants 2022.

Figure 2-4. ARC Spillway Discharge Channel Cross-section

Gate Control Building

The GCB would be located on the paved operations platform installed at ground level just northwest of and adjacent to the top deck of the control structure. The GCB primarily houses the electrical controls to operate the intake gates, local control cabinet, and Supervisory Control and Data Acquisition (SCADA) equipment for the gate operation. All gates at the ARC Spillway would be fully operable from the new GCB.

The GCB would have a finished floor at approximately El. 1,976 feet. The GCB would be approximately 15-feet-tall, with a footprint of approximately 34 by 39 feet, and concrete masonry unit structure with a corrugated metal roof or a pre-engineered steel or precast concrete building. The GCB would include an electrical room for equipment, two offices for operations staff, and a restroom. The layout of the building would allow convenient access and ample floor space for the needed electrical and controls equipment, including room to perform routine maintenance activities. The GCB would be provided with a fire protection system, heating and ventilating equipment, and a domestic water system. Fire protection would be provided for the power and electrical equipment located inside the GCB and would be based on the Camptonville Community Services District requirements, the applicable California Building Standards Code standards, and the equipment manufacturer's recommendation. Electric unit heaters would be provided for the living space and to ensure optimal operating temperatures for operational electronics (minimum 50 degrees Fahrenheit) (°F).

Domestic water would be required for the bathroom in the GCB. The two possible sources of water would be: 1) connecting to an existing 2-inch-diameter water line in Marysville Road extending to a nearby campground/boat launch, or 2) installing a tank at the GCB to be filled with potable water. Wastewater from the GCB would gravity drain to a 1,000 gallon below-grade storage tank. The tank would have access ports and a level alarm and waste would be periodically pumped out by a truck-mounted pump and tank for proper disposal offsite.

Electrical System

The project would require electrical power for the guard and service gate motors, electrical control panels, SCADA and communications systems equipment, access control and video surveillance systems equipment, balance-of-plant mechanical systems, power receptacles, local lighting, and convenience receptacles. The normal maximum demand is estimated as the worst case (a condition occasionally experienced for short periods) for simultaneous loading. Preliminary estimated loading for the project facilities would be as follows: Connected Load–154 kilovolt-ampere (kVA), Peak Maximum Demand–125 kVA, and Normal Maximum Demand–78 kVA. The electrical system would operate as follows:

- **Primary Power Service.** Pacific Gas and Electric Company **(**PG&E) would supply primary power to the project facilities via an existing 12.5kV aerial distribution line located on the southwest side of Marysville Road. At least one of the existing power poles on this overhead line would interfere with the proposed spillway and would need relocation. A new overhead line would be installed extending from an existing pole located approximately 100 feet south of the existing Primary Spillway to a new pole at the operations platform, and 12.5 kV power conductors would be installed in an underground duct bank to a new pad-mounted transformer. A surge arrester and fuse cutout switch would be installed on the new pole to protect against lightning strikes and overcurrent and isolation from PG&E power during maintenance, respectively.

- **Emergency Power.** The project site's emergency power source would be supplied by a 150 kW, 187.5 kVA, 480V/277VAC, three-phase, 3-wire, 60 Hertz, propane gas generator. The generator would be located on the operations platform and enclosed for outdoor installation and would include an output circuit breaker. A permanent on-site fuel supply tank would be installed underground and would supply 48 hours of generator operation at full load. The power and control cables from the generator would be installed in an underground duct bank from the generator to the GCB. In addition, backup power service would be obtained from connection to the mini-hydro unit at the base of the Dam via a new conduit at the top of the Dam.

- **Other Facilities and Electrical Needs.** The new SCADA, and access control and video surveillance systems at the project facilities, would be interfaced to existing facilities via microwave radio and fiber communication pathways to dispatch SCADA data and access controls and video surveillance signals to the New Colgate Powerhouse. The remote control and monitoring of guard and service gates, project facilities, a reservoir level sensor and transmitter, and fire alarm system at the GCB would be monitored via SCADA link. The required number of outdoor lighting fixtures is based on 5-foot candles for an area of 250 feet by 300 feet. Lighting fixtures would be added or removed when the design for the site plan is finalized.

Permanent Access Features

Permanent access to the ARC Spillway would be developed as follows and shown in Figure 2-1:

- **Approach Channel Access.** A permanent access road to the approach channel would be developed for YCWA personnel use after ARC Spillway construction is complete. The access road would extend northeast from the relocated alignment of Marysville Road and along the south side slope of the new approach channel. A small equipment staging area would be provided adjacent to the driveway off Marysville Road. Fencing and a security gate would be provided between Marysville Road and the staging area and access road leading into the Reservoir. Segments of the existing access road to the Primary Spillway approach channel, at the far east end of the new ARC Spillway approach channel, would also be improved to allow access through the ARC Spillway approach channel. Permanent access roads would be surfaced to provide access to top of flood pool elevation during all weather conditions. A large portion of the access road would be inundated during the flood season and the design would incorporate features to help drainage and limit required maintenance after Reservoir drawdown, such as all-weather aggregate surfacing.

- **Operations Platform and Control Structure Access.** The operations platform would provide access to the control structure and GCB and would contain a parking area and storage lot. The operations platform would be located adjacent to and northwest of the control structure and downstream/south of Marysville Road and would be accessed directly from Marysville Road. The parking area and storage lot would be adjacent to and southeast of the control structure and also accessed directly from Marysville Road. Operations areas would be fenced with security gates to control access.

- **New Overlook Site Access.** The new Overlook Site would be located on the Reservoir side/north of Marysville Road after it is relocated. Access to the Overlook Site would be provided directly from Marysville Road.

- **Spillway Chute Access.** Maintenance benches would be developed on both sides of the spillway chute and provide maintenance personnel the ability to visually inspect the spillway chute, flip bucket, and discharge area. Physical access to the invert of the spillway chute and flip bucket would be gained during low Reservoir levels by driving along the approach channel, through the control structure (with open gates), and along the spillway chute. This route would provide access to maintenance staff and equipment to the spillway chute and flip bucket. Maintenance access to the spillway chute and flip bucket during other times of the year when the spillway gates are closed, if needed, would be by crane operated from one of the operations access areas adjacent to the control structure. In addition, the downstream access road developed for construction (discussed further below) may be maintained for permanent access.

2.4.2 Marysville Road Permanent Relocation

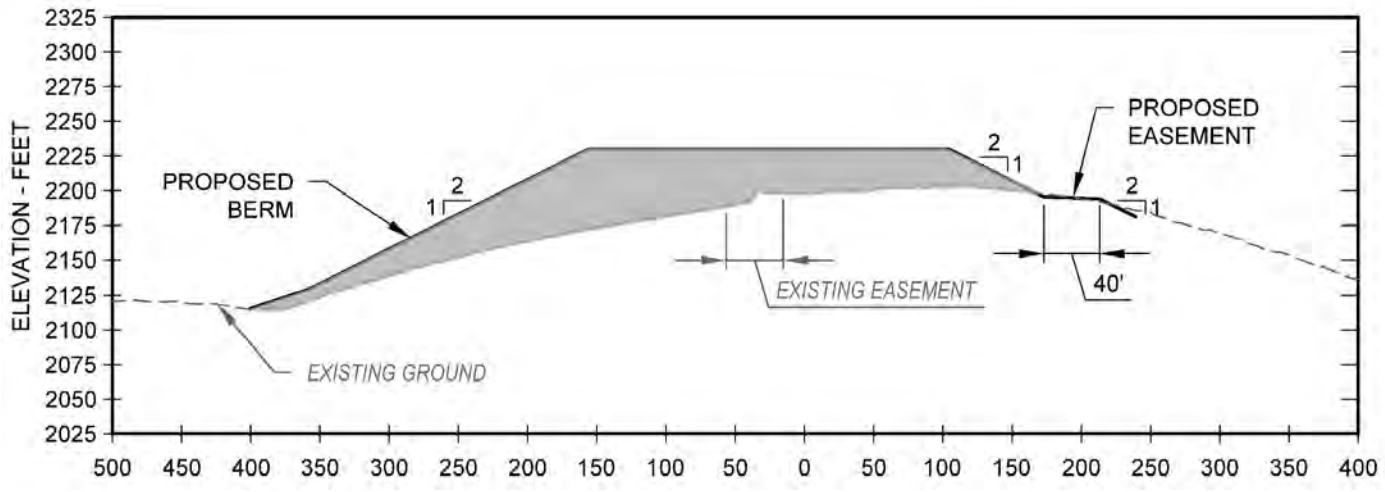
Marysville Road is a two-lane asphalt-concrete paved county road that is part of Yuba County's Primary Road Network and classifies as a rural minor arterial under the Federal Functional Classification. Construction of the proposed ARC Spillway would involve two separate relocations of Marysville Road. A temporary road detour would be constructed as one of the first steps in project construction, as described in Section 2.5.4, below. The road would be relocated to the north, over the existing Overlook Site, to provide access for excavating and erecting the control structure. This temporary road detour would be in place for approximately 3 years. Once the control structure has been completed, the permanent road relocation would be constructed and would route the road over the top deck of the control structure, as shown in Figure 2-1. The approximate length of the road relocation would be 1,150 feet. The permanent road would be an asphalt-concrete paved road of similar width and characteristics to the existing road. The design standards for the permanent road would be the same as those applicable to the existing road.

2.4.3 Dam Overlook Observation Site Relocation

The existing Overlook Site would be relocated approximately 500 feet to the east of the existing Overlook Site along the relocated segment of Marysville Road, as shown in Figure 2-1. It would occupy an area that is now partially occupied by Marysville Road but would become available once the road is relocated to the south over the new control structure. It would have a similar surface area to the existing Overlook Site and would be surfaced with aggregate base and asphalt concrete (the former road pavement). The new Overlook Site would have space for 10 vehicles. The commemorative plaque that exists at the existing Overlook Site would be relocated to the new Overlook Site.

2.4.4 Permanent Soil and Rock Disposal Area

An approximately 17-acre soil and rock disposal area would be established for permanent placement of excess excavated materials generated during construction activities, as shown in **Figures 2-5** and **2-6**. The disposal area is located approximately 0.3 mile southeast of the ARC Spillway at the top of an adjacent ridge. Material placed in the disposal areas would consist of primarily rock but also soil from excavations. At the beginning of site disturbance, the upper 6 inches of soil from areas to be excavated or otherwise disturbed (including the stockpile footprint) will be stripped and stockpiled separately for subsequent use in site restoration. Woody debris may also be placed in the disposal area. The soil and rock disposal area is located on a nearby ridge, and stockpiled material would be placed on the ridge with sides slopes configured with up to a 2H:1V slope and a flat surface formed at the top. Most material is anticipated to be large rock which would be placed to form the slope surfaces to maximize erosion resistance. However, a layer of topsoil will be applied over the slopes and the slopes will be vegetated. An existing easement through the disposal area held by a private landowner for access to a property south of the project site is proposed to be relocated around the western edge of the disposal area. The permanent stockpile would extend up to approximately 25 to 50 ft above the existing ground surface to a maximum of approximately El. 2,230 feet. The upland soil and rock disposal area would be designed and graded such that no ongoing maintenance of the site would be required. YCWA may use the flat surface formed at the top of the stockpile as a location for temporarily staging equipment and materials associated with future operations.



Source: GEI Consultants, Inc. 2022

Figure 2-5. Permanent Soil and Rock Disposal Area Cross-section

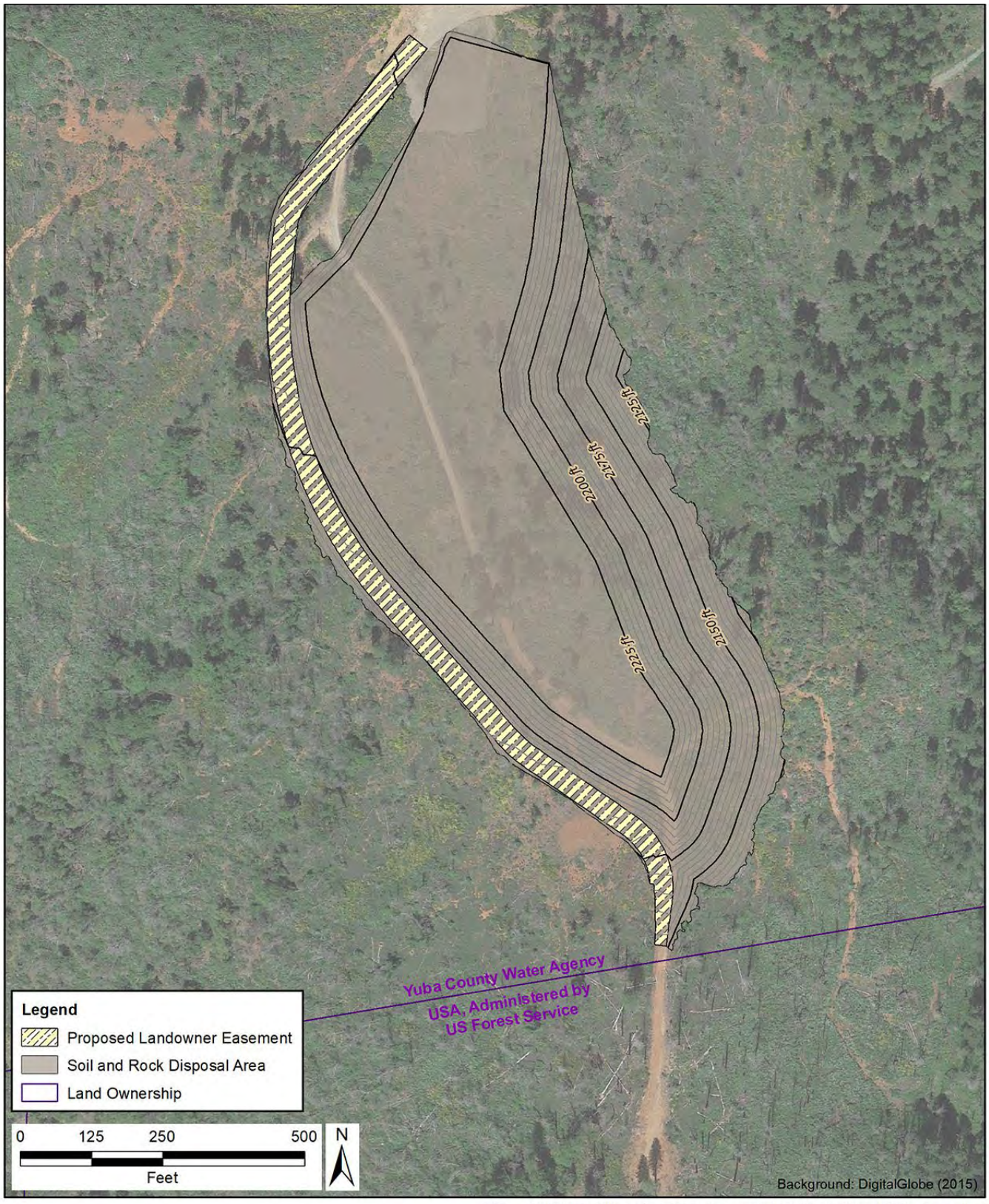


Figure Source: GEI Consultants, Inc.2023.

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Figure 2-6. Permanent Soil and Rock Disposal Area

2.5 Project Construction

Construction areas designated for the project include the footprint of the ARC Spillway and related project components, the soil and rock disposal area, temporary access/haul routes, staging areas, and batch plant areas. Construction would be conducted in several phases, as follows: mobilization, site preparation, downstream construction, upstream construction, site restoration, and demobilization. The construction areas and access used for construction are shown in **Figure 2-7**. Project features that would be used temporarily and removed before project construction is completed include the temporary detour of Marysville Road and upstream access after permanent relocation of Marysville Road. These temporary construction features are shown in **Figure 2-8**. This section discusses construction areas, scheduling and sequencing, demolition and relocation of existing facilities, construction methods, and construction personnel and equipment.

2.5.1 Construction Areas

Staging Areas and Batch Plant

Staging areas and associated facilities are temporary and used only during construction activities. Temporary construction facilities would likely include construction offices, worker and equipment parking, an equipment maintenance yard, a warehouse, a fuel tank and fueling pad, an aggregate processing plant, a concrete batch plant including portable plant, bulk material silos (cement, fly ash), admixtures and aggregate piles, and temporary storage of other construction materials. Potential aggregate sources for concrete production include the rock excavated for the control structure, which would be crushed and screened onsite, or alternatively, fine and coarse aggregates imported from a supplier in the Marysville area. The project includes three potential staging areas:

1) 1.8-acre staging and batch plant area immediately southeast of the control structure and Marysville Road on YCWA lands along U.S. Forest Service (USFS) Road 0008-010.

2) 1.0-acre staging and batch plant area on YCWA land farther east from the first potential staging area along USFS Road 0008-010.

3) 1.9-acre contractor staging area west of the Dam and north of Maryville Road in the parking lot before the marina.

The batch plant(s) would be located at one or both staging areas on YCWA lands.

Construction Access/Haul Routes

Access to the project during construction would be provided by gated entrances on both the north and south sides of Marysville Road. As discussed in Section 2.5.3 below, a small segment of Marysville Road through the project site would be relocated for 3 years of construction. Marysville Road would be used for hauling cement, fly ash, and other construction materials to the project site. An existing USFS road extending from the discharge channel to the south and then north to Marysville Road, including on USFS lands, would be improved and used for construction hauling of materials from discharge channel excavation. Another segment of USFS Road 0008-010, extending south from Marysville Road at the location of the ARC Spillway and through a proposed staging area and the batch plant, would also be used to access the soil and rock disposal area. The USFS roads were developed to construct the Reservoir and have not been maintained. To accommodate traffic needed for project construction activities, the roads would be improved to accommodate construction vehicles and turnarounds would be developed as needed on the segment from the soil and rock disposal area to the discharge channel. These improvements would require grading and removing vegetation and trees. These roads would be used only temporarily during construction and would not be used or maintained after construction is complete.

An approximately 0.35-mile downstream access road would potentially be developed from the staging area adjacent to the soil and rock disposal area to the spillway chute. No road is currently at this location and tree and vegetation removal and grading would be required. This road may also be maintained after the project for permanent access to the spillway chute.

Personnel and equipment would reach the site via Highways 20 or 49 and Marysville Road, which are paved and suitable for the anticipated loads. Work on all project components would be completed with only temporary disruptions of normal traffic patterns along Marysville Road due to movement of heavy construction equipment (e.g., excavators, haul trucks, concrete trucks, and cranes). Some short duration (i.e., 5- to 15-minute) closures of Marysville Road may be required when setting up or unloading large equipment or when performing blasting.

Additional ARC Spillway Construction Areas

Additional areas within the construction study area around the ARC Spillway (and outside of the staging, batching, and other designated construction areas) may be used by construction equipment as needed to construct project components, such as for excavation and grading activities. These additional areas would be restored to approximate pre-project contours and uses after construction activities are complete.

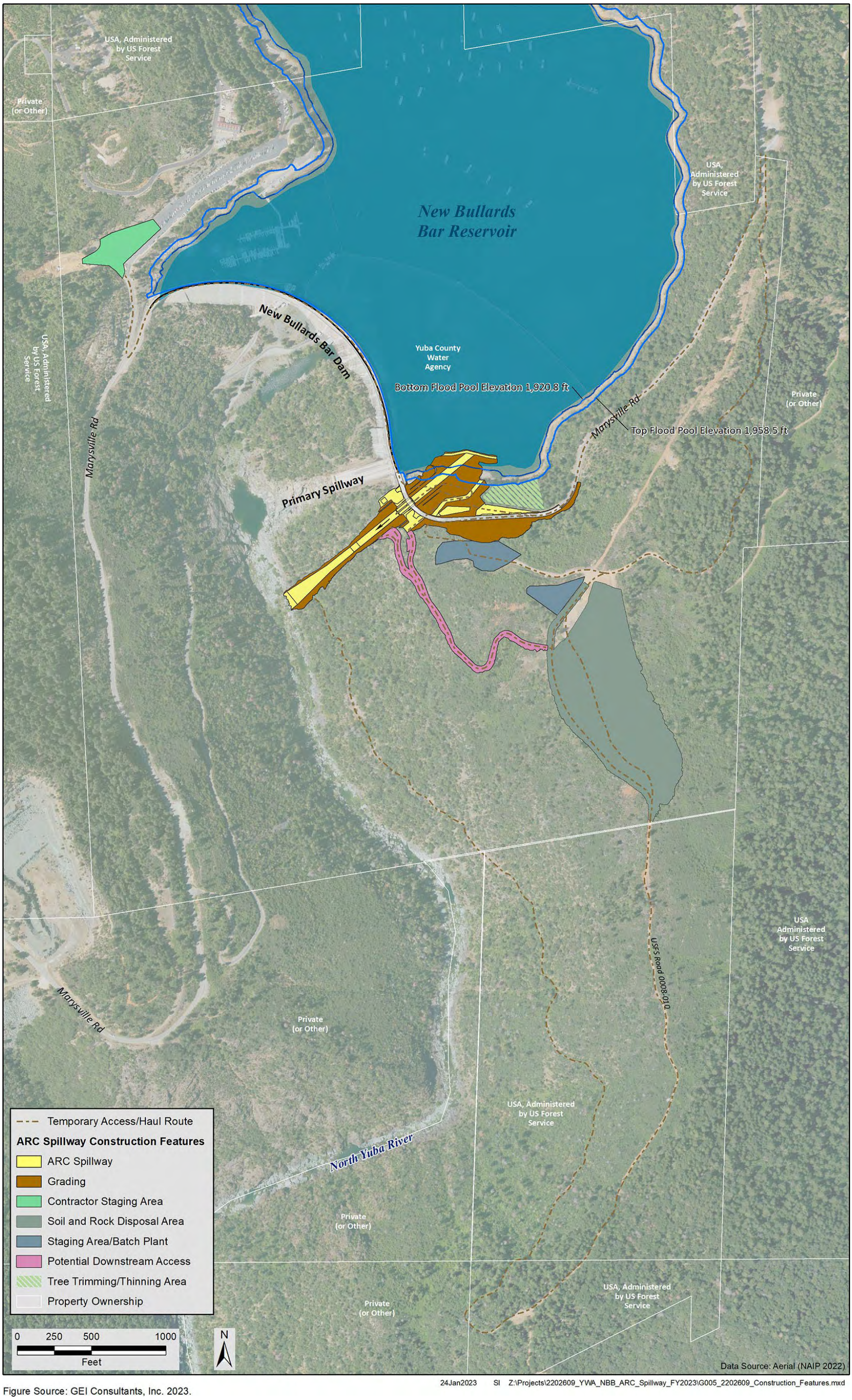
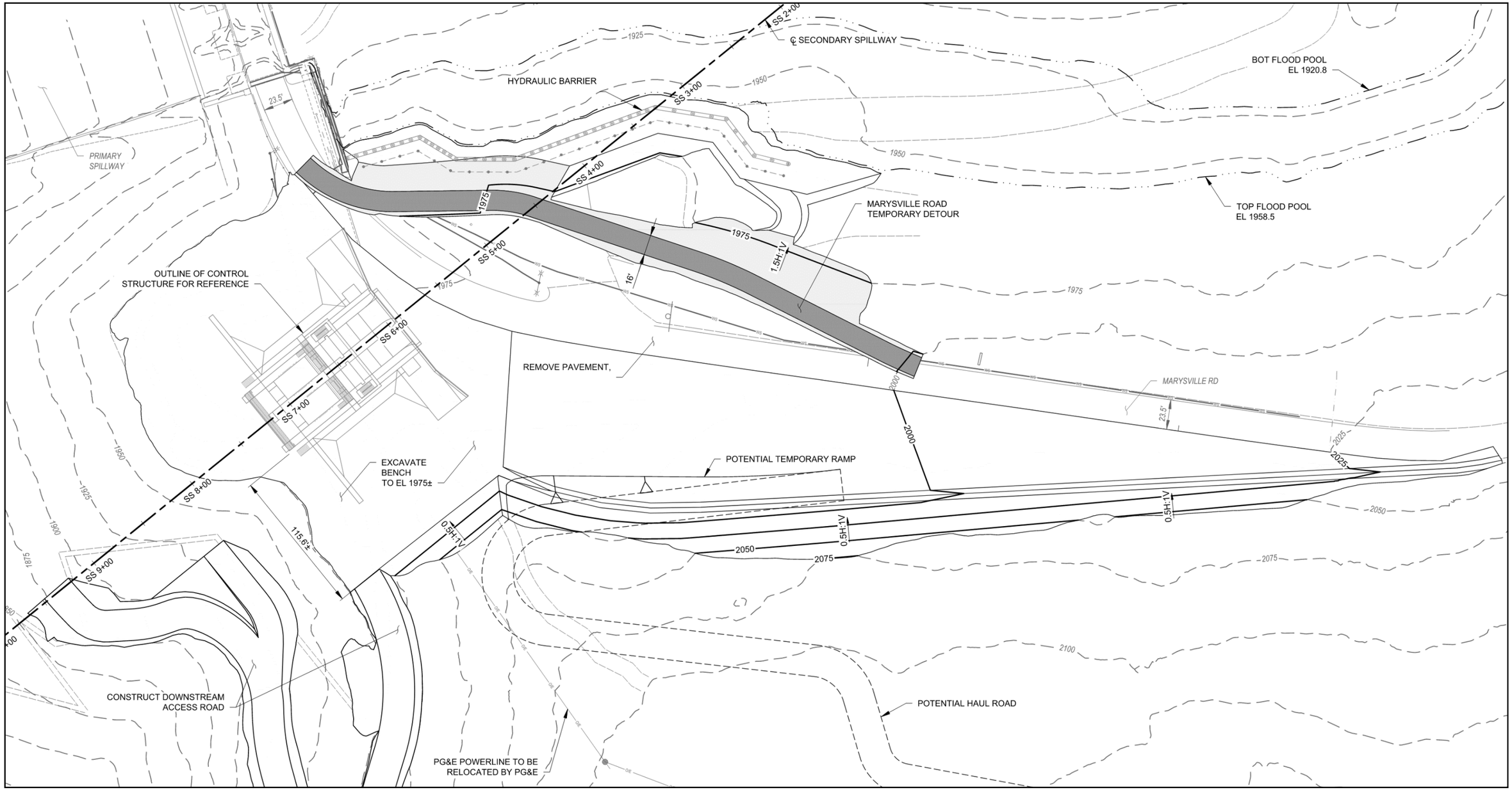


Figure Source: GEI Consultants, Inc. 2023.

Figure 2-7. Construction Areas and Access

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Source: GEI Consultants 2021.

Figure 2-8. Temporary Marysville Road Relocation, Hydraulic Barrier, and Construction Layout

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2.5.2 Construction Schedule and Sequence

The project would be constructed over a 4-year period and construction would not begin until after completion and certification of this environmental impact report (EIR), final designs and construction plans are approved, and all necessary construction-related permits and approvals are obtained. (See Section 2.8, "Regulatory Requirements, Permits, and Approvals"). Construction of the ARC Spillway facility would generally be organized into two phases:(1) the first phase consists of constructing downstream facilities (i.e., those outside of the Reservoir); and (2) the second phase consists of constructing upstream facilities. The following identifies the sequence of construction phases and activities:

- **Phase 1. Mobilization**
- **Phase 2. General Site Preparation**
    - Construct temporary construction haul roads, including the downstream access road from the soil and rock disposal area to the spillway chute.
    - Prepare staging and soil and rock disposal areas.
    - Close existing Overlook Site
    - Demolish existing surface facilities.
    - Lower upstream grade to El 1960 feet and install hydraulic barrier.
    - Construct the Marysville Road temporary construction detour (to the north of the existing road)
    - Excavate rock knob along the south side of Marysville Road.
- **Phases 3–5. Downstream Construction**
    - Begin excavating bench and cut slopes for control structure and spillway chute downstream of Reservoir.
    - Install dewatering wells as needed.
    - Excavate control structure and spillway chute downstream of Reservoir.
    - Begin constructing control structure and spillway chute downstream of Reservoir.
    - Complete constructing control structure
    - Install gates and construct GCB at the control structure.
    - Complete constructing spillway chute
    - Excavate discharge channel downstream of Reservoir.
    - Construct relocated Marysville Road over completed control structure and tie-in to existing Marysville Road.
- **Phases 6–7. Upstream Construction**
    - Construct new Overlook Site.
    - Remove the Marysville Road temporary construction detour.
    - Begin excavating the approach channel upstream of the control structure and relocated Marysville Road.

- Construct approach channel walls and continue excavating approach channel toward the Reservoir.
- Conduct final grading of the approach channel in the Reservoir, thereby connecting the control structure to the Reservoir through the completed approach channel.

- **Phase 8. Site Restoration and Demobilization**

If conditions are wet at the project site (i.e., Reservoir water is encroaching on the project site), YCWA could delay connecting the control structure to the approach channel to prevent needing to lower the Reservoir water level to an elevation suitable for construction. Seasonal schedule constraints that may be imposed by environmental mitigation and permit requirements are not reflected in the construction sequence above.

2.5.3 Demolition and Relocation of Existing Facilities

To accommodate siting of the ARC Spillway facilities, several existing site improvements would be removed or relocated during construction. Removal of the following site elements would be required and would occur within the project site and construction areas: concrete stairs and sidewalks connecting the existing parking area with pedestrian access to the Dam and Overlook Site, a light pole located at the intersection of an existing driveway and Marysville Road, an asphalt driveway to the existing parking area, a K-rail on the west side of Marysville Road, a steel access gate to the Reservoir shoreline, and several piezometers and groundwater monitoring wells. At least one and possibly more of the existing power poles along an existing PG&E 12.5kV overhead distribution line located on the southwest side of Marysville Road would need removal and relocation. In addition, a 1,150-foot reach of Marysville Road would be relocated over the new control structure, as described in Section 2.4.2 above. The existing pavement would be demolished and taken to an off-site pavement recycling or disposal facility. The water line and any other utilities along Marysville Road would primarily be managed in-place during the temporary construction detour and temporarily relocated before final relocation along the new Marysville Road alignment.

2.5.4 Construction Methods and Characteristics

The estimated total quantity of excavated material is approximately 565,000 cubic yards (cy) However, due to the swell factor in rock, the process of excavation changes from the dense, continuous, undisturbed in-situ condition (prior to excavating) to broken up in small pieces in the stockpile which results in a lot more void space. Therefore, the amount of material disposed would be 720,000 cy. Material generated from excavations would primarily consist of large rock and soil and may, in part, be suitable to use as backfill, road and yard surfacing, concrete aggregate, and riprap. Some sorting, stockpiling, and processing of excavated materials would be required to make them suitable for various intended uses. Excess material and material that is unsuitable for reuse in construction would be placed in the disposal area and compacted.

Marysville Road Temporary Detour and Relocation

A temporary detour of Marysville Road would be constructed approximately 70 feet north of the current alignment as one of the first steps in project construction (Figure 2-8). The temporary detour would be in place for approximately 3 years during project construction. The road would be detoured to the north, over the existing Overlook Site, to clear the site for excavating the control structure foundation. This temporary detour would be an approximately 24-feet-wide, two-lane, asphalt-concrete paved road with 2-foot shoulders. The temporary detour would feature a one-way flagging operation stationed upstream and downstream of the construction area in the final construction stages of the permanent Marysville Road that should be in place for no more than 60 days.

Advanced warning signs would be spaced at 250 feet for speeds between 25 to 40 miles-per-hour. Posted speed would be reduced to 20 miles-per-hour. Horizontal curves within the temporary section would be designed to accommodate a WB-50 Truck, which has a minimum turning radius of 45 feet. A 100-feet-long lane taper length would be used for transition into the one lane – two-way traffic control section. Additional or different traffic controls through the detour would be implemented as required by the Yuba County encroachment permit.

Once the control structure has been completed, the permanent road relocation would be constructed over the top deck of the control structure, as described in Section 2.4.2 above. Construction equipment would periodically need to perpendicularly cross the relocated road to finish construction of the approach channel and would be controlled as required by the Yuba County encroachment permits, such as with use of a flagger.

Surface Water Control and Dewatering

Based on piezometer data, groundwater levels are highest in the Reservoir at the approach channel and lower moving along the ARC Spillway alignment away from the Reservoir. Groundwater elevation is strongly influenced by the water elevation in the Reservoir. The soil and rock mass that forms the upstream left abutment will be utilized as the natural cofferdam to protect the control structure work while allowing uninterrupted Reservoir operations up to top of the flood pool.

A hydraulic barrier (shown in Figure 2-8) would be installed through the soil and rock mass to reduce seepage from the Reservoir through the natural cofferdam and into deep excavations for the approach walls, control structure, and spillway chute**.** The hydraulic barrier would be a 3-feet-wide, cement-bentonite cutoff wall constructed through the soil and decomposed rock down to the top of bedrock. Below the top of bedrock, a grout curtain would be installed to a depth below the bottom of the deepest excavations. The barrier is required to be in place before deep excavations extend below the Reservoir water level. The hydraulic barrier would be breached and largely removed by excavating the approach channel where it extends into the Reservoir. Remnants of the barrier extending below the invert of the approach channel would be left in place after construction.

Due to the depth of excavation and project location adjacent to the Reservoir, dewatering is still anticipated to be needed prior to and after deep excavations. Dewatering would be accomplished by installing and operating temporary pumped sumps, dewatering wells, and other methods if deemed necessary during construction. Groundwater and surface water would be removed, treated, and disposed of in accordance with State Water Resources Control Board (SWRCB) National Pollutant Discharge Elimination System (NPDES) permit requirements.

ARC Spillway Components

Approach Channel

Before the upstream portion of the approach channel is excavated in the Reservoir (during the upstream construction phase), the reinforced concrete approach walls and slope protection would be constructed. The fresh rock surface behind the walls would be supported with grouted rock dowels as necessary for stability. The approach walls would be provided with a drain system with weep holes (small openings) that facilitate drainage into the approach channel. The drain system consists of a gravel drainage layer provided behind the approach walls, a continuous perforated drainpipe installed at the base of the walls, and weep holes at 20-foot intervals. A continuous water stop would be provided between the walls and the control structure adjacent to the water side. A water stop is a plastic, metal, or other material element intended to prevent the passage of fluids (such as water) when embedded in and running continuously through concrete joints.

Control Structure, Spillway Chute, and Flip Bucket

Along the upstream face of the control structure and under both approach walls, a grout curtain would be installed to provide seepage cutoff and limit seepage flows through the rock mass surrounding the control structure. The control structure, spillway chute, and flip bucket require removing and hauling large amounts of rock to accommodate construction of the gated structure, concrete-lined channel, and flip bucket. The fresh rock surface would be supported with grouted rock dowels and a shotcrete facing. If defects such as shear zones or decomposed rock zones are exposed by initial channel excavation, these areas would be over excavated and treated with dental (rough surface) concrete.

Discharge Channel

Beginning at the spillway chute flip bucket and working downstream, an excavator and/or bulldozer would remove weathered rock and loose soil from the discharge channel footprint, such as by excavating a bench and continuing to lower the bench. Excavated material would be stockpiled at the bottom of the discharge channel and then loaded into haul trucks for transport to the rock and soil disposal area. The discharge channel would be excavated to the layer of hard rock, the same conditions that exist at the adjacent discharge channel for the Primary Spillway. If defects such as shear zones or decomposed rock zones are exposed by initial channel excavation, these areas would be over excavated and treated with dental (rough surface) concrete.

A minimum instream flow of 5 cfs is required downstream of the Dam year-round. The minimum flows would be maintained through construction, including with construction of a temporary bypass system, if needed. The bypass system could be composed of a pipeline and/or a cofferdam containing the construction area at the downstream end of the discharge channel in the North Yuba River.

Dam Overlook Observation Site Relocation

The existing Overlook Site would be closed for approximately 3 years while the Marysville Road detour is in use. Once the permanent relocation of Marysville Road to the south (over the control structure) has been completed, the area would be developed as the new Overlook Site. Aggregate base would be used to surface the unpaved portion of this area and provide parking for up to 10 vehicles.

Blasting

Blasting would be used to help remove approximately 370,000 cy of hard rock for development of the control structure, spillway chute, flip bucket, Marysville Road relocation, and downstream portion of the approach channel (i.e., the portion near the control structure). Blasting would not be used for the discharge channel. Blasting would be conducted during up to 200 days of construction for other project components. To conduct blasting, explosives would be placed in pre-drilled holes. Each pre-drilled hole would have one detonator/nonelectric cap, one primer, and then ammonium nitrate/fuel oil explosive through most of the column of the hole. Time delays would be used before igniting the explosives. The Marysville Road temporary detour would be closed for durations of 15 minutes, once or at most twice per day. After blasting, rock would be removed by excavator and hauled to the soil and rock disposal area. Blasting would be limited to daytime hours only, between 10 a.m. and 7 p.m. An Explosives Permit would be obtained from the Yuba County Sheriff's Department prior to any blasting activities.

In-Reservoir Construction

Construction of the proposed project would be sequenced to reduce the need for cofferdams and in-water construction. Excavation for downstream ARC Spillway facilities (control structure, spillway chute, and discharge channel) would be separated from the Reservoir by the existing rock formation, which includes fresh, low permeability metavolcanic rock. Once the control structure has been completed and backfilled and Marysville Road has been relocated to the new permanent alignment, a natural rock cofferdam would be constructed from rock excavated onsite, as shown in Figure 2-8. This cofferdam would prevent water from flowing through the ARC Spillway before construction of the approach channel is completed.

The approach channel would be excavated to connect the control structure with the Reservoir. Reservoir water levels peak in summer and slowly dissipate into fall and winter. Excavation into the Reservoir shoreline would be timed for the period of year when Reservoir water levels are lowest. The approach channel would be excavated in stages, leaving soil and rock excavation at the mouth of the approach channel (the Reservoir shoreline) and the natural rock cofferdam for last. No restrictions on recreation boat use or other recreational activities on the Reservoir would occur during construction.

Site Restoration

After construction is complete, temporarily impacted areas, such as staging areas and additional construction areas, would be restored to approximate pre-existing contours and graded to match the adjacent land surface and topography. The areas would also be seeded with a native seed mix for erosion protection and to minimize colonization of exotic vegetation, as appropriate. Areas re-graded around the new Overlook Site would also be revegetated.

2.5.5 Construction Personnel and Equipment

The construction labor force is estimated to average about 56 persons per day during construction. Site workers during peak construction are dependent on contractor schedules and are estimated at a maximum of 75 persons per day.

An estimated 35,000 cy of aggregate would be processed from excavated rock or imported to the project site and temporarily stockpiled at one of the staging areas prior to use for concrete production at the onsite batch plant. Approximately 720,000 cy of material generated from excavation activities would require permanent disposal at the soil and rock disposal area. No soil or rock would be exported outside of the designated construction areas.

An estimated 3,700 deliveries of materials would be made over about approximately 700 days of construction; up to about 2,215 loads of aggregate import would be made over approximately 70 days of construction; about 36,000 hauling trips for disposal of soil and rock would be made over approximately 500 days of construction; and about 250 off-hauling loads would occur over approximately 45 days of construction.

Table 2-1 identifies anticipated construction equipment and number of each and maximum construction workers for different construction activities.

Table 2-1. Construction Phases, Workers, Equipment Use, and Hauling Quantities

Construction Phase		Start	End	Maximum Construction Workers	Construction Activity	Estimated Workdays	Construction Equipment (Number)	Estimated Hauling Quantities
Phase 1. Mobilization		January Year 1	April Year 1	45	Mobilization	60	Mechanic Truck (3) Excavator (1) Crane (1)	–
Phase 2. General Site Preparation		April Year 1	July Year 1	50	General and site improvements	50	Excavator (3) Haul Truck (2) Dozer (3) Blade (1) Roller (1) Water Truck (2) Drill with Compressor (1) Pickups (9) Crew Truck (2)	18,000 cy disposal
Phase 2. General Site Preparation					Staging and disposal area development	50	Excavator (1) Rock Drill (1) Haul Truck (3) Dozer (1) Loader (1)	3,000 cy disposal
Phases 3 – 5. Downstream Construction	Phase 3	April Year 1	October Year 1	65	Control structure preliminary excavation; blasting	60	Excavator (3) Drill with Compressor (1) Haul Truck (3) Dozer (1) Crew Truck (2) Pickup (3) Blade (1) Water Truck (1)	161,700 cy disposal
					Install hydraulic barrier	60	Excavator (1) Drill with Compressor (1) Haul Truck (3) Dozer (1) Pickup (1) Blade (1) Water Truck (1) Crew Truck (1) Pickup (1)	–

Construction Phase	Start	End	Maximum Construction Workers	Construction Activity	Estimated Workdays	Construction Equipment (Number)	Estimated Hauling Quantities
Phase 4	October Year 1	May Year 4	75	Control structure, spillway chute, and Marysville Road relocation rock excavation; blasting	64	Drill with Compressor (3) Excavator (4) Dozer (2) Haul Truck (3) Blade (1) Water Truck (1) Crew Truck (3) Pickup (4) Air Compressor (2)	140,000 cy disposal 25,000 cy import
				Control structure and related structures concrete	640	Boom Crane (3) Manlift (2) Forklift (3) Concrete Pump Truck (2)	–
Phase 5	March Year 2	May Year 4	70	Discharge channel rock excavation	227	Rock Drill (2) Excavator (5) Dozer (1) Loader (1) Haul Truck (3) Crew Truck (1) Pickup (6)	153,300 cy disposal
				Discharge channel foundation cleaning	16	Air Compressor (2) Excavator (2) Vacuum Truck (2)	–
				Install gates and project controls	220	Boom Crane (2) Excavator (1) Haul Truck (1) Roller (1) Dozer (1) Pickup (8) Manlift (2) Forklift (1) Water Truck (1)	–
				Spillway chute rock anchors and concrete	200	Boom Crane (1) Pickup (7) Forklift (1) Concrete Pump Truck (1)	8,000 cy import

Construction Phase		Start	End	Maximum Construction Workers	Construction Activity	Estimated Workdays	Construction Equipment (Number)	Estimated Hauling Quantities
Phases 6 – 7. Upstream Construction	Phase 6	May Year 4	January Year 5	75	Excavate upstream access ramp and approach walls	26	Blade (1) Excavator (2) Truck (3) Dozer (1) Pickup (2) Water Truck (1)	50,800 cy disposal
					Upstream rock excavation; blasting	25	Drill with Compressor (3) Excavator (3) Dozer (1) Water Truck (1) Haul Truck (3) Crew Truck (2) Pickup (3) Blade (1)	38,700 cy disposal
					Approach wall concrete	104	Boom Crane (2) Pickup (2) Forklift (2) Concrete Pump Truck (2)	2,000 cy import
	Phase 7	January Year 5	March Year 5	45	Approach channel excavation	41	Excavator (3) Truck (3) Dozer (2) Pickup (2) Water Truck (1) Blade (1)	90,000 cy disposal
					Approach channel rock excavation; blasting	20	Drill with Compressor (3) Excavator (3) Dozer (2) Water Truck (1) Haul Truck (3) Crew Truck (1) Pickup (3) Blade (1)	57,100 cy disposal
					Upstream access road and dam overlook	10	Excavator (2) Dozer (1) Water Truck (1) Haul Truck (3) Pickup (4) Blade (1)	10,000 cy disposal

Construction Phase	Start	End	Maximum Construction Workers	Construction Activity	Estimated Workdays	Construction Equipment (Number)	Estimated Hauling Quantities
Phase 8. Site Restoration and Demobilization	April Year 5	May Year 5	30	Site restoration and demobilization of equipment and supplies	30	Blade (1) Roller (1) Water Truck (1) Forklift (1) Mechanic Truck (3) Excavator (1) Crane (1)	–

2.6 Project Operations

The Yuba-Feather River system has a long history of catastrophic flood events. To better manage high-water events from future storms, the proposed ARC Spillway would allow for releases from the Dam at a substantially lower Reservoir water elevation than is currently provided from the Primary Spillway. The ARC Spillway flow curve, showing flows at different gate openings, is shown in Figure 2-9. The ARC Spillway would be able to release between 33,500 cfs at the Reservoir bottom flood water level (El. 1,920.8 ft) and 61,100 cfs at the normal maximum water surface elevation (El. 1,958.5 ft).

The ARC Spillway would be used to make releases from the Reservoir in anticipation of storm events with initiation based on current watershed and storage conditions; forecasted inflow volumes and precipitation; and determination of resulting storage levels, required future storm releases, and downstream flow levels. As the high-water event progresses and the Reservoir level rises, the Primary Spillway would begin making flood control releases if additional release capacity is needed. At this point, the Primary and ARC Spillways can be operated together to meet the Reservoir's overall target releases. Additionally, the ARC Spillway would provide redundancy to an unexpected malfunction of the Primary Spillway.

The addition of the ARC Spillway to the Yuba River Development Project (YRDP) would have no effect on flow requirements in the existing Federal Energy Regulatory Commission (FERC) license, nor would it have any effect on the flow requirements that are anticipated to be in the new license.

2.6.1 Flood Control Management Operations

New Bullards Bar Reservoir

The Reservoir must be operated from September 16 to May 31 to comply with Part 208 "*Flood Control Regulations, New Bullards Bar Dam and Reservoir, North Yuba River, California*," pursuant to Section 7 of the Flood Control Act of 1944 (58 Stat. 890) – also referred to as the Water Control Manual (WCM). Under the contract between the U.S. and YCWA entered on May 9, 1966, YCWA agreed to reserve 170,000 acre-feet of storage space (i.e., the space between El. 1,920.8 feet and elE. 1,958,5 ft) for flood management in the Reservoir in accordance with rules and regulations enumerated in the Hydrology Report on Reservoir Regulation for Flood Control (USACE 1972).

If maximum allowable storage is exceeded, releases occur from the Reservoir subject to downstream flow limitations and outlet capacities, to reduce storage to the maximum allowable amount. Water is first released through New Colgate Powerhouse up to its full capacity of 3,430 cfs. Any remaining volume of water is released through the Primary Spillway and/or ARC Spillway and is subject to the maximum release rates shown in **Table 2-2**. For relatively small flood events, the Primary Spillway would be used to make releases above the New Colgate Powerhouse capacity. If the forecasted event is large (as further described below), the ARC Spillway would be used up to its full capacity before releases were made through the Primary Spillway.

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ARC SPILLWAY RATING CURVE TABLE (FULL OPEN)	
ELEVATION (FT NAVD88)	FLOW (CFS)
1873.0	0
1881.8	2,103
1886.2	4,911
1895.0	10,425
1900.5	14,992
1906.7	20,069
1917.7	30,707
1925.8	40,277
1941.7	50,462
1957.4	60,185
1965.8	64,835
1967.5	64,985

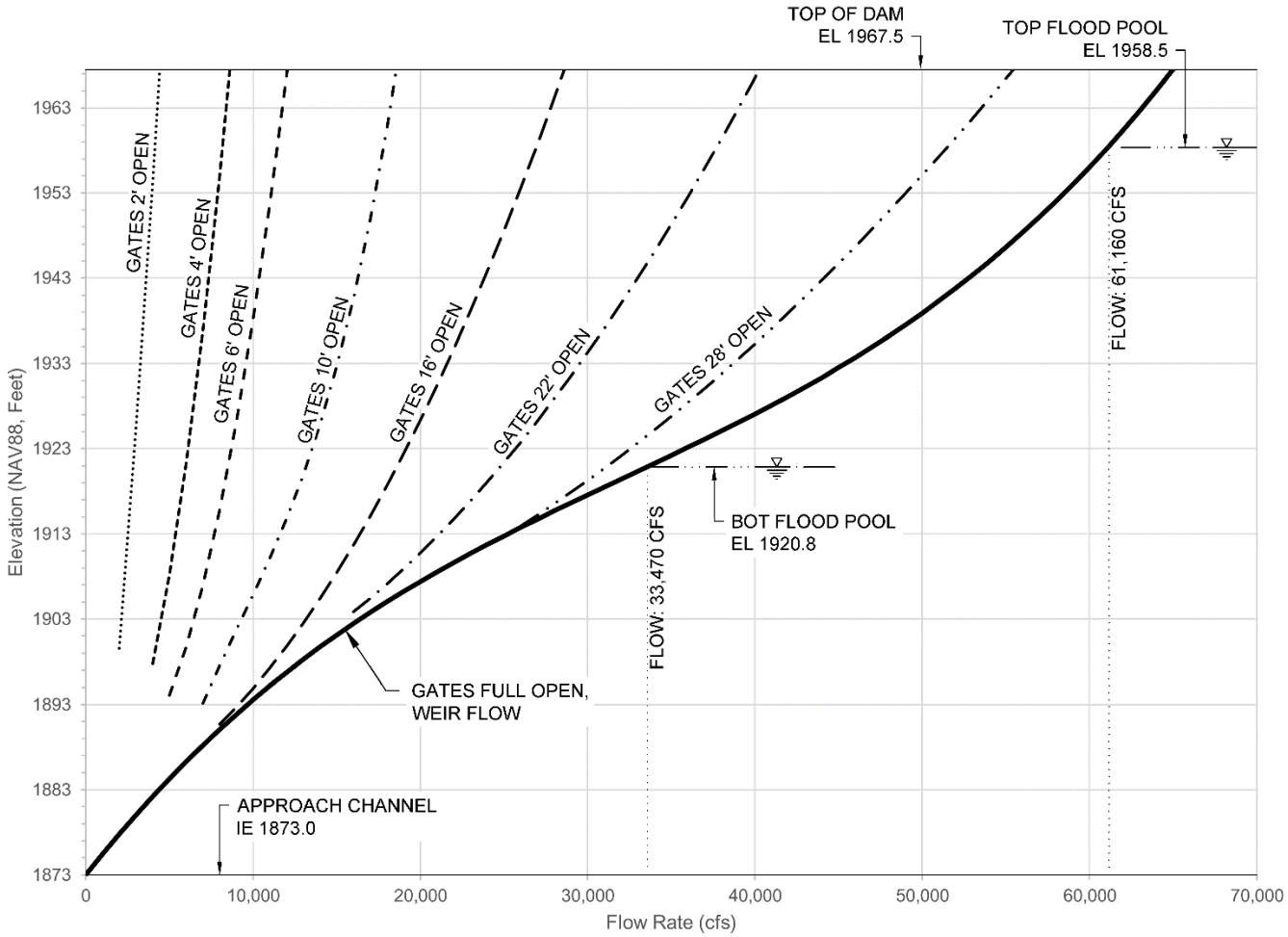


Figure Source: GEI Consultants, Inc. 2022

Figure 2-9. ARC Spillway Flow Rating Curve

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Table 2-2. New Bullards Bar Reservoir Maximum Release

Elevation (ft-msl)	Maximum Primary Spillway and Powerhouse Release (cfs)	Maximum ARC Spillway and Powerhouse Release (cfs)	Maximum Primary Spillway, Powerhouse and ARC Spillway Release Capacity (cfs)
1,730	3,430	3,430	3,430
1,870	3,430	3,430	3,430
1,874	3,430	4,101	4,101
1,878	3,430	5,643	5,643
1,882	3,430	7,740	7,740
1,886	3,430	10,138	10,138
1,890	3,430	12,862	12,862
1,895	3,430	16,811	16,811
1,898	3,430	19,499	19,499
1,902	3,871	23,341	23,782
1,905	6,993	26,315	29,878
1,910	12,993	31,173	40,736
1,915	19,918	35,646	52,134
1,920	27,624	39,667	63,861
1,925	38,794	43,298	78,662
1,930	50,316	46,594	93,480
1,935	64,714	49,642	110,926
1,940	79,521	52,496	128,587
1,945	96,748	55,203	148,521
1,950	114,485	57,787	168,842
1,955	134,333	60,294	191,197
1,960	153,795	62,741	213,107
1,965	160,840	65,156	222,566

Notes: cfs=cubic feet per second, ft-msl=feet above mean sea level, Powerhouse=New Colgate Powerhouse
Source: HDR 2022

In addition to reservation of flood control space in the Reservoir, flood management regulations include rules governing ramping rates as well as target maximum flows in the Yuba River and the Feather River below the confluence with the Yuba River (USACE 1972). The Reservoir is operated for the following maximum flows:

- 50,000 cfs on the North Yuba River below the Dam
- 120,000 cfs on the Yuba River at Marysville
- 300,000 cfs on the Feather River below the Yuba River
- 320,000 cfs on the Feather River below the Bear River

Atmospheric River Control Spillway

The primary benefit of the ARC Spillway is increased flood control during high-flow events. The ARC Spillway would not be used for routine flood management releases that may be necessary because of relatively small encroachments into the flood reservation pool. A high-flow event is defined based on forecasted encroachment of the Reservoir flood pool assuming the 7-day 25 percent exceedance forecast of the Reservoir inflow volume. Prereleases would be made before a high-flow event using either the ARC Spillway or Primary Spillway ahead of a storm up to 7 days in advance, but the ARC Spillway is expected to only be used during large winter and spring events. Based on evaluation of historic flood events, the ARC Spillway would have been used before/during the 12 largest high-flow events over the 40-year period from 1970 to 2020.

Releases from the ARC Spillway would be made in anticipation of large storms to provide increased evacuated storage capacity in the Reservoir prior to and during high-precipitation events and large storm peak inflows to reduce the peak outflow. The ARC Spillway would operate conjunctively with the Primary Spillway and New Colgate Powerhouse to meet the Dam's overall target releases. The proposed ARC Spillway would be used to make anticipatory releases from the Reservoir under the following circumstances:

1) if a large storm event is forecasted to occur in the near future, and both the available storage in the Reservoir and the condition of the contributing watershed (i.e., excessive runoff and high inflows from the North Yuba River) to the Reservoir are in a state in which the storm event would necessitate very large releases from the Reservoir; or

2) there is a concern that the required peak release from the Dam would coincide with the peak release from the California Department of Water Resources (DWR)'s Lake Oroville.

The anticipatory releases based on forecasts would reduce the subsequent required peak release from the Reservoir, which would result in a reduced peak outflow of the Yuba River to allow for better management of flood control operations from Lake Oroville. The expected magnitude of peak flows from the ARC Spillway during the storm event: (1) would be less than what would have been expected through the Primary Spillway except that spills would be occurring days or hours before; and (2) would be released from a Reservoir elevation that is between 30 to 40 feet below what would have occurred if the Primary Spillway was used alone.

2.7 Project Maintenance and Inspections

Once completed, ARC Spillway and associated facilities/areas would be incorporated into the YRDP under FERC's jurisdiction and regulated by under the Federal Power Act. For purposes of this analysis, it is assumed that all requirements that apply to YRDP-licensed facilities under the existing FERC license would apply to operation and maintenance of the ARC Spillway, including all requirements and management plans (e.g., Erosion Control, Integrated Vegetation, etc.)

2.7.1 Control Structure

The control structure would provide sufficient clear access to allow installation, removal, inspection, and routine maintenance of gate equipment; stairs, ladders, and platforms would be installed to access various levels within the control structure for inspection and maintenance of gate and wire hoist equipment. Guard gates would normally be in an open position and would be raised to above the control structure's upper deck level for inspection and routine maintenance. The service gates would be installed outdoors in the downstream portion of the control structure, and would be accessible for inspection and routine maintenance, at all times.

Each gate bay would include platforms and walkways at various elevations to allow 1) inspection of the top seal and trunnion assembly of the service gates, 2) inspection and disconnection of the guard gates in the open position, and 3) equipment maintenance. In the event one of the gates requires inspection and maintenance, the gate would be locked in the open position. For certain major maintenance activities, such as replacing trunnion assemblies, the gates would need to be completely removed from the structure. A mobile crane would be required for handling, removing, and reinstalling gate equipment during major maintenance activities. The gates would be constructed in bolted panel assemblies. Because of their large weight, complete gate removal would likely involve disassembly and removal of the gate in separate panels.

A multi-coat epoxy paint system would be used for corrosion protection of the intake gates. Full removal of the intake gates for major maintenance would be expected every 25 years and removal to the maintenance position for routine maintenance and touchup would be expected every 5 to 10 years. Reservoir water levels may provide further restrictions depending upon which gate requires service.

2.7.2 Other Facilities

Due to anticipated infrequent use, the spillway chute and flip bucket would require visual inspections only after use during flood control conditions and on an annual basis. Since the discharge channel would be excavated to hard rock, future maintenance of sediment in this channel is not anticipated. As discussed, the upland soil and rock disposal area would be designed and graded such that no ongoing maintenance of the sites would be required. Minor electrical and other facility maintenance would be performed by onsite staff, or other YCWA specialist staff, as needed.

YCWA staff are onsite daily for operations and maintenance activities of the nearby existing Dam, Primary Spillway, and appurtenant facilities. Therefore, it is anticipated that inspections and maintenance activities for the proposed project would primarily be coordinated and combined with existing maintenance and inspection trips for the Primary Spillway. Therefore, no additional YCWA staff trips or staff are anticipated for maintenance and inspection of the proposed project.

2.8 Regulatory Requirements, Permits, and Approvals

YCWA, as the CEQA lead agency, has the principal responsibility for approving and carrying out the proposed project and for ensuring that CEQA requirements and all other applicable regulations are met. Other permitting agencies that may have permitting approval or review authority over portions of the proposed project are listed below:

- **FERC, License Amendment.** As discussed in Section 1.1.4 of the Draft EIR, the Dam and Reservoir are part of the YRDP, and construction and operation of the ARC Spillway was included in the YCWA FERC license application filed in 2014 and subsequently updated in the Amended Final License Application (AFLA) in 2017. In 2019, FERC completed the FEIS for the license application under NEPA. In 2021, FERC announced that it plans to prepare a supplement to the FEIS. FERC is expected to issue the new license for the YRDP following completion of the SEIS and ESA Section 7 consultation. Although the precise timing of FERC's completion of the SEIS, ESA Section 7 consultation and issuance of the new license is uncertain, it is not expected to occur for several more years. In Water Year 2023, California experienced 31 atmospheric river events, and, as noted above, the Yuba-Feather River watershed has a long history of catastrophic flood events. Consequently, YCWA has determined to proceed with the ARC Spillway now rather than wait for completion of the YRDP relicensing. YCWA will apply to FERC for a non-capacity amendment to the existing FERC license to authorize construction and operation of the ARC Spillway.

- **FERC, Division of Dam Safety and Inspections Approval.** Before projects are constructed, FERC staff reviews and approves designs, plans, and specifications of dams, powerhouses, and other structures. During and after construction, FERC staff engineers may inspect a project.

- **ESA Section 7 Consultation.** Consultation under Section 7(a)(2) of the ESA. Federal agencies are required to consult with the National Marine Fisheries Service (NMFS) and U.S. Fish and Wildlife Service (USFWS), to ensure that any action the agency authorizes, funds, or carries out is not likely to jeopardize the continued existence of ESA-listed species and/or destroy or adversely modify designated critical habitat.

- **National Historic Preservation Act Section 106 Consultation**. Consultation and Programmatic Agreement or Memorandum of Agreement is required for effects on cultural resources pursuant to Section 106 of the National Historic Preservation Act (NHPA).

- **USFS, Special Use Permit.** This permit is required for access road improvements on USFS lands.

- **USACE, Clean Water Act (CWA) Section 404 Permit**. This permit is required for discharge of dredge and fill material into waters of the U.S., including the Reservoir and the North Yuba River.

- **SWRCB, CWA Section 401 Water Quality Certification.** This certification is required for issuance of Federal permits including the CWA Section 404 permit and discharge of dredge and fill material to waters of the State.

- **SWRCB, CWA Section 402 NPDES Construction General Permit.** This permit is required for projects that will disturb 1 acre or more of soil. Construction activity subject to this permit includes clearing, grading, and disturbances to the ground such as stockpiling or excavation. A Storm Water Pollution Prevention Plan (SWPPP) must be prepared and implemented.

- **SWRCB, CWA Section 402 NPDES Dewatering and Other Low Threat Permit.** This permit is required if dewatering water would require treatment or be discharged into surface waters, including the Reservoir or North Yuba River, among other waterbodies.

- **DWR, Division of Safety of Dams Repair or Alteration of Dams and Reservoirs Permit.** Required for construction of the ARC Spillway at the left abutment of the existing Dam.

- **CDFW, California Endangered Species Act Incidental Take Permit or Consistency Determination; Lake and Streambed Alteration Agreement.** Generally, projects that have the potential to significantly impact listed species must consult with CDFW to obtain an Incidental Take Permit pursuant to Section 2081(b) of the California Fish and Game Code, or, when appropriate, obtain a Consistency Determination under Section 2080.1 of the California Fish and Game Code. If no exemption applies and this State law requirement is determined to be applicable to the proposed project, CESA permitting might be required. Additionally, Section 1602 of the California Fish and Game Code requires that CDFW be notified prior to beginning any activity that may: (1) divert or obstruct the natural flow of any river, stream, or lake; (2) change the bed, channel, or bank of any river, stream, or lake; (3) use material from any river, stream, or lake; or (4) deposit or dispose of material into any river, stream, or lake. Because the proposed project will involve alteration of the bed and bank of the Reservoir and/or North Yuba River, a Lake and Streambed Alteration Agreement might be required. **Feather River Air Quality Management District (FRAQMD), Fugitive Dust Control Plan for New Development.** Compliance with Feather River Air Quality Management District regulations prior to commencement of and during construction.

- **Yuba County, Encroachment Permit.** An encroachment permit is required for temporary and permanent relocation of Marysville Road and may also be needed for damages caused by haul trucks and relocation of water lines and other infrastructure in Marysville Road.

- **Yuba County Sheriff's Department, Explosives Permit.** Required for use and transport of explosive for blasting.

2.9 Other YCWA Activities that are Not Part of the Proposed Project

YCWA is involved in many activities on the Yuba River, including the following:

- It owns and operates the Dam and two smaller dams – Log Cabin Dam and Our House Dam (both upstream of the Dam).

- It holds and implements several water right permits and licenses for the diversion and storage of water.

- It is a party to the Lower Yuba River Accord (a set of three agreements and SWRCB order that resolved a regulatory dispute).

- It controls water releases to the North Yuba River.

- It owns and operates three hydroelectric power plants – New Colgate, Narrows 1, and Narrows 2 Powerhouses.

- It holds and operates under two FERC licenses (i.e., FERC Project Nos. 2246 and 1403) and it has an application to renew the license for the YRDP pending and intends to file an application to renew the license for the Narrows 1 Project.

- It diverts water from the lower Yuba River for delivery to local member agencies for irrigation.

- It undertakes habitat enhancement projects on the lower Yuba River.

- It is a principal party for the Yuba River in the negotiations with the State of California on a proposed voluntary agreement (VA) to resolve issues relating to the update of the Water Quality Control Plan for the San Francisco Bay/Sacramento-San Joaquin Delta Estuary (Bay-Delta Plan).

In developing the project description for this Draft EIR, YCWA evaluated this involvement and the pending or proposed YCWA river-related activities to determine whether any of them should be incorporated as part of the Draft EIR project description. This section confirms the results of that evaluation regarding four major activities.

See Section 5.5, "Cumulative Impacts" for an associated discussion about the potential cumulative environmental impacts of different projects and activities that may cause related impacts.

2.9.1 CEQA Project Description Requirements

In developing the project description, YCWA must include "the whole of an action, which has a potential for resulting in either a direct physical change in the environment, or a reasonably foreseeable indirect physical change in the environment." (CEQA Guidelines sec. 15378(a).) Courts have considered separate activities as one CEQA project and required them to be reviewed together in these situations:

- When the second activity is a reasonably foreseeable consequence of the first activity (the project under review) and the second activity will be significant in that it will likely change the scope or nature of the first activity or its environmental effects.

- When the second activity is an integral part of the same project (i.e., a project description must include future phases or parts of the project that will foreseeably result from first project approval).

- Distinct activities should be reviewed together as a single project when the purpose of the first activity is to provide the necessary first step under a larger development and when development of the first activity review requires or presumes completion of the second activity. For example, is the first activity a crucial or required functional element of a larger proposed project such that, without the first activity, the larger project could not proceed?

On the other hand, a second activity need not be treated as part of the project under review when the second activity has independent utility or serves an independent purpose, is not dependent on completion of the first activity, and is not a contemplated future part of the first activity. Similarly, two activities may properly be treated as separate CEQA projects and undergo separate environmental review when the projects have different proponents, serve different purposes, and can be implemented independently.

2.9.2 Review of Other YCWA Activities

This section reviews four major pending or proposed YCWA activities relating to the Yuba River, together with a summary about why YCWA determined each activity of these did not constitute part of the proposed ARC Spillway Project. To the extent CEQA applies to these other projects, they will be evaluated separately from the project. As the extent of completion of these projects is reasonably foreseeable, they have been considered in the Cumulative Impacts analysis.

Yuba River Development Project FERC Relicensing

As explained in Chapter 1, "Introduction," YCWA owns and operates the multipurpose YRDP under FERC License No. 2246. The YRDP includes the Dam and Reservoir, New Colgate Powerhouse, and Narrows 2 Powerhouse at Englebright Dam. FERC License No. 2246 expired in 2016 and YCWA started the FERC application process in 2010 and applied for a new license in 2014, which was amended by the AFLA subsequently filed with FERC in 2017. Following expiration of the original license, and pending completion of the licensing process, FERC began issuing annual, interim licenses to YCWA in 2016.

The FERC relicensing process is long and complicated. FERC has been processing the license application since 2014. In 2019, FERC completed a FEIS for relicensing NEPA compliance and, in 2020, FERC issued a Biological Assessment (BA) under the Federal ESA. NMFS subsequently requested additional information to initiate ESA Section 7 consultation. In response, in 2021, FERC announced its intent to prepare a SEIS and revised BA. Following completion of the SEIS and revised BA, FERC and NMFS will initiate ESA Section 7 consultation, which will conclude after NMFS preparation issues a Biological Opinion (BO). In consideration of the time that it will take FERC to prepare a SEIS and revised BA, and BO and FERC and NMFS (and potentially USFWS)[2] to consult under ESA and NMFS to prepare a BO, it will likely be several years before FERC is ready to issue a new license to YCWA for the YRDP.

When FERC issues a new license to YCWA for the YRDP, YCWA will need to determine whether to accept and implement the license or seek reconsideration by FERC. The discretionary action of deciding whether or not to accept the new FERC license and implement its terms and conditions will be a YCWA project approval triggering environmental review under CEQA. YCWA plans to prepare a CEQA supplement to FERC's EIS in accordance with CEQA Guidelines Section 15221. On November 7, 2022, YCWA issued its Notice of Intent to Rely on FERC/USACE FEIS, in Combination with a Supplemental Analysis, to Satisfy CEQA compliance for YRDP Relicensing.

When YCWA submitted the 2014 FERC license application and subsequent 2017 AFLA, YCWA expected and planned that FERC would have issued a new license for the YRDP by the time that YCWA was ready to construct the ARC Spillway. Therefore, construction and operation of the ARC Spillway were included in the FERC license application. It is now 2023 and YCWA is ready to proceedwith the ARC Spillway Project. The FERC relicensing process is taking longer than anticipated and it has become apparent that the schedule of events planned in 2014/2017 will not occur as expected, and YCWA has determined that it is necessary for the ARC Spillway Project to proceed ahead of relicensing. Consequently, as explained above, YCWA plans to apply to FERC for an amendment to the

[2] If there are changes to the Proposed Action that may affect ESA-listed species or critical habitat under the jurisdiction of USFWS, FERC may need to consult with USFWS as well as NMFS.

existing FERC license to authorize construction and operation of the ARC Spillway, instead of relying on FERC authorization through a new license as planned in 2014/2017.

SWRCB submitted a December 10, 2020 comment letter in response to the NOP issued for this EIR for the ARC Spillway Project. In its letter, the SWRCB asserts that "Per YCWA's final license application and amendments thereto" to FERC, "the Spillway Project is part of the broader YRDP." The comment letter then continues in part:

> State Water Board recommends YCWA analyze the potential environmental effects of YRDP relicensing, which would include the Spillway Project. YCWA should fully analyze the potential environmental impacts associated with operation of the YRDP as compared to water quality standards identified in the Water Quality Control Plan for the Sacramento River Basin and the San Joaquin River Basin and the Water Quality Control Plan for the San Francisco Bay/Sacramento-San Joaquin Delta Estuary. … Additionally, the EIR should consider the potential impacts of the YRDP and alternatives vis-à-vis state and federal anti-degradation requirements. The EIR should include analysis of the terms of State Water Board's July 17, 2020 water quality certification3 for the YRDP, at the project or program level, as appropriate for each condition. State Water Board staff is concerned that stand-alone environmental review of the Spillway Project could constitute piecemealing, which is impermissible under CEQA. Staff is further concerned that the Spillway Project description as presented in the NOP would not provide the State Water Board with a full analysis of the impacts of related activities associated with YRDP relicensing and alternatives that could support existing certification requirements or provide information for any future certification (e.g., should FERC's waiver finding not be overturned). State Water Board staff encourages YCWA to comply with all CEQA requirements and review the environmental impacts of the entire YRDP.

SWRCB argues that the ARC Spillway Project is "part of the broader YRDP" and that its impact must be reviewed with "the environmental impacts of the entire YRDP" because the ARC Spillway was included in the 2014 FERC application and the 2017 AFLA. SWRCB claims that the two activities – the proposed project and proposed YRDP relicensing – must be treated as a single project under CEQA, which would require YCWA to delay this important flood control improvement project until FERC finishes the relicensing process (which is beyond YCWA's control). YCWA disagrees with the SWRCB's characterization of the ARC Spillway Project as "part of the broader YRDP" and has determined that CEQA does not require the ARC Spillway Project to be included in the environmental analysis of the YRDP relicensing for the following reasons.

1) The ARC Spillway does not exist and has not yet been permitted or constructed. Therefore, it is not yet part of the broader YRDP. If YCWA obtains the permits for and constructs the ARC Spillway, it would become part of the YRDP. Simply including the project proposal in the 2014 application and 2017 AFLA did not make it part of the YRDP.

[3] In a ruling dated June 28, 2022 in a lawsuit filed by YCWA, the Fresno County Superior Court ordered the SWRCB to set aside and vacate the 2020 water quality certification.

2) Since the proposed project would involve modifications to the FERC-licensed dam, the project requires FERC approval. As explained above and earlier in this chapter, YCWA has two regulatory options for obtaining FERC approval: 1) include the construction and operation of the ARC Spillway in the new license application and obtain ARC Spillway authorization through the new license (as was planned in 2014 /2017), or 2) apply to FERC for a project-specific amendment to the existing FERC license. Initially including the ARC Spillway for authorization through the new license did not make the ARC Spillway "part of the broader YRDP" and preclude YCWA from later making a different permitting approach decision in light of the delays with the FERC process and FERC's 2021 announcement that it will prepare a SEIS and revised BA.

   After California experienced 31 atmospheric river events in water year 2023, leading to widespread flooding in parts of the State, YCWA has decided to proceed with the ARC Spillway now to address the flooding risk as quickly as practicable because Yuba County suffered major floods in 1986 and 1997, and the 1997 flood caused numerous fatalities. Since 1997, YCWA has been working on and implementing significant flood control improvements to prevent future catastrophic flooding. The ARC Spillway is YCWA's next major flood control improvement project. YCWA's plans in 2014/2017 had contemplated that the ARC Spillway would be processed simultaneously with the new FERC license, such that both projects could be analyzed in one EIR to make the process more efficient. *See* CEQA Guidelines § 15165 (lead agency may prepare one EIR analyzing two similar projects, or one for each project). Because the FERC process no longer aligns with YCWA's schedule to authorize ARC Spillway construction and operation, YCWA now has determined to undertake separate CEQA analysis for both projects and will apply to FERC for an ARC Spillway-specific non-capacity amendment to the existing license. The 2014/2017 application reflected the FERC permitting approach at that time, but this does not bar YCWA from now deciding on a different FERC approach.

3) The two activities each have independent utility and each serves an independent function. The ARC Spillway is a focused, site-specific project that is intended to reduce flood risk downstream. The FERC relicensing proceeding is a more comprehensive project with a broad purpose of whether and how to renew YCWA's FERC license governing overall YRDP operation. The YRDP relicensing process stands on its own and does not depend on whether YCWA constructs the ARC Spillway. FERC approval of a new license is not a reasonably foreseeable consequence of the ARC Spillway. YRDP relicensing can proceed with or without the ARC Spillway. Similarly, the ARC Spillway Project is an isolated flood risk reduction project with a limited objective. It is not a necessary first step or part that is crucial or required for FERC to proceed with YRDP relicensing. Rather, the ARC Spillway can proceed with or without YRDP relicensing.

For these reasons, the two activities are properly treated as separate CEQA projects and that will undergo separate environmental review. The ARC Spillway may be evaluated as a standalone project, and CEQA does not require that the ARC Spillway Project be delayed merely so that it can be included in the YRDP analysis to be conducted as part of the FERC relicensing.

U.S. Army Corps of Engineers Water Control Manual Update

USACE regulates the Dam and Reservoir through the WCM. YCWA operates the Dam and manages water releases according to the WCM, which includes a guide curve (or rule curve) that governs the water storage and release schedule based on past weather patterns. USACE recently began the process of updating the WCM to reflect changed circumstances, new technology, and improved practices. The updated WCM is expected to implement forecast-informed reservoir operations (FIRO). FIRO is a flexible water management approach that uses watershed monitoring data and improved weather forecasting to help water managers selectively retain or release water from a reservoir for increased resilience to droughts and floods and to better manage releases before and during a storm. USACE is a Federal agency and it will prepare the WCM update in accordance with the Federal statutes and regulations that govern it and WCMs. When the revised WCM is completed, it will govern water releases during and in anticipation of floods, major storms, and high-water events. However, the update of the WCM is not a YCWA-proposed or sponsored project, and YCWA does not control USACE's WCM process. If and after USACE adopts a WCM update, the ARC Spillway would be operated pursuant to the updated WCM.

Bay-Delta Voluntary Agreement Memorandum of Understanding

On March 29, 2022, representatives of YCWA, the State of California, and other local water agencies signed the Memorandum of Understanding (MOU) Advancing a Term Sheet for the Voluntary Agreements to Update and Implement the Bay-Delta Water Quality Control Plan, and Other Related Actions. The MOU establishes a framework for the several parties to negotiate and prepare detailed VA to update and implement the Bay-Delta Plan. The MOU contemplates a global agreement, implementing agreements for each participating tributary, and settlement agreements under Government Code Section 11415.60. YCWA is a principal MOU signatory for the Yuba River.

The MOU outlines terms for a proposed eight-year integrated VA program that would provide substantial new water flows for the environment to help recover salmon and other native fish, create new and restored habitat for fish and wildlife, and provide funding for environmental improvements and water purchases. It also outlines a governance and habitat monitoring framework with metrics and goals to allow State, Federal, and local agencies to manage and implement the program and decide whether the program should be continued, modified, or ended after 8 years. For the Yuba River, the MOU term sheet provides for an additional 60,000 acre-feet contribution to tributary flow and Delta outflows in dry, below normal, and above normal years, and 150 acres of habitat restoration.

As stated in the MOU, the SWRCB will be the CEQA lead agency for the CEQA analysis of the update the Bay-Delta Plan, the SWRCB's Substitute Environmental Document is expected to include programmatic environmental review of the VA Program, and the participating parties responsible to implement VA measures (such as YCWA) will undertake project-specific environmental review as appropriate to their role in the program.

The proposed ARC Spillway Project and VA program are distinct activities that have little relationship with each other. VA implementation is not needed or essential for the ARC Spillway. Furthermore, at this time, the VA program is a proposal, which may or may not proceed. It remains speculative whether the many participating agencies and entities will be able to finalize the various agreements, and the timeline for doing so remains uncertain.

Lower Yuba River Accord Water Transfer Program Extension

In 2008, YCWA implemented the Lower Yuba River Accord (Yuba Accord), which is a comprehensive settlement resolving issues related to instream flow requirements for the lower Yuba River, water transfers, conjunctive use of surface water and groundwater, and fisheries management. The Yuba Accord involves three sets of related agreements: 1) fisheries agreement between YCWA, CDFW and certain non-governmental organizations; 2) conjunctive use agreements between YCWA, member units, and local water and irrigation districts and companies; and 3) water purchase agreement between YCWA and DWR. The Yuba Accord was implemented through a SWRCB water rights order (Corrected Order WR 2008-0014). YCWA prepared and certified a Final EIR for the Yuba Accord in 2007.

The fisheries agreement established new minimum instream flow requirements during specified periods of the year and a monitoring and evaluation program for the fisheries resources in the lower Yuba River. The conjunctive use agreements enable the member units to participate in the Yuba Accord Groundwater Substitution Water Transfer Program. Under this program, the member districts pump groundwater as a substitute supply for YCWA surface water deliveries during dry years, which allows surface water to remain in the lower Yuba River during those years. The water purchase agreement allows YCWA to sell and transfer to DWR and others the water that is being released from the Dam for instream flows and water made available through groundwater substitutions by the member units.

The Yuba Accord water purchase agreement, conjunctive use agreements, and long-term water transfer authorization in SWRCB Corrected Order WR 2008-0014 expire on December 31, 2025. YCWA plans to extend the Yuba Accord water transfer program before this expiration date. Extension of the Yuba Accord water transfer program will involve three principal components: (1) a new or extended DWR water purchase agreement; (2) new or extended conjunctive use agreements; and (3) a SWRCB water right change petition and SWRCB approval. YCWA plans to seek a Yuba Accord water transfer program extension without significant substantive changes. On January 12, 2023, YCWA released its Notice of Preparation of a Draft Supplemental Environmental Impact Report and Notice of Scoping Meetings for Extension of the Lower Yuba River Accord Water Transfer Program.

A Yuba Accord water transfer program extension is not a required entitlement for ARC Spillway construction, and whether YCWA constructs the ARC Spillway will have no effect on whether or how to extend the Yuba Accord water transfer program.

Chapter 3. Environmental Setting and Impact Analysis

This chapter describes the approach to identifying relevant environmental and regulatory setting information, evaluating environmental impacts, and identifying feasible mitigation measures for the New Bullards Bar Dam Atmospheric River Control (ARC) Spillway Project (project or proposed project).

3.0.1 Approach

California environmental law is governed by the California Environmental Quality Act (CEQA), found in Public Resources Code (PRC) Section 21000 et seq. and the State CEQA Guidelines (Section 15000 et seq.). CEQA requires that Environmental Impact Reports (EIRs) evaluate potentially significant effects on the physical environment associated with implementing a proposed project and identify feasible mitigation for those effects. A "[s]ignificant effect on the environment" means a substantial, or potentially substantial, adverse change in any of the physical conditions within the area affected by the project (State CEQA Guidelines, Section 15382).

State CEQA Guidelines Section 15126.2 states:

> "An EIR shall identify and focus on the significant environmental effects of the proposed project. In assessing the impact of a proposed project on the environment, the lead agency should normally limit its examination to changes in the existing physical conditions in the affected area as they exist at the time the notice of preparation is published, or where no notice of preparation is published, at the time environmental analysis is commenced. Direct and indirect significant effects of the project on the environment shall be clearly identified and described, giving due consideration to both the short-term and long-term effects. The discussion should include relevant specifics of the area, the resources involved, physical changes, alterations to ecological systems, and changes induced in population distribution, population concentration, and human use of the land (including commercial and residential development), health and safety problems caused by the physical changes, and other aspects of the resource base such as water, historical resources, scenic quality, and public services. The EIR shall also analyze any significant environmental effects the project might cause by bringing development and people into the area affected."

An EIR also must discuss inconsistencies between the proposed project and applicable general plans and regional plans (State CEQA Guidelines, Section 15125(d)). Furthermore, according to Section 15126.4 of the State CEQA Guidelines, an EIR must describe potentially feasible measures that could avoid or minimize significant adverse impacts (State CEQA Guidelines, Section 15126.4(a)(1)) and feasible and practicable measures that are fully enforceable through permit conditions, agreements, or other legally binding processes (State CEQA Guidelines, Section 15126.4(a)(2)). Mitigation measures are not required for effects found to be less than significant.

State CEQA Guidelines Section 15126.4(a)(1)(d) specifies that if a mitigation measure itself would cause a significant impact, the effects of the mitigation measure will be discussed. Each mitigation measure included in this EIR was considered as to whether it would cause a significant impact upon implementation. It was determined that none of the mitigation measures for the proposed project or any of the alternatives would cause a significant impact of its own upon implementation. Therefore, impacts generated by mitigation measures themselves are not further evaluated or addressed in this EIR.

The following discussion explains the organization and general assumptions used in developing the environmental and regulatory setting and the environmental analysis for each resource topic. The reader is referred to the individual resources sections regarding specific assumptions, methodology, and significance criteria (thresholds of significance) used in the analysis and determination of significance of impacts. Chapters 3.1 through 3.18 of this EIR also identify residual significant impacts (i.e., impacts that would be significant and unavoidable despite the inclusion of feasible mitigation measures). Issues evaluated in these sections consist of a full range of environmental topics originally identified for review in the Notice of Preparation, presented in Appendix A.

3.0.2 Resources Not Evaluated in Detail

Pursuant to State CEQA Guidelines, the discussion of the potential impacts on the physical environment can be focused on those impacts that may be significant or potentially significant. State CEQA Guidelines allow a Lead Agency to limit the details of discussion of the environmental effects (impacts) that are not considered potentially significant (PRC Section 21100, California Code of Regulations [CCR] Sections 15126.2(a) and 15128). State CEQA Guidelines also require that the discussion of any significant impacts on the environment be limited to substantial or potentially substantial adverse changes in physical conditions that exist within the affected area, as defined in PRC Section 21060.5 (Statutory definition of “environment”).

This Draft EIR does not address population and housing and associated impact mechanisms because there is no potential that these resources would be significantly impacted by the proposed project. Specifically, the project does not include housing or commercial development that would directly or indirectly induce population growth and would not displace existing people or housing.

Additionally, potential impacts related to mineral resources are not addressed in this Draft EIR, as the project area is not located within an active mineral or oil resource recovery site and is not known to contain significant mineral resources.

3.0.3 Section Format

Each resource topic analyzed in Chapter 3 contains the following components:

- ***Environmental Setting*** presents the existing environmental conditions within the proposed project boundaries and within the surrounding project area, as appropriate, to establish baseline conditions, in accordance with State CEQA Guidelines Section 15125. The extent of the environmental setting area evaluated (the project study area) differs among resources, depending on the locations where impacts would be expected. For example, water or air quality impacts are assessed for the basin (macro-scale), as well as the site vicinity (micro-scale), whereas aesthetic impacts are assessed for the project vicinity only.

- ***Regulatory Setting*** presents the laws, regulations, plans, and policies that are relevant to each issue area. Regulations originating from the s, State, and/or local levels are each discussed, as appropriate.

- ***Environmental Impacts and Mitigation Measures*** presents the thresholds of significance, analysis methodology, issues not discussed further in this EIR, and impact analysis, as follows.

- ***Thresholds of Significance*** describes the basis for determining the significance of effects for this EIR and is typically based on professional standards and judgment using the criteria in Appendix G (Environmental Checklist) of the State CEQA Guidelines.

- ***Analysis Methodology*** describes the methodology used to determine what constitutes a significant impact, including existing documents and analysis referenced and quantitative methods developed for this EIR.

- ***Issues Not Discussed Further in this EIR*** identifies environmental issues related to the thresholds of significance where it is determined the project would have no impact. These issues and the relationship to the project are briefly described and not addressed further in this EIR.

- ***Impact Analysis*** discusses each remaining potential environmental impact from the project related to the thresholds of significance. Direct, indirect, and cumulative impacts, as well as temporary and long-term impacts, are identified by comparing the effects of the proposed project on the existing physical conditions (i.e., the environmental setting). Project impacts are organized numerically in each subsection (e.g., Impact BIO-1, Impact BIO-2, Impact BIO-3). A bold-font impact statement precedes the discussion of each impact while its level of significance follows the discussion of each impact. The discussion that follows the impact summary includes the substantial evidence supporting the impact significance conclusion. Mitigation measures include specific details of the mitigation with performance standards, timing, and responsible parties identified.

- ***Residual Significant Impacts*** identifies all significant impacts that would remain significant after implementation of the mitigation measures. In some cases, all feasible and available mitigation measures are not sufficient to reduce an impact to a “less-than-significant” level. When this occurs, the impacts are described as remaining “significant and unavoidable.” Significant and unavoidable impacts are also summarized in Chapter 4, “Other CEQA-required Sections,” under the subsection “Significant and Unavoidable Environmental Impacts.

3.0.4 Impact Terminology

This EIR uses the following terminology to describe environmental impacts of the proposed project.

- An impact is considered to be a ***beneficial impact*** if the analysis concludes that the impact would cause a positive change or improvement in the particular environmental resource or issue.

- A finding of ***no impact*** is made when the analysis concludes that the project would not affect the particular environmental resource or issue.

- An impact is considered ***less than significant*** if the analysis concludes that there would be no substantial adverse change in the environment and that no mitigation is needed.

- An impact is considered ***less than significant with mitigation*** if the analysis concludes that there would be no substantial adverse change in the environment with the inclusion of mitigation measures described.

- An impact is considered ***potentially significant*** if the analysis concludes there is a potentially substantial, adverse change in any of the physical conditions with the area affected by the project; however, the occurrence of the change cannot be immediately determined with certainty. A potentially significant impact is treated as if it were a significant impact.

- An impact is considered ***significant*** if the analysis concludes that there is a substantial, or potentially substantial, adverse change in any of the physical conditions within the area affected by the project. An impact is considered ***significant and unavoidable*** if the analysis concludes that there would be a substantial adverse effect on the environment and no feasible mitigation measures are available to reduce the impact to a less-than-significant level.

- ***Mitigation*** refers to specific measures or activities that can be adopted by the lead agency to avoid, minimize, rectify, reduce or eliminate, or compensate for an impact.

3.0.5 Impact Mechanisms

Mechanisms that could cause impacts are discussed within each topic area. General categories of impact mechanisms are construction of the project and activities related to future Operation and Maintenance (O&M), as described in Chapter 2, "Project Description." Project impacts fall into the following categories:

- A **temporary impact** would occur primarily during construction activities and could last from several days at one site to up to 4 years, the anticipated duration of construction activities for the project.

- A **short-term impact** would last from the time construction ceases to within 3 years following construction.

- A **long-term impact** would last longer than 3 years following completion of construction. In some cases, a long-term impact could be considered a permanent impact.

- A **direct impact** is an impact that would be caused by an action and would occur at the same time and place as the action.

- An **indirect impact** is an impact that would be caused by an action but would occur later in time, or at another location, yet is reasonably foreseeable in the future. Examples of indirect impacts include growth-inducing impacts and other impacts related to changes in land use patterns and related effects on the physical environment.

- A **cumulative impact** is an impact resulting from the project under consideration when added to other past, present, and probable future actions (regardless of what agency or person undertakes the actions), referred to in this document as a "related project." A significant cumulative impact occurs when the proposed project makes a "cumulatively considerable" incremental contribution to a significant cumulative impact. "Cumulative considerable" means that the incremental effects of an individual project are significant when viewed in connection with the effects of past projects, current projects, and probable future or related projects (State CEQA Guidelines Section 15064(h)(1)).

3.1 Hydrology and Water Quality

This section discusses the existing hydrology and water quality setting of the New Bullards Bar Dam Atmospheric River Control (ARC) Spillway Project (project or proposed project) site and vicinity, applicable regulations, and potential impacts at the project site and downstream related to hydrology and water quality from project construction and operation. The primary information sources for this analysis were hydrologic studies completed to support the Federal Energy Regulatory Commission (FERC) license renewal, additional operational flow modeling and erosion studies conducted for the proposed project, and additional data gathered for the proposed project.

3.1.1 Environmental Setting

Surface Water

This section summarizes the surface water hydrology of the area focusing on areas of the Yuba River Watershed affected by New Bullards Bar Reservoir (Reservoir) operations.

Local Hydrology

Hydrologic features and water supply and conveyance infrastructure relevant to the project site and the hydrology operations study area are shown in **Figure 3.1-1**. Flows above the New Bullards Bar Dam (Dam) are seasonal from tributaries into the Reservoir, including the North Yuba River, and Burnt Bridge, Oregon, Slate, and Schoolhouse creeks. Other flows into the Reservoir originate from elsewhere in the Yuba River Development Project (YRDP), through diversion facilities including Our House Dam on the Middle Yuba River, the Lohman Ridge Tunnel, Log Cabin Dam on Oregon Creek, and the Camptonville Tunnel, which jointly divert waters from the Middle Yuba River and Oregon Creek into the Reservoir. This area also receives overland drainage flows from the surrounding hillsides above the river channel.

Flows in the North Yuba River below the Dam are controlled by operational rules governing Primary Spillway releases, as detailed in the Flood Control Manual (USACE 1972) and summarized in Chapter 2, "Project Description." Flows below the Dam are also influenced by operations of the Dam's Low-Level Outlet and Minimum Flow Powerhouse, which normally releases approximately 6 cubic feet per second (cfs) to ensure compliance with the FERC license-required minimum streamflow of 5 cfs. Water released from the Dam flows down the North Yuba River for 2 miles to the confluence with the Middle Yuba River. Where the Middle Yuba River and North Yuba River converge, they form the Yuba River. The Colgate Powerhouse is 4.5 miles below this confluence. The Yuba River joins the South Yuba River approximately 4 miles downstream from the Colgate Powerhouse. Englebright Dam is located 6.6 miles below the confluence of the South Yuba River with the mainstem Yuba River. However, the waters of Englebright Lake seasonally extend upstream as far as Colgate Powerhouse during high-pool.

The lower Yuba River extends 24.3 miles from Englebright Dam to the river's confluence with the Feather River. Deer Creek and Dry Creek contribute flow to the lower Yuba River, draining areas of 89 square miles and 108 square miles, respectively. The lower Yuba River includes the YRDP's Narrows 2 Powerhouse, the Narrows 1 Powerhouse, and the United States (U.S.) Army Corps of Engineers (USACE's) Daguerre Point Dam. The lower Yuba River flows into the Feather River at the southwest end of Marysville. Downstream of Lake Oroville, the Feather River flows south and eventually into the Sacramento River, as well as into the Sutter Bypass and Yolo Bypass during certain high-flow hydrologic conditions.

Yuba River Watershed

The Yuba River is formed by the converging forks of the North Yuba, Middle Yuba, and South Yuba rivers, which drain approximately 1,339 square miles along the slope of the western Sierra Nevada and comprise several sub-basins **(Figure 3.1-2**). Runoff is carried through deep canyons separated by high, steep-sided ridges and a parallel drainage network. Land surface elevations in the Yuba River watershed range from a high of approximately 8,590 feet mean sea level (msl) to a low of 88 feet msl at the confluence with the Feather River (YCWA 2017a).

The channel character of the North Yuba River, Middle Yuba River, and Yuba River upstream of Englebright Reservoir is primarily influenced by the presence of erosion-resistant boulders and bedrock which control lateral and vertical stability of the banks. Bedrock channels are generally insensitive to short-term changes in sediment supply or discharge. Except for the Yuba River downstream of the New Colgate Powerhouse, the surface of the riverbed is very coarse gravel and small cobble. Large boulders and bedrock control 1 to 66 percent of the bed and banks. Bank erosion is very low, reflecting these resistant channel materials. Sediment storage does occur in small areas in deep pools, in velocity shadows, and on lateral bars (YWCA 2013).

North Yuba River Subbasin

The ARC Spillway would discharge to the North Yuba River, which originates at Yuba Pass near State Route (SR) 49 at an elevation of 6,701 feet. **Figure 3.1-3** shows a representative image of the North Yuba River channel conditions downstream of the project site. The North Yuba River drainage encompasses approximately 491 square miles. The North Yuba River channel journeys in tandem with the highway as far as the community of Downieville where it leaves the road and flows westward ultimately entering the Reservoir at RM[1] 18.1. There are no significant dams or water diversions restricting flow upstream of the Reservoir, except for the Slate Creek Diversion Dam—part of the South Feather Water and Power Agency's South Fork Power Project (FERC Project No. 2088).

The Dam is one of five dams on the Yuba River. The Dam is 645-feet-tall and 2,323 feet long and is located at the south end of the Reservoir. The Reservoir is 16 miles long, deep, thermally stratified, and has a retention time of about 6 months. The Reservoir has a gross storage capacity of 966,103 acre-feet with a regulatory minimum operating level of 234,000 acre-feet, leaving 736,103 acre-feet of operable capacity (YWCA 2017).

Releases from the Reservoir are made through the New Colgate Power Tunnel to the New Colgate Powerhouse on the Yuba River, the New Bullards Bar Minimum Flow Powerhouse at the base of the Dam, the Dam's low-level outlet, or the gates at the existing Primary Spillway. Water flows to the southwest converging with the Middle Yuba River at an elevation of about 1,350 feet (et. seq).

[1] River miles on the Yuba River begin at RM 0.0 at the confluence of the Yuba River with the Feather River and extend upstream on the Yuba River.

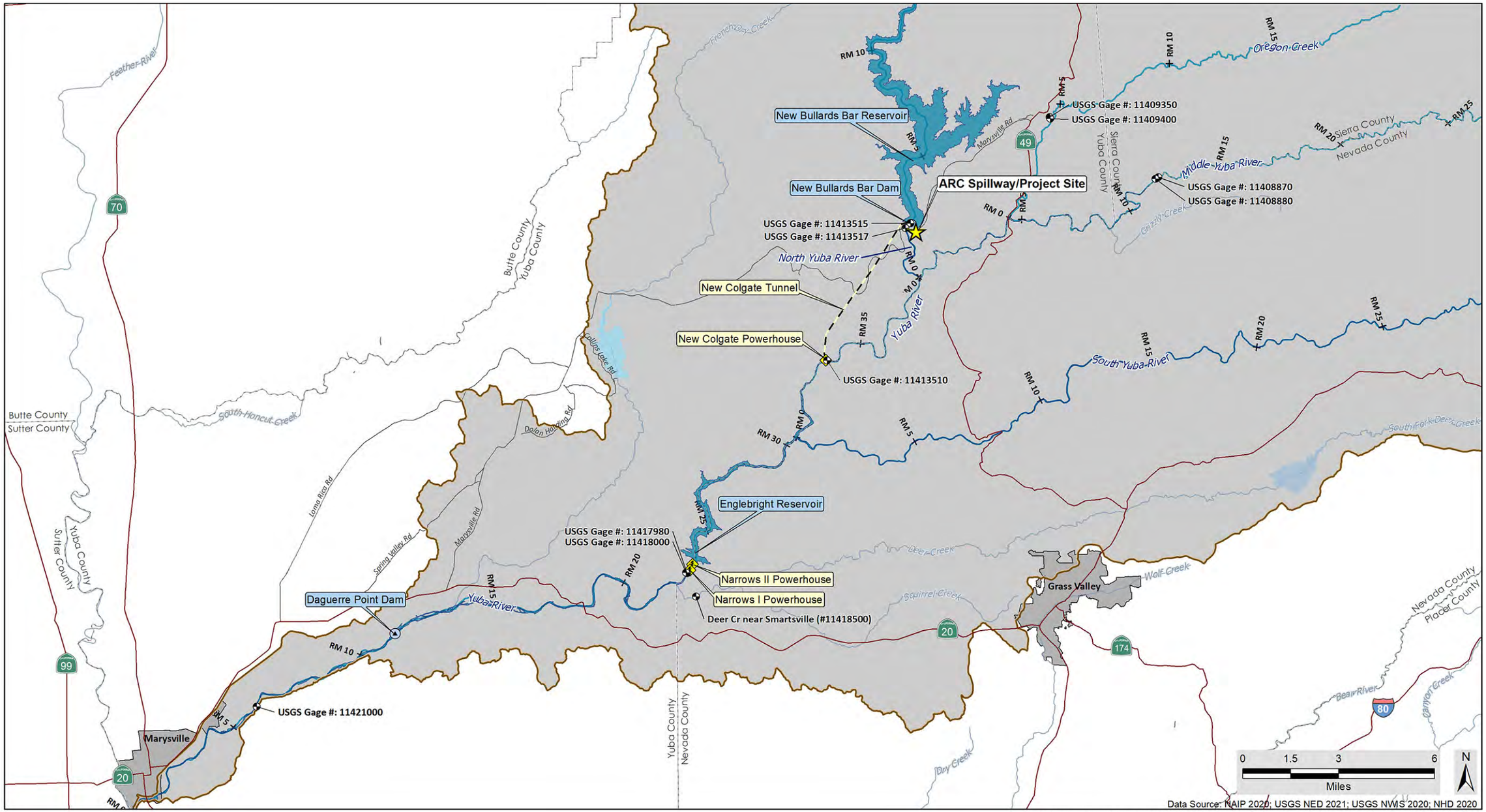


Figure Source: GEI Consultants, Inc. 2023.

Figure 3.1-1. Local Hydrology, Water Infrastructure, and Stream Gages.

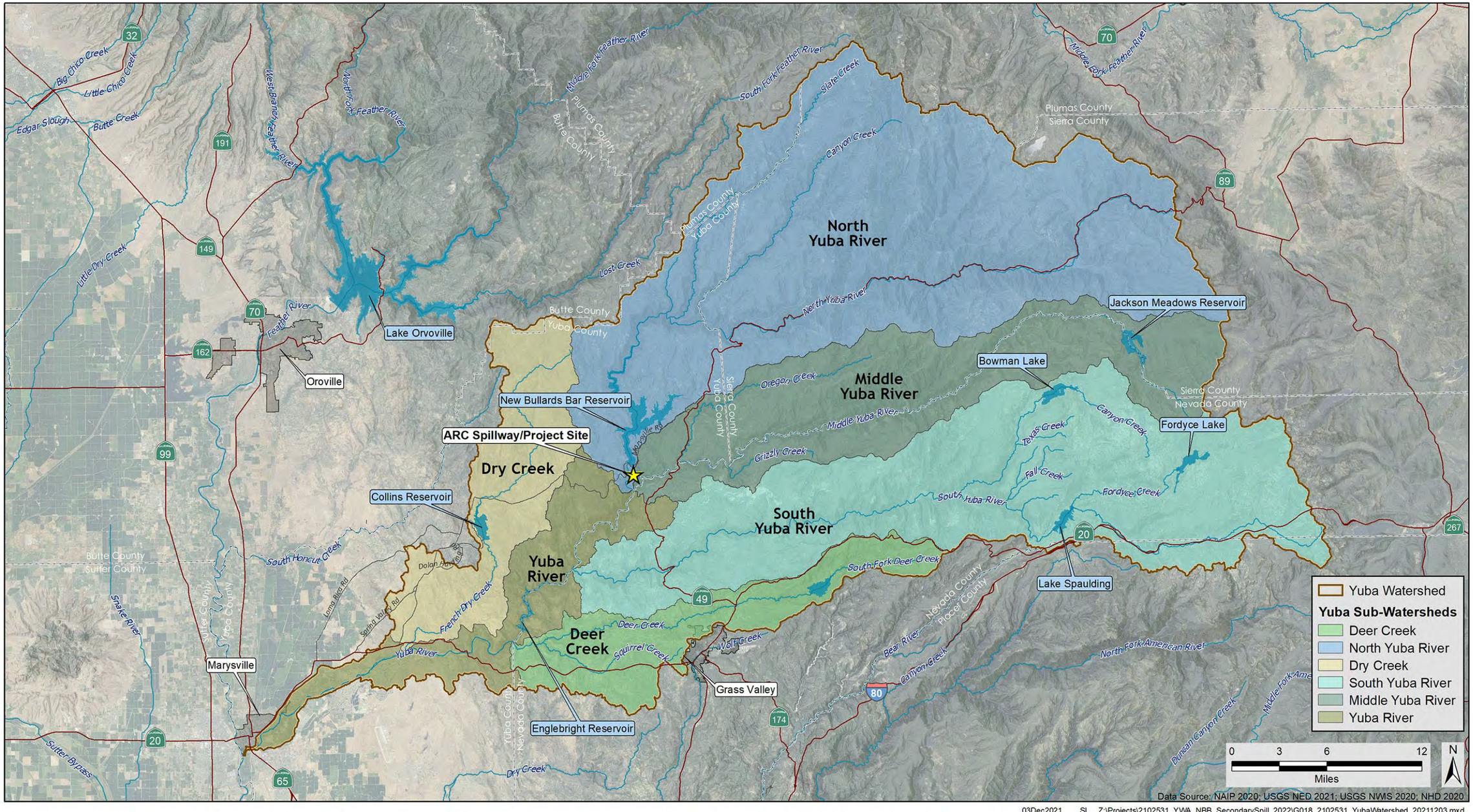


Figure Source: GEI Consultants, Inc. 2021.

Figure 3.1-2. Yuba River Sub-basins.



Figure 3.1-3. North Fork Yuba River Downstream of the Project Site.

Middle Yuba River Subbasin

The total drainage area of the Middle Yuba River is 210 square miles. Flows in the Middle Yuba River originate from snowmelt and rainfall runoff above the main upper watershed impoundment, Nevada Irrigation District's Jackson Meadows Reservoir in Sierra County. Most of the upper reaches of the Middle Yuba River are contained in narrow, steep canyons until the river reaches Yuba County Water Agency (YCWA's) Our House Dam, located at River Mile (RM) 12.1 southwest of Camptonville near the Sierra/Nevada County line. Channel banks located on the upstream side of bends and within and downstream of long-term depositional areas are more alluvially dominated, but sediment transport is still very high, and particles move with high frequency. The Middle Yuba River converges with the North Yuba River approximately 13 miles below Our House Dam (YCWA 2009).

Oregon Creek is a tributary to the Middle Yuba River that originates at an elevation of approximately 5,600 feet and flows southwesterly for 21 miles where it converges with the Middle Yuba River. Like the North and Middle Yuba River watersheds, the Oregon Creek watershed is steep, rugged, sparsely populated, and mostly occupied by conifer forests. Flow is controlled by Log Cabin Diversion Dam at RM 4.1.

South Yuba River Subbasin

The total drainage area of the South Yuba River is 352 square miles. The South Yuba River originates at an elevation of about 7,200 feet near Castle Peak and Donner Lake and flows southwest to its confluence with the main stem Yuba River (at RM 30.7) near the community of Bridgeport at Englebright Reservoir, at an elevation of about 527 ft (YCWA 2009).

Yuba River Subbasin

The Yuba River begins at the confluence of the North Yuba River and Middle Yuba River and flows southwest about 40 miles to its confluence with the Feather River in Marysville. The Yuba River drains approximately 1,339 square miles of the Sierra Nevada. The average annual unimpaired flow of the Yuba River recorded at the Smartville Gage from the period 1975 to 2004 is 2,340,000 acre-feet, ranging from a maximum of approximately 4,700,000 ace-feet in 1995 to a minimum of approximately 360,000 acre-feet in 1977 (YWCA 2009).

Flows on the Yuba River are restricted by two USACE debris dams. The 260-ft-high Englebright Dam was constructed in 1941 at RM 24.0, forming Englebright Reservoir to trap sediment derived from hydraulic mining operations in the Yuba River watershed. Englebright Reservoir is about 9 miles long and has a gross storage capacity of about 70,000 acre-feet. The second dam, Daguerre Point Dam, was constructed in 1906 downstream of Englebright Dam at RM 11.6 to prevent hydraulic mining debris from the Yuba River watershed from flowing into the Feather and Sacramento rivers downstream. This dam is only 25-feet-high and has no appreciable storage capacity.

To the south of the Yuba River downstream of Englebright Dam is a feature known as the Yuba Goldfields—an area of over 8,000 acres containing hydraulic mine tailings that were created during the California Gold Rush (YCWA 2009). Flows in this section of river become subsurface flowing through and within the aggregate field.

Precipitation and Snowfall

The climate within the Yuba River watershed has the typical characteristics of a mixed-elevation Mediterranean climate. The lower elevation areas to the west and south of the Reservoir experience hot, dry summers and cool winters with substantial rainfall, but never appreciable snowfall. The higher elevation areas constitute much of the North, Middle, and South Yuba River watersheds, and are characterized by significant winter snowfall accumulation at elevations over 4,000 to 5,000 feet. The snowpack then melts during spring and early summer. Areas of moderate elevation, between 500 and 4,000 feet, experience a mélange of the high-elevation and low-elevation climate: predominantly rainy winters with heavier precipitation than low-elevation areas, occasional snowfall with short-lived accumulation, and the ubiquitous warm, dry summers.

The National Weather Service maintains Monitoring Station No. 048207 at an elevation of approximately 4,700 feet, located near the confluence of the North Yuba River and Haypress Creek. Average annual snowfall totals 100.4 inches in depth, 84 percent of which occurs from December through March. Annual mean total precipitation is 63.8 inches, most of which (65 percent) occurs from December through March. The summer months (June through August) produce just 3 percent of the total annual average precipitation.

National Weather Service Monitoring Station No. 045385 at Marysville provides a climate history representative of the lower-elevation areas in the Yuba River watershed. These areas occupy the eastern Central Valley and rolling, western Sierra foothills, and can experience high summer temperatures, mostly unmitigated by the “Delta breezes” present farther south and west in California’s Central Valley. Annual average precipitation totals 21.6 inches, and falls exclusively as rain, with 67 percent falling during the winter months from December through March. June through August precipitation averages only one-quarter of an inch (WRCC 2012).

New Bullards Bar Dam Operations and Downstream Flows

Reservoir operations are interrelated among the major rivers of the Sacramento Valley. Operations at the Dam are largely driven by minimum flows and agricultural water supply demands on the Yuba River downstream of the Narrows 2 Powerhouse. The Reservoir makes releases from storage to supplement flows from the Yuba River, South Yuba River, Oregon Creek, and other tributaries to Englebright Reservoir to ensure adequate water supply is available for release to meet downstream objectives. Water levels are monitored through a series of stream gages to ensure compliance with minimum streamflow and Reservoir water level requirements. **Table 3.1-1** depicts the mean annual, monthly, and daily flows recorded in the system over an approximately 45-year period of record. Gage locations are shown on Figure 3.1-1.

Pursuant to Section 7 of the Flood Control Act of 1944 (58 Stat. 890), the Reservoir must be operated from September 16 to May 31 to comply with Title 33, Part 208 of the Code of Federal Regulations, "Flood Control Regulations, New Bullards Bar Dam and Reservoir, North Yuba River, California." Under these regulations and 1966 and 1978 contracts with the Federal government, YCWA agreed to reserve 170,000 ac-ft of storage space for flood management in the Reservoir in accordance with rules and regulations enumerated in the USCOE Reservoir Regulation for Flood Control (USACE 1972).

While there are not strict rule curves for operating the Reservoir and its storage, YCWA generally operates throughout the summer for a maximum storage of 650,000 ac-ft at the end of September. The 650,000 ac-ft storage target ensures adequate storage for the following year in case of extreme drought, yet generally results in sufficient cold water to provide suitable releases for anadromous fish throughout the summer in the Yuba River downstream of the Narrows 2 Powerhouse. In addition to reservation of flood control space in the Reservoir, the flood management regulations include rules governing Reservoir ramping rates as well as target maximum flows in the Yuba River and the Feather River below the confluence with the Yuba River (the Flood Control Manual and Lake Oroville Flood [Water] Control Manual). The Reservoir is operated to maintain no more than the following maximum flows:

- 50,000 cfs on the North Yuba River below the Dam;
- 120,000 cfs on the Yuba River at Marysville;
- 300,000 cfs on the Feather River below the Yuba River (in conjunction with Lake Oroville releases by DWR); and
- 320,000 cfs on the Feather River below the Bear River (in conjunction with Lake Oroville releases by DWR).

YCWA also operates the Narrows 1 Powerhouse at Englebright Dam to use storage in Englebright Reservoir to capture winter storm "freshets" and reduce storm flows on the Yuba River below Englebright Dam. This operation is accomplished by evacuating storage space in Englebright Reservoir in anticipation of storm peak flows. At times when water elevation is not threatening to encroach into the flood management pool, the YRDP may modify Reservoir operations to avoid spilling Englebright Reservoir.

In the lower Yuba River, U.S. Geological Survey (USGS) gage 11418000 (Yuba River below Englebright Dam near Smartsville, California) captures a drainage area of 1,108 square miles. The gage measures flow in the Yuba River downstream from both the Narrows 1 and Narrows 2 Powerhouses and includes both spills from the Dam and powerhouse releases. USGS gage 11421000 (Yuba River near Marysville, California), is located 6.2 miles upstream from the Yuba River's confluence with the Feather River and captures a drainage area of 1,339 square miles (FERC 2019).

Flood Hazards

The portion of the project site located upstream of the Dam, in the Reservoir, is mapped by FEMA as Zone D (undetermined flood hazards) and areas located downstream of the Dam are mapped as Zone X (areas with a 0.2 percent annual chance of flood). There are no areas associated with the project site that are mapped as special flood hazard areas (FEMA 2011). According to the USACE National Levee Database, there are no Federal levees in the project area (USACE 2021).

The North Yuba River downstream of the Dam is delineated as a dam inundation zone for potential dam failure and a "sunny day" spillway failure (DWR 2020a, Yuba County 2011a). Additionally, the California Department of Water Resources (DWR) has classified the downstream hazard of the Dam as "extremely high" (DWR 2019)[2]. In the event of a failure at the Dam, water released would flow downstream toward the City of Marysville. The flood wave would reach Marysville approximately 1 hour later. The flood wave would continue to move through Linda and Olivehurst, inundating the western section of these communities. Marysville, Linda, and Olivehurst would be totally inundated within 3 hours (Yuba County 2021)

A seiche is a stationary wave in a large, enclosed body of water, caused by atmospheric conditions (on very large water bodies, such as the Great Lakes) or seismic displacement in the vicinity of the water body (such as a reservoir). A seiche occurs due to natural processes associated with atmospheric or seismic events and cannot be predicted or prevented. Although a seiche has never been recorded at the Reservoir, the Yuba County General Plan Environmental Impact Report (Yuba County 2011b) identified the Reservoir as a site with the potential for a seismic seiche to occur.

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[2] "Extremely high" meaning it is expected to cause considerable loss of human life or would result in an inundation area with a population of 1,000 or more. The hazard is not related to the condition of the dam or its appurtenant structures. (DWR 2021)

Table 3.1-1. Summary of Historic Flows Recorded at Stream Gages.

USGS Gage Number	USGS Gage Name	Mean[1]	Median[1]	Highest (Year)[1]	Lowest (Year)[1]	Highest (Month)[2]	Lowest (Month)[2]	Highest (Date)[3]	Lowest (Date)[3]	Highest[4]	Lowest[4]
11408880[2]	Middle Yuba River Below Our House Dam, Near Camptonville	127	37	521 (1969)	26 (1977)	2,973 (Jan)	7 (Jan)	21,000 (2 Jan 1997)	2 (10 Jan 1982)	27,500 (2 Jan 1997)	NA[3]
11409400[2]	Oregon Creek Below Log Cabin Dam, Near Camptonville	27	11	128 (1969)	4 (1977)	617 (Feb)	1 (Periodic)	5,340 (17 Feb 1986)	0.34 (18 Sept 1972)	6,400 (17 Feb 1986)	NA
11413517[2]	N Yuba R Low Flow Rel Bl New Bullards Bar Dam	7	6	7 (periodic)	6 (periodic)	6 (Periodic)	8 (Periodic)	10 (17 Mar 2004)	5 (19 Mar 2011)	NA	NA
11418000[2]	Yuba River Below Englebright Dam, Near Smartsville	2,449	1,653	5,251 (1982)	414 (1977)	22,351 (Jan)	41 (Nov)	134,000 (2 Jan 1997)	0 (Periodic)	171,000 (22 Dec 1964)	NA
11421000[2]	Yuba River Near Marysville	2,419	1,490	5,818 (1982)	229 (1977)	26,180 (Jan)	31 (Jul)	140,000 (2 Jan 1997)	15 (Periodic)	180,000 (24 Dec 1964)	NA
11408870	Lohman Ridge Tunnel At Intake, Near Camptonville	180	92	377 (2011)	72 (2001)	789 (May)	0 (Periodic)	850 (20 May 2005)	0 (Periodic)	NA	NA
11409350	Camptonville Tunnel At Intake, Near Camptonville	224	101	448 (2011)	76 (1994)	908 (Apr)	0 (Periodic)	1,090 (25 Mar 1989)	0 (Periodic)	NA	NA
11413510	New Colgate Powerhouse Near French Corral, CA	1,402	14,10	2,686 (1983)	233 (1969)	3,629 (Jun)	0 (Periodic)	4,200 (2 Jun 1971)	0 (Periodic)	NA	NA
11717980	Narrows Ph No 2 Bl Englebright Dam CA	1634	1757	2855 (1983)	122 (1977)	3,620 (Jan)	0 (Periodic)	4,650 (15 Jan 1978)	0 (Periodic)	NA	NA

Notes: [1]Mean Annual Flow (cfs), [2]Mean Monthly Flow (cfs), [3]Mean Daily Flow (cfs), [4]Instantaneous Flow (cfs)
Source: YCWA 2017b.

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Channel Stability and Sediment Transport

Geomorphology is the study of the landforms on the surface of the earth. Geomorphic analysis involves mapping the shape of landforms to describe their spatial patterns; observing landforms over time to record their changes; exploring the drivers and mechanisms of landform change; and evaluating the responses of biological, chemical, and hydrological processes to geomorphic change. Flowing water is a powerful force for landform change and it also carries with it sediment that is even more powerful in its geomorphic impacts. Diverse chemical and biological materials also move with the flow. Fluvial processes involved in river valley and river channel formation include erosion (vertical and lateral), weathering and mass movement, sediment transportation, and deposition. Water flowing within a channel transfers sediment in suspension and from contact with the channel bed. Interactions among water, sediment, and the channel boundaries create distinctive forms that can change over time. The form of a channel is a balance between the sediment that is available for storage or transport and the ability of the stream to transport that sediment.

North Yuba River

The North Yuba River has a much lower sediment production rate compared to the Middle and South Yuba River systems because it was not heavily disturbed by hydraulic mining prior to construction of the Dam and the presence of the Dam traps sediment washing downstream. The total volume of sediment accumulated in the Reservoir is unknown; however, based on watershed characteristics, the rate of transport has been estimated at 350,000 tons per year (USGS 1995, Stillwater Sciences 2013).

Immediately downstream of the Dam, the North Yuba River channel is incised and characterized by a large pool formed behind the Old Colgate Diversion Dam spanning the channel, as shown in **Figure 3.1-4**. The pool level fluctuates seasonally due to periodic flows from the Dam low-level outlet and Minimum Flow Powerhouse, which releases approximately 6 cfs, to ensure compliance with FERC license-required minimum streamflow of 5 cfs. At the downstream end of this pool, vegetation has overgrown the channel in a small area of deposition just upstream of the Old Colgate Diversion Dam. A small notch allows flows over the Old Colgate Diversion Dam. Downstream of the Diversion Dam, the channel is characterized by large substrate and bedrock and scattered vegetation.

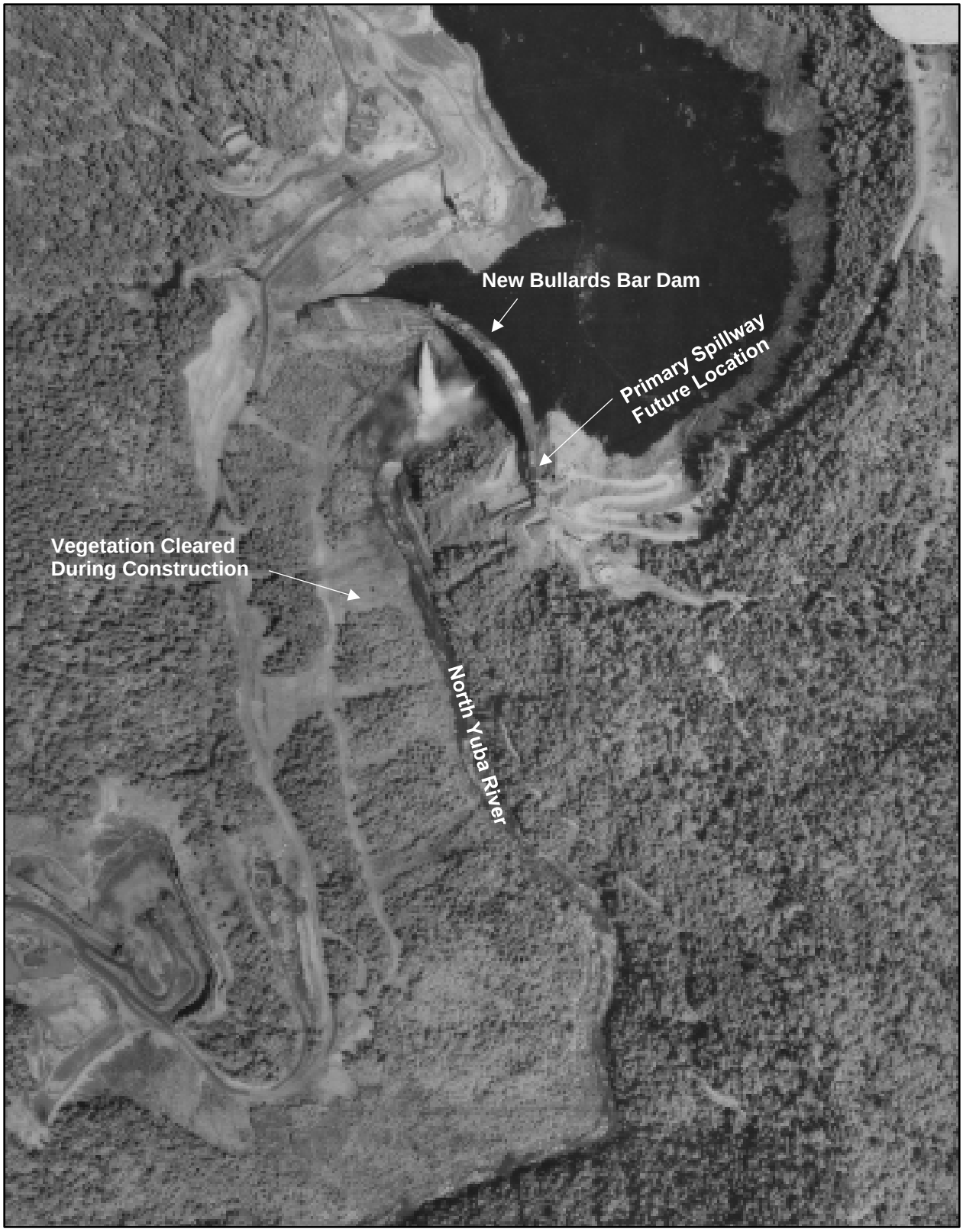
Immediately below this area, the existing Primary Spillway discharge channel perpendicularly intersects the North Yuba River channel, and a large, deep plunge pool has formed where the channel is eroded to bedrock, as shown in Figure 3.1-4. There are no obvious channel deposits that remain in the North Yuba River downstream of the Primary Spillway that are traceable to past spill events, as the channel bed is composed of very coarse material and very low amounts of deformable substrate (YCWA 2013a).

The hillside above the west bank of the North Yuba River across the channel from the Primary Spillway and plunge pool is devoid of vegetation and has been eroded to bedrock a considerable extent up the hillside. Upon inspection of aerial photographs taken during construction of the Dam in 1969, but before the Primary Spillway was constructed, it is apparent that the hillside was devoid of vegetation and this area may have been cleared during construction of the access road leading to the base of the Dam, as shown in **Figure 3.1-5**.



Source: Google Earth Imagery 2020.

Figure 3.1-4. Existing Primary Spillway and North Yuba River Channel Conditions.



Source: YCWA 1969.

Figure 3.1-5. Historical Photo During Construction of New Bullards Bar Dam (1969).

When in operation, water flows at high velocity down the existing Primary Spillway chute and discharge channel. The jet of water contacts the Primary Spillway discharge channel approximately halfway down the discharge channel length, even at the highest flows recorded through the Primary Spillway—53,633 cfs in 1997 (YCWA 2013a). Flows from the Primary Spillway have not directly contacted the opposite hillside (on the west bank) under any operational circumstances to date; however, mist/spray generated during discharges from Primary Spillway operation likely saturates the opposing hillside and may have contributed to long-term erosion in the area where vegetation was previously cleared.

Just above the high-water mark of the North Yuba River, there are exposed surficial deposits that were side cast during excavation from a quarry on the hillside on Marysville Road. This material appears to be an active source of gravel and smaller-sized material to the North Yuba River and is slowly depositing locally (YCWA 2017a). However, with the general absence of substantial new sediment input below the Dam and periodic operation of the Primary Spillway, the North Yuba River channel at the base of the existing Primary Spillway discharge channel has been eroded to bedrock in many places and is characterized by cobble to boulder-sized bed and bank sediment (**Appendix D**).

Downstream of the Dam, the channel is mostly stable with a low likelihood of large-scale planform change or incision. This area is also characterized by steep gradients (nearly 3 percent), vertical confinement, low bank erodibility, and low fine sediment accumulation, with storage of sediment generally occurring only in small areas in deep pools and on lateral bars (Stillwater Sciences 2013). There have been no obvious changes to channel morphology and riparian vegetation far downstream of the project site (near the confluence of the North Yuba River and Middle Yuba River), based on a review of aerial photographs ranging from 1937 to 2009. Therefore, it can be assumed that past Primary Spillway operational effects on channel morphology are fairly localized to the reach immediately downstream of the Dam and existing Primary Spillway (YCWA 2013a).

Yuba River

The Yuba River downstream of Englebright Dam has an extensive history of impacts to channel morphology resulting from hydraulic mining activities in the Yuba River watershed. From the late 19th Century through to the early part of the 20th Century, vast amounts of hydraulic mining debris and sediment were deposited in the Yuba River from the confluence of the Feather River upstream for more than 20 miles. Sediment depths at the Narrows were more than 75 ft deep and more than 15-feet-deep near Marysville in the early 20th Century. Englebright Dam has been completely effective in blocking the downstream movement of sediment. It is estimated that as much as 17,500 ac-ft (over 28 million cubic yards) of sediment is impounded behind Englebright Dam. (YCWA 2011).

Sediment transport remains vigorous even though sediment influx is small. Channel processes and changes over the course of the next several decades will largely be a function of the continued degradation of the riverbed through layers of mining debris, as the river strives to equilibrate with the base levels associated with geomorphic controls at the Feather River and at Daguerre Point Dam.

The Dam and Englebright Dam regulate flows into the lower Yuba River, but they do not eliminate the risk of large floods because the South and Middle Yuba Rivers have no large dams to abate winter floods driven by large rainstorms or rain-on-snow events. For example, the present flow regime includes channel-changing floods that occur approximately every 9 years (e.g., 1986, 1997, and 2005/2006). Based on multiple lines of observational evidence and hydrological flood frequency data analysis, the following flow thresholds are assumed for geomorphic processes in the lower Yuba River (YCWA 2011):

- A preferential riffle-scouring discharge range of flow less than 11,000 cfs;
- A modern bankfull discharge of approximately 5,600 cfs,
- A 1942-1971 bankfull discharge of approximately 11,600 cfs,
- A preferential run-scouring discharge range of approximately 9,000-25,000 cfs;
- A floodplain-filling discharge of approximately 20,000 cfs; and
- A preferential pool-scouring discharge range of greater than 45,000 cfs.

Before Englebright Dam was built, hydraulic mining deposits that filled the entire valley were composed of a mixture of all sizes of non-cohesive alluvial sediments. That mixture is still preserved in alluvial terraces on the hillsides and under the riverbed. However, once those materials wash into the river or are exhumed as the river incises down, silt- and sand-sized particles wash away, leaving local patches of gravel and cobble on the bed surface, with size distribution tied to the hydraulics and landform shape of each morphological unit present. On the falling limb of floods, sand from terrace cutbanks and minor tributary inflows settles onto the gravel/cobble surface. On the floodplain, the surface is largely gravel and cobble as well, but riparian vegetation captures large piles of fine gravel and sand. (YCWA 2011).

Groundwater

The project site is not located within a DWR Bulletin 118 designated groundwater subbasin (DWR 2016) nor is it within a groundwater basin designated as "High Priority" or "Critically Overdrafted" (DWR 2020b). The project site is outside the planning areas of YCWA's Groundwater Management Plan (YCWA 2010) and the Yuba Subbasins Water Management Plan, which are the Groundwater Sustainability Plans (GSPs) developed in compliance with the Sustainable Groundwater Management Act (SGMA) (YCWA 2019).

The project site is located within the Yuba County Integrated Regional Water Management Plan (IRWMP) area which includes a general description of the fractured rock aquifer that underlies the foothill and mountain portions of the County. The fractured granite formations that constitute much of the foothills and western slopes of the Sierra Nevada are generally poorly understood. The crystal nature of the rock prevents water from penetrating except in the joints and fractures. Where fractures are present, small amounts of water may be stored in the fractures and, at best, yield small quantities to wells that intersect the fractures. Generally, in foothill and mountain areas, limited groundwater may also be available in small alluvial deposits immediately adjacent to local streams. The alluvium consists of thin deposits of clay, silt, sand, and gravel that have a low storage capacity. Neither the hard rock nor thin alluvial aquifers of the foothill and mountain areas are considered a dependable groundwater supply of significance (YCRWMG 2018).

No known municipal, domestic, or industrial groundwater supply wells are located near the project site. The nearest known wells are three domestic wells located approximately 0.75-mile east and west of the project site. No information is publicly available regarding depth to groundwater or water quality for these wells (DWR 2020c).

Site-specific information regarding groundwater levels at the project site was developed as part of the geotechnical field exploration and monitoring program for the project in 2018-2019 (GEI 2021a). Piezometers installed in the upstream/approach channel area show a strong correlation between Reservoir pool levels and piezometric levels. Piezometers in the downstream/spillway chute area show a strong correlation to daily rainfall totals, with seemingly little to no effect from Reservoir pool levels. The groundwater data also show an apparent seasonal "step" in the piezometric surface with water levels in the upstream piezometer about 40 inches higher in elevation during higher pool elevations. This apparent step in the groundwater roughly coincides with the prominent geologic contact that is exposed in the cut slopes of the Primary Spillway approach channel (GEI 2021b).

Water Supply

YCWA is one of the major water right holders in the Yuba River watershed. YCWA diverts water for consumptive uses under several permits that authorize direct diversion up to a total rate of 1,593 cfs from the lower Yuba River from September 1 to June 30 for irrigation and other uses, and up to 1,250,000 ac-ft from October 1 to June 30 to storage in the Reservoir (YCRWMG 2018). There are several points of diversion below the Dam (SWRCB 2021). In most years, water supply for irrigation after June 30 is provided from storage. Water supply for the project area and vicinity is primarily surface water. Although the area on the west side of the Reservoir and North Yuba River is located within the boundaries of the North Yuba Water District, the North Yuba Water District obtains most of its water supply from the South Fork Feather River Project and does not divert adjacent to the project site (YCRWMG 2018).

Various water districts, irrigation districts, and mutual water companies have contracts with YCWA for delivery of water. Base water allocations are tied to unimpaired Yuba River flow at Smartsville, and supplemental water supplies are tied to availability. In addition to their contracts with YCWA, several members have water rights that are not subject to deficiencies except under extreme hydrological conditions. Annual water delivery demands on the Yuba River were estimated as shown in **Table 3.1-2**. The present level of development includes only lands irrigable by existing infrastructure, but for the future level of development case the full area of Wheatland Water District is considered irrigated by Yuba River water (and all other district demands remain the same).

Table 3.1-2. Estimated Annual Agricultural Water Delivery Demands from the Lower Yuba River.

YCWA Member Unit	Synthetic Annual Demand (acre-feet)			
	Present Level Development		Future Level Development	
	Wet Year	Dry Year	Wet Year	Dry Year
Brophy Water District	67,187	70,413	67,187	70,413
Browns Valley Irrigation District	34,723	36,383	34,723	36,383
Cordua Irrigation District	55,494	58,398	55,494	58,398
Dry Creek Mutual Water Company	15,552	16,034	15,552	16,034
Hallwood Irrigation Company	47,252	49,394	47,252	49,394
Ramirez Water District	24,295	25,596	24,295	25,596
South Yuba Water District	34,860	36,725	34,860	36,725
Wheatland Water District	11,835	12,139	31,651	32,667
Totals	**291,198**	**305,082**	**311,014**	**325,610**

Source: HDR 2022

Water Quality

The project site is in the Sacramento Hydrologic Basin Planning Area, the Yuba River Hydrologic Unit, and the Bullards Bar Hydrologic Unit Subarea (517.51), as designated by the Central Valley Regional Water Quality Control Board (RWQCB). In accordance with the Clean Water Act (CWA) Section 303, water quality standards for this basin are contained in the Water Quality Control Plan for the Sacramento River Basin and the San Joaquin River Basin (Central Valley RWQCB 2018). To support FERC relicensing for YRDP, YCWA prepared several technical memoranda to collect and evaluate water quality data. These reports, which are also relevant to the project site and operations study area, include: Technical Memorandum 2-3 Water Quality, Technical Memorandum 2-5 Water Temperature Monitoring, and Technical Memorandum 2-6 Water Temperature Models (YCWA 2013b,c).

Beneficial Uses

Several water bodies at the project site and the downstream operations study area have beneficial uses identified by the Central Valley RWQCB, as shown in **Table 3.1-3**. The Reservoir, North Yuba River, and Yuba River upstream of Englebright Reservoir are encompassed in the Water Quality Control Plan for the Sacramento River Basin and San Joaquin River Basin's (Basin Plan's) beneficial use designations for Sources to Englebright Reservoir and the Lower Yuba River.

Table 3.1-3. Designated Beneficial Uses for Surface Water.

Beneficial Use	Sources to Englebright Reservoir	Lower Yuba River
Agricultural Irrigation	●	●
Stock Watering	●	●
Contact Recreation	●	●
Canoeing and Rafting	●	●
Noncontact Recreation	●	●
Cold Freshwater Habitat	●	●
Cold Spawning Habitat [1]	●	●
Warm Freshwater Habitat		●
Warm Spawning Habitat		●
Municipal and Domestic Supply	●	
Industry – Power	●	●
Wildlife Habitat	●	●

Note: Sources to Englebright include North Yuba River, and Yuba River upstream of Englebright.

●=existing beneficial use

[1] Salmon and steelhead.

Source: Central Valley RWQCB 2018.

303(d) Listed Impaired Waters

The State Water Resources Control Board (SWRCB) is required under CWA Section 303(d) to prepare a list of water bodies (also known as the 303[d] list) that do not meet applicable water quality standards and to develop a priority ranking for development of total maximum daily loads (TMDLs) for each water body. Section 303(d) requires that the State develop a TMDL for each listed pollutant. The TMDL is the amount of loading that the water body can receive and still comply with water quality objectives. The National Pollutant Discharge and Elimination System (NPDES) program permit limits for listed pollutants must be consistent with the waste load allocation prescribed in the TMDL. After implementation of the TMDL, the problems that led to placement of a given pollutant on the Section 303(d) list are anticipated to be remediated.

Several water bodies at the project site are currently listed as impaired for mercury, including the Reservoir, the North Yuba River, the South Yuba River between Spaulding and Englebright Reservoirs, and the Lower Yuba River from the undercrossing of State Route 20 to the confluence with the Feather River (SWRCB 2016).

Existing Water Quality Conditions

YCWA has characterized water quality conditions for the YRDP, which covers the project site and operations study area, and found that existing water quality is generally good, as discussed below. Sampling locations included the Reservoir near the Dam, the North Yuba River below the Dam, and the upper North Yuba River at the confluence with Fiddle Creek, approximately 20 miles upstream of the Dam. (YCWA 2013b.)

Temperature

Vertical temperature profiles to a depth of 300 ft at the Reservoir show a consistent pattern of mixing once per year during winter and thermally stratifying with warm water near the surface in summer. Temperatures reach a low during winter, with surface to bottom mixing within the Reservoir, preventing ice formation on the Reservoir. Surface layers begin warming faster than deeper layers in spring, resulting in Reservoir temperature stratification, which is strongest in August, followed by weakening stratification in fall. The thermocline (the transition zone between warmer surface waters and cooler bottom waters) generally occurs at depths of 20 to 60 ft in summer. (FERC 2019.)

YCWA monitored temperature at multiple sites from 2008 through 2012 (YCWA 2013c). Data collected via continuous in situ data loggers included: 1) mean daily water temperature; 2) minimum daily water temperature; 3) maximum daily water temperature; 4) mean daily air temperature; and 5) mean daily flow, if available. Results from 30 locations are relevant to the proposed project and summarized below:

- In the North Yuba River, approximately 23 percent of the days from June through October upstream of the Reservoir and 50 percent of the days from June through October near the confluence with the Middle Yuba River (downstream of the ARC Spillway) recorded temperature readings below 68° F[3]. The maximum of the mean daily water temperatures recorded in the North Yuba River was 75° F in July 2010.

[3] YCWA assumed that mean daily water temperature equal to or less than 68º F indicated conditions that are consistent with the Basin Plan's Cold Freshwater Habitat designated beneficial use.

- In the Yuba River, approximately 66 percent of days from June through September near the confluence of the Middle Yuba River and North Yuba River and 67 percent of the days from June through October upstream of New Colgate Powerhouse release recorded temperature readings below 68° F. The maximum of the mean daily water temperatures recorded in the Yuba River upstream of Englebright Reservoir was 79.5° F in July 2010.

- In the Lower Yuba River, recorded temperatures did not exceed 68° F during any month of the year. The maximum of the mean daily water temperature recorded at the Marysville Gage was 62° F in October 2009.

- Instantaneous surface water temperatures in the Reservoir and Englebright Reservoir were greater than 68° F in all summer months.

Water temperatures in stream reaches generally increase starting in May or June and continuing through August to early September, before declining in late September and October. This temperature trend is consistent with the historically observed Mediterranean climate patterns of inland northern California.

Dissolved Oxygen

The Basin Plan's general Dissolved Oxygen (DO) Water Quality Objective of 7.0 milligrams per liter (mg/L) applies to the Yuba River and its tributaries. YCWA reported DO levels below the Water Quality Objective Threshold during two sample periods—spring and summer 2012 (6.92 mg/L and 6.16 mg/L, respectively) (YCWA 2013b). This is explained by Reservoir thermodynamics; the Reservoir stratifies (i.e., forms distinct thermal layers) during summer, which often results in low DO conditions in the bottom of the Reservoir. (FERC 2019.)

Turbidity

During the 2013 FERC relicensing study, waters throughout the YRDP were sampled for turbidity. Results show that waters at the project site and vicinity are exceptionally clear, ranging from 0 NTUs[4] at the Dam and up to 4.2 NTUs downstream of the Dam near the Old Colgate Diversion Dam. (YCWA 2013b.)

Copper

The Basin Plan does not specify a copper water quality objective for waters in the project area; however, the California Toxics Rule (CTR) threshold for copper is 3.11 micrograms/liter (µg/L). Although a reported copper concentration of 5.01 µg/L exceeded the CTR for one sample period in summer 2012, concentrations of this constituent are related to the hardness of containing waters, and YCWA is unaware of any ongoing activities at the Reservoir that may affect the trace levels of copper. Furthermore, the 303(d)-listed project area waters are not listed for this metal. (YCWA 2013b.)

Mercury and Methylmercury

Mercury in the project vicinity is a legacy of the region's gold mining and remains sequestered in sediments within the project region, and it continues to be a potential source of pollution to the Yuba River and many other streams in the Sierra Nevada and foothills. Mercury can affect the nervous system of higher trophic organisms and is bioaccumulated and transferred to higher trophic organisms through the food-web. Methylmercury is an organic form of mercury that is highly toxic and is the main culprit

[4] Turbidity is measures in a unit called NTUs. The lower the NTU, the lower the turbidity.

in mercury poisoning. The conversion of mercury to methylmercury (and vice versa) is a complex process dependent on environmental variables including sunlight; temperature; moisture; and availability of other elements such as organic carbon. Although the Reservoir and North Yuba River are 303(d)-listed for mercury, there is no established TMDL for mercury in this region. The expected TMDL completion date is 2027. (Central Valley RWQCB 2018.)

Mercury was sampled at multiple locations throughout the Yuba River watershed during spring and summer 2012. Although mercury was detected at all locations, the concentrations ranged from 0.27 to 15.9 nanograms per liter, which are substantially less than the maximum contaminant level of 2,000 nanograms per liter and the CTR benchmark of 50 nanograms per liter, indicating that drinking water beneficial use is being met everywhere in the larger YRDP, including the project site. (YCWA 2013b.)

Fish tissue concentrations of mercury were also collected at two locations: 1) the east arm of the Reservoir near the Willow Creek inlet, and 2) the north arm of the Reservoir near the North Yuba River inflow. Mercury concentrations in fish issue sampled at these locations ranged from 0.068 parts per million (ppm) to 0.143 ppm and 0.446 ppm to 0.807 ppm, respectively. Mercury results were compared to the 0.070 ppm California Office of Environmental Health Hazard Assessment Advisory Tissue Level, which is used by public health managers to decide whether to ask the California Office of Environmental Health Hazard Assessment to evaluate the need for fish ingestion advisories. The 0.070-ppm mercury Advisory Tissue Level was exceeded at both sample locations for rainbow trout, kokanee salmon, and smallmouth bass. Additionally, mercury concentrations measured in fish collected between 1978 and 2005 from the North Yuba, Middle Yuba, and mainstem Yuba Rivers exceeded the 0.070-ppm mercury Advisory Tissue Level for all pikeminnow, Sacramento sucker, and smallmouth bass samples, and for the average concentration of 39 rainbow trout samples (CalEPA 2018).

3.1.2 Regulatory Setting

Federal Plans, Policies, Regulations, and Laws

USACE Reservoir Operations Plan

The USACE Master Manual of Reservoir Regulation, Sacramento River Basin, California (Master Manual), describes hydrologic and flood management conditions and systemwide operating procedures in the Sacramento River Basin in accordance with USACE Engineer Regulation 1110-2-240 and Engineer Manual 1110-2-3600, which detail USACE responsibilities for prescribing flood control and navigation regulations for certain reservoir projects constructed or operated by other Federal, non-Federal, or private agencies (USACE 1959, USACE 2016, and USACE 2017). Each major river in the region is governed by operating rules as described in various appendices to the Master Manual. Appendix V to the Master Manual governs operations at the Dam and Reservoir. According to the Master Manual, the Reservoir is required to maintain Yuba River flows at Marysville not to exceed 120,000 cfs (180,000 cfs when the Feather River is low) but limited to 50,000 cfs unless inflows during the current flood have exceeded 50,000 cfs. If inflow has exceeded 50,000 cfs, water can be released at rates up to the maximum rate of inflow, given that downstream flow criteria are met. (USACE 1959 and USACE 1972.)

FERC License No. 2246 for the Yuba River Development Project

The Dam and Reservoir are part of the YRDP, a hydroelectric project operated by YCWA pursuant to License No. 2246 issued by FERC. The Federal Power Commission (FPC) the predecessor to FERC, issued the initial license to YCWA on May 16, 1963. Subsequently, on May 6, 1966, the license was made effective for the period from May 1, 1966, through April 30, 2016. In 2014, YCWA filed an application for a new/extended license with FERC. Although the construction and operation of the ARC Spillway are not required by the terms of the license and may proceed independently, this project was included in the YCWA FERC license application in 2014 because it was deemed more efficient to combine the two proposals into one FERC proceeding. Since 2014, YCWA has experienced two very high flow years in its watershed, and the need for the project has been highlighted. FERC continues to review and consider YCWA's application for relicensing of the YRDP, but the process has been delayed. While the application is under review, YCWA continues to file annual extensions with FERC and will continue to do so until a new license has been issued.

The FERC license outlines requirements for operation of the YRDP under a series of articles which govern all aspects of the construction, operation, maintenance, and access to the project. Article 6 requires YCWA to construct and operate a series of stream gages to monitor and regulate water flow diverted for the operation of the project works, the amount of water held in and withdrawn from reservoir storage, and the effective head (pressure) on the power-generating turbines. Other articles regulate dam operation to maintain minimum instream flows (Article 33), control sediment (Article 37), and maintain water quality for anadromous fish (Article 40). The license also covers flood control (Article 46) and regulates available storage capacity in the reservoir to limit peak flows in downstream segments of the Yuba and Feather Rivers.

Emergency Action Plan

FERC requires YCWA to prepare and adopt an emergency action plan (EAP). The EAP is intended to minimize the threat to public safety and to minimize the response time to an impending or actual sudden release of water from project dams. The EAP is also designed to be used to provide emergency notification when flood water releases may present the potential for major flooding. The EAP is considered Critical Energy Infrastructure Information and is not publicly available; however, this information is available to personnel at the Yuba Emergency Operations Center and DWR.

Clean Water Act

The Federal Clean Water Act (CWA) and subsequent amendments, under the enforcement authority of the U.S. Environmental Protection Agency (EPA), was enacted “to restore and maintain the chemical, physical, and biological integrity of the Nation’s waters.” The CWA requires States to develop and implement State water plans and policies. The CWA gave EPA the authority to implement pollution control programs such as setting wastewater standards for industry, although State programs can assume this responsibility if the EPA deems the State program, and the resulting standards, sufficiently protective. In California, NPDES implementation and enforcement are conducted through the SWRCB and the nine RWQCBs under California's Porter-Cologne Water Quality Control Act.

CWA Section 401

Under CWA Section 401, a Federal agency may not issue a permit or license to conduct any activity that may result in any discharge into waters of the U.S. unless the applicable permitting authority issues a Section 401 water quality certification or waives its right to act. States and authorized tribes where the discharge would originate are generally responsible for issuing water quality certifications. In cases where a State or tribe does not have authority, EPA is responsible for issuing certification (33 USC 1341). Some of the major Federal licenses and permits subject to Section 401 include:

- Clean Water Act Section 402 and 404 permits issued by EPA or USACE,
- FERC licenses for hydropower facilities and natural gas pipelines, and
- Rivers and Harbors Act Section 9 and 10 permits.

In making decisions to grant, grant with conditions, or deny certification requests, the issuing agency must consider whether the Federally licensed or permitted activity will comply with applicable water quality standards, effluent limitations, new source performance standards, toxic pollutants restrictions, and other appropriate water quality requirements of State or tribal law. Any water quality certification issued must set forth any effluent limitations and other limitations, and monitoring requirements necessary to assure that the applicant for a Federal license or permit will comply with all applicable effluent limitations and other limitations.

CWA Section 404

USACE administers CWA Section 404, which regulates discharge of dredged and fill materials into waters of the U.S. If a project discharges any fill materials into waters of the U.S., including wetlands, then a CWA Section 404 permit must be obtained from USACE. Refer to Chapter 3.4, "Biological Resources," for additional information.

CWA Section 402

CWA Section 402 regulates discharges through NPDES and State waste discharge requirements. SWRCB and Central Valley RWQCB have adopted specific NPDES permits for a variety of activities that have the potential to discharge wastes (including sediment) to waters of the State. SWRCB's Statewide General Permit for Discharges of Storm Water Associated with Construction Activity (2009-0009-DWQ/NPDES No**.** CAS000002) is applicable to all land-disturbing construction activities that would disturb 1 acre or more. Compliance with the NPDES permit requires submittal to the Central Valley RWQCB of notices of intent to discharge, and implementation of storm water pollution prevention plans that include best management practices (BMPs) to minimize water quality degradation during construction activities. Additionally, the Central Valley RWQCB has adopted General Waste Discharge Requirements and NPDES Permit for Limited Threat Discharges to Surface Waters (Order R5-2016-0076-01/NPDES Permit No. CAG995002) which apply to various categories of construction activities, including dewatering.

CWA Section 303(d)

CWA Section 303(d) requires adoption of water quality standards for all surface waters of the U.S. In California, EPA has delegated responsibility to SWRCB and its nine RWQCBs for identifying beneficial uses and adopting applicable water quality objectives. California exercises this authority under the provisions of the Porter-Cologne Water Quality Control Act. CWA Section 303(d) requires the identification of water bodies that do not meet, or are not expected to meet, water quality standards (that is, impaired water bodies). The affected water body, and associated pollutant or stressor, is prioritized in the 303(d) List, and a TMDL must be identified.

FEMA – National Flood Insurance Program

The Federal Emergency Management Agency (FEMA) conducts mapping of flood zones and levee certifications to support the National Flood Insurance Program. Areas mapped into certain flood zones may be eligible for flood insurance. FEMA-mapped flood hazard areas and levee certifications also affect flood repair reimbursement for post-disaster relief and repairs.

State Plans, Policies, Regulations, and Laws

Porter-Cologne Water Quality Control Act

The Porter-Cologne Water Quality Control Act established a program to protect water quality as well as beneficial uses of water. This act applies to surface water, groundwater, wetlands, and both point and nonpoint sources of pollution. The act requires the adoption of water quality control plans to manage and protect the water resources of California. EPA has approved California's program under Porter-Cologne, and this is used by the State to implement its authorities under the CWA.

Water Quality Control Plan for the Sacramento River Basin and San Joaquin River Basin

The most recent update to the Basin Plan was completed by the Central Valley RWQCB in 2018. The Basin Plan describes officially designated beneficial uses for specific surface water and groundwater resources and enforceable objectives for physical and chemical water quality constituents to protect those beneficial uses. The Basin Plan includes water quality objectives. The RWQCB's primary method of ensuring Basin Plan conformance is to issue waste discharge requirements that specify terms and conditions for implementation and operation for projects that may discharge wastes to land or water.

California Toxics Rule and State Implementation Policy

The CTR was promulgated in 2000 in response to requirements of the EPA National Toxics Rule (NTR). The NTR and CTR address inland surface waters, enclosed bays, and estuaries in California that are subject to regulation pursuant to Section 303(c) of the CWA. The NTR and CTR include criteria to protect aquatic life and human health. Human health criteria (water and organisms) apply to all waters with a “Municipal and Domestic Water Supply” beneficial use designation, as indicated in the RWQCBs’ Basin Plans. The *Policy for Implementation of Toxics Standards for Inland Surface Waters, Enclosed Bays, and Estuaries of California*, also known as the State Implementation Policy, establishes a standardized approach for permitting discharges of toxic pollutants to non-ocean surface waters in a manner that promotes statewide consistency.

California State Nondegradation Policy

In 1968, as required under the Federal antidegradation policy, SWRCB adopted a nondegradation policy aimed at maintaining a high quality of waters in California. The nondegradation policy states that the disposal of wastes into State waters shall be regulated to achieve the highest water quality consistent with maximum benefit to the people of the State and to promote the peace, health, safety, and welfare of the people of the State. Any discharges associated with the proposed project would be required to comply with this policy.

2007 FloodSAFE

In October 2007, the California Legislature passed and the Governor signed a package of interrelated bills (flood legislation) aimed at addressing the problems of flood protection and liability and helping direct the use of the approved bond funds. This 2007 Flood Legislation was intended to address several flood management challenges, and the underlying causes of those problems, including flood control system deficiencies, the availability of flood risk information, and links between land use planning and flood management. The legislation outlined specific actions and requirements and responsible parties. New requirements relate to local planning, State planning, risk characterization and notification, and status reporting activities. Additionally, the legislation set a higher flood protection threshold for urban areas by requiring that they ultimately be provided with at least 200-year (0.5% annual chance) flood protection as a condition for further development (DWR 2013).

Sustainable Groundwater Management Act

In 2014, the State adopted the Sustainable Groundwater Management Act to help manage its groundwater. According to the act, local Groundwater Sustainability Agencies must be formed for all high- and medium-priority basins in the State. These Groundwater Sustainability Agencies must develop and implement Groundwater Sustainability Plans for managing and using groundwater without causing undesirable results, including significant groundwater-level declines, groundwater-storage reductions, seawater intrusion, water-quality degradation, land subsidence, and surface-water depletions. These are also referred to as sustainability indicators. DWR and SWRCB are the two lead State agencies that implement the Sustainable Groundwater Management Act.

Regional/Local Plans, Policies, Regulations, and Ordinances

Yuba County Multi-Jurisdictional Local Hazard Mitigation Plan

The Yuba County Multi-Jurisdictional Local Hazard Mitigation Plan is designed to guide hazard mitigation planning to better protect the people and property of the County and participating jurisdictions including the City of Marysville, City of Wheatland, and YCWA, from the effects of natural disasters and hazard events. The plan identifies goals, objectives, and measures for hazard mitigation and risk reduction for natural hazards including disasters such as earthquakes, flooding, and failure of critical infrastructure, such as dams (Yuba County 2021).

Yuba County 2030 General Plan

The following goals and policies from the General Plan may be relevant to the proposed project (Yuba County 2011a).

GOAL HS 1: **Flood Protection.** Reduce flood risk for the County's people and property.

- **Policy HS 1.11.** Natural waterways should be protected from unnecessary alterations whenever flood protection structures or other forms of construction are proposed.

GOAL HS 3: **Water Quality.** Preserve, protect, and improve the quality of regional water supplies.

- **Policy HS 3.1.** County and regional water supply providers should monitor and proactively address water quality problems, with a focus on achieving and maintaining adequate water quality for "beneficial uses" of area waterways identified in the Yuba County Integrated Regional Water Management Plan. "Beneficial uses" in Yuba County include municipal and domestic supply, agricultural supply, industrial service supply, and industrial process supply.

GOAL HS 8: **Geology and Soils.** Reduce risk to people and property from geologic hazards and soil limitations.

- **Policy HS 8.5.** An erosion and sediment control plan meeting County standards for preventing increased discharge of sediment is required for:

    - Projects that propose to grade more than 10,000 square feet of area having a slope greater than 10 percent.
    - Clearing and grubbing areas of one acre or more regardless of slope.
    - Projects where more than 2,500 square feet will be inadequately protected from erosion during any portion of the rainy season.
    - Projects that involve grading will occur within 50 feet of any watercourse; or
    - Where the County determines that the grading will or may pose a significant erosion, or sediment discharge hazard for any reason.

  Projects having more than 1 acre of soil disturbance covered under the SWRCB's General Order 2009-0009-DWQ, discussed above, may still be subject to a plan check to ensure the SWPPP meets County standards, as detailed below for reference.

- **Policy HS 8.6.** Project applicants may be required to show evidence of coverage, or application for coverage, under an NPDES general construction permit and a SWPPP with a State-issued Waste Discharger Identification number, if applicable. Grading activities shall be located and designed to avoid contributing to the violation of provisions of any applicable NPDES stormwater discharge permit.

- **Policy HS 8.7.** Grading activities shall be designed, per County standards, to avoid obstructing or impeding the natural flow of stormwaters, causing accelerated erosion, or aggravating any existing flooding conditions.

- **Policy HS 8.8.** For engineered grading, the peak off-site storm water discharge from the project site shall not exceed pre-construction conditions unless the applicant demonstrates that downstream storm water conveyance systems have sufficient capacity to handle the increased flow rate without exceeding established design standards, subject to County approval.

Yuba County Code

Chapter 11.23 – Grading, Drainage, Erosion Control, and Geotechnical Considerations. Several sections of the Yuba County Code address geologic and geotechnical hazards. Chapter 11.23 details the requirements for County grading permits and related geotechnical investigations and inspections that would be required for buildings meant for public occupancy in areas with potential risk related to geologic conditions or soil limitations, as identified on County-maintained maps. YCWA is exempt from County grading permit requirements.

3.1.3 Environmental Impacts and Mitigation Measures

Thresholds of Significance

The thresholds for determining the significance of impacts for this analysis are based on the environmental checklist in Appendix G of the State CEQA Guidelines. Implementing the proposed project would result in a significant impact related to hydrology and water quality if it would:

- Violate any water quality standards or waste discharge requirements or otherwise substantially degrade surface or ground water quality;
- Substantially decrease groundwater supplies or interfere substantially with groundwater recharge such that the project may impede sustainable groundwater management of the basin;
- Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river or through the addition of impervious surfaces, in a manner which would;
    - result in substantial erosion or siltation on- or offsite.
    - substantially increase the rate or amount of surface runoff in a manner which would result in flooding on- or offsite.
    - create or contribute runoff water which would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff; or
    - impede or redirect flood flows.
- In flood hazard, tsunami, or seiche zones, risk release of pollutants due to project inundation; or
- Conflict with or obstruct implementation of a water quality control plan or sustainable groundwater management plan.

Analysis Methodology

This analysis addresses hydrology and water quality impacts that could result from construction and facility maintenance activities at the project site, as well as project-related changes to Reservoir operations (i.e., Reservoir releases to reduce maximum flood flows downstream) and resulting downstream hydrology and water quality. Construction activities included ground disturbance, in-water work, dewatering, discharges, and use of chemicals onsite, along with potential changes in project site conditions and hydrology due to these activities. Maintenance activities evaluated for impacts to hydrology and water quality included managing drainage in the ARC spillway from the foundation drainage system beneath the control structure.

The operations analysis evaluates impacts related to hydrologic changes from the proposed project including changes in Reservoir storage and flow levels downstream during use of the ARC Spillway, erosion from the water discharged during use of the ARC Spillway, erosion downstream of the ARC Spillway from flow changes, and fulfilling water delivery demands. The operations analysis uses a hydrology and water quality operations study area which includes areas where hydrological changes could occur from operation of the ARC Spillway and the follow waters:

- The Reservoir
- North Yuba River below the Dam
- Upper Yuba River
- Englebright Reservoir
- Lower Yuba River – below Englebright Dam to the Feather River
- Downstream of the lower Yuba River – lower Feather River downstream of the mouth of the Yuba River, Sacramento River downstream of its confluence with the Feather River, Sutter Bypass, and Yolo Bypass

The hydrology and water quality operations analyses are discussed further below.

Operations Analysis

Flow Modeling

Quantitative modeling was conducted to determine direct and indirect changes in downstream hydrologic conditions from changes in operations associated with the ARC Spillway. Water balance/operations modeling for the YRDP was conducted to identify changes in water surface elevations and storage in the Reservoir and Englebright Reservoir and flows downstream of the Dam; results of this modeling are provided in **Appendix B**. Modeled outputs from the proposed project are compared to existing conditions to evaluate changes in flood risk.

The assessment for the Reservoir and Englebright Reservoir was conducted by reviewing the modeled reservoir storage/water surface elevation output to assess the timing, duration, and relative magnitude of reservoir storage-related changes under the proposed project compared to existing conditions to identify the extent that reservoir storage changes for flood control operations.

The assessment for the Yuba River reaches downstream of the Dam, excluding Englebright Reservoir, was conducted by first identifying ARC Spillway events during the simulation period of 1970-2020 (i.e., days when flow was released through the ARC Spillway under the proposed project). Because hydrologic changes associated with the proposed project in the Yuba River Watershed were minimal to non-existent outside of the ARC Spillway events, this impact assessment is limited to the time periods coinciding with ARC Spillway events; Appendix B repeatedly shows primarily no changes or a few very minor changes to Reservoir, Englebright Reservoir, and downstream flows at the conclusion of each ARC Spillway event with the proposed project. The second step was evaluating the modeled flow output to assess the timing, duration, and relative magnitude of flow changes (cfs) to identify the extent to which flow-related changes would occur during flood events.

Water Surface Elevation Modeling

Additionally, using modeled discharge flows, changes in water surface elevations in the lower Yuba River downstream of Englebright Reservoir under existing and project conditions were modeled; these results are provided in **Appendix C**. Changes to water surface elevation is a metric typically used to measure changes to flood risk under project conditions. An increase in water surface elevations when floodwaters are flowing against the levee would directly increase flood risk and reductions in water surface elevation would indicate reduction in flood risk. The water surface elevation modelling includes the lower Feather River, Feather River below Oroville Dam, the Yuba River starting about 15 miles upstream of the Feather River, the Sutter Bypass, and the northern Yolo Bypass. The water surface elevation model was calibrated to the 2006 flood event and verified to the 1997 flood event using historical flood record information such as high-water marks, stage gage records, and stage flow records across the system. This process assures the model will replicate an observed flood event. The water surface elevation model has been used to provide hydraulic design information to improve the levee systems in the lower Yuba River under the responsibility of Three Rivers Levee Improvement Authority.

Erodibility Assessment

A stream power and erodibility assessment of the discharge channel downstream of the ARC Spillway chute was conducted for the proposed project and is provided in Appendix D. The assessment was conducted in two parts. The first part consisted of estimating stream power from the ARC Spillway water releases and the second part consisted of an erodibility assessment of the rock mass along the unlined discharge channel below the spillway chute. The erodibility assessment is based on the stream power estimates, geologic conditions, and ARC Spillway operational parameters. Given the proximity and shared geologic site conditions of the existing Primary Spillway and the proposed ARC Spillway, the available historical data for the existing Primary spillway offer a unique “case history” for evaluating the erosion potential of the unlined rock section of the proposed ARC Spillway discharge channel. As such, the assessment conducted considered historic and existing conditions and operations of the Primary Spillway and applies pertinent analysis and conclusions to the assessment of the proposed ARC Spillway.

Scour and Geomorphic Assessment

Geomorphic impacts in the North Yuba River and upper Yuba River are evaluated using changes in peak flood flows during use of the ARC Spillway. To evaluate the potential for geomorphic impacts in the lower Yuba River, results from the water balance/operations model (Appendix B) are used to compare the frequency and duration that flows in the lower Yuba River exceed bankfull (5,000 cfs) and floodway (21,100 cfs) stages under the proposed project and Existing Condition scenarios.

Public Comments

Comments submitted in response to the Notice of Preparation were reviewed for relevance to the analysis of environmental consequences and development of mitigation measures. Comments related to hydrology and water quality were focused on the potential for land and in-channel erosion during and after project construction, potential flood release scheduling, and operational scenarios for the dam.

Issues Not Discussed Further in this Draft EIR

Tsunami

The project site is not in a coastal area and is outside the tsunami hazard zone. Therefore, no impact would occur from the proposed project and this issue is not evaluated further in this EIR.

Flood Hazard Zones

There are no areas associated with the project site that are mapped as special flood hazard areas by FEMA and no housing or structures would be constructed or placed in a designated floodway as a result of the proposed project. Therefore, no impact would occur from the proposed project and this issue is not evaluated further in this EIR. Potential project-related impacts associated with downstream flooding from operations are addressed below at Impact HWQ-6 (Increase Flooding Onsite or Offsite or Impede or Redirect Flood Flows).

Groundwater Supply, Recharge, and Sustainable Management

The proposed project does not use groundwater supplies during construction or operation. Additionally, as described in the environmental setting, the nature of rock in the mountain and foothill areas of Yuba County prevents water from penetrating except in the joints and fractures. Where fractures are present, small amounts of water may be stored in the fractures and, at best, these yield small quantities to wells that intersect the fractures. However, these "pockets" are not considered a dependable groundwater supply of regional or local significance. Additionally, the project area is not included in a high-priority basin or a basin requiring the preparation of a GSP under SGMA and therefore will not interfere with implementation of any sustainable groundwater management plan. Because the proposed project would have no effect on groundwater supply, recharge, or sustainable management of groundwater, this issue is not evaluated further in this EIR.

Operational Impacts Beyond ARC Spillway Flood Flow Releases

Hydrologic changes associated with the proposed project in the Yuba River Watershed were minimal to non-existent outside of the ARC Spillway events; Appendix B repeatedly shows primarily no changes or a few very minor changes to Reservoir, Englebright Reservoir, and downstream flows at the conclusion of each of the 12 ARC Spillway events with the proposed project. Consequently, the potential for significant impacts resulting from proposed project operations outside of the duration of ARC Spillway events would not occur. There are essentially no or very minor changes to Reservoir, Englebright Reservoir, and downstream river flows at the conclusion of each spillway event. The proposed project would have no effect on Reservoir levels/storages or downstream river flows outside of spillway events, and this issue is not evaluated further in this EIR.

Impact Analysis

Flow Modeling Results

The flow modeling considers a 50-year period of evaluation, covering water years (WY) 1970-2020, using the Reservoir and river hydrology that actually occurred during this 50-year period. First, existing conditions (without the project) were modeled, and then the model was run again with the proposed project. The modeling results show that, if the ARC Spillway had existed during the modeled period, it would have been used during 12 separate spill events (**Table 3.1-4**), primarily during the highest flow occurrences. Other than these events, and associated minor changes in Reservoir storage, Reservoir operations are not expected to change under the proposed project compared to existing conditions. Therefore, evaluation of reservoir storage changes and downstream river flow changes under the proposed project compared to existing conditions is limited to these 12 high-flow events. Modeling results are presented in Appendix B.

Table 3.1-4. ARC Spillway Events Over the WY 1970-2020 Modeling Period of Evaluation

Event #	Date Start	Date End	Duration (days)
1	1/10/1970	1/26/1970	17
2	1/9/1974	1/21/1974	13
3	1/7/1980	1/19/1980	13
4	12/15/1981	12/24/1981	10
5	4/5/1982	4/15/1982	11
6	12/17/1983	12/29/1983	13
7	2/10/1986	2/25/1986	16
8	3/1/1995	3/19/1995	19
9	12/23/1996	1/9/1997	18
10	12/27/2005	1/6/2006	11
11	1/2/2017	1/14/2017	13
12	2/1/2017	2/13/2017	13

Source: Appendix B

Reservoirs

Appendix B provides tables of daily changes in water surface elevations and storage (measured in acre-feet of water remaining in the Reservoir) in the Reservoir and water surface elevations in Englebright Reservoir during each event under existing conditions and the proposed project.

New Bullards Bar Reservoir

Review of modeled daily Reservoir water surface elevations/storage shows that over the 50-year evaluation period water surface elevations/storage would slightly change during active use of the ARC Spillway. During use of the ARC Spillway, water surface elevations/storage would decrease during initial use of the ARC Spillway during most events, signifying that flows are being discharged from the Reservoir flood pool earlier during flood events than they would be under existing conditions. The level of water surface elevation/storage reduction varies depending on the event, with the proposed project achieving a maximum daily water surface elevation reduction of 15.8 feet. During some events, slight increases in water surface elevations/storage occur later in the event after reductions, although duration of increases is typically only a day to a few days compared to several days of decreasing water surface elevations/storage. The largest daily water surface elevation increase modeled was 4.1 feet with the

proposed project. At the conclusion of all 12 flood events, water surface elevations/storage in the Reservoir recovered under the proposed project to the same levels as would have existed in the without-project conditions (Attachment 1 in Appendix B).

Englebright Reservoir

Review of modeled daily Englebright Reservoir water surface elevations/storage shows that over the 50-year evaluation period, the water surface elevation would not change during use of the ARC Spillway in 9 of the 12 modeled events (Attachment 1 in Appendix B). During the other three events (Attachment 1 in Appendix B), water surface elevations increased quickly above existing conditions and then were maintained at the same as existing conditions at the end of the flood event. At no point do water surface elevations from the proposed project exceed those that would occur under existing (without-project) conditions in Englebright Reservoir.

Yuba River

Appendix B also includes tables of daily flow time-series that would occur during each event under existing conditions and with the proposed project at three downstream locations: (1) the North Yuba River below the Dam (Table B-1 and Attachment 1 in Appendix B), (2) upper Yuba River below New Colgate Powerhouse (Table B-2 and Attachment 1 in Appendix B), and (3) lower Yuba River at Smartsville (Table B-3 and Attachment 1 in Appendix B). Appendix B also includes figures of the probability of exceedance distribution of modeled daily flows at these locations under both scenarios (Figures B-1 to B-3 in Appendix B). During the 166 days or 0.9 percent of days over the 50-year (18,628 days) modeling period of record (WY 1970-2020) during which ARC Spillway events occurred, the proposed project would result in reduced flows at all three downstream locations during relatively high-flow periods that would occur without the project, and somewhat higher flows when flows would otherwise be relatively low prior to the flood event peak. That is, the modeling confirms that operation of the ARC Spillway during high-flow events would (as expected) smooth the flows in the river downstream, causing lower maximum flows.

North Yuba River Downstream of the New Bullards Bar Dam

Table 3.1-5 displays the average modeled daily flow in the North Yuba River below the Dam for the duration of each event under the proposed project compared to existing conditions. Average daily flows are generally similar or slightly lower (i.e., differ by 6 percent or less) under the proposed project compared to existing conditions during the ARC Spillway events. In fact, average daily flows differed between the proposed project and existing conditions by 1 percent or less during five of the 12 ARC Spillway events. Overall, release rates into the North Yuba River below the Dam averaged 109 cfs (1.3 percent) lower under the proposed project for all 12 ARC Spillway events over the 50-year evaluation period.

Table 3.1-5. Average Modeled Daily Flow in the North Yuba River Below New Bullards Bar Dam Over the Duration of Each ARC Spillway Event

Event #	Year	Proposed Project (cfs)	Existing Conditions (cfs)	Difference (cfs)	Difference (%)
1	1970	13,863	13,908	-45	0
2	1974	5,860	5,796	65	1
3	1980	7,876	8,407	-531	-6
4	1981	8,162	8,684	-522	-6
5	1982	6,022	6,316	-294	-5
6	1983	6,373	6,185	188	3
7	1986	13,963	14,508	-545	-4
8	1995	6,461	6,572	-111	-2
9	1996-1997	16,487	16,297	191	1
10	2005-2006	10,948	10,947	1	0
11	Jan 2017	11,621	11,587	33	0
12	Feb 2017	15,507	15,243	264	2

Notes: cfs=cubic feet per second
Source: Appendix B

Table 3.1-6 displays the maximum modeled average daily flows over the duration of each event under the proposed project compared to existing conditions. Maximum daily (i.e., "peak") flows are lower under the proposed project compared to existing conditions for all 12 ARC Spillway events. The proposed project reduces the peak flows associated with flood events over the course of a few days. For all 12 ARC Spillway events, peak flows average 3,430 cfs (12.5 percent) lower under the proposed project compared to existing conditions. The largest percentage reduction (42 percent) in peak flow would have occurred during 1980, but peak flow that year under the proposed project remained relatively high at 18,777 cfs.

Table 3.1-6. Maximum Modeled Average Daily Flow in the North Yuba River Below Dam Over the Duration of Each ARC Spillway Event

Event #	Year	Proposed Project (cfs)	Existing Conditions (cfs)	Difference (cfs)	Difference (%)
1	1970	31,172	33,185	-2,012	-6
2	1974	16,958	16,977	-19	0
3	1980	18,777	32,457	-13,680	-42
4	1981	23,617	30,232	-6,615	-22
5	1982	10,936	15,202	-4,265	-28
6	1983	13,922	14,178	-255	-2
7	1986	49,651	50,000	-349	-1
8	1995	13,434	16,295	-2,861	-18
9	1996-1997	50,000	51,901	-1,901	-4
10	2005-2006	30,208	35,132	-4,924	-14
11	Jan 2017	26,664	30,457	-3,793	-12
12	Feb 2017	36,820	37,298	-478	-1

Notes: cfs=cubic feet per second
Source: Appendix B

Upper Yuba River

Table 3.1-7 displays the average modeled daily flow in the upper Yuba River below New Colgate Powerhouse during each event under the proposed project compared to existing conditions. Average daily flows are generally similar (i.e., differ by 3 percent or less) under the proposed project compared to existing conditions during ARC Spillway events. In fact, average daily flows differed between the proposed project and existing conditions by 1 percent or less during 11 of the 12 ARC Spillway events. Overall, flows in the upper Yuba River below New Colgate Powerhouse averaged 35 cfs (0.2 percent) lower under the proposed project for all 12 ARC Spillway events over the 50-year evaluation period.

Table 3.1-7. Average Modeled Daily Flows in the Yuba River Below New Colgate Powerhouse for the Duration of Each ARC Spillway Event

Event #	Year	Proposed Project (cfs)	Existing Conditions (cfs)	Difference (cfs)	Difference (%)
1	1970	20,312	20,312	0	0
2	1974	11,106	11,042	65	1
3	1980	14,905	14,783	122	1
4	1981	15,213	15,735	-522	-3
5	1982	12,580	12,605	-26	0
6	1983	11,918	11,994	-76	-1
7	1986	21,789	21,766	23	0
8	1995	11,809	11,809	0	0
9	1996-1997	25,208	25,208	0	0
10	2005-2006	18,014	18,013	1	0
11	Jan 2017	18,563	18,569	-6	0
12	Feb 2017	23,966	23,966	0	0

Notes: cfs=cubic feet per second
Source: Appendix B

Table 3.1-8 displays peak modeled daily average flow over the duration of each event under the proposed project compared to existing conditions. Peak flows are lower under the proposed project compared to existing conditions for all 12 ARC Spillway events. For all 12 ARC Spillway events, peak flows average 5,270 cfs (11.9 percent) lower under the proposed project than they would be under existing conditions, but flows remain at or above 18,876 cfs. The largest percentage reduction (30 percent) in peak flow occurred during 1980, but peak flow that year under the proposed project remained at 28,966 cfs.

Table 3.1-8. Maximum Modeled Average Daily Flow in the Yuba River Below New Colgate Powerhouse for the Duration of Each ARC Spillway Event

Event #	Year	Proposed Project (cfs)	Existing Conditions (cfs)	Difference (cfs)	Difference (%)
1	1970	36,619	44,548	-7,929	-18
2	1974	22,415	22,424	-9	0
3	1980	28,966	41,634	-12,667	-30
4	1981	30,974	37,589	-6,615	-18
5	1982	18,876	23,741	-4,866	-20
6	1983	21,841	22,096	-255	-1
7	1986	56,529	56,878	-349	-1
8	1995	22,009	23,510	-1,501	-6
9	1996-1997	64,341	81,446	-17,105	-21
10	2005-2006	38,256	43,180	-4,924	-11
11	Jan 2017	36,230	42,769	-6,539	-15
12	Feb 2017	51,429	51,907	-478	-1

Notes: cfs=cubic feet per second
Source: Appendix B

Lower Yuba River

Flow

Table 3.1-9 displays the average mean daily flow in the lower Yuba River at Smartsville for the duration of each event under the proposed project as compared to existing conditions. Average daily flows are generally similar (i.e., differ by 3 percent or less) under the proposed project compared to existing conditions during the ARC Spillway events. In fact, average daily flows differed between the proposed project and existing conditions by 1 percent or less during 11 of the 12 ARC Spillway events. Overall, flows in the lower Yuba River at Smartsville averaged 35 cfs (0.2 percent) lower under the proposed project for all 12 ARC Spillway events over the 50-year evaluation period.

Table 3.1-10 displays the maximum modeled average daily flows over the duration of each event under the proposed project compared to existing conditions. Peak flows are similar or lower under the proposed project compared to existing conditions for all 12 ARC Spillway events. For all 12 events, peak flows average 4,735 cfs (7.4 percent) lower under the proposed project compared to existing conditions, but flows remain at or above 25,951 cfs. The largest percentage reduction (24 percent) in peak flow occurred during 1980, but peak flow that year under the proposed project remained at 42,511 cfs.

Appendix B also provides daily flows farther downstream on the Lower Yuba River below Daguerre Point Dam and near Marysville. While flow levels under the proposed project and existing conditions are different at each location and different from those at Smartsville, the difference between the flow levels with the proposed project and existing conditions was the same as Smartsville for each of the 12 spill events evaluated. Therefore, flow levels on the Lower Yuba River reflected similar hydrologic patterns.

Table 3.1-9. Average Modeled Daily Flow in the Lower Yuba River at Smartsville for the Duration of Each ARC Spillway Event

Event #	Year	Proposed Project (cfs)	Existing Conditions (cfs)	Difference (cfs)	Difference (%)
1	1970	25,454	25,454	0	0
2	1974	13,656	13,592	65	0
3	1980	19,937	19,815	122	1
4	1981	20,091	20,612	-522	-3
5	1982	15,966	15,992	-26	0
6	1983	14,890	14,966	-76	-1
7	1986	30,275	30,252	23	0
8	1995	15,302	15,302	0	0
9	1996-1997	35,102	35,102	0	0
10	2005-2006	24,361	24,359	1	0
11	Jan 2017	25,812	25,818	-6	0
12	Feb 2017	32,423	32,423	0	0

Notes: cfs=cubic feet per second

Source: Appendix B

Table 3.1-10. Maximum Modeled Average Daily Flow in the Lower Yuba River at Smartsville over the Duration of Each ARC Spillway Event

Event #	Year	Proposed Project (cfs)	Existing Conditions (cfs)	Difference (cfs)	Difference (%)
1	1970	56,956	66,915	-9,959	-15
2	1974	26,011	26,030	-19	0
3	1980	42,511	55,849	-13,338	-24
4	1981	50,527	52,008	-1,481	-3
5	1982	25,951	30,817	-4,866	-16
6	1983	29,000	30,152	-1,151	-4
7	1986	85,691	86,041	-349	0
8	1995	33,504	33,874	-371	-1
9	1996-1997	115,684	132,789	-17,105	-13
10	2005-2006	59,082	60,241	-1,159	-2
11	Jan 2017	56,294	62,488	-6,194	-10
12	Feb 2017	73,002	73,830	-828	-1

Notes: cfs=cubic feet per second

Source: Appendix B

Water Surface Elevation Modeling Results

Modeling results are presented in Appendix C and summarized below. Flow modeling was first developed for the Yuba River and Feather River with operation of the Primary Spillway (existing conditions) and ARC Spillway (proposed projects) for the February 1986 and January 1997 floods. The ARC spillway operation produces a substantial reduction in the peak flow in the Yuba River, with small increase in the peak flow in the Feather River above the Yuba River. The net result is a reduction in the peak flow in the Feather River below the Yuba River, and a corresponding reduction in the Yolo Bypass and in the Sacramento River below the Feather River.

Changes in water surface elevations were modeled at key index points along the lower Yuba River, as shown **Figure 3.1-6**. The peak flow reduction due to the ARC spillway operation produces substantial reductions in the peak water surface elevations in the lower Yuba River, over 2 feet in some cases, as shown in **Table 3.1-11**.

Table 3.1-11. Change in Maximum Water Surface Elevation at Lower Yuba River Index Points

Index Point (IP)	Change in Maximum Water Surface Elevation (feet)	
	1986 Flood	1997 Flood
IP1	-0.48	-1.01
IP2	---[1]	---[1]
IP3	-0.43	-0.73
IP4	-0.59	-0.67
IP5	---[1]	---[1]
IP6	---[1]	-2.45
IP7	-0.74	-0.89

Notes: [1] Index point is dry for both spillway operations
Source: Appendix C



Figure source: Appendix C

Figure 3.1-6. Lower Yuba River Water Surface Elevation Model Index Points

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The reduction in the peak water surface elevations due to the ARC spillway operation extends throughout the system, as shown in **Table 3.1-12**. The increase in Yuba River flow early in the flood event due to the ARC Spillway operation results in an increase in flow in Feather River downstream of the Yuba River. The increase in water surface elevation in the Feather River due to the ARC Spillway operation occurs in the simulated flood events when the flow is less than 100,000 cfs, significantly less than the Sacramento River Flood Control Project design flow of 300,000 cfs in the Feather River downstream of the Yuba River. The increase in flow and water surface elevation in the Feather River due to the ARC Spillway operation occurs at a time when conditions are significantly below the system design condition, thereby not significantly increasing flood risk.

Table 3.1-12. Changes in Peak Water Surface Elevation due to ARC Spillway Operation

River	Location	River Mile	Change in Maximum Water Surface Elevation (feet)	
			1986 Flood	1986 Flood
Feather River	Honcut Creek	127.246	+0.01	+0.05
	Yuba River	107.5	-0.58	-0.53
	Bear River	92.55	-0.44	-0.34
	Sacramento River	80.113	-0.28	-0.15
Bear River	WPIC	4.254	-0.02	-0.09
	Highway 70	3.657	-0.07	-0.17
WPIC	Plumas-Arboga Road	3.641	-0.02	-0.03
	Best Slough	2.437	-0.02	-0.06
Sutter Bypass	Wadsworth Canal	83.642	-0.10	-0.03
	Tisdale Bypass	77.45	-0.23	-0.09
	Feather River North Levee	66.29	-0.30	-0.18
Yolo Bypass	Fremont Weir	56.708	-0.25	-0.14
	Near Woodland	50.611	-0.13	-0.07
Sacramento River	Knights Landing	89.999	-0.23	-0.10
	Natomas Cross Canal	78.933	-0.28	-0.15
Natomas Cross Canal	Highway 99	4.553	-0.26	-0.15

Notes: WPIC= Western Pacific Interceptor Canal
Source: Appendix C

Erodibility Assessment Findings

This section summarizes the Stream Power and Erodibility Assessment in Appendix D. The erodibility assessment was performed using the semi-empirical Erodibility Index Method (EIM) originally proposed by Annandale (1995). This method relates the erodibility index of the foundation material to the available stream power exerted on the foundation by jet impact and/or overland flow. The EIM is widely accepted throughout the dam industry and is considered state-of-the-practice for evaluating the erosion potential or initiation of scour for dam overtopping and spill events; it does not, however, directly predict the rate or magnitude of scour and erosion. The erodibility assessment also considered kinematic effects on the rock mass induced by the steep (~ 35 to 50 degrees) rock slope using Block Theory analysis methods (Goodman and Shi 1985), the basic premise being gravity has a greater destabilizing force on a rock mass exposed in a steep slope relative to a gentle slope.

Stream Power

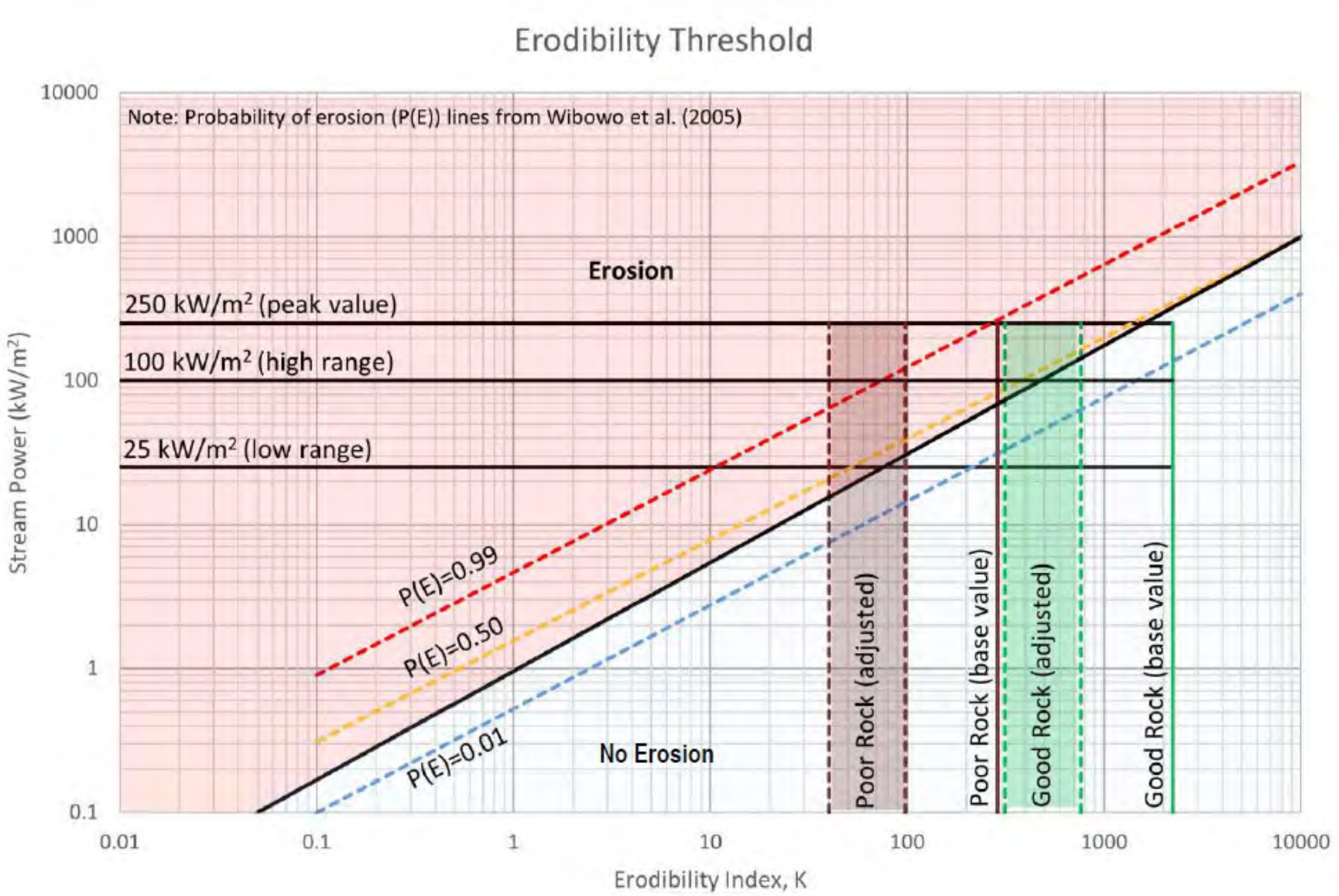
Stream power is the rate of energy dissipation per unit area. This occurs when water flows over the surface or impacts the surface as a jet. As water travels down the ARC Spillway chute, the flip bucket would create a jet of water. As the water jet travels through the air, it breaks up at a distance from the flip bucket referred to as the breakup length. The breakup length is dependent on the design of the spillway terminal exit trajectory, velocity, and depth of water.

A Computational Fluid Dynamics (CFD) model was developed for both the Primary Spillway and the ARC Spillway. For all scenarios of the Primary Spillway and ARC Spillway, the stream power due to the jet impact was concluded to be negligible because the jet impact length was much greater than 2 times the break-up length. The overland flow stream power was determined to be the controlling stream power for all scenarios. This is the power of water flow from the water jet after it impacts the surface and travels overland/rock downslope towards the North Yuba River.

It was also determined that larger flows would impact farther down the ARC Spillway discharge channel and decrease the erosion potential overland flow. The 10,000 cfs run impacted far down on the bottom of the canyon wall, while the 50,000 cfs run impacts in the canyon bottom. A 2,969 cfs run was chosen for the controlling overland flow scenario because it impacts much closer to the flip bucket/spillway chute location. For the ARC spillway, a 2,969 cfs discharge produced stream power values predominately around 25 kilowatts per square meter (kW/m^2) with some peak values as high as 100 kW/m^2.

Erodibility

The estimated stream powers and erodibility index values are shown on the erodibility threshold graph in **Figure 3.1-7**. Rock is classified as “poor” rock which is representative of predominantly moderately to intensely weathered or sheared rock and “good” rock which is representative of predominantly slightly weathered to fresh rock. The stream powers and full range of adjusted erodibility index values for poor rock generally intersect near or above the erodibility threshold line, indicating poor rock is generally erodible for the range of stream powers evaluated for the ARC Spillway discharging at 2,969 cfs. For the good rock mass type, only the lower half of the adjusted values are susceptible to erosion at stream powers of about 70 kW/m^2 or higher.



Source: Appendix D

Figure 3.1-7. Erodibility Analysis Results

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An ancient shear zone extends obliquely through the unlined discharge channel of the Primary Spillway. Areas of the existing unlined discharge channel at the Primary Spillway have experienced erosion in its 52-year lifetime. The most significant areas of erosion coincide with the ancient shear zone that comprises several narrow, subparallel zones of weak, crushed rock, and an area of the discharge channel that was grubbed but only minimally stripped. The shear zone represents a geologic defect in the Primary Spillway discharge channel that has significantly influenced the location and magnitude of historical erosion. The topographic expression of this feature is evident in the 1969 Primary Spillway excavation surface and in historical aerial imagery dated May 16, 1969. The analysis suggests this feature likely has acted as a zone of flow concentration and preferential erosion from the beginning of Primary Spillway operation. Erosion of the adjacent (un-sheared) bedrock has been much less severe in comparison.

Stream powers along the upper half of the ARC Spillway discharge channel are expected to be similar or incrementally smaller in magnitude than those typically experienced at the Primary Spillway. The stream powers expected for the ARC Spillway will have some capacity for moderate erosion, particularly if poor quality rock is exposed in the discharge channel and is not treated as part of the spillway construction.

Scour and Geomorphology Assessment Findings

Lower Yuba River

Because the proposed project could change flows when flows are relatively high in the lower Yuba River, the proposed project could potentially affect scour and erosion in the river. Gervasi et al. (2021) evaluated relationships between topographic change (scour and deposition) in the lower Yuba River and multiple hydrologic metrics. Topographic change was evaluated during three epochs (or periods) – 1999 to 2008, 2008 to 2014, and 2014 to 2017 – using digital elevation model differencing. Hydrologic metrics evaluated for each epoch included instantaneous peak flow, volume of water released above six different discharge zones (bankfull – 5,000 cfs; 2x bankfull – 10,000 cfs; floodway – 21,100 cfs; 6x bankfull – 30,000 cfs; and flood-prone – 42,200 cfs), and duration of flow occurring above each of the six discharge zones. Gervasi et al. (2021) found that peak discharge was not correlated with total scour nor net export of sediment across the periods. Instead, total scour correlated best with the hydrologic duration and volume metrics, particularly above the floodway stage. Therefore, potential effects on channel morphology and scour in the lower Yuba River were evaluated by comparing the duration of flows (from operational flow modeling discussed above and set forth in Appendix B) exceeding the bankfull (5,000 cfs) and floodway (21,000 cfs) stages under the proposed project and existing conditions at two representative Yuba River locations – below Deer Creek and at Marysville (**Tables 3.1-13** and **3.1-14**).

During years in which ARC Spillway events occurred, the proposed project results in lower Yuba River flows exceeding bankfull (5,000 cfs) for an additional 12 days dispersed over 4 out of 50 years below Deer Creek and for an additional 10 days dispersed over 4 out of 50 years at Marysville, compared to existing conditions. Flows exceed the floodway stage (21,100 cfs) for a total of only 5 more days dispersed over 3 out of 50 years below Deer Creek, and for a total of only 6 more days dispersed over 4 out of 50 years at Marysville under the proposed project scenario compared to existing conditions. Consequently, the proposed project would result in additional scour in the lower Yuba River compared to existing conditions, but the increases would be extremely small because of the infrequency and small number of days when scouring conditions would be increased.

Table 3.1-13. Comparison of the Number of Days When Daily Flow Exceed Bankfull Stage (5,000 cfs) Below Deer Creek and at Marysville

Water Year	Number of Days Above Bankfull (5,000 cfs)					
	Below Deer Creek			Marysville		
	Proposed Project	Existing Conditions	Difference	Proposed Project	Existing Conditions	Difference
1970	25	23	**2**	34	32	**2**
1974	75	75	**0**	80	80	**0**
1980	42	38	**4**	47	44	**3**
1982	127	126	**1**	129	128	**1**
1983	125	125	**0**	127	127	**0**
1986	45	40	**5**	48	44	**4**
1995	125	125	**0**	132	132	**0**
1997	41	41	**0**	47	47	**0**
2006	113	113	**0**	114	114	**0**
2017	161	161	**0**	158	158	**0**

Notes: cfs=cubic feet per second

Source: Appendix B

Table 3.1-14. Comparison of the Number of Days When Daily Flow Exceed Floodway Stage (21,100 cfs) Below Deer Creek and at Marysville

Water Year	Number of Days Above Floodway (21,100 cfs)					
	Below Deer Creek			Marysville		
	Proposed Project	Existing Conditions	Difference	Proposed Project	Existing Conditions	Difference
1970	10	10	**0**	11	11	**0**
1974	7	7	**0**	9	9	**0**
1980	10	10	**0**	10	10	**0**
1982	11	12	**-1**	12	12	**0**
1983	4	4	**0**	6	6	**0**
1986	11	11	**0**	11	11	**0**
1995	10	10	**0**	11	10	**1**
1997	13	10	**3**	13	12	**1**
2006	8	6	**2**	10	8	**2**
2017	18	17	**1**	19	17	**2**

Notes: cfs=cubic feet per second

Source: Appendix B

Impacts

Impact HWQ-1: Violate Surface Water Quality Standards from Ground Disturbance and Accidental Discharge of Wastes during Construction.

Ground-Disturbing Activities

Ground-disturbing activities that could temporarily generate erosion include site preparation, vegetation removal, excavation and grading, and other activities such as use of construction equipment and hauling on disturbed soils. Although portions of the project site would be excavated to bedrock (such as the control structure, ARC Spillway chute, and discharge channel), and portions of the project site would be paved (such as the ARC Spillway chute, operations platform, and Overlook Site), project-related earthmoving activities during construction would result in exposed soil that is subject to erosion during storm events. Rainfall of sufficient intensity could dislodge soil particles from the soil surface. Once particles are dislodged and the storm is large enough to generate runoff, substantial localized erosion could transport soils into the North Yuba River below the ARC Spillway chute and hence Englebright Reservoir, or into the Reservoir at the Dam. Soil and entrained contaminants that enter receiving waters through stormwater runoff can increase turbidity, stimulate algae growth, increase sedimentation of aquatic habitat, lower dissolved oxygen content, and introduce compounds that may be toxic to aquatic organisms. These types of impacts would be potentially significant.

Construction In and Around the Reservoir and North Yuba River Channel

A minimum instream flow requirement of 5 cfs is required downstream of the Dam year-round. Without redirection, water would flow in the North Yuba River channel past the downstream end of the proposed ARC Spillway discharge channel. The possibility of construction-related erosion in the North Yuba River, either directly or indirectly during excavation of the adjacent discharge channel, would be addressed by installing a temporary water bypass system during construction, if needed. The bypass system could be composed of a pipeline and/or a cofferdam containing the construction area at the downstream end of the discharge channel in the North Yuba River. This bypass system would allow construction to proceed while maintaining minimum instream flows downstream and preventing eroded material from entering flow in the river channel.

Construction of the proposed project would be sequenced to reduce the need for temporary cofferdams and in-water construction. Excavation for downstream ARC Spillway facilities (control structure, spillway chute, and discharge channel) would be separated from the Reservoir by an existing rock formation, which includes fresh, low permeability metavolcanic rock. Once the control structure has been completed and backfilled, and Marysville Road has been relocated to the new permanent alignment, a natural rock cofferdam would be constructed.

The approach channel would be excavated to connect the control structure with the Reservoir once the barrier is installed. Reservoir water levels peak in summer and slowly dissipate in fall and winter. Excavation into the Reservoir shoreline would be timed for the period of year when reservoir water levels are lowest (likely late summer and fall). The approach channel would be excavated in stages, leaving the excavated soil and rock at the mouth of the approach channel (the Reservoir shoreline) and the natural rock cofferdam for last, which would reduce the erosion potential.

While these construction methods would reduce the potential for impacts to water quality, there could still be some residual erosion or construction-related impacts from installation of the cofferdams and other project features. These types of impacts would be potentially significant.

Discharge of Construction Wastes

Project construction could also temporarily impair water quality should disturbed material, petroleum products, or construction-related wastes be discharged into surface drainages or onto the ground where they could be carried into receiving waters at a later time even post-construction. Accidental spills of construction-related substances such as oils and fuels could also contaminate both surface water and groundwater. These types of impacts would be potentially significant.

Conclusions

Project construction activities have the potential to temporarily impair water quality from erosion resulting in soil and entrained contaminants entering receiving waters through stormwater, potential use of a temporary water bypass in the North Yuba River channel, discharge of water encountered during excavations within and adjacent to the Reservoir, and potential discharge of other construction wastes. Any of these potential impacts could result in potentially significant impacts to water quality in the Reservoir or the North Yuba River and downstream to Englebright Reservoir. Therefore, any of these potential impacts to water quality would be **potentially significant**.

Mitigation Measures: The following mitigation measures have been identified to address these impacts.

Mitigation Measure HWQ-1: Prepare and Implement a Stormwater Pollution Prevention Plan and BMPs to Reduce Erosion.

Construction activities would be subject to SWRCB's General Permit for Discharges of Storm Water Associated with Construction Activity (Order No. 2009-0009-DWQ, NPDES NO. CAS000002) (2009-0009-DWQ) to meet construction-related stormwater permit requirements of the NPDES program. Any permits will be obtained by YCWA or its contractor(s) before commencing ground-disturbing construction activity. The General Permit also requires preparing and implementing a SWPPP that identifies BMPs to prevent or minimize the introduction of contaminants into surface waters. Such BMPs could include, but would not be limited to, silt curtains, silt fencing, straw bale barriers, fiber rolls, storm drain inlet protection, hydraulic mulch, and a stabilized construction entrance. The SWPPP will include development of site-specific structural and operational BMPs to prevent and control impacts on runoff quality, measures to be implemented before each storm event, inspection, maintenance of BMPs, and monitoring of runoff quality by visual and/or analytical means.

Timing: Before and during construction.

Responsibility: YCWA and its contractor(s).

Mitigation Measure HAZ-1: Implement a Spill Prevention Control and Countermeasures Plan and Other BMPs for Storage, Use, and Transport of Hazardous Materials during Construction Activities.

Please refer to Impact HAZ-1 in Chapter 3.11, "Hazards and Hazardous Materials," for the full text of this mitigation measure.

Significance after Mitigation: Implementing Mitigation Measures HWQ-1 and HAZ-1 would reduce construction-related impacts to water quality by requiring preparation and implementation of a SWPPP along with other measures specifically designed to prevent erosion and siltation during construction from entering waterways and requiring the implementation of a Hazardous Materials Management Plan (HMMP), preparation and implementation of a Spill Prevention Control and Countermeasures Plan (SPCCP), and BMPs to reduce the risk of accidental spills. Furthermore, standard permit conditions addressing water quality will be required by the Central Valley RWQCB and implemented by YCWA. Compliance with the NPDES permit requires submittal to the Central Valley RWQCB of notices of intent to discharge, and implementation of a SWPPP and BMPs to minimize water quality degradation during construction activities. Additionally, the Central Valley RWQCB has adopted General Waste Discharge Requirements and NPDES Permit for Limited Threat Discharges to Surface Waters (Order R5-2016-0076-01/NPDES Permit No. CAG995002), which apply to various categories of construction activities to be used during construction of the proposed project, including dewatering. By applying the measures described above and implementing permit conditions required by the Central Valley RWQCB, the proposed project would not violate water quality standards or create or contribute stormwater runoff that would substantially degrade water quality during construction activities. Therefore, the mitigation measures would reduce the potentially significant impacts to water quality associated with project construction to **less than significant with mitigation**.

Impact HWQ-2 Violate Surface Water Quality Standards from Discharge of Water Encountered during Construction.

As described in the project description, groundwater levels are highest in the Reservoir at the approach channel and control structure and lower moving along the ARC Spillway alignment away from the Reservoir. Groundwater elevation is strongly influenced by the water elevation in the Reservoir. Due to the depth of excavation and project location adjacent to the Reservoir, contact with groundwater during excavation is anticipated during construction. A temporary concrete hydraulic barrier would be installed between the project site and the Reservoir maximum flood pool to limit seepage from the Reservoir into deep excavations for the approach walls, control structure, and spillway chute. The hydraulic barrier would be in place before deep excavations extend below the Reservoir level during proposed project construction.

Although the temporary hydraulic barrier would be installed to minimize seepage, it is expected some groundwater would flow around or under the barrier, or seep into excavated areas from other portions of the project site during deep excavations, such as the excavation for the control structure. Additionally, excavation at the site could allow construction-related contaminants (i.e., sediment, oils, grease, etc.) to contact groundwater. Water seeping through, around, or underneath the groundwater barrier and toward the area of excavation would be controlled using pumped sumps and/or dewatering wells. Due to the extent of construction, and the unknown quality of water encountered during dewatering, it is anticipated that an active treatment system would be established onsite to manage dewatering effluent during construction. Although a treatment system would be constructed, discharge of dewatering effluent could directly or indirectly affect water quality in the basin. The impact from discharge of effluent derived from construction dewatering to adjacent lands or surface waters would be **potentially significant.**

Mitigation Measures: The following mitigation measure has been identified to address this impact.

Mitigation Measure HWQ-2: Obtain Coverage and Comply with Requirements of the General Order for Limited Threat Discharges to Surface Water.

Construction and operations involving dewatering would be subject to Central Valley RWQCB's Waste Discharge Requirement (WDR) R5-2016-0076-01 requirements for managing wastewater produced during dewatering activities or drainage collected during operation of the ARC Spillway. To obtain coverage under this General Order, which also serves as the NPDES Permit, the Discharger must submit a complete Notice of Intent and provide samples for analysis to determine the quality of the discharge (using tiers) and assign appropriate controls that would apply to the permit.

YCWA or its contractor(s) will obtain coverage under one or more of the following permit tiers, as applicable:

- Tier 1: Clean or relatively pollutant-free wastewaters that pose little or no threat to water quality.
    - Tier 1A: Discharges of less than 0.25 million gallons per day (MGD) or less than 4 months in duration, and
    - Tier 1B: Discharges greater than or equal to 0.25 MGD and greater than or equal to 4 months in duration.

- Tier 2: Discharges that may contain toxic organic constituents, volatile organic compounds, petroleum fuel pollution constituents, pesticides, inorganic constituents, chlorine, and/or other chemical constituents that require treatment prior to discharge.

YCWA or its contractor(s) will submit a separate Notice of Intent under the General Order for applicable construction and/or operation activities.

Timing: Before construction activities.

Responsibility: YCWA and its construction contractor(s).

Significance after Mitigation: Implementing Mitigation Measure HWQ-2 would require coverage under the appropriate General Order and implementation of activities to protect surface water quality by testing samples prior to discharge and assigning treatment controls to ensure that contaminants do not enter surface waters when YCWA is discharging water encountered in deep excavations. Therefore, these project impacts would be **less than significant with mitigation**.

Impact HWQ-3: Violate Surface Water Quality Standards from Drainage Water Discharges during Operations.

The proposed project includes installing, beneath the control structure gallery, a foundation drainage system designed to intercept and collect seepage water to reduce water pressure under the control structure. Seepage flows intercepted by the drainage system would be collected in sumps and: 1) pumped back into the Reservoir, 2) discharged to the chute for the ARC Spillway downstream of the gates, or 3) discharged by gravity though a drilled and lined drain hole to the chute of the Primary Spillway. Additionally, a system of drains would be installed beneath the spillway chute channel bottom and in the side walls to collect drainage water resulting from seepage that occurs by design, to relieve subsurface pressure on the discharge channel and components. This drainage water would be discharged

by gravity to the discharge channel downstream of the chute for the ARC Spillway. The discharge of effluent derived from drainage management at the control structure and ARC Spillway chute would reach the North Yuba River channel and possibly the Reservoir (if that option is selected) and could impair surface water quality. Therefore, this impact is considered **potentially significant**.

Mitigation Measures: The following mitigation measure has been identified to address this impact.

> **Mitigation Measure HWQ-2: Obtain Coverage and Comply with Requirements of the General Order for Limited Threat Discharges to Surface Water (NPDES No. CAG995002/ Order R5-2016-0076-01)**
>
> Please refer to Impact HWQ-1 above for the full text of this mitigation measure.

Significance after Mitigation: Implementing Mitigation Measure HWQ-3 would require coverage under the appropriate General Order and implementation of specific activities developed to protect water quality when discharging drainage water during operations. Therefore, impacts from the project would be **less than significant with mitigation**.

Impact HWQ-4: Potential Long-Term Erosion from Development of the Project Site.

Potential long-term erosion from discharge of the water stream through the ARC Spillway chute onto the discharge channel is evaluated in Impact HWQ-5 below. Potential long-term erosion impacts from development of all other project components is evaluated herein. With the large extent of ground disturbance from constructing the proposed project, YCWA has included specific design features for the project components to reduce the possibility of erosion and maximize the use of durable surfaces, after construction is complete. These features are described below along with an evaluation of potential long-term erosion.

ARC Spillway, Overlook Site, and Marysville Road

Hardscape slope protection, such as rip-rap or concrete, would be used to protect the channel and adjacent slopes from excessive scouring and damage from water flows and wave action. A permanent, reinforced, cast-in-place concrete facing would be installed on the walls of the approach channel with an integrated drainage system. The access road would be surfaced to provide access to the top of flood pool elevation during all weather conditions. A large portion of the access road would be inundated during the flood season and the design would incorporate features to improve drainage and limit required maintenance after Reservoir drawdown, such as all-weather aggregate surfacing.

Construction of the control structure requires excavating the existing hillside at the left Dam abutment. After construction, hard rock from the excavated hillside would remain exposed. Additionally, along the upstream face of the control structure and under both approach walls, a grout curtain would be installed to provide seepage cutoff and limit seepage flows through the rock mass surrounding the control structure. The operations platform and the relocated Overlook Site would be graded and paved to ensure appropriate drainage and reduce the possibility of erosion on and around the operations platform.

The relocated, permanent Marysville Road would be an asphalt-concrete paved road of similar width and characteristics to the existing road. The realigned roadway would meet the same County design standards as the existing road, including drainage and grading specifications. Land disturbed by realigning the road would be restored by the construction contractor to mimic pre-construction conditions. Once topographic restoration is completed, natural areas disturbed by detour construction

would be planted with a mixture of native grasses and forbs (i.e., herbaceous flowering plants). The project components described above are designed in a manner that reduce the potential for erosion after construction, including excavation to bedrock, where appropriate, the use of hardscape and riprap where needed, the use of all-weather road and pavement materials, and grading and appropriate drainage design. This impact is considered potentially significant.

Construction Access Roads

Segments of existing U.S. Forest Service (USFS) Road 0008-010 would be improved, including vegetation removal and grading, and used during construction to access the ARC Spillway site and soil and rock disposal area. USFS Road 0008-010 was developed to construct the Reservoir and has been subject only to basic custodial maintenance since construction of the Reservoir was completed. Temporary construction roads would be developed within the project site and only used during construction and would not be used or maintained after construction is complete. One new access road would be developed from the staging area adjacent to the soil and rock disposal area downstream to the spillway chute. The downstream access road alignment would require removing mature trees and vegetation which would expose bare soil. The road was designed to limit the amount of fill required for construction (approximately 98 percent of the road is in-cut). This road will be maintained after project construction in sufficient condition to allow permanent access to the Spillway Chute. Since some construction access roads are located on steep slopes and may be left unmaintained after grading, vegetation removal, and use for constructing the project, the potential exists for longer-term erosion for years after construction is complete. This impact is considered potentially significant.

Rock and Soil Disposal Area

Prior to disposal, the debris would be sorted to separate material that can be used as engineered backfill, road and yard surfacing, concrete aggregate, and riprap. The remainder would be placed at the designated soil and rock disposal area, compacted, and graded to create a mound with stable side slopes of 2H (high):1V(vertical) with a flat surface formed at the top (see Figure 2-6). Material placed in the disposal areas would consist of primarily rock but also excavated soils. Woody debris may also be placed in the disposal area. Since soils would be used for other construction activities, to the extent possible, most material is anticipated to be large rock, which will be used to form the side slope to maximize erosion resistance at the disposal pile. It is anticipated that placing material at the disposal site would mirror the construction sequence, with loose soil and vegetation excavated first from the site, and placed for disposal, followed by weathered rock, and finally hard rock placed on the top layer of the disposal pile. Although large rock would be placed last to protect against erosion at the disposal site, the potential for initial runoff at the disposal pile to contain sediment exists, since loose material may be attached to larger rock fragments comprising the surface of the disposal pile. This may result in a “first flush” of sediment-laden runoff during the first several precipitation events to occur after completing construction. This impact is considered potentially significant.

Conclusions

There is potential for long-term erosion on construction access roads on steep slopes that are left unmaintained after construction, and discharge of sediment-laden runoff from the soil and rock disposal area during the first several precipitation events to occur after construction is completed. Therefore, these impacts would be **potentially significant**.

Mitigation Measures: The following mitigation measures have been identified to address the impact of potential erosion associated on construction access roads and the soil and rock disposal area.

Mitigation Measure HWQ-1: Prepare and Implement a Stormwater Pollution Prevention Plan and Best Management Practices to Reduce Erosion.

Please refer to Impact HWQ-1 above in this section for full text of this mitigation measure.

Mitigation Measure HWQ-3: Implement Erosion Control Measures, Conduct Periodic Inspections, and Revise Measures as Needed

The following erosion control measures will be implemented on construction access roads on steep slopes (those greater than 15 percent) and the soil and rock disposal area:

- BMPs placed at construction access roads and the soil and rock disposal area as part of the SWPPP implemented under Mitigation Measure HWQ-1 would be left in place after the completion of construction for a minimum of 5 years, depending on conditions at the site, as outlined below.
    - YCWA shall inspect the BMPs immediately prior to, and immediately after, the first precipitation event following construction completion, to ascertain the effectiveness of erosion control measures.
    - Inspections shall continue to occur on a seasonal basis (at least twice per year), for at least 5 years.
    - If noticeable erosion is observed during any inspection, additional site stabilization such as hydroseeding, repair, or addition of BMPs shall occur, including in consultation with USFS where construction roads are located on USFS lands.
    - If erosion associated with these areas has stabilized after 5 years, then inspections may cease.
    - If erosion has not stabilized after 5 years, then inspections shall continue seasonally (at least twice per year) in areas that have not yet stabilized. These areas will be revaluated for stabilization annually and inspections may cease once areas have stabilized.

Timing: During and after construction until erosion areas have stabilized.

Responsibility: YCWA and its contractor(s).

Significance after Mitigation: Implementing Mitigation Measures HWQ-1 and HWQ-3 would reduce potentially significant long-term erosion along construction access roads and the soil and rock disposal area by requiring implementation of erosion control measures, regular inspections, and additional site stabilization, if needed, until erosion areas have stabilized. Therefore, the impact from the project would be **less than significant with mitigation**.

Impact HWQ-5: Potential Long-Term Erosion Impacts from Use of the ARC Spillway.

Discharge Channel

Use of the ARC Spillway would result in water being conveyed down the spillway chute and over the flip bucket in the form of a jet stream. The Stream Power and Erodibility Assessment conducted for the proposed project determined that the stream power due to the jet impact is negligible and overland flow stream power would be the controlling stream power. The jet from lower discharge volumes would land high on the discharge channel and flow overland down the discharge channel to the North Yuba River. Poor rock is generally erodible for the range of stream powers expected during lower flows. The jet for larger volume flows would impact farther down the discharge channel and decrease the erosion potential from overland flow.

Some erosion of the unlined discharge channel of the ARC spillway should be expected; however, the magnitude of such erosion should be less than that observed at the Primary Spillway because the full length of the discharge channel would be stripped to a nominal depth of about 20 feet as part of project construction. This depth of stripping is anticipated to remove most of the poor quality rock on the discharge channel slope. If defects such as shear zones or decomposed rock zones are exposed by initial channel excavation during construction, these areas would be over excavated and treated with dental (rough surface) concrete to prevent excessive erosion. However, areas of new, concentrated erosion could still form on the ARC Spillway discharge channel. This impact would be **potentially significant**.

Plunge Pool

A plunge pool is expected to develop in the North Fork Yuba River adjacent to the ARC Spillway discharge channel over time. The plunge pool likely will be similar in size and depth to the plunge pool at the Primary Spillway, based on the similar rock erodibility and stream power values developed for the two spillways. The existing plunge pool beneath the Primary Spillway is estimated to ultimately be about 37,000 cubic yards. The first discharge events will create more erosion than later events of the same magnitude, and it is anticipated that a larger discharge event will cause more erosion than a smaller one. Erosion will progress at a decreasing rate and will tend to largely cease once the plunge pool that develops is sufficient to dissipate the energy of discharges. A much larger discharge occurring for the first time after a series of smaller discharges would also cause additional erosion. Therefore, it is anticipated that erosion of the plunge pool to approximately 37,000 cy would occur over many years or decades. For a worst-case scenario, it is assumed that half of the erosion of the plunge pool could occur in one first large event (approximately 18,500 cy of material), with rapidly decreasing additional erosion events occurring later.

The material in the North Yuba River channel beneath the ARC Spillway discharge channel consists of large boulders, cobbles, and some gravels, with very little finer materials, underlain by bedrock. The existing plunge pool beneath the discharge channel for the Primary Spillway is in bedrock. Breaking down of material would occur primarily in larger rock sizes down to gravel sizes, but very little to no sand or fine gravels would form because of the hard rock and the high velocity and energy of flows. As a result, material that erodes from the plunge pool and breaks down would consist primarily of cobble- to boulder sized material with little to no sand or fine gravel. This material would be carried by flows until being deposited downstream. As indicated in the previous paragraph, about half of the material could be transported in one first large event, with rapidly decreasing additional transport occurring during later flood events. The specific transport of materials would vary depending on the characteristics (quantity, duration, and frequency) of the first few flood events but would decrease over many years or decades and largely stop at some point. In the context of the Yuba River system, this impact would be **less than significant**.

North Yuba River Canyon Opposite Hillside

As discussed, mist/spray generated during discharges from Primary Spillway operation likely saturates the opposing hillside across the North Yuba River and may have contributed to long-term erosion in the area where vegetation was previously cleared. Mist/spray could also saturate the hillside across from the ARC Spillway or adjacent areas during spill events. However, these areas are primarily vegetated and would not be cleared as part of the project, and this vegetation is anticipated to stabilize the slopes. Minor amounts of erosion could occur from this mist/spray during larger and/or longer spill events. Areas that are currently cleared and could be saturated during use of the ARC Spillway are near the Primary Spillway and have already experienced saturation and erosion during use of the Primary Spillway. This impact would be **less than significant**.

Conclusions

Erosion from spray during use of the ARC Spillway is anticipated to be minor. Erosion of the new plunge pool adjacent to the ARC Spillway discharge channel would occur primarily as larger boulders and cobbles and in episodes over many years or decades. The ARC Spillway discharge channel would be excavated, and any remaining poor rock would be treated with dental concrete to prevent excessive erosion. However, areas of new, concentrated erosion could still form on the ARC Spillway discharge channel resulting in erosion at the site and some material transport downstream, especially during the first few initial large flood events. Therefore, this is considered to be a **potentially significant** impact over some temporary period (depending on timing, frequency, duration, and magnitude of specific spill characteristics), which likely is 5 to 25 years. Over the long-term, after the first few initial large flood events, this impact is considered to be **less than significant**.

Mitigation Measures: The following mitigation measures have been identified to address the impact of potential erosion from the ARC Spillway discharge channel and downstream transport.

> **Mitigation Measure HWQ-4: Regularly Inspect the ARC Spillway Discharge Channel for Erosion.**
>
> Following construction, the ARC Spillway discharge channel will be inspected for erosion on a regular basis. Multiple inspections will occur each year during the first 5 years of service. Inspections will be conducted immediately or as soon as possible after the first few spill events. After 5 years, an annual inspection will be conducted as long as there are no issues in the first 5 years.

An aerial Light Detection and Ranging (LiDAR) survey of the ARC Spillway will be conducted after construction (and prior to operation) to document as-built conditions of the discharge channel and establish a baseline topographic surface that can be used to compare with subsequent surveys. These surveys will be repeated on a 10-year basis and supplemented with drone surveys to obtain high resolution aerial imagery. Analysis of the LiDAR data and aerial imagery will be performed by a qualified engineering geologist or engineer to monitor erosion trends.

If areas of new, concentrated erosion are identified on the ARC Spillway discharge channel during inspections that exceed the magnitude of erosion features observed in the Primary Spillway, YCWA will investigate the nature and causes of the erosion. If the results of that investigation indicate that significant additional erosion seems likely, YCWA will implement appropriate remedial actions to the extent needed to prevent substantial prolonged erosion and ensure Dam and spillway safety. Remedial actions may include excavation or other methods to remove rock that may erode, additional dental concrete treatments, or other methods as determined suitable by a qualified engineering geologist or engineer.

Timing: After construction.

Responsibility: YCWA.

Significance after Mitigation: Implementing Mitigation Measures HWQ-4 would reduce potentially significant short- and long-term erosion of the ARC Spillway discharge channel by requiring regular inspections during the life of the proposed project for erosion and implementation of remedial actions as needed to prevent substantial erosion. Therefore, the impact from the project would be **less than significant with mitigation**.

Impact HYD-6: Changes in Reservoir Storage, Downstream Flows, and Flood Risk.

The Yuba-Feather River system has a long history of catastrophic flood events. Since 1950, five major floods have resulted in loss of life, caused significant property damage, and constrained economic development in the region. The ARC Spillway is being developed to allow YCWA to release additional water from the Reservoir earlier during projected large flow events to reduce peak flows later during these flood event and reduce flood risk downstream. The ARC Spillway makes this possible because the gates would be lower in elevation than the Primary Spillway gates. Over the WY 1970-2020 modeling period of evaluation, the proposed project would result in the use of the ARC Spillway during 12 separate spill events, primarily during the highest flow occurrences over the 50-year evaluation period.

Reservoir Storage

Operational flow modeling conducted for these 12 spill events found that slight temporary reductions in Reservoir water surface elevations/storage typically occurs for a few to several days with the proposed project compared to existing conditions. This is a result of flows being released downstream through the ARC Spillway earlier during large flow events than what occurs presently with the Primary Spillway. The modeling shows that these reductions allow the Reservoir flood pool to fill back up later in the flow event during and after peak flows until Reservoir water surface elevations/storage volumes under the proposed project match existing conditions, which occurs in all cases within 3 weeks of the initiation of ARC Spillway releases. This is a more efficient use of the Reservoir flood pool since the capacity (to collect additional water) available in the Reservoir flood pool is typically increased slightly in the

middle of large flood flow events. Additionally, operational flow modeling found that there typically was not a change in water surface elevations in Englebright Reservoir during the proposed project compared to existing conditions, except at the beginning of some large flow events when water is collected in Englebright Reservoir until water surface elevations under the proposed project match those of existing conditions. Consequently, impacts to the Reservoir and Englebright Reservoir storage volumes would be temporary (up to 3 weeks in duration), minor, and **less than significant**.

Yuba River Flows and Flood Risk

Operational flow modeling evaluated flows downstream of the Dam in the North Yuba River; upper Yuba River below New Colgate Powerhouse; and the lower Yuba River at Smartsville, below Daguerre Point Dam, and near Marysville. At all locations along the Yuba River, most events are generally characterized by higher flows during early portions of the event followed by lower flows during subsequent portions of the event, such that the peak daily flow of the event is reduced under the proposed project compared to existing conditions during all 12 flood events that occurred during the period from 1970-2020. Furthermore, use of the ARC Spillway would substantially reduce the peak water surface elevations in the lower Yuba River, over 2 feet in some cases (as shown in Table 3.1-11), compared to existing conditions. Because flood risk within the Yuba River system downstream of the Reservoir to the confluence with the Feather River would be reduced, this impact would be beneficial, and **no significant adverse impact** would result.

Feather River and Downstream Flows and Flood Risk

The proposed project would result in infrequent flow changes during flood events in the Feather River downstream of the lower Yuba River. In general, the contribution of higher flows from the Feather River upstream of the lower Yuba River would reduce and minimize changes in flows from the lower Yuba River because of the proposed project. The reduction in the peak water surface elevations due to the ARC Spillway operation extends throughout the system in the Feather River and downsteam, as shown in Table 3.1-12. There is one very slight increase in flow and water surface elevation in the Feather River due to the ARC Spillway operation; however, as discussed above in this section, this slight increase occurs at a time when conditions are significantly below the system design condition, thereby not significantly increasing flood risk. In summary, it is expected that the proposed project would slightly reduce flood risk in the Feather River below the Yuba River confluence and this impact therefore would be beneficial. **No significant adverse impact** would result.

Conclusion

In conclusion, the proposed project would redirect flood flows to more efficiently use the flood pool in the Reservoir and reduce peak flood flows downstream in the lower Yuba River, thereby (to a lesser degree) also reducing flood flows in the lower Feather River below the Yuba River confluence and farther downstream. The proposed project will promote public safety by reducing flood risks. The proposed project's impacts on flooding and flood flows therefore would be beneficial, and the project will have **no significant adverse impacts** associated with redirection of flood flows to the ARC Spillway**.**

Mitigation Measure: No mitigation is required.

Impact HWQ-7: Potential Long-Term Erosion from Flow Changes Downstream.

In the North Yuba River and upper Yuba River, it is anticipated that increases in peak flow volumes could increase erosion and scour due to new areas becoming inundated and/or increases in flow velocities. As discussed in Impact HWQ-6, operational flow modeling of the 12 high-flow events found that peak daily flows are reduced under the proposed project compared to existing conditions. Therefore, no increase in erosion or scour of the North Yuba River or upper Yuba River channel is anticipated from flow changes during use of the ARC Spillway.

As discussed, total scour in the lower Yuba River correlates best with the hydrologic duration and volume metrics, particularly above the floodway stage. Overall, the minor increase in frequency of exceeding bankfull and floodway stages under the proposed project is not expected to result in significant effects to channel morphology resulting from scour in the lower Yuba River. Additionally, the minimal effect to flows in the Feather River, Sacramento River, and downstream areas receiving flows is not anticipated to substantially change erosion and scour. Therefore, this impact would be **less than significant**.

Mitigation Measure: No mitigation is required.

Impact HYD-8: Changes in Agricultural Water Deliveries.

Even though diversions occur from three distinct locations in the lower Yuba River, for modeling purposes all agricultural diversions for YCWA member units are assumed to occur at Daguerre Point Dam. As discussed above, no differences in flow were identified along the lower Yuba River from the proposed project compared to existing conditions. Review of annual modeling data over the 50-year evaluation period showed no differences in the quantity of water deliveries at Daguerre Point Dam with the proposed project compared to existing conditions. Since the project would not change agricultural water deliveries, there would be **no impact**.

Impact HWQ-9: Risk of Inundation and Release of Pollutants from Seismic Seiche.

Although a seiche has never been recorded at the Reservoir, the Yuba County General Plan EIR (Yuba County 2011b) identified the Reservoir as a site with the potential for a seismic seiche to occur. Additionally, a portion of the project site is located in DWR-mapped and Yuba County General Plan dam inundation zone, for both a potential Dam failure and a “sunny day” spillway failure, and DWR has classified the Dam as “extremely high” hazard (as discussed in Section 3.10.1, “Environmental Setting”).

A seiche occurs due to natural processes associated with atmospheric or seismic events and cannot be predicted or prevented. Although highly unlikely due to low seismic rick associated with the project vicinity and the strict design considerations associated with high-hazard critical infrastructure, if a large seiche occurred, it could lead to a dam failure or overtopping of the Dam. In the unlikely event that a seiche or dam failure were to occur at the project site, evacuation would occur per the Yuba County Multi-jurisdictional Local Hazard Mitigation Plan (Yuba County, 2021). Additionally, the FERC EAP includes information intended to minimize the threat to public safety and minimize response time in the event of a sudden release of water from the Dam, regardless of cause. There are no populated areas in the immediate downstream vicinity of the Dam. In the event of a failure or overtopping, the flood wave would not reach Marysville for approximately 1 hour, and other downstream communities such as Olivehurst would not be reached by floodwaters until approximately 3 hours after an event. The Yolo

County Multi-jurisdictional Local Hazard Mitigation Plan and EAP establish emergency procedures for Yuba County Office of Emergency Services to institute warning and evacuation procedures in the event of flooding caused by a seiche or dam failure by other cause. The ARC Spillway would result in changes to flood control operations during large storm events but would not change the potential for a seiche to occur at the project site. Therefore, impacts from the project due to seiche or dam failure would be **less than significant**.

Mitigation Measure: No mitigation is required.

Seismic risk and associated design considerations incorporated into project design to address potential failure are discussed in Chapter 3.8, "Geology and Soils."

Residual Significant Impacts

The project would result in potentially significant impacts related to hydrology and water quality, but mitigation measures would be implemented to reduce potential hydrology and water quality impacts to a less-than-significant level. Therefore, the project would not result in residual significant impacts related to hydrology and water quality, and, with the imposition of the mitigation measures identified above, the project would not have any significant and unavoidable impacts related to hydrology and water quality.

3.2 Fisheries Resources

This section provides an overview of the existing fisheries resource conditions in the New Bullards Bar Dam Atmospheric River Control (ARC) Spillway Project (project or proposed project) area, identifies the regulatory framework, and analyzes potential fisheries impacts that would result from project construction and operation. Fisheries resource studies completed to support Federal Energy Regulatory Commission (FERC) license renewal; additional available information on fish populations and habitat conditions in the Yuba River system; and hydrologic information presented in Chapter 3.1, "Hydrology and Water Quality," and Appendices B–E were the primary information sources for this analysis. Existing conditions and potential impacts related to other non-fish biological resources are addressed in Chapter 3.3, "Terrestrial Biological Resources."

3.2.1 Environmental Setting

Most of the approximately 66-acre project site is terrestrial habitat that does not support fisheries resources. Fisheries habitat within the project site is limited to very small portions of the Reservoir and the North Yuba River below the New Bullards Bar Dam (Dam). However, the fisheries operations study area includes extensive fisheries habitat in the following reaches of the Yuba River including the Reservoir and Englebright Reservoir:

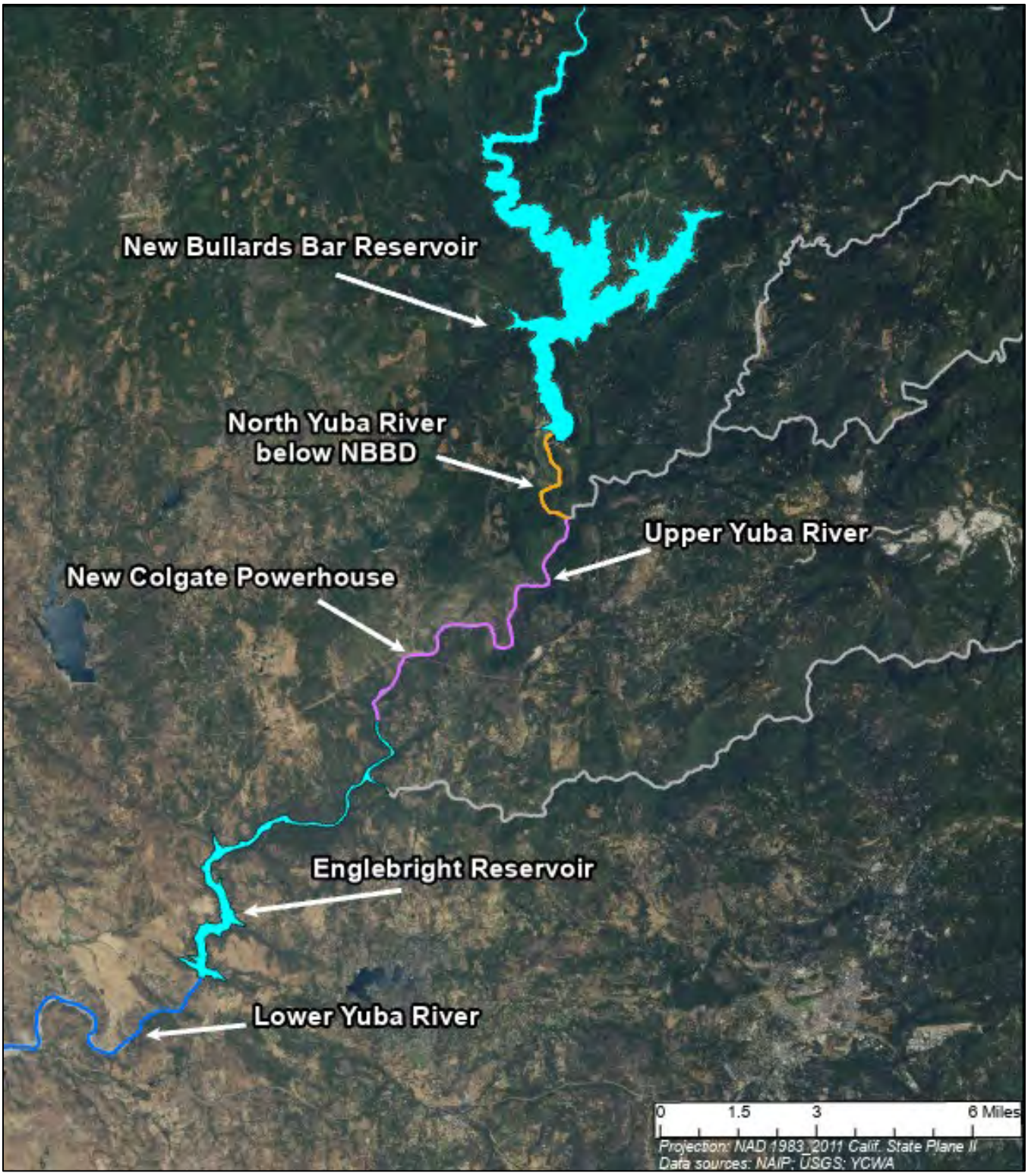
- Upstream of Englebright Dam – the New Bullards Bar Reservoir (Reservoir), the North Yuba River below the Dam, the upper Yuba River, and Englebright Reservoir;
- Lower Yuba River – below Englebright Dam to the Feather River; and
- Downstream of the lower Yuba River – lower Feather River downstream of the mouth of the Yuba River, Sacramento River downstream of its confluence with the Feather River, Sutter Bypass, and Yolo Bypass.

Physical Conditions

Upstream of Englebright Dam

Figure 3.2-1 depicts waterbodies in the fisheries operations study area upstream of Englebright Dam, including reservoirs and the Yuba River. The Reservoir supports coldwater and warmwater fisheries and has a long history of fish stocking activities by California Department of Fish and Wildlife (CDFW) dating back to 1959 (Yuba County Water Agency [YCWA] 2017). Englebright Reservoir also supports coldwater and warmwater fisheries; it essentially serves as a re-regulating afterbay for the Reservoir and generally acts as a flow-through facility.

The North Yuba River below the Dam extends for approximately 2.3 miles downstream to its confluence with the Middle Yuba River. The channel is dominated by gradients of less than 3 percent and has an average gradient of 2 percent. Most of the reach is composed of bedrock and car- and house-sized boulders that separate large mid-channel pools. There are very short and infrequent areas of cobble-size deposits, but most of the substrate is large and immobile. There is no apparent floodplain or terrace development, and aquatic habitat is dominated by pocketwater and mid-channel pools. Physical cover features are limited to boulders, but the depth of pools can also provide cover to resident trout. Trout spawning-sized gravel accumulations and large woody material are rare, and potential natural barriers to upstream movement are likely very common in the confined, steep channel. Bank erosion is rare, given the bedrock/boulder channel margins. (YCWA 2013a.)



Source: Figure provided by HDR in 2022.

Figure 3.2-1. Fisheries Operations Study Area Upstream of Englebright Dam

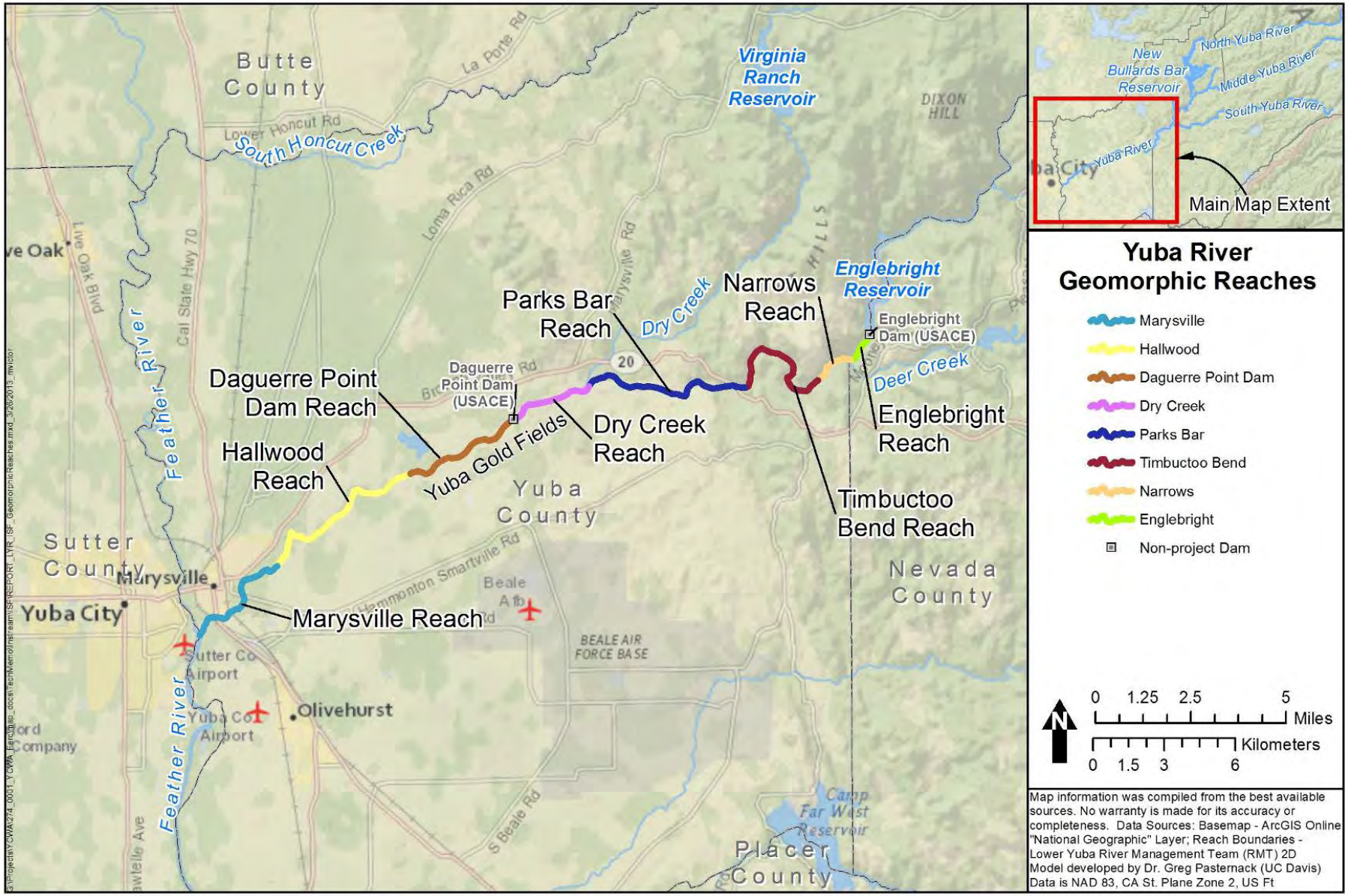
The upper Yuba River extends approximately 8 miles from the confluence of the North Yuba River and the Middle Yuba River to the normal maximum water surface elevation of Englebright Reservoir and includes the Middle/North Yuba River and New Colgate Powerhouse reaches. The river flows through bedrock canyons, and the vertical walls inhibit ground access. The only location that has been ground-mapped is the area just above and below New Colgate Powerhouse (25 percent of the reach). The channel is laterally and vertically stable due to dominant bedrock control, with only very short boulder/cobble sections. Sinuosity (the ratio of the stream's length to the length of the valley) is very low and the channel is not strongly influenced by alluvial deposition; finer sediment (cobble and finer, such as silt) accumulations are not common. Pools are large and deep and separated by long sections of pocketwater that runs through and under very large boulders. Though not very steep, according to the mapped gradient of 1.8 percent, high gradient riffles dominate the gradient "steps." Boulders are the only structural instream cover type, but deep pools likely also provide some fish cover. Large woody debris has not been observed, and trout spawning-sized gravel accumulations are uncommon. (YCWA 2013a.)

Lower Yuba River

The lower Yuba River extends for approximately 24 miles downstream from Englebright Dam to the Feather River. Geomorphic reaches (**Figure 3.2-2**) were delineated by Wyrick and Pasternack (2012) based on the longitudinal profile and associated geomorphic variables. Tributary junctions form the upstream boundary of two reaches and dams form the boundary for two more reaches. The other reach boundaries are formed by hydro-geomorphic variables such as the onset of emergent floodplain gravel; transition from confined bedrock valley to a wider, meandering system; and decreases in bed channel slope. **Table 3.2-1** provides the length and gradient of each geomorphic reach.

Downstream of the Lower Yuba River

The lower Feather River extends downstream of the mouth of the Yuba River to the confluence with the Sacramento River. During flood events, the Sacramento River flows enter the Sutter Bypass, which conveys flood waters from the Butte Basin, Sacramento River, and Feather River to the Sacramento River at the entrance to the Yolo Bypass at Fremont Weir. Additional flood flows from the Sacramento River enter the Sutter Bypass through Tisdale Bypass. Because the Sacramento River upstream of Fremont Weir has a relatively low channel capacity (28,000 cubic-feet per second [cfs]), Sutter Bypass flooding occurs at a much more frequent interval and at lower flows than in the Yolo Bypass. Water from Sutter Bypass re-enters the Sacramento River and typically overtops Fremont Weir at Sacramento River flows above 56,270 cfs.



Source: YCWA 2017

Figure 3.2-2. Geomorphic Reaches in the Lower Yuba River.

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Table 3.2-1. Geomorphic Reaches in the Lower Yuba River

Reach Name	Description	Gradient (percent)	Start (River Mile)	End (River Mile)	Length (miles)
Englebright	Confluence with Deer Creek to Englebright Dam	0.31	23.4	24.3	0.9
Narrows	Deer Creek to emergent gravel at canyon mouth	not measurable	22.3	23.4	1.1
Timbuctoo Bend	Upstream of State Route 20 Bridge to end of emergent gravel bar by Blue Point Mine	0.20	18.6	22.3	3.8
Parks Bar	Dry Creek to 0.35 mile upstream of State Route 20 Bridge	0.19	13.9	18.6	4.7
Dry Creek	Daguerre Point Dam to Dry Creek	0.14	11.6	13.9	2.3
Daguerre Point Dam	River Mile 8.3 to Daguerre Point Dam	0.18	8.3	11.6	3.3
Hallwood	River Mile 3.3 to slope break near Eddie Drive at River Mile 8.3	0.13	3.3	8.3	5.0
Marysville	Junction with Feather River to River Mile 3.3	0.05	0.0	3.3	3.3
	Total	0.16	0.0	24.3	24.3

Source: YCWA 2017

Fisheries Populations

Fish species addressed in this analysis include:

- those that are officially listed, candidates for listing, or proposed for Federal or State listing as endangered or threatened;
- other sensitive fish species of management concern, including Federal species of concern, species managed by the Pacific Fishery Management Council (PFMC), California Species of Special Concern, and species designated by California statute as fully protected (i.e., California Fish and Game Code [CFGC], Section 5515 [fish]); and
- non-sensitive fish species of tribal, recreational, or commercial importance.

Information on Federally and State-listed species and other species considered sensitive was obtained primarily from the California Natural Diversity Database (CNDDB) (CDFW 2023a) and online databases and recovery plans of the United States (U.S) Fish and Wildlife Service (USFWS) and National Marine Fisheries Service (NMFS). Additional information sources were used to compile the following for each species considered in this analysis: (1) a description of the species' habitat requirements, (2) any known occurrences of the species in the study area, and (3) references to any recovery plans or status reports pertaining to the species.

Species Eliminated from Consideration

A list of species under USFWS jurisdiction that are Federally listed or candidates for Federal listing was generated using the Information for Planning and Consultation system[1] (USFWS 2023). The list includes one fish species – delta smelt (*Hypomesus transpacificus*). Delta smelt do not occur in the Yuba River or Feather River basins; the nearest occurrence of the species was recorded in October 2021 in the Sacramento River Deep Water Ship Channel south of West Sacramento (CDFW 2023a). Therefore, delta smelt was eliminated from further consideration and is not addressed further in this section.

Although there were some reported observations of Sacramento hitch (*Lavinia exilicauda*) in the lower Yuba River over 20 years ago, this species has not been reported in the lower Yuba River during any other surveys, including: CDFG (1991) snorkeling and electrofishing surveys; rotary screw trap surveys after about 2001; Kozlowski (2004) snorkeling and electrofishing surveys; VAKI Riverwatcher™ data from 2004 through 2017; and Lower Yuba River Accord River Management Team (RMT) snorkeling surveys during 2012, 2014, and 2015. Hitch prefer warm, slow-moving waters and have shown a preference for water temperatures of 81-84°F (Knight 1985 as cited in Moyle 2002). Additionally, the lower Yuba River is located outside of the identified range of Sacramento hitch. For these reasons, Sacramento hitch was eliminated from further consideration and is not addressed further in this section.

Although chum salmon (*Oncorhynchus keta*) reportedly have been observed in the lower Yuba River in the past, more recent VAKI Riverwatcher™ data indicate that chum salmon observations are rare (two records during 2013, one record during 2017, two records during 2018, and one record during 2020). Although two rare observations (nine records during 2011, two records during 2013) of pink salmon (*Oncorhynchus gorbuscha*) in the lower Yuba River have been reported, there have been no observations of pink salmon in the VAKI Riverwatcher™ data from 2014 through February 2022. YCWA (2017) also reports that "Pink and chum salmon are unique visitors to Central Valley streams and have not sustained a viable population in California for over 70 years." For these reasons, chum and pink salmon were eliminated from further consideration and are not addressed further in this section.

CDFW (2015) reports that Sacramento splittail (*Pogonichthys macrolepidotus*) only rarely enter the lower reaches of the Feather River. Although UC Davis (2012) lists the Yuba River downstream of Englebright Dam among the watersheds where splittail occurs, no reference is provided for this determination, and YCWA could not find any verified observations of splittail nor was it found during YCWA's studies (YCWA 2017). Recent review of VAKI Riverwatcher™ data indicates that no Sacramento splittail have been observed in the lower Yuba River from January 2004 through February 2022. For these reasons, Sacramento splittail was eliminated from further consideration and is not addressed further in this section.

[1] Based on the location of the proposed project, the Information for Planning and Consultation system identifies fish species within USFWS jurisdiction that should be considered.

Upstream of Englebright Dam

No Federally or State-listed fish species occur in the upper Yuba River Watershed. However, hardhead (*Mylopharodon conocephalus*) and the Central California roach subspecies (*Hesperoleucus symmetricus symmetricus*) have been reported to occur in portions of the upper Yuba River Watershed and both are designated as a California Species of Special Concern. Recreationally important coldwater and warmwater fish species upstream of Englebright Dam include kokanee (*Oncorhynchus nerka*), rainbow trout (*Oncorhynchus mykiss*), and black bass species.

Fish Distribution Summaries

New Bullards Bar Reservoir

The primary fishes planted in the Reservoir have included rainbow trout, kokanee, brook trout (*Salvelinus fontinalis*), and cutthroat trout (*Oncorhynchus clarkii*) (YCWA 2017). The Reservoir supports a significant salmonid fishery and is known for having some of the best kokanee fishing in California (YCWA et al. 2007). Although warmwater fish species including centrarchids (crappie, largemouth and smallmouth bass, and sunfish) and ictalurids (catfish and bullhead) have historically been reported to occur in the Reservoir, limited recreational fisheries exist for these species (YCWA et al. 2007).

YCWA documented 11 fish species during Reservoir fisheries sampling (gill netting and boat electrofishing) events in January and June 2012. Spotted bass (*Micropterus punctulatus*) was the most common species collected, accounting for approximately 66 percent of the total catch. Other common species included bluegill (*Lepomismacrochirus*), green sunfish (*Lepomis cyanellus*), rainbow trout, kokanee, and common carp (*Cyprinus carpio*). Less common species recorded included Sacramento sucker (*Catostomus occidantalis*), Sacramento pikeminnow (*Ptychocheilus grandis*), white catfish (*Ameiuris catus*), brown bullhead (*Ameiurus nebulosus*), and white crappie (*Pomoxis annularis*). Largemouth bass (*Micropterus salmoides*) and smallmouth bass (*Micropterus dolomieu*), which were historically documented in the Reservoir, were not found during the study. (YCWA 2017).

Englebright Reservoir

Englebright Reservoir supports warmwater and coldwater fish species, including rainbow trout, brown trout, catfish, crappie, smallmouth bass, green sunfish, and bluegill (USACE 2020). Fish population sampling (gill netting and boat electrofishing) conducted by YCWA at Englebright Reservoir in 2012 documented 11 fish species. Sacramento sucker and spotted bass were the more common species collected, followed by hardhead, rainbow trout, bluegill, and Sacramento pikeminnow (YCWA 2017).

North Yuba River below New Bullards Bar Dam

In YCWA's 2012 fish population surveys, Sacramento sucker represented approximately 85 percent (3,203 fish/mile) of fish collected from the North Yuba River below the Dam, followed by 15 percent for rainbow trout (567 fish/mile) and a single Sacramento pikeminnow. In 2013 sampling, rainbow trout represented approximately 75 percent of fish observed (534 fish/mile) and Sacramento sucker represented approximately 25 percent (181 fish/mile); Sacramento pikeminnow was not observed in 2013. All Sacramento suckers observed in 2012 were young of the year; rainbow trout were predominantly young of the year, with relatively low numbers of older age classes. (YCWA 2017).

Upper Yuba River

During fisheries surveys conducted during 2012 and 2013 at two sites in the reach upstream of New Colgate Powerhouse, smallmouth bass was the most abundant fish species observed, followed by rainbow trout, with relatively few Sacramento pikeminnow and Sacramento sucker observed. In the reach downstream of New Colgate Powerhouse, rainbow trout was the primary fish species observed during surveys in both 2012 and 2013. Several carcasses of adult kokanee were incidentally observed in 2012 below New Colgate Powerhouse. (YCWA 2017).

Species Accounts

Hardhead

Hardhead is a large (i.e., up to 60 cm standard length [SL]), long-lived (i.e., more than 10 years) minnow that is native to the Sacramento-San Joaquin River watersheds of Central California. Historically, hardhead was considered a widespread and locally abundant species within its range. Substantial alteration of its relatively specialized habitat requirements and predation, as well as competition from introduced black bass and other centrarchids, have resulted in population declines and isolated populations (Moyle 2002). Smallmouth bass have been reported to result in diminished hardhead abundance in the Central Valley, including in the upper Kings River and in the South Yuba River (Moyle et al. 1995). Today, hardhead is still widely distributed in the Sacramento-San Joaquin drainage, as well as in the Russian River drainage, but its abundance has been substantially reduced. The current range of hardhead extends from the Kern River in the south to the Pit River in the north. In the Sacramento River drainage, hardhead is present in most of the larger tributary streams as well as in the Sacramento River.

Hardhead is typically found within larger mid- and low-elevation streams where summer mean daily water temperatures exceed 20°C (68°F) (Moyle 2002). Optimal summer temperatures for juveniles have been reported to range between 24°C and 28°C (75-82°F) (Knight 1985 as cited in Moyle 2002). Based on acclimation water temperatures ranging from 12-18°C (53.6-64.4°F), Cocherell et al. (2014) found that adult hardhead preferred water temperatures of about 19.6-21°C (67-70°F) and avoided water temperatures <17°C (62.6°F). Hardhead is relatively intolerant of low dissolved oxygen levels, especially at higher temperatures, a factor which may limit its distribution to well-oxygenated streams and the surface water of reservoirs (Cech et al. 1990). Adult hardhead generally rear in clear, deep (>3 ft) pools with sand-gravel-boulder substrates and slow water velocities (Moyle 2002). Juvenile hardhead concentrate in shallow water close to the stream margin (Moyle and Baltz 1985 as cited in Moyle 2002). Hardhead spawning occurs in spring (March-May), when hardhead migrate upstream to gravel riffles, often within tributary streams (Moyle 2002). Spawning adults from larger rivers and reservoirs migrate into tributary streams to spawn in April and May (Moyle et al. 1995).

Hardhead is a bottom feeding species that forages for benthic invertebrates and aquatic plant material in quiet water. Smaller, younger hardhead (<20 cm SL) feed primarily on mayfly and caddisfly larvae and small snails (Reeves 1964 as cited in Moyle et al. 1995). Larger, older hardhead feed more on aquatic plants (especially filamentous algae), as well as crayfish and other large invertebrates (Moyle et al 1995). Hardhead mature following their second year.

Although considered a riverine species, hardhead has become well established in mid-elevation reservoirs. The initial establishment of hardhead in recently impounded reservoirs is probably the result of residual populations of juvenile fish growing to large sizes before populations of predatory centrarchids, primarily black bass, were established (Moyle et al. 1995). Hardhead has been reported to

occur in the upper Yuba River Watershed, including the Reservoir, and in Englebright Reservoir (YCWA 2017). Hardhead may occur in the North Yuba River and in the Yuba River upstream of Englebright Reservoir; however, none were observed or collected within these streams during any of YCWA's FERC license renewal studies (YCWA 2017).

Central California Roach

The Central California roach is part of the California roach complex, which is composed of various subspecies. The Central California roach is found in the Sacramento and San Joaquin River drainages, except the Pit River, and in other tributaries to San Francisco Bay. The Central California roach is generally found in small, warm intermittent streams, and is most abundant in mid-elevation streams in the Sierra foothills and in the lower reaches of some coastal streams (Moyle 2002). Although roach are abundant in a large number of streams, roach populations have been extirpated from many streams and stream reaches due to human disturbances, including diversions and introduced predatory fishes (particularly green sunfish) (Moyle 2002). Brown and Moyle (1993) found that roach were most abundant when they were the only fish species observed.

Roach are tolerant of relatively high temperatures (86°F to 95°F) and low oxygen levels (1 to 2 mg/L) (Taylor et al. 1982) but also can be found in cold, well-aerated clear "trout" streams (Taylor et al. 1982), human-modified habitats, and main river channels (Moyle 2002). Reproduction occurs from March through early July, with spawning typically initiating after water temperatures reach approximately 61°F (Moyle 2002). During the spawning season, schools of fish move into shallow areas with moderate flow and gravel/rubble substrate (Moyle 2002). Females deposit adhesive eggs in the substrate interstices or within emergent vegetation and the eggs are fertilized by attendant males. Eggs hatch in 2 to 3 days, and fry remain in the substrate interstices or among emergent vegetation until they are free-swimming (Moyle 2002).

Central California roach have been reported to occur historically between Dam and Englebright Reservoir (UC Davis 2012). However, roach were not identified during any of YCWA's fish population surveys in these streams (YCWA 2017). The prevalence of smallmouth bass in the upper Yuba River upstream of Englebright Reservoir may be a factor in the lack of recent roach observations.

Kokanee

Kokanee prefer well-oxygenated, open waters with temperatures in the range of 10-15°C (50-59°F), normally in large lakes and reservoirs (Moyle 2002). Kokanee life cycles can range from 2 to 7 years, with the majority reaching a mature stage within 4 years (Moyle 2002). In California, kokanee migrate from reservoirs to upstream tributaries during the fall to spawn (CDFW 2023b), with spawning potentially extending into April. Females build redds in gravel substrate near the mouths of streams or near lake spawning sites where they were spawned or planted, and adults die soon after spawning. Depending on when the spawning occurred, fry emerge during April through June and subsequently move downstream to mature in lakes (Moyle 2002). The kokanee diet changes little as the fish grow larger but is highly dependent on zooplankton availability, which may change throughout the seasons (Moyle 2002). Kokanee feed primarily on zooplankton, with a preference for water fleas, but small fish and insects are occasionally taken as well (Moyle 2002). Kokanee are present in the Reservoir and Englebright Reservoir, and evidence of spawning has been observed in the upper Yuba River upstream of Englebright Reservoir.

Rainbow Trout

Rainbow trout have been observed throughout the upper Yuba River Watershed, in and downstream of Reservoir. Optimal rainbow trout habitat is characterized by: (1) silt-free rocky substrate in riffle-run areas; (2) an approximately 1:1 pool-to-riffle ratio, with areas of slow, deep water; (3) well-vegetated and stable stream banks; and (4) abundant instream cover (Raleigh et al. 1984). Rainbow trout spawn almost exclusively in streams, although some hybrid species have reproduced in lakes without tributary streams (Raleigh et al. 1984). Rainbow trout residing in lakes will spawn in an inlet or outlet stream if available (Raleigh et al. 1984). Rainbow trout fry prefer relatively shallow water and slow water velocities, particularly in pool habitats within 1 meter of cover (Raleigh et al. 1984). Both juvenile and adult rainbow trout are opportunistic feeders and consume a wide variety of foods, particularly aquatic insects (Raleigh et al. 1984). Rainbow trout spawn during April through June in the upper Yuba River Watershed (YCWA 2017). Water temperatures in the low 50°F range appear to support high embryo survival in *O. mykiss*, while optimal water temperatures for juveniles are reported to be about 65°F or less (Bratovich et al. 2012; Cocherell et al. 2014).

Black Bass

Non-native freshwater black bass species occur in the upper Yuba River Watershed, particularly spotted bass in the Reservoir and Englebright Reservoir and smallmouth bass in the upper Yuba River upstream of Englebright Reservoir. Spotted bass in rivers spend most of their time hiding in pools while avoiding riffles or backwaters with heavy vegetation (UC Davis 2023). Reservoir spotted bass populations are found along steep rocky banks, often towards the upstream end of the reservoir (UC Davis 2023). Largemouth bass are most common in warm, shallow waters with moderate clarity and beds of aquatic plants. Optimum riverine habitat for smallmouth bass includes complex habitat with deep pools, riffles, rocky bottoms, overhanging vegetation, and a moderate gradient, while lake populations tend to prefer narrow bays along shorelines with rocky shelves (Moyle 2002). During the summer, black bass are often found in water temperatures between about 24°C (75ºF) and 31°C (88ºF) (Moyle 2002). In reservoirs, juvenile black bass often school in shallow areas near the shoreline while adults are often found in water depths ranging from approximately 3 to 15 feet. In California, black bass spawn during the spring months in relatively shallow areas near the shoreline of reservoirs. Spotted bass spawning can occur from March through June at water temperatures ranging from about 59-74°F. Largemouth bass spawn during April through June (up to water temperatures of about 75°F), and smallmouth bass can spawn from May into July, when water temperatures range from about 55-61°F (Moyle 2002). After black bass fry hatch in approximately 1 to 2 weeks, males guard the fry for 2 to 4 weeks (Moyle 2002).

Lower Yuba River

Three Federally listed fish species occur in the lower Yuba River portion of the fisheries operations study area: spring-run Chinook salmon (*Oncorhynchus tshawytscha*), steelhead (*Oncorhynchus mykiss*), and green sturgeon (*Acipenser medirostris*). Information on listing status, habitat requirements, known occurrences, and relevant status reports and recovery plans for each of these listed species is provided in **Table 3.2-2**. **Table 3.2-3** lists the other fish species of management concern in the lower Yuba River and their status. Non-native freshwater black bass are targeted by recreational anglers in the Central Valley. However, angler surveys conducted during 2008, 2009, and 2010 indicate that seasonal fishing efforts in the lower Yuba River target primarily rainbow trout and steelhead, followed by American shad and striped bass (RMT 2013). Black bass are not considered to be a recreationally important species within the lower Yuba River and are not addressed in this section.

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Table 3.2-2. Federally Listed Fish Species Known to Occur in the Lower Yuba River

Species	Status*	Suitable Habitat Type	Occurrence in Project Vicinity	Relevant Status Reports and Recovery Plans
Central Valley spring-run Chinook salmon *Oncorhynchus tshawytscha* Evolutionarily Significant Unit	FT, ST	Naturally spawning anadromous Chinook salmon expressing the phenotypic characteristics of spring-run have been observed in the lower Yuba River below Englebright Dam (McEwan 2001). RMT (2013) identified the spring-run Chinook salmon adult immigration and holding period as April through September. Adult spring-run Chinook salmon hold in areas in their natal streams of spawning grounds during the summer months until their eggs fully develop and become ready for spawning, generally between late August and mid-October. Spring-run juveniles may emigrate as fry soon after emergence, rear in their natal streams for several months prior to emigration as young of the year, or remain in their natal streams for extended periods and emigrate as yearlings. Studies conducted by RMT (2013) suggest that juvenile Chinook salmon appeared to occupy areas in close proximity to the shore and primarily occupy lateral bar, slackwater, slow glide, and riffle transition morphological units.	Lower Yuba River from Englebright Dam downstream to the river mouth (RMT 2013; CDFG 2009). Spawning generally occurs upstream of Daguerre Point Dam (RMT 2013).	Status Reports CDFG 1996a; CDFG 1998; Myers et al. 1998; NMFS 1999; Good et al. 2005; NMFS 2016a Restoration and Management Plans CDFG 1991; CDFG 1993 Recovery Plan NMFS 2014
California Central Valley steelhead *Oncorhynchus mykiss* Distinct Population Segment	FT	Naturally spawning steelhead that exhibit anadromy have been found in the Yuba River below Englebright Dam (McEwan 2001). Spawning generally extends from January through April. After emergence, steelhead fry move to shallow-water, low-velocity habitats, and forage in areas both including cover, and open areas lacking instream cover. Juvenile steelhead are reported to increasingly use areas with instream object cover and show a preference for higher velocity, deeper mid-channel areas as they grow larger. In the lower Yuba River, juvenile steelhead exhibit variable durations of rearing. Some juveniles may rear in the lower Yuba River for short periods (up to a few months) and others may spend 1 to 3 years rearing in the river.	Occurs in the lower Yuba River from Englebright Dam downstream to the mouth (RMT 2013). Spawning occurs primarily upstream of Daguerre Point Dam (RMT 2013).	Status Reports Busby et al. 1996; NMFS 1997; NMFS 1998; Good et al. 2005; Ford 2011; NMFS 2016b Restoration and Management Plans CDFG 1991; CDFG 1993; CDFG 1996b Recovery Plan NMFS 2014
North American green sturgeon *Acipenser medirostris* Southern Distinct Population Segment	FT	Limited information regarding green sturgeon distribution, movement, and behavioral patterns, as well as lifestage-specific habitat utilization preferences, is available for the Yuba River (as well as for other Central Valley rivers).	Green sturgeon observed in the lower Yuba River below Daguerre Point Dam since 2018 (CFS 2011; Heublein et al. 2017; NMFS 2018). Beccio (2019) documented green sturgeon spawning in the lower Yuba River for the first time.	Status Reports Adams et al. 2002; NMFS 2005; NMFS 2021 Recovery Plan NMFS 2018

Notes: * FT = Listed as Threatened under the Federal Endangered Species Act; ST = Listed as Threatened under the California Endangered Species Act

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Table 3.2-3. Fish Species of Management Concern with Potential to Occur in the Lower Yuba River

Species	Status[1] NMFS-SC	Status[1] CDFW-SSC	Status[1] USFWS-SC	Status[1] PFMC-Managed	Status[1] Tribal/Recreational/ Commercial Importance
Fall- and Late-Fall Run Chinook salmon *Oncorhynchus tshawytscha*	•	•		•	•
Pacific lamprey *Lampetra tridentata*		•	•		
River lamprey *Lampetra ayresii*		•			
Central California roach *Hesperoleucus symmetricus symmetricus*		•			
Hardhead *Mylopharodon conocephalus*		•			
White sturgeon *Acipenser transmontanus*		•			•
Striped bass *Morone saxatilis*					•
American shad *Alosa sapidissima*					•

Notes: [1] Status: NMFS-SC = National Marine Fisheries Service Species of Concern; USFWS-SC = U.S. Fish and Wildlife Service Species of Concern; CDFW-SSC = California Department of Fish and Wildlife Species of Special Concern; PFMC-Managed = Managed by the Pacific Fishery Management Council

A description of each species is provided below, including listing status, life history, known occurrence in the lower Yuba River, and other pertinent information. More detailed information regarding spring-run Chinook salmon, steelhead, and green sturgeon in the lower Yuba River is provided in YCWA's 2017 Application for New License, as amended, for the YRDP (YCWA 2017).[2]

In the lower Yuba River, critical habitat for spring-run Chinook salmon and steelhead is designated from the confluence with the Feather River upstream to Englebright Dam, and critical habitat for green sturgeon includes the river channel to the ordinary high-water line extending from the confluence with the Feather River upstream to Daguerre Point Dam.

Under the Magnuson-Stevens Fishery Conservation and Management Act, NMFS has identified Essential Fish Habitat (EFH) for Chinook salmon in the Yuba River Basin, including the lower Yuba River.

[2] Accession Number 20170605-5050 on FERC's ELibrary - https://www.ferc.gov/ferc-online/elibrary.

Spring-run Chinook Salmon

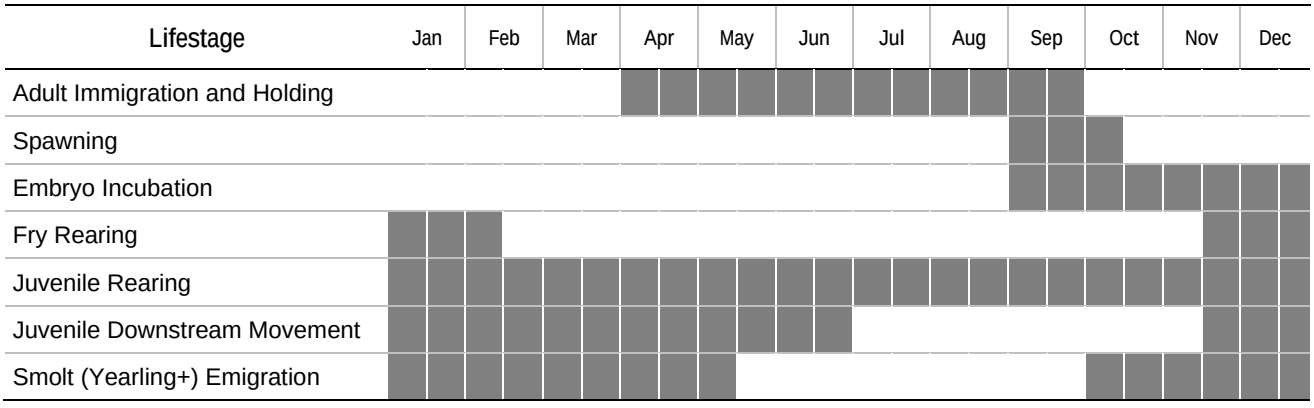
On September 16, 1999, NMFS listed the Central Valley spring-run Chinook salmon Evolutionarily Significant Unit (ESU) as a "threatened" species (64 FR 50394), and critical habitat was designated on September 2, 2005 (70 FR 52488). In the Yuba River, critical habitat extends from the confluence with the Feather River upstream to Englebright Dam. Englebright Dam is a complete physical barrier to the upstream migration of spring-run Chinook salmon in the lower Yuba River. Some publications state that historical accounts indicate prior to construction of the original Bullards Bar Dam in the early 1920s, large numbers of Chinook salmon were present as far upstream as Downieville on the North Yuba River; these runs were believed to be spring-run Chinook salmon (Yoshiyama et al. 2001).

Four principal life history variants of Chinook salmon are recognized in the Central Valley and are named for the timing of their spawning runs: fall-run, late fall-run, winter-run, and spring-run. Seventeen distinct groups, or ESUs, of naturally spawned Chinook salmon occur from southern California to the Canadian border and east to the Rocky Mountains; five of these groups occur in California (Myers et al. 1998). The spring-, fall-, and late fall-runs have been documented in the lower Yuba River (Massa and McKibbin 2005).

Section 305(b)(2) of the 1996 amendments to the Magnuson-Stevens Fishery Conservation and Management Act (MSA) (16 USC 1801 et seq.) requires identification of EFH for Federally managed fishery species and implementation of measures to conserve and enhance this habitat. In the Mid-Pacific Region, the PFMC designates EFH and NMFS approves the designation. EFH includes specifically identified waters and substrate necessary for fish spawning, breeding, feeding, or growth to maturity and covers a species' full life cycle (16 USC 1802(10)). EFH only applies to commercial fisheries. Chinook salmon habitat in the Yuba River (USGS Hydrologic Unit 18020107) has been identified as part of the Pacific salmon freshwater EFH (PFMC 2014). For the lower Yuba River downstream of Englebright Dam, EFH is applied to all runs of Chinook salmon.

The RMT (2013) developed representative temporal distributions for specific spring-run Chinook salmon lifestages in the lower Yuba River through review of previously conducted studies, as well as ongoing data collection activities of their Monitoring and Evaluation (M&E) Program. These periodicities are shown in **Table 3.2-4**.

Table 3.2-4. Lifestage-specific Periodicities for Spring-run Chinook Salmon in the Lower Yuba River



Source: RMT 2013 and YCWA 2017.

Adult Immigration and Holding

Spring-run Chinook salmon have previously been reported to migrate immediately to areas upstream of the Highway 20 Bridge after entering the Yuba River from March through October (Vogel and Marine 1991, YCWA et al. 2007) then over-summer in deep pools downstream of the Narrows 1 and 2 powerhouses, or farther downstream in the Narrows Reach, through the reported spawning period of September through November (CDFG 1991, SWRCB 2003). Results from the RMT's M&E Program, including the VAKI Riverwatcher™ monitoring and particularly the 3-year acoustic telemetry study, found past characterizations of temporal and spatial distributions to be largely unsupported. Phenotypic adult spring-run Chinook salmon were observed to exhibit a much more diverse pattern of movement and holding locations in the lower Yuba River were more expansive than previously reported (RMT 2013).

A large longitudinal extent of the lower Yuba River was occupied by the tagged phenotypic adult spring-run Chinook salmon during immigration and holding periods and temporal migrations to areas upstream of Daguerre Point Dam occurred over an extended period. Tagged phenotypic adult spring-run Chinook salmon in the lower Yuba River migrated upstream of Daguerre Point Dam from May through September and utilized a broad expanse of the lower Yuba River during the summer holding period, including areas as far downstream as Simpson Lane Bridge (i.e., ~River Mile [RM] 3.2) and as far upstream as the area just below Englebright Dam.

Prolonged occupancy in pool habitats was observed during the summer months from Simpson Lane Bridge (i.e., ~RM 1.8) upstream to Englebright Dam (i.e., RM 24.3). The majority of tagged spring-run Chinook salmon were detected in the plunge pool immediately downstream of Daguerre Point Dam from the onset of tagging in May/June through the over-summer holding period as late as September. Periods of occupation in the Daguerre Point Dam pool during the study ranged from 0 to 116 days (RMT 2013). Only the large pool in the downstream section of the Narrows Reach (i.e., the Narrows Pool) was occupied for a longer temporal period and no other area of the river was utilized by a higher proportion of the tagged phenotypic adult spring-run Chinook salmon for an extended temporal period than the Daguerre Point Dam plunge pool. There are no definitive explanations for this observation, but it has been suggested that Daguerre Point Dam represented a passage impediment or that these fish over-summered in the Daguerre Point Dam pool due to suitable habitat conditions available below the dam (e.g., favorable water depths, cover, water temperatures, and proximity to spawning gravels).

The RMT (2013) examined the daily number of adult Chinook salmon passing upstream of Daguerre Point Dam obtained by the VAKI Riverwatcher™ system from 2004 through 2011 and mean daily flows at the Marysville Gage did not find any consistent trend or relationship between adult Chinook salmon passage upstream of Daguerre Point Dam and flow rate. Chinook salmon passage was observed over a variety of flow conditions, including ascending or descending flows, as well as during extended periods of stable flows. Flow thresholds prohibiting passage of Chinook salmon through the ladders at Daguerre Point Dam were not apparent in the data.

Adult Spawning and Embryo Incubation

The RMT's (2013) examination of the 2009, 2010, and 2011 acoustically-tagged spring-run Chinook salmon data revealed a consistent pattern in fish movement. In general, acoustically tagged spring-run Chinook salmon exhibited an extended holding period, followed by a rapid movement into upstream areas (upper Timbuctoo Reach, Narrows Reach, and Englebright Dam Reach) during September. Fish then held at one specific location for approximately 1 week before rapidly moving downstream. The approximate 1-week period appeared to be indicative of spawning events, which ended by the first week in October. These observations, combined with early redd detections and initial carcasses appearing in the carcass surveys described below suggest that the spring-run Chinook salmon spawning period in the lower Yuba River may be of shorter duration than previously reported, extending from September 1 through mid-October (RMT 2013).

The earliest spawning, presumed to be spring-run Chinook salmon, generally occurs in the upper reaches, and progressively moves downstream. This spatial trend reflects cooler water temperatures extending farther downstream as the spawning season progresses (RMT 2013). Spring-run Chinook salmon spawning in the lower Yuba River is believed to primarily occur upstream of Daguerre Point Dam. With the exception of the Englebright Dam Reach, there is an abundance of naturally occurring suitable spawning gravel in the lower Yuba River. Since 2011, annual USACE gravel injection efforts have also provided suitable spawning gravels for salmonids in the Englebright Dam Reach.

Annual surveys have been conducted to assess temporal and spatial distribution of Chinook salmon and steelhead spawning in an approximately 1-mile reach in the lower Yuba River from the Narrows 2 Powerhouse to approximately 0.25 mile downstream of the confluence with Deer Creek (Campos et al. 2013). Chinook salmon redds were identified in all annual redd surveys in the Englebright Dam Reach from 2011 through 2021 (Campos and Massa 2012; Campos et al. 2013; Campos et al. 2014; Stearman and Massa 2015; Stearman and Massa 2016; Stearman et al. 2017; Stearman et al. 2018; Kowalik et al. 2019; Kowalik and Massa 2020; Laubach et al. 2021; Laubach and Nichols 2022).

Compared to previous years, results of the 2018-2021 surveys showed a relatively higher concentration of redds at the Anadromous Fish Restoration Program's Narrows Canyon Restoration Project area, which was implemented in summer 2018 (Kowalik et al. 2019; Kowalik and Massa 2020; Laubach et al. 2021; Laubach and Nichols 2022).

Based on the redd surveys conducted from 2011 through 2021, the Englebright Dam Reach gravel augmentation program has provided improved spawning habitat suitability and availability within and downstream of the gravel injection area. However, after sufficiently high flow events, augmented gravels can be evacuated and moved downstream from within the gravel injection area and the reach between the injection area and the Deer Creek confluence. The extent to which the gravel augmentation efforts may have increased spawning habitat suitability and availability downstream of the Englebright Dam Reach is unknown due to a lack of redd surveys conducted.

Juvenile Rearing

Snorkel observations conducted in 2012 (RMT 2013) indicate that the density of juvenile Chinook salmon was highly variable throughout the lower Yuba River although, with the exception of the upstream-most survey reach (i.e., Englebright Dam Reach), the density of juvenile Chinook salmon generally was higher in the survey reaches upstream rather than downstream of Daguerre Point Dam. Based on 2012, 2014, and 2015 RMT snorkel surveys, Chinook salmon fry and juveniles were observed

in greatest numbers in the Timbuctoo Bend, Parks Bar, and Dry Creek reaches upstream of Daguerre Point Dam (RMT, unpublished data). These observations are consistent with previous reports (Beak 1989; CDFG 1991; Kozlowski 2004). This may be due to larger numbers of spawners; greater amounts of more complex, high-quality cover; and lower densities of predators such as striped bass (*Morone saxatilis*), which reportedly are generally restricted to areas below the dam (YCWA et al. 2007).

The RMT (2013) reported that juvenile Chinook salmon appeared to occupy areas in close proximity to the shore during most survey months and in most survey reaches. However, in the Marysville Reach, juveniles were distributed considerably farther from shore compared to the other reaches. The Marysville Reach has an extended shallow sandy bar on the north bank on which large woody debris collects, which may provide refuge to juveniles away from the shoreline. The overall findings indicate that juvenile Chinook salmon in the lower Yuba River initially prefer slower, shallower habitat, and move into faster and deeper water as they grow.

Smolt Emigration

Although it has been previously suggested that spring-run Chinook salmon emigrate as smolts from November through June in the Yuba River (CALFED and YCWA 2005; CDFG 1998; SWRI 2002), more recent rotary screw trap (RST) monitoring data indicate that the vast majority emigrate as post-emergent fry in late November and December. Overall, most (~84 percent) of the juvenile Chinook salmon were captured at the Hallwood Boulevard RSTs soon after emergence from November through February, with relatively small numbers continuing to be captured through June. Although not numerous, captures of over-summer holdover juvenile Chinook salmon ranging from about 70 to 140 millimeters (mm) fork length (FL) primarily occurred from October through January, with a few individuals captured into March (Massa 2005; Massa and McKibbin 2005). These fish likely reared in the river over the previous summer, an extended juvenile rearing strategy characteristic of spring-run Chinook salmon (RMT 2013).

Adult Abundance

To estimate annual abundance of spring-run and fall-run Yuba River Chinook salmon, it is necessary to differentiate between annually returning spring-run and fall-run Chinook salmon in the lower Yuba River. While recent advances in genetic analyses suggest that run timing in Chinook salmon may be associated with genetic identity (Prince et al. 2017; Narum et al. 2018; Thompson et al. 2019, Kock and Narum 2020; Meek et al. 2020; Thompson et al. 2020), specific analyses to determine the genetic identity of Yuba River Chinook salmon with respect to adult return timing have not been conducted. As such, run type differentiation of Yuba River Chinook salmon relies on phenotypic timing of adult Chinook salmon passage at Daguerre Point Dam. The phenotypic expression is often obscure, requiring application of advanced statistical techniques to VAKI Riverwatcher™ and other datasets to identify the phenotypic differences in run timing.

Infrared-imaging technology has been used to monitor fish passage at Daguerre Point Dam in the lower Yuba River since 2003 using VAKI Riverwatcher™ systems to document specific observations used to address Viable Salmonid Population (VSP) parameters of adult abundance and diversity. The VAKI Riverwatcher™ infrared systems produced by VAKI Aquaculture Systems Ltd., of Iceland, provided a tool for monitoring fish passage year-round. The VAKI Riverwatcher™ system records both silhouettes and electronic images of each fish passage event in both Daguerre Point Dam fish ladders. By capturing silhouettes and images, fish passage can be accurately monitored even under turbid conditions.

The RMT presented the original methodology used for differentiating upstream passage of Yuba River Chinook salmon at Daguerre Point Dam into spring-run and fall-run Chinook salmon passage in the Yuba Accord Monitoring and Evaluation Program Draft Interim Report (RMT 2013). However, the methodology was recently revised to incorporate biological considerations evident in available datasets that were not accounted for by the previous methodology (Poxon and Bratovich 2020). A full description of the revised VAKI Riverwatcher™ data run differentiation methodology is provided by Poxon and Bratovich (2020), and the key results of the revised analyses, which have been updated to include results through February 2022, are summarized in **Table 3.2-5**.

Table 3.2-5. Results of Phenotypic Run Differentiation Analyses[1] for 2004–2021 Biological Years of Lower Yuba River Chinook Salmon Based on VAKI Riverwatcher™ Net Upstream Passage Observations at Daguerre Point Dam, Corrected for Periods of VAKI System Outages[2]

Year	Early-Migrating Spring-Run Chinook Salmon Estimate	Early-Migrating Spring-Run Chinook Salmon % Ad-Clip	Late-Migrating Spring-Run Chinook Salmon Estimate	Late-Migrating Spring-Run Chinook Salmon % Ad-Clip	Total Spring-Run Chinook Salmon Estimate	Total Spring-Run Chinook Salmon % Ad-Clip	Fall-Run Chinook Salmon Estimate	Fall-Run Chinook Salmon % Ad-Clip	Total Chinook Salmon Estimate	Total Chinook Salmon % Ad-Clip
2004	509	11.8%	1,109	6.2%	1,618	8.0%	3,716	2.6%	5,334	4.2%
2005	1,978	23.1%	3,296	10.1%	5,274	15.0%	5,816	2.1%	11,090	8.2%
2006	374	9.6%	1,082	5.3%	1,456	6.4%	3,174	3.1%	4,630	4.1%
2007	285	13.0%	68	0.0%	353	10.5%	1,007	2.7%	1,360	4.7%
2008	372	2.7%	948	3.8%	1,320	3.5%	1,182	18.4%	2,502	10.6%
2009	693	30.2%	1,923	16.4%	2,616	20.1%	1,942	11.9%	4,558	16.6%
2010	2,988	59.7%	749	44.7%	3,737	56.7%	2,647	15.9%	6,384	39.8%
2011	59	47.5%	2,301	24.8%	2,360	25.4%	5,396	21.0%	7,756	22.4%
2012	807	59.4%	1,482	16.6%	2,289	31.7%	4,368	24.7%	6,657	27.1%
2013	2,053	4.7%	1,993	7.3%	4,046	6.0%	7,345	13.5%	11,391	10.9%
2014	618	12.1%	1,403	8.8%	2,021	9.8%	7,188	16.6%	9,209	15.1%
2015	50	8.0%	185	15.1%	235	13.6%	4,780	20.3%	5,015	20.0%
2016[2]	NA	NA	NA	NA	NA	NA	NA	NA	1,888	45.9%
2017[2]	NA	NA	NA	NA	NA	NA	NA	NA	1,644	55.4%
2018	66	80.3%	215	80.0%	281	80.1%	2,779	34.2%	3,060	38.4%
2019[3]	NA	NA	NA	NA	NA	NA	NA	NA	2,691	18.8%
2020	227	4.0%	1,110	8.6%	1,337	7.8%	2,531	19.9%	3,868	15.7%
2021	1,246	37.6%	423	11.3%	1,669	30.9%	2,914	15.2%	4,583	20.9%

Notes: [1] Run differentiation between spring-run and fall-run Chinook salmon for all years included in the evaluation was conducted using the methodology described in Poxon and Bratovich (2020).

[2] 2016 and 2017 annual time series were deemed inappropriate for count correction and run separation analyses due to long periods of VAKI Riverwatcher™ system outages that resulted in incomplete datasets for both years. No estimates (run-differentiated or overall) are possible for these years. The total number of Chinook salmon for these years represent raw counts as affected by VAKI Riverwatcher™ system outages, and do not represent estimated annual abundances.

[3] 2019 annual time series was deemed inappropriate for run separation analysis due to an extended closure (February 13, 2019 through September 10, 2019) of the Daguerre Point Dam North Ladder, which fundamentally altered the temporal patterns of passage at Daguerre Point Dam on which the run separation analysis is based. As a result, the only possible annual abundance estimate for the 2019 annual time series is Total Chinook Salmon.

NMFS Recovery Plan

The NMFS (2014) Recovery Plan for Central Valley Chinook Salmon and Steelhead establishes three population levels to help guide recovery efforts for existing populations, referred to as Core 1, 2, and 3 populations. The lower Yuba River spring-run Chinook salmon population below Englebright Dam is identified as Core 2 population. Core 2 populations meet, or have the potential to meet, the biological recovery standard for moderate risk of extinction. Core 2 populations provide increased life history diversity to the ESU and are likely to provide a buffering effect against local catastrophic occurrences that could affect other nearby populations, especially in geographic areas where the number of Core 1 populations is lowest (NMFS 2014). Additionally, the recovery plan states that "*Implementation of the flow schedules specified in the Fisheries Agreement of the Yuba Accord is expected to address the flow-related major stressors including flow-dependent habitat availability, flow-related habitat complexity and diversity, and water temperatures.*"

Steelhead

On March 19, 1998 (63 FR 13347) NMFS listed the Central Valley Distinct Population Segment (DPS) of steelhead as threatened. On September 2, 2005, NMFS published the final rule designating critical habitat, which includes the lower Yuba River (70 FR 52488), from the confluence with the Feather River upstream to Englebright Dam. Englebright Dam is a complete physical barrier to the upstream migration of steelhead.

Steelhead exhibits perhaps the most complex suite of life-history traits of any species of Pacific salmonid. Members of this species can be anadromous or freshwater residents and, under some circumstances, members of one form can apparently yield offspring of another form. The RMT developed representative temporal distributions for specific steelhead lifestages[3] in the lower Yuba River through review of previously conducted studies, as well as ongoing data collection activities of their M&E Program. These periodicities are shown in **Table 3.2-6**.

Table 3.2-6. Lifestage-specific Periodicities for Steelhead in the Lower Yuba River

Lifestage	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Adult Immigration & Holding[4]	■	■	■	■	■	■			■	■	■	■	■	■	■	■	■	■
Spawning	■	■	■	■	■	■	■	■										
Embryo Incubation	■	■	■	■	■	■	■	■	■	■								
Fry Rearing						■	■	■	■	■	■	■	■	■				
Juvenile Rearing	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
Juvenile Downstream Movement				■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
Smolt (Yearling+) Emigration	■	■	■	■	■	■	■								■	■	■	■

Source: RMT 2013 and YCWA 2017.

[3] As with spring-run Chinook salmon, the resultant lifestage periodicities are intended to encompass the majority of activity for a particular lifestage and are not intended to be inclusive of every individual in the population.

[4] Although the adult immigration and holding lifestage for steelhead was presented in RMT (2013) and YCWA (2017) as extending from August through March, updated analysis of VAKI Riverwatcher™ data indicate that the time period for this lifestage should be revised to extend from September through March.

Many of the most important stressors specific to steelhead in the lower Yuba River correspond to the stressors described for spring-run Chinook salmon in the lower Yuba River, which include passage impediments and barriers, poaching, hatchery effects, fry and juvenile rearing physical habitat structure, predation, loss of riparian habitat and instream cover (e.g., riparian vegetation, instream woody material), loss of natural river morphology and function, and loss of floodplain habitat (YCWA 2017).

As with all naturally spawning populations of steelhead in the Central Valley, Lindley et al. (2007) characterized the steelhead population in the lower Yuba River as data deficient and, therefore, did not characterize its viability. Data limitations, particularly regarding abundance and productivity, continue to render problematic quantitative estimation procedures to assess the viability of the steelhead population in the lower Yuba River. Continued monitoring of adult steelhead in the lower Yuba River is providing additional information that is needed to assess extinction risk based on Lindley et al. (2007) criteria regarding population size, population decline, occurrences of catastrophes within the last 10 years that could cause sudden shifts from a low-risk state to a higher one, and the impacts of hatchery influence.

Adult Immigration and Holding

RMT (2010a, 2013) examined preliminary data and identified variable annual timing of *O. mykiss* ascending the fish ladders at Daguerre Point Dam since the VAKI Riverwatcher™ began operations in 2003 and identified the period extending from August through March as encompassing the majority of the upstream migration and holding of adult steelhead in the lower Yuba River. However, consistent and more reliable data are now available extending from January 2004 through February 2022, and recent examination of adult steelhead upstream passage data from this period indicates that the majority of the upstream migration of adult steelhead extends from September through March.

Adult Spawning and Embryo Incubation

Steelhead spawning has been reported to primarily occur in the lower Yuba River upstream of Daguerre Point Dam (SWRI et al. 2000, YCWA et al. 2007). Kozlowski (2004) states that field observations during winter and spring 2000 (YCWA unpublished data) indicated that the majority of steelhead spawning in the lower Yuba River occurred from Long Bar upstream to the Narrows, with the highest concentration of redds observed upstream of the Highway 20 Bridge. The RMT (2013) reported that steelhead redds show a distinctive pattern spatially throughout the lower Yuba River, with the majority of redds in the Timbuctoo Bend and Parks Bar reaches. In the lower Yuba River, steelhead have been observed to spawn in side-channel areas as well as in mainstem areas (YCWA unpublished data).

Juvenile Rearing and Outmigration

In the lower Yuba River, juvenile steelhead exhibit variable durations of rearing. Some juvenile *O. mykiss* may rear in the lower Yuba River for short periods (i.e., up to a few months) and others may spend from 1 to 3 years rearing in the river. Using the combined results from electrofishing and snorkeling surveys conducted during the late 1980s, CDFG (1991) reported that juvenile steelhead were observed in all river reaches downstream of the Englebright Dam and, in addition to Chinook salmon, were the only fish species observed in the Narrows Reach. CDFG also indicated that most juvenile steelhead rearing occurred above Daguerre Point Dam. SWRI et al. (2000) summarized data collected in the lower Yuba River from 1992 through 2000. They reported the primary rearing habitat for juvenile *O. mykiss* is upstream of Daguerre Point Dam, with decreasing abundance downstream of the dam. SWRI et al. (2000) suggested that higher abundances of juvenile *O. mykiss* above Daguerre Point Dam may have been due to larger numbers of spawners; greater amounts of more complex, high-quality

cover; and lower densities of predators such as striped bass, which reportedly were restricted to areas below Daguerre Point Dam. During RMT snorkel surveys in 2014, the vast majority of steelhead fry observed were in the Timbuctoo Bend Reach, followed by the Englebright Dam Reach (RMT, unpublished data). Steelhead juvenile observations also were primarily in the Timbuctoo Bend and Englebright Dam reaches, with fewer observations in the remaining reaches.

Smolt Emigration

Although not numerous, captures of over-summer holdover juvenile *O. mykiss* generally ranging from about 60 to 140 mm FL were observed in the RST captures primarily from October through mid-April (RMT 2013). These fish likely reared in the river over the previous summer, representing an extended juvenile rearing strategy characteristic of holdover juvenile *O. mykiss*. Larger juvenile *O. mykiss* exhibiting extended rearing in the lower Yuba River and emigration during the fall to early spring are referred to as yearlings and smolts. Smolt-sized *O. mykiss* constitute a highly variable percentage of the annual emigrant populations.

NMFS Recovery Plan

As described above, NMFS's (2014) Recovery Plan for Central Valley Chinook Salmon and Steelhead establishes three population levels to help guide recovery efforts for existing populations, referred to as Core 1, 2, and 3 populations. The lower Yuba River steelhead population below Englebright Dam is identified as a Core 2 population. The recovery plan states that "*Implementation of the flow schedules specified in the Fisheries Agreement of the Yuba Accord is expected to address the flow-related major stressors including flow-dependent habitat availability, flow-related habitat complexity and diversity, and water temperatures.*"

Southern DPS of North American Green Sturgeon

The Southern DPS of North American green sturgeon was listed as a Federally threatened species on April 7, 2006 (71 FR 17757) and includes the North American green sturgeon population spawning in the Sacramento River and using the Sacramento-San Joaquin River Delta (Delta) and San Francisco Estuary. On October 9, 2009, NMFS (74 FR 52300) designated critical habitat for the Southern DPS of North American green sturgeon, which includes the Sacramento River, lower Feather River, lower Yuba River, the Delta, and San Francisco Estuary. NMFS (74 FR 52300) defined specific habitat areas in the Sacramento, Feather, and Yuba rivers to include riverine habitat from the river mouth upstream, to and including the farthest known site of historic and/or current sighting or capture of North American green sturgeon, as long as the site is still accessible. NMFS (74 FR 52300) designated critical habitat in the lower Yuba River to extend from the confluence with the Feather River upstream to Daguerre Point Dam.

Green sturgeon are slow-growing fish, typically reaching maturity around age 15 and living 60 to 70 years (NMFS 2021). Limited information regarding green sturgeon distribution, movement, and behavioral patterns, as well as lifestage-specific habitat utilization preferences, is available for the Yuba, Feather, and Sacramento rivers. Green sturgeon in the Sacramento River has been documented and studied more widely than it has in either the Feather River or the Yuba River.

Since the 1970s, numerous surveys of the lower Yuba River downstream of Englebright Dam have been conducted, including annual salmon carcass surveys, snorkel surveys, beach seining, electrofishing, rotary screw trapping, redd surveys, and other monitoring and evaluation activities. Over the many years of these surveys and monitoring of the lower Yuba River, only a few confirmed observations of an adult green sturgeon occurred prior to 2011.

YCWA (2017) examined the potential occurrence of green sturgeon in the lower Yuba River based on detections of acoustically tagged green sturgeon in the Yuba River. None of the 217 green sturgeon acoustically tagged and tracked by the California Fish Tracking Consortium in the Central Valley were detected in the Yuba River. One fish tagged by DWR in the Feather River was detected once on September 6, 2011, in the Yuba River by CDFW's lowermost acoustic receiver located at the confluence of the Yuba and Feather rivers. That fish also was detected upstream in the Feather River earlier on the same day and downstream in the Sacramento River on the evening of September 6, 2011. Therefore, the fish apparently only entered the mouth of the lower Yuba River for a very brief period of time before continuing its downstream migration in the Feather and Sacramento rivers. In 2016, CDFW personnel conducted some observational snorkeling in the plunge pool located immediately below Daguerre Point Dam and observed and video documented a few green sturgeon.

Although adult green sturgeon have been observed in the lower Yuba River, including during 2011 and 2016, no documentation of green sturgeon (or white sturgeon) spawning had been confirmed as of 2016 (Beccio 2018). CDFW initiated green sturgeon spawning (egg mat) surveys in 2017 immediately downstream of Daguerre Point Dam (Beccio 2018). Although adults were observed between mid-June and early August 2017, no eggs were collected. The limited number of egg mats deployed, and the general patchiness of egg distribution of spawning sturgeon, may have limited the ability to detect spawning (Beccio 2018).

In 2018, egg mats were deployed from May 1 through June 27. At least two to six adult green sturgeon were observed by CDFW during each site visit. On June 15, 2018, CDFW observed approximately 270 sturgeon eggs, 30 of which were examined to identify the species. Physical characteristics of the eggs indicated that they were green sturgeon eggs (Beccio 2018). CDFW conducted similar egg mat surveys April 16 through August 19, 2019, but no green sturgeon eggs were observed (Beccio 2019). However, one early stage juvenile green sturgeon (40 mm FL) was captured by hand in an edgewater habitat about 200 m downstream of Daguerre Point Dam on August 19, 2019, providing evidence that spawning recently occurred (Beccio 2019). CDFW also observed between one and at least 10 adult green sturgeon holding below Daguerre Point Dam during each site visit.

CDFW also conducted green sturgeon egg mat surveys in 2020 and 2021. Although no eggs were observed, six green sturgeon adults were observed below Daguerre Point Dam and were tagged for tracking. Between June 1 and June 4 of 2021, five of the fish tagged in 2020 were detected by CDFW in the Daguerre Point Dam plunge pool (Beccio 2022). Adults were observed holding primarily in the north part of the pool. During the 2021 egg mat surveys, CDFW staff made visual observations of two to five adult green sturgeon holding in the Daguerre Point Dam plunge pool during most site visits (Beccio 2022).

The lifestage-specific periodicities for green sturgeon in the lower Yuba River are summarized in **Table 3.2-7**.

Table 3.2-7. Lifestage-specific Periodicities for Green Sturgeon in the Lower Yuba River

Lifestage	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Adult Immigration and Holding												
Spawning and Embryo Incubation												
Post-Spawning Holding[1]												
Juvenile Rearing and Outmigration												

Note: [1] While the majority of the existing literature indicates that the green sturgeon adult post-spawn holding lifestage typically extends from the completion of spawning through November, recent telemetry data from the Sacramento, Feather, and Yuba rivers suggest that some adult green sturgeon may remain in riverine environments for over one year after spawning (DWR and CDFW unpublished data; Beccio 2022).

Source: RMT 2013 and YCWA 2017.

Adult Immigration and Holding

According to Erickson and Webb (2007), water temperature seems to be an important cue signaling adult North American green sturgeon to migrate into river systems. Adult green sturgeon enter San Francisco Bay in late winter through early spring and spawn in the Sacramento River primarily from April through early July (Heublein et al. 2009; Poytress et al. 2011, 2015). For the Sacramento River, NMFS (2009) reports that adult green sturgeon prefer deep holes (≥ 5 m depth) at the mouths of tributary streams, where the fish spawn and rest on the bottom. No definitive information regarding green sturgeon adult immigration and holding is available for the lower Yuba River.

Spawning and Embryo Incubation

Unlike salmon, green sturgeon may spawn several times during their long lives, returning to their natal rivers every 3 to 5 years (NMFS 2020). Eggs are likely broadcast and externally fertilized in relatively fast water and probably in depths greater than three meters (Moyle 2002). Because successful green sturgeon spawning has not been consistently documented in the Yuba River, the research conducted to date suggests that spawning in the Yuba River is periodic and occurs during years with higher flow (Beccio 2018, 2019; NMFS 2021). Green sturgeon larvae hatch from fertilized eggs after approximately 169 hours of incubation at a water temperature of 59°F (Van Eenennaam et al. 2001, Deng et al. 2002), which is similar to the sympatric white sturgeon development rate (176 hours). Van Eenennaam et al. (2005) indicated that an optimum range of water temperatures for egg development was between 57.2°F and 62.6°F. Water temperatures above 68°F are reportedly lethal to green sturgeon embryos (Cech et al. 2000, Beamesderfer and Webb 2004).

Post-Spawning Adult Holding

Post-spawn adult fish may hold for several months in the Sacramento River and out-migrate in the fall or winter or move out of the river quickly during the spring and summer months, with the holding behavior most commonly observed (Heublein et al. 2009; Mora 2016). Modeling conducted for YCWA's FERC license renewal demonstrated that a substantial amount of green sturgeon deepwater pool holding habitat and spawning habitat is available downstream of Daguerre Point Dam. For the February through November period, which represents the potential green sturgeon adult holding, spawning, and post-spawning holding periods, the amount of deepwater pool habitat ranged from approximately 6 to 45 acres annually over the 41-year hydrologic simulation period (YCWA 2017).

Juvenile Rearing and Outmigration

Green sturgeon larvae are strongly oriented to the bottom and exhibit nocturnal activity patterns (NMFS 2009). After 6 days, larvae exhibit nocturnal swim-up activity (Deng et al. 2002) and nocturnal downstream migrational movements (Kynard et al. 2005). After approximately 10 days, larvae begin feeding and growing rapidly. Under laboratory conditions, green sturgeon larvae cling to the bottom during the day and move into the water column at night (Van Eenennaam et al. 2001). Juvenile green sturgeon spend from 1 to 4 years in fresh and estuarine waters and disperse into saltwater at lengths of 300 to 750 mm. Metamorphosis to the juvenile stage is complete at 45 days and juveniles continue to grow rapidly reaching 300 mm in one year (USACE 2007). Green sturgeon juveniles tested under laboratory conditions had optimal bioenergetic performance (i.e., growth, food conversion, swimming ability) between 59°F and 66.2°F under either full or reduced rations (Mayfield and Cech 2004).

NMFS Recovery Plan

The NMFS (2018) Recovery Plan states that since the listing of the Southern DPS in 2009, spawning has been documented in the lower Yuba River (Seesholtz et al. 2015; Beccio 2018) but many significant threats have not been addressed. Because Daguerre Point Dam is recognized by NMFS as limiting the distribution of green sturgeon in the lower Yuba River (74 FR 52300, October 9, 2009; Mora et al. 2009), the recovery plan includes actions to restore habitat for green sturgeon below Englebright Dam and to provide volitional passage at Daguerre Point Dam on the lower Yuba River.

Fall- and Late Fall-run Chinook Salmon

The Central Valley fall- and late fall-run Chinook salmon (*O. tshawytscha*) ESU is neither Federally nor State-listed as threatened or endangered. NMFS determined that listing this ESU as a threatened species was not warranted (64 FR 50394), but subsequently classified this ESU as a Federal Species of Concern because of specific risk factors, including population size and hatchery influence (69 FR 19975). Both fall- and late fall-run Chinook salmon are considered a California Species of Special Concern (CDFW 2023c; Moyle et al. 2015). As discussed above, Chinook salmon habitat in the Yuba River has been identified as part of the Pacific salmon freshwater EFH. For the lower Yuba River downstream of Englebright Dam, EFH is applied to all runs of Chinook salmon, including fall- and late fall-run Chinook salmon. In the Yuba River, Englebright Dam is a complete physical barrier to the upstream migration of fall- and late-fall run Chinook salmon.

Although late fall-run Chinook salmon populations occur primarily in the Sacramento River (RMT 2010), incidental observations of this run have been reported to occur in the lower Yuba River (RMT 2013). However, there have been only occasional episodic incidences of late fall-run Chinook salmon straying from the Sacramento River system into the lower Yuba River (USACE 2014). The remainder of this discussion refers to fall-run Chinook salmon.

In the Central Valley, fall-run Chinook salmon are the most numerous of the four salmon runs and are the principal run raised in hatcheries (Moyle 2002). Fall-run Chinook salmon are raised at five major Central Valley hatcheries that have released more than 32 million smolts each year into California waterbodies (CDFG 2007). While hatchery programs can increase overall returns to the fishery, Lindley et al. (2007) concluded that hatchery programs have negative effects on wild populations of Chinook salmon due to competition by hatchery fish with wild juveniles and straying of hatchery fish both within and between basins and resultant introgression of hatchery stocks with native populations. Throughout the Central Valley, the number of Chinook salmon returning in the fall to spawn has exhibited a declining trend in recent years based on data reported in GrandTab.[5]

Although fall-run Chinook salmon is an important commercial and recreational fish species, declines in populations of this species have resulted in harvest management restrictions. In April 2009, the PFMC adopted a closure of all commercial ocean salmon fishing through April 30, 2010, and placed restrictions on inland salmon fisheries (CDFG 2009). Since then, and most recently during 2019, NMFS has taken several in-season management actions, including temporary closure, that have modified the commercial and recreational fishing seasons and quotas for salmon fisheries from the U.S. and Canada border to the U.S. and Mexico border (NMFS 2019). Because NMFS determined that the Sacramento River fall-run Chinook salmon stock (which includes fish in the Yuba and Feather rivers) has been overfished[6] under the MSA, a rebuilding plan developed by the PFMC was approved by NMFS in 2020.[7] In addition to recommendations on a harvest control rule that will be applied to setting annual ocean salmon fishery management measures that impact Sacramento River fall-run Chinook salmon, the rebuilding plan recommends work with Federal, State, and local habitat experts to review the status of the EFH affecting these salmon and, as appropriate, provide recommendations for habitat restoration and enhancement within a suitable time frame. The MSA requires overfished stocks to be rebuilt, generally within 10 years (PFMC and NMFS 2020).

The RMT (2013) developed representative temporal distributions for specific fall-run Chinook salmon lifestages through review of previously conducted studies, as well as ongoing data collection activities of the RMT's M&E Program. The resultant lifestage-specific periodicities encompass the majority of activity for a particular lifestage and are not intended to be inclusive of every individual in the population. The lifestage-specific periodicities for fall-run Chinook salmon in the lower Yuba River are shown in **Table 3.2-8**.

[5] GrandTab is a compilation of annual population estimates for Chinook salmon in the Sacramento and San Joaquin River systems. GrandTab is available for download at: https://nrm.dfg.ca.gov/FileHandler.ashx?DocumentID=84381

[6] Overfished is defined to be when the 3-year geometric mean of a salmon stock's annual spawning escapements falls below the reference point known as the minimum stock size threshold (MSST). The three-year geometric mean of spawning escapement fell below MSST for the Sacramento River fall-run Chinook salmon stock for the 2015–2017 period (85 Fed. Reg. 75920 (November 27, 2020).

[7] Fisheries Off West Coast States; West Coast Salmon Fisheries; Rebuilding Chinook Salmon Stocks. 85 Fed. Reg. 75920 (November 27, 2020).

Table 3.2-8. Lifestage-specific Periodicities for Fall-run Chinook Salmon in the Lower Yuba River

Lifestage	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Adult Immigration & Staging[1]							■	■	■	■	■	■
Spawning										■	■	■
Embryo Incubation	■	■	■	■	■	■				■	■	■
Fry Rearing	■	■	■	■	■	■	■	■				■
Juvenile Rearing		■	■	■	■	■	■	■	■	■	■	■
Fry and Juvenile Downstream Movement	■	■	■	■	■	■	■	■	■	■	■	■

[1] Although the adult immigration and staging lifestage for fall-run Chinook salmon was presented in RMT (2013) and YCWA (2017) as extending from July through December, updated analysis of VAKI Riverwatcher™ data from 2004-February 2022 indicate that the time period for this lifestage should be revised to extend from mid-July through December.

Source: RMT 2013 and CALFED and YCWA 2005.

Adult Immigration and Staging

In the Central Valley, adult fall-run Chinook salmon generally begin migrating upstream annually in June, with immigration continuing through December (Moyle 2002). Immigration generally peaks in November and, typically, greater than 90 percent of the run has entered their natal river by the end of November (Moyle et al. 2008). Unlike spring-run Chinook salmon, adult fall-run Chinook salmon do not exhibit an extended over-summer holding period. Rather, they stage for a relatively short period of time prior to spawning. Adult fall-run Chinook salmon immigration and staging generally occurs in the lower Yuba River from mid-July through December (Poxon and Bratovich 2020).

Escapement surveys for Chinook salmon in the lower Yuba River have occurred from the Narrows Pool to Daguerre Point Dam and from Daguerre Point Dam to the Simpson Lane Bridge. Escapement surveys suggest that approximately three-fourths of fall-run Chinook salmon spawning in the lower Yuba River occurs above Daguerre Point Dam (YCWA unpublished data). During the escapement surveys, recoveries of Chinook salmon with coded wire tags indicate that straying of spring-run and fall-run Chinook salmon from the Feather River Fish Hatchery occurs in the lower Yuba River. Additionally, during 2008, six Chinook salmon adults were recovered during the late-winter and early spring portion of the escapement surveys with tags demonstrating they were late fall-run fish from the Coleman National Fish Hatchery located on Battle Creek, a tributary to the Sacramento River.

Adult Spawning and Embryo Incubation

Examination of preliminary data obtained from the carcass surveys does not indicate a distinct bimodal distribution of spawning activities (i.e., a distinct spring-run spawning period followed by a distinct fall-run Chinook salmon spawning period) but instead demonstrates a slow build-up of spawning activities starting in early September and transitioning into the main fall-run spawning period. The lower Yuba River fall-run Chinook salmon spawning period has been reported to extend from October through December (RMT 2013, CALFED and YCWA 2005). Preliminary data from redd surveys and back-calculations from carcass surveys generally confirm this temporal distribution.

Fall-run Chinook salmon require gravel and cobble areas, primarily at the heads of riffles, with water flow through the substrate for spawning. Gravel and cobble diameter sizes can range from 0.1 to 6 inches. In the Central Valley, the fall-run Chinook salmon spawning and embryo incubation period generally extends from October through March but may occur earlier if temperatures fall below 60°F

(Moyle 2002). Fall-run Chinook salmon embryo incubation in the lower Yuba River extends from the time of egg deposition through alevin emergence from the gravel. Based upon consideration of accumulated thermal units from the time of egg deposition through hatching and alevin incubation, the fall-run incubation period is considered to extend from October through March (RMT 2013, YCWA et al. 2007). This period is consistent with observed trends in Chinook salmon fry captures in RSTs in the lower Yuba River.

Juvenile Rearing and Outmigration

Central Valley fall-run Chinook salmon fry emergence typically occurs from late December through March (Moyle 2002). Fall-run Chinook salmon juvenile rearing and outmigration, also referred to as downstream movement, in the lower Yuba River has been reported to primarily occur from December through June (CALFED and YCWA 2005, SWRI 2002). In the lower Yuba River, most fall-run Chinook salmon exhibit downstream movement as fry shortly after emergence from gravels, although some individuals rear in the river for a period of up to several months and move downstream as juveniles. Thus, the fry rearing lifestage is considered to extend from mid-December through April, the juvenile rearing lifestage extends from mid-January through June, and the fry and juvenile downstream movement lifestage generally extends from mid-December through June (RMT 2013).

Juvenile salmonid outmigration monitoring was conducted in the lower Yuba River near Hallwood Boulevard by CDFW annually from 1999 to 2006, and by the Yuba Accord RMT from 2006 to 2009. Data from CDFW RST monitoring are available from 1999 to 2005, and a Yuba Accord RMT report (Campos and Massa 2010) has been prepared for the sampling period extending from October 1, 2007 to September 30, 2008. Analyses of CDFW RST data indicate that about 98 to 99 percent of the total numbers of juvenile Chinook salmon were captured by May 1 of each year, followed by up to about 1 percent during May and June (YCWA et al. 2007). During the 2007 to 2008 sampling period, 95 percent of all juvenile Chinook salmon were captured by June 2, 2008 (Campos and Massa 2010).

For the sampling periods extending from 2001 to 2005, CDFW identified specific runs based on sub-samples of lengths of all juvenile Chinook salmon captured in the RSTs by using the length at-time tables developed by Fisher (1992), as modified by S. Green. The examination of run-specific determinations indicate that, in the lower Yuba River, the majority (i.e., 81.1 percent) of fall-run Chinook salmon move past the Hallwood Boulevard RST from December through March, with decreasing numbers captured during April (8.9 percent), May (6.6 percent), June (3.2 percent), and July (0.2 percent). Most of the fish captured in December through March were post-emergent fry (<50 mm FL), while nearly all juvenile fall-run Chinook salmon captured in May and later were larger (≥50 mm FL) (YCWA et al. 2007). As an overall characterization, juvenile fall-run Chinook salmon downstream movement extends from late December through June.

Adult Abundance

Annual spawning stock escapement estimates are reported in GrandTab, the Central Valley database maintained by CDFW. In the lower Yuba River, no distinction is made between phenotypic spring-run Chinook salmon and fall-run Chinook salmon in GrandTab, and all Chinook salmon returning to the lower Yuba River are reported as fall-run. As discussed above for spring-run Chinook salmon, a revised VAKI Riverwatcher™ data run differentiation methodology was developed by Poxon and Bratovich (2020). Key results of revised analyses for fall-run Chinook salmon through February 2022 are summarized in **Table 3.2-9**. For the period during which VAKI Riverwatcher™ data are available, the annual number of fall-run Chinook salmon estimated to have passed upstream of Daguerre Point Dam

ranged from 1,007 in 2007 to 7,345 in 2013 (Poxon and Bratovich 2020). The annual percentage of adipose fin-clipped fall-run Chinook salmon compared to the total number estimated to have passed upstream of Daguerre Point Dam ranged from 2.1 percent in 2005 to 34.2 percent in 2018 (Poxon and Bratovich 2020).

Pacific Lamprey

The Pacific lamprey (*Lampetra tridentata*) is a California Species of Special Concern and is designated as a Species of Concern by USFWS (CDFW 2023c; Moyle et al. 2015). A petition to Federally list Pacific lamprey was determined to have insufficient information to warrant listing (USFWS 2004).

The habitat requirements of Pacific lamprey have not been well studied in Central Valley streams. Much of the understanding of Pacific lamprey life history habitat and population traits is based on collective observations and evaluations of Pacific lamprey elsewhere throughout its range. The anadromous Pacific lamprey has two very distinct parts of its life cycle. Eggs hatch into larvae known as ammocoetes, usually within a freshwater stream. Ammocoetes burrow tail first into mud or soft substrate where they filter feed on algae and organic matter. The larval lampreys often move around the stream in their 5- to 7-year stay in freshwater. When the ammocoetes reach a length of around 14 to 16 cm TL, they begin a drastic change in physiology and physical appearance, assuming a silvery form with large eyes and a sucking disc. Following ammocoete metamorphosis, downstream migration coincides with high-flow events in late-winter and early spring (Moyle 2002). The newly morphed lampreys swim downstream to the Pacific Ocean where they take on a new predatory lifestyle in an estuarine or saltwater environment, rarely straying far from the mouth of their home stream. Pacific lampreys attack and feed on fish, including salmon. Their stay at sea usually lasts 3 to 4 years in Canada but may be shortened in more southern populations.

Table 3.2-9. Lower Yuba River 2004 – 2021 Fall-run Chinook Salmon Abundance Estimates

Biological Year	Below DPD Fall-Run Chinook Salmon Estimation Method	Below DPD Fall-Run Chinook Salmon Estimate	Above DPD VAKI-Based Fall-Run Chinook Salmon Estimate	Total Fall-Run Chinook Salmon Estimate
2004	$LM_{CJS/VAKI}$	1,121	3,716	4,837
2005	$LM_{CJS/VAKI}$	3,290	5,816	9,106
2006	$LM_{CJS/VAKI}$	855	3,174	4,029
2007	$LM_{CJS/VAKI}$	0	1,007	1,007
2008	$LM_{CJS/VAKI}$	54	1,182	1,236
2009	$LM_{CJS/VAKI}$	828	1,942	2,770
2010	$LM_{CJS/VAKI}$	1,516	2,647	4,163
2011	CJS	1,398	5,396	6,794
2012	CJS	1,082	4,368	5,450
2013	CJS	3,836	7,345	11,181
2014	CJS	2,569	7,188	9,757
2015	CJS	1,787	4,780	6,567
2016[1]	--	--	--	--
2017[1]	--	--	--	--
2018[2]	'mark closed' - VAKI	406	2,779	3,185
2019[3]	CJS	640	--	--
2020	CJS	395	2,531	2,926
2021	$LM_{CJS/VAKI}$	838	2,914	3,752

Notes: Sources of estimates of abundance downstream of Daguerre Point Dam (DPD) are provided.
For years when Cormack-Jolly-Seber (CJS) estimates for downstream of DPD are not available, the abundance downstream of DPD is estimated based on the relationship (i.e., LMCJS/VAKI) between available CJS downstream estimates and VAKI-based total Chinook salmon abundance estimates upstream of DPD (Poxon and Bratovich 2020).
Whole river (i.e., Total LYR) fall-run Chinook salmon annual abundance estimates are the sum of the below DPD estimate and VAKI-based estimate upstream of DPD (YWA unpublished data).
Additional information on specific annual run estimates are provided in Poxon and Bratovich (2020).
[1] No CJS abundance estimate possible due to low capture and recapture rates. No 'mark closed'-based estimate due to no reliable VAKI-based total Chinook salmon abundance estimate upstream of Daguerre Point Dam.
[2] The VAKI-based total Chinook salmon estimate (Poxon and Bratovich 2020) was subtracted from the 'mark closed' river-wide estimate provided in the 2018 annual report. The 2018 report does not provide a VAKI-based total Chinook salmon estimate and so the below Daguerre Point Dam estimate varies slightly.
[3] A CJS below Daguerre Point Dam Chinook salmon estimate is provided, however, 2019 is excluded from total river estimation.

Like salmon, the lamprey return to freshwater and migrate upstream to spawn and die. The adult migration into freshwater towards upstream spawning areas primarily begins between early March and late June (Moyle 2002). Most adult upstream movement occurs at night under high flow conditions. Some streams have multiple runs of lamprey that may be different in the timing of entry to freshwater or in the amount of time spent in freshwater before breeding occurs.

Adult Pacific lamprey require clean, gravel-rich riffles in perennial streams to spawn successfully; these requirements are thought to be similar to those of salmonids. Nests are built on gravel substrate, with moderately swift current, water temperatures typically from 12°C to 18°C (53.6 – 64.4°F), and at depths ranging from 0.1 to 1.5 m (Moyle 2002). Ammocoetes require water temperatures below 25°C (Moyle et al. 1995). Meeuwig et al. (2005) found significant death or deformation of eggs and early stage ammocoetes in water with temperatures greater than 22°C (71.6°F).

Snorkel and electrofishing surveys have shown that Pacific lamprey is abundant and well distributed in the lower Yuba River (YCWA 2012). Juvenile Pacific lamprey was the fourth most abundant species (out of 25 species) captured during downstream migration surveys conducted at RM 7.2 from 1999 through 2010. Juvenile Pacific lamprey downstream migration occurred throughout the year, with peak migration between December and February (YCWA 2012). Although lamprey were most recently observed in the VAKI Riverwatcher™ fish monitoring system at Daguerre Point Dam during 2016 and 2017, lamprey in the lower Yuba River are not categorized to species. No lamprey were observed in the VAKI Riverwatcher™ from 2018 through February 2022.

River Lamprey

The river lamprey (*Lampetra ayresii*) is designated as a California Fish Species of Special Concern (CDFW 2023c). A petition to Federally list river lamprey was determined to have insufficient information to warrant listing (USFWS 2004).

The river lamprey occurs along most of the Pacific Coast, from just north of Juneau, Alaska, to San Francisco Bay in California. While its general range is widespread, detailed information on its distribution and abundance is lacking. The river lamprey is associated with large river systems such as the Fraser, Columbia, Klamath, Eel, and Sacramento rivers. Beamish (1980) and others have noted that river lamprey appears to be concentrated only in particular rivers, and only in the lower portions of these large rivers.

Little information is available on river lamprey life history. According to Moyle (2002), its life span is 6 to 7 years. Adult lampreys spawn in gravel bottomed streams, at the upstream end of riffle habitat. Both sexes construct the nests, often moving stones with their mouths. River lampreys lay 11,400 to 37,300 eggs per adult female. Adults typically die after the eggs are deposited and fertilized. After the eggs hatch, young ammocoetes drift downstream to areas of low velocity and silt or sand substrate. They remain burrowed in the stream bottom, living as filter feeders on algae and detritus for 2 to 7 years. Metamorphosis from the ammocoete to macropthalmia lifestage occurs between July and April. At this time, macropthalmia are thought to live deep in the river channel, which may explain why they are rarely observed. As adults, their oral disc develops just before they enter the ocean between May and July.

River lampreys were consistently observed emigrating past the RST survey sites near Hallwood Boulevard (RM 7.2) in the lower Yuba River between 1999 and 2010 (YCWA 2017). A total of 340 juvenile river lampreys were counted at the RST sites during the survey period. As discussed above, although VAKI Riverwatcher™ observations of lamprey in the lower Yuba River are not categorized to species, lamprey were most recently observed during 2016 and 2017. No lamprey were observed in the VAKI Riverwatcher™ from 2018 through February 2022.

Hardhead

Adult and juvenile hardhead have been documented in the lower Yuba River downstream of Englebright Dam during various surveys conducted since the late 1980s (reviewed by YCWA 2012). Juvenile hardhead were routinely collected during juvenile salmon emigration studies on the Yuba River between 1999 and 2009 and were routinely observed during snorkel and electrofishing surveys conducted between 1985 and 2002 (YCWA 2012, RMT 2013). However, only a few hardhead were observed during the RMT's 2012, 2014, and 2015 snorkel surveys (RMT, unpublished data). More recently, hardhead have been recorded annually in the VAKI Riverwatcher™ fish monitoring system at Daguerre Point Dam from 2015 through February 2022.

Central California Roach

Central California roach have been documented during the RST monitoring on the lower Yuba River (RMT 2013). More recently, there have been no observations of Sacramento-San Joaquin roach in the VAKI Riverwatcher™ fish monitoring system at Daguerre Point Dam from 2015 through February 2022. During the RMT 2012, 2014 and 2015 snorkel surveys, 20 juvenile roach were identified (RMT, unpublished data).

White Sturgeon

White sturgeon (*Acipenser transmontanus*) is a California Species of Special Concern (CDFW 2022c). Although there once was a commercial white sturgeon fishery in California, it was closed by the State of California in 1917 after numbers declined precipitously. After the population recovered, the State permitted a white sturgeon recreational fishery beginning in 1954, which continues to the present day (CDFW 2023d). The recreational fishery focuses on the upper San Francisco Estuary, the Delta, and the Sacramento River (CDFW 2019).

In the Central Valley, CDFW (2023d) reports that white sturgeon primarily spawn in a short reach of the middle Sacramento River between Knights Landing and Colusa (Schaffter 1997), although spawning may occur in tributaries including the Feather and Yuba rivers. Females spawn every 2 to 5 years after reaching 12 to 16 years old, while males spawn every 1 to 2 years after reaching 10 to 12 years old. White sturgeon do not necessarily breed annually and only a small percentage of the adult population spawn in a given season. In the Sacramento River system, spawning success appears to be related to high outflows during spring (CDFW 2019). Adults migrate upstream from the San Francisco Estuary during the winter, spawn from February to June, and return to the Delta after spawning. The early life history of white sturgeon is not well understood, but current evidence indicates that dispersed, fertilized eggs settle to the bottom of the river and stick to hard surfaces. Eggs hatch into the larval stage after about 12 days. The newly hatched larvae swim actively for several days before settling to the bottom of the channel. Juveniles move rapidly down-river during their first year, taking up residence in the freshwater region of the estuary (CDFW 2023d). Adult white sturgeon have been observed in the lower Yuba River downstream of Daguerre Point Dam (Beccio 2019).

Striped Bass

Striped bass (*Morone saxatilis*) is a recreationally important anadromous fish species native to the Atlantic coast and introduced into the Sacramento River Basin between 1879 and 1882 (Moyle 2002). Despite their non-native status and piscivorous feeding habits, striped bass are considered to be recreationally important because they are a major game fish in the Delta.

Striped bass occur in the Sacramento River, its major tributaries, and the Delta. Substantial striped bass spawning and rearing occurs in the Sacramento River and Delta, although striped bass can typically be found upstream as far as barrier dams (Moyle 2002). Adult striped bass are present in Central Valley rivers throughout the year, with peak abundance occurring during the spring months (CDFG 1971, DeHaven 1977 and 1979). Striped bass spawn in water temperatures ranging from 59°F to 68°F (Moyle 2002). Spawning may begin in April, but peaks in May and early June (Moyle 2002). In the Sacramento River, most striped bass spawning is believed to occur between Colusa and the mouth of the Feather River. In years of higher flow, spawning typically occurs farther upstream than usual because striped bass continue migrating upstream while waiting for temperatures to rise (Moyle 2002). Sacramento River currents carry striped bass embryos and larvae to rearing habitats in the Delta.

The number of striped bass entering Central Valley streams in summer is believed to vary with flow levels and food production (CDFG 1986). Sacramento River tributaries seem to be nursery areas for young striped bass (CDFG 1971 and 1986). Juvenile and sub-adult fish have been reported to be abundant in the lower American River and lower Yuba River during the fall (DeHaven 1977). Optimal water temperatures for juvenile striped bass rearing have been reported to range from approximately 61°F to 73°F (Hassler 1988).

CDFG (1991) reported that striped bass are unable to access the lower Yuba River upstream of Daguerre Point Dam, but they have occasionally accessed the fish ladders at Daguerre Point Dam and have been identified in the lower Yuba River downstream of Daguerre Point Dam during snorkel surveys and other fisheries studies (RMT 2013). However, striped bass were not observed in the lower Yuba River during the most recent snorkel surveys conducted in 2012, 2014, and 2015 (RMT, unpublished data)

American Shad

American shad (*Alosa sapidissima*) is a recreationally important anadromous fish species native to the Atlantic coast and introduced into the Sacramento River Basin in the 1870s (Moyle 2002). Because of its importance as a sport fish, American shad have been the subject of several CDFW investigations. The lower Yuba River from the confluence to Daguerre Point Dam has been reported to be exceptional for American shad fishing, and large numbers of fish can be caught regularly throughout June and much of July (Apalategui 2022, Excellent Adventures 2023).

American shad occur in the Sacramento River, its major tributaries, the San Joaquin River, and the Delta. Adult American shad typically enter Central Valley rivers from April through early July (CDFG 1986), with the majority of immigration and spawning occurring from mid-May through June (Urquhart 1987). Water temperature is an important factor influencing the timing of spawning. American shad are reported to spawn at water temperatures ranging from approximately 46°F to 79°F (USFWS 1967), although optimal spawning temperatures are reported to range from approximately 60ºF to 70°F (Bell 1986, CDFG 1980, Leggett and Whitney 1972, Painter et al. 1979, Rich 1987). Spawning takes place primarily in the main channels of rivers, and generally approximately 70 percent of the spawning run is made up of first-time spawners (Moyle 2002).

Shad have remarkable abilities to navigate and to detect minor changes in their environment (Leggett 1973). Although homing is generally assumed in the Sacramento River and its tributaries, there is some evidence that numbers of first-time spawning (i.e., "virgin") fish are proportional to flows of each river at the time the shad arrive. When suitable spawning conditions are found, American shad school and broadcast their eggs throughout the water column. The optimal temperature for egg development is reported to occur at 62°F. At this temperature, eggs hatch in 6 to 8 days; at temperatures near 75°F, eggs would hatch in 3 days (MacKenzie et al. 1985). Egg incubation and hatching, therefore, are coincident with the spawning period.

The main shad spawning runs in California are in the Sacramento River up to Red Bluff, with the main summer nursery areas occurring in the lower Feather River, Sacramento River from Colusa to the north Delta, and to a lesser extent the south Delta (Moyle 2002). In 2018, American shad fish eggs were collected from several of the egg mats placed below Daguerre Point Dam as part of CDFW's lower Yuba River sturgeon spawning study (Beccio 2018). American shad have primarily been observed downstream of Daguerre Point Dam during snorkel and RST surveys, but also have been observed accessing the fish ladders at Daguerre Point Dam (RMT 2013). American shad were not observed in the lower Yuba River during the most recent snorkel surveys conducted during 2012, 2014, and 2015 (RMT unpublished data).

Downstream of the Lower Yuba River

The lower Feather River downstream of the mouth of the Yuba River and the Sacramento River downstream of its confluence with the Feather River support the same fish species described above for the lower Yuba River.

3.2.2 Regulatory Setting

The Federal, State, and local plans, policies, regulations, and laws discussed in this Environmental Impact Report (EIR) are relevant to the proposed project. Other environmental laws not relevant to the proposed project are not discussed.

Federal Plans, Policies, Regulations, and Laws

Endangered Species Act

Under the Endangered Species Act (ESA), the Secretary of the Interior and the Secretary of Commerce jointly have the authority to list a species as threatened or endangered (16 U.S.C. Section 1533(c)). Pursuant to ESA requirements, a Federal agency proposing to implement or approve a project within its jurisdiction must determine whether any Federally listed threatened or endangered species may be present in the project area and determine whether the project would result in "take" of any such species. In addition, the agency is required to determine whether the project is likely to jeopardize the continued existence of any species proposed to be listed under the ESA or result in the destruction or adverse modification of critical habitat proposed to be designated for such species (16 U.S.C. Sections 1536(3), (4)). Section 7 of the ESA provides a means for authorizing incidental take of Federally endangered or threatened species that result from Federally conducted, permitted, or funded projects. Similarly, Section 10 authorizes incidental take of Federally endangered or threatened species that result from non-Federal projects.

Critical Habitat Designations

The ESA also requires the designation of "critical habitat" for listed species. "Critical habitat" is defined as: (1) specific areas within the geographical area occupied by the species at the time it is listed, on which are found those physical or biological features essential to the conservation of the species, and which may require special management considerations or protection; and (2) specific areas outside the geographic area occupied by the species at the time it is listed if the agency determines that the area itself is essential for conservation of the species (16 USC §1532(5)(a) and is capable of being occupied by the species (*Weyerhaeuser Co. v. United States Fish & Wildlife Serv.*, 139 S. Ct. 361, 368 (2018) (only "habitat" of an endangered species is eligible for designation as "critical habitat.")). As discussed above, critical habitat has been designated for spring-run Chinook salmon, steelhead, and green sturgeon in the lower Yuba River.

National Marine Fisheries Service Recovery Planning for Salmon, Steelhead, and Green Sturgeon in California

In the Central Valley, NMFS is responsible for facilitating the development of recovery plans for the following species addressed in this analysis:

- Central Valley Spring-run Chinook Salmon ESU
- Central Valley Steelhead DPS
- Southern DPS of North American Green Sturgeon

The NMFS (2014) recovery plan describes the steps, strategy, and actions recommended to return spring-run Chinook salmon and steelhead to viable status in the Central Valley, with the goal of ensuring their long-term persistence and evolutionary potential. For the Central Valley Chinook salmon ESUs and the steelhead DPS to achieve recovery, the recovery strategy is focused on two principles: (1) functioning, diverse, and interconnected habitats are necessary for a species to be viable; and (2) species viability is determined by spatial structure, diversity, productivity, and abundance. In 2018, NMFS completed a recovery plan for the Southern DPS of North American green sturgeon. To achieve delisting, the objective of the recovery plan is to increase green sturgeon abundance, distribution, productivity, and diversity by alleviating significant threats to the species, including blockage of access to spawning habitat in the Sacramento River, critical flow and water temperature patterns, harvest and poaching rates, entrainment, invasive species, exposure to contaminants, and loss of habitat and related estuarine/Delta function (NMFS 2018).

Magnuson-Stevens Fishery Conservation and Management Act

The Magnuson-Stevens Fishery Conservation Management Act, as amended by the Sustainable Fisheries Act (Public Law 104-297), was enacted primarily to establish a management system for conserving and managing commercial fisheries within the 200-mile Federal waters boundary of the U.S. The act also requires that all Federal agencies consult with NMFS on activities or proposed activities authorized, funded, or undertaken by that agency that may adversely affect EFH of commercially managed marine and anadromous fish species. EFH includes specifically identified waters and substrate necessary for fish spawning, breeding, feeding, or growing to maturity. EFH also includes all habitats necessary to allow the production of commercially valuable aquatic species, to support a long-term sustainable fishery, and to contribute to a healthy ecosystem (16 U.S.C. Section 1802(10)). Because EFH only applies to commercial fisheries, all Chinook salmon habitats are included, but not steelhead habitat.

Freshwater EFH for Pacific salmon (e.g., spring-run Chinook salmon and fall-/late fall-run Chinook salmon) includes waters currently or historically accessible to salmon within the Central Valley ecosystems, as described by Myers et al. (1998). In the Yuba River Watershed, potential project-related effects having the potential to affect EFH are limited to three geographic areas: (1) North Yuba River; (2) Yuba River upstream of Englebright Reservoir; and (3) lower Yuba River, as described below.

- **North Yuba River**. PFMC (2014) has designated Chinook salmon EFH "*To Salmon Creek, near Sierra City*."
    - *Reservoir* – Approximately 15.4 miles of the North Yuba River canyon from the NMWSE of the Reservoir at RM 17.8 to the Dam at RM 2.4.
    - *Dam Reach* – Approximately 2.4 miles of the North Yuba River from the New Bullards Bar Minimum Flow Release Powerhouse at RM 2.4 to the confluence of the North Yuba River with the Middle Yuba River at RM 0.0.
- **Yuba River Upstream of Englebright Reservoir**. Although no Chinook salmon are present upstream of Englebright Dam, nor have they been present upstream of Englebright Dam since its construction in 1941, the following reaches are contained within designated EFH.
    - *Middle/North Yuba River Reach* – Approximately 5.8 miles of the Yuba River from the confluence of the North Yuba River and the Middle Yuba River at RM 40.0 to the New Colgate Powerhouse at RM 34.2.
    - *New Colgate Powerhouse Reach* – Approximately 2.0 miles of the Yuba River from New Colgate Powerhouse at RM 34.2 to the normal maximum water surface elevation of the USACE's Englebright Reservoir at RM 32.2.
    - *Englebright Reservoir* – Approximately 7.9 miles of the Yuba River from the normal maximum water surface elevation of Englebright Reservoir at RM 32.2 to Englebright Dam at RM 24.3.
- **Lower Yuba River**. EFH is designated for the entire the lower Yuba River starting at Englebright Dam extending downstream to the confluence with the Feather River.

Fish and Wildlife Coordination Act

The Fish and Wildlife Coordination Act (16 U.S.C. Sections 661, et seq.) provides that fish and wildlife resources receive equal consideration with other features throughout the planning process of water resources development projects. The act requires consultation with USFWS, NMFS, and State fish and wildlife agencies where the waters of any stream or other body of water are proposed, authorized, permitted, or licensed to be impounded, diverted, or otherwise controlled or modified under a Federal permit or license. Consultation is undertaken for the purpose of preventing loss of and damage to wildlife resources. The project proponents are required to consider the recommendations of the consultation, but implementation of them is not mandated.

State Plans, Policies, Regulations, and Laws

California Endangered Species Act

Under the California Environmental Species Act (CESA, CFGC Sections 2050, et seq.), CDFW has the responsibility for maintaining a list of threatened and endangered species designated under State law (*see* FGC Section 2070). Pursuant to CESA requirements, an agency reviewing a proposed project within its jurisdiction must determine whether any State-listed endangered or threatened species may be present in the project area and determine whether the proposed project would result in take of any such species. Under CESA, "take" is defined as the action of or attempt to "pursue, hunt, shoot, capture, collect, or kill." CDFW may authorize the incidental take of a State-listed species under Section 2081 of the CFGC. For species that are listed as threatened or endangered under both ESA and CESA, and for which an incidental take permit has been issued in accordance with Section 7 or Section 10 of the ESA, CDFW may authorize take after certifying that the Federal incidental take permit is consistent with CESA, pursuant to Section 2080.1 of the CFGC.

California Fish and Game Code

Rivers, Lakes, and Streams

Under CFGC Section 1602, it is unlawful for any entity to substantially divert or obstruct the natural flow of or substantially change or use any material from the bed, channel, or bank of, any river, stream, or lake, or to deposit or dispose of debris, waste, or other material where it may pass into any river, stream, or lake, without first notifying CDFW of such activity and obtaining an agreement authorizing the activity.

Dams and Obstructions

Section 5937 of the CFGC requires the owner of any dam to allow sufficient water at all times to pass through a fishway, or in the absence of a fishway, allow sufficient water to pass over, around or through the dam, to keep in good condition any fish that may be planted or exist below the dam. During the minimum flow of water in any river or stream, permission may be granted by CDFW to the owner of any dam to allow sufficient water to pass through a culvert, waste gate, or over or around the dam, to keep in good condition any fish that may be planted or exist below the dam, when, in the judgment of CDFW, it is impracticable or detrimental to the owner to pass the water through the fishway.

California Environmental Quality Act Guidelines

Pursuant to State of California Environmental Quality Act (CEQA) Guidelines Section 15380, CEQA requires consideration of potential impacts not only to species that are listed Federally or by the State but also to species that are not listed but may be considered rare, threatened, or endangered. Accordingly, "A species not included in any listing identified in subdivision (c) [ESA and CESA listed species] shall nevertheless be considered to be endangered, rare or threatened, if the species can be shown to meet the criteria in subdivision (b)" (State CEQA Guidelines Section 15380(d)).

The CEQA provision requires the lead agency to consider potential impacts to a species even when the respective government agencies have not had an opportunity to determine whether the species' status warrants listing. To assess "impact significance" to populations of non-listed species as well as listed species, CDFW recommends that the lead agency consider population-level effects, proportion of the taxon's range affected by a project, regional effects, and impacts to habitat features.

Porter-Cologne Water Quality Control Act

The Porter-Cologne Water Quality Control Act (California Water Code Sections 13000, et seq.) requires that each of the State's nine RWQCBs prepare and periodically update basin plans for water quality control. Each basin plan sets forth water quality standards for surface water and groundwater and actions to control nonpoint and point sources of pollution to achieve and maintain these standards. Basin plans offer an opportunity to protect wetlands by establishing water quality objectives. RWQCB jurisdiction includes both Federally protected waters and areas that meet the definition of "waters of the State." Waters of the State include all surface water and groundwater, including saline waters, within the State's boundaries. The RWQCBs have discretion to take jurisdiction over areas not Federally regulated under Section 401, provided they meet the definition of waters of the State. Mitigation requiring no net loss of wetlands functions and values of waters of the State is typically required by RWQCB.

Regional/Local Plans, Policies, Regulations, and Ordinances

Yuba County 2030 General Plan

Most of the policies included in the Natural Resources Element of the *Yuba County 2030 General Plan* (Yuba County 2011) apply exclusively to development projects. However, the following policy addressed public investments and therefore applies to the proposed project:

- **Policy NR 5.7.** New developments and public investments near Yuba County's streams and rivers shall be designed to avoid tree removal, erosion, or other modifications that would adversely affect salmonid habitat.

Yuba County Municipal Code

Chapter 11.44 of the Yuba County Municipal Code includes a section addressing protection of natural resources. However, this chapter focuses on design of subdivisions, connections between subdivisions, and adjacent uses and developments. Therefore, it does not apply to this project.

3.2.3 Environmental Impacts and Mitigation Measures

Thresholds of Significance

The significance criteria used to evaluate the project impacts to biological resources are based on Appendix G of the State CEQA Guidelines and professional judgment. A significant impact related to fisheries resources would occur if the project would:

- have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special-status species in local or regional plans, policies, or regulations, or by CDFW, USFWS, or NMFS;
- interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impede the use of nursery sites by native wildlife;
- conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance;
- conflict with the provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or State Habitat Conservation Plan; or

- substantially reduce the habitat of a fish or wildlife species; cause a fish or wildlife population to drop below self-sustaining levels; threaten to eliminate a plant or animal community; or substantially reduce the number or restrict the range of an endangered, rare, or threatened species.

Analysis Methodology

The fisheries impact analysis methodology included evaluation of the frequency, duration, and magnitude of changes in modeled flows; review of modeled water temperatures (**Appendix E**); and evaluation of potential geomorphic impacts on fisheries habitat to assess the potential for the proposed project to impact species and lifestage-specific fisheries habitat conditions. If potential for substantial changes in fisheries habitat are identified, more detailed impact assessment tools would be employed. Impact determinations are based on consideration of all evaluated indicators for all lifestages for a particular species.

Fisheries Operational Analysis

The first step of the fisheries impact assessment methodology was to identify ARC Spillway events during the simulation period of Water Year (WY) 1970-2020 (i.e., days when flow was released through the ARC Spillway under the proposed project). Because hydrologic changes associated with the proposed project in the Yuba River Watershed are not anticipated outside of the ARC Spillway events, with the exception of minor changes in storage at the Reservoir following spillway events, this impact assessment is limited to the time periods coinciding with ARC Spillway events. The impact assessment methodologies for each geographic area (i.e., the Reservoir, Englebright Reservoir, North Yuba River downstream of the Dam, upper Yuba River, lower Yuba River, and downstream of the lower Yuba River) are described below, followed by a stand-alone section that presents the CEQA impact conclusions.

New Bullards Bar and Englebright Reservoirs

Changes in reservoir storage during the summer and fall have the potential to affect reservoir coldwater habitat availability, and changes in reservoir water surface elevations have the potential to affect reservoir fish spawning success. To assess the potential for effects to coldwater and warmwater fisheries in the Reservoir and Englebright Reservoir, a screening evaluation was conducted by reviewing the modeled reservoir storage/water surface elevation output to assess the timing, duration, and relative magnitude of reservoir storage-related changes under the proposed project compared to existing conditions. If potential reservoir storage or water surface elevation related changes were identified, reservoir model output would be compared under the proposed project compared to existing conditions to evaluate potential effects on coldwater habitat availability and reservoir fish spawning success.

North Yuba River Downstream of Dam and Upper Yuba River

The first step of the fisheries impact assessment methodology for the North Yuba River downstream of the Dam and the upper Yuba River was to conduct a screening evaluation with the modeled flow and water temperature output to assess the timing, duration, and relative magnitude of flow- and water temperature-related changes, and to identify the extent to which flow- or water temperature-related changes may impact fish species evaluated under the proposed project compared to existing conditions. If the magnitude, frequency, or duration of changes in flows or water temperatures may result in substantial changes in habitat conditions for evaluated fish species, more detailed analyses would be conducted, such as evaluation of species and lifestage-specific water temperature index values, and evaluation of flow-dependent habitat availability through application of habitat-discharge relationships.

The screening evaluation for the North Yuba River downstream of the Dam and the upper Yuba River included the following steps:

- Identify ARC Spillway events during the simulation period (i.e., days when the flow was released through the ARC Spillway under the proposed project).
- To evaluate the potential for flow-related impacts on evaluated fish species, the following screening evaluations were conducted:
    - Compare the modeled average daily flow timeseries in the North Yuba River downstream of the Dam and in the upper Yuba River below New Colgate Powerhouse during each ARC Spillway event under the proposed project and Existing Condition scenarios.
    - Calculate the average daily flow maximum daily flow in the North Yuba River downstream of the Dam and in the upper Yuba River below New Colgate Powerhouse over the duration of each ARC Spillway event under the proposed project and Existing Condition scenarios.
    - Compare flow probability of exceedance distributions in the North Yuba River downstream of the Dam and in the upper Yuba River below New Colgate Powerhouse during ARC Spillway events under the proposed project and Existing Condition scenarios.
- To evaluate the potential for water temperature-related impacts on special-status fish species, review modeled daily water temperatures downstream of the Dam and below New Colgate Powerhouse during the ARC Spillway events under the proposed project and Existing Condition scenarios.

After completion of the screening evaluations, the evaluations were used in conjunction with lifestage-specific periodicities for fish species considered for evaluation in the upper watershed to identify species and lifestages potentially impacted by flow or water temperature-related changes under the proposed project compared to existing conditions. If potential flow-related effects were identified for a species and lifestage, flow model output under the proposed project was compared to existing conditions to evaluate effects on adult and juvenile migration, lifestage-specific (i.e., adult, spawning and/or juvenile) flow-dependent habitat availability, and redd dewatering and scour. If changes in flow under the proposed project compared to existing conditions indicated the potential for substantial impacts to a species and lifestage, more detailed evaluation tools would be employed, such as application of previously developed habitat-discharge relationships (YCWA 2013a) to compare habitat availability time-series for a species and lifestage under the proposed project and Existing Condition scenarios. If changes in water temperatures indicated the potential for substantial water temperature-related effects for a species and lifestage, modeled water temperatures would be compared under the proposed project and Existing Condition scenarios in relation to species- and lifestage-specific water temperature index values (YCWA 2017).

Lower Yuba River

The first step of the fisheries impact assessment methodology for the lower Yuba River was to conduct a screening evaluation with the modeled flow and water temperature output to assess the timing, duration, and relative magnitude of flow- and water temperature-related changes in the lower Yuba River, and to identify the extent to which flow, water temperature, and geomorphic-related effects may impact fish species evaluated under the proposed project compared to existing conditions. If the magnitude, frequency, or duration of changes in flows or water temperatures may result in substantial impacts to habitat conditions for evaluated fish species in the lower Yuba River, more detailed analyses would be conducted, such as evaluation of species and lifestage-specific water temperature index values, evaluation of flow-dependent habitat availability through application of habitat-discharge relationships, and redd dewatering analyses.

The screening evaluation for the lower Yuba River included the following steps:

- Identify ARC Spillway events during the simulation period (i.e., days when the flow was released through the ARC Spillway under the proposed project).
- To evaluate the potential for flow-related impacts on evaluated fish species in the lower Yuba River, the following screening evaluations were conducted:
    - Compare the modeled daily flow timeseries at Smartsville in the lower Yuba River during each ARC Spillway event under the proposed project and Existing Condition scenarios.
    - Calculate the average daily flow and maximum daily flow at Smartsville over the duration of each ARC Spillway event under the proposed project and Existing Condition scenarios.
    - Compare flow probability of exceedance distributions at Smartsville during ARC Spillway events under the proposed project and Existing Condition scenarios.
- To evaluate the potential for water temperature-related impacts on evaluated fish species, review modeled daily water temperatures at Smartsville during the ARC Spillway events under the proposed project and Existing Condition scenarios.
- To evaluate the potential for geomorphic impacts on fisheries habitat in the lower Yuba River, compare the frequency and duration that flows in the lower Yuba River exceed bankfull (5,000 cfs) and floodway (21,100 cfs) stages under the proposed project and Existing Condition scenarios.

After the screening evaluations were completed, they were used in conjunction with lifestage-specific periodicities for evaluated fish species in the lower Yuba River to identify species and lifestages potentially impacted by flow- or water temperature-related changes under the proposed project compared to existing conditions. If potential flow-related changes were identified for a species and lifestage, flow model output under the proposed project was compared to existing conditions to evaluate effects on adult and juvenile migration, lifestage-specific (i.e., adult, spawning, and/or juvenile) flow-dependent habitat availability, and redd dewatering and scour. If changes in flow under the proposed project compared to existing conditions indicated the potential for substantial changes to a species and lifestage, more detailed evaluation tools would be employed, such as application of previously developed habitat-discharge relationships (YCWA 2013b) to compare habitat availability time-series for a species and lifestage under the proposed project and Existing Condition scenarios. If changes in water temperatures indicated the potential for substantial water temperature-related changes for a species and lifestage, modeled water temperatures would be compared under the proposed project and Existing Condition scenarios in relation to species and lifestage-specific water temperature index values (Bratovich et al. 2012; RMT 2013).

Downstream of the Lower Yuba River

The fisheries evaluations conducted for the lower Yuba River were used in conjunction with flow rates observed in the Feather and Sacramento rivers when flow changes are expected in the lower Yuba River to assess whether detailed fisheries analyses were necessary in the Feather and Sacramento rivers. In addition, changes in lower Yuba River flow under the proposed project compared to existing conditions were compared to flows in the Sacramento River at Fremont Weir during ARC Spillway events to evaluate potential for changes in floodplain habitat availability in the Sutter and Yolo bypasses.

Public Comments

Comments submitted in response to the Notice of Preparation were reviewed for relevance to the analysis of environmental consequences and development of mitigation measures. There were no comments submitted regarding fisheries resources impacts.

Issues Not Discussed Further in this EIR

Conflict with an Adopted Conservation Plan

The proposed project is not within the plan area for a Habitat Conservation Plan; Natural Communities Conservation Plan; or other approved local, regional, or State Habitat Conservation Plan that has been adopted or is in development. The Yuba-Sutter Regional Conservation Plan effort was initiated in the early 2010s to address indirect growth-inducing impacts of improvements to State Routes 70 and 99 that could result in additional development. However, planning efforts were abandoned in 2018 after it was determined that anticipated growth in the plan area had not materialized and the plan was not needed. Therefore, there would be no impact related to potential conflict of the project with an adopted Habitat Conservation Plan; Natural Communities Conservation Plan; or other approved local, regional, or State Habitat Conservation Plan, and this issue is not discussed further.

Impact Analysis

Flow Modeling

The impact analysis in Chapter 3.1, "Hydrology and Water Quality," discusses the results of operational flow modeling conducted for the proposed project and existing conditions during the 12 spill events identified for use of the ARC Spillway at the following locations: the Reservoir, North Yuba River downstream of the Dam, upper Yuba River, Englebright Reservoir, lower Yuba River, and downstream of the lower Yuba River on the Feather and Sacramento Rivers and Sutter and Yolo Bypasses. These results are used throughout the fisheries assessments and impact discussions below in this section.

Operational Erosion Assessment

The impact analysis in Chapter 3.1, "Hydrology and Water Quality," discusses the results of the operational erosion assessment. In addition, it discusses geomorphology in the lower Yuba River. Overall, the minor increase in frequency of exceeding bankfull and floodway stages under the proposed project is not expected to result in effects to channel morphology resulting from scour in the lower Yuba River that would significantly impact fisheries habitat compared to existing conditions.

Water Temperature Modeling

An overview of water temperature modeling and results is provided in Appendix E.

North Yuba River

Modeled mean daily water temperatures were compared under the proposed project and Existing Condition scenarios during each ARC Spillway event. Mean daily water temperatures in the North Yuba River below the Dam are less than about 52°F under both scenarios nearly all the time during all ARC Spillway events. Therefore, water temperature suitability for coldwater fish species (e.g., rainbow trout) would not be substantially affected in the North Yuba River under the proposed project compared to existing conditions.

Upper Yuba River

Modeled mean daily water temperatures were compared under the proposed project and Existing Condition scenarios during each ARC Spillway event. Mean daily water temperatures in the upper Yuba River below New Colgate Powerhouse are less than about 50°F under both scenarios nearly all of the time during all of the ARC Spillway events. Therefore, water temperature suitability for coldwater fish species such as rainbow trout and kokanee would not be substantially affected in the upper Yuba River under the proposed project compared to existing conditions.

Lower Yuba River

Modeled mean daily water temperatures in the lower Yuba River were compared between the proposed project and existing conditions scenarios during each ARC spillway event. Mean daily water temperatures at Smartsville are less than 50°F under both scenarios nearly all of the time during all of the ARC spillway events. Lifestage-specific water temperature index values previously used to evaluate changes in thermal suitability for special-status fish species in the lower Yuba River are all greater than 50°F (Bratovich et al. 2012; RMT 2013). Therefore, the proposed project would not substantially affect water temperature suitability for fish species in the lower Yuba River as compared to existing conditions.

Reservoir Water Surface Elevation-Related Fisheries Impact Assessment

Because the hydrologic modeling shows that no ARC Spillway events occur from May through November, coldwater fisheries habitat during the summer and fall would not be affected in the Reservoir or Englebright Reservoir under the proposed project compared to existing conditions.

Review of modeled daily water surface elevations from WY 1970-2020 in the Reservoir shows that over the 51-year evaluation period, water surface elevations would change on only two occasions under the proposed project compared to existing conditions during the March through June warmwater fish spawning period. Over several days during March of one year (1995), water surface elevation is reduced up to 6 ft, and during April of one year (1982), water surface elevation is reduced up to 3 feet under the proposed project compared to existing conditions. ARC Spillway events primarily occurred during December and January, and the two events that occurred during the March through June warmwater fish spawning period consisted of a total of only 29 days out of a possible 6,222 days (0.5 percent). Modeled daily water surface elevations in Englebright Reservoir do not differ between the proposed project and Existing Condition scenarios during March through June during any of the ARC Spillway events.

The minimal frequency and magnitude of changes in storage and water surface elevations in the Reservoir and Englebright Reservoir under the proposed project compared to existing conditions would not result in biologically significant impacts to coldwater or warmwater fish species in the reservoirs. In addition, because the infrequent and minimal changes in water surface elevations associated with ARC Spillway events only occur during December through April, the proposed project also would not result in impacts to kokanee migrating from the Reservoir and Englebright Reservoir into tributaries during the fall to spawn. Because only one ARC Spillway event occurred in April over the 51-year evaluation period, adult hardhead migrating into tributary streams in April and May also are not expected to be significantly impacted.

Yuba River Flow-Related Fisheries Impact Assessment

As described above, water temperature suitability would not be significantly affected for any species or lifestage under the proposed project compared to existing conditions in the upper watershed or in the lower Yuba River. Therefore, these effects are not further evaluated.

Because no changes in flow would occur in the North Yuba River, upper Yuba River, or lower Yuba River during May through November, species and lifestages considered for evaluation of potential flow-related effects under the proposed project are limited to lifestages that may be present during December through April. Potential flow-related impacts of the proposed project could include effects on adult and juvenile migration conditions, flow-dependent habitat availability for adults and juveniles, redd dewatering, and redd scour in the Yuba River reaches.

North Yuba River and Upper Yuba River

Based on lifestage periodicities, the following species and lifestages are evaluated in the subsequent impact discussions for the North Yuba River and upper Yuba River:

- Central California Roach
    - Spawning (March – April)
    - Adults and other lifestages (December – April)
- Hardhead
    - Spawning (March – April)
    - Adults and other lifestages (December – April)
- Rainbow Trout
    - Spawning and embryo incubation (April)
    - Juvenile rearing (December – April)
- Kokanee
    - Spawning and embryo incubation (December - April)
    - Juvenile rearing and downstream movement (December – April)

Migration Conditions

Changes in flow could potentially affect migration (spawning migration or redistribution) conditions in the North Yuba River below the Dam and in the upper Yuba River for juvenile and adult rainbow trout, hardhead, roach, kokanee, and other fish species. However, due to: (1) the minimal frequency of changes in daily flows (i.e., occurring during less than 1 percent of the days in the period of evaluation), (2) the relatively high flow ranges at which changes in flows occur (i.e., increases in flow when flows are less than about of 10,000 cfs in the North Yuba River and 20,000 cfs in the upper Yuba River, and decreases in flow when flows are greater than about 17,000 cfs in the North Yuba River and 25,000 cfs in the upper Yuba River), and (3) similar or lower daily maximum flows under the proposed project compared to existing conditions, these changes in flow would not significantly affect juvenile or adult migration conditions. Although high flow events can affect or temporarily impede migration conditions, comparison of the hydrographs under the proposed project and Existing Condition scenarios does not suggest there would be a significant difference in the distribution of flows in the North Yuba River or upper Yuba River such that migration conditions would be significantly affected under the proposed project compared to existing conditions.

Flow-Dependent Habitat Availability

Changes in flow could potentially affect habitat availability for fish species in the North Yuba River and upper Yuba River, including juvenile and adult roach, hardhead, rainbow trout, and kokanee. However, the minimal frequency of changes in daily flows (i.e., occurring during less than 1 percent of the days in the period of evaluation) indicate that flow-dependent habitat availability would not be substantially affected over the respective species and lifestage-specific periods. In addition, differences in modeled flows occurring over a minimal proportion of lifestage-specific periods during relatively high flow conditions (i.e., increases in flow when flows are less than about 10,000 cfs in the North Yuba River and 20,000 cfs in the upper Yuba River, and decreases in flow when flows are greater than about 17,000 cfs in the North Yuba River and 25,000 cfs in the upper Yuba River) are not expected to adversely affect flow-dependent habitat availability conditions. Although habitat availability modeling is not available for flows greater than approximately 3,000 cfs in the North Yuba River and about 10,000 cfs in the upper Yuba River, modeled instream habitat availability for rainbow trout and other native fish species in the North Yuba River and upper Yuba River generally peaks at flows less than 1,000 cfs (YCWA 2013a). Because this is a flood control project that will operate only during periods of high flows, changes in flows under the proposed project compared to existing conditions primarily occur at flows much higher than 1,000 cfs. Consequently, flow-dependent habitat conditions that occur at lower flows would not be substantially affected under the proposed project as compared to the high flow conditions that would exist in the without-project scenario.

Redd Dewatering and Scour

Rainbow trout and kokanee are the only species evaluated for the North Yuba River and upper Yuba River that spawn in redds. Rainbow trout reportedly spawn in these areas at the beginning of April (YCWA 2017). Because ARC Spillway events primarily occur during December and January, and only one event occurred during April over the 51-year evaluation period, rainbow trout populations are not expected to be significantly impacted due to redd dewatering or scour.

Flow reductions under the proposed project compared to existing conditions could have potential for the dewatering of kokanee redds. Kokanee reportedly spawn from early fall to April and therefore could be spawning during the ARC Spillway event timeframe of December through April. However, infrequent flow changes occurring during high flow conditions, including higher flows when flows are relatively lower during the ARC Spillway events, are not expected to substantially affect redd dewatering under the proposed project compared to existing conditions. In addition, successful spawning and subsequent embryo incubation conditions are not expected to differ between the proposed project and existing conditions given that the flow differences occur at very high flow conditions.

Substantial increases in flow under the proposed project compared to existing conditions could have potential for redd scouring. However, infrequent changes in flows during high flow conditions, including lower peak flows during the ARC Spillway events, are not expected to substantially affect channel morphology in the boulder-dominated reaches of the North Yuba River or upper Yuba River such that redd scour would be substantially affected compared to existing conditions.

Lower Yuba River

Based on lifestage periodicities, the following species and lifestages are evaluated in the subsequent impact discussions for the lower Yuba River:

- Spring-run Chinook Salmon
  - Embryo incubation (December)
  - Juvenile rearing and downstream movement (December – April)
  - Yearling+ smolt emigration (December – April)
- Steelhead
  - Adult immigration and holding (December – March)
  - Spawning and embryo incubation (January – April)
  - Juvenile rearing and downstream movement (December – April)
  - Yearling+ smolt emigration (December – mid-April)
- Green Sturgeon
  - Adult immigration and holding (mid-February – April)
  - Spawning and embryo incubation (March – April)
  - Post-spawning holding (March – April)
  - Juvenile rearing and outmigration (December – April)
- Fall-run Chinook Salmon
  - Adult immigration and staging (December)
  - Spawning and embryo incubation (December – March)
  - Juvenile rearing and downstream movement (mid-December – April)
- Pacific and River Lamprey
  - Adult immigration and spawning (March – April)
  - Ammocoete rearing and downstream movement (December – April)
- Central California Roach
  - Spawning (March – April)
  - Adults and other Lifestages (December – April)
- Hardhead
  - Spawning (March – April)
  - Adults and other lifestages (December – April)
- White Sturgeon
  - Adult immigration and holding (December – April)
  - Spawning and embryo incubation (February – April)
  - Juvenile rearing and outmigration (December – April)
- Striped Bass
  - Adult immigration and spawning (April)
  - Juvenile rearing (December – April)
- American Shad
  - Adult immigration and spawning (April)
  - Juvenile rearing (December – April)

Migration Conditions

Changes in flow could potentially affect migration conditions in the lower Yuba River for juvenile spring-run and fall-run Chinook salmon, adult and juvenile steelhead, adult and juvenile green sturgeon and white sturgeon, adult and juvenile lamprey, and adult and juvenile striped bass and American shad. However, due to: (1) the minimal frequency of changes in daily flows (i.e., occurring during less than 1 percent of the days in the period of evaluation), (2) the relatively high flow ranges at which changes in flows occur (i.e., increases in flow primarily over the flow range of 4,000 – 20,000 cfs, and decreases in flow primarily over the flow range of 35,000 – 90,000 cfs), and (3) lower daily maximum ("peak") flows under the proposed project compared to existing conditions, these flow changes would not substantially affect adult migration over the respective upstream migration lifestage periods, nor would juvenile emigration be substantially affected over the respective species-specific lifestage periods. Although high flow events can affect or temporarily impede adult upstream migration conditions under existing conditions, comparison of the hydrographs under the proposed project and Existing Condition demonstrates lower peak flows under the proposed project, which suggests that migration conditions would not be significantly affected.

Flow-Dependent Habitat Availability

The proposed project has the potential to minimally affect flows over the period extending from December into April. During this time period, changes in flow could potentially affect habitat availability for fish species in the lower Yuba River, including spring-run and fall-run Chinook salmon juvenile rearing; steelhead, green sturgeon, white sturgeon, Pacific lamprey, and river lamprey adult holding, spawning, and juvenile rearing; and roach, hardhead, striped bass, and American shad adult spawning and juvenile rearing. However, the minimal frequency of changes in daily flows (i.e., occurring during less than 1 percent of the days in the period of evaluation) indicate that flow-dependent habitat availability would not be substantially affected over the respective species and lifestage-specific periods. In addition, differences in modeled flows occurring over a minimal proportion of lifestage-specific periods during relatively high flow conditions (i.e., increases in flow primarily over the flow range of 4,000 – 20,000 cfs, and decreases in flow primarily over the flow range of 35,000 – 90,000 cfs) are not expected to substantially affect flow-dependent habitat availability conditions.

Adult holding habitat for steelhead and green and white sturgeon is not expected to be substantially affected by infrequent differences in flow when flows exceed the bankfull channel. Because successful salmonid spawning and embryo incubation habitat in the lower Yuba River is located within the bankfull channel, previous analyses of salmonid spawning habitat have been restricted to flows less than or equal to 5,000 cfs (YCWA 2017). Because differences in flow under the proposed project and Existing Condition scenarios are infrequent and primarily occur at flows greater than 4,000 cfs, steelhead spawning habitat is not expected to be substantially affected. Because spawning lamprey use similar habitat as salmonids, lamprey spawning habitat also is not expected to be substantially affected by the proposed project. Modeled green sturgeon spawning habitat increases as flows increase up to the highest modeled flow downstream of Daguerre Point Dam (42,200 cfs; YCWA 2017); however, sturgeon spawning activity has not been documented outside the bankfull channel. Therefore, green and white sturgeon spawning habitat is not expected to be substantially affected by infrequent changes in flow during high flow events.

Hydraulic habitat availability discharge relationships for salmonid juveniles in the lower Yuba River generally show increases in habitat as flows increase from 5,000 cfs to 21,100 cfs and decreases in habitat as flows increase above 21,100 cfs (YCWA 2013b). Therefore, the proposed project may result in some increases in flow-dependent habitat availability for juvenile salmonids, and potentially other juvenile fish species, compared to existing conditions. Substantial changes to ammocoete rearing habitat, including the potential for dewatering of ammocoete habitat, would not be expected with the infrequent flow increases or decreases during high flow events under the proposed project compared to existing conditions. Habitat-discharge relationships are not available in the lower Yuba River for juvenile green sturgeon or for lifestages of hardhead, roach, striped bass, or American shad. However, based on the limited potential for substantial changes in habitat availability for more sensitive lifestages described above, substantial changes in flow-dependent habitat availability are not expected to occur for these species under the proposed project compared to existing conditions.

Redd Dewatering and Scour

Reductions in flow under the proposed project compared to existing conditions could have the potential for the dewatering of redds for spring-run and fall-run Chinook salmon, steelhead, and Pacific and river lamprey. As described above, successful spawning and embryo incubation habitat for salmonids and other species is generally restricted to the bankfull channel. Therefore, infrequent changes in flows during high flow conditions when flows exceed the bankfull channel are not expected to result in a substantial increase in redd dewatering. Moreover, flow reductions under the proposed project compared to existing conditions primarily occur when flows exceed 35,000 cfs.

Substantial increases in flow under the proposed project compared to existing conditions could have the potential for the scouring of redds. However, infrequent changes in flows during high flow conditions when flows exceed the bankfull channel are not expected to result in a substantial increase in redd scour. In addition, as described above, the proposed project reduces peak flow rates, and the minor increase in frequency of exceeding bankfull and floodway stages under the proposed project is not expected to result in effects to channel morphology in the lower Yuba River that would substantially increase redd scour compared to existing conditions.

Downstream of the Lower Yuba River

Feather and Sacramento Rivers

The same fish species evaluated above for the lower Yuba River are also present in the lower Feather and Sacramento rivers. The minor changes in flow-related conditions evaluated for fish species in the lower Yuba River would be further minimized in the lower Feather River and downstream. Because the proposed project would not result in substantial effects to evaluated status fish species in the lower Yuba River, no substantial flow- or water temperature-related effects are anticipated in the larger Feather River downstream of the Yuba River or in the much larger Sacramento River downstream of the Feather River.

Sutter and Yolo Bypasses

Because the maximum daily reduction in lower Yuba River flow during these ARC Spillway events under the proposed project represents approximately 2-5 percent of the flow at Fremont Weir during flood events, and based on the infrequent occurrence of ARC Spillway events and the minimal frequency of daily flow reductions during each ARC Spillway event, the proposed project is not expected to substantially affect floodplain inundation or habitat availability in the Sutter or Yolo bypasses. Therefore, significant impacts to fish species in the bypasses are not expected to occur under the proposed project compared to existing conditions.

Impact Conclusions

This section includes CEQA-required impact conclusions for each fish species evaluated in the study area, based on construction-related impacts, operation flow and water temperature modeling results, flow-related impacts on migration conditions, flow-dependent habitat availability, and redd dewatering and scour. The preceding impact evaluations determined that all operations-related hydrologic impacts that would potentially affect fish populations and their habitats would be less than substantial and minimal, especially with respect to the limited number of days that water surface elevations, flows, and water temperatures would be changed and the small magnitude of the changes when they occurred during peak flow events. Moreover, construction-related impacts are very localized to 1 acre of the Reservoir and potentially the North Yuba River below the Reservoir and would be addressed through implementation of standard permit conditions and construction practices that minimize erosion and water quality impacts. Accordingly, all such impact conclusions for construction- and operations-related impacts to fish species and their habitats are less than significant, as presented below.

Impact FISH-1: Potential Construction-related Impacts on Fish and Their Habitats.

Reservoir

Construction of the approach channel would affect approximately 1 acre of the Reservoir. This temporary impact on an extremely small proportion of the Reservoir could result in minor disturbance of hardhead, kokanee, and rainbow trout if present near the work area but would not affect spawning habitat for these species. Minor impacts on warmwater species such as spotted, largemouth, and smallmouth bass could also occur, but limited recreational fisheries exist for these species in the reservoir.

North Yuba River

Construction of the discharge channel would permanently affect an extremely small (less than 0.1 acre) portion of the North Yuba River and associated EFH. This area is currently dominated by bedrock and the habitat conversion would have an extremely minor effect on fish populations in the North Yuba River below the Dam. Potential for fish to be directly impacted by construction activities is low, because a very small proportion of the channel is within the project site. Minimum instream flow requirements downstream of the Dam would be maintained during construction, potentially requiring a temporary bypass system. If fish are present at the project site when a bypass system is installed, a relatively small number could be lost if they are stranded in the work area. This would have a minor impact, if any, on the affected species populations.

Discharge channel construction and associated construction activities, such as vegetation clearing for construction access, would result in large areas of ground disturbance and may include equipment operation in the North Yuba River channel. Because the river channel is rocky, in-channel construction is unlikely to result in soil erosion and river sedimentation. However, disturbance of the adjacent slope could lead to erosion and potentially increase suspended sediment and turbidity in the river during and following construction. Construction equipment operating in the channel and on the adjacent slope could also introduce sediment and other hazardous materials, such as fuels, into the river. Depending on the extent of these potential impacts, fish could experience physiological stress, behavior impairment, and increased susceptibility to other sources of mortality, if present in the affected area. Exposure to high turbidity or contaminant concentrations could be lethal. These potential impacts could extend downstream of the construction area and have greater potential to affect a larger number of individuals than disturbance confined to the construction area.

Conclusions

Due to potential impacts from exposure to high turbidity or contaminant concentrations during discharge channel construction, this impact would be **potentially significant**.

Mitigation Measures: The following mitigation measures have been identified to address these impacts.

> **Mitigation Measure HWQ-1: Prepare and Implement a Stormwater Pollution Prevention Plan and BMPs to Reduce Erosion.**
>
> Please refer to Mitigation Measure HWQ-1 in Chapter 3.1, "Hydrology and Water Quality," for the full text of this mitigation measure.
>
> **Mitigation Measure HAZ-1: Implement a Spill Prevention Control and Countermeasures Plan and Other BMPs for Storage, Use, and Transport of Hazardous Materials during Construction Activities.**
>
> Please refer to Mitigation Measure HAZ-1 in Chapter 3.11, "Hazards and Hazardous Materials," for the full text of this mitigation measure.

Significance after Mitigation: Implementing Mitigation Measures HWQ-1 and HAZ-1 would reduce impacts on special-status fish because measures specifically designed to minimize erosion and sedimentation and to prevent water contamination would be implemented. Therefore, impacts from the project would be **less than significant with mitigation**.

Impact FISH-2: Potential Impacts on Reservoir Coldwater Fishes and Their Habitats.

No operations-related changes in reservoir habitat conditions would occur for coldwater fish species during the summer or fall in New Bullards Bar or Englebright reservoirs. Minimal changes in reservoir storage and water surface elevations during the winter and early spring would result in **less-than-significant impacts** to coldwater fish species and their habitats in the Reservoir and Englebright Reservoir.

Mitigation Measures: No mitigation is required.

Impact FISH-3: Potential Impacts on Reservoir Warmwater Fishes and Their Habitats.

Minimal or no operations-related changes in New Bullards and Englebright Reservoir water surface elevations during the early spring would result in **less-than-significant impacts** to warmwater fish species in the Reservoir and Englebright Reservoir.

Mitigation Measures: No mitigation is required.

North Yuba River

Impact FISH-4: Potential Impacts on Fish Species and Their Habitats in the North Yuba River.

Minimal changes in flows and the occurrence of suitable water temperatures between December and April when ARC Spillway events occur, would result in **less-than-significant impacts** to spawning and other lifestages of Central California roach, hardhead, rainbow trout, and kokanee and their habitats in the North Yuba River. A plunge pool of similar in size and depth to the plunge pool at the Primary Spillway is expected to develop over time adjacent to the ARC Spillway discharge channel. Transition of habitat in this area to a more frequently inundated area of bedrock substrate would have a minor effect on Central California roach, hardhead, rainbow trout, and kokanee and their habitats. In addition, material transported downstream would be like that currently present downstream and would not substantially alter downstream habitat or affect spawning or lifestages.

Mitigation Measures: No mitigation is required.

Impact FISH-5: Potential Impacts on Chinook Salmon Essential Fish Habitat in the North Yuba River.

Because riverine habitat characteristics used by Chinook salmon are generally similar to those of rainbow trout and kokanee, and because the foregoing evaluations demonstrated minimal changes in flow-related conditions and resulting from creation over time of a plunge pool adjacent to the ARC Spillway discharge channel, the proposed project would also result in **less-than-significant impacts** to Chinook salmon EFH in the North Yuba River.

Mitigation Measures: No mitigation is required.

Impact FISH-6: Potential Impacts on Fish Species and Their Habitats in the Upper Yuba River.

Infrequent and minimal changes in flows and the occurrence of suitable water temperatures between December and April when ARC Spillway events occur, would result in **less-than-significant impacts** to spawning and other lifestages of Central California roach, hardhead, rainbow trout and kokanee and their habitats in the upper Yuba River.

Mitigation Measures: No mitigation is required.

Impact FISH-7: Potential Impacts on Chinook Salmon Essential Fish Habitat in the Upper Yuba River.

Because riverine habitat characteristics used by Chinook salmon are generally similar to those of rainbow trout and kokanee, and because the foregoing evaluations demonstrated minimal changes in flow-related conditions, the proposed project would also result in **less-than-significant impacts** to Chinook salmon EFH in the upper Yuba River.

Mitigation Measures: No mitigation is required.

Impact FISH-8: Potential Impacts on Spring-run Chinook Salmon and Their Designated Critical Habitat in the Lower Yuba River.

No changes in habitat conditions would occur during the spring-run Chinook salmon adult immigration and holding or spawning lifestages. Infrequent and relatively minimal changes in flows during December of the embryo incubation lifestage and during December through April of the juvenile rearing and smolt emigration lifestages would result in **less-than-significant impacts** to spring-run Chinook salmon and designated critical habitat in the lower Yuba River.

Mitigation Measures: No mitigation is required.

Impact FISH-9: Potential Impacts on Steelhead and Their Designated Critical Habitat in the Lower Yuba River.

Infrequent and minimal changes in flows between December and April encompassing portions of the steelhead adult immigration and holding, spawning and embryo incubation, juvenile rearing and downstream movement, and smolt emigration lifestages would result in **less-than-significant impacts** to steelhead and designated critical habitat in the lower Yuba River.

Mitigation Measures: No mitigation is required.

Impact FISH-10: Potential Impacts on Green Sturgeon and Their Designated Critical Habitat in the Lower Yuba River.

Infrequent and minimal changes in flows between December and April encompassing portions of the green sturgeon adult immigration and holding, spawning and embryo incubation, post-spawning adult holding, and juvenile rearing and outmigration lifestages would result in **less-than-significant impacts** to green sturgeon and designated critical habitat in the lower Yuba River.

Mitigation Measures: No mitigation is required.

Impact FISH-11: Potential Impacts on Fall-run Chinook Salmon and Chinook Salmon Essential Fish Habitat in the Lower Yuba River.

Infrequent and minimal changes in flows between December and April encompassing portions of the fall-run Chinook salmon adult immigration and staging, spawning and embryo incubation, and juvenile rearing and downstream movement lifestages would result in **less-than-significant impacts** to fall-run Chinook salmon and Chinook salmon EFH in the lower Yuba River.

Mitigation Measures: No mitigation is required.

Impact FISH-12: Potential Impacts on Pacific Lamprey in the Lower Yuba River.

Infrequent and minimal changes in flows between December and April encompassing portions of the Pacific lamprey adult immigration and spawning, and ammocoete rearing and downstream movement lifestages would result in **less-than-significant impacts** to Pacific lamprey in the lower Yuba River.

Mitigation Measures: No mitigation is required.

Impact FISH-13: Potential Impacts on River Lamprey in the Lower Yuba River.

Infrequent and minimal changes in flows between December and April encompassing portions of the river lamprey adult immigration and spawning, and ammocoete rearing and downstream movement lifestages would result in **less-than-significant impacts** to river lamprey in the lower Yuba River.

Mitigation Measures: No mitigation is required.

Impact FISH-14: Potential Impacts on Central California Roach in the Lower Yuba River.

Infrequent and minimal changes in flows between December and April encompassing portions of the Central California roach spawning and other lifestage periods would result in **less-than-significant impacts** to roach in the lower Yuba River.

Mitigation Measures: No mitigation is required.

Impact FISH-15: Potential Impacts on Hardhead in the Lower Yuba River.

Infrequent and minimal changes in flows between December and April encompassing portions of the hardhead spawning and other lifestage periods would result in **less-than-significant impacts** to hardhead in the lower Yuba River.

Mitigation Measures: No mitigation is required.

Impact FISH-16: Potential Impacts on White Sturgeon in the Lower Yuba River.

Infrequent and minimal changes in flows between December and April encompassing portions of white sturgeon adult immigration and holding, spawning and embryo incubation, and juvenile rearing and outmigration lifestages would result in **less-than-significant impacts** to white sturgeon in the lower Yuba River.

Mitigation Measures: No mitigation is required.

Impact FISH-17: Potential Impacts on Striped Bass in the Lower Yuba River.

Infrequent and minimal changes in flows between December and April encompassing portions of the striped bass adult immigration and spawning and juvenile rearing lifestage periods would result in **less-than-significant impacts** to striped bass in the lower Yuba River.

Mitigation Measures: No mitigation is required.

Impact FISH-18: Potential Impacts on American Shad in the Lower Yuba River.

Infrequent and minimal changes in flows between December and April encompassing portions of the American shad adult immigration and spawning and juvenile rearing lifestage periods would result in **less-than-significant** impacts to American shad in the lower Yuba River.

Mitigation Measures: No mitigation is required.

Impact FISH-19: Potential Impacts on Fish Species and Their Habitats in the Lower Feather and Sacramento Rivers.

Because relative changes in flows under the proposed project evaluated in the lower Yuba River would be further reduced in the Feather River and downstream, potential effects evaluated for fish species in the lower Yuba River would be further minimized for fish species and their habitats in the lower Feather River and downstream. Therefore, the proposed project would result in **less-than-significant impacts** to fish species and their habitats in the Feather River downstream of the Yuba River and in the Sacramento River downstream of the Feather River.

Mitigation Measures: No mitigation is required.

Impact FISH-20: Potential Impacts on Fish Species and Their Habitats in the Sutter and Yolo Bypasses.

The infrequent and minimal changes in flows exiting the lower Yuba River under the proposed project compared to flows in the Sacramento River near Sutter and Yolo bypasses during flood events would result in **less-than-significant impacts** to floodplain habitat availability for fish species and their habitats in the bypasses.

Mitigation Measures: No mitigation is required.

Residual Significant Impacts

The project would result in potentially significant impact to fisheries resources, but implementation of the mitigation measures identified above would reduce potential impacts on fisheries resources to a less-than-significant level. Therefore, the project would not result in residual significant impacts, and the project would not have any significant and unavoidable impacts related to fisheries resources.

3.3 Terrestrial Biological Resources

This section provides an overview of the existing terrestrial biological resource conditions in the New Bullards Bar Dam Atmospheric River Control (ARC) Spillway Project (project or proposed project) area, identifies the regulatory framework, and analyzes potential impacts to terrestrial biological resources that would result from project construction and operation. Existing conditions and potential impacts related to fisheries are addressed in Chapter 3.2, "Fisheries Resources."

Biological resource studies completed to support Federal Energy Regulatory Commission (FERC) license renewal and additional data gathered for the proposed project were the primary information sources for this analysis. The project site was included in numerous studies of terrestrial biological resources conducted in 2012-2016 to support FERC license renewal (Yuba County Water Agency [YCWA] 2012a, 2012b, 2012c, 2012d, 2012e, 2012f, 2013a, 2013b, 2013c, 2016a, 2016b, 2016c, and 2016d). Additional data on terrestrial resources in the project vicinity were collected during subsequent biological monitoring for nesting birds at the Cottage Creek Boat Ramp in 2017, biological surveys at Cottage Creek Campground in 2016, and nesting bird surveys at the Cottage Creek parking area in 2020 (HDR Engineering [HDR] unpublished data 2016, 2017, 2020). Field surveys of the project site were conducted by HDR biologists in 2020 and 2021 to map current land cover/habitat types and extents and generally document existing conditions (HDR unpublished data). Additional relevant information was obtained from the United States (U.S) Fish and Wildlife Service (USFWS) Information, Planning, and Consultation (IPaC) website, California Department of Fish and Wildlife (CDFW) California Natural Diversity Database (CNDDB), California Native Plant Society (CNPS) list of rare and endangered plants, and scientific articles and other available documents on species distribution and habitat requirements.

3.3.1 Environmental Setting

The approximately 66-acre project site ranges from approximately 1,350 feet above mean sea level in the North Yuba River channel to approximately 2,250 feet on the ridge where the eastern batch plant/staging area and soil and rock disposal area are located. Topography is highly variable, sloping steeply down from Marysville Road into the New Bullards Bar Reservoir (Reservoir), down to the river channel, and up to the soil and rock disposal area.

The terrestrial biological resources operations study area includes areas with potential to experience changes in flows resulting from ARC Spillway operation and associated changes in Reservoir storage and releases. These were determined to include the Reservoir and the North Yuba River below it, the upper Yuba River, Englebright Reservoir, and the lower Yuba River to its confluence with the Feather River. As described in Chapter 3.1, "Hydrology and Water Quality," changes in river flows below Englebright Dam and changes in water levels of Englebright Reservoir would be very minor. It was determined that these minor changes would not have potential to substantially affect terrestrial biological resources. Therefore, this section focuses on resources and potential impacts to such resources associated with the Reservoir and Yuba River reaches downstream of the New Bullards Bar Dam (Dam) to the upstream end of Englebright Reservoir.

Habitat and Land Cover Types

The project site supports a variety of habitats and unvegetated land cover types, as listed in **Table 3.3-1**, shown in **Figure 3.3-1**, and described below. These cover types were mapped in the field in 2020 and 2021. A minimum mapping unit of 0.1 acre was used when differentiating cover types. Nomenclature of vegetation types generally follows *A Manual of California Vegetation*, 2nd Edition (Sawyer et al. 2009).

Table 3.3-1. Habitat and Land Cover Types in the Project Site.

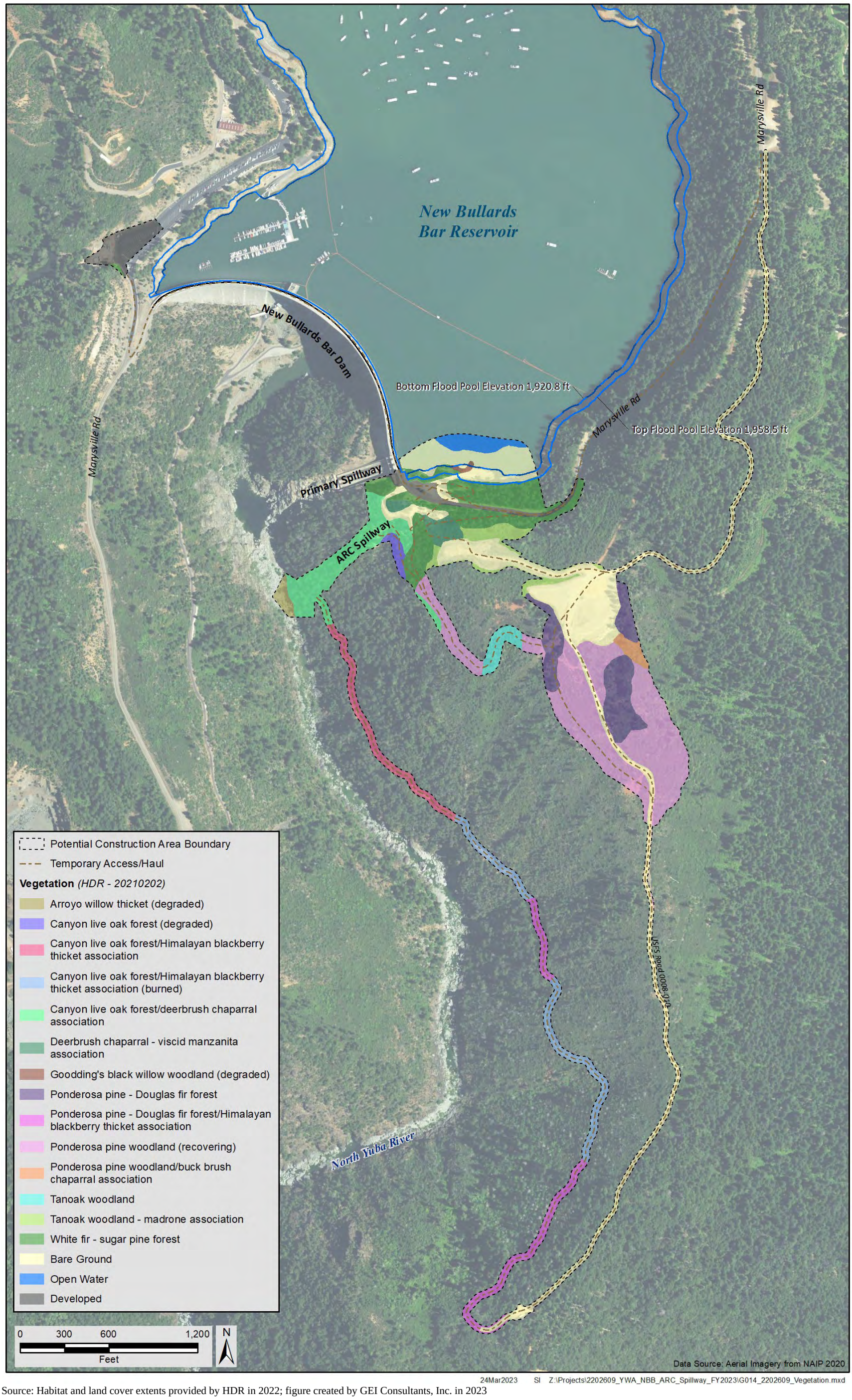
Cover Type	Project Site Acreage
Developed and bare ground	22.29
Open water	1.16
Ponderosa pine woodland (recovering)	13.91
Buckbrush chaparral association	0.55
Ponderosa pine–Douglas fir forest	4.79
Himalayan blackberry thicket association	2.52
White fir–Sugar pine forest	7.40
Canyon live oak forest (degraded)	0.47
Deer brush chaparral association	4.51
Himalayan blackberry thicket association (burned)	2.57
Himalayan blackberry thicket association	1.92
Deer brush chaparral/viscid manzanita association	1.08
Tanoak woodland	0.98
Madrone association	1.72
Arroyo willow thicket (degraded)	0.48
Goodding's black willow woodland (degraded)	0.13
Total	66.50

Source: HDR, Inc. 2021

Habitats and Land Cover at the Project Site

Unvegetated Land Covers

Unvegetated land covers on the project site include open water of the Reservoir; bare ground, primarily at the Reservoir edge, batch plant/southern staging area, unpaved maintained portions of Unites States Forest Service (USFS) Road 0008-010, and a small portion of the soil and rock disposal area; and developed land, including Marysville Road and the northern contractor staging area in the parking lot near the New Bullards Bar Marina (Marina).



Source: Habitat and land cover extents provided by HDR in 2022; figure created by GEI Consultants, Inc. in 2023

Figure 3.3-1. Habitat and Land Cover Types at the Project Site

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Ponderosa Pine Woodland

Ponderosa pine woodland is dominated by ponderosa pine (*Pinus ponderosa*) in the tree layer, with deer brush (*Ceanothus integerrimus*), Pacific madrone (*Arbutus menziesii*), Scotch broom (*Cytisus scoparius*), and whiteleaf manzanita (*Arctostaphylos viscida*) in the shrub layer. This community has a relatively open canopy with some herb layer development. It occurs throughout most of the soil and rock disposal area, in a form indicating that it is recovering from a fire. The relatively sparse ponderosa pine trees in this area are less than approximately 20-feet-tall. This community has one association, a buck brush chaparral association, in which deer brush is absent and buck brush (*Ceanothus cuneatus*) is a co-dominant species with Scotch broom in the shrub layer; it occurs in the northeast portion of the soil and rock disposal area.

Ponderosa Pine–Douglas Fir Forest

Ponderosa pine–Douglas fir forest is co-dominated by ponderosa pine and Douglas fir (*Pseudotsuga menziesii*) in the tree layer, with some occurrence of tanoak (*Notholithocarpus densiflorus*), bigleaf maple (*Acer macrophyllum*), and Pacific madrone in the tree layer and broken honeysuckle (*Lonicera interrupta*) and deer brush in the shrub layer. This community has a completely closed to moderately closed canopy with minimal herb development. It occurs along USFS Road 0008-010 and patchily in the soil and rock disposal area, generally on west- or northwest-facing slopes. This community has one association, a Himalayan blackberry association, in which Himalayan blackberry (*Rubus armeniacus)* is the dominant species in the shrub layer; it occurs along the abandoned portion of USFS Road 0008-010.

White Fir–Sugar Pine Forest

White fir–sugar pine forest is dominated by white fir (*Abies concolor*) and sugar pine (*Pinus lambertiana*) in the tree layer, with sugar pine providing marginally more cover. Scattered Douglas firs also occur in the tree layer, and minor cover of Pacific madrone and/or Jeffrey pine (*Pinus jeffreyi*) can occur in the tree to shrub layer. Canopy closure is variable; in areas with a relatively open canopy, deer brush chaparral comprises the understory. This community occurs along Marysville Road, south and east of the Dam.

Canyon Live Oak Forest

Canyon live oak forest is dominated by canyon live oak (*Quercus chrysolepis*) in the tree layer, with mixed cover of California black oak (*Quercus kelloggii*), Pacific madrone, California buckeye (*Aesculus californica*), toyon (*Heteromeles arbutifolia*), bush monkeyflower (*Mimulus aurantiacus*), and bigleaf maple in the tree and/or shrub layers. This community has a dense canopy and poorly developed herb layer and occurs on west-facing slopes in the lower portion of the discharge channel and elsewhere along the unmaintained portion of USFS Road 0008-010. This community has two associations and two additional forms within the project site:

- The deer brush chaparral association occurs in the lower portion of the discharge channel, where deer brush is the dominant species in the shrub layer.
- The Himalayan blackberry thicket association occurs along the abandoned portion of USFS Road 0008-010, where Himalayan blackberry is dominant in the shrub layer and co-occurs with other non-native species, such as Scotch broom and bristly dogtail grass (*Cynosurus echinatus*).
- The burned form of canyon live oak forest occurs along the abandoned portion of USFS Road 0008-010 and appears to be recovering from a fire approximately 10 years ago.

- The degraded form of canyon live oak forest occurs on a steep rocky slope near the middle of the discharge channel.

Deer Brush Chaparral

Deer brush chaparral is dominated by deer brush in the shrub layer, with some occurrences of whiteleaf manzanita, Scotch broom, Pacific madrone, and fewer patches of bigleaf maple. This community is relatively closed, with limited herb development, and is often the understory component of the white fir–sugar pine forest described below. This community only occurs in two patches in the middle portion of the discharge channel, on southwest-facing moderate slopes. This community has one association, a whiteleaf manzanita association, in which whiteleaf manzanita is the dominant species in the shrub layer.

Tanoak Woodland

Tanoak woodland is dominated by tanoak, with lesser co-dominance of bigleaf maple and Pacific madrone in the tree layer. This community has a relatively closed canopy with some Himalayan blackberry, Pacific madrone, and Scotch broom in the shrub layer and some woolly mullein (*Verbascum thapsus*) in the herb layer, primarily on the community margins. It occurs near the discharge channel and soil and rock disposal area. This community has one association, a Pacific madrone association, in which Pacific madrone cover is nearly as extensive as the tanoak cover.

Arroyo Willow Thicket

Arroyo willow thicket is dominated by arroyo willow (*Salix lasiolepis*) in the tree layer, with some cover of Fremont's cottonwood (*Populus fremontii*), and patches of Himalayan blackberry in the shrub layer. This community is limited to the North Yuba River channel below the discharge channel. Although mapped as a vegetation community, bare bedrock and boulder riverbed comprise most of the surface area and few plants are present, as a result of regulated flows. Because of this condition, this community is in a degraded form and does not function as a typical arroyo willow thicket.

Goodding's Black Willow Woodland

Goodding's black willow woodland is dominated by Goodding's black willow (*Salix gooddingii*) in the tree layer and with virtually no other plant cover. This community occurs below the existing Overlook Site, on a relatively steep and eroding north-facing slope with limited cover overall. It is likely a remnant cluster of Goodding's black willows that may have been more extensive in the past. Because of the ongoing erosion and apparent remnant nature, this community is in a degraded form.

Habitats in the Operations Study Area

The operations study area for terrestrial biological resources includes the Reservoir and North Yuba River. This study area is dominated by open water and adjacent oak and conifer woodland and forest. The North Yuba River below the Dam extends for approximately 2.3 miles to its confluence with the Middle Yuba River. Most of the reach is composed of bedrock and car- and house-sized boulders that separate large mid-channel pools. There are very short and infrequent areas of cobble-size deposits, but most of the substrate is large and immobile. There is no apparent floodplain or terrace development, and aquatic habitat is dominated by pocketwater and mid-channel pools. Physical cover features and in-river vegetation are limited. Bank erosion is rare, given the bedrock/boulder channel margins. (YCWA 2013c.)

Nonnative Invasive Plants

Non-native invasive plants were documented in and near the project site during surveys conducted for FERC relicensing, including bull thistle (*Cirsium vulgare*), Medusahead grass (*Elymus caput-medusae*), Scotch broom, Himalayan blackberry, yellow star-thistle (*Centaurea solstitialis*), Bermuda grass (*Cynodon dactylon*), skeleton weed (*Chondrilla juncea*), barbed goat grass (*Aegilops triuncialis*), French broom (*Genista monspessulana*), and Italian thistle (*Carduus pycnocephalus* ssp. *pycnocephalus*). The most widespread weeds identified were Himalayan blackberry, scotch broom, and yellow star-thistle, which are present throughout the project site. Bermuda grass is also common, occurring in a thin band around the Reservoir just below the minimum flood pool elevation, and along roads in the project site. These are also the most common invasive species documented in portions of the operations study area for which mapping was conducted (YCWA 2012b).

Sensitive Habitats

Sensitive habitats include those that are of special concern to resource agencies or are afforded specific consideration under Federal or State regulations. Sensitive habitats may be of special concern for a variety of reasons, including their locally or regionally declining status or because they provide important habitat for special-status species.

Waters and Wetlands

The Reservoir, North Yuba River, North Yuba River and Middle Yuba River, Englebright Reservoir, and Lower Yuba River are waters of the U.S. under the U.S. Army Corps of Engineers (USACE) jurisdiction and waters of the State under State Water Resources Control Board and Regional Water Quality Control Board (RWQCB) jurisdiction. In addition, the river reaches qualify as streams and the reservoirs qualify as lakes under CDFW jurisdiction. No areas that meet criteria to qualify as wetlands are present at the project site (YCWA 2012a).

Critical Habitat

No units of proposed or designated critical habitat for Federally listed species overlap the project site or operations study area. The edge of California red-legged frog critical habitat Unit YUB-1 is approximately 1.5 miles northwest of the contractor staging area in the parking lot near the Marina and 2 miles from the primary construction area at the ARC Spillway.

Sensitive Natural Communities

CDFW maintains a list of sensitive natural communities that includes tanoak forest and Goodding's black willow woodland (CDFW 2022). Both communities occur in very small amounts in the project site. In addition, tanoak woodland occurs primarily in association with Pacific madrone, where madrone is nearly as extensive in cover as the tanoak, and Goodding's black willow woodland is in an apparently remnant, degraded patch. Therefore, these do not function as sensitive natural communities at the project site.

Patches of riparian habitat were identified occur along the North Yuba River during surveys conducted for FERC relicensing (YCWA 2017). These areas supported woody species in various life stages, including mature trees, recruits (i.e., saplings) and seedlings; the abundance of each life stage was often dependent on substrate conditions.

Wildlife

Numerous common wildlife species are known and expected to occur at the project site and operations study area. Reptiles likely to occur include garter snakes (*Thamnophis* sp.), western rattlesnake (*Crotalus oreganus*), western fence lizard (*Sceloporus occidentalis*), western sagebrush lizard (*Sceloporus graciosus gracilis*), and Sierra alligator lizard (*Elgaria coerulea palmeri*). These species occur in a variety of habitats, including woodlands, forests, scrub, and grasslands.

A high diversity of common resident birds occur in the variety of habitats of the project site and operations study area. These include species such as osprey (*Pandion haliaetus*), red-tailed hawk (*Buteo jamaicensis*), great horned owl (*Bubo virginianus*), acorn woodpecker (*Melanerpes formicivorus*), northern flicker (*Colaptes auratus*), Steller's jay (*Cyanocitta stelleri*), wrentit (*Chamaea fasciata*), dark-eyed junco (*Junco hyemalis*), and spotted towhee (*Pipilo maculatus*). Additional species, such as Pacific-slope flycatcher (*Empidonax difficilis*), Cassin's vireo (*Vireo cassinii*), cliff swallow (*Petrochelidon pyrrhonota*), orange-crowned warbler (*Leiothlypis celata*), black-throated gray warbler (*Setophaga nigrescens*), and black-headed grosbeak (*Pheucticus melanocephalus*) are only present during migration and the breeding season (eBird 2023, FERC and USACE 2019.)

Common mammals at the project site and operations study area include Columbian black-tailed deer (*Odocoileus hemionus columbianus*), black bear (*Ursus americanus*), and western gray squirrel (*Sciurus griseus*). These species are most often associated with the forested and woodland habitats. Columbian black-tailed deer are generally migratory and spend the summer months at higher elevations and winter months in the foothills. Deer at the project site and operations study area are associated with migratory Columbian black-tailed deer from the Mooretown and Downieville Deer Herds and non-migratory resident deer of the foothills. The project site is within winter range for the Mooretown Deer Herd and critical winter range for the Downieville Deer Herd (FERC and USACE 2019.)

Special-status Species

Plants and animals addressed as special-status species in this analysis include taxa (distinct taxonomic categories or groups) that fall into any of the following categories:

- taxa officially listed, candidates for listing, or proposed for listing by the Federal government or the State of California as endangered, threatened, or rare;
- taxa that meet the criteria for listing;
- wildlife identified by CDFW as species of special concern and plant taxa considered by CDFW to be "rare, threatened, or endangered in California";
- species listed as Fully Protected under the California Fish and Game Code (CFGC); or
- species afforded protection under local or regional planning documents.

Plant taxa are assigned by CDFW to one of the following six California Rare Plant Ranks (CRPRs):

- CRPR 1A—Plants presumed to be extinct in California;
- CRPR 1B—Plants that are rare, threatened, or endangered in California and elsewhere;
- CRPR 2A—Plants that are presumed extirpated in California, but are more common elsewhere;
- CRPR 2B—Plants that are rare, threatened, or endangered in California, but are more common elsewhere;
- CRPR 3—Plants about which more information is needed (a review list); or
- CRPR 4—Plants of limited distribution (a watch list).

CDFW considers all plants with a CRPR "special plants," a broad term applied to all plant taxa inventoried in the CNDDB, regardless of their legal or protection status. Plants ranked as CRPR 1 or 2 may qualify as endangered, rare, or threatened species within the definition presented in Section 15380 of the State CEQA Guidelines. CDFW recommends, and local governments may require, that CRPR 1 and 2 plants be addressed in California Environmental Quality Act (CEQA) documents. In general, CRPR 3 and 4 plants do not meet the definition of endangered, rare, or threatened pursuant to State CEQA Guidelines Section 15380; however, these species may be evaluated by the lead agency on a case-by-case basis. This section analyzes List 1, 2, 3, and 4 plants.

CDFW applies the term "California species of special concern" to wildlife taxa that are not listed under the Federal Endangered Species Act (ESA) or California Endangered Species Act (CESA) but that are nonetheless declining at a rate that could result in listing, or that historically occurred in low numbers and are subject to current known threats to their persistence.

The CNDDB and CNPS inventory queries included the U.S. Geological Survey Challenge 7.5-minute quadrangle, within which the project site is located, and the surrounding eight quadrangles (Forbestown, Clipper Mills, Strawberry Valley, Rackerby, Camptonville, Oregon House, French Corral, and Nevada City). CNDDB, CNPS, and IPaC species lists are provided in **Appendix F,** "Biological Database Searches," (Note: Not all species tracked in the CNDDB and CNPS inventory and included on species lists meet the definition of special-status species described above.) **Figure 3.3-2** shows known special-status plant species within 1 mile of the project site documented during surveys conducted to support FERC license renewal (YCWA 2012b).

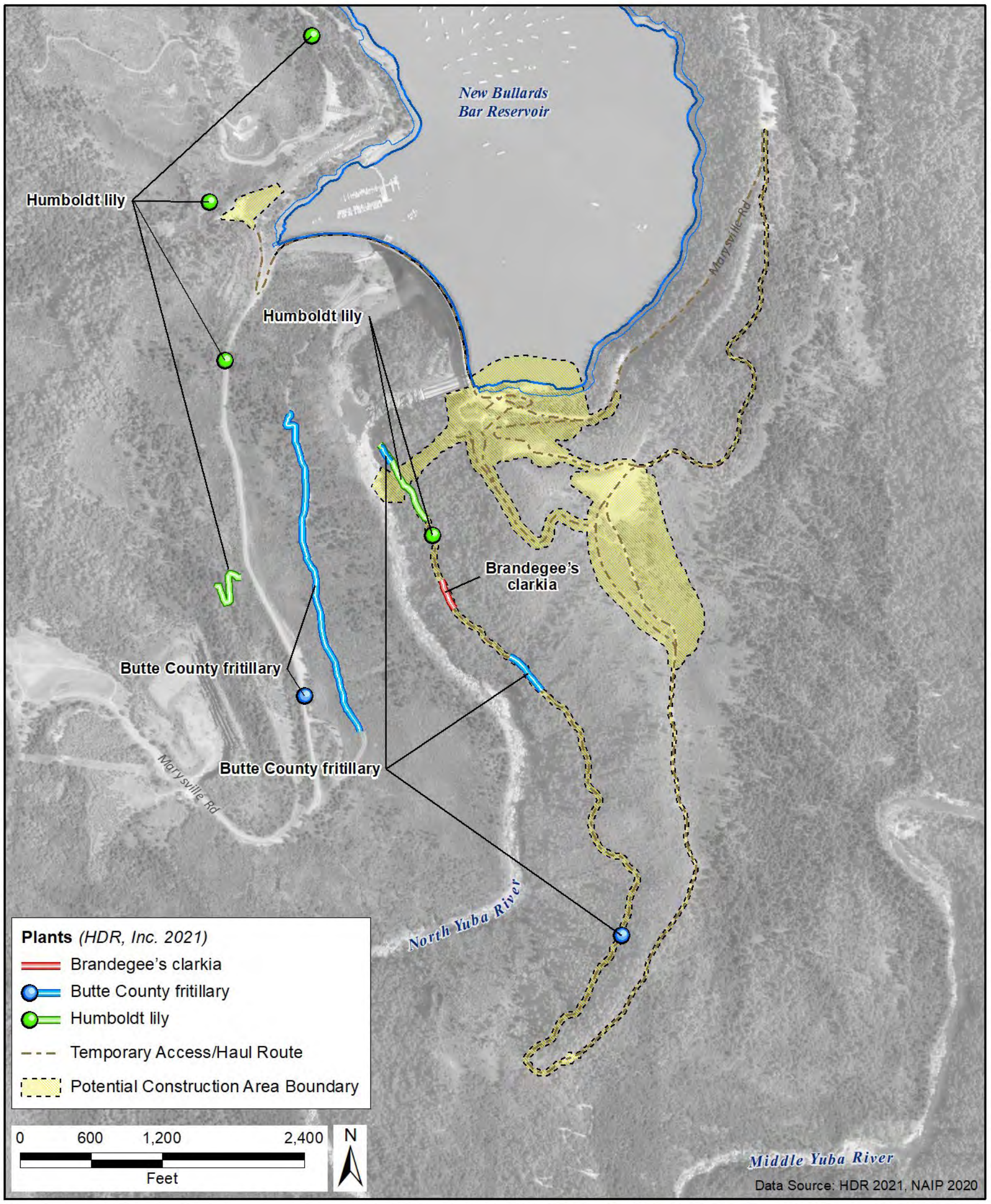
Special-status Plants

A preliminary list of special-status plants to be evaluated for potential to occur at the project site and/or in the operations study area was developed based on the special-status plant technical memorandum prepared to support FERC license renewal (YCWA 2012b), CNDDB and CNPS species and occurrence information (CDFW 2023, CNPS 2023), the USFS Region 5 Sensitive Plant Species List (USFS 2013), and the IPaC resource list (USFWS 2023). Special-status fungi were also considered. **Table 3.3-2** provides information on special-status plant and fungi taxa that were determined to have potential to occur at the project site or operations study area, based on known occurrences, habitat and microhabitat requirements, and observations made during the 2020 and 2021 field surveys. Taxa that are restricted to elevations or habitat conditions absent from the project site (e.g., vernal pools and serpentine and gabbro soils) were excluded from consideration.

Based on extensive protocol-level botanical surveys conducted on more than 1,900 acres in 2012, six special-status plant and fungi taxa are known to occur at the project site and/or operations study area: Brandegee's clarkia (*Clarkia biloba* ssp. *brandegeeae*), lady's-slipper orchid (*Cypripedium fasciculatum*), Butte County fritillary (*Fritillaria eastwoodiae*), Cantelow's lewisia (*Lewisia cantelovii*), Humboldt lily (*Lilium humboldtii* ssp. *humboldtii*), and olive phaeocollybia (*Phaeocollybia olivacea*).

Special-status plant surveys conducted in 2012 and 2015 documented Humboldt lily and Butte County fritillary near the lower end of the discharge channel and at two locations each along USFS Road 0008-010. Humboldt lily also was found at one location at the edge of the Marina parking lot, and Brandegee's clarkia was found at one location along USFS Road 0008-010. Based on habitat conditions observed during the 2020 and 2021 field surveys, these populations are likely to still be present at the project site and are discussed in more detail below. Brandegee's clarkia, lady's-slipper orchid, Cantelow's lewisia, Humboldt lily, and olive phaeocollybia have been documented in the operations study area, primarily in the upper arms of the Reservoir. These occurrences are also described below (YCWA 2012b, HDR unpublished data 2021.)

Four additional species were determined to have potential to occur in the operations study area: Sierra arching sedge (*Carex cyrtostachya*), brownish-beaked rush (*Rhynchospora capitellata*), wooly-fruited sedge (*Carex lasiocarpa*), and white-beaked rush. However, none of these sedges and rushes has been documented in the vicinity.



Source: Plant occurrence extents provided by HDR in 2022; figure created by GEI Consultants, Inc. in 2023

Figure 3.3-2. Known Special-tatus Plant Occurrences within 1 Mile of the Project Site

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Table 3.3-2. Special-status Plants and Fungi with Potential to Occur at or Adjacent to the Project Site or in the Operations Study Area

Species	Blooming Period	Federal Status1	State Status1	Elevation Range (feet)	Habitat Associations
Fungi					
olive phaeocollybia (Phaeocollybia olivacea)	Fall fruiting	FSS (P/T)	–	unknown	Older forest habitats
Plants					
Sanbom's onion *Allium sanbornii* var. *congdonii*	April–July	–	4.2	950-3,250	Cismontane woodland, lower montane coniferous forest
Sanbom's onion *Allium sanbornii* var. *sanbornii*	May–September	–	4.2	850-5,000	Chaparral, cismontane woodland, serpentine
Sierra foothills brodiaea *Brodiaea sierrae*	May–August	–	4.3	150-3,200	Usually serpentinite or gabbroic soils in chaparral, cismontane woodland, lower montane coniferous forest
dissected-leaved toothwort *Cardamine pachystigma* var. *dissectifolia*	February–May	–	1B.2	800-6,900	Usually serpentinite, rocky areas in chaparral and lower montane coniferous forest
Sierra arching sedge *Carex cyrtostachya*	May–August	–	1B.2	2,000-4,460	Lower montane coniferous forest (mesic), meadows and seeps, marshes and swamps, riparian forest
Woolly-fruited sedge *Carex lasiocarpa*	June–July	–	2B.3	2,000-4,460	Bogs and fens, marshes and swamps (freshwater, lake margins)
Brandegee's clarkia *Clarkia biloba* ssp. *brandegeeae*	May–July	–	4.2	200-3,000	Chaparral, cismontane woodland; often roadcuts
white-stemmed clarkia *Clarkia gracilis* ssp. *Albicaulis*	May–July	FSS(P)	1B.2	800-3,500	Chaparral, cismontane woodland, sometimes serpentine
golden-anthered clarkia *Clarkia mildrediae* ssp. *lutescens*	June–August	–	4.2	900-5,750	Cismontane woodland, lower montane coniferous forest; often road cuts
Mosquin's clarkia *Clarkia mosquinii*	May–July (September)	FSS(P)	1B.1	600-4,000	Rocky areas and roadsides in cismontane woodland, lower montane coniferous forest
Sierra clarkia *Clarkia virgata*	May–August	–	4.3	1,300-5,300	Cismontane woodland and lower montane coniferous forest
clustered lady's-slipper *Cypripedium fasciculatum*	March–August	FSS (P/T)	4.2	500-7,200	Lower montane coniferous forest, North Coast coniferous forest, mixed conifer
Clifton's eremogone *Eremogone cliftonii*	April–September	FSS(P)	1B.3	1,500-5,800	Openings, usually granitic, in chaparral and montane coniferous forest
Northern Sierra daisy *Erigeron petrophilus* var. *sierrensis*	June–October	–	4.3	900-6,800	Cismontane woodland, montane coniferous forest; sometimes serpentinite

Species	Blooming Period	Federal Status1	State Status1	Elevation Range (feet)	Habitat Associations
minute pocket moss *Fissidens pauperculus*	None	FSS(P)	1B.2	below 3,600	Damp soils in coniferous forest
Butte County fritillary *Fritillaria eastwoodiae*	March–June	FSS (P/T)	3.2	150-4,900	Chaparral, cismontane woodland, lower montane coniferous forest; sometimes serpentine
Humboldt lily *Lilium humboldtii* ssp. *humboldtii*	May–July (August)	–	4.2	1,500-3,500	Openings in chaparral, cismontane woodland, lower montane coniferous forest
Lewis Rose's ragwort *Packera eurycephla* var. *lewisrosei*	March–July (August–September)	FSS(P)	1B.2	900-6,200	Chaparral, cismontane woodland, lower montane coniferous forest
white beaked-rush *Rhynchospora alba*	June–August	–	2B.2	195-6,695	Bogs and fens, meadows and seeps, marshes and swamps (freshwater)
brownish beaked-rush *Rhynchospora capitellata*	July–August	–	2B.2	150-6,560	Lower montane coniferous forest, meadows and seeps, marshes and swamps, upper montane coniferous forest
Tracy's sanicle *Saniculaa tracyi*	April–July	–	4.2	300-5,200	Openings in cismontane woodland, lower montane coniferous forest, upper montane coniferous forest
long-fruit jewelflower *Streptanthus longisiliquus*	April–September	–	4.3	2,300-4,900	Openings in cismontane woodland and lower montane coniferous forest

Note: Taxa known to occur at the project site are designated with yellow shading.

[1] Status Definitions

– = no status

Federal Status

FSS = U.S. Forest Service Region 5 Sensitive Plant List for Tahoe (T) and Plumas (P) National Forests

California Rare Plant Ranks

1B = Plant species considered rare or endangered in California and elsewhere

3 = Plants about which more information is needed – a review list

4 = Plants of limited distribution – a watch list

California Rare Plant Rank Extensions

1 = Seriously endangered in California (greater than 80 percent of occurrences are threatened and/or have a high degree and immediacy of threat).

2 = Fairly endangered in California (20 to 80 percent of occurrences are threatened and/or have a moderate degree and immediacy of threat).

3 = Not very threatened in California (less than 20 percent of occurrences are threatened and/or have a low degree and immediacy of threat or no current threats known)

Sources: CDFW 2023; CNPS 2023; USFS 2013; USFWS 2023; YCWA 2012b; additional data collected by HDR in 2020 and 2021

Olive phaeocollybia

One of three areas occupied by olive phaeocollybia along the southeast side of the Reservoir extends down to the shoreline. This occurrence is approximately 1 mile from the northeast end of the Reservoir. Vegetation in this area is dominated by an overstory of Ponderosa pine and Douglas fir.

Brandegee's Clarkia

Six occurrences of Brandegee's clarkia, totaling more than 500 plants, were found during the 2012 surveys. One of these occurrences is on a rocky cliff face adjacent to USFS Road 0008-010. The habitat in this area is dominated by an overstory of canyon live oak and California laurel (*Umbellularia californica*), with an understory of poison oak (*Toxicodendron diversilobum*), deer brush, California buckeye, and bush monkeyflower. Brandegee's clarkia also occurs at three locations along the southeast side of the Reservoir in habitat dominated by an overstory of Douglas fir, tanoak, black oak, and canyon live oak, with an understory dominated by poison oak, deer brush, Pacific dogwood (*Cornus nuttallii*), bigleaf maple, gold back fern (*Pentagramma triangularis*), and pink honeysuckle (*Lonicera hispidula*).

Lady's-slipper orchid

One occurrence of six clustered lady's-slipper plants was documented near the northeast end of the Reservoir, in the same area as the olive phaeocollybia population. Habitat was dominated by an overstory of tanoak, canyon live oak, and Pacific dogwood (*Cornus nuttallii*), with an understory of poison oak, pink honeysuckle, woodland star (*Trientalis latifolia*), and Hooker's fairybell (*Disporum hookeri*).

Butte County Fritillary

Five occurrences of Butte County fritillary, totaling more than 500 plants, were found during the 2012 surveys. Two of these occurrences were on a cliff-like cut bank adjacent to USFS Road 0008-010, in an area that burned approximately 10 years ago. Habitat in this area includes an overstory dominated by canyon live oak, Pacific madrone, and black oak and a recovering understory of common woolly sunflower (*Eriophyllum lanatum*), wild mock orange (*Philadelphus lewisii*), California buckeye, verileaf phacelia (*Phacelia heterophylla*), and toyon. A third occurrence is near the lower end of the discharge channel, in habitat dominated by an overstory of Douglas fir, Ponderosa pine, and interior live oak (*Quercus wislizeni*), with an understory of whiteleaf manzanita (*Arctostaphylos viscida*), deer brush, and poison oak.

Cantelow's lewisia

Twelve occurrences totaling more than 2,000 Cantelow's lewisia plants have been documented along the northern arm of the Reservoir, approximately 1 to 2 miles west of the North Yuba River. The occurrences are on steep, mossy cliff faces in habitat dominated by an overstory of canyon live oak with some Douglas fir, bigleaf maple, madrone, and black oak. Other cliff-dwelling species in the area include broadleaf stonecrop (*Sedum spathulifolium*), narrowleaf swordfern (*Polystichum imbricans*), littleleaf minerslettuce (*Montia parvifolia*), and crevice alumroot (*Heuchera micrantha*).

Humboldt Lily

Twenty-four occurrences of Humboldt lily, totaling more than 600 plants, were found during the 2012 surveys. In general, these occurrences were in habitat dominated by an overstory of Douglas fir, Ponderosa pine, tanoak, and Pacific madrone, with an understory of deer brush, Pacific dogwood, poison oak, and western brackenfern (*Pteridium aquilinum*). Occurrences of Humboldt lily at the project site include an area of approximately 750 feet along USFS Road 0008-010 to near the lower end of the discharge channel and adjacent to the contractor staging area in the parking lot near the Marina. Occurrences are also known along the southeast and northern portions of the Reservoir.

Special-status Wildlife

A preliminary list of special-status wildlife species to be evaluated for potential to occur at the project site and/or operations study area was developed based primarily on technical memoranda and the Environmental Impact Statement prepared to support FERC relicensing (FERC and USACE 2019; YCWA 2012c, 2012d, 2012e, 2012f, 2013a, 2013b), CNDDB species and occurrence information (CDFW 2023), and the IPaC resource list (USFWS 2023). Online sources eBird (2023) and iNaturalist (2023) also were reviewed for reliable evidence of special-status wildlife occurrence in the project vicinity. **Table 3.3-3** provides information on special-status wildlife taxa that were determined to have potential to occur at the project site and/or operations study area, based on known occurrences, habitat and microhabitat requirements, and observations made during the 2020 and 2021 field surveys.

Species eliminated from consideration include those whose current range does not include the project vicinity and those with habitat requirements that are not supported by the project site and operations study area (e.g., specific forest types, meadows and grasslands, freshwater marsh and other natural wetlands). For example, Pacific fisher (*Pekania pennanti*) was eliminated from consideration, despite having occurred historically in the area, because this species' California distribution is now limited to the southern Sierra Nevada and northern Coast Range. Another previously widely distributed species, western bumble bee (*Bombus occidentalis*), now appears to be limited to relatively high-elevation meadow areas in the northern Sierra Nevada portion of its range; all but one occurrence in the region were from at least El. 2,900 feet, and 86 percent of the occurrences were above El. 5,000 feet. Therefore, because of the elevation and habitat conditions in the project area, this species was eliminated from consideration. In addition, birds that are only considered to have special status if nesting, but that do not nest in the area, and those that are only known to occur at few scattered local areas in the Sierra Nevada and are not known to have been documented in the project vicinity, have been excluded from consideration.

Table 3.3-3. Special-status Wildlife with Potential to Occur at or Adjacent to the Project Site or in the Operations Study Area

Species	Federal Status	State Status	Habitat Associations	Potential to Occur
Invertebrates				
monarch butterfly *Danaus plexippus*	C	–	Requires milkweed for egg laying and larval feeding and various nectar plants	Known to breed near operations study area at South Yuba River State Park; suitable nectar plants occur on project site and in operations study area; no milkweed documented on project site during field surveys but may occur in operations study area.
Amphibians				
foothill yellow-legged frog *Rana boylii*	FSS	E	Partly-shaded, shallow streams and riffles with cobble-sized rocky substrate	Project site provides poor habitat, but potential habitat occurs in operations study area downstream of New Bullards Bar Dam to approximately State Route 20; known from multiple tributaries to the Yuba River but only known occurrence on the river is from the Deer Creek confluence approximately 1 mile downstream of Englebright Reservoir.
California red-legged frog *Rana draytonii*	T	SSC	Perennial ponds and pools and slow-moving perennial or seasonal streams in lowland and foothill areas, with deep water and dense vegetation	Project site and operations study area lack suitable breeding habitat but could use Yuba River corridor for dispersal; nearest known occurrence is along Little Oregon Creek, approximately 2.5 miles north of the project site
Reptiles				
western pond turtle *Actinemys marmorata*	FSS	SSC	Permanent or nearly permanent water bodies; nests in sunny uplands near aquatic habitat	Known to occur at New Bullards Bar Reservoir and tributaries to the lower Yuba River; suitable habitat has been identified in the operations study area downstream of New Bullards Bar Dam
coast horned lizard *Phrynosoma blainvillii*	–	SSC	Woodland, scrub, and grassland habitats, most commonly along sandy washes with scattered low bushes	Project site and operations study area provide relatively poor habitat; nearest known occurrences are from the 1990s in open, rocky chaparral, woodland, and forest 8-15 miles from the project site and operations study area
Birds				
bald eagle *Haliaeetus leucocephalus*	FSS	E	Coastal shorelines and wetlands, lakes, reservoirs, and rivers; nests in large trees, typically in mountain and foothill forests and woodlands near reservoirs, lakes, and rivers	Winters and nests at New Bullards Bar Reservoir; not known to nest or have winter roosts elsewhere in operations study area
golden eagle *Aquila chrysaetos*	–	FP	Variety of habitats in foothills, mountains, high plains, and dessert; primarily nests on cliffs in steep canyons, but also in large trees in open areas	Only three known occurrences in the project vicinity, none of which include nesting birds or evidence of nesting activity
American peregrine falcon *Falco peregrinus anatum*	–	FP	Wide range of habitats; nests on cliffs, banks, dunes, mounds, and human-made structures near wetlands, lakes, rivers, and other water bodies	Has been observed in the project site and may nest in the North Yuba River canyon below the Dam and farther downstream in the operations study area

Species	Federal Status	State Status	Habitat Associations	Potential to Occur
northern goshawk *Accipiter gentilis*	FSS	SSC	Coniferous and montane riparian forest; typically nests on north-facing slopes near water	Known from the north end of the Reservoir, but project site and operations study area do not support preferred forest types
California spotted owl *Strix occidentalis*	PT	SSC	Primarily coniferous and montane hardwood forests at middle elevations in the Sierra Nevada	Multiple nests are known from the project vicinity but no known occurrences in or immediately adjacent to the project site
great gray owl *Strix nebulosa*	FSS	E	Dense coniferous and hardwood forests, especially near wet meadows	Only known occurrence in the project vicinity is near the Log Cabin Diversion Dam, approximately 6 miles northwest of the project site
olive-sided flycatcher *Contopus cooperi*	–	SSC	Variety of forest and woodland, including subalpine coniferous forest and mixed coniferous-deciduous forest	Known to occur in project vicinity and portions of project site provide potentially suitable habitat
yellow warbler *Setophaga petechia*	–	SSC	Riparian woodland and scrub, open scrub, and second-growth woodland, especially near water	Known to occur in project vicinity; project site and upper portions of operations study area provide marginally suitable habitat
Mammals				
ringtail *Bassariscus astutus*	–	FP	Riparian, hardwood and coniferous forest, and scrub near water, with rocky areas, hollow trees, logs, and snags	Not known to occur in the project site or operations study area, but suitable vegetation is present and potential day shelters and dens may occur
pallid bat *Antrozous pallidus*	FSS	SSC	Roosts in caves, crevices, and undisturbed buildings in a variety of arid habitats	Possible detections during acoustic monitoring below New Bullards Bar Dam
Townsend's big-eared bat *Corynorhinus townsendii*	FSS	SSC	Roosts in caves and undisturbed human-made structures in a variety of habitats, but prefers mesic habitats	Possible detections during acoustic monitoring below New Bullards Bar Dam
spotted bat *Euderma maculatum*	–	SSC	Roosts in rock crevices in cliffs and caves in a wide variety of habitats	Confirmed detections during acoustic monitoring below New Bullards Bar Dam
western mastiff bat *Eumops perotis californicus*	–	SSC	Roosts in crevices in cliff faces, high buildings, tunnels, and trees in a wide variety of habitats	Nearest known occurrences are more than 20 miles from the project vicinity
western red bat *Lasiurus blossevillii*	–	SSC	Roosts primarily in trees and prefers habitat edges and mosaics	Confirmed detections during acoustic monitoring below New Bullards Bar Dam
fringed myotis *Myotis thysanodes*	FSS	–	Roosts in rock crevices, caves, mines, and buildings, typically in forest and woodland	Confirmed detections at Our House Diversion Dam and Camptonville tunnel

[1] **Status Definitions**

C = Candidate for listing as Threatened or Endangered under the Federal Endangered Species Act
E = Listed as Endangered under the Federal or State Endangered Species Act
T = Listed as Threatened under the Federal or State Endangered Species Act
FSS = U.S. Forest Service Region 5 Sensitive Animal List for Plumas/Tahoe National Forest
FP = Fully Protected under the California Fish and Game Code
PT = Proposed for listing as Threatened under the Federal Endangered Species Act
SSC = California Species of Special Concern

Sources: CDFW 2023; CNPS 2023; USFS 2013; USFWS 2023; YCWA 2012c, 2012d, 2012e, 2012f, 2013a, 2013b; data collected by HDR in 2020 and 2021

Monarch Butterfly

The California overwintering population of Monarch butterfly (*Danaus plexippus*) is a candidate for Federal listing as threatened or endangered. Migratory monarchs in the western population primarily overwinter in groves along the coast of California and Baja California. In spring, individuals move to inland areas, including the Sierra Nevada foothills, to breed. Egg laying and larval development and feeding occur exclusively on milkweed (primarily *Asclepias* spp.) (USFWS 2020). Adults feed on a diversity of blooming nectar resources throughout their migration routes and breeding grounds (spring through fall). Monarchs have been documented in the project vicinity in recent years, including an adult approximately 1.3 miles west of the project site (iNaturalist 2023a). The nearest known milkweed location is approximately 2.5 miles east of the site (Western Monarch and Milkweed Occurrence Database 2023) and nearest know breeding is at South Yuba River State Park, approximately 7 miles southwest of the project site (iNaturalist 2023b and Western Monarch and Milkweed Occurrence Database 2023). No milkweed plants were observed during botanical surveys of the project site conducted in 2020, but several nectar plant species known to be used by monarchs in California (Xerces Society 2019) occur onsite, including gumplant (*Grindelia camporum*), mountain monardella (*Monardella odoratissima*), coyote brush (*Baccharis pilularis*), woody goldenbush (*Ericameria arborescens*), whiteleaf manzanita, Goodding's black willow, and arroyo willow.

California Red-legged Frog

California red-legged frog (*Rana draytonii*) is Federally listed as threatened and a California species of special concern. These frogs are primarily associated with perennial ponds or pools and slow-moving perennial or seasonal streams where water remains continuously for a minimum of 20 weeks beginning in the spring (i.e., sufficiently long for breeding to occur and tadpoles to complete development). Deep-water pools, ponds, and lakes, such as the Reservoir, and rivers such as the Yuba River below the Dam, do not provide suitable breeding habitat. Locations with the highest densities of California red-legged frogs support dense emergent or shoreline riparian vegetation closely associated with moderately deep, still or slow-moving water. In the Sierra Nevada foothills, where the species was once widespread, only six known populations persist (USFWS 2010). The closest recent observation of California red-legged frog to the project site is along Little Oregon Creek, approximately 2.5 miles to the north. The Cottage Creek impoundment, approximately 200 feet west of the contractor staging area in the parking lot near the Marina, was identified as potential breeding habitat during FERC relicensing studies. However, use by California red-legged frog was considered unlikely, because the water was likely too deep and too cold, and it supports predatory largemouth bass (YCWA 2013a). This impoundment has since been removed and now supports creek habitat that flows through a large concrete box culvert in what remains of the Cottage Creek Dam. No potential breeding habitat for California red-legged frog occurs on or near the project site or operations study area.

Foothill Yellow-legged Frog

Foothill yellow-legged frog (Rana boylii) is State-listed as endangered and a USFS sensitive species. This species occurs in small to large streams and rivers with pools and low-gradient riffles. Breeding sites are usually near the shore, in shallow, slow-flowing areas with coarse substrates (cobbles and small boulders). There are no known records of the species in the Yuba River from the Dam downstream to Englebright Dam. During surveys conducted for FERC relicensing in 2011-2013, foothill yellow-legged frog observations were limited to the Middle Yuba River above and below Our House Diversion Dam, the North Yuba River above the Reservoir, and Oregon Creek above and below Log Cabin Diversion Dam. (YCWA 2012c, 2013b). Most of the North Yuba River from the Dam to the Middle Yuba River

confluence provides poor-quality habitat because the substrate is dominated by bed rock and very large ("house-sized") boulders, with very short and infrequent areas of cobble-size deposits and riffles. Within this reach, potential breeding and rearing habitat were only identified at the confluence with the Middle Yuba River and at a tributary confluence more than 1 mile downstream of the project site, where substrate includes patches of cobble.

Western Pond Turtle

Western pond turtle (*Actinemys marmorata*) is a California species of special concern and USFS sensitive species. These turtles require permanent or nearly permanent ponds, lakes, channels, backwaters, or stream pools with emergent vegetation; warm, shallow water with cover for hatchlings; terrestrial sites for nesting; and sites with suitable basking substrates such as rocks, logs, banks, and root masses. According to FERC license renewal studies, potentially suitable aquatic habitat at the Reservoir is limited to near-shore areas concentrated at the mouths of certain tributaries (e.g., Willow Creek, Little Oregon Creek, and unnamed tributaries at Tractor Cove) and occasionally in coves without an apparent tributary (e.g., at Garden Point). In these areas, basking substrates included fallen logs, stumps, boulders, bedrock, and/or live vegetation distributed where they would be partially exposed over a range of water surface elevations. Elsewhere, such as in the project site, the Reservoir shoreline has steep slopes and deep water, scarce or absent underwater cover, and scarce or absent basking habitat favorable to western pond turtle. Western pond turtles are not known to occur in the North Yuba River downstream of the Dam, but they have been observed at several locations in the Reservoir; the nearest of these observations is approximately 2.5 miles north of the project site. Potentially suitable nesting habitat is sparse along the Reservoir and North Yuba River, but small patches were identified within the approach channel construction area and within and downstream of the discharge channel construction area. (YCWA 2012d.)

Coast Horned Lizard

Coast horned lizard (*Phrynosoma blainvillii*) is a California species of special concern with a broad distribution extending well inland from the coast, including into the Sierra Nevada mountains. This species occurs in a wide variety of habitats but are typically found in open sandy areas in desert, chaparral, and grassland. Individuals require open areas for sunning, bushes for cover, and patches of loose soil for burial. The project site provides relatively poor-quality habitat for horned lizards, due to the mostly closed canopy of the deer brush chaparral. However, the species is known from mixed pine and chaparral areas at a similar elevation approximately 10 miles to the south. Because this species is poorly reported in the CNDDB, it could occur elsewhere in the region, including at the project site.

Bald Eagle

Bald eagle (*Haliaeetus leucocephalus*) is State-listed as endangered, fully protected under the CFGC, and a USFS sensitive species. Breeding habitat most commonly includes areas close to rivers, lakes, reservoirs, or other bodies of water that provide adequate food sources. During winter, bald eagles roost in conifers or other sheltered sites, typically near water, and communal roost sites are commonly used by two or more individuals. Numerous bald eagle occurrences, including night roosts and hunting perches, have been documented at the Reservoir. The nearest known night roost is approximately 1.5 miles north of the project site. At least two active bald eagle nests occur at the Reservoir. One nest has been active since 1989, and the second nest was first reported in 2011. The nearer of these nests is more than 3 miles north of the project site. (YCWA 2012e.) Bald eagles are known to forage in the Reservoir and could forage in the North Yuba River.

Golden Eagle

Golden eagle (*Aquila chrysaetos*) is fully protected under the CFGC. This eagle has a very widespread distribution, including throughout the Sierra Nevada mountains and foothills adjacent to the Central Valley. Golden eagles occur primarily in sparse woodlands, grasslands, savannas, lower successional forest stages, and shrubland. Cliffs, large trees, and man-made structures (e.g., electric transmission towers) are used for nesting. Three occurrences of golden eagle are known from the project vicinity, all at the Reservoir. However, none of these occurrences include nesting birds or evidence of nesting activities, suggesting golden eagles are nonresident visitors to the project area. (FERC and USACE 2019.)

American Peregrine Falcon

American peregrine falcon (*Falco peregrinus anatum*) is fully protected under the CFGC. When not breeding, peregrine falcons occur in areas where prey concentrate, including farmlands, marshes, lakeshores, river mouths, tidal flats, dunes and beaches, broad river valleys, cities, and airports. They often nest on ledges or in holes on the face of rocky cliffs or crags, as well as human-made structures. The North Yuba River canyon below the Dam provides suitable nesting habitat. In 2013, a potential nesting pair was reported in this area, and information from USFS indicated potential presence of a nest in the vicinity of Dam (FERC and USACE 2019). In 2017, there were three sightings of American peregrine falcon in this area, including one individual entering a small hole in the Dam during the nesting season. Before the nesting season began in 2018, YCWA screened over the hole in the dam to prevent further entrance by falcons or other birds. American peregrine falcon may nest in the North Yuba River canyon but nesting has not been confirmed.

Northern Goshawk

Northern goshawk (*Accipiter gentilis*) is a California species of special concern and a USFS sensitive species. This raptor occurs in montane riparian and coniferous forest, including lodgepole pine (*Pinus contorta*), red fir (*Abies magnifica*), mountain hemlock (*Tsuga mertensiana*), white pine (*Pinus monticola*), and mixed conifer. Two occurrences of northern goshawk are known from the project vicinity, and one nesting area has been documented near the Slate Creek inflow to the Reservoir (FERC and USACE 2019), approximately 9 miles north of the project site. However, forest and woodland types and conditions at the project site and operations study area are unlikely to provide suitable nesting habitat for northern goshawk.

California Spotted Owl

California spotted owl (*Strix occidentalis*) is currently proposed for Federal listing as threatened and is a California species of special concern and USFS sensitive species. This owl occurs in mixed forests dominated by black oak, lodgepole pine, red fir, white fir, ponderosa pine, sugar pine, incense cedar (*Calocedrus decurrens*), and/or Douglas fir. Nest sites, activity centers, pairs, young, and/or other observations of California spotted owl have been documented in six areas within 3 miles of the project site (CDFW 2023). The closest of these to the project site are associated with YUB-0026, approximately 0.3 mile west of the contractor staging area in the parking lot at the Marina. All other nests and activity centers are more than 1 mile from the project site and operations study area.

Great Gray Owl

Great gray owl (*Strix nebulosa*) is State-listed as endangered and a USFS sensitive species. This owl occurs in dense coniferous and hardwood forest, especially pine, spruce, paper birch, and poplar; it also

can occur in second growth forest, especially near water, and foraging in wet meadows. Great gray owl nests in tops of large broken-off trees, in old nests of other large birds, and in mistletoe debris platforms, frequently near bogs or clearings. A pair of great gray owls has been known to nest within 1 mile of the Log Cabin Diversion Dam impoundment and associated access road, approximately 6 miles from the project site. However, the project site and operations study area are unlikely to provide suitable habitat for this species, due to the forest types present and lack of meadows and other wet clearings.

Olive-sided Flycatcher

Olive-sided flycatcher (*Contopus cooperi*) is a California species of special concern that occurs in a variety of forest and woodland habitats. The species typically nests above 3,000 feet in late-successional coniferous forest with open canopy; in the Sierra Nevada, it is most abundant in open mixed conifer and red fir forest (Shuford and Gardali 2008). Olive-sided flycatcher has been documented in the Reservoir area (eBird 2023) and could occur at the project site. However, the project site and operations study area provide marginal-quality nesting habitat.

Yellow Warbler

Yellow warbler (*Setophaga petechia*) is a California species of special concern that typically occurs in riparian habitat. Yellow warblers can occur in a variety of habitats during migration, but nesting occurs primarily in willow thickets and sometimes in scrub within open coniferous forest. Yellow warbler has been documented in the Reservoir and Dam areas (eBird 2023) and could occur at the project site and in the operations study area. However, the project site provides poor-quality nesting habitat.

Ringtail

Ringtail (*Bassariscus astutus*) is fully protected under the CFGC. This species occurs in forest, woodland, and shrub habitats near water. Important habitat features include rocky areas with cliffs or crevices, hollow trees, and logs and snags, all of which are used for daytime shelter. Ringtail also den in these features, as well as burrows dug by other animals, and buildings. Ringtail is not tracked in the CNDDB, but YCWA has reported multiple occurrences inside the New Colgate and Narrows 2 powerhouse facilities (YCWA 2016a). Ringtail were also observed at Our House Diversion Dam, approximately 7 miles east of the project site, during 2012 bat surveys (FERC and USACE 2019). Although none of these locations is in close proximity to the project site, ringtail could occur in portions of the project site and operations study area that support shrub, woodland, or forest habitat.

Bats

Six special-status bat taxa have potential to occur in the project site and operations study area: pallid bat (*Antrozous pallidus*), Townsend's big-eared bat (*Corynorhinus townsendii*), spotted bat (*Euderma maculatum*), western mastiff bat (*Eumops perotis californicus*), western red bat (*Lasiurus blossevillii*), and fringed myotis (*Myotis thysanodes*). All of these, except fringed myotis, are California species of special concern and fringed myotis, pallid bat, and Townsend's big-eared bat are USFS sensitive species. An intensive bat study, including mist netting and acoustic monitoring, was conducted to support FERC relicensing (YCWA 2012f). Mist netting was conducted at two locations on the east side of the Reservoir, within 1 mile north of the project site. Mist netting, acoustic monitoring during mist netting, and long-term acoustic monitoring were conducted very near the project site, immediately downstream of the Dam. Western red bat and spotted bat were detected, and possible detections of pallid bat and Townsend's big-eared bat were documented below the Dam. No additional special-status species were documented at the other two nearby survey locations, but pallid bat, Townsend's big-eared bat, and

fringed myotis were confirmed at more distant locations. Western mastiff bat is the only species that was not detected during any surveys. No maternity roosts were identified during any surveys, and no special-status bats that were captured were found to be reproductive (lactating females and scrotal males). In addition, no signs of roosting on the Dam were observed. Canyon walls adjacent to and downstream of the Dam, including near the project site and operations study area, may be suitable for roosting by species that use cliff crevices. Western red bat is the only foliage-roosting species. Although this species is typically associated with riparian woodland and forest habitat, canyon live oak and tanoak forest in the project site and adjacent to the operations study area may provide suitable roost sites.

3.3.2 Regulatory Setting

The Federal, State, and local plans, policies, regulations, and laws discussed in this Environmental Impact Report (EIR) are relevant to the proposed project. Other environmental laws not relevant to the proposed project are not discussed further.

Federal Plans, Policies, Regulations, and Laws

Endangered Species Act

Under the ESA, the Secretary of the Interior and the Secretary of Commerce jointly have the authority to list a species as threatened or endangered (16 U.S. Code (USC) Section 1533(c)). Pursuant to ESA requirements, each Federal agency must consult with USFWS to ensure that any action it authorizes, funds, or carries out does not jeopardize the continued existence of any endangered or threatened species or result in the destruction or adverse modification of designated critical habitat. (16 USC Section 1536(a)(2)). Section 7 of the ESA provides a means for authorizing incidental take of Federally endangered or threatened species that result from Federally conducted, permitted, or funded projects. Similarly, Section 10 authorizes incidental take of Federally endangered or threatened species that result from projects that do not include any Federal agency action.

Migratory Bird Treaty Act

The Federal Migratory Bird Treaty Act (MBTA) (16 USC, Sec. 703, Supp. I, 1989) prohibits killing, possessing, or trading migratory birds, except in accordance with regulations prescribed by the Secretary of the Interior. This act encompasses whole birds, parts of birds, bird nests, and eggs and applies to all persons and agencies in the U.S., including Federal agencies. The MBTA is administered by the USFWS.

Clean Water Act Section 401

Under federal Clean Water Act (CWA) section 401 every applicant for a Federal permit or license for any activity which may result in a discharge to a water body must obtain a Water Quality Certification (Certification) that the proposed activity will comply with state water quality standards. CWA Section 401 Certification provides States and authorized tribes with an effective tool to help protect the physical, chemical, and biological integrity of water quality, by providing them an opportunity to address the aquatic resource impacts of Federally issued permits and licenses.

Clean Water Act Section 404

CWA Section 404 regulates the discharge of dredged and fill materials into waters of the U.S. The Navigable Waters Protection Rule became effective on June 22, 2020 (85 FR 22250), which redefined the scope of navigable “waters of the U.S.” On June 9, 2021, EPA and USACE announced their

intention, through two separate rulemakings, to revise the definition of waters of the U.S. On August 31, 2021, the U.S. District Court for the District of Arizona vacated and remanded the Navigable Waters Protection Rule in the case of the Pascua Yaqui Tribe v. USEPA. Following the decision, EPA and USACE halted implementation of the Navigable Waters Protection Rule and are currently interpreting "waters of the U.S." consistent with the pre-2015 regulations and associated guidelines and case law, including the Supreme Court decision *Rapanos v. United States*, 547 U.S. 715 (2006). Waters of the U.S. (with the exception of wetlands) are currently defined as territorial seas and waters which are currently used, were used in the past, or may be susceptible to use in interstate or foreign commerce, including waters which are subject to the ebb and flow of the tide; interstate waters, including wetlands; other waters such as intrastate lakes, rivers, streams (including intermittent streams), mudflats, sandflats, wetlands, sloughs, prairie potholes, wet meadows, playa lakes, or natural ponds, the use, degradation or destruction of which could affect interstate or foreign commerce; and impoundments of waters otherwise defined as waters of the U.S. For wetlands, the U.S. Supreme Court in Sackett v. EPA (citation pending) recently announced the continuous surface connection test which requires direct adjacency between the waterbodies. USACE and USEPA are expected to issue additional guidance on the continuous surface connection test.

USACE has primary Federal responsibility for administering regulations that concern waters of the U.S., including wetlands and drainages. USACE acts under two statutory authorities: the Rivers and Harbors Act (Sections 9 and 10), which governs specified activities in "navigable waters of the U.S.," and the CWA Section 404, which governs specified activities in waters of the U.S. USACE requires that a permit be obtained if a project proposes placing structures within, over, or under navigable waters and/or discharging dredged or fill material into waters of the U.S., including wetlands.

Invasive Species Regulation – Executive Order 13112

Executive Order 13112 directs all Federal agencies to prevent and control introductions of invasive species in a cost-effective and environmentally sound manner. Executive Order 13112 established a national Invasive Species Council made up of Federal agencies and departments and a supporting Invasive Species Advisory Committee composed of State, local, and private entities. The Invasive Species Council and Advisory Committee oversee and facilitate implementation of the Executive Order, including preparation of a National Invasive Species Management Plan. The Management Plan recommends objectives and measures to implement the Executive Order and to prevent the introduction and spread of invasive species.

State Plans, Policies, Regulations, and Laws

California Endangered Species Act

Under CESA, CDFW has the responsibility for maintaining a list of threatened and endangered species designated under State law (CFGC Section 2070). Pursuant to CESA requirements, an agency reviewing a proposed project within its jurisdiction must determine whether any State-listed endangered or threatened species may be present in the project area and determine whether the proposed project would result in take of any such species. Under CESA, "take" is defined as the action of or attempt to "pursue, hunt, shoot, capture, collect, or kill." CDFW may authorize the incidental take of a State-listed species under Section 2081 of the CFGC. For species that are listed as threatened or endangered under both ESA and CESA, and for which an incidental take permit has been issued in accordance with Section 7 or Section 10 of the ESA, CDFW may authorize take by certifying that the Federal incidental take permit is consistent with CESA, pursuant to Section 2080.1 of the CFGC.

California Fish and Game Code

Rivers, Lakes, and Streams

Under CFGC Section 1602, it is unlawful for any entity to substantially divert or obstruct the natural flow of or substantially change or use any material from the bed, channel, or bank of, any river, stream, or lake, or to deposit or dispose of debris, waste, or other material where it may pass into any river, stream, or lake, without first notifying CDFW of such activity and obtaining an agreement authorizing the activity. In practice, CDFW may exert authority over any feature that holds water at least periodically or intermittently, and associated habitat (e.g., riparian vegetation), that supports fish, other aquatic life, or terrestrial wildlife.

Fully Protected Species

Sections 3511, 4700, 5050, and 5515 of the CFGC provide protection from take for 37 fish and wildlife species referred to as fully protected species. Except for take related to scientific research or incidental take authorized as part of an approved Natural Communities Conservation Plan, take of fully protected species is prohibited.

Protection of Birds

Section 3503 of the CFGC states that it is unlawful to take, possess, or needlessly destroy the nest or eggs of any bird. Section 3503.5 states that it is unlawful to take, possess, or destroy any raptors (i.e., species in the orders Falconiformes and Strigiformes), including their nests or eggs.

Native Plant Protection

Section 1900 et seq. of the CFGC prohibits “take” of endangered and rare plants native to the State, with the exception of special criteria identified in the Code. A species, subspecies, or variety is endangered when its prospects of survival and reproduction are in immediate jeopardy from one or more causes. A species, subspecies, or variety is rare when, although not presently threatened with extinction, it is in such small numbers throughout its range that it may become endangered if its present environment worsens.

Assembly Bill 454

Assembly Bill (AB) 454 was signed into law in 2019, in response to changes to MBTA interpretation and application proposed by USFWS (USFWS dropped the proposed changes in 2021). AB 454 strengthened the State’s protections for migratory birds beyond those specified under Federal law, clarified existing State safeguards for native birds (i.e., CFGC), and closed loopholes where California law defers to Federal law.

California Environmental Quality Act Guidelines

Pursuant to State CEQA Guidelines Section 15380, CEQA requires evaluation and feasible mitigation of impacts to Federal- and/or State-listed species, as well as species not listed Federally or by the State that may be considered rare, threatened, or endangered. Accordingly, "A species not included in any listing identified in subdivision (c) [ESA and CESA listed species] shall nevertheless be considered to be endangered, rare or threatened, if the species can be shown to meet the criteria in subdivision (b)" (State CEQA Guidelines Section 15380(d)).

The CEQA provision enables an agency to protect a species from potentially significant project impacts until the respective government agencies have had an opportunity to list the species as protected, if warranted. To assess "impact significance" to populations of non-listed species as well as listed species, CDFW recommends population-level effects, proportion of the taxon's range affected by a project, regional effects, and impacts to habitat features are all considered.

Porter-Cologne Water Quality Control Act

The Porter-Cologne Water Quality Control Act (California Water Code Section 13000 et seq.) is the method by which the State implements the Federal CWA. Porter-Cologne also sets additional water quality requirements that apply to waters of the State. RWQCB jurisdiction thus includes both Federally protected waters and "waters of the State." Among other things, Porter-Cologne requires that each of the State's nine RWQCBs prepare and periodically update basin plans for water quality control. Each basin plan sets forth water quality standards for surface water and groundwater and actions to control nonpoint and point sources of pollution to achieve and maintain these standards. Basin plans also offer an opportunity to protect wetlands. Mitigation requiring no net loss of wetlands functions and values of waters of the State is typically required by RWQCB.

Regional/Local Plans, Policies, Regulations, and Ordinances

Yuba County 2030 General Plan

Policies included in the Natural Resources Element of the *Yuba County 2030 General Plan* (Yuba County 2011) that are related to terrestrial biological resources apply exclusively to development projects. Therefore, they do not apply to this project.

Yuba County Municipal Code

Chapter 11.44 of the Yuba County Municipal Code includes a section addressing protection of natural resources. However, this chapter focuses on design of subdivisions, connections between subdivisions, and adjacent uses and developments. Therefore, it does not apply to this project.

3.3.3 Environmental Impacts and Mitigation Measures

Thresholds of Significance

The significance criteria used to evaluate the project impacts to biological resources are based on Appendix G of the State CEQA Guidelines and professional judgment. A significant impact related to terrestrial biological resource issues would occur if the project would:

- have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special-status species in local or regional plans, policies, or regulations, or by CDFW, USFWS, or the National Marine Fisheries Service (NMFS);
- have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, or regulations, or by CDFW, USFWS, or NMFS;
- have a substantial adverse effect on Federally or State protected wetlands (including, but not limited to, marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means;
- interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impede the use of nursery sites by native wildlife;
- conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance;
- conflict with the provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or State Habitat Conservation Plan; or
- substantially reduce the habitat of a fish or wildlife species; cause a fish or wildlife population to drop below self-sustaining levels; threaten to eliminate a plant or animal community; or substantially reduce the number or restrict the range of an endangered, rare, or threatened species.

Analysis Methodology

This analysis addresses terrestrial biological resource impacts that could result from construction and facility maintenance activities at the project site, as well as project-related changes in the operations study area. Potential to adversely affect special-status species and their habitats and other habitats considered sensitive by Federal, State, or local agencies is evaluated, in addition to the potential to substantially reduce the habitat or population of any fish or wildlife species or to eliminate a plant or animal community. This analysis considers temporary and permanent habitat loss and disturbance and potential for direct injury or death of individuals or a result of adverse effects on habitat quality. Impact conclusions consider the habitat quality, impact extent, impact duration, and impact intensity (e.g., level of harm, injury/loss, or degradation suffered by the resource). Information on activities and habitat conditions that could adversely affect special-status species is based on project-specific modeling, scientific publications, agency documents, and other relevant sources.

Terrestrial Biological Resources Operations Assessment

Modeling was conducted to determine direct and indirect changes in downstream hydrologic conditions and temperature from changes in operations associated with the ARC Spillway. In addition, an assessment was conducted of potential long-term erosion from discharge of water through the new ARC Spillway chute. Detailed discussions of modeling and results are presented in Chapters 3.1, "Hydrology and Water Quality," and 3.2, "Fisheries Resources."

Evaluation of potential operational effects is based on anticipated changes in Reservoir operation and resulting changes in downstream flows. The first step of the terrestrial impact operations assessment was to identify ARC Spillway events during the simulation period of 1970-2020 (i.e., days when flow was released through the ARC Spillway under the proposed project). Because hydrologic changes associated with the proposed project in the Yuba River Watershed are not anticipated outside of the ARC Spillway events, this impact assessment is limited to the time periods coinciding with ARC Spillway events.

The second step of the terrestrial impact operations assessment was to conduct a screening evaluation with the modeled flow and water temperature output to assess the timing, duration, and relative magnitude of flow changes and to identify the extent to which flow-related changes could impact special-status species and sensitive habits. The screening evaluation included the following steps:

- Identify ARC Spillway events during the simulation period (i.e., days when the flow would be released through the ARC Spillway under the proposed project)
- To evaluate the potential for flow-related impacts on special-status species and sensitive habitats:
    - compare the modeled average daily flow timeseries in the North Yuba River downstream of the Dam during each ARC Spillway event under the proposed project with the flows that occur in existing conditions;
    - calculate the average daily flow and maximum daily flow in the North Yuba River downstream of the Dam over the duration of each ARC Spillway event under the proposed project and existing conditions; and
    - compare flow probability of exceedance distributions in the North Yuba River below the Dam during ARC Spillway events under the proposed project and existing conditions.

After the screening evaluations were completed, they were used in conjunction with biological data for each potential special-status species or sensitive habitat considered to identify species and habitats potentially impacted by flow-related changes under the proposed project relative to existing conditions. If potential flow-related effects were identified for a species or habitat, flow model output was compared under the proposed project relative to existing conditions to evaluate effects.

Public Comments

During the Notice of Preparation scoping period, general comments regarding potentially applicable regulations and content of the biological resources section were received. These general comments and the following specific biological resources issues that were identified in the Notice of Preparation comments have been considered when preparing this section:

- Without a short- and long-term soil stabilization plan, there is potential for much of the excavated material to end up in the river and impact riparian habitat.
- Several fully protected species have potential to occur in or adjacent to the project area, including, but not limited to, golden eagle, bald eagle, and American peregrine falcon. American peregrine falcons in particular have been observed nesting on the Dam face in the past.

Issues Not Discussed Further in this EIR

Conflict with Local Ordinances or Policies

Yuba County does not have any ordinances prescribing specific requirements for tree preservation or protection of other terrestrial biological resources. All policies related to terrestrial biological resources identified in the Natural Resources Element of the Yuba County 2030 General Plan apply to development projects. Therefore, there would be no impact related to potential conflict of the project with local terrestrial biology ordinance or policies, and this issue is not discussed further.

Conflict with Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or State Habitat Conservation Plan

As described in Chapter 3.2, "Fisheries Resources," there is no adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other conservation plan that applies to the proposed project.

Impact Analysis

The impact analysis first provides a summary of applicable operations modeling results used to evaluate impacts to special-status species with potential to occur in the terrestrial biological resources operations study area. Then, impacts to special-status species from construction and changes in operations are discussed. Impacts in this section are organized by the special-status species – plants and fungi, amphibians, reptiles, birds, and mammals – and then habitats. With each impact discussion, impacts related to construction and operations are discussed in separate subsections where different information and analysis is provided. However, where the analysis of impacts related to construction and/or operations is brief or not applicable, the analysis is provided collectively without use of separate sections.

Summary of Applicable Operations Modeling Results

There would have been only 12 flood events where the ARC Spillway was used during the period from 1970 to 2020, all of which would have occurred in December through April. The combined period of ARC Spillway use represents only 166 days out of 18,623 days in this 51-year period of evaluation. Changes to Reservoir water levels under the proposed project would be limited to these extremely rare winter and early spring occasions, during which the levels could fluctuate by no more than 10 feet. There may also be small fluctuations in tributary water elevations where the tributaries intercept the Reservoir and for several feet upstream of these discharge points. These small and extremely rare fluctuations would not alter habitat conditions along the Reservoir or its tributaries. The highest rise in average modeled daily flows in the Yuba River between the Dam and Englebright Reservoir was 264 cubic feet per second (cfs), and the maximum modeled average daily flows fell by at least 19 cfs in the same reach. In all cases, modeled flows were at least 5,860 cfs before the ARC Spillway would be used (and at 15,507 cfs when the highest rise in modeled average daily flow occurred). Given the Yuba River has sustained flows of up to 16,297 cfs under the existing conditions at times when the ARC Spillway would be used in the reach just below the Dam, this slight increase in average flows (and overall decrease in high flows) at such infrequent intervals is not anticipated to change conditions or increase erosion such that it would adversely impact existing habitat for terrestrial biological resources.

Impacts to Special-status Plants and Fungi

Impact BIO-1: Impacts to Special-status Plants and Fungi.

Six special-status plant and fungi taxa are known to occur at the project site and/or in the operations study area: Brandegee's clarkia, Butte County fritillary, Humboldt lily, lady's-slipper orchid, Cantelow's lewisia, and olive phaeocollybia. Four additional species were determined to have potential to occur in the operations study area: Sierra arching sedge, brownish-beaked rush, wooly-fruited sedge, and white-beaked rush, though none of these four species has been documented in the vicinity.

Construction

Occurrences of Brandegee's clarkia, Butte County fritillary, and Humboldt lily on the project site have been documented at multiple locations along the unmaintained portion of USFS Road 0008-010, including near the lower end of the discharge channel, as discussed below in this impact. Because the lower portion of this USFS road is not maintained, it has become overgrown in most areas and special-status plants have been documented. This road would be cleared, graded, and widened and turnarounds would be developed to accommodate construction vehicles and equipment. Road improvements are likely to disturb areas occupied by special-status plants and result in loss of individuals and potential reduction in population size. However, the road would not be maintained after construction is complete, and the special-status plant populations would likely expand back into the roadway as they have before as the road surface and characteristics would not be changed over the long term.

Brangee's Clarkia and Humboldt Lily

Only one of the six Brangee's clarkia occurrences and two of the 24 Humboldt lily occurrences documented during FERC relicensing surveys are within the project site boundary. These plant taxa are CRPR List 4 species (not considered threatened or endangered in California) and neither is a USFS sensitive species. Although Humboldt lily is not tracked in the CNDDB, FERC relicensing surveys demonstrated that it occurs widely in the local area, and the CNPS Inventory indicates it is widely distributed along the western slope of the northern and central Sierra Nevada. The CNDDB includes

numerous occurrences of Brandegee's clarkia in the past 20 years, from Lake Oroville to southern El Dorado County. Based on the status and current distribution of Humbodt lily and Brandegee's clarkia, the project is unlikely to have a substantial adverse effect on the local or regional populations of these taxa because they are relatively widespread and any project-related impacts would be to a small portion of the existing local and regional populations.

Butte County Fritillary

Butte County fritillary is a CRPR List 3 species, meaning its sensitivity status is unclear and under review by CNPS; however, it is a USFS sensitive species in both Plumas and Tahoe National Forests. Numerous occurrences are known from the southern Cascade Range and northern Sierra Nevada, but only one recent occurrence has been documented south of the project area. In addition, three of the five occurrences documented during FERC relicensing surveys are within the project site, and the other two are on the opposite slope of the North Yuba River canyon. Because USFS Road 0008-010 improvements would impact three of the five known local occurrences of Butte County fritillary, and these may be very near the southern end of the extant distribution of this species, project implementation could have a substantial adverse effect on the local population and larger distribution of the species.

Previously Unknown Special-status Plants and Fungi

It is possible additional populations of special-status plants and fungi have become established at the project site after the prior surveys were conducted. In addition, there is potential for previously unknown populations to exist on steep slopes at the project site that were not safely accessible during previous surveys. If populations of previously unknown special-status plant taxa occur within the project's construction footprint, they could be removed during project construction and reductions in the local population could be substantial.

Operations

As discussed above, the proposed project would result in extremely rare fluctuations of water levels in the Reservoir of no more than 10 feet and relatively small average daily flow increases (and overall small decrease in high flows) in the North Yuba River. These rare events would not occur during the growing season for annual species and are not anticipated to affect long-term viability of the sedges and beaked-rushes. Therefore, operations-related changes would not have a substantial adverse effect on any special-status plants or fungi known or with potential to occur in the operations study area.

Conclusion

Due to the potential for construction-related impacts to Butte County fritillary and previously unknown special-status plants, this impact is **potentially significant**.

Mitigation Measures: The following mitigation measure has been identified to address this impact.

Mitigation Measure BIO-1: Avoid and Minimize Impacts on Butte County Fritillary and Other Special-status Plants not Documented during Previous Surveys.

YCWA and its construction contractor(s) will implement the following measures to avoid and minimize impacts on Butte County fritillary and other special-status plants:

- A qualified botanist will conduct protocol-level surveys for all potentially occurring special-status plants in portions of the project site that provide suitable habitat and can be safely accessed. All plants encountered will be identified to the taxonomic level necessary to determine their CRPR. Surveys will be conducted during the specific blooming period for the target taxa.

- If special-status plants are identified, impacts will be avoided wherever possible by adjusting disturbance areas for non-engineered project components, such as staging, access, and material sorting and processing. Where feasible, depending on substrate and topography, temporary protective barriers will be installed and maintained during construction to minimize potential for accidental impacts on occupied habitat that will be avoided. Where barriers are not feasible, avoidance areas will be flagged, staked, or otherwise marked with high-visibility materials.

- Before on-site project activities begin, all on-site project personnel will attend a worker training program conducted by a qualified biologist. The program will address sensitive biological resources that could occur on the project site and include a discussion of species identification, life history, general behavior, habitat, and sensitivity to human activities; discussion of sensitive habitats; review of Federal and State legal protections; and description of required mitigation, including avoidance and minimization measures. All on-site personnel also will be provided with contact information for the project biologist.

- If direct loss of special-status plants cannot be avoided, a mitigation plan will be developed and implemented to minimize local population reductions with the performance criterion of achieving no net loss of special-status plants. This plan is anticipated to include collecting seeds and/or soil likely to contain seeds from areas occupied by target taxa that would be directly disturbed by construction activities and distributing seeds/soil in areas temporarily disturbed by construction activities after construction is complete. The mitigation plan will outline specific collection methods, appropriate storage to maximize preservation and potential for germination, distribution site preparation, and seed/soil distribution methods.

- To minimize potential indirect impacts on special-status plant populations from nonnative invasive plants, the followings measures, which are consistent with the FERC Project-2246 *Integrated Vegetation Management Plan* (YCWA 2016b) to the extent possible, will be implemented during project construction, operation, and maintenance activities:

    - Measures to prevent project-related introduction and spread of nonnative invasive plants will follow California Invasive Plant Council best management practices (BMPs), per the current BMP manual (Cal-IPC 2012) or a more recent version, if available.

    - Temporarily disturbed areas on YCWA-owned land will be reseeded in accordance with applicable Federal, State, and County regulations and requirements of any specific permits and/or approvals pertaining to project-related revegetation.

- Temporarily disturbed areas on USFS land will be seeded with a mix that contains only native plant species that meet USFS standards. A mixture of seeding techniques may be used and seeding rates will be determined based on pure live seed methods and in a mixture to improve seeding success. Seeds will be covered no more than three times the thickness of the seed. Seeding areas will be covered with certified weed-free mulch after seeding, and mulch will cover the surface through germination. If certified weed-free material is not available, an alternative will be identified in consultation with USFS.

Timing: Before, during, and after ground-disturbing activities.

Responsibility: YCWA and its construction contractor(s).

Significance after Mitigation: Implementing Mitigation Measure BIO-1 would reduce the impact associated with loss of special-status plants because it would minimize loss of individuals by avoiding them where feasible and minimize population reductions by redistributing seeds/soil in temporarily disturbed areas after construction activities are complete. Therefore, this impact would be **less than significant with mitigation**.

Impacts to Special-status Invertebrates

Impact BIO-2: Impacts on Monarch Butterfly.

Chaparral and open woodland/forest habitats on the project site support some plant species likely to provide nectar habitat for monarch butterfly. However, no milkweed has been documented on the project site, and monarchs are unlikely to breed onsite. Documented observations of monarchs suggest the species is not common in the project vicinity, and adults are highly mobile and likely to avoid areas of substantial disturbance, such as the construction area. Therefore, if monarchs are present on the project site during construction, few individuals are likely to occur and potentially be affected by construction activities. In addition, the project site does not provide unique habitat characteristics for monarch, and similar nectar habitat is abundant adjacent to construction areas and in the project vicinity. Because the California overwintering population of monarch is a large, wide-ranging migratory species, this extent of potential nectar plant loss and potential direct effects on a small number of individuals would not have a substantial adverse effect on the population. Therefore, this impact would be **less than significant**.

Mitigation Measures: No mitigation is required.

Impacts to Special-status Amphibians

Impact BIO-3: Impacts on California Red-legged Frog.

No potential breeding habitat for California red-legged frog occurs on or near the project site or in the operations study area. The only area of potentially suitable aquatic habitat for California red-legged frog in the project vicinity is along Cottage Creek, approximately 200 feet west of the contractor staging area in the parking lot near the Marina. If California red-legged frog is present in Cottage Creek during project construction, individuals are extremely unlikely to wander into the staging area because it is developed and does not provide suitable upland habitat. The North Yuba River does not provide suitable breeding habitat for California red-legged frog and potential use of the river corridor would be limited to dispersal along the banks to/from tributary creeks and streams. Similarly, the Reservoir does not provide

suitable habitat and potential unknown populations would be limited to its tributaries. The winter/early spring when the ARC Spillway would be used corresponds with the California red-legged frog breeding season, when individuals occur in ponds or in backwater pools or creeks with low to no flow. Such areas would not be affected by project construction or operations. Therefore, California red-legged frog would not be adversely affected by project implementation, and this impact would be **less than significant**.

Mitigation Measures: No mitigation is required.

Impact BIO-4: Impacts on Foothill Yellow-legged Frog.

Neither the Reservoir nor the Cottage Creek impoundment provide suitable habitat for foothill yellow-legged frog. More suitable habitat, including potential breeding and rearing habitat, occurs in the North Yuba River channel just over 1 mile downstream from the end of the discharge channel, but no individuals have been documented in the Yuba River between the Dam and Englebright Reservoir.

Construction

The very small portion of the North Yuba River that is within the potential construction area adjacent to the discharge channel is dominated by large boulders and provides poor-quality habitat for foothill yellow-legged frog. Because of the poor habitat conditions, foothill yellow-legged frog is very unlikely to occur at the project site and be directly affected by discharge channel construction. However, equipment operation in and above the river channel could result in substantial erosion and river sedimentation and accidental release of high turbidity and contaminants that affect downstream areas. If a previously unknown foothill yellow-legged frog population occurs close enough to the construction area, it could be substantially adversely affected by extensive erosion and sedimentation or an accidental contaminant spill.

Operations

If foothill yellow-legged frog occurs in the North Yuba River, individuals would likely move to smaller streams and tributaries to avoid higher flows during the time of year when the ARC Spillway would be used. Based on the modeled conditions over the 51-year operations modeling evaluation period, the ARC Spillway would only be used 1 percent of the time during already high flows and would on average lower the maximum flows in the Yuba River in the reach below the Dam. This combination of factors would limit potential effects to any habitats within or on the banks of the North Yuba River. The backwater and coarse substrate habitat preferred by this species is not anticipated to be substantially altered by the proposed project, as compared to existing conditions. A plunge pool of similar in size and depth to the plunge pool at the Primary Spillway is expected to develop over time in the North Yuba River adjacent to the ARC Spillway discharge channel. Transition of habitat in this area to a pool with bedrock substrate would have a minor effect on foothill yellow-legged frog because the area currently provides relatively poor-quality habitat. In addition, material transported downstream would be like that currently present downstream and would not substantially alter downstream habitat quality. Therefore, foothill yellow-legged frog is unlikely to be adversely affected by project operations.

Conclusions

Due to potential impacts to foothill yellow-legged frog from potential exposure to high turbidity or contaminant concentrations during construction, this impact would be **potentially significant**.

Mitigation Measures: The following mitigation measures have been identified to address these impacts.

> **Mitigation Measure HWQ-1: Prepare and Implement a Stormwater Pollution Prevention Plan and BMPs to Reduce Erosion.**
>
> Please refer to Mitigation Measure HWQ-1 in Chapter 3.1, "Hydrology and Water Quality," for the full text of this mitigation measure.
>
> **Mitigation Measure HAZ-1: Implement a Spill Prevention Control and Countermeasures Plan and Other BMPs for Storage, Use, and Transport of Hazardous Materials during Construction Activities.**
>
> Please refer to Mitigation Measure HAZ-1 in Chapter 3.11, "Hazards and Hazardous Materials," for the full text of this mitigation measure.

Significance after Mitigation: Implementing Mitigation Measures HWQ-1 and HAZ-1 would reduce construction-related impacts on foothill yellow-legged frog because a Stormwater Pollution Prevention Plan (SWPPP) and BMPs specifically designed to minimize erosion and sedimentation would be implemented and a Spill Prevention Control and Countermeasures Plan (SPCCP) and other measures specifically designed to prevent water contamination would be implemented. These are proven and effective construction-related mitigation measures employed by Yuba County Water Agency (YCWA) and others for similar construction projects. Therefore, impacts from the project would be **less than significant with mitigation**.

Impacts to Special-status Reptiles

Impact BIO-5: Impacts on Coast Horned Lizard.

The construction area provides poor-quality habitat for coast horned lizard because the most suitable on-site habitat (chaparral) has a relatively closed canopy and likely supports few areas with the microhabitat conditions these lizards require. However, if present, horned lizards within the project site would likely be killed during vegetation-clearing or other construction activities. Approximately 2 acres of deer brush-dominated habitat and 5 acres of forest and woodland with deer brush or buck brush chaparral associations (habitats with the highest likelihood of supporting the species) would be removed during project construction. However, the project site does not provide unique habitat characteristics, and similar habitat is abundant adjacent to construction areas and in the project vicinity. Therefore, the construction area likely supports a small proportion of the overall local population of coast horned lizard, if one exists. Loss of individuals and habitat at the project site is unlikely to have a substantial adverse effect on the potential local population, and this impact would be considered **less than significant**.

Mitigation Measures: No mitigation is required.

Impact BIO-6: Impacts on Western Pond Turtle.

Construction

Construction of the approach channel and end of the discharge channel near the Yuba River Channel would occur in poor-quality aquatic and upland habitat for western pond turtle. Individuals have not been documented at the project site, but approximately 1 acre of potentially suitable nesting habitat has been identified. Though unlikely to occur at the project site, individual pond turtles could be disturbed and nests could be destroyed by construction equipment. Because construction activities would disturb a small area of poor-quality habitat, very few if any individuals would be present, and they would be likely to leave the area when project activities begin. However, in the unlikely event nests are present, all eggs could be destroyed. In addition, equipment operation in and above the river channel could result in substantial erosion and sedimentation into the river channel and accidental release of contaminants that affect downstream areas. Because the North Yuba River provides potentially suitable aquatic habitat downstream of the construction area, if a western pond turtle population occurs close enough to the construction area, it could be substantially adversely affected by extensive erosion and sedimentation or an accidental spill. Approach channel construction also could degrade aquatic habitat in the event of an accidental contaminant spill or substantially increased turbidity or sedimentation.

Operations

Pond turtles present in the Reservoir would not be affected by the small pool fluctuations during ARC Spillway operation. Individuals in the North Yuba River would likely move to smaller streams and tributaries to avoid higher flows during the time of year when the ARC Spillway would be used, which does not coincide with nesting season when there is potential for nests to be present along the river margins. Per the modeled conditions over the 51-year operations modeling evaluation period, the ARC Spillway would only be used 1 percent of the time during already high flows and would, on average, lower the maximum flows in the Yuba River in the reach below the Dam. This combination of factors would limit potential effects to any habitats within or on the banks of the North Yuba River. Creation over time of a plunge pool adjacent to the ARC Spillway discharge channel would have a minor effect on western pond turtle because the area currently provides relatively poor-quality habitat. In addition, material transported downstream would be like that currently present downstream and would not substantially alter downstream habitat quality. Therefore, western pond turtle and its habitat are unlikely to be adversely affected by project operations.

Conclusions

Due to the potential to destroy western pond turtle nests at the project site and degrade aquatic habitat in and beyond the construction area, this impact would be considered **potentially significant**.

Mitigation Measures: The following mitigation measures have been identified to address these impacts.

Mitigation Measure BIO-2: Minimize Potential for Destruction of Western Pond Turtle Nests and Death of Individuals during Construction Activities.

The following measures will be implemented to reduce potential for death or injury of western pond turtle during project construction:

- Within 10 days before onsite construction activities begin, a qualified biologist will conduct a focused survey for western pond turtles in portions of the construction area that provide suitable aquatic or upland habitat and can be safely accessed. If construction activities would begin during the pond turtle nesting season (March through August), surveys will include suitable nesting habitat within the construction footprint. If a pond turtle is found, it will be allowed to move out of the area on its own, if feasible. If the biologist determines it is likely to re-enter the construction area and it can be safely captured, the pond turtle will be relocated to suitable habitat far enough away to avoid reentry into the construction area. If a nest is found, it will remain undisturbed, if feasible, until the eggs have hatched.

- Before on-site project activities begin, all on-site project personnel will attend a worker training program conducted by a qualified biologist. The program will address sensitive biological resources that could occur on the project site and include a discussion of species identification, life history, general behavior, habitat, and sensitivity to human activities; discussion of sensitive habitats; review of Federal and State legal protections; and description of required avoidance and minimization measures. All on-site personnel also will be provided with contact information for the project biologist.

- If a pond turtle is discovered at the project site during construction activities, it will be allowed to move out of the area on its own, if feasible. If the pond turtle does not leave the construction area or a qualified biologist determines it is likely to re-enter the construction area and it can be safely captured, the biologist will relocate the pond turtle to suitable habitat far enough away to avoid reentry into the construction area.

Timing: Before and during construction activities.

Responsibility: YWCA and its construction contractor(s).

Mitigation Measure HWQ-1: Prepare and Implement a Stormwater Pollution Prevention Plan and BMPs to Reduce Erosion.

Please refer to Mitigation Measure HWQ-1 in Chapter 3.1, “Hydrology and Water Quality,” for the full text of this mitigation measure.

Mitigation Measure HWQ-1: Implement a Spill Prevention Control and Countermeasures Plan and Other BMPs for Storage, Use, and Transport of Hazardous Materials during Construction Activities.

Please refer to Mitigation Measure HAZ-1 in Chapter 3.11, “Hazards and Hazardous Materials,” for the full text of this mitigation measure.

Significance after Mitigation: Implementing Mitigation Measures BIO-2, HWQ-1, and HAZ-1 would reduce potential construction-related impacts on western pond turtle because nests would be avoided to the extent feasible, worker training would be provided, pond turtles discovered at the project site would be allowed to leave on their own to the extent feasible, a SWPPP and BMPs specifically designed to minimize erosion and sedimentation would be implemented, and an SPCCP and other measures specifically designed to prevent water contamination would be implemented. These types of measures have been routinely used by YCWA and others to successfully mitigate projects impacts to western pond turtle. Therefore, impacts from the project would be **less than significant with mitigation**.

Impacts to Special-status Birds

Impact BIO-7: Impacts on Bald Eagle.

Disturbance of potential bald eagle foraging habitat during construction would be limited to approximately 1 acre, depending on Reservoir levels at the time. Foraging habitat is almost exclusively in the approach channel construction area at the Reservoir. Potential foraging habitat in the North Yuba River is minimal, and discharge channel construction is unlikely to disrupt foraging activities. Because the construction area includes an extremely small proportion of foraging habitat available at the Reservoir, potential disruption of foraging activities in this area would be minimal.

Based on past surveys and monitoring, no bald eagle night roosts or wintering areas are known to occur near the project site, and construction activities are very unlikely to occur within 0.5 mile of a night roost or winter site. Because these activity areas have generally been concentrated in the less-disturbed northern portions of the Reservoir, new sites in or near the project site are unlikely to become established before construction begins. If night roosts or winter sites become established near the project site, construction activities may disturb and cause eagles to abandon the sites. However, the project site has not traditionally been an important area for bald eagle activity, and higher-quality, less-disturbed areas would be available.

Similar to night roosts and wintering areas, known bald eagle nest sites have been located adjacent to the northern portion of the Reservoir. Because these more remote traditional nest sites are subject to much lower disturbance levels than the project site, a nest site is very unlikely to be present within 0.5 mile of the project site. However, if such a nest becomes established, noise and visual disturbance from construction and maintenance activities during the bald eagle nesting season (February through July) could have a substantial adverse effect on the nesting birds and their eggs or young, including potential nest abandonment, reduced care of eggs or young, or premature fledging.

The project features and associated operations and maintenance activities are unlikely to permanently impact bald eagle. Although the new structures would be up to 40 feet tall, the topography in the local area is variable and trees of similar height are present in adjacent areas along the Reservoir. Similarly, the additional height of the disposal area would blend with the natural topographic variation. Foraging habitat conditions in the North Yuba River are highly variable and the ARC Spillway flow releases are unlikely to substantially alter foraging conditions. Disturbance from maintenance activities would be similar to existing conditions and unlikely to result in substantial disturbance of bald eagle behavior unless major maintenance is required and an active nest is located nearby.

Due to the potential disturbance of an active bald eagle nest that could be present during a construction year, this impact would be **potentially significant**.

Mitigation Measures: The following mitigation measure has been identified to address this impact.

Mitigation Measure BIO-3: Implement Bald Eagle Protection Measures during Construction Activities.

To minimize potential impacts on nesting bald eagle, YCWA will implement the following measures:

- A qualified biologist will conduct bald eagle nest surveys in areas that are within 0.5 mile of the general construction area and/or 1 mile of the blasting area, as well as within 1 mile of the Reservoir, starting the year before project construction is scheduled to begin and in each year that construction occurs. Surveys will be conducted in accordance with the Bald Eagle Breeding Survey Instructions (CDFG 2010) and the Protocol for Evaluating Bald Eagle Habitat and Populations in California (Jackman and Jenkins 2004) and/or other appropriate methods, as determined by a qualified biologist. Each bald eagle nesting survey will include three visits to the survey area, one each in March, April or early May, and mid-June of the same year.

- Upon completion of the first nest survey, and for all active nests identified after the initial nest survey, a buffer will be established around all documented active bald eagle nests within 0.5 mile of the general construction area and/or 1 mile of the blasting area. The size and shape of the buffer will be determined by a qualified biologist, based on the specific localized factors, including the type and intensity of project disturbance, presence of visual buffers, and other variables that affect susceptibility of the nest to disturbance. No project activities will occur within the buffer until a qualified biologist determines the nest is no longer active.

- A qualified biologist will monitor any active bald eagle nest 0.5 mile of the general construction area and/or 1 mile of the blasting area during project construction activities to observe behavior of the nesting birds and young and confirm project activities do not cause disturbance that could result in nest abandonment, reduced care of eggs or young, or premature fledging. A qualified biologist may adjust the buffer, if appropriate, based on monitoring observations.

- Before on-site project activities begin, all on-site project personnel will attend a worker training program conducted by a qualified biologist. The program will address sensitive biological resources that could occur on the project site and include a discussion of species identification, life history, general behavior, habitat, and sensitivity to human activities; discussion of sensitive habitats; review of Federal and State legal protections; and description of required avoidance and minimization measures. All on-site personnel also will be provided with contact information for the project biologist.

- The above measures also will be implemented for project maintenance activities within 1 mile of the Reservoir that would result in disturbance levels high enough to potentially disrupt an active bald eagle nest.

Timing: Before and during construction activities; and during some maintenance activities.

Responsibility: YWCA and its construction contractor(s).

Significance after Mitigation: Implementing Mitigation Measure BIO-3 would reduce impacts on bald eagle because pre-construction nest surveys would be conducted, worker training would be provided, and buffers would be implemented to avoid project-related failure of any active nests present during construction and maintenance activities. Therefore, project impacts would be **less than significant with mitigation**.

Impact BIO-8: Impacts on American Peregrine Falcon.

The entire project site may provide foraging habitat for peregrine falcon. However, project construction would not occur throughout this entire area over the full construction period. In addition, many hundreds of acres of similar habitat are present in the immediate project vicinity. Because the project site includes an extremely small proportion of foraging habitat available in the area, potential disruption of foraging activities during construction activities would be minimal.

Based on past surveys and monitoring, peregrine falcon is not known to nest in or near the project site. Suitable nest sites are not present at the project site, and the Dam is unlikely to provide suitable nest sites. However, cliffs in the North Yuba River canyon immediately below the Dam provide potential nest sites. If an active nest occurs near the construction area, noise and visual disturbance from construction and maintenance activities during the peregrine falcon nesting season (March through July) could have substantial adverse effects on the nesting birds and their eggs or young, including potential nest abandonment, reduced care of eggs or young, or premature fledging.

The project features and associated operations and maintenance activities are unlikely to permanently impact peregrine. Peregrine falcons typically use artificial structures and are known to perch on the existing facilities. Therefore, the new structures are unlikely to affect their use of the area. Disturbance from maintenance activities would be similar to existing conditions and unlikely to result in substantial disturbance of peregrine falcon behavior unless major maintenance is required and an active nest is located nearby.

Due to potential disturbance of any active peregrine falcon nests present during construction, this impact would be **potentially significant**.

Mitigation Measures: The following mitigation measure has been identified to address this impact.

> **Mitigation Measure BIO-4: Implement American Peregrine Falcon Protection Measures during Construction Activities.**
>
> To minimize potential impacts on nesting peregrine falcon, the following measures will be implemented:
>
> - A qualified biologist will conduct peregrine falcon nest surveys in areas that are within 0.5 mile of the general construction area and 1 mile of the blasting area, starting the year before project construction is scheduled to begin and in each year that construction occurs. Surveys will be conducted as described in *Protocols for Observing Known and Potential Peregrine Falcon Eyries in the Pacific Northwest* (Pagel 1992) and/or other appropriate methods, as determined by a qualified biologist. An initial survey will be conducted in mid-March through April of each year of construction, and a second survey will be conducted approximately 1 month later.

- A buffer will be established around all documented active peregrine falcon nests within 0.5 mile of the general construction area and/or 1 mile of the blasting area. The size and shape of the buffer will be determined by a qualified biologist, based on the specific localized factors, including the type and intensity of project disturbance, presence of visual buffers, and other variables that affect susceptibility of the nest to disturbance. No project activities may occur within the buffer until a qualified biologist determines the nest is no longer active.

- A qualified biologist will monitor any active peregrine falcon nest within 0.5 mile of the general construction area and/or 1 mile of the blasting area during project construction activities to observe behavior of the nesting birds and young and confirm project activities do not cause disturbance that could result in nest abandonment, reduced care of eggs or young, or premature fledging. A qualified biologist may adjust the buffer, if appropriate based on monitoring observations.

- Before on-site project activities begin, all on-site project personnel will attend a worker training program conducted by a qualified biologist. The program will address sensitive biological resources that could occur on the project site and include a discussion of species identification, life history, general behavior, habitat, and sensitivity to human activities; discussion of sensitive habitats; review of Federal and State legal protections; and description of required avoidance and minimization measures. All on-site personnel also will be provided with contact information for the project biologist.

- The above measures also will be implemented for project maintenance activities that would result in disturbance levels high enough to potentially disrupt an active peregrine nest.

Timing: Before and during construction activities; and during some maintenance activities.

Responsibility: YWCA and its construction contractor(s).

Significance after Mitigation: Implementing Mitigation Measure BIO-4 would reduce potential impacts on peregrine falcon because pre-construction nest surveys would be conducted, worker training would be provided, and buffers would be implemented to avoid project-related failure of active nests. Therefore, impacts from the project would be **less than significant with mitigation**.

Impact BIO-9: Impacts on Golden Eagle, Northern Goshawk, and Great Gray Owl.

Past surveys and observations of golden eagle, northern goshawk, and great gray owl in the project vicinity have not documented occurrences of any of these species at or adjacent to the project site, likely because the area provides poor-quality habitat for them. Golden eagle is thought to be a non-breeding visitor in the project vicinity, and Northern goshawk and great gray owl are not known to occur within 5 miles of the project site. Because the project site provides relatively poor-quality habitat for these species, and more suitable habitat is available elsewhere in the project vicinity and larger region, loss of approximately 30 acres of coniferous forest and woodland during project construction activities would not have a substantial adverse effect. In addition, nesting golden eagle, goshawk, and great gray owl would not be disturbed, because these species do not nest in the vicinity of the construction area. Therefore, these impacts would be **less than significant**.

Mitigation Measures: No mitigation is required.

Impact BIO-10: Impacts on California Spotted Owl.

California spotted owl has been extensively surveyed in the project vicinity, and nest sites, activity centers, territories and other observations are well documented. California spotted owl activity centers, including nest sites, have been documented at several locations within 5 miles; the closest site is approximately 0.3 mile from the contractor staging area in the parking lot near the Marina and 1 mile from the primary construction area at the ARC Spillway. Based on this available information, it is unlikely a new nest site or activity center would become established in or within 0.25 mile of the project site. However, if a previously unknown active nest occurs in or near the project site, construction-related vegetation removal and noise and visual disturbance from construction and maintenance activities during the spotted owl nesting season (February through July) could have substantial adverse effects on the nesting birds and their eggs or young, including potential nest destruction or abandonment, reduced care of eggs or young, or premature fledging.

The project features and associated operations and maintenance activities are unlikely to permanently impact spotted owl. This species is very unlikely to use the area in the immediate vicinity of the existing and new structures and is not anticipated be affected by the changed conditions. Disturbance from maintenance activities would be similar to existing conditions and unlikely to result in substantial disturbance of spotted owl behavior unless major maintenance is required and an active nest or activity center is located nearby.

Due to potential removal or disturbance of an active spotted owl nest during construction activities, this impact would be a **potentially significant**.

Mitigation Measures: The following mitigation measure has been identified to address this impact.

> **Mitigation Measure BIO-5: Avoid Construction-related Impacts on Active California Spotted Owl Nest Sites.**
>
> To minimize potential effects of project construction on nesting California spotted owl, the following measures will be implemented:
>
> - Project-related vegetation removal will be conducted during the non-nesting season (August through January) to the maximum extent feasible to avoid potential for accidental removal of an unknown active nest and disturbance of recently fledged young.
> - Starting the year project construction begins and in each year that construction occurs, as well as any year in which project maintenance activities that would result in disturbance levels high enough to potentially disrupt an active nest, YCWA will coordinate with USFS staff to confirm that no new California spotted owl nest sites have become established within 0.25 mile of the construction area.
> - If an active nest site is present within 0.25 mile of the construction area, a buffer will be established around the nest site. The size and shape of the buffer will be determined by a qualified biologist, based on the specific localized factors, including the type and intensity of project disturbance, presence of visual buffers, and other variables that affect susceptibility of the nest to disturbance. No project activities may occur within the buffer until a qualified biologist determines the nest is no longer active.

- A qualified biologist will monitor any active spotted owl nest within 0.25 mile of the construction area during project construction activities to ensure construction-related nest disturbance does not occur. A qualified biologist may adjust the buffer, if appropriate based on monitoring observations.
- Before on-site project activities begin, all on-site project personnel will attend a worker training program conducted by a qualified biologist. The program will address sensitive biological resources that could occur on the project site and include a discussion of species identification, life history, general behavior, habitat, and sensitivity to human activities; discussion of sensitive habitats; review of Federal and State legal protections; and description of required avoidance and minimization measures. All on-site personnel also will be provided with contact information for the project biologist.

Timing: Before and during construction activities; and during some maintenance activities.

Responsibility: YWCA and its construction contractor(s).

Significance after Mitigation: Implementing Mitigation Measure BIO-5 would reduce impacts on California spotted owl because vegetation removal would occur outside the nesting season to the extent feasible, YWCA would coordinate with USFS staff regarding previously unknown nesting areas, worker training would be provided, and buffers would be implemented to avoid project-related failure of active nests. Therefore, impacts from the project would be **less than significant with mitigation**.

Impact BIO-11: Impacts on Olive-sided Flycatcher, Yellow Warbler, and Other Nesting Birds.

The project site provides suitable nesting habitat for a variety of bird species, including marginally suitable habitat for two special-status species: olive-sided flycatcher and yellow warbler. Common resident and migratory species are known or likely to nest in and near the project site. Construction-related vegetation removal and noise and visual disturbance from construction and maintenance activities during the birds' nesting season (February through July) could result in nest destruction or abandonment, reduced care of eggs or young, or premature fledging. Because habitat quality for olive-sided flycatcher and yellow warbler is marginal, few, if any pairs of these species are likely to be affected by project activities. This is unlikely to have a substantial adverse effect on the local populations of these species. Relatively minor and extremely rare changes in North Yuba River flows are not anticipated to change conditions in such a way that would adversely impact potential nesting habitat for yellow warbler. In addition, the potential extent of loss of active nests of common nesting birds would not substantially reduce their abundance or cause them to drop below self-sustaining levels. Therefore, these impacts would be **less than significant**.

Mitigation Measures: No mitigation is required.

Impacts to Special-status Mammals

Impact BIO-12: Impacts on Ringtail.

Forest, woodland, and chaparral habitats at the project site may be suitable for ringtail, but no occurrences are known at the project site or nearby areas. The nearest known occurrence is from Our House Diversion Dam, approximately 7 miles east of the project site. Although YCWA has reported multiple occurrences inside the New Colgate and Narrows 2 powerhouses, ringtail has not been

observed at the Dam facilities or other buildings in the area. It appears unlikely for ringtail to occur at the project site, but because the area provides potentially suitable habitat and is within the broad distribution for this species, the possibility that ringtail occurs onsite and could be killed or injured during vegetation removal and other habitat disturbance cannot be dismissed. Because ringtail is fully protected under the CFGC, potential loss of individuals from project construction activities is considered to be **potentially significant**.

Mitigation Measures: The following mitigation measure has been identified to address this impact.

> **Mitigation Measure BIO-6: Minimize Potential for Project-related Death or Injury of Ringtail during Construction Activities.**
>
> To minimize potential project-related death or injury of ringtail during construction activities, the following measures will be implemented:
>
> - Project-related vegetation removal will be conducted during the non-breeding season (September through February) to the maximum extent feasible.
> - If vegetation removal must occur during the ringtail breeding season (March through August), a qualified biologist will conduct a survey of potential denning habitat in accessible portions of the construction area for occupied dens.
> - If an occupied den is located, a buffer will be established around the den. The size and shape of the buffer will be determined by a qualified biologist, based on the specific localized factors, including the type and intensity of project disturbance, presence of visual buffers, and other variables that affect susceptibility to disturbance. A qualified biologist may adjust the buffer, if appropriate based on monitoring observations. No construction activities may occur within the buffer until a qualified biologist determines the den is no longer occupied.
> - If a ringtail is discovered at the project site during construction activities, it will be allowed to move out of the area on its own, if feasible. If the ringtail does not leave the construction area it will be safely captured by a qualified person and relocated to suitable habitat far enough away to minimize reentry into the construction area.
> - Before on-site project activities begin, all on-site project personnel will attend a worker training program conducted by a qualified biologist. The program will address sensitive biological resources that could occur on the project site and include a discussion of species identification, life history, general behavior, habitat, and sensitivity to human activities; discussion of sensitive habitats; review of Federal and State legal protections; and description of required avoidance and minimization measures. All on-site personnel also will be provided with contact information for the project biologist.

Significance after Mitigation: Implementing Mitigation Measures BIO-7 would reduce impacts on special-status ringtail because vegetation removal would occur outside of the breeding season to the extent feasible, den surveys would be conducted before construction begins, appropriate buffers would be implemented to avoid disturbance of occupied dens, and worker training would be provided. Therefore, impacts from the project would be **less than significant with mitigation**.

Impact BIO-13: Impacts on Special-status Bats.

Two special-status bat species (western red bat and spotted bat) have been detected in the immediate vicinity of the project site, and possible detections of two additional special-status species (pallid bat and Townsend's big-eared bat) have been documented below the Dam. Foraging behavior of these species would not be substantially altered by construction activities, because the entire project vicinity provides suitable foraging habitat, and potential disturbance would be limited to work that occurs outside normal daytime construction hours. No bats captured during FERC relicensing studies were in reproduction condition, but captures below the Dam did not include any special-status species. Therefore, potential for maternity roosts to occur in or near the project site cannot be dismissed.

The only species with potential to roost in the project site is western red bat. Canyon live oak forest and tanoak woodland provide marginally suitable roosting habitat for this species. However, this species is primarily solitary, and the numbers of individuals that may roost at the project site is relatively small, in contrast to colonial-roosting species. The project site does not provide unique roosting habitat characteristics, and similar habitat is abundant in the project vicinity. Therefore, the project site likely supports a small proportion of the overall local population of western red bat. Loss of individuals at the project site is unlikely to have a substantial adverse effect on the potential local population.

Canyon walls adjacent to and downstream of the Dam, including near the project site, may be suitable for roosting by species that use crevices. If colonies of crevice-roosting species occur close to the project site, they could be substantially disturbed by construction activities, particularly blasting. Facility operations and maintenance activities also could disturb species that roost in buildings, if roosts become established in the newly constructed facilities. If large numbers of individuals are affected by project construction or operations and maintenance, this could result in a substantial adverse impacts that would be **potentially significant**.

Mitigation Measures: The following mitigation measure has been identified to address this impact.

> **Mitigation Measure BIO-7: Minimize Potential for Project-related Loss or Disturbance of Roosting Special-status Bats.**
>
> To minimize potential project-related impacts on special-status bats, the following measures will be implemented:
>
> - In the year before project construction is scheduled to begin, a qualified biologist will conduct daytime visual assessments and nighttime emergence surveys for bats and/or signs of bats roosting. Surveys will be conducted between July 1 and August 31 and at safely accessible locations near cliffs within 1,000 feet of the construction area.
>
> - If potential evidence of special-status bats roosting within 1,000 feet of project-related blasting is detected, blasting will be conducted during the non-pupping season (September through March) to the maximum extent feasible to avoid disturbance of active maternity sites.

- Before on-site project activities begin, all on-site project personnel will attend a worker training program conducted by a qualified biologist. The program will address sensitive biological resources that could occur on the project site and include a discussion of species identification, life history, general behavior, habitat, and sensitivity to human activities; discussion of sensitive habitats; review of Federal and State legal protections; and description of required avoidance and minimization measures. All on-site personnel also will be provided with contact information for the project biologist.

The above measures also will be implemented for project maintenance activities that would result in disturbance levels high enough to potentially disrupt an active special-status bat roost.

Timing: Before and during construction activities; and some maintenance activities.

Responsibility: YWCA and its construction contractor(s).

Significance after Mitigation: Implementing Mitigation Measures BIO-8 would reduce impacts on special-status bats because pre-construction roost surveys would be conducted, blasting would occur outside the pupping season to the extent feasible if evidence of roosting is documented, and worker training would be provided. Therefore, impacts from the project would be **less than significant with mitigation**.

Impacts to Habitats

Impact BIO-14: Impacts on Riparian Habitat and Sensitive Natural Communities.

Construction

The construction area supports very little riparian vegetation because the North Yuba River channel at the bottom of the discharge channel is dominated by bedrock and very large boulders. Although this area is shown as arroyo willow thicket in **Figure 3.3-1**, few plants are present and very little, if any, riparian vegetation would be removed in this area. Similarly, the small, remnant patch of Goodding's black willow below the existing Overlook Site supports very limited and degraded cover, and loss of this habitat would not have a substantial adverse effect. Tanoak woodland occurs in very small amounts at the project site and is primarily only in association with Pacific madrone; therefore, it does not represent a sensitive natural community.

Operations

As discussed above, the proposed project would result in extremely rare relatively small average daily flow increases (and overall small decrease in high flows) in the North Yuba River downstream of the Dam. Given that the riparian habitats are sustained at flows of up to 16,297 cfs under the existing conditions in the reach just below the Dam at times when the ARC Spillway would be used, this slight increase in average flows (and overall decrease in high flows) at such infrequent intervals is not anticipated to change conditions, including erosion, in a way that would adversely impact riparian vegetation. Similarly, the extremely rare Reservoir fluctuations of no more than 10 feet are not anticipated to adversely affect the viability of any riparian vegetation that may be present along the Reservoir margins or the lower reaches of its tributaries.

Conclusions

Because the minor operational Reservoir fluctuations and flow changes in the North Yuba River are not anticipated to affect riparian habitat and construction-related vegetation removal would impact only small, degraded areas of riparian vegetation and would not affect sensitive natural communities, these impacts would be **less than significant**.

Mitigation Measures: No mitigation is required.

Impact BIO-15: Chaparral, Woodland, and Forest Removal.

Approximately 2 acres of chaparral, 27 acres of coniferous forest and woodland, and 12 acres of oak forest and woodland would be removed during construction of the ARC Spillway and associated facilities, including the soil and rock disposal area. Although this is a substantial amount of habitat for common plants and animals that occur at the immediate project construction site, many hundreds of acres of similar habitat occur immediately adjacent to the project construction site and more occur in the larger vicinity. Therefore, the extent of vegetation loss would not substantially reduce the habitat of any wildlife species, cause a wildlife population to drop below self-sustaining levels, or threaten to eliminate a plant or animal community. Therefore, this impact would be **less than significant**.

Mitigation Measures: No mitigation is required.

Impact BIO-16: Impacts on Federal- and State-protected Waters.

The Reservoir, North Yuba River, North Yuba River and Middle Yuba River, Englebright Reservoir, and Lower Yuba River are Federally protected waters of the U.S. and State-protected waters of the State.

Construction

Construction activities would include approach and discharge channel construction and associated temporary disturbance and potentially dewatering (limited to a small portion of the North Yuba River channel adjacent to the discharge channel) within these jurisdictional waters. A total of approximately 0.5 acre in the North Yuba River and 1 acre in the Reservoir are anticipated to be directly impacted. These impacts would require USACE, RWQCB, and potentially CDFW authorization.

North Yuba River impacts would include construction equipment operation in the areas where the discharge channel terminates at the river's east bank; this equipment would be used to remove decomposed and severely weathered rock from the adjacent slope to reduce potential for erosion when the discharge channel is operating. Because this portion of the river is dominated by bedrock and very large boulders, the very small amount of excavation that may occur below the ordinary high-water mark would not adversely affect the river's habitat quality or functions and values.

Although a larger area in the Reservoir would be permanently altered by constructing the approach channel and new permanent access route, this portion of the Reservoir provides very limited aquatic habitat value and represents a tiny fraction of the more than 4,000 acres of Reservoir surface area. The affected area is immediately adjacent to the Dam, and much of the new ARC Spillway approach channel overlaps existing permanent access to the Primary Spillway. Permanent impacts associated with the approach channel would not have a substantial adverse effect on the Reservoir's habitat quality or functions and values. These permanent impacts would represent very small areas of Federally and State-protected waters associated with the North Yuba River and the Reservoir.

Construction equipment operation in and above the North Yuba River channel could result in substantial erosion and river sedimentation and accidental release of contaminants that affect downstream areas. Approach channel construction also could substantially degrade Reservoir water quality in the event of an accidental contaminant spill or substantially increased turbidity or sedimentation that affects a large portion of the Reservoir.

Operations

Based on the modeled conditions over the 51-year operations modeling evaluation period, the ARC Spillway would only be used 1 percent of the time during already high flows and would have relatively minor effects on the North Yuba River. In all cases, modeled flows were at least 5,860 cfs before the ARC Spillway would be used (and at 15,507 cfs when the highest rise in modeled average daily flow occurred). The highest rise in average modeled daily flows in the Yuba River between the Dam and Englebright Reservoir was 264 cfs, and the maximum modeled average daily flows fell by at least 19 cfs in the same reach. Therefore, the changes are very minor relative to the overall flows. Similarly, the extremely rare Reservoir fluctuations of no more than 10 feet in winter and early spring would have a very minor effect on this water body that experiences much larger and longer-term fluctuations. Creation of the plunge pool area over time adjacent to the ARC Spillway discharge channel would result in transition to a more frequently inundated area of bedrock substrate. Material transported from the area and deposited downstream would consist primarily of cobble- to boulder-sized material with little to no sand or fine gravel. This material would be like that currently present in the downstream reach and would not result in substantial sedimentation or other habitat degradation. Therefore, there would not be a substantial operations-related adverse effect on Federally or State-protected waters.

Conclusions

Since construction activities could degrade aquatic habitat downstream well beyond the project site due to erosion, river sedimentation, and contaminants released during construction, this impact would be **potentially significant**.

Mitigation Measures: The following mitigation measures have been identified to address this impact.

> **Mitigation Measure HWQ-1: Prepare and Implement a Stormwater Pollution Prevention Plan and Best Management Practices to Reduce Erosion during Construction Activities.**
>
> Please refer to Mitigation Measure HWQ-1 in Chapter 3.1, "Hydrology and Water Quality," for the full text of this mitigation measure.

Mitigation Measure HAZ-1: Implement a Spill Prevention Control and Countermeasures Plan and Other BMPs for Storage, Use, and Transport of Hazardous Materials during Construction Activities.

Please refer to Mitigation Measure HAZ-1 in Chapter 3.11, "Hazards and Hazardous Materials," for the full text of this mitigation measure.

Significance after Mitigation: Implementing Mitigation Measures HWQ-1 and HAZ-1 would reduce construction-related impacts on Federally and State-protected waters because a SWPPP and BMPs specifically designed to minimize erosion and sedimentation would be implemented and a SPCCP and other measures specifically designed to prevent water contamination would be implemented. These are proven and effective construction-related mitigation measures employed by YCWA and others for similar construction projects. Therefore, impacts from the project would be **less than significant with mitigation**.

Other Biological Impacts

Impact BIO-17: Impacts on Fish and Wildlife Movement Corridors and Nursery Sites.

The project site and operations study area are part of a much larger extent of reservoir, riverine, woodland/forest, and scrub habitats. Although the North Yuba River is likely used as a movement corridor by various wildlife, including local and migratory deer herds, travel by such animals in the project area is already disrupted by the Dam, Marysville Road, and other developed facilities. Construction and maintenance activities would not substantially interfere with the movement of native wildlife because activities would be limited to one side of the river canyon, and equally suitable habitat is available on the other side of the canyon, west of the construction area, and in scrub and woodland/forest habitat east of the construction area. Access to and travel along the Reservoir shore also would not be substantially disrupted, because the construction area represents a tiny fraction of the total Reservoir shoreline and is located in the portion with the highest disturbance levels. In addition, the extremely rare and minor operational fluctuations in Reservoir levels and North Yuba River flows would not substantially affect wildlife movement. Finally, although a variety of wildlife likely breed at the project site and operations area, they are unlikely to support nursery sites. Therefore, impacts on fish or wildlife migration, movement, and nursery site use would be **less than significant**.

Mitigation Measures: No mitigation is required.

Residual Significant Impacts

The project would result in potential significant impacts related to terrestrial biological resources, but mitigation measures would be implemented to reduce potential terrestrial biological resources impacts to a less-than-significant level. Therefore, the project would not result in residual significant impacts related to terrestrial biological resources, and, with imposition of the mitigation measures identified above, the project would not have any significant and unavoidable impacts related to terrestrial biological resources.

3.4 Cultural and Tribal Cultural Resources

This section describes the environmental and regulatory setting for cultural resources and Tribal Cultural Resources (TCRs). It also describes potential impacts on cultural resources and TCRs that could result from implementing the New Bullards Bar Dam Atmospheric River Control (ARC) Spillway Project (project or proposed project).

3.4.1 Environmental Setting

Prehistoric Context

This section is adapted from Technical Memorandum 12-1 *Historic Properties* (Yuba County Water Agency [YCWA] 2013), which was produced for Federal Energy Regulatory Commission (FERC) relicensing of the Yuba River Development Project (YRDP) and included archeological and architectural history studies.

Late Pleistocene/Younger Dryas/Recess Peak Advance-Paleoindian (15,000 to 10,000 B.P.)

The Clovis culture currently is identified in North America as occurring between approximately 13,500 to 13,000 years ago. The acquisition of date ranges for the Clovis culture from current literature is fraught with confusion due to a plethora of alternative dating schemes and dating methods. The cultural pattern is distinguished by "fluted" projectile points, percussion blades, and other distinctive artifacts. Very few Clovis sites have been identified in North America. The Clovis culture, which is the earliest well documented cultural expression in the Americas, is linked to the medial part of this time period, circa (ca.) 13,500 to 13,000 before present (B.P.). No diagnostic Clovis artifacts, which are distinguished by "fluting" of the proximal portion of both faces of projectile points and possibly other tools, have been found in the project vicinity. However, a fluted point was found at Lake Almanor, located approximately 100 miles north in Plumas County. Fluted point fragments and complete specimens, typically isolated, are known, however, from scattered locations throughout much of the Sierra Nevada. Unfortunately, few are from dated contexts.

Terminal Pleistocene/Initial Holocene (ca. 10,000 B.P.)

The Pleistocene ended 10,000 years ago in the sense that the great continental ice sheets were in serious retreat. However, modern studies using data from Antarctic and Greenland ice cores have shown that the great glacial advances of the Pleistocene were at least quasi-periodic with a cycle length ranging from approximately 110 to over 150,000 years. There is no certainty at present whether the Pleistocene has really ended or if the Holocene is merely the latest interstadial event with more ice to come in the future. Cultural evidence from this era in the Sierra Nevada is scant, but comparatively well established.

Early Holocene-Late Paleoindian (ca. 10,000 to 8,000 B.P.)

By the Early Holocene, evidence from numerous archaeological sites throughout the State show that California was fully explored by this time and supported a significant population. The regional climate was distinguished by a steady warming and drying trend, or a period of "relative warming." In the Truckee area, the Alder Hill basalt quarry was active. Researchers recovered Great Basin stemmed points, datable carbon, and obsidian that indicate the area was being visited for the procurement of toolstone by the Early Holocene. At site CA-ELD-180, Great Basin stemmed points, some of which likely had their origins in the western Sierra foothills, were recovered, manufactured from a broad range

of materials, and indicate considerable mobility of at least portions of the human population. In yet other areas, such as the western Sierra foothills in Calaveras County, there is evidence of extremely stable land use. For example, evidence shows continued use of the Skyrocket site in Calaveras County over a span of approximately 2,500 years during the Early Holocene.

Middle Holocene-Early Archaic (ca. 8,000 to 5,000 B.P.)

The Middle Holocene is poorly represented archaeologically throughout California, with researchers speculating that several factors may obscure middle Holocene contexts. Warming conditions arising during the early Holocene evidently continued into the mid-Holocene. In the Tahoe region, an extensive list of studies concluded that the mid-Holocene was the warmest period in recent geological history and, at least in North America, one of the driest periods. Levels in Lake Tahoe may at times have fallen sufficiently low to isolate the lake from the Truckee River. Evidence indicates a drought period estimated to have lasted approximately 350 years between about 6,300 and 4,850 B.P. Effects of these changes farther west are not well documented. At the Skyrocket site, evidence of occupation diminishes but is never fully interrupted.

Late Holocene-Middle Archaic (5,000 to 2,000 B.P.)

The beginning of the Late Holocene is marked by climatic shifts toward a more temperate regime and the first well documented archaeological cultures in central and northern California. In the Sacramento-San Joaquin Delta region, the Windmiller culture emerged with unique traits, including an unusual mortuary pattern marked by prone interments with crania oriented in a westerly direction. In the Truckee vicinity and portions of the neighboring western High Sierra, the Martis Complex, marked by typological affiliations with the Great Basin and a preference for locally abundant basalt, was identified by several researchers. The Martis complex is well-represented near the project vicinity at sites such as CA-NEV-15, CA-NEV-67, CA-PLA-6, and CA-SIE-20. To the west and north, the Messilla Complex was defined at three sites in Butte County. Early investigators suggested that Martis may reflect ancestral Maiduan prehistory. A three-stage Bullards Bar cultural complex appears to follow the same typological progression as the Martis to Kings Beach and Mesilla to Sweetwater cultural phases from Lake Tahoe and Lake Oroville, respectively. The Bullards Bar I-III phases are characterized by a shift from large to small projectile points. The earliest period, Bullards Bar I, dates from approximately 2,450 B.P. to 1,949 B.P. This phase likely represents seasonal occupation sites with a diverse subsistence base, characterized by large basalt and chert projectiles as well as milling stones and mortars. What is evident from the available archaeological information is that by the Middle Archaic, people of the Sierra Nevada show clear influences from both the Great Basin and Central California. However, the archaeological remains cannot be reliably attributed to modern ethnographic groups.

Late Holocene-Late Archaic and Emergent (2,000 to 200 B.P.)

The Emergent Period marks the clear appearance of the modern ethnographic cultures. In the Sierra, the Late Kings Beach and Phase II Augustine pattern societies continue their development, now readily associated with Washoe and Nisenan, respectively. The ancestral Nisenan are likely represented by the Bullards Bar III phase, which dates from approximately 500 B.P. to the historic period. Residential villages appear archaeologically in this period, as well as the continued use of bedrock acorn processing and arrow points for hunting (The Keith Companies et al. 1993:4-76, as cited in YWCA 2013). With the Late Archaic, the lack of discernible relations between archaeological complexes and the known material cultures of ethnographic Californian populations end. In the High Sierra, the Martis Complex gives way to the Kings Beach Complex, and in the west analogous changes occur as the Middle Horizon is replaced by early Augustine Pattern settlements. In the west, important subsistence

changes take place as the acorn emerges as a clearly important staple; a process marked by a proliferation of the use of bedrock mortars. The bow appears as the preeminent weapon, marked archaeologically by an abrupt reduction in projectile point size and a significant increase in numbers of points in use. In the high Sierra, the bow also appears in the Kings Beach Complex and preferred materials for weapon tips change from basalt to microcrystalline silicate materials.

The Emergent Period marks the clear appearance of modern ethnographic cultures. In the Sierra, the Late Kings Beach and Phase II Augustine pattern societies continue their development, now readily associated with Washoe and Nisenan, respectively. The ancestral Nisenan are likely represented by the Bullards Bar III phase, which dates from approximately 500 B.P. to the historic period. Residential villages appear archaeologically in this period, as well as the continued use of bedrock acorn processing and arrow points for hunting.

Ethnographic Context

The following ethnographic context is adapted from Technical Memorandum 13-01 *Native American Traditional Cultural Properties* (YCWA 2012). This technical memorandum was also produced for the YRDP FERC relicensing.

The project lies within the traditional territory of the Nisenan, also called the southern Maidu or Valley Maidu. The Nisenan are part of the of the three main branches of the Maidu linguistic group, itself part of the larger Penutian language family. Nisenan territory included a portion of northeastern California including Yuba County. From north to south, their territory encompassed an area from either the North Yuba River or South Fork Feather River south to the Cosumnes River. The Sacramento River bounded Nisenan territory to the east and the Sierra Nevada to the west.

Population estimates for pre-contact Nisenan are difficult to determine because of early decimation due to the California Gold Rush. A.L. Kroeber (1925) estimated a total precontact Maidu population of 9,000 but he thought that was likely low.

Nisenan were organized into the characteristic California “tribelet” society, living in small, semi-permanent villages within a loosely specified territory. Tribelet was defined as a social aggregation consisting of one or more household groups including immediate family members and any associated relatives, living together in a village or community. Tribelets could, and usually did, consist of two or more villages, with one village being the main or central village and the other a satellite village. Each tribelet was autonomous, self-governing, and independent.

Division of labor was generally along sexual division, with men generally hunting and fishing while women gathered. Both sexes, however, were involved in gathering acorn and pine nut. Terrestrial game, such as elk, bear, rabbit, various small- and medium-sized mammals, and deer, was an especially important component of the diet. Hunting techniques varied from single hunters stalking deer to communal hunts. Bears were hunted while they hibernated in winter. Rabbits were usually hunted in drives that took place during spring, with nets strung together to form barriers up to a mile long. A variety of species of birds were hunted, with quail being especially prized.

Fish was an important food source, especially for groups living along rivers and streams. Fish were taken using hook and line as well as using poisons. Trout were eaten as soon as caught or dried and made into a meal. Insects were also an exploited resource, particularly grasshoppers, larvae, pupae, and ants. Grasshoppers were taken by driving the insects into 3-foot conical pits.

Vegetables were the most important source of food for the Nisenan. Various nuts, seeds, roots, tubers, bulbs, berries, and other greens were gathered. Acorns were the most important single vegetable food. The most valued acorn was from the black oak. Acorn harvesting occurred during fall, with particularly productive trees possibly owned by individual families.

Historic Context

Yuba County

Although Russian trappers and traders associated with the Hudson's Bay Company likely traveled through the Yuba County region during earlier years, the first well-documented European exploration of the region occurred in 1808, when Spanish explorer Gabriel Moraga led an expedition from Mission San Jose to the northern Sacramento Valley. In 1839, the first large landholdings in the region were granted to John Marsh near Mount Diablo and John Sutter at the confluence of the American and Sacramento Rivers. In 1848, California formally became an American territory and 2 years later it became the 31st State of the Union (HDR Engineering [HDR 2020a: 7]).

By 1849, the Yuba River and outlying areas felt the impact of the Gold Rush as an estimated 90,000 individuals made their way through the region on their way to the California mines. The streams flowing into the Sacramento River from the northern Sierra attracted hundreds of gold seekers. Following the discovery of gold on the Yuba River at Rose's Bar in June 1848, small communities like Fosters Bar and Bullards Bar began to line the Yuba drainage. Many of the settlements also occurred at river crossings, where high waters required the construction of ferries to carry passengers, livestock, and freight. These communities provided lodging, sustenance, and services to travelers. In 1849, miners established Bullards Bar along the Yuba River just south of Fosters Bar. The community was named for pioneer miner Dr. Bullard of New York. It functioned mostly as a lumber, mining, and farming community (HDR 2020a; 8, 13).

Hydraulic mining became more common by the 1860s as gold placer deposits were depleted. The mining process of using high-pressure water to wash away tons of boulders, gravel, dirt, and ounces of gold proved detrimental to the rivers and streams as the resulting debris and sediment flowed downstream, clogging Sacramento Valley waterways. Lawsuits by farmers curtailed hydraulic mining in 1884 with the Sawyer Decision (HDR 2020a: 8).

Hydroelectric Development

Mining and hydroelectric power generation in California has had a symbiotic relationship from the beginning. During the Gold Rush, California placer miners harnessed waterpower to turn large water wheels used for washing river gravels. As California mining shifted from placer to hard rock gold mining at the end of the 19th century, engineers searched for new sources of waterpower to hoist elevators and drive machinery. The Yuba River has historically been used for multiple purposes, including hydraulic mining, irrigation, hydroelectric power generation, and flood control (HDR 2020a: 20).

Following the discovery of gold in the Sierra, Yuba River water was used for industrial-scale mining operations. After the decline of mining in the first half of the 20th century, many of the ditches and flumes originally built for the mining industry were reused in the burgeoning field of hydroelectricity, with early developers of hydroelectric power plants purchasing the ditches and water rights to supply water to their power plants (HDR 2020a: 20).

Construction of the Old Bullards Bar Dam (currently inundated by the Reservoir) began in 1922 and was completed in 1924. The dam was constructed for local hydraulic mining interests. The dam replaced an earlier earthen debris structure. The dam included a powerhouse. Pacific Gas & Electric Company (PG&E) leased the powerhouse from the Yuba Development Company until 1928 when PG&E purchased the dam and powerhouse. The Old Bullards Bar Dam served the community until the construction of the Dam in the latter part of 20th century, demonstrating an upgrade to the original system (HDR 2020a: 9, 13).

Yuba County Watershed Management

The 1950s witnessed the culmination of earlier efforts to establish multipurpose water systems in California. Dams no longer were only for supplying agricultural and domestic water—they became part of an integrated system. Dams and watershed management evolved to provide flood control, irrigation, and potable water; helped reclaim swampy land; delivered recreational opportunities; and generated hydroelectric power. The Central Valley Project, initiated in 1951, focused on Shasta Dam, and Friant Dam and its associated Delta-Mendota and Friant-Kern Canals. The subsequent California State Water Project (1957) included the California Aqueduct and Feather River Project (HDR 2020a: 24, 25).

In December 1955, excessive winter rain and snow in northern California resulted in devastating floods in the Central Valley that overpowered local levees and other flood control systems. This resulted in both State and local initiatives to better manage flood control, resulting in the construction of numerous levees, canals, and reservoirs throughout the State. In December 1951, the Yuba County Board of Supervisors created the Yuba County Water Resources Board. During this time, the Yuba County Board began discussion for proposed expansion and upgrading of the reservoir and hydroelectric facilities at Bullards Bar and nearby Colgate. In addition to flood control, an expanded reservoir was viewed as a means of increasing water availability for irrigation within Yuba and Sutter Counties, providing additional electric power to the growing local population, and subsequently encouraging development within the area. In 1957, the Yuba County Board unanimously voted to construct a new dam at Bullards Bar to meet county flood control and water storage needs. In 1959, Yuba County Water Agency (YCWA) was established to reduce flood risk and provide a water supply to the people of the county (HDR 2020a: 25).

New Bullards Bar Dam

The New Bullard's Bar Dam (Dam), completed in 1970, is a concrete arch hydroelectric dam situated on the North Yuba River and upstream of the Middle Yuba River confluence. The Dam was built to replace the earlier Bullards Dam and it includes the Primary Spillway and creates the Reservoir located on the North Yuba River. The Dam furnishes power to the New Colgate Powerhouse, located downstream. Yuba County Water Agency (YCWA) owns and administers the Dam and New Bullard's Bar Dam Reservoir (Reservoir) as a facility for flood control, irrigation, hydroelectricity, and recreation. The Reservoir receives a portion of the flow from the Middle Fork of the Yuba River, which is diverted to the Reservoir via tunnels. Additional creeks empty into the Reservoir (HDR 2020a: 48, 61).

3.4.2 Regulatory Setting

Federal Plans, Policies, Regulations, and Laws

National Historic Preservation Act Section 106

The project is Federally licensed and must adhere to Section 106 of the National Historic Preservation Act of 1966, as amended. Section 106 requires that Federal agencies and entities that these agencies fund or permit, consider the effects of their actions on properties that are listed in the National Register of Historic Places (NRHP), or that may be eligible for such listing. To determine whether an undertaking could affect NRHP-eligible properties, cultural resources (including archaeological, locations of sacred importance to Native Americans, historical, and architectural properties) must be inventoried and evaluated.

The Section 106 review process consists of four steps:

1. Initiate the Section 106 process by establishing the undertaking, developing a plan for the public involvement, and identifying other consulting parties;

2. Identify historic properties (resources that are eligible for inclusion in the NRHP) by determining the scope of efforts, identifying cultural resources within the area potentially affected by the project, and evaluating properties' eligibility for NRHP inclusion;

3. Assess adverse effects by applying the Section 106 criteria of adverse effect to identified historic properties; and

4. Resolve adverse effects by consulting with the State Historic Preservation Officer (SHPO) and other consulting agencies, including the Advisory Council on Historic Preservation if necessary, to develop an agreement that addresses the treatment of historic properties.

National Register of Historic Places Evaluation Criteria

The NRHP is the nation's master inventory of known historic resources. It is administered by the National Park Service, in consultation with the SHPO. The NRHP includes listings of buildings, structures, sites, objects, and districts that possess historic, architectural, engineering, archaeological, or cultural significance at the Federal, State, or local level. The NRHP criteria and associated definitions are outlined in the *National Register Bulletin: How to Apply the National Register Criteria for Evaluation* (National Park Service 1997). The following is a summary of that bulletin.

Properties (structures, sites, buildings, districts, and objects) more than 50 years of age can be listed in the NRHP provided they meet one of the evaluation criteria described below; however, properties less than 50 years of age that are of exceptional significance or are contributors to a district, that also meet the evaluation criteria, can be included in the NRHP.

The NRHP uses the following four criteria under which a property can be considered significant for listing:

- Properties associated with events that have made a significant contribution to the broad patterns of history.
- Properties associated with the lives of persons significant in our past.
- Properties that embody the distinctive characteristics of a type, period, or method of construction, or that represent the work of a master, or that possess high artistic values, or that represent a significant and distinguishable entity whose components may lack individual distinction.
- Properties that have yielded or may likely yield information important in prehistory or history.

Properties can be listed individually or as contributors to a historic district.

In addition to meeting one of the evaluation criteria, a property must also retain integrity to convey that significance. Although the evaluation of integrity is sometimes subject to judgement, it must always be grounded in an understanding of the property's physical features and how they relate to its significance.

The NRHP recognizes the following seven aspects of integrity:

- Location: the place where the historic property was constructed or the place where the historic event occurred.
- Design: the combination of elements that create the form, plan, space, structure, and style of a property.
- Setting: the physical environment of a historic property.
- Materials: the physical elements that were combined or deposited during a particular period of time and in a particular pattern or configuration to form a historic property.
- Workmanship: the physical evidence of the crafts of a particular culture or people during any given period in history or prehistory.
- Feeling: a property's expression of the aesthetic or historic sense of a particular period of time.
- Association: the direct link between an important historic event or person and a historic property.

State Plans, Policies, Regulations, and Laws

California Environmental Quality Act

The California Environmental Quality Act (CEQA) requires consideration of a project's potential impacts on cultural and historical resources. CEQA states that if a project may cause significant adverse impacts on an historical resource or tribal cultural resource, then alternative plans or mitigation measures must be considered. (California PRC Sections 21084.1 & 21084.2.) CEQA defines an historical resource to include "a resource listed in, or determined to be eligible for listing in, the California Register of Historical Resources (CRHR).".

California Register of Historic Resources

The CRHR includes resources listed in or formally determined eligible for listing in the NRHP, as well as some California Historical Landmarks and Points of Historical Interest. Properties of local significance that have been designated under a local preservation ordinance (local landmarks or landmark districts) or that have been identified in a local historical resources inventory may be eligible for listing in the CRHR and are presumed to be significant resources for purposes of CEQA unless a preponderance of evidence indicates otherwise (California PRC Section 5024.1, 14 CCR Section 4850). The eligibility criteria for listing in the CRHR are similar to those for NRHP listing but focus on the importance of the resources to California history and heritage. A cultural resource may be eligible for listing on the CRHR if it:

1. is associated with events that have made a significant contribution to the broad patterns of California's history and cultural heritage;

2. is associated with the lives of persons important in our past;

3. embodies the distinctive characteristics of a type, period, region, or method of construction or represents the work of an important creative individual or possesses high artistic values; or

4. has yielded, or may be likely to yield, information important in prehistory or history.

The State CEQA Guidelines also require consideration of potential effects on archaeological resources (CCR Section 15064.5), including any unique archeological resources. As used in California PRC Section 21083.2, the term "unique archaeological resource" refers to an archaeological artifact, object, or site about which it can be clearly demonstrated that, without merely adding to the current body of knowledge, there is a high probability that it meets any of the following criteria:

- contains information needed to answer important scientific research questions and that there is a demonstrable public interest in that information,

- has a special and particular quality such as being the oldest of its type or the best available example of its type, or

- is directly associated with a scientifically recognized important prehistoric or historic event or person.

In addition to meeting one or more of the above criteria, resources eligible for listing in the CRHR must retain enough of their historic character or appearance to be recognizable as historical resources and to convey the reasons for their significance. Integrity is evaluated with regard to the retention of location, design, setting, materials, workmanship, feeling, and association (Office of Historic Preservation 1999). These regulations apply to the eligibility determination of cultural resources in the project's area of potential effects.

Assembly Bill 52

Assembly Bill (AB) 52, effective on July 1, 2015, amends CEQA and adds new sections relating to Native American tribe consultation and certain types of cultural resources, TCRs. TCRs are either (1) sites, features, places, cultural landscapes, sacred places, and objects with cultural value to a California Native American Tribe that is either on or eligible for inclusion in the CRHR or a local historic register; or (2) the lead agency (in this case, YCWA), at its discretion and supported by substantial evidence, chooses to treat the resource as a TCR. Additionally, a cultural landscape may also qualify as a TCR if it meets the criteria to be eligible for inclusion in the CRHR and is geographically defined in terms of the size and scope of the landscape. Other historical resources (as described in California PRC 21084.1), a unique archaeological resource (as defined in California PRC 21083.2[g]), or non-unique archaeological resources (as described in California PRC 21083.2[h]), may also be TCRs if they conform to the criteria to be eligible for inclusion in the CRHR.

AB 52 provides that a project with an effect that may cause a substantial adverse change in the significance of a TCR may have a significant effect on the environment. AB 52 requires the lead agency (in this case, YCWA) to begin consultation with California Native American tribes that are traditionally and culturally affiliated with the geographic area of the project if the tribe requests the lead agency, in writing, to be informed by the lead agency through formal notification of projects that are proposed in that geographic area and the tribe subsequently requests consultation. California PRC Section 21084.3 states that "public agencies shall, when feasible, avoid damaging effects to any tribal cultural resource."

AB 52 explicitly recognizes "that California Native American tribes may have expertise with regard to their tribal history and practices, which concern the tribal cultural resources with which they are traditionally and culturally affiliated. Because CEQA calls for a sufficient degree of analysis, tribal knowledge about the land and tribal cultural resources at issue should be included in environmental assessments for projects that may have a significant impact on those resources." AB 52 therefore requires meaningful consultation with culturally and geographically affiliated tribes to identify TCRs and to develop avoidance or mitigation as appropriate.

Discovery of Human Remains

Section 7050.5 of the California Health and Safety Code (CHSC) states the following regarding the discovery of human remains:

- Every person who knowingly mutilates or disinters, wantonly disturbs, or willfully removes any human remains in or from any location other than a dedicated cemetery without authority of law is guilty of a misdemeanor, except as provided in Section 5097.99 of the [PRC]. The provisions of this subdivision shall not apply to any person carrying out an agreement developed pursuant to subdivision (l) of Section 5097.94 of the [PRC] or to any person authorized to implement Section 5097.98 of the [PRC].

- In the event of discovery or recognition of any human remains in any location other than a dedicated cemetery, there shall be no further excavation or disturbance of the site or any nearby area reasonably suspected to overlie adjacent remains until the coroner of the county in which the human remains are discovered has determined, in accordance with Chapter 10 (commencing with Section 27460) of Part 3 of Division 2 of Title 3 of the California Government Code [CGC], that the remains are not subject to the provisions of Section 27491 of the CGC or any other related provisions of law concerning investigation of the circumstances, manner and cause of any death, and the recommendations concerning the treatment and disposition of the human remains have been made to

the person responsible for the excavation, or to his or her authorized representative, in the manner provided in Section 5097.98 of the PRC. The coroner shall make his or her determination within two working days from the time the person responsible for the excavation, or his or her authorized representative, notifies the coroner of the discovery or recognition of the human remains.

- If the coroner determines that the remains are not subject to his or her authority and if the coroner recognizes the human remains to be those of a Native American or has reason to believe that they are those of a Native American, he or she shall contact, by telephone within 24 hours, the Native American Heritage Commission (NAHC) (CHSC Section 7050.5).

- Of particular note to cultural resources is subsection (c), which requires the coroner to contact the NAHC within 24 hours if discovered human remains are determined to be Native American in origin. After notification, NAHC will follow the procedures outlined in PRC Section 5097.98, which include notification of most likely descendants (MLDs), if possible, and recommendations for treatment of the remains. The MLD will have 24 hours after notification by the NAHC to make their recommendation (PRC Section 5097.98). In addition, knowing or willful possession of Native American human remains or artifacts taken from a grave or cairn is a felony under State law (PRC Section 5097.99).

Local Plans, Policies, Regulations, and Ordinances

Yuba County 2030 General Plan

The following goal and policies from the Yuba County 2030 General Plan Natural Resources (NR) Element, related to cultural resources, are relevant to the proposed project (Yuba County 2011).

GOAL NR 6: **Cultural Resources.** Identify, protect, preserve Yuba County's important prehistoric and historic resources.

- **Policy NR 6.1.** The County will require environmental assessment and mitigation to reduce or avoid impacts to significant cultural resources, as feasible, per State and Federal legislation and regulations.

- **Policy NR 6.2.** If potential paleontological or prehistoric resources are detected during construction, work shall stop and consultation is required to avoid further impacts.

- **Policy NR 6.3.** New developments, roads, water and sewer lines, and stormwater infrastructure should be located to avoid impacts to significant cultural resources.

- **Policy NR 6.4.** The County will encourage adaptive reuse of historic structures in a way that maintains the character defining elements of the historic structure.

- **Policy NR 6.5.** Priority investment should go to preserving or rehabilitating historic structures that are grouped in close proximity, are particularly good examples of a specific architectural style, or are associated with important people or events in the County's history.

- **Policy NR 6.6.** The County will disseminate information to property owners regarding tax incentives and other Federal and State programs that support the rehabilitation of historic structures.

Yuba County Ordinance Code

The most recent Yuba County Ordinance Code was updated in 2018. It contains **11.44.060. - Protection of natural and cultural resources**. A single paragraph relates to cultural resources:

(a) *Resource protection.* Sensitive habitat areas, archeological resources, and designated and potential historic resources shall be shown and identified on all tentative maps, and on any improvement and landscape plans. Such features shall be preserved as required by the Development Review Committee or Planning Commission as part of tentative map approval.

3.4.3 Environmental Impacts and Mitigation Measures

Thresholds of Significance

The significance criteria used to evaluate the project impacts are based on Appendix G of the State CEQA Guidelines. A significant impact related to cultural and tribal cultural resources would occur if the proposed project would:

- cause a substantial adverse change in the significance of a historical resource as defined in Section 15064.5;
- cause a substantial adverse change in the significance of an archaeological resource pursuant to Section 15064.5;
- disturb any human remains, including those interred outside of formal cemeteries; or
- result in a substantially adverse change in the significance of a TCR (as defined in California PRC Section 21074 and above) when compared against existing conditions.

Analysis Methodology

This section is informed by cultural resources investigations conducted by HDR for the YRDP and this Environmental Impact Report (EIR), and consultations conducted by GEI Consultants, Inc. (GEI) for this EIR. The work is summarized in Technical Memorandum 12-1 *Historic Properties* (YCWA 2013), Technical Memorandum 13-1 *Native American Traditional Cultural Properties* (YCWA 2012), Environmental Report (YCWA 2017), and HDR personal communication 2020.

Records Search and Archival Research

Records searches were conducted in May and June of 2009 at the Northeast Information Center and the North Central Information Center of the California Historical Resources Information System. Referenced documents for the records search included base maps, reports from previous projects, Department of Parks and Recreation site records, and California Historic Landmarks documentation. Additional archival research in 2011 at several data repositories including TNF and PNF offices; the Yuba County Library California Room in Marysville; the Doris Foley Library for Historical Research in Nevada City; the California State Library, Sacramento; the Center for Sacramento History in Sacramento; the Firehouse Museum in Nevada City; the Special Collections Room of the Meriam Library, California State University, in Chico; the Camptonville Historical Society; the USACE office in Sacramento; as well as files maintained in the YCWA archives.

Field Survey

HDR conducted intensive pedestrian surveys for the YRDP between 2011 and 2017, and an additional survey for the project in November 2020. Specifically, portions of the project were surveyed in 2011, 2013, 2014, 2016, 2017, and 2020. Archaeologists meeting the Secretary of the Interior's Qualification Standards for archaeology managed and conducted the archaeological surveys. The surveys were conducted to intensive standards and included all portions of the project except for those areas that were unsafe or inaccessible to survey.

Native American Consultation

GEI cultural resources specialists requested the NAHC to conduct a search of their Sacred Lands File of the project area. The NAHC replied on October 27, 2020, and indicated that the results of its Sacred Lands File search were negative. The NAHC also provided a list of Native American Tribal contacts that might have information regarding cultural resources in the project area; the tribes included in the list provided by the NAHC included the Colfax-Todds Valley Consolidated Tribe, the Tsi Adim Maidu, and the United Auburn Indian Community of the Auburn Rancheria.

In addition, three tribes have previously requested to be notified regarding projects within their traditional geographic area of cultural affiliation, in accordance with AB 52 (PRC 21080.3.1): the Enterprise Rancheria, Shingle Springs Band of Miwok Indians, and United Auburn Indian Community of the Auburn Rancheria.

Letters were sent via email on November 10, 2020 inviting the tribes to consult on the project with Enterprise, Shingle Springs, and United Auburn Indian Community of the Auburn Rancheria being invited under PRC 21080.3.1. To date, none of the tribes have responded to the consultation invitation letters. **Table 3.4-1** summarizes Native American consultation activities.

Table 3.4-1. Native American Contact Efforts

Date(s) Contacted	Method of Contact	Addressee
November 10, 2020	Letter via email	Clyde Prout, Chairperson Colfax-Todds Valley Consolidated Tribe
November 10, 2020	Letter via email	Pamela Cubbler, Treasurer Colfax-Todds Valley Consolidated Tribe
November 10, 2020	Letter via email	Creig Marcus, Tribal Administrator Enterprise Rancheria
November 10, 2020	Letter via email	Regina Cuellar, Chairwoman Shingle Springs Band of Miwok Indians
November 10, 2020	Letter via email	Grayson Coney, Cultural Director Tsi Akim Maidu
November 10, 2020	Letter via email	Matthew Moore, Tribal Historic Preservation Officer Chair, Tribal Historic Preservation Committee United Auburn Indian Community of the Auburn Rancheria

Historical Society Consultation

On November 20, 2020, GEI sent letters to the Yuba County Historical Society and the Yuba County Museum of History requesting information on known cultural resources in the project area. As of the date of this document, GEI has not received a response from either organization.

Archaeological Results

One historic-era archaeological site was identified during pedestrian surveys: P-58-2722/CA-YUB-1723H (CA-YUB-1723H). The resource is a domestic refuse deposit approximately 15 ft in diameter. It contains several metal fragments, 18 complete cans, can fragments, glassware, and porcelain. The glassware includes fragments of an amber Clorox bottle, Stewarts Bluing bottles, amethyst tumblers, and an amethyst glass vase. The site condition was reported as poor due to active logging, ground disturbance, and vegetation removal. The site was recommended as not eligible for listing in NRHP because it does not contain artifacts in sufficient numbers to answer important archaeological questions, does not meet any other significance criteria, and lacks integrity. SHPO agreed with the findings in 2014. For the same reasons the resource is not eligible for listing in the NRHP, and in addition not having simply the numbers of artifacts but the kind and variety of artifacts to develop meaningful data, the resource is not eligible for the CRHR; it is not a significant resource.

Built Environment Results

Four historic-era (more than 45 years old) resources are in the project area: the Dam (P-58-2706), the Reservoir (P-58-2708), and two road segments–HDR-YCWA-115 and HDR-Spillway-01.

The Dam and Reservoir were constructed in 1970 as part of the larger YCWA hydroelectric facility, which includes several water-related features. The original Bullards Bar Dam dates to the early 1920s and was inundated by construction of the Dam and Reservoir (HDR 2020a: 48, 61). The Dam and Reservoir were evaluated for NRHP/CRHR significance in 2020 and recommended as not meeting eligibility requirements because of a lack of historical significance. They were also recommended as ineligible as part of a potential historic district, the YRDP Historic Built Environment District (P-29-5050/P-58-3309) (HDR 2020a: 79-81; 2020d).

The two road segments date to circa 1948 and 1960, respectively. Little is known about the history of the road segments; however, research indicates they are likely access routes associated with construction-related projects at the site and are not known to have played a significant role in the history of the area (Criterion A/1). The roads are located in the south and southwest areas of the project site. The Yuba Development Company worked with Yuba County to reroute existing roads that would be flooded by construction of the new reservoir and subsequently spent $40,000 on roadwork (HDR 2020b; 2020c; 202d). Under Criterion B/2, The road segments are also not known to be associated with significant individuals nor do they represent a unique design (Criterion C/3). They also do not appear to be the principal source of important information (Criterion C/4). In summary, the road segments do not appear to meet the criteria for the NRHP/CRHR because of a lack of historical significance. None of the four resources appear to meet NRHP/CRHR significance and, therefore, they are also not considered historical resources for the purposes of CEQA.

Tribal Cultural Resources Results

No TCRs were identified based on consultation with the NAHC. No TCRs were identified during HDR's efforts to identify Traditional Cultural Properties. No tribes have responded to invitations to consult.

Given the above, it appears there are no TCRs located within the project's area of potential effect.

Public Comments

Comments submitted in response to the Notice of Preparation were reviewed for relevance to the analysis of environmental consequences and development of mitigation measures. Comments related to cultural resources and TCRs included a summary of YCWA's consultation obligation under AB 52 and the NAHC's recommendations for conducting cultural resource assessments.

Issues Not Discussed Further in the EIR

Changes to Historical, Archaeological, and Tribal Cultural Resources from Changes in Flood Flow Releases from New Bullards Bar Reservoir

As discussed in Chapter 3.1, "Hydrology and Water Quality," the project would result in a reduction in peak daily discharges downstream from use of the ARC Spillway compared to existing conditions. As a result, no new historical, archaeological, and Tribal cultural resources located along waterways downstream of the Dam receiving flood flows would be impacted by the proposed project.

Impact Analysis

Impact CUL-1: Substantial Adverse Change in the Significance of a Historical Resource or an Archaeological Resource pursuant to CCR Section 15064.5.

No archaeological, tribal, or historical resources as defined by CEQA were identified during cultural resources investigations. Nevertheless, the possibility remains that previously unidentified, buried historical, or archaeological resources may exist on the project site. If such resources are present in areas subject to project-related ground disturbance, they could be destroyed or otherwise substantially altered by project implementation. This would be a **potentially significant** impact.

Mitigation Measures: The following mitigation measures have been identified to address this impact.

> **Mitigation Measure CUL-1: Implement Procedures for Inadvertent Discovery of Cultural Material.**
>
> If an inadvertent discovery of buried or otherwise previously unidentified historical resources, including archaeological resources (e.g., unusual amounts of shell, animal bone, any human remains, bottle glass, ceramics, building remains), is made at any time during project-related construction activities or project planning, YCWA, with input from other interested parties, will develop and implement appropriate protection and avoidance measures, where feasible. If such resources are discovered during project construction, all work within a 50-foot-radius of the find shall cease temporarily pending implementation of this measure. YCWA shall retain a professional archaeologist meeting the Secretary of the Interior's Professional Standards for Archaeologists to assess the discovery and recommend what, if any, further treatment or investigation is appropriate for the find. Culturally affiliated Native American tribes will also be contacted concerning resources of Native American origin. Avoidance is the preferred CEQA mitigation measure for cultural resources. If avoidance is not feasible, any necessary treatment/investigation shall be developed in coordination with interested Native American tribes (if applicable) providing recommendations to YCWA and shall be completed before project activities continue in the vicinity of the find. An inadvertent discovery plan shall be developed before construction begins and shall be implemented in the event of a discovery during project construction.

Timing: Before and during project construction activities.

Responsibility: YCWA and its construction contractor(s).

Mitigation Measure CUL-2: Conduct Cultural Resource Awareness and Sensitivity Training.

YCWA will hold a pre-construction training session for all construction personnel before beginning any project-related, ground-disturbing work. Participants will sign a form acknowledging that they have received the training and agree to keep resource locations confidential and to stop work within 50 feet of any unanticipated discovery. Topics to be addressed in training sessions will include but are not limited to: regulations protecting cultural resources, including archaeological sites and TCRs; basic identification of archaeological resources and potential TCRs; and proper discovery protocols. Training will be provided by YCWA and its environmental contractor and conducted by a qualified archaeologist who meets the Secretary of the Interior's Standards for Archaeology (36 CFR Part 61). If requested by a culturally affiliated Tribe, the training presentation will be developed in consultation with Tribal representatives. Topics will include the potential presence and type of Native American and non-Native American resources potentially found during construction or other activities, required procedures in the event of a discovery, proper behavior in the presence of sacred remains and human remains, and necessary reporting protocols. Written materials will be provided to trained personnel, as appropriate.

Timing: Before project construction activities.

Responsibility: YCWA and its environmental contractor(s).

Implementation of Mitigation Measures CUL-1 and CUL-2 would reduce this impact because any previously unidentified cultural resources encountered during ground-disturbing activities would be recognized by construction personnel and appropriate discovery protocols would be implemented. Therefore, the impact from the project associated with discovery of previously unknown cultural resources would be **less than significant with mitigation**.

Impact CUL-2: Disturbance of Human Remains, including Remains Interred Outside of Dedicated Cemeteries.

No human remains were identified during the pedestrian survey of the project site and none were reported in the records search conducted for the project. Given the project site was used for aggregate mining in the past, any human remains that may have existed on the site have likely been destroyed. However, it is possible, though unlikely, that undiscovered, buried human remains may exist on the project site. If human remains are present in areas subject to project-related ground disturbance, they could be encountered during project implementation. This would be a **potentially significant** impact.

Mitigation Measures: The following mitigation measure has been identified to address this impact.

Mitigation Measure CUL-3: Avoid Potential Effects to Previously Unknown Human Remains.

If an inadvertent discovery of human remains is made at any time during project-related construction activities or project planning, YCWA will implement the procedures listed below. If human remains are identified on the project site, the following performance standards shall be met prior to implementing or continuing actions, such as construction, that may result in damage to or destruction of human remains:

In accordance with the California Health and Safety Code, if human remains are uncovered during ground-disturbing activities, YCWA and its construction contractor will immediately halt potentially damaging excavation in the area of the burial and notify the Yuba County Coroner and a professional archaeologist to determine the nature of the remains. The Coroner is required to examine all discoveries of human remains within 48 hours of receiving notice of a discovery on private or State lands (California Health and Safety Code Section 7050.5(b)). If the Coroner determines that the remains are those of a Native American, he or she must contact the NAHC by phone within 24 hours of making that determination (California Health and Safety Code Section 7050(c)). After the Coroner's findings have been made, the archaeologist and the NAHC-designated MLD, in consultation with the landowner, shall determine the ultimate treatment and disposition of the remains. The responsibilities of YCWA for acting upon notification of a discovery of Native American human remains are identified in PRC Section 5097.9 et seq.

Upon the discovery of Native American human remains, YCWA will require that all construction work within 100 ft of the discovery stop, until consultation with the MLD has taken place. The MLD will have 48 hours to complete a site inspection and make recommendations to the landowner after being granted access to the site. A range of possible treatments for the remains, including nondestructive removal, preservation in place, relinquishment of the remains and associated items to the descendants, or other culturally appropriate treatment may be discussed. PRC Section 5097.98(b)(2) suggests that the concerned parties may mutually agree to extend discussions beyond the initial 48 hours to allow for the discovery of additional remains.

If agreed to by the MLD and the landowner, YCWA or its authorized representative will rebury the Native American human remains and associated grave goods with appropriate dignity on the property in a location not subject to further subsurface disturbance. If the NAHC is unable to identify an MLD, or if the MLD fails to make a recommendation within 48 hours after being granted access to the site, YCWA or its authorized representative may also reinter the remains at a location not subject to further disturbance if recommendation of the MLD is rejected and mediation by the NAHC fails to provide measures acceptable to YCWA. YCWA will implement mitigation to protect the burial remains. Construction work in the vicinity of the burials shall not resume until the mitigation is completed.

If the human remains are of historic age and are determined not to be of Native American origin, YCWA will follow the provisions of the California Health and Safety Code Section 7000 (et seq.) regarding the disinterment and removal of non-Native American human remains.

Timing: During project construction activities.

Responsibility: YCWA and its construction contractor(s).

Implementation of Mitigation Measure CUL-2 would reduce this impact because any inadvertent discovery of human remains would be addressed as proscribed by State law and the MLD will be consulted. Therefore, the impact from the project associated with disturbance of human remains would be **less than significant with mitigation**.

Impact CUL-3: Substantial Adverse Change in the Significance of an Unidentified TCR, as defined in PRC 21074.

No TCRs were identified during consultation efforts by YCWA. The possibility is small, but it is possible that an unknown TCR may exist within the project and might be impacted by ground-disturbing, project-related activities. This would be a **potentially significant** impact.

Mitigation Measures: The following mitigation measures have been identified to address this impact.

Mitigation Measure CUL-1, "Implement Procedures for Inadvertent Discovery of Cultural Material."

Please refer to Mitigation Measure CUL-1 in Impact CUL-1 above for full text of this mitigation measure.

Mitigation Measure CUL-2, "Conduct Cultural Resource Awareness and Sensitivity

Please refer to Mitigation Measure CUL-2 in Impact CUL-1 above for full text of this mitigation measure.

Mitigation Measure CUL-3, "Avoid Potential Effects to Previously Unknown Human Remains."

Please refer to Mitigation Measure CUL-3 in Impact CUL-2 above for full text of this mitigation measure.

Implementation of Mitigation Measures CUL-1, CUL-2, and CUL-3 would reduce this potential impact because impacts to TCRs would be avoided, or appropriate treatment measures would be developed and implemented. Therefore, impacts from the project related to TCRs would be **less than significant with mitigation**.

Residual Significant Impacts

The project would result in potential significant impacts related to cultural and TCR, but several mitigation measures would be implemented to reduce potential impacts cultural and TCRs to a less-than-significant level. Therefore, the project would not result in residual significant impacts related to cultural and TCRs, and, with imposition of the mitigation measures identified above, the project would not have any significant and unavoidable impacts related to cultural and TCRs.

3.5 Air Quality

This section examines the degree to which implementing the New Bullards Bar Dam Atmospheric River Control (ARC) Spillway Project (project or proposed project) may result in adverse changes in air quality. This section describes existing air quality conditions, summarizes applicable regulations, and analyzes construction- and operation-related air quality impacts from the project. The analysis of criteria air pollutant and toxic air contaminant (TAC) emissions is consistent with recommendations of the Feather River Air Quality Management District (FRAQMD).

3.5.1 Environmental Setting

The proposed project is located in the Sacramento Valley Air Basin (SVAB) within Yuba County. The FRAQMD is responsible for obtaining and maintaining air quality conditions in the County. The SVAB is bounded on the west and north by the Coast Ranges and on the east by the southern portion of the Cascade Range and the northern portion of the Sierra Nevada. These mountain ranges provide a substantial physical barrier to both locally created pollution and the pollution that prevailing winds transport northward from the Sacramento metropolitan area.

Summer conditions in the SVAB are typically characterized by high temperatures and low humidity, with prevailing winds from the south. Summer temperatures average approximately 90°F during the day and 50°F at night (FRAQMD 2010). Summer temperatures exceeding 100°F, coupled with clear sky conditions, are favorable for ozone formation. Winter conditions in the SVAB are characterized by occasional rainstorms interspersed with stagnant and foggy weather. Winter daytime temperatures average in the low 50s and nighttime temperatures average in the upper 30s.

The Coast Ranges induce winter storms from the Pacific Ocean to release precipitation on the western slopes, producing a partial rain shadow over the valley. The winds and unstable atmospheric conditions associated with the passage of winter storms result in periods of low air pollution and excellent visibility. However, between winter storms, high pressure and light winds lead to the creation of low-level temperature inversions and stable atmospheric conditions that can result in high concentrations of carbon monoxide (CO) and particulate matter (PM).

Most precipitation in the SVAB occurs during winter storms. Rainfall occurs mainly from late October to early May, averaging 17.2 inches per year, but the amount varies substantially from year to year. During winter, north winds are frequent, but winds from the south predominate (FRAQMD 2010).

Sensitive Receptors

Sensitive receptors include schools, residences, playgrounds, childcare centers, athletic facilities, long-term health care facilities, rehabilitation centers, convalescent centers, and retirement homes. The closest sensitive receptors to the project site are a residence located approximately 0.1 mile east of the haul route on Marysville Road and 0.6 mile from the ARC Spillway, and a second residence located 0.5 mile north of the haul route on United States (U.S.) Forest Service Road 0008-010.

Criteria Air Pollutants

Individual air pollutants at certain concentrations may adversely affect human or animal health, reduce visibility, damage property, and reduce the productivity or vigor of crops and natural vegetation. Six air pollutants have been identified by the U.S. Environmental Protection Agency (EPA) and the California Air Resources Board (CARB) as being of concern on both the nationwide and Statewide levels: ozone;

CO; nitrogen dioxide (NO_2); sulfur dioxide (SO_2); lead; and particulate matter, which is subdivided into two classes based on particle size: PM equal to or less than 10 micrometers in diameter (PM_{10}) and PM equal to or less than 2.5 micrometers in diameter ($PM_{2.5}$). Because these are the most prevalent air pollutants known to be harmful to human health, and extensive health effects criteria documentation is available for these pollutants, they are commonly referred to as "criteria air pollutants." Each criteria air pollutant is described below.

- **Ozone** is the principal component of smog and is formed in the atmosphere through a series of reactions involving reactive organic gases (ROG) and oxides of nitrogen (NO_X) in the presence of sunlight. ROG and NO_X are called ozone precursors. NO_X includes various combinations of nitrogen and oxygen, such as nitric oxide and NO_2. Ozone is a principal cause of lung and eye irritation in the urban environment. Large ozone concentrations are usually produced only in summer, when atmospheric inversions are greatest and temperatures are high. ROG and NO_X emissions are both considered critical in ozone formation.

- **Carbon monoxide** is a colorless and odorless gas that, in the urban environment, is associated primarily with the incomplete combustion of fossil fuels in motor vehicles. Relatively high concentrations are typically found near crowded intersections and along heavily used roadways carrying slow-moving traffic. Even under the most severe meteorological and traffic conditions, high CO concentrations are limited to locations within a relatively short distance (300 to 600 ft) of heavily traveled roadways. Vehicle traffic emissions can cause localized CO impacts, and severe vehicle congestion at major signalized intersections can generate elevated CO levels called "hot spots," which can be hazardous to human receptors adjacent to the intersections.

- **Nitrogen dioxide** is a product of combustion and is generated in vehicles and stationary sources such as power plants and boilers. It is also formed when ozone reacts with nitric oxide in the atmosphere. NO_2 can cause lung damage. As noted above, NO_2 is part of the NO_X family and is a principal contributor to ozone and smog generation. Sulfur dioxide is a combustion product, with the primary source being power plants and heavy industries that use coal or oil as fuel. SO_2 is also a product of diesel engine combustion. The health effects of SO_2 include lung disease and breathing problems for asthmatics. SO_2 in the atmosphere contributes to the formation of acid rain.

- **Lead** is a highly toxic metal that may cause a range of human health effects. Previously, the lead used in gasoline anti-knock additives represented a major source of lead emissions to the atmosphere. EPA began working to reduce lead emissions soon after its inception, issuing the first reduction standards in 1973. Lead emissions have decreased substantially as a result of the near-elimination of leaded-gasoline use.

- **Particulate matter** is a complex mixture of extremely small particles and liquid droplets. PM is made up of several components: acids (such as nitrates and sulfates), organic chemicals, metals, and soil or dust particles. Natural PM sources include windblown dust and ocean spray. The size of PM is directly linked to the potential for causing health problems. EPA is concerned about particles that are 10 micrometers in diameter or smaller, because these particles generally pass through the throat and nose and enter the lungs. Once inhaled, these particles can affect the heart and lungs and cause serious health effects. Individuals particularly sensitive to fine-particle exposure include older adults, people with heart and lung disease, and children. As discussed previously, EPA groups PM into two categories:

- **PM2.5** consists of fine particles, such as those found in smoke and haze. Sources of fine particles include all types of combustion activities (e.g., motor vehicles, power plants, wood burning) and certain industrial processes. $PM_{2.5}$ is also formed through reactions of gases such as SO_2 and NO_X in the atmosphere. $PM_{2.5}$ is the major cause of reduced visibility (haze) in California.

- **PM10** encompasses both fine and coarse dust particles; the fine particles are $PM_{2.5}$. Coarse particles, such as those found near roadways and dusty industries, are larger than 2.5 micrometers and smaller than 10 micrometers in diameter. Sources of coarse particles include crushing or grinding operations and dust from paved or unpaved roads. Control of PM_{10} is achieved primarily by controlling dust at construction and industrial sites, cleaning paved roads, and wetting or paving frequently used unpaved roads.

Air Quality Standards

Health-based air quality standards have been established for these pollutants by EPA at the national level and by CARB at the State level. These standards were established to protect the public with a margin of safety from adverse health impacts caused by exposure to air pollution. California has also established standards for sulfates, visibility reducing particles, hydrogen sulfide, and vinyl chloride. A brief description of each criteria air pollutant is provided below along with the most current monitoring station data and attainment designations for the study area. **Table 3.5-1** presents the national ambient air quality standards (NAAQS) and the California ambient air quality standards (CAAQS).

California and National Area Designations

Both EPA and CARB use ambient air quality monitoring data to designate areas according to their attainment status for criteria air pollutants. The purpose of these designations is to identify the areas with air quality problems and initiate planning efforts for improvement. The three basic designation categories are nonattainment, attainment, and unclassified. An “attainment” designation for an area signifies that pollutant concentrations did not exceed the established standard. In most cases, areas designated or redesignated as attainment must develop and implement maintenance plans, which are designed to ensure continued compliance with the standard.

In contrast, a “nonattainment” designation indicates that a pollutant concentration has exceeded the established standard. Nonattainment may differ in severity. To identify the severity of the problem and the extent of planning and actions required to meet the standard, nonattainment areas are assigned a classification that is commensurate with the severity of their air quality problem (e.g., moderate, serious, severe, extreme).

Finally, an “unclassified” designation indicates that insufficient data exist to determine attainment or nonattainment. The California designations also include a subcategory called “nonattainment-transitional,” a designation given to nonattainment areas that are progressing and nearing attainment.

Table 3.5-1. National and California Ambient Air Quality Standards

Pollutant	Averaging Time	California Standards [a] Concentration [c]	National Standards [b] Primary [c,d]	National Standards [b] Secondary [c,e]
Ozone (O_3)	1 hour	0.09 ppm (180 µg/m^3)	–	Same as primary standard
Ozone (O_3)	8 hours	0.070 ppm (137 µg/m^3)	0.075 ppm (147 µg/m^3)	Same as primary standard
Respirable particulate matter (PM_{10})[f]	24 hours	50 µg/m^3	150 µg/m^3	Same as primary standard
Respirable particulate matter (PM_{10})[f]	Annual arithmetic mean	20 µg/m^3	–	Same as primary standard
Fine particulate matter ($PM_{2.5}$)[f]	24 hours	–	35 µg/m^3	Same as primary standard
Fine particulate matter ($PM_{2.5}$)[f]	Annual arithmetic mean	12 µg/m^3	12 µg/m^3	15 µg/m
Carbon monoxide (CO)	8 hours	9.0 ppm (10 mg/m^3)	9 ppm (10 mg/m^3)	None
Carbon monoxide (CO)	1 hour	20 ppm (23 mg/m^3)	35 ppm (40 mg/m^3)	None
Carbon monoxide (CO)	8 hours (Lake Tahoe)	6 ppm (7 mg/m^3)	–	–
Nitrogen dioxide (NO_2)[g]	Annual arithmetic mean	0.030 ppm (57 µg/m^3)	0.053 ppm (100 µg/m^3)	Same as primary standard
Nitrogen dioxide (NO_2)[g]	1 hour	0.18 ppm (339 µg/m^3)	100 ppb (188 µg/m^3)	None
Sulfur dioxide (SO_2)[h]	Annual Arithmetic Mean	–	0.030 ppm (for certain areas) [h]	–
Sulfur dioxide (SO_2)[h]	24 hours	0.04 ppm (105 µg/m^3)	0.14 ppm (for certain areas) [h]	–
Sulfur dioxide (SO_2)[h]	3 hours	–	–	0.5 ppm (1,300 µg/m^3)
Sulfur dioxide (SO_2)[h]	1 hour	0.25 ppm (655 µg/m^3)	75 ppb (196 µg/m^3)	–
Lead (Pb)[i,j]	30-day average	1.5 µg/m^3	–	–
Lead (Pb)[i,j]	Calendar quarter	–	1.5 µg/m^3 (for certain areas) [j]	Same as primary standard
Lead (Pb)[i,j]	Rolling 3-month average	–	0.15 µg/m^3	Same as primary standard
Visibility-reducing particles[k]	8 hours	See footnote j	No national standards	No national standards
Sulfates	24 hours	25 µg/m^3	No national standards	No national standards
Hydrogen sulfide	1 hour	0.03 ppm (42 µg/m^3)	No national standards	No national standards
Vinyl chloride[j]	24 hours	0.01 ppm (26 µg/m^3)	No national standards	No national standards

Notes: µg/m^3 = micrograms per cubic meter; mg/m^3 = milligrams per cubic meter; ppb = parts per billion; ppm = parts per million

[a] California standards for ozone, carbon monoxide (except 8-hour Lake Tahoe), sulfur dioxide (1- and 24-hour), nitrogen dioxide, and particulate matter (PM_{10}, $PM_{2.5}$, and visibility-reducing particles), are values that are not to be exceeded. All others are not to be equaled or exceeded. California ambient air quality standards are listed in the Table of Standards in Section 70200 of Title 17 of the California Code of Regulations.

[b] National standards (other than ozone, particulate matter, and those based on annual arithmetic mean) are not to be exceeded more than once a year. The ozone standard is attained when the fourth highest 8-hour concentration measured at each site in a year, averaged over 3 years, is equal to or less than the standard. For PM_{10}, the 24-hour is attained when the expected number of days per calendar year with a 24-hour average concentration above 150 µg/m^3 is equal to or less than 1. For $PM_{2.5}$, the 24-hour standard is attained when 98% of the daily concentrations, averaged over 3 years, are equal to or less than the standards.

[c] Concentration expressed first in the units in which it was promulgated. Equivalent units given in parentheses are based upon a reference temperature of 25 degrees Celsius (°C) and a reference pressure of 760 torr. Most measurements of air quality are to be corrected to a reference temperature of 25°C and reference pressure of 760 torr; parts per million (ppm) in this table refers to ppm by volume, or micromoles of pollutant per mole of gas.

[d] National Primary Standards: The levels of air quality necessary, with an adequate margin of safety to protect the public health.

[e] National Secondary Standards: The levels of air quality necessary to protect public welfare from any known or anticipated adverse effects of a pollutant.

[f] On December 14, 2012, the national annual $PM_{2.5}$ primary standard was lowered from 15 µg/m^3 to 12.0 µg/m^3. The existing national 24-hour $PM_{2.5}$ standards (primary and secondary) were retained at 35 µg/m^3, as was the annual secondary standard of 15 µg/m^3. The existing 24-

hour PM_{10} standards (primary and secondary) of 150 µg/m^3 also were retained. The form of the annual primary and secondary standards is the annual mean, averaged over 3 years.

[g] To attain the 1-hour national standard, the 3-year average of the annual 98th percentile of the 1-hour daily maximum concentrations at each site must not exceed 100 ppb. California standards are in units of ppm. To directly compare the national 1-hour standard to the California standards the units can be converted from 100 ppb to 0.100 ppm.

[h] On June 2, 2010, a new 1-hour SO_2 standard was established and the existing 24-hour and annual primary standards were revoked. To attain the 1-hour national standard, the 3-year average of the annual 99th percentile of the 1-hour daily maximum concentrations at each site must not exceed 75 ppb. The 1971 SO_2 national standards (24-hour and annual) remain in effect until 1 year after an area is designated for the 2010 standard, except that in areas designated nonattainment for the 1971 standards, the 1971 standards remain in effect until implementation plans to attain or maintain the 2010 standards are approved. To directly compare the 1-hour national standard to the California standard, the units can be converted to ppm. In this case, the national standard of 75 ppb is identical of 0.075 ppm.

[i] The California Air Resources Board (CARB) has identified lead and vinyl chloride as toxic air contaminants with no threshold level of exposure for adverse health effects determined. These actions allow for the implementation of control measures at levels below the ambient concentrations specified for these pollutants.

[j] The national standard for lead was revised on October 15, 2008, to a rolling 3-month average. The 1978 lead standard (1.5 µg/m^3 as a quarterly average) remains in effect until 1 year after an area is designated for the 2008 standard, except that in areas designated nonattainment for the 1978 standard, the 1978 standard remains in effect until implementation plans to attain or maintain the 2008 standards are approved.

[k] In 1989, CARB converted both the general Statewide 10-mile visibility standard and the Lake Tahoe 30-mile visibility standard to instrumental equivalents, which are “extinction of 0.23 per kilometer” and the “extinction of 0.07 per kilometer” for the tatewide and Lake Tahoe Air Basin standards, respectively.

Source: California Air Resources Board 2016

Yuba County is classified as nonattainment for the $PM_{2.5}$ national standard and attainment or unclassified for all other national standards. Yuba County is classified as nonattainment-transitional for the 1-hour and 8-hour State ozone standards and nonattainment for the State PM_{10} standard. Yuba County is classified as attainment or unclassified for all remaining State standards.

Toxic Air Contaminants

In addition to criteria air pollutants, EPA regulates TACs, also known as hazardous air pollutants. Concentrations of TACs are also used as indicators of ambient air quality conditions. A TAC is defined as an air pollutant that may cause or contribute to an increase in mortality or in serious illness, or that may pose a hazard to human health. TACs are usually present in minute quantities in ambient air; however, their high toxicity may pose a threat to public health even at low concentrations. Most TACs originate from human-made sources: on-road mobile sources, off-road mobile sources such as construction equipment, area sources such as dry cleaners, and stationary sources such as factories and refineries.

3.5.2 Regulatory Setting

Federal Plans, Policies, Regulations, and Laws

The Federal Clean Air Act (CAA) requires the EPA to establish health-based air quality standards at the Federal level. The NAAQS were established for the following criteria pollutants: CO, ozone, SO_2, NO_2, PM_{10}, $PM_{2.5}$, and lead. Areas of the State are designated as attainment, nonattainment, maintenance, or unclassified for the various pollutant standards according to the Federal CAA.

State Plans, Policies, Regulations, and Laws

The California CAA requires CARB to establish health-based air quality standards at the State level. The CAAQS were established for the following criteria pollutants: CO, O_3, SO_2, NO_2, PM_{10}, $PM_{2.5}$, lead, sulfate, visibility reducing particles, hydrogen sulfide, and vinyl chloride. Areas of the State are designated as attainment, nonattainment, maintenance, or unclassified for the various pollutant standards according to the California CAA.

Regional/Local Plans, Policies, Regulations, and Ordinances

Feather River Air Quality Management District

FRAQMD attains and maintains air quality conditions in Yuba County through a comprehensive program of planning, regulation, enforcement, and promotion of the understanding of air quality issues. FRAQMD develops air quality plans that address Federal and State requirements. The air quality plans include strategies and tactics to be used to attain and maintain acceptable air quality in Yuba County. FRAQMD is also responsible for monitoring air pollution and adopting rules and regulations. The rules and regulations include procedures and requirements to control the emission of pollutants and prevent significant adverse impacts.

As mentioned previously, Yuba County is currently designated as a nonattainment area for the $PM_{2.5}$ NAAQS. On January 10, 2013, EPA determined that the area had attained the $PM_{2.5}$ NAAQS based on monitoring data from 2009 to 2011. However, that action did not constitute a redesignation to attainment because EPA has not yet approved a maintenance plan. Yuba County is also a nonattainment-transitional area for the 1-hour and 8-hour ozone CAAQS and a nonattainment area for the PM_{10} CAAQS.

FRAQMD, in coordination with the SVAB's other air quality management districts and air pollution control districts in Butte, Colusa, Glenn, Shasta, and Tehama Counties, prepared and submitted the 2009 Air Quality Attainment Plan (AQAP). The AQAP was drafted in compliance with the requirements set forth in the California CAA and specifically addresses the nonattainment status for ozone and PM_{10}. The California CAA also requires a triennial assessment of the extent of air quality improvements and emissions reductions achieved through the use of control measures. As part of the assessment, the AQAP must be reviewed and, if necessary, revised to correct for deficiencies in progress and incorporate new data or projections.

FRAQMD provides California Environmental Quality Act (CEQA) planning guidance online to assist in identifying significant adverse air quality impacts and suggest measures to reduce emissions early in the planning process (FRAQMD 2010). Because stationary sources like industrial facilities are largely regulated, the guidelines focus on using transportation and land use control measures to reduce emissions to achieve and maintain Federal and State health-based air quality standards. Many projects, particularly those proposing new stationary sources, are subject to FRAQMD rules and regulations in effect at the time of construction.

FRAQMD regulations focus primarily on stationary sources, indirect sources, and control measures to minimize air pollutants within FRAQMD's jurisdiction. FRAQMD has also established rules to prevent, reduce, or mitigate the fugitive dust emissions. Specific rules applicable to project construction activities are listed below:

- **Rule 3.0—Visible Emissions**. A person shall not discharge into the atmosphere from any single source of emission whatsoever any air contaminant for a period or periods aggregating more than 3 minutes in any 1 hour which is as dark or darker in shade as that designated as No. 2 on the Ringelmann Chart, as published by the U.S. Bureau of Mines.
- **Rule 3.2—Particulate Matter Concentration**. A person shall not discharge into the atmosphere from any source particulate matter in excess of 0.3 grain per cubic foot of gas at standard conditions.

- **Rule 3.3—Dust and Fumes**. A person shall not discharge in any one hour from any source, dust or fumes that would exceed the amounts shown in Rule 3.3 Allowable Rate of Emission Based on Process Weight Rate table.

- **Rule 3.16—Fugitive Dust Emissions**. A person shall take every reasonable precaution not to cause or allow the emissions of fugitive dust from being airborne beyond the property line, from which the emission originates, from any construction, handling or storage activity, or any wrecking, excavation, grading, clearing of land or solid waste disposal operation.

- **Rule 4.1—Permit Requirements**. Any person operating an article, machine, equipment, or other contrivance, the use of which may cause, eliminate, reduce, or control the issuance of air contaminants, shall first obtain a written permit from the Air Pollution Control Officer. Stationary sources subject to the requirements of Rule 10.3, Federal Operating Permit Program, must also obtain a Title V permit pursuant to the requirements and procedures of that rule.

Yuba County 2030 General Plan

The following goals and policies from the Yuba County 2030 General Plan Public Health and Safety (HS) Element related to air quality are relevant to the proposed project (Yuba County 2011):

GOAL HS 6: **Construction Emissions.** Use construction practices and operational strategies that minimize air pollution.

- **Policy HS 6.1.** New developments shall implement emissions control measures recommended by the Feather River Air Quality Management District for construction, grading, excavation, and demolition, to the maximum extent feasible.

3.5.3 Environmental Impacts and Mitigation Measures

Thresholds of Significance

The significance criteria used to evaluate project impacts to air quality are based on Appendix G of the State CEQA Guidelines. A significant impact related to air quality would occur if the project would:

- conflict with or obstruct implementation of the applicable air quality plan;

- result in a cumulatively considerable net increase of any criteria pollutant for which the project region is nonattainment under an applicable Federal or State ambient air quality standard;

- expose sensitive receptors to substantial pollutant concentrations; or

- result in other emissions (such as those leading to odor) adversely affecting a substantial number of people.

As stated in Appendix G, the significance criteria established by the applicable air quality management or air pollution control district may be relied upon to make the above determinations. Therefore, according to FRAQMD, a project would have a significant impact on air quality if implementing it would:

- generate average daily construction-related emissions of ROG or NO_X that exceed 25 pounds per day (lb/day) or 4.5 tons per year;
- generate maximum daily construction-related emissions of PM_{10} that exceed 80 lb/day; or
- generate daily operational emissions of ROG or NO_X that exceed 25 lb/day or PM_{10} emissions that exceed 80 lb/day.

Analysis Methodology

Emissions of criteria air pollutants were evaluated using methodologies and guidance recommended by FRAQMD. Construction- and operation-related emissions were compared with the applicable thresholds of significance. Project emissions of criteria air pollutants were quantified using the California Emissions Estimator Model (CalEEMod) Version 2016.3.2. Construction-related emissions were estimated using information such as construction schedule and phasing, expected duration of activities, equipment types, volumes of material to be hauled, and number of construction workers on-site during each construction phase. Construction information used to estimate air emissions is discussed in Chapter 2, "Project Description," including Table 2-1. Operational emissions were estimated using information such as PG&E power for operation of the gate hoist and outside lighting, epoxy paint coating, and emergency generator testing. The construction and operation-related criteria air pollutant emissions estimated for each year of project construction and the foreseeable years of operation are presented and compared to FRAQMD significant thresholds in **Tables 3.5-2** and **3.5-3**, respectively. Air quality modeling data summarized in this section are provided in **Appendix G,** "Air Quality and GHG Emissions Modeling."

Public Comments

Comments submitted in response to the Notice of Preparation were reviewed for relevance to the analysis of environmental consequences and development of mitigation measures. There were no comments submitted regarding air quality impacts.

Table 3.5-2 Unmitigated and Mitigated Criteria Air Pollutant Emissions from Construction Activities

Emissions Category	ROG (tons/year)	NOx (tons/year) [a]	PM_{10} (lbs/day) [b]
Year 1			
FRAQMD Threshold	3.2	3.2	80
Unmitigated Emissions	0.6	6.8	65
Exceedance	*No*	*Yes*	*No*
Mitigated Emissions [c]	0.6	5.8	59
Exceedance after Mitigation	*No*	*Yes*	*No*
Year 2			
FRAQMD Threshold	3.3	3.3	80
Unmitigated Emissions	0.8	10.2	122
Exceedance	*No*	*Yes*	*Yes*
Mitigated Emissions [c]	0.8	9.6	116
Exceedance after Mitigation	*No*	*Yes*	*Yes*
Year 3			
FRAQMD Threshold	3.3	3.3	80
Unmitigated Emissions	0.4	7.4	9
Exceedance	*No*	*Yes*	*Yes*
Mitigated Emissions [c]	0.4	7.3	4
Exceedance after Mitigation	*No*	*Yes*	*No*
Year 4			
FRAQMD Threshold	3.3	3.3	80
Unmitigated Emissions	0.3	4.1	27
Exceedance	*No*	*Yes*	*No*
Mitigated Emissions [c]	0.3	3.9	24
Exceedance after Mitigation	*No*	*Yes*	*No*
Year 5			
FRAQMD Threshold	1.2	1.2	80
Unmitigated Emissions	0.2	1.4	36
Exceedance	*No*	*Yes*	*No*
Mitigated Emissions [c]	0.2	1.2	33
Exceedance after Mitigation	*No*	*No*	*No*

Notes: yellow-shaded cells indicate exceedance of the applicable significance threshold.
ROG=reactive organic gases; NO_X=oxides of nitrogen; PM_{10}=particulate matter with aerodynamic diameter less than 10 micrometers; FRAQMD=Feather River Air Quality Management District

[a] Emissions of NO_X are in units of total tons. The Feather River Air Quality Management District's (FRAQMD's) thresholds of significance for NO_X are in units of average lb/day. The total tons of NO_X are divided by the total number of workdays to calculate average daily NO_X emissions to compare to the FRAQMD threshold.

[b] Emissions of PM_{10} are presented in units of maximum lb/day. FRAQMD's threshold of significance for PM_{10} is in units of maximum daily pounds. PM_{10} emissions include both exhaust and fugitive dust emissions.

[c] Estimates emissions after implementation of Mitigation Measures AIR-1 and AIR-2 as outlined below in this section.

Source: Rincon 2021; see Appendix G for details.

Table 3.5-3 Annual Criteria Air Pollutant Emissions from Operations

Emission Category	ROG (lb/day)	NOx (lb/day)	PM10 (lbs/day)
FRAQMD Threshold	25	25	80
Unmitigated Emissions	1.0	0.3	0.1
Exceedance	*No*	*No*	*No*

Notes: ROG=reactive organic gases; NO_X=oxides of nitrogen; PM_{10}=particulate matter with aerodynamic diameter less than 10 micrometers; FRAQMD=Feather River Air Quality Management District

Source: Rincon 2021; see Appendix G for details.

Impact Analysis

Impact AIR-1: Conflicts with Applicable Air Quality Plan from Construction Activities.

Consistency with an air quality plan is determined based on whether the project would conflict with or obstruct implementation of the Federal and State air quality plans, which would lead to increases in the frequency or severity of existing air quality violations. FRAQMD is responsible for establishing and enforcing air quality rules and regulations at the project site that address the requirements of Federal and State air quality laws. FRAQMD has identified CEQA thresholds of significance to assist lead agencies determine air quality impacts for projects, as discussed above.

Two criteria are used to determine whether the proposed project would conflict with or obstruct implementation of the air quality plans. The first criterion is whether the proposed project is consistent with the projections for population and vehicle miles traveled (VMT) that were used as the basis of the air quality plan. The proposed project would not increase population in the project area and would only temporarily add VMT during the approximately 5-year construction period and would not exceed the projections used by FRAQMD (see VMT estimates in Chapter 3.17, "Transportation").

The second criterion is whether the proposed project would increase the frequency or severity of existing air quality violations, contribute to new violations, or delay the timely attainment of air quality standards. FRAQMD has developed thresholds of significance for criteria pollutants to evaluate regional impacts of project-specific emissions of air pollutants and their impact on the existing air quality plans. Emissions exceeding the thresholds have not been accommodated in the air quality plans and would not be consistent with such plans and therefore would be considered potentially significant impacts.

Construction emissions are considered temporary, but they have the potential to represent a significant impact on air quality. Construction activities for the project would temporarily generate emissions of criteria air pollutants including ROG, NO_X, and PM_{10}. Emissions of the ozone precursors ROG and NO_x are generated primarily by on-road mobile sources (i.e., delivery vehicles, construction worker vehicles) and off-road construction equipment. Fugitive PM dust is one of the pollutants of greatest concern with respect to construction activities. Construction-related emissions of fugitive PM dust can vary greatly depending on the level of activity, the specific operations taking place, the number and types of equipment operated, vehicle speeds, local soil conditions, weather conditions, and the amount of earth disturbance. Hauling along unpaved construction roads, operation of the batch plant to make concrete, and blasting activities would be the primary sources of fugitive PM dust emissions from construction activities. Blasting generates emissions by ejecting particulate matter into the air, especially larger diameter particulate matter, and creates temporary dust clouds. Movement of off-road construction equipment and work trucks on unpaved roads can also generate emissions of fugitive PM dust. Criteria air pollutant emissions would be generated throughout construction in five calendar years.

As shown in Table 3.5-2, unmitigated NO_x emissions generated during all construction years would exceed FRAQMD's threshold of significance. Unmitigated PM_{10} emissions generated during construction Year 2 also would exceed FRAQMD's threshold of significance. Unmitigated NO_x and PM_{10} emissions in other years and unmitigated ROG emissions in all years of construction would not exceed FRAQMD's threshold of significance. Due to NO_x and PM_{10} emissions exceeding FRAQMD's established thresholds of significance during construction, this impact would be **potentially significant**.

Mitigation Measures: The following mitigation measures have been identified to address this impact.

Mitigation Measure AIR-1: Implement FRAQMD Construction Phase Mitigation Measures.

The following FRAQMD Construction Phase Mitigation Measures, listed below, will be implemented to reduce construction related emissions of criteria air pollutants:

- Develop and submit a fugitive dust control plan to FRAQMD and implement the FRAQMD-approved plan.
- The contractor will be responsible to ensure that all construction equipment is properly tuned and maintained prior to and for the duration of onsite operation.
- Utilize existing power sources (e.g., line power) or clean fuel generators rather than temporary power generators to the extent feasible and practicable.
- All grading operations should be suspended when average wind speeds exceed 20 miles per hour or when winds carry dust beyond the property line despite implementation of all feasible dust control measures.
- Work areas will be watered or treated with dust suppressants as necessary to prevent fugitive dust violations.
- An operational water truck should be available at all times. Apply water to control dust at least twice daily to prevent visible emissions violations and offsite dust impacts. Travel time to water sources should be considered and additional trucks used if needed.
- Onsite dirt piles or other stockpiled material should be covered when active, wind breaks installed, and water and/or soil stabilizers employed to reduce wind-blown dust emissions. Incorporate the use of approved non-toxic soil stabilizers according to manufacturer's specifications to all inactive construction areas.
- All transfer processes involving a free fall of soil or other particulate matter will be operated in such a manner as to minimize the free fall distance and fugitive dust emissions.
- Apply approved chemical soil stabilizers according to the manufacturers' specifications, to all inactive construction areas (previously graded areas that remain inactive for 96 hours) including unpaved roads and employee/equipment parking areas.
- To prevent track-out, wheel washers should be installed where project vehicles and/or equipment exit onto paved streets from unpaved roads. Vehicles and/or equipment will be washed prior to each trip. Alternatively, a gravel bed may be installed as appropriate at vehicle/equipment site exit points to effectively remove soil buildup on tires and tracks to prevent/diminish track-out.
- Paved streets will be swept frequently (water sweeper recommended; wet broom) if soil material has been carried onto adjacent paved, public thoroughfares from the project site.
- Provide temporary traffic control as needed during all phases of construction to improve traffic flow, as deemed appropriate by the County Department of Public Works and/or Caltrans and to reduce vehicle dust emissions.

- Reduce traffic speeds on all unpaved surfaces to 25 miles per hour or less and reduce unnecessary vehicle traffic by restricting access. Provide appropriate training, onsite enforcement, and signage.
- Reestablish ground cover on the construction site as soon as feasible, through seeding and watering.

Timing: Throughout all construction activities.

Responsibility: YCWA and its construction contractor(s).

Mitigation Measure AIR-2: Reduce Construction-related Exhaust Emissions.

YCWA will require its contractor to prepare a comprehensive inventory list (i.e., make, model, engine year, horsepower, emission rates) of all heavy-duty (equal to or greater than 50 horsepower) off-road (portable and mobile) equipment that will be used an aggregate of 40 or more hours for the construction project (including owned, leased, and subcontractor vehicles).

Using the inventory list, the contractor will prepare and provide a plan for approval by FRAQMD demonstrating that the heavy-duty off-road equipment to be used in the construction project will achieve a project wide fleet-average 20 percent NOx reduction and 45 percent particulate reduction compared to the most recent CARB fleet average at time of construction. The contractor will implement the FRAQMD-approved plan.

A Construction Mitigation Calculator (MS Excel) may be downloaded from the Sacramento Metropolitan Air Quality Management District web site to perform the fleet average evaluation http://www.airquality.org/businesses/ceqa-land-use-planning/mitigation. Acceptable options for reducing emissions may include use of late model engines (Tier 4), CARB-Approved low-emission diesel products, alternative fuels, engine retrofit technology (Carl Moyer Guidelines), aftertreatment products, voluntary offsite mitigation projects, provide funds for air district offsite mitigation projects, and/or other options as they become available. FRAQMD should be contacted to discuss alternative measures.

The results of the Construction Mitigation Calculator will be submitted and approved by FRAQMD prior to beginning construction work. The project will provide a monthly summary of heavy-duty off-road equipment usage to FRAQMD throughout project construction.

Timing: Prior to and throughout all construction activities.

Responsibility: YCWA and its construction contractor(s).

Mitigation Measure AIR-3: Purchase Off-Site NOx Mitigation Fees

Any excess emissions of NO_x above FRAQMD's established threshold will be mitigated through a contribution to the FRAQMD's Off-Site Mitigation Program to reduce emissions to less than significant. Accordingly, it is anticipated that YCWA will need to purchase 13.5 tons of NO_x credits (2.6 tons in Year 1, 6.3 tons in Year 2, 4.0 tons in Year 3, and 0.6 ton in Year 4) to reduce emissions to the FRAQMD established threshold. YCWA will comply with the following measures to pay an off-site construction mitigation fee to reduce NOx emissions:

- YCWA will compile a list of all emission sources and consult with FRAQMD staff to implement this mitigation measure.
- The project will need to track emissions generated from equipment and vehicles throughout the project phases that are estimated to exceed the threshold (for example, if construction phase exceed the threshold, then track emissions from off-road, portable, and on-road equipment and vehicles).
- YCWA will pay a mitigation fee in the amount of $30,000 per ton of excess emissions of NOx caused by project construction above the FRAQMD established threshold (as quantified by YCWA in accordance with FRAQMD guidelines) and a 10% administrative fee to the FRAQMD Mitigation fund, such as a Carl Moyer-type Program, to reduce the project impacts from construction NO_x emissions to below the significance threshold each year. If mitigation fees change, then YCWA will pay the current fee at the time of the mitigation payment.
- YCWA, or its designee, will make a down-payment prior to construction activities with the remainder due following the completion of construction activities. YCWA will submit monthly usage summarizes to FRAQMD and will submit a final usage summary within 60 days after the completion of construction activities.

The mitigation amount may change based on the emissions sources and equipment inventory submitted to FRAQMD before beginning the project. However, the mitigation amount/fee will be provided for all NOx emissions in exceedance of thresholds after implementation of Mitigation Measures AIR-1 and AIR-2.

Timing: Prior to construction activities and following the completion of construction activities.

Responsibility: YCWA.

Implementation of Mitigation Measures AIR-1 through AIR-2 would require implementation of Best Management Practices (BMPs) and other on-site controls, including use of Tier 4 equipment, to reduce NO_x and PM_{10} emissions at the project site to the extent possible, as shown by mitigated emissions in Table 3.5-2. Implementation of Mitigation Measure AIR-3 would further reduce this impact down to a less-than-significant level by paying a fee to reduce NO_x emissions at off-site sources. There is no off-site fee program or other options to further reduce PM_{10} emissions generated at the project site during construction. As a result, the project would continue to generate maximum daily PM_{10} emissions that exceed FRAQMD thresholds of significance in construction Year 2, as shown in Table 3.5-2. There are no other feasible mitigation measures, or additional mitigation measures approved by the FRAQMD, that can be implemented to further reduce this significant adverse impact related to PM_{10} emissions generated at the project site during construction. Therefore, this impact would be **significant and unavoidable**.

Impact AIR-2: Conflicts with Applicable Air Quality Plan from Operations, Maintenance, and Inspections.

Following construction of the proposed project, minimal emissions associated with the operations, maintenance, and inspection of the project would occur. Currently, YCWA staff are onsite to conduct operations, maintenance, and inspection activities of the existing facilities nearby. Therefore, it is anticipated that these activities would primarily be coordinated and combined with existing maintenance trips. The project would not require additional YCWA staff or staff trips due to operations, maintenance, and inspection of the proposed project. As shown in Table 3.5-3, these activities would not generate substantial air quality emissions that would exceed FRAQMD thresholds. Therefore, this impact would be **less than significant**.

Mitigation Measures: No mitigation is required.

Impact AIR-3: Result in Cumulatively Considerable Net Increase of Any Criteria Pollutant from Construction Activities.

Under the NAAQS, Yuba County is designated as nonattainment for $PM_{2.5}$, and attainment or unclassified for all other national standards. Under the CAAQS, Yuba County is designated as nonattainment for PM_{10}, nonattainment-transitional for 1- and 8-hour ozone, and attainment or unclassified for all other State standards.

FRAQMD's nonattainment/nonattainment-transitional status is attributed to the region's development history. Past, present, and future development projects contribute to the region's adverse air quality impacts on a cumulative basis. By its nature, air pollution is largely a cumulative impact. No single project by itself is sufficient in size to result in nonattainment of ambient air quality standards. Instead, a project's individual emissions contribute to existing cumulatively significant adverse air quality impacts. FRAQMD developed regional air quality thresholds as allowable project-level emissions limits to enable the region to attain and maintain ambient air quality standards. Therefore, if a project exceeds its identified project-level significance thresholds, the project's cumulative impact would be cumulatively considerable.

See Impact AIR-1 above for detail discussion of construction-related air emissions. As shown in Table 3.5-2, unmitigated NO_x emissions generated during all construction years would exceed FRAQMD's threshold of significance and unmitigated PM_{10} emissions generated during construction Year 2 would exceed FRAQMD's threshold of significance. Unmitigated NO_x and PM_{10} emissions in other years of construction and unmitigated ROG emissions in all years would not exceed FRAQMD's threshold of significance. Due to NO_x and PM_{10} emissions exceeding FRAQMD's established thresholds of significance during construction, the project would result in cumulatively considerable emissions of criteria air pollutants with nonattainment/nonattainment-transitional status in Yuba County. Therefore, this impact would be **significant.**

Mitigation Measures: The following mitigation measures have been identified to address this impact.

Mitigation Measure AIR-1: Implement FRAQMD Construction Phase Mitigation Measures.

Please refer to Impact AIR-1 above for full text of this mitigation measure.

Mitigation Measure AIR-2: Reduce Construction-related Exhaust Emissions.

Please refer to Impact AIR-1 above for full text of this mitigation measure.

Mitigation Measure AIR-3: Purchase Off-Site NOx Mitigation Fees.

Please refer to Impact AIR-1 above for full text of this mitigation measure.

Implementation of Mitigation Measures AIR-1 through AIR-2 would require implementation of BMPs and other on-site controls, including use of Tier 4 equipment, to reduce NO_x and PM_{10} emissions at the project site to the extent feasible, as shown by mitigated emissions in Table 3.5-2. Implementation of Mitigation Measure AIR-3 would further reduce this impact down to a less-than-significant level by paying a fee to reduce NO_x emissions at off-site sources. There is no off-site fee program or other options to further reduce PM_{10} emissions generated at the project site during construction. As a result, the project would continue to generate maximum daily PM_{10} emissions that exceed FRAQMD thresholds of significance in construction Year 2, as shown in Table 3.5-2. With implementation of all feasible mitigation measures, the project would reduce emissions of criteria air pollutants with nonattainment/nonattainment-transitional status in Yuba County to below cumulative considerable levels, except PM_{10} which would remain cumulative considerable. There are no other feasible mitigation measures, or additional mitigation measures approved by the FRAQMD, that can be implemented to further reduce this significant adverse impact related to PM_{10} emissions generated at the project site during construction. Therefore, this impact would be **significant and unavoidable**.

Impact AIR-4: Result in Cumulatively Considerable Net Increase of Any Criteria Pollutant from Operations.

Under the NAAQS, Yuba County is designated as nonattainment for $PM_{2.5}$, and attainment or unclassified for all other national standards. Under the CAAQS, Yuba County is designated as nonattainment for PM_{10}, nonattainment-transitional for 1- and 8-hour ozone, and attainment or unclassified for all other State standards. As discussed in Impact AIR-3 above, if a project exceeds its identified FRAQMD project-level significance thresholds, the project's cumulative impact would be cumulatively considerable. As shown in Table 3.5-3, operations and maintenance activities would not generate substantial air quality emissions that would exceed FRAQMD thresholds. Therefore, implementing operation and maintenance activities would not contribute to an existing or projected air quality violation. This impact would be **less than significant**.

Mitigation Measures: No mitigation is required.

Impact AIR-5: Expose Sensitive Receptors to Substantial Pollutant Concentrations.

Some members of the population are especially sensitive to emissions of air pollutants: children, older adults, persons with preexisting respiratory or cardiovascular illness, and athletes and others who engage in frequent exercise. These people and places where they congregate should be given special consideration during the evaluation of a project's air quality impacts. Sensitive receptors encompass residences, schools, playgrounds, childcare centers, athletic facilities, long-term health care facilities, rehabilitation centers, convalescent centers, and retirement homes. The nearest sensitive receptors to the project site are residences located approximately 0.5 mile north and 0.6 mile east of the project site. Operational emissions onsite are minimal and would occur from use of an emergency generator.

The greatest potential for TAC emissions would be related to diesel PM emissions from use of diesel-powered heavy-duty construction equipment and off-road vehicles, as well as fugitive dust from the batch plant, blasting, and excavation activities. The dose to which receptors are exposed is the primary factor used to determine health risk and is a function of the concentration and duration of exposure. According to the State Office of Environmental Health Hazard Assessment, health-risk assessments (HRA) that determine the health risks associated with exposure of residential receptors to TAC emissions should be based on a 70-year exposure period (OEHHA 2003). However, HRAs should be limited to the period/duration of activities associated with the emissions activity. Construction emission from the project would only be generated for an approximately 5-year period. Use of the emergency generator for operations would not occur on a regular basis.

Furthermore, the dose (i.e., concentration levels) to which nearby receptors would be exposed would be limited because of their distance from the project site. CARB's Air Quality and Land Use Handbook states that PM levels drop by 70 percent at a distance of 500 feet from a roadway (CARB 2005). Due to the distance of sensitive receptors from the project site, it is anticipated that diesel PM and fugitive dust concentrations would decrease substantially before affecting the nearest sensitive receptor. Therefore, this impact would be **less than significant**.

Mitigation Measures: No mitigation is required.

Impact AIR-6: Other Emissions (Such as Those Leading to Odors) Adversely Affecting a Substantial Number of People.

During construction, the project would generate odor from the use of diesel fuels over the 5-year construction period. Additionally, potential odors associated with blasting activities could be generated during phases when blasting activities would be conducted. Blasting would be conducted during up to 200 days of construction. However, the project would not generate a considerable amount of other emissions that would adversely affect a substantial number of people. This impact would be **less than significant**.

Mitigation Measures: No mitigation is required.

Residual Significant Impacts

The project would result in potential significant impacts related to air quality. Mitigation measures have been implemented to reduce NOx emissions to a less-than-significant level and to reduce PM_{10} emissions to the maximum extent possible. However, even with all feasible mitigation measures implemented, PM_{10} emissions would still be generated in excess of the threshold of significance in Year 2 of construction. With imposition of mitigation measures identified above, the project would have residual, significant and unavoidable impacts related to PM_{10} emissions.

3.6 Greenhouse Gas Emissions

This section assesses the Greenhouse Gas (GHG) emissions that would be generated by the New Bullards Bar Dam Atmospheric River Control (ARC) Spillway Project (project or proposed project). GHG emissions have the potential to adversely affect the environment because such emissions contribute, on a cumulative basis, to global climate change. This section discusses climate change, existing sources of GHG emissions, applicable regulations, and potential impacts of the project related to GHG emissions.

3.6.1 Environmental Setting

Certain gases in the earth's atmosphere, classified as GHGs, play a critical role in determining the earth's surface temperature. A portion of the solar radiation that enters the earth's atmosphere is absorbed by the earth's surface, and a smaller portion of this radiation is reflected back toward space. This infrared radiation (i.e., thermal heat) is absorbed by GHGs within the earth's atmosphere. As a result, infrared radiation released from the earth that otherwise would have escaped back into space is instead "trapped," resulting in a warming of the atmosphere. This phenomenon, known as the "greenhouse effect," is responsible for maintaining a habitable climate on the earth.

GHGs are present in the atmosphere naturally, are released by natural and anthropogenic (human-caused) sources and are formed from secondary reactions taking place in the atmosphere. Natural sources of GHGs include human, animal, and plant respiration; organic matter decomposition; and ocean evaporation. Anthropogenic sources include the combustion of fossil fuels, waste treatment, and agricultural processes. The following GHGs are widely accepted as the principal contributors to human-induced global climate change: carbon dioxide (CO_2), methane (CH_4), nitrous oxide (N_2O), hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), and sulfur hexafluoride (SF_6).

Natural sources of CO_2 include organic matter decomposition; animal and plant respiration; and ocean evaporation. Anthropogenic sources include burning coal, oil, natural gas, and wood. CH_4 is the main component of natural gas and is associated with agricultural practices and landfills. N_2O is a colorless GHG that results from industrial processes, vehicle emissions, and agricultural practices. HFCs are synthetic chemicals used as a substitute for chlorofluorocarbons in automobile air conditioners and refrigerants. PFCs are produced as a byproduct of various industrial processes associated with aluminum production and the manufacturing of semiconductors. SF_6 is an inorganic, odorless, colorless, nontoxic, and nonflammable GHG used for insulation in electric power transmission and distribution equipment, and in semiconductor manufacturing.

Global warming potential (GWP) is a concept developed to compare the ability of each GHG to trap heat in the atmosphere relative to CO_2. The GWP of a GHG is based on several factors, including the relative effectiveness of a gas to absorb infrared radiation and length of time (i.e., lifetime) that the gas remains in the atmosphere ("atmospheric lifetime"). The reference gas for GWP is CO_2; therefore, CO_2 has a GWP of 1. The other main GHGs that have been attributed to human activity include CH_4, which has a GWP of 21, and N_2O, which has a GWP of 310 (UNFCCC 2012). For example, 1 ton of CH_4 has the same contribution to the greenhouse effect as approximately 21 tons of CO_2. GHGs with lower emission rates than CO_2 may still contribute to climate change because they are more effective at absorbing outgoing infrared radiation than CO_2 (i.e., they have a high GWP). The concept of CO_2-equivalents (CO_2e) is used to account for the different GWP potentials of GHGs to absorb infrared radiation.

GHG emissions related to human activities have been determined to be highly likely responsible for intensifying the greenhouse effect and leading to a trend of unnatural warming of the earth's atmosphere and oceans, with corresponding effects on global circulation patterns and climate (IPCC 2013). Similarly, impacts of GHGs are borne globally, as opposed to the more localized air quality effects of criteria air pollutants and Toxic Air Contaminants (TACs). The quantity of GHGs that it takes to ultimately result in climate change is not precisely known; however, no single project alone is expected to measurably contribute to a noticeable incremental change in the global average temperature or to a global climate, local climate, or microclimate. Given the nature of environmental consequences from GHGs and global climate change, the California Environmental Quality Act (CEQA) requires that lead agencies evaluate the cumulative impacts of GHGs, even relatively small additions, on a global basis.

Trends of Climate Change

Warming of the climate system is now considered to be unequivocal (IPCC 2013), with global surface temperature increasing approximately 1.33°F over the last 100 years. The rate of increase in global average surface temperature over the last 100 years has not been consistent; the last three decades have warmed at a much faster rate—on average, 0.32°F per decade. Continued warming is projected to increase the global average temperature by 2°F to 11°F over the next 100 years.

The causes of this warming have been identified as both natural processes and human actions. The Intergovernmental Panel on Climate Change (IPCC) concluded that variations in natural phenomena, such as solar radiation and volcanoes, produced most of the warming from preindustrial times to 1950 and had a small cooling effect afterward. However, after 1950, increasing GHG concentrations resulting from human activity, such as increasing fossil fuel burning and deforestation, have been responsible for most of the observed temperature increase.

Impacts of Climate Change

Over the same period that increased global warming has occurred, many other changes have occurred or are predicted to occur in other natural systems. Sea levels have risen; precipitation patterns throughout the world have shifted, with some areas becoming wetter and others drier; snowlines can rise, resulting in changes to the snowpack, runoff, and water storage; and numerous other conditions have been observed. Although it is difficult to prove a definitive cause-and-effect relationship between global warming and other observed changes to natural systems, there is a high level of confidence within the scientific community that these changes are a direct result of increased global temperatures caused by the increased presence of GHGs in the atmosphere (IPCC 2013).

Greenhouse Gas Emission Sources

GHG emissions contributing to global climate change are attributable in large part to human activities. For purposes of accounting for and regulating GHG emissions, sources of GHG emissions are grouped into emission categories. The California Air Resources Board (CARB) identifies the following categories, which account for most anthropogenic GHG emissions generated within California:

- *Transportation:* On-road motor vehicles, recreational vehicles, aviation, ships, and rail.
- *Electric Power:* Use and production of electrical energy.
- *Industrial:* Mainly stationary sources (e.g., boilers and engines) associated with process emissions.

- *Commercial and Residential:* Area sources, such as landscape maintenance equipment, fireplaces, and consumption of natural gas for space and water heating.
- *Agriculture:* Agricultural sources that include off-road farm equipment; irrigation pumps; crop residue burning (CO_2); and emissions from flooded soils, livestock waste, crop residue decomposition, and fertilizer volatilization (CH_4 and N_2O).
- *High GWP Gases:* Refrigerants for stationary and mobile source air conditioning and refrigeration, electrical insulation (e.g., SF_6), and various consumer products that use pressurized containers.
- *Recycling and Waste:* Waste management facilities and landfills; primary emissions are CO_2 from combustion and CH_4 from landfills and wastewater treatment.

3.6.2 Regulatory Setting

Federal Plans, Policies, Regulations, and Laws

The United States (U.S.) Environmental Protection Agency (EPA) is the Federal agency responsible for implementing the Federal Clean Air Act (CAA). On April 2, 2007, in *Massachusetts v. EPA*, 549 U.S. 497 (2007), the Supreme Court found that GHGs are air pollutants covered by the Federal CAA and that EPA has the authority to regulate GHGs. The court held that the EPA Administrator must determine whether GHG emissions from new motor vehicles cause or contribute to air pollution, which may reasonably be anticipated to endanger public health or welfare, or whether the science is too uncertain to make a reasoned decision.

Greenhouse Gas Findings under the Clean Air Act

On December 7, 2009, the EPA Administrator signed two distinct findings regarding GHGs under Section 202(a) of the CAA:

- Endangerment finding: The EPA Administrator found that the current and projected concentrations of the six key well-mixed GHGs (CO_2, CH_4, N_2O, HFCs, PFCs, and SF_6) in the atmosphere threaten the public health and welfare of current and future generations.
- Cause or contribute finding: The EPA Administrator found that the combined emissions of these well-mixed GHGs from new motor vehicles and new motor vehicle engines contribute to the GHG pollution, which threatens public health and welfare.

State Plans, Policies, Regulations, and Laws

With the passage of legislation, including Senate Bills (SBs), Assembly Bills (ABs), and executive orders, California launched an innovative and proactive approach to dealing with GHG emissions and climate change at the State level.

Assembly Bill 1493

AB 1493 requires CARB to develop and implement regulations to reduce automobile and light truck GHG emissions. These stricter emission standards were designed to apply to automobiles and light trucks beginning with model year 2009. In 2009, the EPA Administrator granted a CAA waiver of preemption to California. This waiver allowed California to implement its own GHG emissions standards for motor vehicles beginning with model year 2009. California agencies worked with Federal agencies to conduct joint rulemaking to reduce GHG emissions for passenger car model years 2017–2025.

Executive Order S-3-05

The goal of Executive Order S-3-05, signed in 2005 by Governor Arnold Schwarzenegger, is to reduce California's GHG emissions to 2000 levels by 2010, 1990 levels by 2020, and 80% below 1990 levels by 2050. In 2006, this goal was further reinforced with the passage of AB 32.

Assembly Bill 32

AB 32, the California Global Warming Solutions Act of 2006, was signed in September 2006. AB 32 establishes regulatory, reporting, and market mechanisms to achieve quantifiable reductions in GHG emissions and a cap on Statewide GHG emissions. It requires that Statewide GHG emissions be reduced to 1990 levels by 2020. In December 2008, CARB adopted its *Climate Change Scoping Plan* (Scoping Plan) (CARB 2008), which contains the main strategies California will implement to achieve the required GHG reductions required by AB 32. The Scoping Plan also includes CARB-recommended GHG reductions for each emissions sector of the State's GHG inventory. CARB further acknowledges that decisions about how land is used will have large impacts on the GHG emissions that will result from the transportation, housing, industry, forestry, water, agriculture, electricity, and natural gas emission sectors.

CARB is required to update the Scoping Plan at least once every 5 years to evaluate progress and develop future inventories that may guide this process. CARB has updated the Scoping Plan twice since it was first adopted in December 2008. CARB updated the Scoping Plan, and draft updates were issued for initial review and comment on October 1, 2013, and February 10, 2014. The final Scoping Plan update was adopted by on May 22, 2014. The second update was made to the Scoping Plan in 2017. The draft update was issued for initial review and comment on January 22, 2017. The final Scoping Plan update was adopted in November 2017.

Executive Order S-01-07

Governor Schwarzenegger set forth the low carbon fuel standard for California; under Executive Order S-01-07, the carbon intensity of California's transportation fuels is to be reduced by at least 10% by 2020.

Senate Bill 97 (Chapter 185, 2007)

SB 97, signed in August 2007, acknowledges that climate change is a prominent environmental issue that requires analysis under CEQA. SB 97 required the Governor's Office of Planning and Research to develop recommended amendments to the State CEQA Guidelines for addressing GHG emissions. The amendments became effective on March 18, 2010.

Executive Order S-13-2008

Executive Order S-13-08 required the National Academy of Sciences to complete a California Sea Level Rise Assessment Report. The Executive Order also dictates that the California Ocean Protection Council shall work with the California Department of Water Resources (DWR), the California Energy Commission, California's coastal management agencies, and State Water Resource Control Board (SWRCB) to conduct a review of the Assessment Report every 2 years or as necessary. California adopted its 2009 Climate Adaptation Strategy (CAS 2009) in response to this Executive Order, which is used to prepare, plan, and respond to future detrimental effects of climate change.

Regional and Local Plans, Policies, Regulations, and Ordinances

CARB's Scoping Plan states that local governments are "essential partners" in the effort to reduce GHG emissions (CARB 2008). It also acknowledges that local governments have broad influence and, in some cases, exclusive jurisdiction over activities that contribute to significant direct and indirect GHG emissions through their planning and permitting processes, local ordinances, outreach and education efforts, and municipal operations. Many of the proposed measures to reduce GHG emissions rely on local government actions.

Feather River Air Quality Management District

Feather River Air Quality Management District (FRAQMD) has no regulations relative to GHG emissions for residential, commercial, or industrial projects. However, as discussed in more detail later in this section, the FRAQMD Indirect Source Review Guidelines provide recommendations for resources that should be used to evaluate GHG emissions (FRAQMD 2010).

Yuba County 2030 General Plan

The following goals and policies from the Yuba County 2030 General Plan are relevant to the proposed project, GHG emissions, and climate change (Yuba County 2011).

GOAL HS 5: **Greenhouse Gas Emissions and Climate Change.** Provide greenhouse-gas efficient development patterns and successfully adapted to future changes in Yuba County's climate.

- **Policy HS 5.1.** The County will guide land use change, direct investments, and apply its fees and programs to encourage more GHG-efficient development patterns, as feasible.
- **Policy HS 5.3.** Since transportation is the large sector contributing to GHG emissions both locally and at the Statewide level, the County will prioritize land use/transportation projects that manage travel demand by increasing housing/employment density, placing home in closer proximity with destinations, increasing accessibility to transit, or otherwise decreasing vehicle miles traveled (VMT) (per household, per capita, and/or per employee).
- **Policy HS 5.4.** The County will use an efficiency-based threshold (net emissions per-capita + employee) to evaluate proposed urban land uses, such as homes, retail, office, and other uses where the location, density, and mix of use in the project area is important to the level of GHG generation.
- **Policy HS 5.7.** The County will work collaboratively with State agencies and public/private utility providers charged with regulated building efficiency, mobile-source emissions controls, energy sources and uses, and other components of GHG emissions to create opportunity for more GHG-efficient local developments.

3.6.3 Environmental Impacts and Mitigation Measures

The proper context for addressing GHG emissions in an Environmental Impact Report (EIR) is within an assessment of cumulative impacts because, although it is unlikely that a single project would contribute significantly to climate change, cumulative emissions from many projects could impact global GHG concentrations and the climate system. As discussed above, unlike criteria air pollutants and TACs that are pollutants of localized or regional concern, the location where GHG emissions are generated is not much of a concern. Rather, the total amount and types of GHG emissions ultimately have a cumulative effect on climate change. Therefore, this analysis of GHG emissions is inherently a cumulative analysis.

Thresholds of Significance

Significance criteria are based on Appendix G of the State CEQA Guidelines. The project would have a significant impact on GHG emissions if implementing the project would:

- generate GHG emissions, either directly or indirectly, that may have a significant effect on the environment; or
- conflict with any applicable plan, policy, or regulation of an agency adopted for the purpose of reducing GHG emissions.

FRAQMD has not established quantitative significance thresholds for evaluating GHG emissions in CEQA analyses; however, the Sacramento Metropolitan Air Quality Management District (SMAQMD) has adopted CEQA thresholds for GHG emissions. In the absence of a local threshold, SMAQMD thresholds were used to evaluate the significance of GHG emissions from construction activities and operations. The SMAQMD has a threshold of 1,100 metric tons (MT) of CO_2e for construction-related GHG emissions (SMAQMD 2015). The SMAQMD policy further provides that during operations the project proponent must demonstrate consistency with the Climate Change Scoping Plan by implementing applicable BMPs, or equivalent on-site or off-site mitigation. All projects must implement Tier 1 BMPs to design and construct projects without natural gas infrastructure and to meet current CalGreen Tier 2 standards. Projects that exceed 1,100 MTs CO_2e per year after implementation of Tier 1 BMPs shall implement Tier 2 BMPs related to reducing VMT (SMAQMD 2015).

Analysis Methodology

Construction- and operation-related GHG emissions were estimated using CalEEMod Version 2013.2.2. Construction-related exhaust emissions for the proposed project were estimated for construction worker commutes, haul trucks, and the use of off-road equipment. Operation-related emissions for the proposed project were estimated for use of electrical power from operation of the guard and service gates in the control structure; equipment associated with the gate control building (GCB), including electrical control panels, Supervisory Control and Data Acquisition (SCADA) and communications systems equipment, access control and video surveillance systems equipment, balance-of-plant mechanical systems, and power receptacles; and local lighting and convenience receptacles at the operations pad, as well as emergency generator testing. All construction and operation assumptions used to estimate criteria air pollutant and precursor emissions in Chapter 3.4, "Air Quality," were also used to estimate GHG emissions. **Table 3.6.1** presents unmitigated GHG emissions from construction-related activities. Operation-related activities would generate an estimated 4.6 MTs of CO_2e per year. GHG modeling data summarized in this section are provided in **Appendix G,** "Air Quality and Greenhouse Gas Emissions Modeling."

Table 3.6-1. Unmitigated GHG Emissions from Construction Activities

Emissions Category	MT of CO_2e per year
SMAQMD Threshold	1,100
Year 1	
Unmitigated Emissions	1,251
Exceedance	*Yes*
Year 2	
Unmitigated Emissions	2,388
Exceedance	*Yes*
Year 3	
Unmitigated Emissions	1,365
Exceedance	*Yes*
Year 4	
Unmitigated Emissions	923
Exceedance	*No*
Year 5	
Unmitigated Emissions	381
Exceedance	*No*

Notes: yellow-shaded cells indicate exceedance of SMAQMD significance threshold.
CO_{2e}/year=carbon dioxide equivalent per year; MT=metric tons; SMAQMD=Sacramento Metropolitan Air Quality Management District
Source: Rincon 2021; see Appendix C for modeling calculations.

Public Comments

Comments submitted in response to the Notice of Preparation were reviewed for relevance to the analysis of environmental consequences and development of mitigation measures. There were no comments submitted regarding GHG impacts.

Impact Analysis

Impact GHG-1: Generation of GHG Emissions from Construction Activities

The proposed project would generate construction-related emissions from vehicle engine exhaust from operation of heavy-duty construction equipment, haul trips, and construction worker vehicle trips. The construction-related GHG emissions estimated for each year of project construction is presented in Table 3.6-1. The project would generate construction-related GHG emissions exceeding the SMAQMD construction threshold of 1,100 MT of CO_2e per year during construction Years 1 through 3. Therefore, generation of construction-related GHG emissions from the project would cause a **potentially significant** impact on the environment.

Mitigation Measures: The following mitigation measures have been identified to address this impact.

Mitigation Measure GHG-1: Implement Construction GHG Emissions Reduction Best Management Practices

The following measures will be implemented during construction activities, when feasible, to reduce GHG emissions in exhaust:

- Improve fuel efficiency from construction equipment:
    - Minimize idling time either by shutting equipment off when not in use or reducing the time of idling to no more than 3 minutes. Provide clear signage that posts this requirement for workers at the entrances to the site.
    - Maintain all construction equipment in proper working condition according to manufacturer's specifications. The equipment must be checked by a certified mechanic and determined to be running in proper condition before it is operated.
    - Train equipment operators in proper use of equipment.
    - Use the proper size of equipment for the job.
- Perform on-site material hauling with trucks equipped with on-road engines, when possible and determined to be less emissive than the off-road engines.
- Use alternative fuels for generators at construction sites such as propane or solar or use electrical power.
- Use a CARB-approved low carbon fuel for construction equipment. (NOx emissions from the use of low carbon fuel must be reviewed and increases mitigated.)
- Produce concrete on-site if determined to be less emissive than transporting ready mix.

Timing: During construction activities.

Responsibility: YCWA and its construction contractor(s).

Mitigation Measure GHG-2: Purchase Off-Site GHG Construction Mitigation Credits

YCWA will acquire carbon offset credits equal to construction-related GHG emissions that exceed the annual SMAQMD significance threshold of 1,100 MT of CO2e, based on actual construction emissions calculated after project construction is complete. Carbon offset credits will comply with CARB's Cap-and-Trade program and will be purchased from an accredited carbon credit market. Offset credits must be registered with, and retired by an Offset Project Registry, as defined in Title 17 California Code of Regulations (CCR) Section 95802(a), that is approved by CARB, such as, but not limited to, Climate Action Reserve, American Carbon Registry, or Verra (formerly Verified Carbon Standard), that is recognized by the Climate Registry, a non-profit organization governed by U.S. states and Canadian provinces and territories. To demonstrate that the carbon offset credits provided are real, permanent, additional, quantifiable, verifiable, and enforceable, as those terms are defined in 17 CCR Section 95802(a), YCWA will document the protocol used to verify the credits and submit the documentation for approval to a CARB-accredited third-party verification entity. If the verification entity finds that any credits purchased did not meet these criteria, YCWA will purchase alternative credits and submit a follow-up report to the verification entity for concurrence. All carbon offsets purchased will be tracked through the Climate Registry.

Timing: Before construction activities begin, during construction activities, and after construction activities are complete.

Responsibility: YCWA.

Implementing Mitigation Measure GHG-1 would reduce GHG emissions from construction equipment used for the proposed project. GHG emission reductions are not estimated with implementation of Mitigation Measure GHG-1 because it is uncertain to what extent these measures can be implemented; however, it is anticipated that the proposed project would still generate project total GHG emissions above the SMAQMD significance threshold. Implementing Mitigation Measure GHG-2 will require purchase of off-site construction mitigation credits to reduce GHG emissions to below SMAQMD's construction threshold of 1,100 MT CO_2e per year. Therefore, the proposed project would have a **less than significant with mitigation**.

Impact GHG-2: Generation of GHG Emissions from Operations

The project would generate operation-related GHG emissions on an on-going basis, primarily from electricity use from connection to the existing Pacific Gas and Electric (PG&E) electrical line at the project site. The project would require electrical power from operation of the guard and service gates in the control structure; equipment associated with the GCB, including electrical control panels, SCADA and communications systems equipment, access control and video surveillance systems equipment, balance-of-plant mechanical systems, and power receptacles; and local lighting and convenience receptacles at the operations pad as well as emergency generator testing. Operation of these components would require approximately 28,720 kilowatt-hours of electricity per year.

In addition, a 201-horsepower propane emergency generator used for backup power would be tested once per month in accordance with regulatory requirements. Vehicle trips made to perform visual inspection of the ARC Spillway and related facilities would be part of existing daily operations and maintenance trips made by staff from Marysville to the New Bullards Bar Reservoir area and therefore would not be net new trips. A multi-coat epoxy paint system would be used for corrosion protection of the intake gates.

Following construction of the proposed project, operation-related activities would generate 3.4 MTs of CO_2e per year. Under the SMAQMD policy, all projects that generate CO_2e emissions during operations need to include the following tier 1 BMPs: 1) projects shall be designed and constructed without natural gas infrastructure, and 2) projects shall meet the current CalGreen Tier 2 standards, except all electric vehicle capable spaces shall instead be electric vehicle ready. The project operation-related emissions would not exceed the SMAQMD operations threshold of 1,100 MT of CO_2e per year and therefore the tier 2 BMPs would not need to be implemented. Impacts from operation-related GHG emissions from the project, therefore, would be **less than significant**.

Mitigation Measures: No mitigation is required.

Impact GHG-3: Conflict with a GHG Reduction Plan.

Yuba County does not have any applicable plans, policies, or regulations regarding GHG emissions. CARB's Scoping Plan identifies measures that would indirectly address GHG emissions from construction activities, including the phasing in of cleaner technology for diesel engine fleets (including construction equipment) and the development of a Low Carbon Fuel Standard. Policies formulated under the mandate of AB 32 that apply to construction-related activities, either directly or indirectly, are assumed to be implemented Statewide and would affect the proposed project if those policies are implemented before construction begins. The proposed project's construction emissions would comply with any mandate or standards set forth by the Scoping Plan.

Although implementing the proposed project would cause temporary construction-related GHG emissions, the intent, purpose, and function of this project align with the goals of the AB 32 Scoping Plan related to protecting against the detrimental effects of climate change (i.e., increased frequency and magnitude of flood events). The 2009 CAS is the most current plan adopted to address the effects of climate change. Although it is not a GHG reduction plan, it provides guidance on how to respond to detrimental climate change effects that would result in additional GHG emissions. Flooding events that damage or destroy homes and other infrastructure would result in future GHG-intensive activities, such as cleaning up after the flood, rebuilding houses, and reinstalling infrastructure. Accordingly, the 2009 Climate Adaptation Strategy (CAS 2009) recommends upgrading and raising levees and other flood-risk reduction structures.

YCWA has not adopted a climate change or GHG reduction plan with which the proposed project would conflict. However, as determined in the analysis of Impact GHG-1 above, GHG emissions during construction would exceed SMAQMD's applicable threshold of significance. Since exceedance of this threshold would conflict with all local and regional plans to reduce GHG emissions in the proposed project area, this impact would be **potentially significant**.

Mitigation Measures: The following mitigation measures have been identified to address this impact:

> **Mitigation Measure GHG-1: Implement SMAQMD Construction GHG Emissions Reduction Best Management Practices.**
>
> Please refer to Mitigation Measure GHG-1 in Impact GHG-1 above for full text of this mitigation measure.
>
> **Mitigation Measure GHG-2: Purchase Off-site GHG Construction Mitigation Credits.**
>
> Please refer to Mitigation Measure GHG-1 in Impact GHG-1 above for full text of this mitigation measure.

Implementation of Mitigation Measure GHG-1 would reduce GHG emissions from construction equipment used for the proposed project. However, it is anticipated the proposed project would still generate project total GHG emissions above the SMAQMD significance threshold. Implementing Mitigation Measure GHG-2 would require purchase of off-site construction mitigation credits to reduce GHG emissions to below SMAQMD's significance threshold of 1,100 MT of CO_2e per year. Therefore, the proposed project would have a **less than significant with mitigation**.

Residual Significant Impacts

The proposed project would result in potential significant impacts related to the generation of GHG emissions during construction and conflict with a GHG reduction plan. The implementation of mitigation measures would reduce impacts associated with GHG emission production to less-than-significant levels. Therefore, the project would not result in a residual significant impact related to GHG emissions, and, with imposition of the mitigation measures identified above, the project would not have any significant and unavoidable impacts related to GHGs.

3.7 Aesthetics

This section describes the existing visual character, viewer sensitivity, and visual quality throughout the New Bullards Bar Dam Atmospheric River Control (ARC) Spillway Project (project or proposed project) area. Representative photographs showing key observation points and existing visual character of the project site are also included. This section uses a United States Forest Services (USFS) methodology for the analysis of the aesthetic values of USFS and Yuba County Water Agency (YCWA) lands. This section determines whether implementing the project would result in a significant adverse change to the visual character and quality at the project site.

3.7.1 Environmental Setting

Visual Character

Both natural and created features in a landscape contribute to its visual character. Landscape characteristics that influence visual character include geologic, hydrologic, botanical, wildlife, recreation, and urban features. The basic elements that comprise the visual character of landscape features are form, line, color, and texture. The appearance of the landscape is described in terms of the dominance of each of these elements.

The project site is located in the northern Sierra Nevada within a terrain subregion characterized by rolling to flat ridge tops interspersed with deep valleys. The dominant natural visual character for the project area is continuous forest cover consisting of mixed conifer, live oak, black oak, and madrone–typical of the foothills transition areas and lower elevations of the Sierra Nevada. The mixed conifers include primarily ponderosa pine, white fir, and Douglas fir with a scattering of sugar pine. The forest vegetation is vigorous and dense with medium to fine texture and medium to dark green in color. In winter, the conifers keep the hillsides looking predominantly green. In spring, the hillsides appear a brighter yellow/green due to new growth on the conifers and new leaves on the deciduous trees.

Cliffs and swaths of varying red, white, and yellowish soils are seen around the project site along roadcuts, trails, and areas disturbed during past construction of the New Bullards Bar Dam (Dam) and recreation facilities, and areas currently in use by YCWA for periodic equipment or materials storage. Additionally, as water levels in the Reservoir are typically drawn-down during summer and fall (hereinafter referred to as seasonal drawdowns), largely undeveloped areas of the New Bullards Bar Reservoir (Reservoir) shoreline associated with the Reservoir fluctuation zone are exposed and characterized by the same soils. Seasonal drawdown of Reservoir water levels is a normal part of Reservoir operations. The visible fluctuation zone or bathtub ring resulting from seasonal drawdowns represents a visual feature that adversely affects the overall visual quality of the area.

Grayish-white natural rock outcroppings are visible along the steep valley walls where overlying soil has been eroded to bedrock, especially in the North Yuba River canyon. Like many streams in the Sierra Nevada and foothills, the North Yuba River flows through a deeply incised fairly narrow canyon throughout much of its length. The canyon generally includes the slopes above the river channel, extending up to the nearest ridgetop, or other major topographic change. In the context of the project site, the canyon refers to the area immediately downstream of the Dam, which the river flows though, and extends as far as the edge of the project viewshed, approximately 1 mile downstream. The mostly dry river channel below the Dam is also characterized by large grayish-white boulders and cobbles and exposed bedrock. Generally, the waters of the Reservoir and pools within the river channel below the Dam are a light to dark turquoise blue depending on depth.

Viewer Sensitivity

Sensitivity levels are a measure of visitors' concern for the scenic quality of public lands. The basic assumption is that where there are high numbers of visitors using roads and trails or developed recreation facilities, including lakes and rivers, there is likely to be a high concern for scenic values. Conversely, where there are few people or the people are working in forest or related industries, there would generally be a lower concern for scenic values.

Previously Evaluated Viewer Sensitivity in the Project Vicinity

For the project area, viewer sensitivity has been formalized by USFS as part of its development of Visual Quality Objectives (VQOs) for the Tahoe National Forest (TNF) and Plumas National Forest (PNF). Sensitivity levels were identified by USFS through a formal planning process that systematically inventoried all roads, trails, and use areas; assigned sensitivity levels; and mapped seen areas by distance zones during development of the Land and Resource Management Plans (LRMPs) that apply to USFS lands adjacent to the project site (USFS 1988, 1990). Sensitivity levels are assigned as follows:

- **Sensitivity Level 1** includes primary travel routes and recreation use areas where visitors are expected to have a high concern for scenic values.
- **Sensitivity Level 2** includes secondary travel routes and recreation use areas of lower use where visitors are expected to have a moderate concern for scenic values.
- **Sensitivity Level 3** includes travel routes with low use, or that are for forest industry use, and areas with very low recreation use where concern would be expected to be low. Sensitivity Level 3 also includes areas with virtually no visitor use.

The following viewsheds were identified in the project area and assigned Sensitivity Level 1 by USFS (YCWA 2012):

- County Route 8 (Marysville Road) – for motorists traveling along Marysville Road and viewing the Dam, Reservoir, and surrounding landscape.
- Bullards Bar Trail – for hikers on the trail.
- New Bullards Bar Dam Overlook – for motorists stopping at the Overlook and viewing the area.
- Cottage Creek Boat Launch, Emerald Cove Marina, and General Store – for boaters and visitors using picnic facilities.
- Sunset Vista Point Picnic Area and Trailhead (trailhead for Bullards Bar Trail) – for day users using picnic areas, viewing the Dam and Reservoir, and beginning/ending hikes.

Additional Sensitive Viewers in the Project Vicinity

The closest access to the North Yuba River channel downstream of the Dam and adjacent to the project site is from a YCWA road originating near the Marysville Road turnout and leading to the base of the Dam. This road is closed to the public and is used for maintenance of the Dam low-level outlet and for inspections activities. Additionally, on the opposite side of the river, USFS Road 0008-010 traverses through forestlands and is also closed to the public. There are no nearby trails that lead to the base of the Dam. Indirect access to the river channel is difficult because the public would likely need to access the site overland and then hike several miles up the river canyon to view the project site. Therefore, views from the river channel downstream of the Dam are not discussed further in this section.

Although not publicly accessible, there are several rural residences located 0.55 to 1.5 miles southeast of the project site that may have a partial view of a portion of the project site, including truck traffic along the USFS Road 0008-010 haul route during construction and of the disposal area once construction is complete. These residents could be considered sensitive viewers due to the rural character of these residences and the area.

Scenic Vistas, Corridors, and Highways

A scenic vista is generally considered a viewpoint that provides expansive views of a highly valued landscape for the benefit of the general public. Some scenic vistas are officially designated by public agencies. Typical scenic vistas in the project area include locations where views of rivers, hillsides, and open space areas can be obtained. Yuba County (County) has not identified or designated any scenic vistas; however, the General Plan includes non-specific guidance to retain or enhance scenic views (Yuba County 2011). Depending on viewer location and orientation on the project site, views of the North Yuba River canyon and the Dam and Reservoir adjacent to the project site are prominent as either a foreground or background element. Sunset Vista Point, located northeast of the project site and accessible from Marysville Road, offers partial views of the Dam in the middle ground, with Marysville Road and forested hillsides in the background. Additionally, the Dam Overlook offers views of the Dam, Reservoir, forested hillsides, and Cottage Creek recreational facilities northwest of the project site.

Scenic corridors are enclosed areas of landscape that when viewed as a single entity include the total field of vision from a specific point or series of points along a linear route. The County supports the eventual designation of State Route (SR) 49 as a State scenic highway (approximately 1.75 miles southeast of the project site). However, the nearest officially designated State scenic highway is SR 20, approximately 15 miles southeast of the project site (Caltrans 2007, 2015).

Existing Visual Resources

Under existing conditions, the Reservoir provides scenic assets to the landscape. The public takes advantage of these assets by hiking, biking, fishing, boating, camping, and picnicking on or nearby the Reservoir. In the project vicinity, Marysville Road, the Dam, Primary Spillway, New Colgate Tunnel inlet hoist, Reservoir Marina (Marina), and moored boats and houseboats exhibit strong visual contrast due to light colors, uniform textures, and geometric shapes seen in the foreground and middle ground from many areas around the Reservoir.

Key observation points (KOPs) are critical viewpoints representing areas commonly used by sensitive viewers—visitors to the Reservoir or motorists driving through the project site—to view the project site. Six KOPs of the project site have been identified. Selection of KOPs is discussed further in Section 3.7.3, "Environmental Impacts and Mitigation Measures," below. KOP locations are shown in **Figure 3.7-1**. Representative photos were taken from all KOPs and are shown in **Figures 3.7-2** through **3.7-12.** The view and visual character associated with each KOP are described after Figure 3.7-12.

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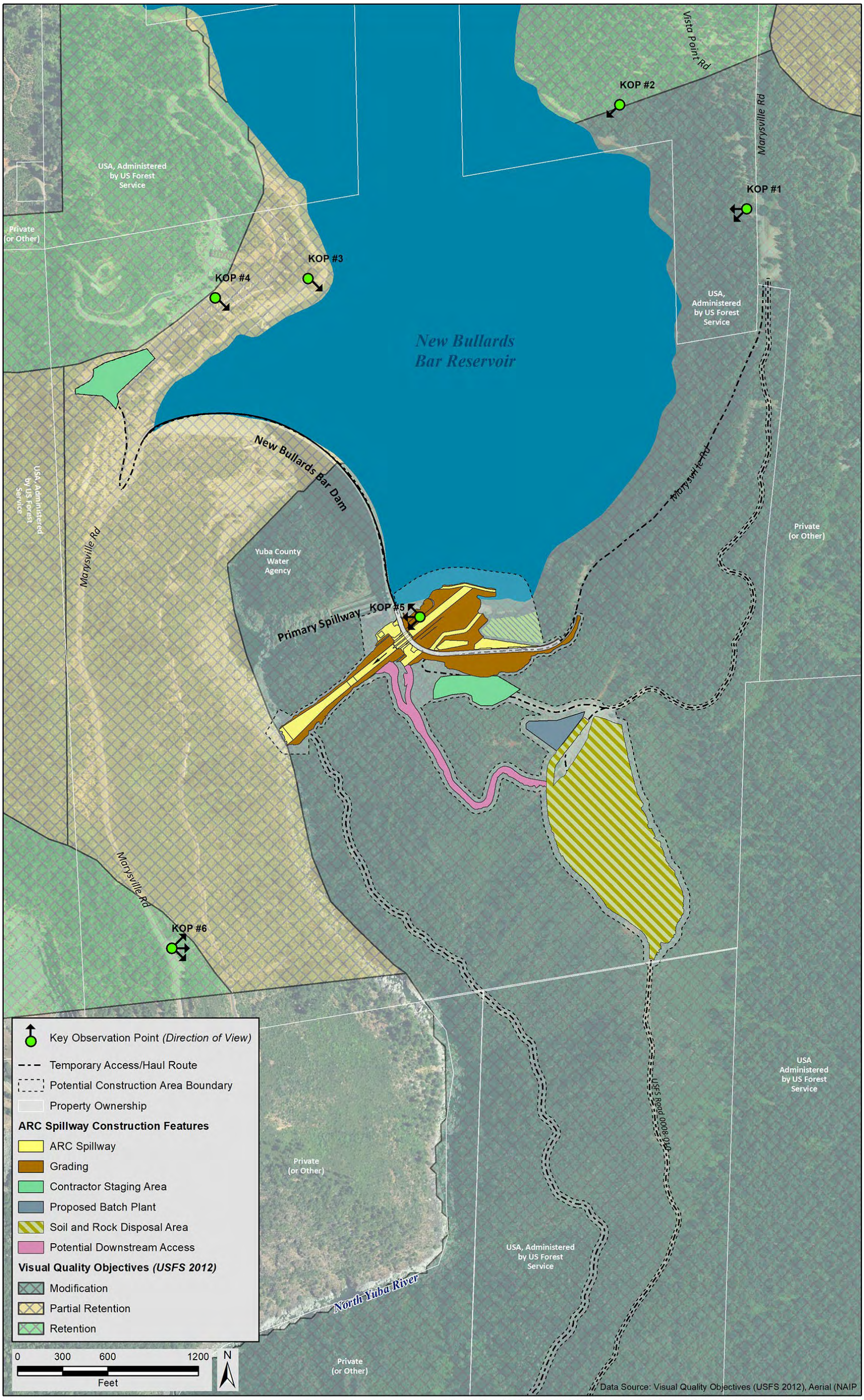


Figure Source: GEI Consultants, Inc. 2023.

Source: Adapted from United States Forest Service 1988 and 1990, by GEI Consultants, Inc. 2020.

Figure 3.7-1. United States Forest Service-Designated Visual Quality Objectives and Project Key Observation Points

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Source: GEI Consultants, Inc. 2020

Figure 3.7-2. View from Sunset Vista Point Looking West toward Project Site (KOP 1A)



Source: GEI Consultants, Inc. 2020

Figure 3.7-3. View from Sunset Vista Point Looking Southwest toward Project Site (KOP 1B)



Source: GEI Consultants, Inc. 2020

Figure 3.7-4. View from Bullards Bar Trail Looking Southwest Toward Project Site (KOP 2)



Source: GEI Consultants, Inc. 2020

Figure 3.7-5. View of Project Site from Cottage Creek Boat Launch (KOP 3)



Source: GEI Consultants, Inc. 2020

Figure 3.7-6. View of Project Site from Cottage Creek Boat Launch Parking Area with the Marina in Foreground (KOP 4)



Source: GEI Consultants, Inc. 2020

Figure 3.7-7. View from New Bullards Bar Dam Overlook to the Northwest (KOP 5A)



Source: GEI Consultants, Inc. 2020

Figure 3.7-8. View from New Bullards Bar Dam Overlook to the West (KOP 5B)



Source: GEI Consultants, Inc. 2020

Figure 3.7-9. View from New Bullards Bar Dam Overlook to the Southwest (KOP 5C)



Source: GEI Consultants, Inc. 2020

Figure 3.7-10. View of Project Site from Marysville Road Looking Northeast (KOP 6A)



Source: GEI Consultants, Inc. 2020

Figure 3.7-11. View of Project Site from Marysville Road Looking East (KOP 6B)



Source: GEI Consultants, Inc. 2020

Figure 3.7-12. View of Project Site from Marysville Road Looking Southeast (KOP 6C)

Sunset Vista Point (KOP 1)

The Sunset Vista Point includes a parking area, one picnic table, and restroom facilities and is the trailhead for Bullards Bar Trail. This viewpoint has been separated into two sub-areas (KOP 1A and 1B), which are discussed collectively. There is a framed view of the Dam and Reservoir from Sunset Vista Point. The view of the project site is somewhat obscured by native forest vegetation. The view duration is long because forest visitors are invited to come to the vista point to enjoy the view and can sit at a picnic table located at the vista point. At high pool, the curved linear element of the Dam, angular Primary Spillway outlet, and the bright orange log boom present contrast. In addition, the Marina and moored houseboats all in light or white colors add to the visual contrast at this KOP. Marysville Road beyond the Dam and County Road 169 present linear elements and visible road cuts. The New Colgate Tunnel gate inlet hoist blends into the background vegetation and is barely noticeable due to its green-gray color. Post-fire regrowth on the hillside along Marysville Road and a remaining swath of dead trees above and below Marysville Road are visible in the background. At low pool, drawdown increases the visual contrast from the exposed Dam and the exposed "bathtub ring" (Figures 3.7-2 and 3.7-3).

Bullards Bar Trail (KOP 2)

Bullard Bar Trail originates at Sunset Vista Point and extends for several miles around the east side of the Reservoir. The Reservoir is seen in the foreground from a mostly screened slightly superior viewer position on the Trail. The Dam is difficult to see in the middle ground due to trees screening the view. The view duration is long (minutes or longer) for hikers along the trail. There are several screened views along the trail. The light to medium gray concrete of the Dam presents some visual contrast to the water and surrounding green vegetation at high pool, but overall is considered low visual contrast since the view itself is partially screened. At low pool, once Reservoir drawdown exposes more of the Dam, the gray concrete presents more of a moderate contrast. The background from this KOP is of forested hillsides in the distance (Figure 3.7-4).

Cottage Creek Boat Launch (KOP 3)

The view duration is long (minutes) for recreation users launching boats or visiting the Marina/General Store to rent a boat or purchase supplies. The background from this viewpoint is characterized by a forested hillside, with the Reservoir's "bathtub" ring, and the existing unimproved access road used for maintenance of the Primary Spillway, also prominent during low water conditions. At high pool, the Dam has little exposure (approximately 30 feet) and the color is medium to dark gray concrete. At low pool, the Dam exposure may be 100 feet or more. The visual contrast is moderate due to the straight line introduced at the top of the Dam, the chain linked fence along the Dam crest, and the straight uprights of light poles. The New Colgate Tunnel gate lifting apparatus introduces additional geometric shapes, but the uprights are painted a gray-green that reduces contrast. The forested hillside in the background provides visual contrast to the medium to dark gray of the Dam. In the immediate foreground, the bright orange floating booms and the light/white colors of the Marina and moored boats present strong visual contrast to the water and the generally green backdrop of the forest. The orange booms and Marina are floating and shift seasonally in the viewshed. At the southwest end of the Dam, the cut face of the rock with light gray colors and horizontal terracing presents low visual contrast due to forest vegetation on the cut face. As the water level drops, the visual contrast of the Dam increases compared to the surrounding native forest green (Figure 3.7-5).

Cottage Creek Boat Launch Parking Area (KOP 4)

The view duration is long (minutes) for recreation users parking cars and trailers. The Marina and Dam dominate the foreground during low pool conditions. The background from this viewpoint is characterized by a forested hillside, with the Reservoir's "bathtub" ring also prominent during low water conditions. The background also provides viewers a view down the upper hillsides of the North Yuba River canyon. The view from the parking area is to the south. At high pool, the Dam has little exposure (approximately 30 feet) and the color is medium to dark gray concrete. At low pool, the Dam exposure may be 100 feet or more. The visual contrast is moderate due to the straight line introduced at the top of the Dam, the view of the top of the Dam including Marysville Road, the chain linked fence, and the straight uprights of the light poles. The New Colgate Tunnel gate lifting apparatus introduces additional geometric shapes, but the uprights are painted a gray-green that reduces contrast with the green forested hillside in the background. The forested hillside in the background contrasts with the medium to dark gray of the Dam. In the foreground, during high and low pool conditions, the bright orange floating booms and the light/white colors and geometric shapes of the Marina present strong visual contrast to the water and the generally green backdrop of the forest. As the water level drops, the visual contrast of the Dam increases significantly compared to the surrounding forested landscape (Figure 3.7-6).

New Bullards Bar Dam Overlook (KOP 5)

This viewpoint is the existing established Overlook Site on Marysville Road that offers views of the Reservoir and Dam and adjacent areas. The view duration is long (minutes) for motorists parking their cars and stopping to look at the Dam and Reservoir. KOP 5 has been separated into three sub-areas for this discussion (identified as KOP 5A, 5B, and 5C).

KOP 5A – Shrubby vegetation and outcropping boulders dominate the immediate foreground. The Dam is seen in the foreground at the edge of the left abutment of the Dam. This is a popular photo location for visitors. At high Reservoir pool, an expanse of water is visible between the viewer and the Dam. The visual contrast is moderate due to the straight line introduced at the top of the Dam, the view of the top of the Dam including Marysville Road, the chain linked fence, and the straight uprights of the light poles. The background is characterized by the Marina, the Cottage Creek Boat Launch Parking Area, and a partially vegetated hillside behind the parking area that has been graded to build a road traveling up the background hillside. During low pool, the "bathtub ring" results in an expanse of reddish dirt visible in the background. At full pool, around 30 feet of the Dam is exposed, but the light and medium gray concrete is in strong contrast to the water and surrounding native forest due to the size of the improvements and close proximity of the view. The white colors of the houseboats moored to the right of the Dam also present visual contrast but are of less consequence as seen in the middle ground. The bright orange booms also present strong visual contrast but are that color for safety purposes. At low pool, the Dam exposure may be 100 feet or more which creates a stronger contrast (Figure 3.7-7).

KOP 5B – A graveled area and the Bullards Bar Overlook Monument dominate the foreground from this view. The middle ground is dominated by an existing roadcut hillside with sparse forest vegetation and Marysville Road. The background is characterized by forested hillside on the opposite side of the North Yuba River. The view is to the west. The visual contrast is moderate due to the light to medium gray gravel and concrete sidewalks surrounding the Monument, and straight-line features including the chain linked fence surrounding the Overlook Site, and the straight uprights of the light poles visible in the middle ground (Figure 3.7-8).

KOP 5C – A graveled area and the Bullards Bar Overlook Monument dominate the foreground from this view. The middle ground is dominated by an existing roadcut hillside with sparse forest vegetation and Marysville Road. The view is to the southwest. The visual contrast is moderate due to the light to medium gray gravel and concrete sidewalks surrounding the Monument, straight-line features including the chain linked fence surrounding the Overlook, and straight uprights of the light poles visible on top of the roadcut hill adjacent to Marysville Road (Figure 3.7-9).

Marysville Road Turnout (KOP 6)

This existing turnout along Marysville Road is a popular viewing location for visitors to the project area. This KOP offers a panoramic view across the North Yuba River canyon. The view duration is long (minutes) for motorists parking their cars, but similar views from moving cars would be a few seconds. KOP 6 has been separated into three sub-areas for this discussion (identified as KOP 6A, 6B, and 6C).

KOP 6A – Post-fire shrubby vegetation regrowth and remaining snags along Marysville Road dominate the foreground at this location. The Dam and Primary Spillway are seen in the middle ground from an oblique slightly superior viewer position. The view from the turnout is to the northeast. This view is similar to views experienced by vehicles approaching the project site along Marysville Road. This expansive view has been available to visitors for approximately 10 years but will change over time as vegetation continues to regrow in this area, eventually partially or fully obstructing the view. Due to the height of the Dam, a large amount of light to medium gray concrete is seen from this KOP. This light color and straight line at the top of the Dam is in strong contrast to the Reservoir water and surrounding green native forest during late spring and summer when Reservoir water levels are higher. However, the contrast of the Dam is less apparent as it relates to the background landscape as Reservoir water levels drop, exposing the “bathtub” ring of reddish soil in late summer, and seasonal changes creates more brown vegetation. The white colors and geometric shapes of the Marina and moored boats also presents visual contrast but are of less consequence as seen in the middle ground, during high pool. The Marina is not visible from this KOP during low pool conditions. The background from this KOP consists of distant forested ridgetops (Figure 3.7-10).

KOP 6B and 6C – Post-fire shrubby vegetation growth dominates the foreground from these views along Marysville Road. The middle ground is comprised of forested hillside from a neutral viewer position. The view is to the east. This view is similar to views experienced by vehicles approaching the project site along Marysville Road. This expansive view has been available to visitors for approximately 10 years but will change over time as vegetation continues to regrow in this area, eventually blocking the view. Additionally, the adjacent canyon hillside burned in the recent past and will continue to experience vegetation regrowth. The foreground vegetation blends with the vegetation visible in the middle ground. An old road cut is visible on the lower margins of the opposite canyon wall from a superior viewer position. The background of these views consists of distant forested ridgetops. The river channel bottom is not visible (Figures 3.7-11 and 3.7-12).

3.7.2 Regulatory Setting

Federal Plans, Policies, Regulations, and Laws

United States Forest Service Agricultural Handbook Number 701: Landscape Aesthetics Handbook

The handbook, developed in 1995, defines a system, known as the Scenery Management System (SMS) for the inventory and analysis of the aesthetic values of USFS lands. The SMS evolved from and replaces the Visual Management System (VMS) defined in Agricultural Handbook #462, for most USFS lands. While the essence of the system remains intact, terminology has changed, and the system has been expanded to incorporate an increased role for constituents throughout the inventory and planning process. The SMS improves integration of aesthetics with other biological, physical, and social/cultural resources in the planning process. Most aspects of the VMS system carry over to the new SMS.

United States Forest Service Agricultural Handbook Number 462: Visual Management System

The VMS was developed in 1974 and provides the framework within which to inventory the visual resources on USFS lands and provide measurable standards for managing visual quality on these lands, including the analysis and establishment of VQOs for USFS lands. The VMS began to be replaced in 1995 (USFS 1995), with development of the SMS, and individual forests have been directed to move toward using the new SMS approach. However, the TNF and PNF LRMPs have not yet been amended to use the new system and include adopted VQOs based on the VMS system and the VMS vocabulary; this terminology and methodology is still applicable to the project area.

Plumas National Forest and Tahoe National Forest Land and Resource Management Plans

The TNF and PNF LRMPs evaluate allowable uses and coordinate potential future activities and resource use in relation to public needs on National Forest lands including established VQOs under Forest Standards and Guidelines and Management Area direction that require land management activities meet specific VQOs. The VQOs and their definitions are primarily focused on forest land management activities, but they also apply to existing and proposed facilities and have been used by adjacent landowners (including YCWA) in the past to evaluate facilities. The VQOs as part of the Forest Plan were set in 1990 for the TNF and 1988 for the PNF based on the VMS created in 1974.

State Plans, Policies, Regulations, and Laws

Other than California Environmental Quality Act (CEQA), no State plans, policies, regulations, or laws are relevant to the analysis of aesthetic impacts for the project.

Regional/Local Plans, Policies, Regulations, and Ordinances

Yuba County 2030 General Plan

The following goals and policies of the Yuba County 2030 General Plan (Yuba County 2011) are applicable to the project and visual resources.

Natural Resources

GOAL NR9: Preservation of Yuba County's important visual resources.

- **Policy NR9.1:** New developments near the Yuba, Bear and Feather Rivers should be designed and located in a way that retains or enhances scenic views of these important visual resources.
- **Policy NR9.4:** New buildings in areas of natural and scenic beauty should be placed and designed in a way that preserves scenic vistas available from public rights-of-way, parks and other public viewing areas.
- **Policy NR9.5:** The County supports the designation of SR 49 as a State Scenic Highway and will guide land use change in areas visible from this highway in a way that preserves important aspects of the visual character.
- **Policy NR9.6:** Grading and drainage for new developments in foothill and mountain areas should preserve and take advantage of the natural landforms and vegetation.
- **Policy NR9.7:** New construction should be designed to avoid excessive cut and fill by following the natural corridor of the subject site.

GOAL NR11: Aesthetics of the built environment.

- **Policy NR11.2:** In new development areas, service, utility, loading areas, roof-mounted equipment, and noise-generating equipment shall be screened, design, and located to reduce visibility, odor, and noise as experienced at surrounding properties and pedestrian areas.
- **Policy NR11.4:** To the maximum extent feasible, new developments shall avoid adverse light and glare effects on adjacent roads, neighboring properties, and pedestrian areas through careful location of on-site lighting, use of non-reflective paint and building materials, screening or shielding of light at the source, use of vegetation screening, use of directional lighting, use of lower intensity lighting, use of timing devices or sound/motion-controlled lighting, or other equally effective means.

3.7.3 Environmental Impacts and Mitigation Measures

Thresholds of Significance

The thresholds for determining the significance of impacts for this analysis are based on the environmental checklist in Appendix G of the State CEQA Guidelines. Implementing the project would have a significant impact on aesthetics if it would:

- have a substantial adverse effect on a scenic vista;
- substantially damage scenic resources, including, but not limited to, trees, rock outcroppings, and historic buildings, within a State scenic highway;
- substantially degrade the existing visual character or quality of the site and its surroundings; or
- create a new source of substantial light or glare that would adversely affect day or nighttime views in the area.

In addition, based on the USFS's VMS guidelines, implementing the project would result in a significant impact on aesthetics if it would:

- substantially degrade the existing visual condition (EVC) of the project site, or
- substantially conflict with the established VQO as designated in the USFS LRMPs for the project area.

Analysis Methodology

The analysis of visual impacts from the project is based on changes to the existing visual character and quality of the area and the USFS VMS, which YCWA used previously for the Federal Energy Regulatory Commission (FERC) relicensing of the Yuba River Development Project (YRDP). This section first describes previous studies and then the approach to the current Environmental Impact Report (EIR) process.

Previous Studies

2012 Visual Quality Assessment

As part of the ongoing FERC relicensing of the YRDP, which includes the proposed project site, YCWA evaluated facilities, and developed Technical Memorandum 10-1 (YCWA 2012), a Visual Quality Assessment for the entire YRDP based on the USFS VMS methodology (USFS 1974) (described in the next section).

As part of the Visual Quality Assessment, YCWA developed an EVC rating for each YRDP facility. Based on the EVC ratings, YCWA determined if each YRDP facility or feature on USFS land managed by the PNF complies with visual direction in PNF's 1988 LRMP (USFS 1988), and if each YRDP facility or feature on USFS land managed by the TNF complies with visual direction in the TNF's 1990 LRMP (USFS 1990). Both plans were developed after the YRDP was in place for at least 20 years. For facilities on YCWA land, YCWA determined if each YRDP facility or feature complies with visual direction in TNF's LRMP. Although the USFS VQOs do not apply on non-USFS lands, the VMS was used by YCWA in 2012 because it provides a robust assessment framework to assess proposed project facilities and features on land owned by YCWA.

United States Forest Service Visual Management System Summary

As described previously, the VMS provides the framework to inventory visual resources on USFS lands and provide measurable standards for managing the visual quality on these lands, including the analysis and establishment of VQOs for USFS lands. Several preliminary assessments contributed to developing VQOs for the TNF and PNF, which are shown on Figure 3.7-1 and discussed below.

Viewer Sensitivity

As mentioned previously, sensitivity levels were identified by USFS during LRMP development that systematically inventoried all roads, trails, and use areas; assigned sensitivity levels; and used YCWA mapped seen area distance zones (described below) for the Visual Quality Assessment of the project area (YCWA 2012). Sensitivity levels were described in the "Environmental Setting" section above.

Seen Area Distance Zones

Three distance zones have been established by USFS to characterize what a visitor can see from a given viewpoint. These zones account for topographic screening but not vegetation screening. Areas seen closer in allow for observation of detail, and viewers have more clarity regarding lines, color, texture, and forms. Areas seen farther away allow for less detail and the line, color, texture, and forms are less vivid. The general observation is that closer views are more critical to visitors. The three distance zones of the VMS are:

- **Foreground:** The landscape seen within 0.5 mile of the observer. Sometimes foreground will extend to 0.75 mile to capture a close-in ridgeline that helps define the end of foreground.
- **Middle ground:** The landscape seen between 0.5 mile and an average of 3.0 miles. Key ridge lines can help define the end of middle ground.
- **Background:** The landscape seen beyond approximately 3.0 miles, usually up to 5 or 6 miles.

Landscape Variety Class

USFS Landscape Variety Classification assumes that the more variety in landforms, rock forms, and water forms, the more attractive the landscape. The other premise is that all landscapes are valued, but landscapes of higher scenic quality should receive a higher priority for protection. During previous USFS scenic inventories of the PNF and TNF, the following three classes were mapped:

- **Class A** - Distinctive
- **Class B** - Common
- **Class C** – Minimal

Landscape Character Types were developed to describe regions with similar landscape character so that variety class ratings would be relative to that region. For example, a desert area would have different landscape characteristics than a mountainous area with high rainfall. Without Landscape Character Types, the tendency would be to rate the mountainous areas high and the foothills or desert relatively low. The project site is located within the Sierra Nevada Mountains Character Type. Within this Landscape Character Type, characteristic landscapes are described that help the reader understand how facilities may contrast with typical landscape elements of landform, waterform, and vegetation.

Visual Quality Objectives

The combination of distance zones, sensitivity levels, and variety class allows for a range of priorities for scenic quality. These combinations (for example, foreground Sensitivity Level 1, Variety Class A; or middle ground Sensitivity Level 2, Variety Class B) were mapped by USFS as part of an inventory and then converted to landscape-scale VQOs as reported in the respective LRMPs (USFS 1988, 1990) and shown on **Figure 3.7-1**.

Existing Visual Condition

EVC is an additional component of the VMS that was developed after the VMS was introduced. The EVC describes the degree of visual contrast that would be created by project facilities or features when seen from a road or use area in terms of form, line, color and texture, and duration and aspect of viewing. This is a formal evaluation of how well a facility or feature blends with the current, surrounding landscape. EVC can be used as an analysis tool for evaluating the visual effect of existing and/or proposed management activities on USFS lands. The EVC system uses different definitions than VQOs, but the EVC definitions do match up with the VQO definitions. In other words, EVC Type I corresponds to Preservation; Type II corresponds to Retention; Type III corresponds to Partial Retention; Type IV corresponds to Modification; and Type V corresponds to Maximum Modification.

Current EIR Analysis

As mentioned previously, although the USFS VQOs do not apply on non-USFS lands, the VMS was used by YCWA in 2012 because it provides a robust assessment framework to assess YRDP facilities and features on land owned by YCWA. During the 2012 Visual Quality Assessment, YCWA: 1) measured EVC, 2) compared EVC with LRMP visual objectives, and 3) developed a Visual Resources Management Plan (YCWA 2016). The adapted methods are applied to the proposed project in this EIR, where applicable, and existing visual quality information from YCWA's Visual Quality Assessment (YCWA 2012) prepared for FERC relicensing of the YRDP is incorporated by reference. The 2012 YCWA Visual Quality Assessment is available for public review at the YCWA office at 1220 F Street, Marysville, CA 9590 or on YCWA's website at:
https://www.yubawater.org/DocumentCenter/View/1682/TM-10-1-PDF?bidId=

Visual Analysis Area

The visual analysis area for the project consists of the viewshed from which project facilities and other components may be viewed by the public, including publicly accessible travel routes and recreation sites/facilities. For consistency, the EIR employs viewsheds and sensitivity levels identified by the USFS for previous studies in the project area, as discussed above in this section (Figure 3.7-1).

Data Collection

VQO information was digitized from TNF and PNF LRMP maps (**Figure 3.7-1**). Private lands do not have VQOs assigned. However, for consistency with the 2012 Visual Quality Assessment (YCWA 2012), the VQOs were displayed across private lands for graphic simplicity. Although VQOs do not apply to private land, they are used to evaluate proposed project facilities on private land for consistency and ease of comparison with the ongoing FERC relicensing process.

Key Observation Points

KOPs of the project site are presented and described in Section 3.7.1 "Environmental Setting," above. Field assessments were conducted by vehicle and on foot to identify these KOPs. Digital photographs were taken from KOPs during a site visit on December 7, 2020, and represent low Reservoir pool conditions. KOPs chosen for this assessment are all located within Sensitivity Level 1 viewsheds (Figure 3.7-1). Since the KOPs used for the 2012 Visual Quality Assessment (YCWA 2012) were developed in close consultation with USFS and were considered the most critical observer points for EVC analysis, this assessment uses the same KOPs for project facility evaluations, where possible and applicable, to allow the most direct comparison of proposed project effects on visual quality. In some instances, one KOP provided critical views in more than one direction. In these cases, the analysis differentiated

between multiple views and photographs in the EVC table by using letters (e.g., A, B and C). It should be noted that although the TNF and PNF LRMP VQO maps show many areas as seen from Sensitivity Level 1 travel routes, many areas are screened from public view by forest trees. Although the viewing public may be unable to see project construction or facilities from two of the KOPs, they have been included in this analysis for completeness and consistency with the 2012 Visual Quality Assessment.

Field Assessment

At each KOP, key visual information was noted and an EVC rating was given to describe the current state of the landscape, considering previous human alterations. As mentioned previously, comparing the EVC of a facility in the landscape against the VQO for that area can indicate whether the VQO is being met. This EIR used the landscape analysis concepts documented in the *National Forest Landscape Management, Volume 1, Agriculture Handbook Number 434* (USFS 1974), as well as an assessment of the visual contrast of proposed project facilities and other components as compared to the surrounding landscape.

Analysis of Proposed Visual Conditions and Consistency with Applicable Plans

Although several years have passed since the 2012 Visual Quality Assessment, no new construction or modifications have occurred at the project site and existing conditions as documented at the time of the previous assessment are essentially unchanged. Therefore, this EIR compares the EVC rating developed for each KOP (pre-project EVC), as reported in the 2012 Technical Memorandum 10-1 for the YRDP P-2246 – Visual Quality Assessment (YCWA 2012), with the expected EVC after implementation of the proposed project (post-project EVC), and this assessment is supported by visual assessments, where appropriate. The EIR also evaluates each final, constructed project component for consistency with the VQOs for the applicable LRMP.

As mentioned previously, this EIR uses the VMS within the TNF and PNF boundaries, which includes and surrounds privately owned lands. While a portion of land within and near to the projects site is USFS land, most of the project site is on YCWA-owned lands that are concentrated around the Reservoir. With this in mind, it is important to note that while the USFS VMS was used on YCWA land around proposed project facilities, this methodology was employed for consistency with the FERC relicensing and for ease of comparison of project features. The TNF and PNF VQOs do not formally apply to YCWA lands; nor do TNF and PNF have official LRMP maps depicting VQOs on these or any other private lands. In analyzing impacts, land ownership is listed specifically as a reminder that facilities are often on YCWA land and may have different land management objectives.

Public Comments

Comments submitted in response to the Notice of Preparation were reviewed for relevance to the analysis of environmental consequences and development of mitigation measures. There were no comments submitted regarding aesthetics.

Issues Not Discussed Further in the EIR

Scenic Resources within Designated Scenic Highways

Although the Yuba County General Plan - Natural Resources Element supports the eventual designation of SR 49 as a State scenic highway, there are no officially designated State scenic highways or eligible State scenic highways located in the project vicinity. The nearest highway eligible for listing is a segment of SR 49 (extending from the intersection with SR 20 near Nevada City to the intersection with SR 89 near Sattley. SR 49 is approximately 1.75 miles southeast of the project site and the project site is not visible from SR 49 due to topography and the presence of tall vegetation along the road corridor. The nearest officially designated State scenic highway is SR 20, approximately 15 miles southeast of the project site, without views of the project site. Therefore, no impact to scenic resources within a scenic highway corridor would occur and this issue is not discussed further in this EIR.

Impact Analysis

Impact AES-1: Temporary Visual Changes from Construction Equipment.

Motorists traveling on Marysville Road and recreational users would be subjected to visual changes from construction activities during the approximately 5-year construction period. Most recreational users in the vicinity of project construction or within view of construction would be day users using the Cottage Creek Boat Ramp and Marina, hiking on Bullards Bar Trail, or fishing from a boat or the shoreline. Nighttime users in the vicinity of construction would be houseboat users moored at or near the Marina. Construction would be visible from both directions during daytime and nighttime hours for drivers on Marysville Road.

The daytime and nighttime visual character of the project site would be affected by the staging and use of heavy equipment during construction and substantial earthwork associated with the project, including vehicle emissions and dust generation during the approximately 5-year construction period. Similar construction equipment (in smaller numbers) is periodically seen during normal operations and maintenance activities for the Dam and Primary Spillway. Equipment would primarily be visible during construction at the ARC Spillway site and soil and rock disposal area. Construction at certain locations, such as the approach channel, spillway chute, and discharge channel, would occur for a shorter portion of the construction period. The construction detour of Marysville Road would be similar to the existing alignment but 70 feet to the north and in-place for approximately 3 years of construction. Work at the control structure and adjacent areas, hauling to/from and placement of materials at the soil and rock disposal area, and use of staging areas and batch plants would occur continuously during almost the entire construction duration. While the surrounding forested areas, Reservoir water, and North Yuba River canyon would continue to dominate available views for recreation users, the presence of construction equipment in the viewshed of the project site over the 5-year construction period would be **significant and unavoidable**.

Mitigation Measure: No feasible mitigation measures are available, as described in the following section, “Residual Significant Impacts.”

Impact AES-2: Temporary Visual Changes from Construction Activities.

After construction is complete, temporarily impacted areas, which excludes the new downstream access road and improvements to USFS Road 0008-010, would be restored to approximate pre-existing contours by matching the adjacent grade and seeding with a native seed mix to establish ground vegetation for erosion protection. This would also reduce the permanent contrast between temporarily

impacted areas and the surrounding landscape. Visual changes from construction that are not temporary—removal of mature trees and access road construction and improvements—are evaluated in Impact AES-3 below. Use of nighttime lighting during construction activities is evaluated in Impact AES-5 below.

Dust would be generated throughout construction activities at the project site and could be visible to sensitive users for prolonged periods. Depending on ambient winds and climatic conditions, construction-related dust could be much more visible from a greater distance and affect many more sensitive users. Since substantial dust affecting sensitive viewers could be generated at the project site periodically throughout the 5-year construction period, this impact would be considered **significant**. As described in Chapter 3.2, "Air Quality", Mitigation Measure AIR-1, "Implement FRAQMD Construction Phase Mitigation Measures," would be implemented during project construction.

Mitigation Measures: The following mitigation measure has been identified to address construction-related dust impacts to visual resources.

> **Mitigation Measure AIR-1: Implement FRAQMD Construction Phase Mitigation Measures.**
>
> Please refer to Impact AIR-1 in Chapter 3.2, "Air Quality," for the full text of this mitigation measure.

Implementation of Mitigation Measure AIR-1 would reduce impacts associated with temporary visual changes from construction activities by reducing dust emissions from construction activities to the extent feasible. However, since the particulate matter equal to or less than 10 micrometers in diameter (PM_{10}) threshold would still be exceeded with implementation of Mitigation Measure AIR-1 during construction in Year 2, substantial dust could still be emitted. There are no other onsite mitigation measures to reduce dust. Therefore, this impact would be **significant and unavoidable**.

Impact AES-3: Permanent Alteration of the Visual Character or Quality of the Project Area, including Scenic Vistas.

This analysis first describes permanent visual changes from project components and operations, then uses this information to discuss changes in visual conditions at KOPs, USFS visual conditions, and potentially sensitive viewsheds, and finally summarizes conclusions.

Visual Changes from Project Components

The project would result in permanent visual changes from developing the ARC Spillway facilities, excavating the hillside for the control structure, permanently relocating the Overlook Site and Marysville Road, developing the soil and rock disposal area, constructing the new downstream construction access road, and improving USFS Road 0008-010 for construction access. Figure 2-3 shows the conceptual design of the approach walls, control structure, gate hoist, and spillway chute. Figures 2-1, 2-2, and 2-4 through 2-6 also show proposed project components.

Approach Channel and Walls; Reservoir Access Improvements

During high pool conditions, the approach channel and walls would not be visible as they would be submerged in the water of the Reservoir. However, as seasonal drawdown occurs, a portion of the approach walls would appear above the water surface. Additionally, two maintenance benches, a 5-ft-wide bench at elevation 1908 and a 6-ft-wide bench at elevation 1943, would connect to each approach wall in the Reservoir, extending part way up the approach channel slope along approximately 200 feet of the approach channel. Although this represents a change from existing conditions, the relative characteristics of the approach walls (geometric feature with medium gray concrete) would be similar in form, texture, color, and overall visual appearance to the existing Dam and associated features. From their maximum height at the ARC Spillway, the approach walls and maintenance benches would gradually diminish in height, moving upstream into the Reservoir, until they eventually intersect with the Reservoir grade. Over time, the approach walls would discolor from exposure and submersion, which would reduce the contrast with the background landscape. The approach channel would primarily be formed from soil and rock and graded to the shape of a large channel leading to the ARC Spillway control structure with rock used as needed for stabilization. Where rock slope protection is impractical due to steep slopes, shotcrete would be installed and would consist of reinforced welded wire mesh and anchored to the slope with grouted bar anchors. Lining with shotcrete will result in a wavy, grey surface. The approach channel would match existing natural features at the Reservoir. Although Reservoir access roads would be improved during construction, they would not substantially change from the reddish soil color of the existing access.

Control Structure and Excavated Hillside

Visual changes from the control structure are primarily associated with the presence of the gate hoist, gate control building (GCB), concrete retaining walls at the downstream end of the control structure, and the results of earthwork associated with the control structure installation, where a portion of the adjacent hillside would be excavated and slopes near the operations platform and hillside are graded. The earthwork would change the view down the North Yuba River canyon. The control structure facilities and topographic modifications would be similar to facilities and modifications associated with the existing Reservoir, Dam, and New Colgate Tunnel outlet hoist.

With the exception of the gate hoist and the GCB, the control structure facility would be developed in an excavated area below ground level and appear “sunken” into the hillside. The top of the spillway gates and control structure would not protrude any higher than the existing grade of the Dam and Marysville Road. This orientation reduces the effect of additional geometric shapes and unnatural features on the viewshed. The gate hoist would add an approximately 40-foot-tall additional geometric shape (measures from the surface of the grade and operations platform). The gate hoist is not solid metal, but an open framework that viewers can look through and past, to the background view beyond. The appearance would be similar to that of the existing New Colgate Tunnel gate structure, located on the adjacent side of the Dam.

The existing hillside adjacent to the control structure that would be excavated is already exposed with obvious construction-related terraces that are visible. Although a portion of the hillside would be removed, the resultant surface soils, vegetation, color, and texture of this topography in the background would appear similar to existing conditions, only slightly receded into the background.

Spillway Chute, Control Structure, and Discharge Channel

The ARC Spillway chute, control structure, and discharge channel would be similar in form, texture, color, and overall visual appearance as adjacent existing features associated with the Dam and Primary Spillway. The new spillway chute and control structure would provide an additional expanse of medium gray concrete and the discharge channel an additional area of exposed bedrock. These same facilities are present at the Primary Spillway and are approximately twice the width as those proposed for the ARC Spillway. Over time, the exposed concrete along the chute and control structure and exposed bedrock along the discharge channel would discolor from exposure to the weather and would likely grow lichen/moss, similar to what has occurred at the existing Dam and Primary Spillway since construction over 50 years ago. These small growths are not deleterious to the concrete structure and further reduce the starkness of the lighter-colored concrete as compared to the adjacent landscape. Additionally, a steel wire mesh rock netting would be constructed along the left bench of the spillway chute. Between the Primary and ARC Spillways, a portion of natural hillside and vegetation approximately 320 feet wide would be left in place, creating a natural forested segment between the two facilities, consistent with other surrounding forested areas.

Permanent Marysville Road Relocation

A 1,150-feet segment of Marysville Road would be permanently realigned, but the grade would not change. The new alignment would extend over the control structure and be visually similar with the paved/graveled portions of the operations platform and Overlook Site. A portion of the same hillside excavated for the control structure would also be excavated to accommodate the relocated segment of Marysville Road. Significant impacts to traffic and emergency access related to the Marysville Road relocation are discussed in Chapter 3.16, “Transportation”.

Soil and Rock and Disposal Area

The permanent soil and rock disposal area is located on top of an adjacent ridge to the south of the ARC Spillway facility. The disposal area would consist of a flat top surface with side slopes and rise approximately 25 feet (on the west side towards the ARC Spillway and towards KOPs) to 50 feet (on the east side) above the surrounding landscape (as shown in Figure 2-5). Development of the disposal area would require tree removal, and trees in this area are sparser than surrounding densely vegetated areas.

The visible surface and slopes of the disposal area would primarily consist of excavated overburden and weathered rock and some soil. Additionally, the visible side slopes would be covered with a layer of topsoil and vegetated. This rock would likely be a medium gray color and where visible would contrast with the foreground and background forested hillsides and ridges. Since rock is excavated on-site, it would be the same or similar to other visible rock and soil in the project area and around the Reservoir. Where vegetated, the side slopes would exhibit less contrast and blend in better with the surrounding vegetation.

Downstream Construction Access Road and Improvements to United States Forest Service Road 0008-010

The new downstream construction access road would consist of a road and grading resulting in disturbance of an approximately 100- to 115-foot-wide area along the route and hill side. Improvements would also be needed along USFS Road 0008-010 for construction access and hauling, such as grading, tree removal, and development of turnarounds (Figure 2-7). Construction of the downstream access road and improvements to the USFS road would include tree removal and grading. After construction, these new/improved roadways would not be returned to existing conditions. The construction access road may be maintained for permanent access. The USFS road would not be maintained but improved areas would be visible after construction until they begin to naturally revegetate, as occurred with the same USFS road after construction of the Dam and Primary Spillway (when the road was developed).

Visual Changes from Project Operations

When the ARC Spillway is in use, which would occur infrequently, water would be visible emerging from the control structure on the spillway chute and a jet of water would extend from the control structure onto the discharge channel. Due to the presence of the Reservoir and North Yuba River channel, water is already an important component of the existing visual character of the site. In addition, water spilling down the ARC Spillway would be similar to current use of the Primary Spillway, since these spillways have similar designs.

Due to its lower elevation in the Reservoir, operation of the ARC Spillway would discharge flood flows more frequently than with the Primary Spillway alone, resulting in occasional changes in the Reservoir water level/pool and visibility of the Reservoir fluctuation zone. These changes would occur within the Reservoir flood control space, but visual changes due to the seasonal fluctuation of the Reservoir are considered a normal part of project operations and vary from year to year within the Reservoir flood control space. Recreational users of the Reservoir also know to expect significant changes in Reservoir levels due to periodic drawdown. Therefore, changes in visibility of the Reservoir fluctuation with operation of the ARC Spillway likely would not be noticeable to viewers, or if they are noticed, would still be similar to existing conditions and within the normal range of Reservoir levels.

Visual Changes to Key Observation Points of the Project Site

Project changes to visual conditions at each KOP of the project site identified in the “Environmental Setting” section above are discussed below.

Sunset Vista Point (KOP 1)

After construction, KOP 1 would provide a screened view of the relocated Overlook Site and Marysville Road, but since these features would be replaced at grade and nearby their current locations, there would not be substantial permanent change in appearance from this KOP. The gate hoist structure and GCB may be visible in the background to an extent through screened vegetation growing immediately in the foreground of the Vista Point. In addition, mature trees removed during construction may provide more visibility to the hillside. The soil and rock disposal area, new downstream access road, and improvements to USFS Road 0008-010 would not be visible.

Bullards Bar Trail (KOP 2)

After construction, the view from KOP 2 would not change substantially because the Dam and project site are currently difficult to see, due to the presence of screening forest vegetation. However, views vary along the trail and when hikers pass through less vegetated portions of the trail, the project site may dominate the background of views for short periods of time. Viewers may see the geometric features of the approach walls and potentially the ARC Spillway control structure at low pool. The gate hoist and GCB are screened from view at certain points along the trail, including at this KOP. In addition, mature trees removed during construction may provide more visibility to the hillside. The soil and rock disposal area, new downstream access road, and improvements to USFS Road 0008-010 would not be visible.

Cottage Creek Boat Ramp (KOP 3) and Parking Area (KOP 4)

The viewsheds of KOP 3 and 4 are similar, as they relate to the project site. Viewers from both KOPs would primarily see a change due to the presence of the gate hoist and approach channel walls, and the results of earthwork associated with the control structure, where a portion of the adjacent hillside would be excavated. These KOPs also have a view of the relocated Overlook Site and Marysville Road, but since these features would be replaced at grade and nearby their current locations, there would not be substantial permanent change in appearance from this KOP. The approach walls would not substantially degrade the visual integrity of these KOPs. In addition, mature trees removed during construction may provide more visibility to the hillside. The soil and rock disposal area is not anticipated to be visible and improvements to USFS Road 0008-010 would not be visible.

The gate hoist structure would also be visible from these KOP post-construction. The structure would add an approximately 40 foot-tall additional geometric shape to the background. The appearance would be similar to that of the existing New Colgate Tunnel inlet gate structure, located on the adjacent side of the Dam, which is not solid metal, but an open framework that viewers can look through and past, to the background view beyond. The concrete GCB may also be partially visible from these KOPs.

The end of the downstream access road where it meets the new spillway chute on the hillside southeast of the ARC Spillway would be partially visible in the background of these views. Tree removal and grading of the new road would reduce the existing visual conditions in the background of this view, but since natural features (the hillside) would still be visible, these changes are considered small.

New Bullards Bar Dam Overlook (KOP 5)

Viewers from this KOP would be moved approximately 500 feet to the east after the existing Overlook Site is relocated with the project.

KOP 5A. Importantly, the view from KOP 5A would still include expansive views of the Reservoir and long, linear Dam feature. Trees would be trimmed adjacent to the new Overlook Site if needed to make sure these views are preserved at KOP 5A. The view from this KOP includes many geometric elements, some with high contrast, in a heavily modified area of the Reservoir, which degrade the existing visual condition. The orientation of the ARC Spillway and associated structures would reduce the effect of additional geometric shapes and unnatural features on the viewshed. Viewers would see changes in the Reservoir at low pool, due to the presence of the approach channel walls and adjacent portions of the control structure and gates and improved existing access road in the Reservoir fluctuation zone. The addition of the approach walls to this viewshed would not substantially degrade the visual integrity of this KOP. The background of this KOP is dominated by the Dam, Reservoir, and exposed soils of the Reservoir's "bathtub" ring in the distance during low pool conditions.

KOPs 5B and 5C. Outside of the Reservoir, viewers would now see the gate hoist structure and operations platform including a small equipment staging area adjacent to the driveway off Marysville Road. The gate hoist structure would dominate the view from this direction (KOP 5B) and the GCB may be visible in the background. However, because the gate hoist is a framed structure, it may blend into the background some and expansive views offered by the North Yuba River Canyon. Across the relocated Marysville Road, the excavated hillside would be visible, similar to existing conditions where the hillside is visible across the road. The soil and rock disposal area and new downstream access road and improvements to USFS Road 0008-010 would not be visible.

Marysville Road Turnout (KOP 6)

Tree removal and grading for the new downstream access road and improvements to USFS Road 0008-010 would be visible along the hillside from this KOP. The downstream access road may be maintained for permanent access. The USFS road would not be maintained and vegetation would re-establish overtime, just as occurred after this road was initially developed to construct the Dam. These changes result in more prominent linear features across the hillside within this KOP's viewshed. In addition, mature trees removed during construction may provide more visibility to the hillside. Although the project represents a new manmade alteration to the viewshed from this KOP, viewers are oriented at an angle to the project site at this KOP, which reduces the dominance of straight-line project features in the viewshed.

KOP 6A. In addition to the existing Dam and Spillway, viewers from KOP 6A would now also see the ARC Spillway chute and the upper portion of the discharge channel, the gate hoist, operations platform, and GCB. Although this represents a change from existing conditions, the relative characteristics of the ARC Spillway itself would be nearly identical to the Primary Spillway. A portion of natural hillside and vegetation extending approximately 320 feet wide would be left in place between the Primary and ARC Spillways, further reducing the effect of additional straight-line features on the visual appearance of the ARC Spillway from this KOP. Topographic change associated with excavating a portion of the hillside adjacent to the control structure would offer viewers from KOP6 a slightly more expansive view of the Reservoir. The gate hoist structure and GCB would be visible and add additional geometric features to the middle ground of KOP 6A.

Additionally, unless vegetation is cleared periodically by Yuba County, the area in the immediate foreground of the Marysville Road turnout would change over time, as vegetation continues to regrow (post-fire) on the hillside in the vicinity of the turnout, eventually screening the view from the turnout.

KOPs 6B and 6C. The most noticeable change in the viewer experience from these KOPs would be the topographic change from addition of the permanent soil and rock disposal area, visible in the middle ground. Up to approximately 25 feet of the disposal area slope would be visible above the ground surface, with some existing trees potentially providing screening of the slope. In addition, the disposal area is not anticipated to obscure the view of green ridgelines in the background. Forested areas to the north of the disposal area and on the ridge around the east side of the Reservoir would remain visible and dominate views of the horizon.

The new downstream access road would be visible from grading and tree removal. Improvements to USFS Road 0008-010 extending from the discharge channel would be visible for a period of time until vegetation naturally re-establishes. These features would add straight-line features of contrasting natural elements with the adjacent forested hillsides.

United States Forest Service Visual Conditions Assessment

Using information on permanent visual changes at each KOP discussed above, changes to the USFS EVC rating and compliance with the TNF and PNF LRMP VQOs were evaluated for each of the six project KOPs. **Table 3.7-1** summarizes existing USFS visual conditions and changes from the project. The findings of the analysis are discussed below. Note that none of the project area was ever evaluated for VQOs prior to development of the YRDP and Dam and changes to visual character take this into account.

Existing Visual Conditions Rating Analysis

EVC types applicable to the project KOPs and used in the analysis are defined by USFS as follows (USFS 1974):

- **Type III - Changes Evident, Natural Appearance Dominates.** Some evidence but management activities are subordinate. Areas where changes in the landscape are noticed by the average forest visitor, but they do not attract attention. The natural appearance of the landscape remains dominant. These areas appear to be minor disturbances.

- **Type IV - Moderate Contrasts, Changes are Obvious.** Moderate evidence and management activities are subordinate. Areas in which changes in the landscape are easily noticed by the average forest visitor and may attract some attention. These areas visually appear as disturbances but resemble natural patterns.

- **Type V – Strong Contrasts.** Moderate evidence and management activities generally dominate the landscape. Areas in which changes in the landscape are strong and would be obvious to the average forest visitor. These changes stand out as a dominating impression of the landscape, yet they are shaped so that they might resemble natural patterns when viewed from a distance of 3 to 5 miles or more. These areas visually appear to be major disturbances.

After construction of the proposed project, the majority of the viewshed from all KOPs, except KOP 6, would remain similar to existing conditions and the EVC rating would not change.

The approximately 15-mile-long Bullards Bar Trail, where KOP 2 is located, varies from III to IV, depending on the amount of screening vegetation growing along the trail. Due to screening and the large viewshed provided at KOPs 1 and 2, the view from these KOPs would remain similar to existing conditions from the KOP and other locations along the trail.

At KOPs 3 and 4, the existing EVC varies from III (at high pool) to IV (at low pool) with forested topography as a dominant background feature and constructed features considered noticeable, but subordinate to the landscape. After construction, the most dominant new feature, the approach walls, would be submerged at high pool. During low pool, the view of the exposed backside of the Dam would be similar to existing conditions, where the New Colgate Tunnel inlet hoist and other appurtenant features are visible. The post-construction viewshed from these KOPs would remain similar to existing conditions, at high pool and low pool, with project constructed features subordinate to the landscape. The downstream access road for the ARC Spillway would be slightly visible from these KOPs. However, it would not create a strong contrast beyond the existing disturbance and obvious change to the landscape already experienced by viewers from these KOPs.

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Table 3.7-1 Project Changes to Visual Conditions at KOPs

Viewing Location	Project KOP	Land Ownership	LRMP Assigned VQO	Existing Conditions EVC Rating	Existing Conditions Compliance with LRMP VQO	Proposed Project EVC Rating	Proposed Project Consistent with LRMP VQO?	After Mitigation EVC Rating	After Mitigation Consistent with LRMP VQO?
Sunset Vista Point	KOP 1	USFS	Modification -TNF Partial Retention - PNF	IV	Yes, for TNF M-VQO No, for PNF PR-VQO	IV	No, for TNF-M. No, for PNF - PR	IV	Yes, for TNF-M after mitigation. No, for PNF - PR
Bullards Bar Trail	KOP 2	NFS and YCWA	Modification and Partial Retention – TNF[2]	III to IV, depending on trail segment.[1]	Yes, for TNF PR and M-VQO	III to IV	Yes, for trail segments viewing the project site. TNF-M and PR	III to IV	Yes, for trail segments viewing the project site. TNF-M and PR
Cottage Creek Boat Launch	KOP 3	YCWA	Modification -TNF Partial Retention - PNF	III High Pool IV Low Pool	Yes, for TNF M-VQO No, for PNF PR-VQO	III High Pool IV Low Pool	No, for TNF-M. No, for PNF - PR	III High Pool IV Low Pool	Yes, for TNF-M after mitigation. No, for PNF - PR
Cottage Creek Boat Launch Parking Area	KOP 4	YCWA	Modification -TNF Partial Retention - PNF	III High Pool IV Low Pool	Yes, for TNF M-VQO No, for PNF PR-VQO	III High Pool IV Low Pool	No, for TNF-M. No, for PNF - PR	III High Pool IV Low Pool	Yes, for TNF-M after mitigation. No, for PNF - PR
New Bullards Bar Dam Overlook	KOP 5	YCWA	Modification for TNF	IV	Yes, for TNF-M	IV	No, for TNF-M.	IV	Yes, for TNF-M after mitigation.
Marysville Road Turn Out	KOP 6	YCWA	Modification -TNF Partial Retention - PNF	IV	Yes, for TNF-M No, for PNF-PR	V	No, for TNF-M. No, for PNF-PR	IV	Yes, for TNF-M after mitigation. No, for PNF-PR

[1] The Bullards Bar Trail is approximately 15 miles long. The project site is visible from various portions of the trail alignment but is screened by vegetation at KOP 2.
[2] Due to its location, this KOP was not evaluated for PNF consistency in YCWA's 2012 analysis and is not evaluated here for consistency with the previous analysis.
EVC = Existing Visual Condition, KOP = Key Observation Point, LRMP = Land and Resource Management Plan
M = Modification, PR = Partial Retention,
PNF = Plumas National Forest, TNF = Tahoe National Forest,
VQO = Visual Quality Objective
USFS = United States Forest Service

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The EVC at KOP 5 would remain EVC IV for all project activities and the viewshed would remain focused on the existing high-contrast Dam infrastructure and a heavily modified area of the Reservoir. The addition of the approach walls and control structure gates to this viewshed would not substantially degrade the visual integrity of this KOP since the background of this KOP is currently dominated by the Dam, Reservoir, and exposed soils of the Reservoir's "bathtub" ring during low pool conditions.

The EVC at KOP 6 would remain IV for all project activities except for the soil and rock disposal area where it would change to EVC V with the project. At KOP 6, the contrast of the soil and rock disposal area in the middle ground of this viewshed would partially reduce the existing visual conditions and would lower the EVC from this KOP, because these changes would be a dominant factor in the viewshed. Although the downstream access road for the ARC Spillway would be visible, and contrast with surroundings, the access road would not introduce any manmade structures to the viewshed. The access road would result in landscape changes that may be noticed by a visitor as a disturbance, but due to surrounding project components, an existing access road disturbance in this viewshed, and with the existing adjacent Dam and Primary Spillway, the access road would not dominate the landscape.

Land and Resource Management Plan Visual Quality Objectives Analysis

VQO types applicable to the project vicinity, and employed during the 2012 YCWA analysis, are defined by USFS, as follows (USFS 1974):

- **Partial Retention:** Under the Partial Retention VQO, management activities are to remain visually subordinate to the characteristic landscape. Activities may repeat form, line, color, or texture common to the characteristic landscape, but changes in their qualities of size, amount, intensity, direction, pattern, etc., remain visually subordinate to the characteristic landscape. Activities may also introduce form, line, color, or texture that are found infrequently or not at all in the characteristic landscape, but they should remain visually subordinate to the visual strength of the characteristic landscape.

- **Modification:** Under the Modification VQO, management activities may visually dominate the original characteristic landscape. However, activities of vegetative and landform alterations must borrow from naturally established form, line, color, or texture so completely and at such a scale that its visual characteristics are those of natural occurrences within the surrounding area or character type. Additional parts of these activities, such as structures, roads, slash, root wads, etc., should borrow naturally established form, line, color, and texture so completely and at such a scale that its visual characteristics are compatible with the natural surroundings.

Plumas National Forest

The existing VQO at all KOPs, except KOP 5, is assigned as "Partial Retention" and KOP 2 is also assigned "Modification" for PNF. The PNF LRMP VQO is not evaluated for KOPs 2 or 5 for consistency with the 2012 YCWA analysis, in which these KOPs were not evaluated for the PNF criteria.

The existing Dam, appurtenant features, and associated recreational facilities do not meet the visual direction specified in the LRMP VQOs, due to the presence of light colors, uniform textures, geometric shapes, and visual contrast with the surrounding landscape. Because the proposed project would involve modifications and additions of similar features, it would also not be in compliance with the PNF VQO. Therefore, at KOPs 1, 3, 4, and 6, the proposed project would not represent a change in the level of compliance with the PNF VQO.

Tahoe National Forest

The existing VQO at all KOPs is assigned as "Modification" for TNF, except for KOP-2 where it is assigned as "Modification" and "Partial Retention." The ARC Spillway and associated structures would not borrow from natural forms and would generally be consistent with the character and contrast associated with the existing Dam and Primary Spillway.

However, the gate hoist and GCB would add additional geometric features that are visible in front of the hillside adjacent forested areas of the viewshed for KOPs 1 through 4, visible in the foreground of the viewshed for KOP 5, and visible in the middle ground of the viewshed for KOP 6. Although the gate hoist and GCB would not be a dominant feature in all views, the presence of these new major structures could degrade the existing visual character or quality of the views. The new downstream access road would change the background view to a small extent and contrast starkly with the adjacent hillside from KOP 3. Since the gate hoist is a framed structure, views would not be completely obstructed. The GCB would present as a blocky structure partially obstructing background views; however, the GCB is much smaller than the gate hoist structure. The new downstream access road and improvements to USFS Road 0008-010 would contrast starkly with the adjacent hillside and forested areas from KOP 6. However, they would not introduce any new structures to the viewshed, which would contribute to project objectives while maintaining the Modification VQO for these components. These combined changes from the gate hoist, GCB, downstream access road, and USFS Road 0008-010 make it difficult to achieve the additional Modification VQO guidance that a reduction in form, line, color, and texture should be accomplished in the first year[1]. Therefore, these features would conflict with the VQO for this area and could degrade the existing visual character or quality of the views from KOPs 1 through 4 and 6.

The contrast of the medium gray soil and rock disposal area (where visible between the vegetated side slopes) and associated topographic change would alter the middle ground of the viewshed for KOPs 6B and 6C, and due to the scale of the pile, would make it difficult to achieve the Modification VQO guidance that a reduction in form, line, color, and texture should be accomplished in the first year.

Visual Changes to Other Potentially Sensitive Viewsheds

Although not publicly accessible, there are several rural residences located 0.55 mile to 1.5 miles southeast of the project site that may have a partial view of improvements to USFS Road 0008-010 and the soil and rock disposal area once construction is complete. However, due to the ensuing distance, topographic variability, generally forested character of the area surrounding the rural residences, and the presence of vegetation that wholly or partially screens these residences from the surrounding landscape, there would not be a substantial change to the viewshed of these distant residences.

Visual Impact Conclusions

Permanent visual changes from development of the ARC Spillway and associated structures would be similar to the existing Dam, Primary Spillway, and associated structures. While the gate hoist structure is similar to the existing New Colgate Tunnel gate structure, it would also present a large new framed structure that would alter the character of existing viewsheds at the KOPs to some extent. Additionally, the introduction of the blocky GCB into the viewshed would also alter the character of existing views to a small extent. Tree removal and grading for the new downstream construction access road and

[1] From the USFS Visual Management System (1974) guidance regarding maintaining the Partial Retention VQO: "Reduction in form, line, color, and texture to meet partial retention should be accomplished as soon after project completion as possible or at a minimum within the first year."

improvements to USFS Road 0008-010, and development of the soil and rock disposal area, would also be visible after project construction and would contrast to some extent with adjacent forested areas. Although various constructed project features would be visible from most KOPs, many project features are considered mild or moderate changes to the landscape that are noticeable by visitors. While these changes may attract attention, the natural landscape is dominant and many disturbances from the project would resemble natural patterns visible elsewhere in the landscape.

Therefore, even with project construction, the EVC rating at all KOPs would remain the same as pre-project conditions, except for KOP 6, where the EVC would degrade after construction because of the multitude of features visible from this KOP, including the soil and rock disposal pile. These combined visual changes associated with manmade structures resulting from project implementation would make it difficult to achieve consistency with the existing TNF LRMP Modification VQO for KOPs 13, 4, 5, and 6.

Although there are no designated scenic vistas in the project vicinity, KOPs 1, 5, and 6 are used by the public as informal scenic viewpoints. Visual changes to KOP 1 would be minimal due to vegetation screening in the foreground and because the ARC Spillway facilities would be similar to existing facilities in this viewshed and background of the view. KOP 5, the Overlook Site, would be relocated to the east and would generally provide the same views of the Dam and Reservoir that currently exists, and although the gate hoist structure and GCB would now be present, visual changes are not considered adverse and do not preclude the views intended for this site, since the Overlook Site is intended to view the developed Dam facilities. Visual changes to KOP 6 from the soil and rock disposal area, permanent downstream access road, and improvements to USFS Road 0008-010 would contrast starkly with adjacent forested and natural areas. While these changes individually may not be adverse, all the changes viewed collectively from KOP 6 would be considered substantially adverse due to the additional contrast associated with these project elements.

The EVC rating at all KOPs would remain the same as pre-project conditions, except for KOP 6, where the EVC would degrade after project construction, for reasons mentioned above. The project would not maintain compliance with the existing TNF LRMP Modification VQO and would adversely affect the informal scenic viewpoints provided by KOPs 1, 5, and 6. This would be a **significant** impact.

Mitigation Measures: The following mitigation measures have been identified to address this impact.

Mitigation Measure AES-1: Paint Gate Hoist and Gate Control Building Structure to Blend with Surroundings

The gate hoist and gate control building structures will be painted a gray, green, or brown color, as appropriate to blend with surroundings or background features, including natural rock present in adjacent areas. This mitigation measure is consistent with measures proposed in the YCWA Visual Resources Management Plan, included in the pending FERC license application.

Timing: Within 1 year after the Gate Hoist and GCB are constructed.

Responsibility: YCWA and its construction contractor(s).

Mitigation Measure AES-2: Revegetation of the Soil and Rock Disposal Area Side Slopes.

Once placement of material at the soil and rock disposal area is complete, YCWA will install native seed and/or other vegetation on the side-slopes around the entire disposal pile, where it isn't used for access, to reduce the visual impact to the surrounding landscape over time. Trees may not be feasible to plant in topsoil on side slopes. Vegetation shall be selected as determined appropriate and feasible for its compatibility with the surroundings and species selected for plantings should be reasonably expected to provide the intended revegetation of the side slopes within approximately 5 years after construction ends.

Timing: After construction.

Responsibility: YCWA and its construction contractor(s).

Implementation of Mitigation Measures AES-1 and AES-2 would reduce the visual prominence and contrast of the gate hoist structure, GCB, and soil and rock disposal area with the surrounding landscape. Painting of the gate hoist and GCB would be accomplished soon after project construction (within the 1-year criterion required to maintain the Partial Retention VQO). Additionally, revegetation of the soil and rock disposal pile will allow this area to better blend in with natural surrounding areas, which would reasonably contribute to maintaining the Modification VQO[2]. Therefore, the impact from the gate hoist, GCB, and the disposal area would be **less than significant with mitigation**.

Impact AES-4: Introduce New Sources of Light and Glare from Construction Activities.

As described previously, most recreational users in the vicinity of project construction or within view of construction would be day users using the Cottage Creek Boat Ramp or the Marina, hiking on Bullards Bar Trail, viewing the Dam from Sunset Vista Point, or fishing from a boat or the shoreline. Nighttime users in the vicinity of construction would be houseboat users moored at or nearby the Marina. Construction would be visible from both directions for drivers on Marysville Road during daytime and nighttime hours.

Nighttime construction could occur during critical construction phases throughout the construction period. The nighttime visual character of the project site would be temporarily degraded during construction from the presence of heavy equipment and lighting that may be necessary to facilitate nighttime construction. Nighttime sensitive receptors would include motorists traveling through the project area. The marina and boat ramp are closed during nighttime hours, and although many houseboat users enter the reservoir near the Marina, they quickly disperse upstream, to less crowded and less developed areas of the Reservoir, avoiding the heavy use areas near the Marina. There is also another boat ramp (Dark Day) at which to enter the Reservoir, completely avoiding the ramp near to the project site. Houseboat users near to the project site may experience glare during any nighttime construction but the majority of houseboat users on the Reservoir would be upstream of the construction areas and the lighting and equipment associated with construction would not be directly visible to them due to screening topography and vegetation. However, due to the rural character of the project vicinity and the absence of other major light sources that may affect the viewshed, the possibility of nighttime construction activities to create sources of light and glare would be **potentially significant**.

[2] From the USFS Visual Management System (1974) guidance regarding maintaining the Modification VQO: "Reduction in form, line, color, and texture should be accomplished in the first year or at a minimum should meet existing regional guidelines.

Mitigation Measures: The following mitigation measure has been identified to address this impact.

Mitigation Measure AES-3: Provide Shielding from Nighttime Construction Activities.

To reduce nighttime light and glare effects on sensitive receptors during construction, YCWA will ensure that the following measures are implemented as defined below:

- All nighttime lighting will be shielded and directed downward and in the opposite direction from sensitive receptors.
- Lighting shall be low intensity, where feasible, and located and designed to minimize direct view of light sources and diffusers, and to minimize halo and spillover effects.
- Solid screened temporary construction fencing at least 6 feet high will be provided along the boundary of the construction site where nighttime lighting would occur, where feasible. The shielded fencing will be proximate to the location of the lighting.
- Signage detailing the timing and duration of construction activities, and the location of other Reservoir access points for boaters, shall be posted at recreation sites such as the Emerald Cove Marina, Yuba Rim Trail, New Bullards Bar Trail, Cottage Creek boat launch, and the Dark Day boat launch, to give at least 48 hours of notice to users that nighttime construction activities with associated lighting will be conducted for the specific dates mentioned in the signage.

Timing: During construction activities.

Responsibility: YCWA and its construction contractor(s).

Implementation of Mitigation Measure AES-3 would reduce the significant impacts associated with creation of nighttime light and glare effects because exposure of the small number of sensitive viewers using the Marina and houseboats at night, in the immediate project vicinity, to nighttime lighting would be minimized and viewers would be notified of nighttime construction, and the option to use other ramps for access to the Reservoir. This would reduce the significant impact related to additional sources of light and glare to **less than significant with mitigation**.

Impact AES-5: Introduce New Sources of Light and Glare from New Facilities and Operations.

The project site would be permanently altered during and after project construction by the introduction of new manmade surfaces. The concrete-lined spillway chute and exposed light-colored rock along the new spillway channel would contrast with the existing landscape but would be similar in appearance to the adjacent existing Primary Spillway concrete structure and rock channel. Additionally, excavated soil and rock placed at the disposal area would be light-colored and would contrast somewhat with the surrounding land, as would the excavated discharge channel and hillside adjacent to the control structure. The approach channel would be excavated and left unsurfaced but would blend with the Reservoir bottom when exposed during low pool conditions and would be inundated during high pool conditions. However, due to the rough surface texture of the excavated/exposed rock or concrete, none of these project elements would create a new source of glare. Additionally, except for any windows required to meet fire code and safety specifications for the GCB structure, there would be no glass or other potentially reflective surfaces installed as part of the project.

The permanent nighttime visual character of the site would not be degraded after project construction. The project would not create new sources of light or glare that are uncharacteristic of existing lighting associated with the Dam and appurtenant facilities. The existing Dam includes several streetlamps evenly spaced along the Dam crest to light the roadway for vehicles traveling across the Dam on Marysville Road. As described in the project description, the required number of outdoor lighting fixtures would be based on 5-foot candles for an area of 250 feet by 300 feet and would be limited to the GCB and gate structures. The total number of lighting fixtures would be decided when the design is finalized but would be similar in brightness and intensity to existing onsite lighting and would be aimed downward and would be shielded, similar to existing onsite lighting. This impact would be **less than significant.**

Mitigation Measures: No mitigation is required.

Residual Significant Impacts

The project would result in potential significant impacts related to aesthetics. Mitigation measures have been implemented to reduce impacts regarding permanent changes to a scenic vista, overall visual quality of the project area, and light and glare to a less-than-significant level. However, there are no feasible mitigation measures that can reduce the impact associated with the presence of construction equipment in the viewshed of the project site. Additionally, although mitigation would partially reduce the presence of dust during construction, the regional threshold would be exceeded during certain construction phases, due to the extent of earthmoving that must occur to meet the project purpose and objectives. Therefore, even with all feasible mitigation measures implemented, the project would have residual, significant and unavoidable impacts related to temporary visual changes from construction equipment and construction dust emissions.

3.8 Agriculture and Forestry Resources

Since there are no agricultural resources within the project site or vicinity, this section focuses on forestry resources by describing forestry resources, summarizing the regulatory setting related to forestry resources, and analyzing potential impacts of implementing the New Bullards Bar Dam Atmospheric River Control (ARC) Spillway Project (project or proposed project) on forestry resources. Additional information related to land uses on and adjacent to the proposed project site is provided in Chapter 3.12, "Land Use and Planning."

3.8.1 Environmental Setting

Agricultural Resources

The project site's topography and its location within and adjacent to the New Bullards Bar Reservoir (Reservoir) limit the viability for agricultural activities or uses to occur on site. The project site is not designated as farmland on maps prepared for the Farmland Mapping and Monitoring Program. Consequently, the project site does not support agricultural production or related uses. The project site is zoned as Resource Preservation and Recreation District (Yuba County 2016), with land uses consisting primarily of forestland, the developed Overlook Site, Marysville Road, and United States Forest Service (USFS) Road 0008-010.

Forestry Resources

Public Resources Code (PRC) Section 12220(g) defines "forestland" as land that can support 10 percent native tree cover and forest vegetation of any species, including hardwoods, under natural conditions and that allows for management of one or more forest resources, including timber, aesthetics, fish and wildlife, biodiversity, water quality, recreation, and other public benefits. Portions of the project site that would be used for the ARC Spillway facility, relocation of the Overlook Site and Marysville Road, temporary haul routes, and the soil and rock disposal area are located on land that qualifies as forestland. In all, the study area for the project contains approximately 40 acres of forest and woodland (including coniferous and oak forests and woodlands). Refer to Chapter 3.3, "Terrestrial Biological Resources," for additional details on land cover/habitats at the project site.

There are large forested areas of Yuba County that provide habitat, surface water supply, visual resources, and timber resources. Most forests are in the foothills and mountain areas of eastern and northeastern Yuba County and include portions of the Plumas National Forest (PNF) and Tahoe National Forest (TNF) (Yuba County 2011a). In 2005, there was a total of 95,000 acres of forestland in Yuba County—55,000 acres were privately owned, and 40,000 acres were publicly owned (Yuba County 2011b).

The TNF western boundary is along the North Yuba River and extends eastward away from the New Bullards Bar Marina (Marina) and towards the project site. The TNF consists of 794,374 acres of forestland and encompasses the majority of the project site including a portion of the ARC Spillway and related facilities, the soil and rock disposal area, construction batch plants/staging areas, the downstream construction access road, and portions of USFS Road 0008-010 used for construction access.

The PNF eastern boundary is along the North Yuba River and extends west towards the Emerald Cove Marina, away from the project site. The PNF consists of 1,146,000 acres of forestland. The portions of the project site within the PNF boundaries would be part of the temporary haul route along Marysville Road and the staging area located at the Marina parking lot, which are both existing features on developed lands. The project would not be located on any land designated as forestland within the PNF.

3.8.2 Regulatory Setting

Federal Plans, Policies, Regulations, and Laws

Since only developed portions of the project site are in the PNF, the PNF Land and Resource Management Plan is not discussed.

Tahoe National Forest Land and Resource Management Plan

The purpose of the TNF Land Resource Management Plan (LRMP) was to direct the management of the TNF until 2005 (USFS 1990). The TNF LRMP was amended in 2004 and again in 2011 and is still used by USFS. The goals of the TNF LRMP are to ensure the wise use and protection of TNF resources, fulfill legislative requirements, and address local, regional, and national issues. The TNF LRMP includes a supply and demand analysis, public issues, concerns and opportunities summary, and establishes management direction and monitoring and evaluation requirements.

State Plans, Policies, Regulations, and Laws

Other than the California Environmental Quality Act (CEQA), no State plans, policies, regulations, or laws related to agricultural and forestry resources apply to the proposed project.

Regional/Local Plans, Policies, Regulations, and Ordinances

See Chapter 3.12, "Land Use and Planning," for a discussion about Yuba County codes, plans and policies.

3.8.3 Environmental Impacts and Mitigation Measures

Thresholds of Significance

Significance criteria are based on Appendix G of the State CEQA Guidelines. The proposed project would have a significant impact on agricultural and forestry resources if implementing the project would:

- convert Prime Farmland, Unique Farmland, or Farmland of Statewide Importance, as shown on the maps prepared pursuant to the Farmland Mapping and Monitoring Program of the California Resources Agency, to nonagricultural use;
- conflict with existing zoning for agricultural use or a Williamson Act contract;
- conflict with existing zoning for, or cause rezoning of, forestland (as defined in PRC Section 12220(g)), timberland (as defined by PRC Section 4526), or timberland zoned Timberland Production (as defined by Government Code Section 51104(g));
- result in the loss of forestland or conversion of forestland to nonforest use; or

- involve other changes in the existing environment that, because of their location or nature, could result in conversion of Farmland to nonagricultural use or conversion of forest land to nonforest use.

Analysis Methodology

Forestland at the project site was identified from mapping biological habitats/landcover and information in existing uses of the project. Evaluation of the potential impacts of the proposed project on forestry resources was based on a review of planning documents pertaining to the project area, particularly the Yuba County 2030 General Plan (Yuba County 2011b) and the Final Yuba County 2030 General Plan Environmental Impact Report (EIR) (Yuba County 2011a), and field and aerial photographic review.

Public Comments

Comments submitted in response to the Notice of Preparation were reviewed for relevance to the analysis of environmental consequences and development of mitigation measures. There were no comments submitted regarding agricultural and forestry resources.

Issues Not Discussed Further in the EIR

Converting Agricultural Land to Nonagricultural Land and Conflict with a Williamson Act Contract

Since there is no agricultural land present within the project site or adjacent areas, there would be no zoning conflicts with agricultural resources, and project implementation would not convert prime farmland, unique farmland, or farmland of Statewide importance to non-agricultural uses. Additionally, the project would not conflict with any Williamson Act contracts since Yuba County does not participate in the Williamson Act program. Therefore, there would be no impact from the project and these issues are not evaluated further in this EIR.

Impact Analysis

Impact AGF-1: Conflict with Existing Zoning or Cause Rezoning of Forestland.

The project site is zoned by Yuba County as Resource Preservation and Recreation. Forestland falls within this zoning designation and is present within the project site. The areas where the ARC Spillway, soil and rock disposal area, relocated Overlook Site and Marysville Road, and access roads would be constructed are designated as forestland. Relocating the Overlook Site would not conflict with this zoning designation since passive recreation is an allowable land use within the Resource Preservation and Recreation zoning designation. Additionally, the relocation of Marysville Road would be permitted through an Encroachment Permit from Yuba County. The project would not conflict with the Yuba County Development Code because (since YCWA is a local government agency) “zoning ordinances of a county or city shall not apply to the location or construction of facilities for the production, generation, storage, treatment, or transmission of water, or for the production or generation of electrical energy.” (Govt. Code § 53091(e).) Existing areas surrounding and adjacent to the project site would not be impacted from constructing or operating the proposed project and, therefore, would continue to be used as Resource Preservation and Recreation, which includes forestland. In addition, the ARC Spillway would provide long-term benefits to the surrounding forestland by providing increased protection from future flood damages and would not have a short- or long-term detrimental effect on the management or use of surrounding forestland. This impact would be **less than significant**.

Mitigation Measures: No mitigation is required.

Impact AGF-2: Convert Forestland to Non-Forest Land or Result in the Loss of Forestland.

Forestland is located throughout the project site and adjacent areas. As part of the proposed project, segments of USFS Road 0008-010 would be used as a temporary construction access and hauling route. However, this access route has not been maintained and improvements along the existing route are needed for constructing the proposed project. A USFS Special Use Permit would be obtained by YCWA for access road improvements on USFS lands. Portions of the access roads where improvements are made, along the perimeter of the existing road, may require tree removal and conversion of forestland to non-forestland. However, following construction activities the road would not continue to be maintained and it is anticipated that vegetation and trees along the road perimeter that are removed for the project would eventually become re-established as part of the contiguous forestland. Other areas temporarily impacted by construction would be hydroseeded and restored to pre-project conditions. Where mature trees are removed from temporary construction areas, vegetation and trees are anticipated to eventually re-establish.

Project construction would disturb approximately 40 acres of forestland. Much of this forestland would be permanently removed within the footprint of the ARC Spillway, relocated Overlook Site and Marysville Road, soil and rock disposal area, and new downstream access road. However, where trees are removed in other construction areas and for improvements to USFS Road 0008-010, it is anticipated that trees would eventually become re-established returning these areas to forestland matching contiguous areas. Since Yuba County has large expanses of forestland which serve as wildlife areas and important recreational sources, the project represents loss of less than a 0.04 percent (40 of 95,000 acres) of forestlands in Yuba County[1]. Therefore, conversion of forestland for project implementation would not be a significant amount in relation to the overall amount of available forestland in Yuba County. Additionally, the project would not affect existing uses of forestlands adjacent to the project site. This impact would be considered **less than significant**.

Mitigation Measures: No mitigation is required.

Residual Significant Impacts

The project would result in less-than-significant impacts related to agricultural and forestry resources. Therefore, the project would not result in residual significant impacts related to agricultural and forestry resources and the project would not have any significant and unavoidable impacts related to agricultural and forestry resources.

[1] Based on most recently available data from Yuba County in 2005.

3.9 Energy

This section was prepared pursuant to the State California Environmental Quality Act (CEQA) Guidelines Section 15126.2(b) and Appendix F of the State CEQA Guidelines, which require that Environmental Impact Reports (EIRs) include a discussion of the potential energy impacts of projects. The analysis considers whether implementing the New Bullards Bar Dam Atmospheric River Control (ARC) Spillway Project (project or proposed project) would result in inefficient, wasteful, or unnecessary consumption of energy or conflict with or obstruct a State or local plan for renewable energy or energy efficiency.

3.9.1 Environmental Setting

Electricity Use and Generation

Yuba County receives its retail electric service from Pacific Gas and Electric (PG&E). In 2018, the total electricity consumption for Yuba County was approximately 505 million kilowatts per hour (kWh) (CEC 2018a). Natural gas is the main source of electricity in California, accounting for approximately half of electricity used in California. After natural gas generation, electricity in California is generated by renewables (32 percent), large hydroelectric (11 percent), nuclear (9 percent), coal (0.15 percent), oil (0.2 percent), and other methods such as petroleum and waste heat (0.22 percent) (CEC 2018b). Yuba County Water Agency (YCWA) owns four powerhouses in the Yuba River Watershed. The powerhouses and their generation capacity include New Colgate – 340 MW, Narrows 1 – 12 MW, Narrows 2 – 55 MW, and New Bullards Bar Minimum Flow – 150 kW.

3.9.2 Regulatory Setting

Federal Plans, Policies, Regulations, and Laws

Energy Policy and Conservation Act

The Energy Policy and Conservation Act of 1975 established nationwide fuel economy standards to reduce energy consumption by increasing the fuel economy of cars and light trucks. Pursuant to this Act, the National Highway Traffic and Safety Administration, part of the United States (U.S.) Department of Transportation (DOT), is responsible for revising existing fuel economy standards and establishing new vehicle economy standards.

Corporate Average Fuel Economy Standards

The Corporate Average Fuel Economy (CAFE) program was established to determine vehicle manufacturer compliance with the government's fuel economy standards. Compliance with the CAFE standards is determined based on each manufacturer's average fuel economy for the portion of their vehicles produced for sale in the country. The U.S. Environmental Protection Agency (EPA) calculates a CAFE value for each manufacturer based on the city and highway fuel economy test results and vehicle sales. Based on information generated under the CAFE program, DOT is authorized to assess penalties for noncompliance. Under the Energy Independence and Security Act of 2007 (described below), the CAFE standards were revised for the first time in 30 years.

Energy Policy Act of 2005 and Independence and Security Act of 2007

The Energy Policy Act of 2005 provides renewed and expanded tax credits for electricity generated by domestic energy production, such as landfill gas; provides bond financing, tax incentives, grants, and loan guarantees for energy efficiency, such as clean renewable energy and rural community electrification; and establishes a Federal purchase requirement for renewable energy. Improved national energy efficiency is encouraged through the development of new statutory standards, requirements for Federal action, and incentives for voluntary improvements.

The Energy Independence and Security Act of 2007 increases the production of clean renewable fuels; increases the efficiency of products, buildings, and vehicles; promotes research on and deploy greenhouse gas capture and storage options; improves the energy performance of the Federal Government; and increases the U.S. energy security, develops renewable fuel production, and improves vehicle fuel economy (EPA 2019). The Energy Independence and Security Act of 2007 set mandatory Renewable Fuel Standard requiring fuel producers to use at least 36 billion gallons of biofuel in 2022, which represents a nearly five-fold increase over current levels; and reduces U.S. demand for oil by setting a national fuel economy standard of 35 miles per gallon by 2020—an increase in fuel economy standards of 40 percent. The Energy Independence and Security Act of 2007 builds on progress made by the Energy Policy Act of 2005 in setting out a comprehensive national energy strategy for the 21st century.

State Plans, Policies, Regulations, and Laws

California Green Building Standards Code

The California Building Standards Code is published in its entirety every 3 years by order of the California Legislature. The California Legislature delegated authority to various State agencies, boards, commissions, and departments to create building regulations to implement the State's statues. These building regulations or standards have the same force of law, and generally apply to all new building construction in California. A city or county may establish more restrictive standards reasonably necessary because of local climatic, geological, or topographical conditions.

The California Energy Code (CEC) (Title 24-part 6) and its building energy efficiency standards are designed to reduce wasteful, uneconomic, inefficient, or unnecessary consumption of energy, and enhance outdoor and indoor environmental quality. All residence will be required to install enough renewable energy to offset all the site electricity needs of each residential unit. The California Energy Commission estimates that the combination of mandatory on-site renewable energy and prescriptively required energy efficiency features (such as solar rooftops) will result in new residential construction that uses 53 percent less energy than the 2016 standards. Nonresidential buildings will use about 30 percent less energy due mainly to lighting upgrades (CEC 2019).

Regional/Local Plans, Policies, Regulations, and Ordinances

Yuba County 2030 General Plan

The following goals and policies from the Yuba County 2030 General Plan Natural Resource (NR) Element are relevant to the proposed project (Yuba County 2011a).

GOAL NR 7: **Energy.** Improve energy efficiency, encourage renewable energy generation and use, and reduce ongoing household and business energy costs.

Policy NR 7.1. New developments shall address energy conservation in landscaping methods, materials, and design.

Policy NR 7.2. New buildings shall meet standards for energy efficiency and should provide for renewable energy development and use, to the greatest extent feasible.

Policy NR 7.3. New developments should be designed to take advantage of passive or natural summer cooling and winter solar access.

Policy NR 7.4. New developments should provide street and lot orientation and lot dimensions that facilitate the use of solar energy.

Policy NR 7.6. New developments should consider energy conservation in building-site orientation and construction, with articulated windows, roof overhangs, appropriate insulation materials and techniques, and other architectural features that improve passive interior climate control.

Policy NR 7.7. Shade trees and other appropriate plantings should be used in new developments to protect buildings from unwanted solar gain in summer months. Using deciduous trees on the southern side of structures is encouraged to allow cooling in the summer and solar gain in winter. Short front setbacks are encouraged to allow shade trees planted in the public right-of-way to provide summertime shading.

Policy NR 7.8. New buildings should emphasize passive and natural lighting systems in architectural design to conserve electricity.

3.9.3 Environmental Impacts and Mitigation Measures

Thresholds of Significance

The significance criteria used to evaluate the project impacts to energy are based on Appendix G of the State CEQA Guidelines. A significant impact related to energy would occur if the project would:

- result in potentially significant environmental impact due to wasteful, inefficient, or unnecessary consumption of energy resources, during project construction or operation; or
- conflict with or obstruct a State or local plan for renewable energy or energy efficiency.

Analysis Methodology

Evaluation of the potential impacts of the proposed project on energy consumption was based on a review of planning documents pertaining to the project area, particularly the Yuba County 2030 General Plan (Yuba County 2011a) and the Final Yuba County 2030 General Plan Environmental Impact Report (Yuba County 2011b). Annual energy usage for operation of the ARC Spillway was estimated based on design and proposed uses of the gate control building (GCB) (heating, ventilation, air conditioning, kitchen, supervisory control and data acquisition, security and surveillance, and communications room equipment), operation of the wire rope hoist for each gate (two service gates and two guard gates) once per year, lighting provided for the operations platform and operating 50 percent of the time per year, and outdoor power receptacles operated for 1 hour four times per year.

Public Comments

Comments submitted in response to the Notice of Preparation were reviewed for relevance to the analysis of environmental consequences and development of mitigation measures. There were no comments submitted regarding energy.

Issues Not Discussed Further in this EIR

Conflict with State or Local Plan for Renewable Energy or Energy Efficiency

Yuba County has not adopted a local plan for renewable energy or energy efficiency; however, the State's Climate Commitment is to reduce reliance on non-renewable energy sources by half by 2030 (CEC 2015). Operational electricity would come from the existing PG&E power poles and transmission lines, and emergency power may be obtained from the mini-hydro unit located in the New Bullards Bar Dam (Dam) facilities. The project would not conflict or obstruct the State's Climate Commitment. Therefore, the project would not conflict with any State standards or renewable energy plans. There would be no impact from the project and this issue is not discussed further in this EIR.

Impact Analysis

Impact EN-1: Cause Wasteful, Inefficient, or Unnecessary Consumption of Energy Usage.

CEQA requires mitigation measures to reduce "wasteful, inefficient, and unnecessary" energy usage (PRC 21100(b)(3)). However, no criteria have been established that define wasteful, inefficient, or unnecessary use of energy.

The project would involve the use of gas- and diesel-fueled vehicles and equipment during construction activities and from import/export of materials to and from the project site. Construction activities would occur over an approximately 4-year construction period. See Table 2-1 within Chapter 2, "Project Description," for information regarding construction equipment uses and workers during each stage of construction of the proposed project. The project's use of energy resources during construction would be non-recoverable but temporary and would not include unnecessary, inefficient, or wasteful energy use. Project construction would temporarily increase fuel consumption. However, it is anticipated that fuel would only be used to the extent it is needed to complete construction activities and would not be consumed in a wasteful manner during construction. Additionally, the selected construction contractor(s) would use the best available engineering techniques, construction practices, and equipment operating procedures.

A temporary fuel tank and fueling pad would be set up at the staging area to allow for the onsite refueling of construction vehicles. The fuel tank and fueling pad onsite would significantly reduce the amount of energy used during vehicle transport as it would limit the distance vehicles would need to drive to refuel. Fuel consumption associated with vehicle trips generated by the project would not be considered inefficient, wasteful, or unnecessary, and would be similar to that associated with other, similar rural counties.

The GCB would be constructed in compliance with the California Energy Code standards. The project is estimated to require approximately 28,720 kWh hours per year of electricity during operations. A 201-horsepower propane emergency generator would be tested once per month in accordance with regulatory requirements. A permanent on-site fuel supply tank would be installed underground and would supply 48 hours of generator operation at full load. No additional trips would be generated for operations and maintenance as activities would be coordinated and combined with existing maintenance trips. Energy consumption during operation of the proposed project would be limited to what is needed for the operation of the ARC Spillway and associated facilities. Therefore, the project's energy consumption for construction and operations would not be considered wasteful, inefficient, or unnecessary and this impact would be **less than significant**.

Mitigation Measures: No mitigation is required.

Residual Significant Impacts

The project would result in less-than-significant impacts related to energy. Therefore, the project would not result in residual significant impacts related to energy and would not have any significant and unavoidable impacts related to energy.

3.10 Geology and Soils

This section discusses the existing geological setting of the New Bullards Bar Dam Atmospheric River Control (ARC) Spillway Project (project or proposed project) site and vicinity; applicable regulations; and potential impacts related to geology, soils, and paleontological resources.

3.10.1 Environmental Setting

Geology

The project is located in the Sierra Nevada Geomorphic Province, generally a tilted fault block nearly 400 miles long. Its east face is a high, rugged multiple scarp, contrasting with the gentle western slope that disappears under sediments of the Great Valley Province (i.e., Central Valley). The Sierra Nevada crest forms the eastern limit of the Yuba River watershed. The project site is located within the United States (U.S.) Geological Survey (USGS) Challenge 7.5-minute quadrangle. Geology of the project vicinity is characterized by mafic volcanic deposits of the Smartville Complex adjacent to the granitic/granodioritic deposits of the Yuba Rivers Pluton, formed during the Mesozoic period (Saucedo and Wagner 1992) (**Figure 3.10-1**).

Approximately 225 million years ago, the project area was underlain by an oceanic plate underlying an ancient sea. This plate and overlying sediments moved westward due to the formation of a plate subduction boundary on what was then the western margin of the North American land mass, east of the present-day Sierra Nevada. Metamorphic rocks derived from Paleozoic and Mesozoic terrain were subducted beneath the continent. Resulting magma within the subduction zone eventually rose as both surface volcanic rock and subsurface granitic plutons that form the core of the current Sierra Nevada. At the same time, the magma intruded into the folded sedimentary rocks, resulting in metamorphism, and creation of gold deposits in the fractures (Yuba County Water Agency [YCWA] 2017, Federal Emergency Regulatory Commission [FERC] 2019). Subsequent uplift along the eastern Sierra Nevada resulted in the deeply incised drainages that characterize the area to this day (generally oriented east to west). The incisions occurred 65 million years ago, exposing gold veins created during the Mesozoic Period. Many of the modern channels have elevations below the ancestral (Tertiary period) channels. These gold veins were eroded and deposited throughout the ancestral Yuba River drainage (which ran generally north to south). These “Tertiary River Gravels” are the source for much of the 19th century mining in the region. Volcanism in the Tertiary period deposited lava, mudflows, pyroclastic flows, and ash throughout the Yuba River basin. These igneous deposits filled many pre-existing drainages, such as the ancestral Yuba River, as well as placing a cap of volcanic rock/volcanic debris on the existing granite and remnants of the early Mesozoic sedimentary rocks (FERC 2019).

Project Site Geology

The project site geology was further examined through borings conducted at multiple locations in 2018 and 2019 (GEI Consultants, Inc. [GEI] 2021a). Bedrock at the project site is altered plagioclase schist likely derived from andecite or dacite porphyry (i.e., large crystal) and can be classified as metavolcanic rock. Quartz veins, calcite veins, and healed fractures were common throughout all borings. Exposed bedrock at the site is visibly weathered and fractured; however, the results of borings confirm that unexposed bedrock is considered strong to very strong. Shears (ancient, small-scale faults) were observed locally in outcrop and in the rock core during site investigations. One notable shear crosses the existing discharge channel for the Primary Spillway at a northeast/southwest angle. This zone was unknown during construction of the New Bullards Bar Dam (Dam) and has affected the erosion pattern within the Primary Spillway discharge channel.

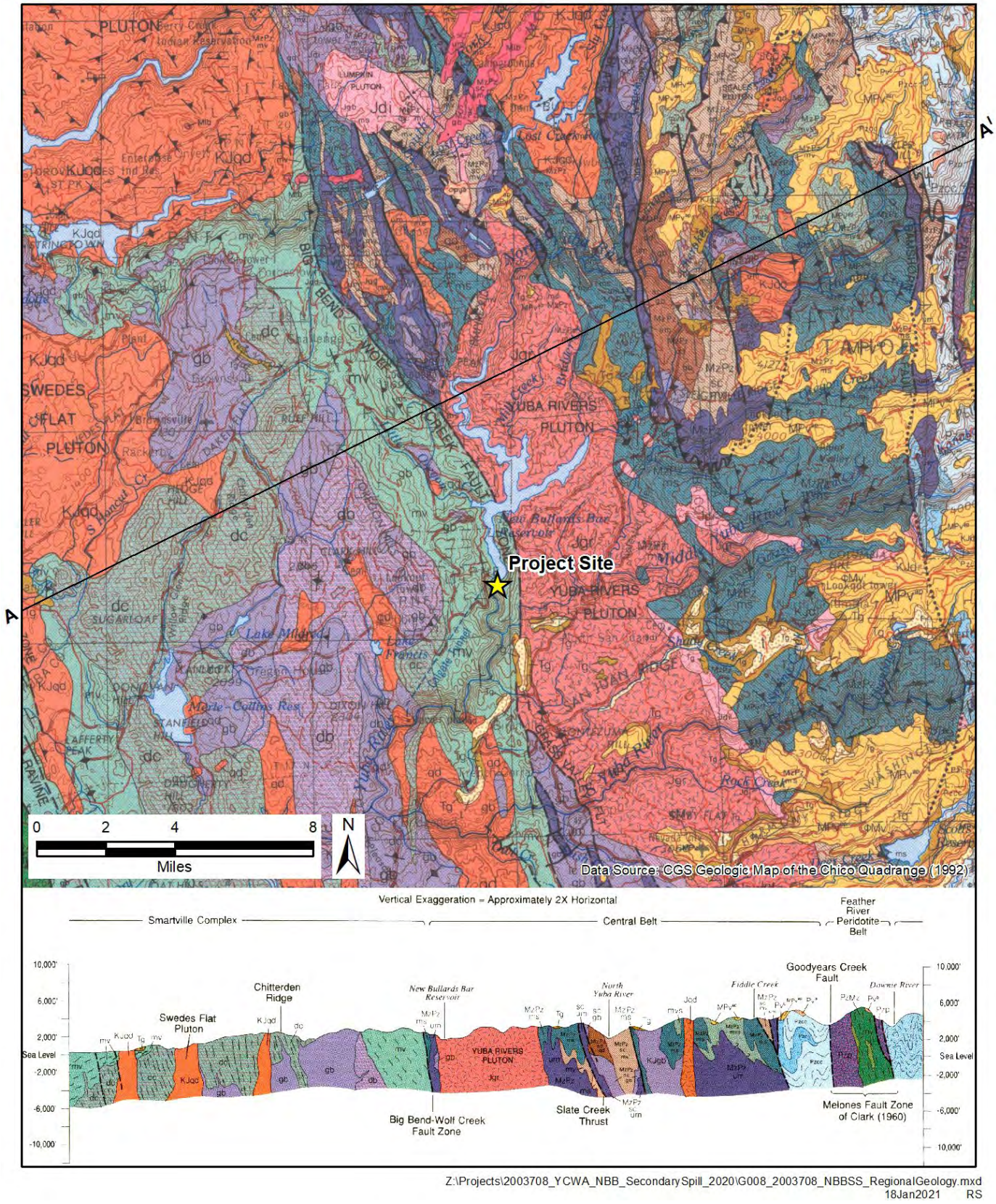
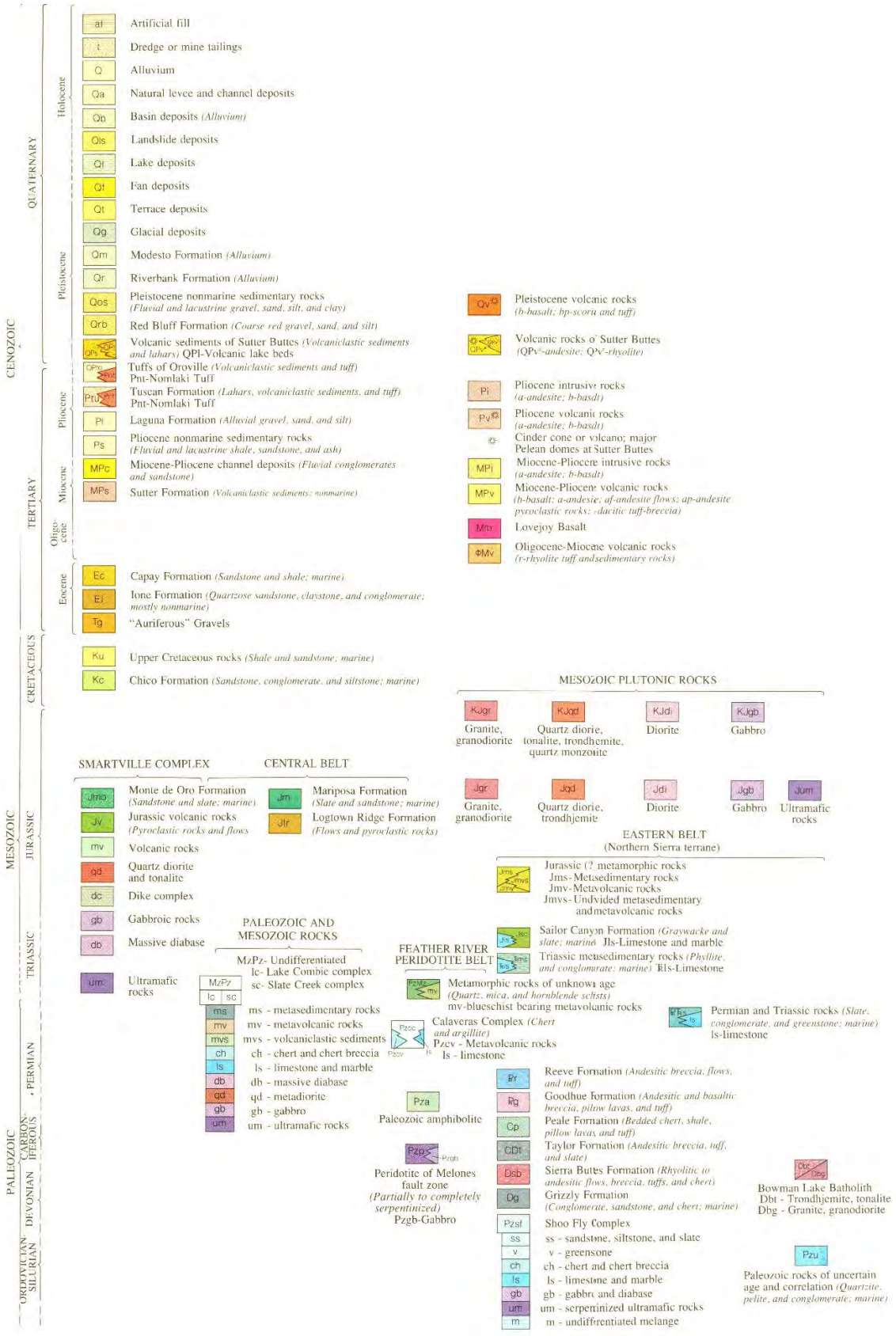


Figure 3.10-1. Regional Geology



Source: Saucedo and Wagner 1992

Figure 3.10-1. Regional Geology (Continued)

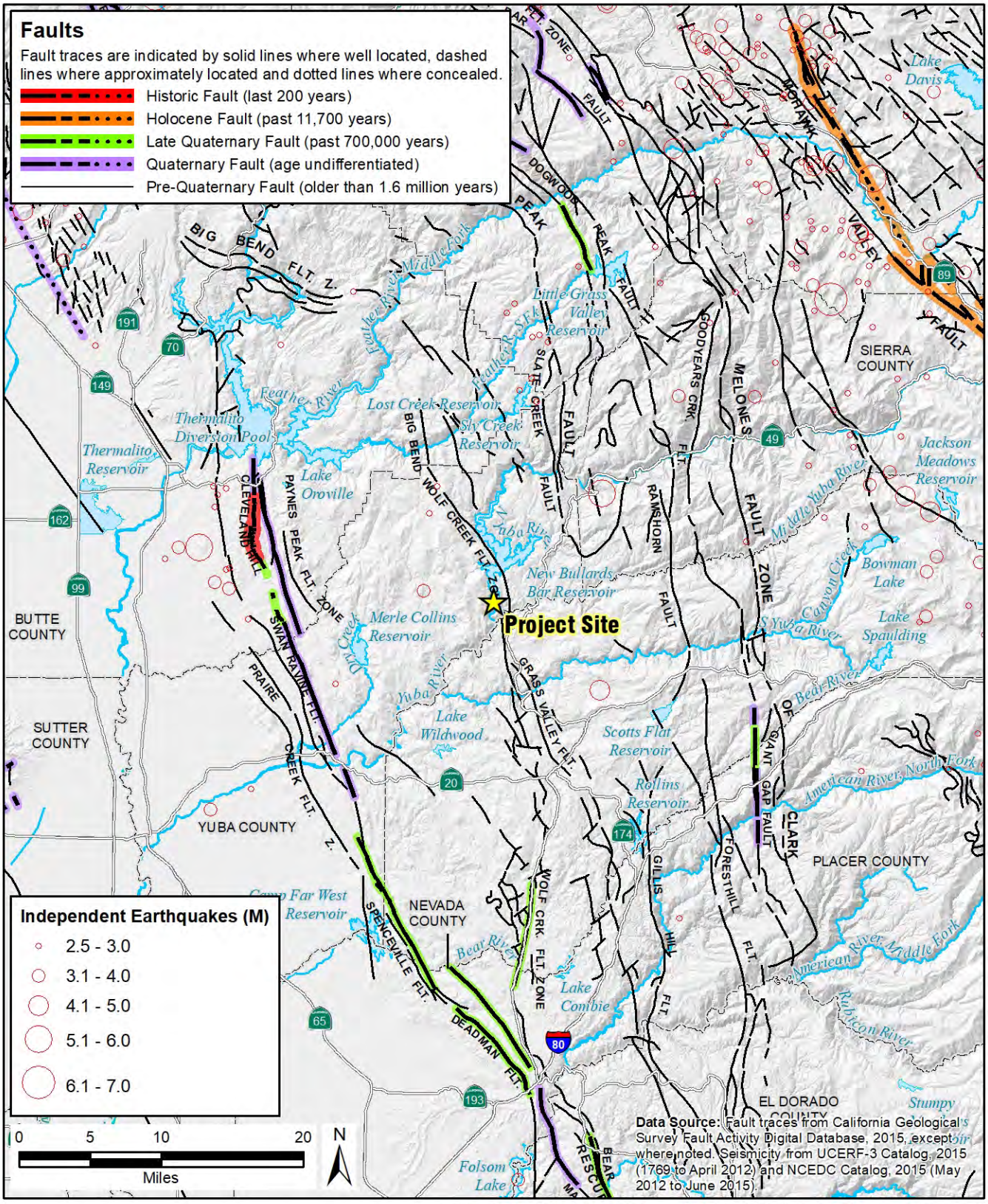
Seismicity

Yuba County is located within an area of California with relatively low seismic activity, where damaging earthquakes are rare. One mile east of the Dam, the New Bullards Bar Reservoir (Reservoir) is transected by the inactive Big Bend Wolf Creek Pre-Quaternary fault zone that trends north-northwest to south-southeast through the Reservoir area. Additional inactive, unnamed pre-Quaternary faults lie to the south and east of this fault along the Foothills Fault System. The nearest known potentially active (Holocene or Historic) faults to the project site are the Cleveland Hills Fault and Little Grass Valley Fault, located 18 and 19 miles from the Dam, respectively. The Mohawk Valley fault zone, about 38 miles northeast of the Dam, has documented evidence of Holocene displacement and is considered active by the California Geological Survey (CGS) (CGS 2020a). The Sanborn Mine (aka Camel Peak) fault is also considered active, due to the lack of consensus regarding its activity (YCWA 2017) (**Figure 3.10-2**).

Seismicity at the project site is well documented. Yuba County Water Agency (YCWA) conducted a detailed review of potential seismic sources in relation to the Dam in 2004 (AMEC Geomatrix 2004). The study involved research of faults and areas of displacement, a review of potential seismic sources and controlling faults, and an estimation of the range of ground motions. Of the identified or inferred lineaments or faults in the region identified during the analysis, the controlling fault is believed to be the Little Grass Valley fault with a Maximum Credible Earthquake magnitude of 6.75 approximately 15 miles from the Dam. In addition, the study analyzed a random minimum earthquake. The “minimum earthquake”[1] recommended by the California Division of Safety of Dams (DSOD) has a magnitude of 6.25. Therefore, YCWA’s report recommended that the “minimum earthquake” of 6.25 should be used for analyses of the main Dam (AMEC Geomatrix 2004). The seismic characteristics at the site were revisited during a 2015 study that confirmed this information regarding seismicity (GEI 2021a). Additionally, during the 2018 and 2019 geotechnical data collection efforts, seismic refraction surveys were performed to evaluate the depth to bedrock (ranging from 5 to 75 feet), the bedrock weathering profile (highly variable), and seismic characteristics to aid in ARC Spillway design (GEI 2021a).

According to the Yuba County Multi-Jurisdictional Local Hazard Mitigation Plan (Yuba County 2021) and the YCWA Dam Safety and Surveillance Program (2014), the Dam is inspected visually three times per week, year-round, for any changed conditions such as increased leakage, cracking, or settlement. DSOD conducts inspections twice a year, usually in June and December when the Reservoir is at its annual high and low levels, respectively. The Federal Energy Regulatory Commission (FERC) conducts annual inspections usually in May. In addition, two seismic sensors are located at each end of the Dam. An earthquake that registers 5.5, within 50 miles of the Dam, triggers YCWA to inspect the Dam (YCWA 2014).

[1] The "minimum earthquake" provides ground motions that represent a random event on an unrecognized seismic source that is not associated with a mapped fault.



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18Jan2021 RS

Source: California Geological Survey 2020a, adapted by GEI Consultants, Inc. 2021

Figure 3.10-2. Regional Faults and Historic Seismicity

Other Geologic Hazards

According to the CGS, the project site is not mapped in a State-designated area (Alquist-Priolo Fault Zone) where strong seismic ground shaking, or associated liquefaction, landslides, or seiche are likely to occur (Branum et. al 2016, CGS 2020b). Localized landslides have occurred near the project site, most recently near the right abutment of the Dam in 2006, and near the Cottage Creek Boat Ramp area in 2013. However, these slides did not result in any sediment deposition into the North Yuba River (YCWA 2017). Additionally, during 2018 and 2019 field reconnaissance in support of Geotechnical Data Report development (GEI 2021a), an old landslide or rockfall scar was observed on the slope approximately 200 feet downstream of the downstream end of the proposed ARC Spillway discharge channel. This feature is defined by several prominent bedrock escarpments 20 feet tall that appear to be part of an older landslide or rockfall that is up to about 200 feet wide (across the slope). Review of light detection and ranging (LiDAR) images also revealed another suspected landslide on the slope between the existing unlined ARC Spillway channel and the landslide/rockfall scar described above. This feature is approximately 100 feet wide and 200 feet long.

Soils

According to the Natural Resources Conservation Service (NRCS) Web Soil Survey seven soil map units are generally present within the project vicinity (**Table 3.10-1**) (NRCS 1998, 2020). These soils exhibit a moderate shrink-swell potential and moderate to severe erosion potential. Expansive or shrink-swell soils contain significant amounts of day minerals that swell when wet and shrink when dry. These clays tend to swell despite the heavy loads imposed by large structures. Damage (such as cracking of foundations) results from differential movement and from the repetition of the shrink-swell cycle. In some cases, this problem may be avoided by removing the topsoil layer before placing a foundation. Although these soils can be a nuisance, awareness of their existence prior to construction often means that the problem can be eliminated through proper design. NRCS soil erosivity is based on slope and soil erodibility factors. Soil loss may occur due to sheet or rill erosion on these soils.

Project Site Soils

During the 2018 and 2019 geotechnical field investigations, project site soils were further examined (GEI 2021a). Thick residual soil overlies fractured and weathered bedrock at the site. Thick artificial fill overlies the residual soil and decomposed rock. This fill material was placed during Dam construction.

The residual soil is derived from in-place bedrock that has completely weathered to soil. It typically consists of very stiff clay and very stiff sandy clay, with variable plasticity and variable amounts of fine to coarse sand and gravel. In some places, the residual soil is dominantly silty. The residual soils encountered in the borings ranged from about 2 to 40 feet thick, before transitioning to the underlying decomposed bedrock

Artificial fill composition is highly variable, ranging from medium dense to very dense clayey sands and medium stiff to very stiff sandy clays, to stiff silty sands, dense sands, and very dense clayey to silty gravels with cobbles and small boulders. Based on borehole and seismic refraction data, the fills range from about 3 to at least 36 feet thick.

Table 3.10-1. Soils within the Project Vicinity

Soil Series Name and Identification Number	Description	Shrink-Swell Potential	Erosion Potential
145, Dumps/landfills	Disposal sites and adjoining areas where soil has been removed or disturbed.	N/A	N/A
190, Mariposa-Jocal complex, 30 to 75 percent slopes, N Low Montane	Mountain soils formed from weathered metasedimentary rock; small areas of rock outcroppings. Soils are shallow to deep and well-drained. Runoff is rapid or very rapid.	Moderate	Severe-Very Severe
191, Mariposa-Rock outcrop complex, 50 to 75 percent slopes	Found along mountain side slopes in the inner gorge of river and stream canyons, formed from weathered metasedimentary rocks; small areas of rock outcroppings. Soils are shallow to moderately deep and well-drained. Runoff is very rapid.	Moderate	Severe
224, Sites gravelly loam, 30 to 50 percent slopes	This very deep, well-drained mountain soil is formed from material weathered from metamorphic rock. Runoff is rapid.	Moderate	Severe
230, Sites-Jocal complex, 2 to 30 percent slopes	This deep to very deep, well-drained mountain soil is formed from material weathered from metamorphic and metasedimentary rock. Runoff is medium.	Moderate	Moderate
231, Sites-Jocal-Mariposa complex, 30 to 50 percent slopes	This shallow to very deep, well-drained mountain soil is formed from material weathered from metamorphic and metasedimentary rock. Runoff is rapid.	Moderate	Severe
254, Water	Comprised of open waters of New Bullards Bar Reservoir or the North Yuba River channel.	N/A	N/A

Notes: N/A = not applicable
Source: Natural Resources Conservation Service 1998, 2020

Paleontological Setting

Paleontological remains may be found in numerous types of rock formations. However, vertebrate fossils are most commonly recovered from sedimentary formations, as well as from a few igneous formations where sedimentary deposits are interbedded (such as the Mehrten Formation). The Mehrten Formation, and similar formations, are contiguous with portions of Yuba County, as described below.

The Tahoe National Forest (TNF) Land Resources Management Plan (LRMP) mentions broadly that soils on the ridgetops within the TNF "developed primarily from andesitic tuff breccia mudflows of the Meherten (sic) Formation." The Mehrten Formation has been correlated with andesitic rock formations in the vicinity of the Yuba River, and andesitic deposits along the eastern Central Valley are now generally termed "Mehrten" (Wagner and Saucedo 1990, Yeend 1974, Anderson et. al 2018).

The Mehrten Formation is a sequence of extrusive volcanic materials deposited in the late Miocene through Pliocene Epochs. The Mehrten is complex and characterized by materials carried in andesitic flows (blocky lava) and lahars (volcanic mudflow) that emanated from near the Sierra Nevada crest and blanketed the northern and central Sierra Nevada (Wakabayashi and Sawyer 2001). These flows swept down the Sierra Nevada slopes (along with living or fossilized vertebrates) and filled low-lying areas and channels. Streams and rivers continuously reworked the mudflow deposits and deposited them as conglomerates farther downstream, which were buried by subsequent mudflows. The elongated configuration of the mudflow deposits is evident on geologic maps and is due to the confining nature of ancient stream channels and river valleys. As these mudflows hardened, they formed resistant caps which protected the underlying softer rocks from erosion. Scattered through the Sierra Nevada, these Mehrten Formation flows now often stand as inversions of topography, presenting as table mountain-type landforms and erosion-resistant rock along ridgelines. Ridgetops which contain the Mehrten are typically very rocky as large angular blocks associated with this unit protrude over the surface

(Anderson et. al 2018). The Mehrten consists of deposits from several units including volcanic conglomerate and ash (tuff) sandstone and siltstone derived from andesitic sources, unconsolidated black sands interbedded with blue-to-brown clay, and hard, very dense tuff breccia that may act as a confining layer between sand layers. Placer gold deposits have also been associated with the Mehrten Formation (GEI 2003).

Although present at higher elevations in the Yuba watershed, as described above, the Mehrten Formation is known in Yuba County primarily as one of the principal groundwater-bearing formations in the lower elevation (valley) portions of the County, where it may be up to 500 feet thick (YCWA 2010, DWR 2006). Past studies have documented surficial exposure of this formation to extend over a few square miles in the eastern central portion of the basin south and east of the Yuba Goldfields. The Mehrten Formation is considered to be equivalent to the Sierra-derived Mio-Pliocene volcaniclastic rocks that outcrop in the Sutter Buttes and have been called the Sutter Formation (Saucedo and Wagner 1992, as cited in YCWA 2008).

3.10.2 Regulatory Setting

Federal Plans, Policies, Regulations, and Laws

Federal Energy Regulatory Commission Engineering Guidance

FERC oversees licensing for hydropower facilities. If a proposed project is licensed, FERC reviews and approves the final designs for project structures before construction begins and monitors the progress of project construction according to *FERC Engineering Guidelines for the Evaluation of Hydropower Projects, Chapter 12 – Water Conveyance* (FERC 2006). After construction is complete, FERC staff conduct periodic dam safety inspections to ensure safe project operation, as well as environmental inspections to ensure that project operators comply with environmental safeguards required by the license. During the term of a license, FERC must approve any proposed changes or amendments to that license. FERC also requires the development of an Emergency Action Plan (EAP) for every applicant for a license, licensee, and exemptee. The EAP is considered Critical Energy Infrastructure Information and is not publicly available.

United States Bureau of Reclamation Design Standards

The U.S. Bureau of Reclamation (USBR) has no official regulatory authority regarding the Dam or ARC Spillway design. However, where FERC or DSOD criteria were not sufficiently detailed to fully establish the design criteria for the project, additional detailed design criteria were used. Reclamation Design Standards establish technical requirements and processes to enable preparation of designs, documents, and reports necessary to manage, develop, and protect water and related resources in an environmentally and economically sound manner in the public interest. The following USBR design standards were referenced in designing the ARC Spillway:

- Design Standards No. 3: Water Conveyance Facilities, Fish Facilities, and Roads and Bridges: Pertains to the design of tunnels, shafts, and caverns (USBR 2014a).
- Design Standards No. 6: Hydraulic and Mechanical Equipment: Informs design of bulkhead gates; stoplogs; heating, ventilation, and air conditioning systems; trash racks; auxiliary mechanical systems; machine shop equipment; and engine-generator sets (USBR 2018).
- Design Standards No. 14: Appurtenant Structures for Dams (Spillway and Outlet Works): Informs hydrologic and general spillway design considerations (USBR 2014b).

- Report DSO-12-02 Thermal Properties of Reinforced Structural Concrete: Addresses thermal properties of reinforced structural concrete and design (USBR 2012).

United States Army Corps of Engineers Design Guidance

The U.S. Army Corps of Engineers (USACE) has no official regulatory authority regarding the Dam or ARC Spillway design. However, where FERC or DSOD criteria were not sufficiently detailed to fully establish the design criteria for the project, additional detailed design criteria were used. USACE engineering publications are very specific and technically detailed, and the design standards are recognized as being consistent with sound engineering practice.

- Engineering Manual (EM) EM 1110-2-1602 Hydraulic Design of Reservoir Outlet Works: Informs air ventilation requirements for the control structure (USACE 1980).
- EM 1110-2-1902 Slope Stability: Informs slope stability analysis methodologies and recommended factors of safety (USACE 2003).
- EM 1110-2-2000 Standard Practice for Concrete for Civil Works Structures: Informs concrete suitability (USACE 1994).
- EM 1110-2-2100 Stability Analysis of Concrete Structures: Informs external stability analysis of the Secondary Spillway structures (USACE 2005).
- EM 1110-2-2104 Strength Design for Reinforced Concrete Hydraulic Structures: Informs strength and serviceability design; loads, load categories, load factors, and load combinations; and performance criteria for the project (USACE 2016a).
- EM 1110-2-2200 Gravity Dam Design: The Secondary Spillway control structure functions as a gravity dam. This manual provides partial guidance on design considerations, material properties, loads, and methods of stress and stability analysis (USACE 1995).
- EM 1110-2-2502 Retaining and Flood Walls: Informs design of approach walls (USACE 1989).
- EM 1110-2-6053 Earthquake Design and Evaluation of Concrete Hydraulic Structures: Informs seismic design of the project (USACE 2007)
- ER 1110-2-1806 Earthquake Design and Evaluation for Civil Works Projects: Informs design earthquake criteria for the project (USACE 2016b).
- Engineering Technical Letter (ETL) 1110-2-584, Design of Hydraulic Steel Structures. Informs steel structural steel design (USACE 2014).

California Building Code Chapter 18, Division 1 Section 1803.2 and 1804.5

The California Building Code (CBC), Chapter 18, Division 1 Section 1803.2 mandates that special foundation design consideration be employed if the Soil Expansion Index is 20 or greater in accordance with information shown in **Table 3.10-2**.

Table 3.10-2. California Building Code Expansive Soils Classification

Expansion Index	Potential Expansion
0-20	Very Low
21-50	Low
51-90	Medium
91-130	High
Above 130	Very High

Source: International Conference of Building Officials 1994 (Table 18-I-B), adapted by GEI Consultants, Inc. 2020

The methodology and scope for a geotechnical investigation are described in CBC Section 1803, and requires an assessment of a variety of factors, such as slope stability, soil strength, adequacy of load-bearing soils, the presence of compressible or expansive soils, and the potential for liquefaction. The required content of the geotechnical report includes recommendations for foundation type and design criteria. These recommendations can include foundation design provisions that are intended to mitigate the effects of expansive soils, liquefaction, and differential settlement. In general, mitigation can be accomplished through a combination of ground-modification techniques (i.e., stone columns, reinforcing nail and anchors, deep soil mixing, etc.), selection of an appropriate foundation type and configuration, and use of appropriate building/foundation structural systems. Section 1804.5 Excavation, Grading, and Fill requires the preparation of a geotechnical report where a building may be constructed on compacted fill, such as the proposed gate control building (GCB).

The International Building Code replaced earlier regional building codes, including the Uniform Building Code, in 2000 and established consistent construction guidelines for the nation. In 2006, the International Building Code was incorporated into the CBC (Cal. Code Regs., Title 24), and currently applies to all structures being constructed in California. The national model codes are therefore incorporated by reference into the building codes of local municipalities. The CBC includes building design and construction criteria that take into consideration the State's seismic conditions.

Office of Surface Mining Reclamation and Enforcement

The Office of Surface Mining Reclamation and Enforcement enforces Federal regulations pertaining to the use of explosives and managing the effect of blasting on nearby structures, specifically 30 Code of Federal Regulations (CFR) 715.19 - Use of Explosives and 30 CFR 816.67 - Use of explosives: Control of adverse effects.

Earthquake Hazards Reduction Act of 1977

The Earthquake Hazards Reduction Act of 1977 established the National Earthquake Hazards Reduction Program "to reduce the risks of life and property from future earthquakes in the U.S. through the establishment and maintenance of an effective earthquake hazards reduction program." The four principal goals of this program are:

- develop effective practices and policies for earthquake loss reduction and accelerate their implementation;
- improve techniques for reducing earthquake vulnerabilities of facilities and systems;
- improve earthquake hazards identification and risk assessment methods, and their use; and
- improve the understanding of earthquakes and their effects.

Many of the tools used to assess, as well as mitigate, earthquake hazards and impacts were developed under this program.

State Plans, Policies, Regulations, and Laws

Alquist-Priolo Earthquake Fault Zoning Act

The Alquist-Priolo Fault Zoning Act, administered by the CGS, provides a mechanism for reducing losses from surface fault ruptures on a Statewide basis. The Act requires the mapping of zones around active faults in California to prohibit the construction of structures for human occupancy on active faults and minimize damage due to rupture of a fault. Active faults are those that have ruptured within the past 11,000 years. Where the Act identifies an Earthquake Fault Zone, a geologic investigation and report is necessary to prevent siting of buildings on active fault traces.

Seismic Hazards Mapping Act

The Seismic Hazards Mapping Act of 1990 (Public Resource Code [PRC] Sections 2690–2699.6) addresses earthquake hazards from nonsurface fault rupture, including liquefaction and seismically induced landslides. The Act established a mapping program for areas that have the potential for liquefaction, landslide, strong ground shaking, or other earthquake and geologic hazards. The Act also specifies that the lead agency for a project may withhold development permits until geologic or soils investigations are conducted for specific sites, and mitigation measures are incorporated into plans to reduce hazards associated with seismicity and unstable soils.

California Building Standards Code

Title 24, Part 2 of the California Building Standards Code contains specific requirements for construction with respect to earthquakes and seismic hazards intended to be protective of public health. Chapter 16, Section 1613, Earthquake Loads of the Code deals with structural design and requires that every structure, and portion thereof, including nonstructural components that are permanently attached to structures and their supports and attachments, shall be designed and constructed to resist the effects of earthquake motions.

California Water Code

Division 3. Dams and Reservoirs - Since 1929, the California Water Code grants broad authority to California Department of Water Resources (DWR's) DSOD, *"under the police power of the tate, shall supervise the construction, enlargement, alteration, repair, maintenance, operation, and removal of dams and reservoirs for the protection of life and property. . ."* for State jurisdictional dams (i.e., dams not wholly under the control of the Federal government). This authority extends to all aspects of dam and reservoir planning, construction, and operation, including the issuance of permits for the repair or alteration of dams and reservoirs and compliance with necessary mapping of inundation areas, in case of dam failure. Additionally, Part 1, Chapter 3 of the California Water Code includes provisions for appointment of a board of consultants to independently review plans, specifications, and reports for changes to a dam/reservoir and report their findings to the Director.

Dam owners must receive DSOD approval prior to the construction of new dams, or the enlargement, repair, alteration, or removal of existing dams. DSOD also has statutory authority to require that dams be constructed, maintained, and operated in a safe manner.

Regional/Local Plans, Policies, Regulations, and Ordinances

Yuba County 2030 General Plan

The following goals and policies from the Yuba County 2030 General Plan are relevant to the proposed project for geology, soils, and paleontological resources (Yuba County 2011a).

GOAL HS 8: **Geology and Soils.** Reduce risk to people and property from geologic hazards and soil limitations.

- **Policy HS 8.1.** Development projects shall implement applicable State and local building code requirements, including structural and seismic safety measures, in order to reduce risks associated with seismic events and unstable or expansive soils.
- **Policy HS 8.2.** New developments that could be adversely affected by geological and/or soil conditions shall include project features that minimize these risks.

GOAL NR 6: Identify, protect, and preserve Yuba County's important prehistoric and historic resources.

- **Policy NR 6.2.** If potential paleontological or prehistoric resources are detected during construction, work shall stop and consultation is required to avoid further impacts.
- **Policy NR6.3:** If potential paleontological or prehistoric resources are detected during construction, work shall stop and consultation is required to avoid further impacts.
- **ACTION NR 6.2: Paleontological Resources.** If potential paleontological resources are detected during construction, work shall stop and consultation is required to avoid further impacts. Actions after work stoppage will be designed to avoid significant impacts to the greatest extent feasible. These measures could include construction worker education, consultation with a qualified paleontologist, coordination with experts on resource recovery and curation of specimens, and other measures.

Yuba County Multi-Jurisdictional Local Hazard Mitigation Plan

The Yuba County Multi-Jurisdictional Local Hazard Mitigation Plan is designed to guide hazard mitigation planning to better protect the people and property of the County and participating jurisdictions including the City of Marysville, Wheatland, and YCWA from the effects of natural disasters and hazard events. The plan identifies goals, objectives, and measures for hazard mitigation and risk reduction for natural hazards including disasters such as earthquakes, flooding, and failure of critical infrastructure, including dams (Yuba County 2021).

Other Regulations and Guidance

Professional Paleontological Standards

The Society of Vertebrate Paleontology (2010), a national scientific organization of professional vertebrate paleontologists, has established standard guidelines that outline acceptable professional practices in the conduct of paleontological resource assessments and surveys; monitoring and mitigation; data and fossil recovery; sampling procedures; and specimen preparation, analysis, and curation. Most practicing professional paleontologists in the nation adhere to the Society of Vertebrate Paleontology assessment, mitigation, and monitoring requirements, as specifically spelled out in its standard guidelines.

International Society of Explosives Engineers

The International Society of Explosives Engineers publishes the Blaster's Handbook, which includes best practices regarding explosive types; methods and techniques; applications; equipment and calculations; and vibration control, regulatory compliance, and insurance.

Various Professional Standards

Due to the size and complexity of project design and specifications, numerous other professional standards will be adhered to or consulted during project design and construction:

- ACI American Concrete Institute
- AISC American Institute of Steel Construction
- ANSI American National Standards Institute
- ASCE American Society of Civil Engineers
- ASHRAE American Society of Heating, Refrigeration, and Air Conditioning Engineers
- ASME American Society of Mechanical Engineers
- ASTM ASTM International
- AWS American Welding Society
- AWWA American Water Works Association
- ICC International Code Council
- IEEE International Electrical and Electronics Engineers
- NEMA National Electrical Manufacturers Association
- NFPA National Fire Protection Association
- SSPC Steel Structures Painting Council
- UL Underwriters Laboratory

3.10.3 Environmental Impacts and Mitigation Measures

Thresholds of Significance

The thresholds for determining the significance of impacts for this analysis are based on the environmental checklist in Appendix G of the State CEQA Guidelines. Implementing the project would result in a significant impact related to geology, soils, and paleontological resources if it would:

- directly or indirectly cause potential substantial adverse effects, including the risk of loss, injury, or death involving rupture of a known earthquake fault, strong seismic ground shaking, seismic-related ground failure (including liquefaction), or landslides;
- be located on a geologic unit or soil that is unstable, or that would become unstable as a result of the project, and potentially result in on- or off-site landslide, lateral spreading, subsidence, liquefaction, or collapse;
- be located on expansive soil, creating substantial direct or indirect risks to life or property;
- have soils incapable of adequately supporting the use of septic tanks or alternative wastewater disposal systems where sewers are not available for the disposal of wastewater; or
- directly or indirectly destroy a unique paleontological resource or site or unique geologic feature.

In addition, because of the project's association with an existing dam, implementing the project would result in a significant impact on geology and soils if it would:

- result in vibrations that may affect the integrity of a dam or nearby structures.

This section, in addition to evaluating effects to geology, soils, and paleontological resources, evaluates adverse effects from blasting related to geologic conditions. Transport of explosives for blasting during construction is addressed in Chapter 3.11, "Hazards and Hazardous Materials." Exposure of sensitive receptors to noise and vibrations generated from blasting is addressed in Chapter 3.13, "Noise." Impacts related to soil erosion or the loss of topsoil from construction and operations and to geomorphology from operation of the ARC Spillway are addressed in Chapter 3.1, "Hydrology and Water Quality."

Analysis Methodology

The evaluation of potential impacts to geology, soils, and paleontological resources relied on a review of published geological and paleontological literature and maps and NRCS soil survey data for Yuba County.

In its standard guidelines for assessment and mitigation of adverse impacts on paleontological resources, the Society of Vertebrate Paleontology (2010) established three categories of sensitivity for paleontological resources: high, low, and undetermined. Areas where fossils have been previously found are considered to have a high sensitivity and a high potential to produce fossils. Areas that are not sedimentary in origin and that have not been known to produce fossils in the past typically are considered to have low sensitivity. Areas that have not had previous paleontological resource surveys or fossil finds are considered to be of undetermined sensitivity until surveys and mapping are performed to determine their sensitivity. All vertebrate fossils are generally categorized as being of potentially significant scientific value.

Evaluation of potential project effects to seismic and soils hazards also relied upon documentation compiled by YCWA during the ongoing FERC relicensing process for the Yuba River Development Project, geologic and geotechnical investigations for the project conducted between October 2018 and November 2019 (GEI 2021a), technical studies prepared for designing the ARC Spillway, and professional judgment of technical experts supporting project design.

Public Comments

Comments submitted in response to the Notice of Preparation were reviewed for relevance to the analysis of environmental consequences and development of mitigation measures. There were no comments submitted regarding geology, soil, and paleontological resource impacts.

Issues Not Discussed Further in this EIR

Surface Fault Rupture

The project site is not located within an Alquist-Priolo Earthquake Fault Zone and there are no known active faults within or adjacent to the project site. Therefore, the project would have no effect on surface fault ruptures or increase risk of loss, injury, or death from surface fault ruptures, and this issue is not evaluated further in this EIR.

Soil Suitability for Septic Systems

The project would include a wastewater disposal system at the GCB that would be contained in an onsite tank and periodically pumped and transported to an approved disposal facility offsite. Therefore, there would be no impact related to the ability of project site soils to support septic systems and this issue is not evaluated further in this EIR.

Impact Analysis

Impact GEO-1: Adverse Effects from Seismic Groundshaking or Soil Hazards.

Yuba County is located within an area of California with relatively low seismic activity and damaging earthquakes in the area are rare. The project site is shown as an area of low earthquake hazard on the CGS map of earthquake-shaking potential for California (Branum et al. 2016). However, the project site is characterized by steep slopes between Marysville Road and the North Yuba River, in-Reservoir construction areas, near the disposal pile, and along the USFS Road 0008-010 haul route. Additionally, NRCS (2020) classifies soils on the project site as moderately expansive. Therefore, project construction could be subject to hazards when construction occurs on steep slopes. Construction on unstable or expansive soils may occur along Marysville Road and at the GCB and operations platform, where facilities may be constructed on areas not excavated to bedrock, necessitating construction on compacted fill.

Project facilities would be designed using results of detailed geotechnical engineering studies conducted to address the unique construction needs of the project site, as required under the CBC (Section 1804.5) and Yuba County General Plan (Action HS 8.1) guidance. Placement of material at the soil and rock disposal area would occur in a way that the final side slopes would be approximately 2H:1V with a flat surface formed at the top. Additionally, since the project involves construction associated with a dam, multiple Federal and State agencies provide design guidance and/or oversight during project development and construction to ensure design and implementation occur to required engineering standards to protect public safety, including approval by DSOD and FERC and technical design guidance from USBR, and USACE, as discussed below in this section.

The Dam is a DSOD jurisdictional dam (CA Dam ID 1034-000) and is classified as an "extreme consequence" of failure dam according to DSOD's Consequence Hazard Matrix (which classifies dams by the slip rate on controlling faults and consequence of failure by the dam's total class weight). This classification informs the ground motions design parameters and fault displacement that must be accounted for in facility design (Fraser 2002 as cited in GEI 2021b). As part of project design, YCWA would obtain a DWR DSOD Repair or Alteration of Dams and Reservoirs Permit, which involves a review and approval of the project design and specifications. YCWA has also retained a Board of Consultants to independently review plans, specifications, and reports for changes to a dam/reservoir and report their findings to DSOD, in compliance with DSOD's authority under the California Water Code.

Design Considerations

Seismic

The seismic design criteria for the project, at a minimum, would follow the guidelines established in USACE Engineer Manuals (EM) 1110-2-6053 – Earthquake Design and Evaluation of Concrete Hydraulic Structures for strength and serviceability criteria and EM 1110-2-2100 – Stability Analysis of Concrete Structures for stability criteria. Reinforced concrete hydraulic structures would be designed for both an operating basis earthquake and a maximum design earthquake event, to satisfy serviceability and strength requirements, respectively. Although the approach walls are considered normal structures while other components are considered critical, all project components would be conservatively designed as critical structures under seismic loads. The control structure and gates would be designed with performance goals of maintaining operations up to the operating basis earthquake and controlling damage up to the maximum design earthquake, with no uncontrolled release of the Reservoir. Any building structures required for maintenance equipment storage or similar purposes would be designed in accordance with the earthquake load and seismic design provisions of the CBC.

Structural

For the purpose of establishing safety factors or safety provisions for use in stability analyses, USACE EM 1110-2-2100 requires that civil works structures are to be designated as either "critical" or "normal." EM 1110-2-2100 states that "structures designated as critical are those structures on high hazard projects whose failure would result in loss of life. Loss of life can result directly, due to flooding, or indirectly from secondary effects. Loss of life potential should consider the population at risk, the downstream flood wave depth and velocity, and the probability of fatality of individuals within the affected population." **Table 3.10-3** lists the structure classifications for project facilities.

Table 3.10-3. Project Structure Classification

Structure	Classification	Justification
Control Structure	Critical	Failure under load would directly result in uncontrolled release of the reservoir.
Spillway Chute	Critical	Failure during spillway operation could result in headcutting, which could undermine the control structure resulting in uncontrolled release of the reservoir.

Source: GEI Consultants, Inc. 2021b

Concrete

Concrete used for the project would be designed for conditions beyond structural loading requirements. In general, mass concrete would be placed for the lower approach walls and slabs, the control structure slab and lower walls, and the control structure slab. Conventional structural concrete would be used for the upper portions of the approach walls, control structure, control structure, and concrete treatments on the discharge channel. High strength abrasion-resistant concrete would be placed as a topping layer on the control structure slab and end sill. All mass concrete placements would, at a minimum, include provisions for surface reinforcement to reduce surface shrinkage and temperature cracking.

Impact Conclusion

After construction is complete, inspections and monitoring, particularly for seismic concerns, would continue as specified in the Yuba County Multi-Jurisdictional Local Hazard Mitigation Plan and the YCWA Dam Safety and Surveillance Program, described earlier in this section. The project is being designed and based on site-specific geotechnical information in conformance with the requirements of multiple regulating agencies, standard engineering practices, and under the purview of a DSOD Repair or Alteration of Dams and Reservoirs Permit. Design considerations include meeting or exceeding standards related to soil stability, seismic-related ground shaking, and subsidence. Therefore, the project would result in a **less-than-significant** impact related to seismic and soil hazards.

Mitigation Measures: No mitigation is required.

Impact GEO-2: Adverse Effects from Blasting Vibrations during Construction.

Removing large areas of bedrock to achieve the necessary finished grade of some project facilities would necessitate blasting hard rock. Blasting would not be used for excavating the discharge channel. Blasting may occur for excavation of the control structure, spillway chute, permanent relocation of Marysville Road, and portions of the approach channel. Blasting would be limited primarily to rocky terrain (i.e., areas underlain by un-weathered volcanic bedrock or other hard, massive, or un-fractured geologic formations) where traditional excavation and earth-moving equipment are not adequate to meet project specifications. According to the CGS, the project site is not mapped as an area where liquefaction is likely to occur. However, vibrations from blasting would move through soils and rock formations at the project site to the adjacent Dam, Primary Spillway, and related facilitates, and potentially presents risk of adverse effects to these structures, especially those constructed of concrete. Therefore, this would be a **potentially significant** impact.

Mitigation Measures: The following mitigation measure has been identified to address this impact.

Mitigation Measure GEO-1: Prepare and Implement Blasting Plan.

A qualified, experienced, and licensed blasting contractor will perform blasting using current and professionally accepted methods, products, and procedures to maximize safety during blasting operations. YCWA will prepare and require the contractor to comply with and implement a project-specific blasting plan, which includes the following:

- Blasting would follow industry standard best practices, which are generally accepted by DSOD.
- The plan would be submitted to DSOD for approval prior to mobilizing materials and equipment for blasting.
- Where blasting operations are to continue during concrete operations, guidelines for peak particle velocities, measured in inches per second, will be related to time intervals after placing concrete/shotcrete/grout curtains shown in **Table 3.10-4**.
- Vibration limits at the Dam and Existing Spillway shall not exceed 2 inches per second and should be considered when designing a blast. Vibrations will be monitored at the Dam and appurtenant facilities if/as required by DSOD.
- The blast will be designed to prevent/minimize production of flyrock and air blast hazards to the extent feasible.
- Blasting will be in accordance with safety measures identified in the International Society of Explosives Engineers "Blaster's Handbook," including requirements for: transportation, storage, and handling of explosives, chemicals, and other blasting supplies and materials; worker and public safety when handling explosives and chemicals; fire safety; and blasting noise.

Table 3.10-4. Vibration Levels for Green Concrete, Shotcrete, and Grout Curtains

Time After Placement	Allowable Peak Particle Velocity (inches per second)
0-4 Hours	2 x DF
4-24 Hours	3 x DF
1-3 Days	5 x DF
4-7 Days	7 x DF
8-10 Days	9 x DF
Over 10 Days	10 x DF
Distance (feet)	**Distance Factor**
0 to 50	1.0
50 to 100	0.8
100 to 250	0.7
Over 250	0.6

Source: United Facilities Guide Specifications 2021, adapted by Integrated Engineering & Construction. 2021.

- Blasting will be limited to daytime hours only, between 10 a.m. and 7 p.m., in accordance with the Yuba County General Plan.

- Blasting will be designed to minimize vibrations (blasting is not expected to occur near occupied structures and monitoring of blast vibration and air blast at sensitive receptors is not recommended). If any complaints attributed to blasting are received from residents or other sensitive receptors, YCWA will consider blast vibration and air blast monitoring to determine the actual levels experienced, and limits for blastvibration and air blast will be established, as necessary to minimize annoyance to the affected residents or other sensitive receptors, and to ensure that nearby structures are not damaged.

Timing: Prior to and during construction.

Responsibility: YCWA and its contractor(s).

Implementing Mitigation Measure GEO-1 would reduce impacts related to vibrations from blasting during construction because a blasting plan would be prepared and implemented by a qualified contractor. Therefore, impacts from the project would be reduced to **less than significant with mitigation**.

Impact GEO-3: Potential Destruction of Unique Paleontological Resources.

The site is underlain by altered igneous rock and igneous rock formations generally are not paleontologically sensitive, except the Mehrten Formation, described in the "Paleontological Setting" section above, which is known to contain vertebrate fossils and is considered paleontologically sensitive. The TNF LRMP mentions broadly that soils on the ridgetops within the TNF "developed primarily from andesitic tuff breccia mudflows of the Meherten (sic) Formation." However, the TNF covers a very small portion of the project site. Additionally, although the Mehrten Formation is considered paleontologically sensitive and present in the broader geomorphic region, the underlying geology at the project site is metavolcanic (altered plagioclase schist likely derived from andecite or dacite porphyry) and a review of geologic maps of the area confines material associated with the Mehrten Formation (such as Miocene-Pliocene volcanic rock [pyroclastics and tuff-breccias]) to linear ridgeline features far to the east and south of the project site (Saucedo 1992). There are no recorded vertebrate fossil sites within Yuba County (Yuba County 2011b). Additionally, a search of the University of California Museum of Paleontology specimen library resulted in only three recorded non-vertebrate fossils (plant and invertebrate) (UCMP 2020). None of documented plant/invertebrate fossils are located near the project site. Therefore, impacts from the project to unique paleontological resources would be **less than significant**.

Mitigation Measures: No mitigation is required.

Impact GEO-4: Potential Destruction of Unique Geologic Features.

A unique geologic feature consists of a major natural element that stands out in the landscape such as a large and scenic river, gorge, waterfall, volcanic cinder cone, lava field, or glacier. The North Yuba River could be considered a unique geologic feature but has no official designation. Additionally, the river channel and surrounding canyon are already altered due to the presence and operations of the Dam and Primary Spillway. The river channel adjacent to the ARC Spillway would potentially be temporarily disturbed during construction of the proposed project if a cofferdam or bypass system is needed during excavation of the discharge channel. However, the cofferdam or bypass channel would be removed after construction is complete.

During operation of the project, some long-term erosion may occur on the west (opposite) canyon wall from the ARC Spillway due to mist resulting from spillway flows. Additionally, coarse sediment that has been deposited within the channel slightly downstream of the Primary Spillway, from past operations, may be reworked and transported slightly downstream, during ARC Spillway flows. However, these potential changes would be consistent with changes that have already occurred, and are ongoing, due to Primary Spillway operations (see the discussion for Impacts HYD-3 and HYD-4, in Chapter 3.1, "Hydrology and Water Quality," for further context).

The ARC Spillway discharge channel design would be consistent with the Primary Spillway channel but smaller in width. As discussed in Chapter 3.1, "Hydrology and Water Quality," operation of the ARC Spillway may result in some erosion of the discharge channel, plunge pool[2], and the North Yuba River channel and hillside on the opposite bank after prolonged use of the ARC Spillway (over a long period of time), similar to erosion that has occurred over time from operation of the Primary Spillway. Therefore, operational effects to the river channel and canyon from project-related activities would not result in substantial permanent damage to or destruction of any unique qualities of the North Yuba River beyond its currently altered state, and this impact would be **less than significant**.

Mitigation Measures: No mitigation is required.

Residual Significant Impacts

The project would result in potential significant impacts related to geology and soils due to the effects of blasting vibrations during construction, but a mitigation measure would be implemented to reduce potential impacts to a less-than-significant level. Therefore, the project would not result in residual significant impacts related to geology and soils, and, with imposition of the mitigation measure identified above, the project would not have any significant and unavoidable impacts related to geology and soils.

[2] Immediately below the Primary Spillway discharge channel perpendicularly intersects the North Yuba River channel, and a large, deep plunge pool has formed where the channel is eroded to bedrock.

3.11 Hazards and Hazardous Materials

This section provides an overview of the existing hazards (other than potential floods or wildfires) and hazardous materials conditions within the New Bullards Bar Dam Atmospheric River Control (ARC) Spillway Project (project or proposed project) vicinity, identifies the regulatory framework, and analyzes the potential hazards and hazardous materials impacts that would result from implementation of the proposed project. Hazards associated with floods (the mitigation of which is the purpose of the project) are addressed in Chapter 3.1, "Hydrology and Water Quality", and hazards associated with wildfires are addressed in Chapter 3.18, "Wildfire."

3.11.1 Environmental Setting

Known Hazardous Materials Sites

A database search was conducted of all data sources in the Cortese List (enumerated in Public Resources Code (PRC) Section 65962.5). These sources include the GeoTracker database, a groundwater information management system that is maintained by State Water Resources Control Board (SWRCB); the Hazardous Waste and Substances Site List (i.e., the EnviroStor database), maintained by the California Department of Toxic Substances Control (DTSC); and the United States Environmental Protection Agency (EPA) Superfund Site database (DTSC 2020a,b; SWRCB 2020a,b; CalEPA 2019, 2020). There is one site identified within 0.25 mile of the project site, the Bullards Bar Center, which is located 0.10 mile north of the project site and was previously identified as a Leaking Underground Gasoline Storage Tank. Remediation of the site, as directed by the Central Valley Regional Water Quality Control Board (RWQCB), was completed in August 1996 (SWRCB 2020a).

The project site is not located in an area identified by the California Department of Conservation (DOC) as more likely to contain asbestos (DOC 2000).

School Facilities

The project site is located within the boundaries of the Camptonville Union School District, which services the Camptonville Elementary and sponsors the Camptonville Academy (Yuba County 2011a). However, there are no schools located within 0.25 mile of the project site. The nearest school facility to the project site is the Oak Tree Elementary School, which is located approximately 3 miles southeast of the project site. Camptonville Elementary is located approximately 6 miles northeast of the project site.

Airports and Airstrips

There are no airports located within 2 miles of the project site. The nearest airport is the privately owned Milhous Ranch Airport, which is located approximately 5.5 miles southeast of the project site. The Milhous Ranch Airport does not have a Comprehensive Land Use Plan.

The Brownsville Aero Pine Airport is located approximately 9 miles northeast of the project site. The project site is not within a Safety Zone associated with the Brownsville Aero Pine airport (Sacramento Area Council of Governments [SACOG] 1992).

3.11.2 Regulatory Setting

Federal Plans, Policies, Regulations, and Laws

Resources Conservation and Recovery Act

The Resources Conservation and Recovery Act (RCRA) set up the Federal regulatory program for hazardous substances and gives EPA the authority to regulate the generation, transport, treatment, and disposal of hazardous substances in a "cradle to grave" system. Under the RCRA, EPA regulates the generation, transportation, treatment, storage, and disposal of hazardous substances. This regulatory system includes tracking all generators of hazardous waste.

United States Department of Transportation Regulations on Hazardous Materials

The United States Department of Transportation governs the transport of chemicals and hazardous materials under Code of Federal Regulations Title 49, which stipulates the types of containers, labeling, and other restrictions that must be used to move such material on interstate highways.

Federal Energy Regulatory Commission

Emergency Action Plan

The Emergency Acton Plan (EAP) was prepared by Yuba County Water Agency (YCWA) and is implemented under the Yuba River Development Project (YRDP) Federal Energy Regulatory Commission (FERC) license. The EAP is intended to minimize the threat to public safety and minimize the response time to an impending or actual sudden release of water from YRDP dams. The EAP can also be used to provide notification when flood releases will create major flooding. The EAP includes emergency detection, evaluation, and classification in the event of an emergency at the New Bullards Bar Dam (Dam), as well as outlines the YCWA preparedness for such an emergency. The EAP outlines step-by-step actions to take in the event of numerous different emergencies. The EAP identifies Marysville Road as providing primary access to the Dam from Dobbins and secondary access from Highway 49/Camptonville. (YCWA 2006.)

State Plans, Policies, Regulations, and Laws

Worker Safety Requirements

The California Occupational Safety and Health Administration (Cal/OSHA) is primarily responsible for developing and enforcing workplace safety regulations in the State. Cal/OSHA regulations pertaining to the use of hazardous materials in the workplace (California Code of Regulations (CCR) Title 8) require employers to provide safety training and safety equipment, conduct accident and illness prevention programs, warn against hazardous-substance exposure, and prepare emergency action and fire prevention plans.

Cal/OSHA also enforces hazard-communication program regulations that contain training and information requirements. Companies must establish procedures to identify and label hazardous substances, communicate information about hazardous substances and their handling, and prepare health and safety plans to protect workers and employees at hazardous-waste sites. Employers must make material safety data sheets available to employees and document employee information and training programs.

California Environmental Protection Agency

The California Environmental Protection Agency (CalEPA) is responsible for creating and enforcing environmental regulations within California. Within CAL EPA is housed the DTSC, which was formed under the Hazardous Waste Control Act. DTSC is responsible for regulating hazardous waste, remediating existing contamination, and identifying ways to reduce production of hazardous wastes. DTSC can delegate enforcement responsibilities to local jurisdictions.

Hazardous Waste Control Act of 1972

The Hazardous Waste Control Act (California Health and Safety Code, Section 25100 et seq.) creates the framework for managing hazardous wastes in California. It requires that a Statewide hazardous waste program be developed to administer and implement the provisions of the Federal RCRA. The Hazardous Waste Control Act also designates California-only hazardous wastes and includes standards (regulations) that are equal to or, in some cases, more stringent than Federal requirements. The act lists allowable exemptions and requirements for recycled materials and for other materials, such as launderable rags.

DTSC administers and implements the provisions of the Hazardous Waste Control Act at the State level, pursuant to EPA's authorization. Certified unified program agencies, which are typically local agencies, implement some provisions of the act locally.

DTSC requires preparation of written programs and response plans, such as hazardous materials business plans. DTSC's programs also include aftermath cleanup caused by improper management of hazardous waste; evaluation of samples taken from sites; enforcement of regulations regarding use, storage, and disposal of hazardous materials; and encouragement of pollution prevention.

Cortese List Government Code Section 65962

Government Code Section 65962 was enacted in 1985 and was amended in 1992. It is used as a planning document to comply with the California Environmental Quality Act (CEQA) and requires information about locations of hazardous materials release sites. It states that through the combined efforts of the DTSC, the Department of Health Service, SWRCB, and local enforcement agencies a list of potentially hazardous areas and sites will be compiled and remain up to date (at a minimum annually updated). The list is consolidated by the Secretary for Environmental Protection and is distributed to each city and county which sites on the list are located. The list can be found on DTSC's data management system known as EnviroStor, which includes information from SWRCB's GeoTracker database.

California Emergency Services Act

The California Emergency Services Act provides the basic authority for conducting emergency operations following a proclamation of emergency by the governor and/or appropriate local authorities. Local government and district emergency plans are considered to be extensions of the California Emergency Plan, established in accordance with the Emergency Services Act.

The California Emergency Management Agency (Cal EMA) is the State agency responsible for establishing emergency response and spill notification plans related to hazardous materials accidents. CAL EMA regulates businesses by requiring specific businesses to prepare an inventory of hazardous materials (CCR Title 19). CAL EMA is also the lead State agency for emergency management and is responsible for coordinating the State-level response to emergencies and disasters.

Regional/Local Plans, Policies, Regulations, and Ordinances

Yuba County 2030 General Plan

The following goals and policies from the Yuba County 2030 General Plan Public Health and Safety Element are relevant to the proposed project (Yuba County 2011b).

GOAL HS 7: **Hazards and Hazardous Materials.** Protect the community from the harmful effects of hazards and hazardous materials.

- **Policy HS 7.1.** The County will assess risks associated with public investments and other County-initiated actions, and new private developments shall access and mitigate hazardous materials risks and ensure safe handling, storage, and movement in compliance with local, State, and Federal safety standards.

GOAL HS 9: **Emergency Preparedness and Response.** Minimize the loss of life and damage to property from natural and human-caused hazards by ensuring adequate emergency routes and response.

- **Policy HS 9.1**. The County will review development projects, plans, and public investment decisions to ensure consistency with the Multi-Hazard Mitigation Plan.
- **Policy HS 9.3**. The County will coordinate with the California Department of Transportation (Caltrans) to maintain Highways 20, 70, 49, and 65 in the lower half of the County and the County will maintain Marysville Road, Frenchtown Road, and La Porte-Quincy Road in the upper half of the County as primary emergency access and evacuation routes and improve other roads, as necessary, such as Plumas Arboga Road, to create additional evacuation routes.

Yuba County Emergency Operations Plan

The purpose of the County of Yuba Emergency Operations Plan (EOP) is to address the County's planned response to emergencies associated with natural, man-made, and technological disasters. The EOP provides an overview of operational concepts and identifies components of the County's emergency management organization within the Standardized Emergency Management System and the National Incident Management System). Additionally, it further describes the overall responsibilities of the local, State, and Federal entities for protecting life and property and assuring the overall well-being of the population. (Yuba County 2015a.)

Yuba County Multi-Jurisdictional Multi-Hazard Mitigation Plan

The purpose of the Yuba County Multi-Jurisdictional Multi-Hazard Mitigation Plan (MHMP) is to guide and assist Yuba County implement effective hazard mitigation strategies, projects, and measures to protect lives and reduce damage to property and the environment. The MHMP provides a forum for information sharing and coordination of resources to identify a strategy to prevent losses and damage from disasters in Yuba County. The Disaster Mitigation Act of 2000 requires hazard mitigation planning in the Stafford Disaster Relief and Emergency Assistance Act. Local governments and entities are required to develop and submit hazard mitigation plans to be eligible to apply for Federal hazard mitigation disaster assistance funding. (Yuba County 2021).

3.11.3 Environmental Impacts and Mitigation Measures

Thresholds of Significance

The significance criteria used to evaluate the project impacts to hazards are based on Appendix G of the State CEQA Guidelines. A significant impact related to hazards or hazardous materials would occur if the project would:

- create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials;
- create a significant hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment, including hazards associated with existing contaminated soils, asbestos, or existing contaminated groundwater during dewatering activities;
- emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within one-quarter mile of an existing or proposed school;
- be located on a site which is included on a list of hazardous materials sites compiled pursuant to Government Code Section 65962.5 and, as a result, would it create a significant hazard to the public or the environment;
- for a project located within an airport land use plan or, where such a plan has not been adopted, within 2 miles of a public airport or public use airport, would the project result in a safety hazard or excessive noise for people residing or working in the project area; or
- impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan.

Analysis Methodology

Potential impacts on the environment related to hazards and hazardous materials were evaluated based on the type and location of anticipated project-related construction and Operation and Maintenance (O&M) activities. The analysis was based on review of publicly available information and databases related to existing land uses, schools, wildfire hazard zones, and known soil and/or groundwater contamination sites within and near the project site.

Public Comments

Comments submitted in response to the Notice of Preparation were reviewed for relevance to the analysis of environmental consequences and development of mitigation measures. There were no comments submitted regarding hazards and hazardous materials.

Issues Not Discussed Further in this EIR

Accidental Release of Hazardous Materials Associated with Asbestos

No structures would be demolished as a part of the project and the project is not located in an area of known naturally occurring asbestos (DOC 2000). Therefore, there would be no potential for exposure to asbestos-containing materials as a result of project construction. No impact would occur from the project and this issue is not discussed further in this Environmental Impact Report (EIR).

Emit Hazardous Emissions or Handle Hazardous Materials or Waste Within One-Quarter Mile of an Existing or Proposed School

The project is not located within one-quarter mile of a school. Therefore, there would be no potential for emitting or handling hazardous materials or waste near a school. No impact would occur from the project and this issue is not discussed further in this EIR.

Conflict with An Airport Land Use Plan or Location Within Two Miles of An Airport Resulting in Excessive Noise

The project is not located within an airport land use planning area and is not located within 2 miles of an airport. Therefore, there would be no conflicts with an airport land use plan or generation of excessive noise. No impact would occur and this issue is not discussed further in this EIR.

Be Located on a Site Which is included on a List of Hazardous Materials Sites Compiled Pursuant to Government Code Section 65962.5

The project is not located on an active site included on the Cortese list compiled pursuant to Government code Section 65962.5. Therefore, no impact would occur from the project and this issue is not discussed further in this EIR.

Impact Analysis

Impact HAZ-1: Create a Significant Hazard to the Public or the Environment Through the Routine Transport, Use, or Disposal of Hazardous Materials.

Equipment such as haul trucks, excavators, bulldozers, and scrapers would be used to construct the project components. See Section 2.2.5, "Construction Personnel, Equipment, and Hauling," for a full list of construction equipment. Construction equipment would use minor amounts of hazardous materials, such as fuels (gasoline and diesel), oils and lubricants, and cleaners (which could include solvents and corrosives in addition to soaps and detergents) that are commonly used in construction projects.

A temporary fuel tank and fuel pad would be set up at the staging area for on-site refueling of equipment and work trucks. A permanent on-site fuel supply tank would be installed underground at the operations pad and would be used as a backup fuel source for the emergency power source. Additionally, the transport and use of approximately 225 tons of the acutely hazardous material ammonium nitrate/fuel oil during construction would be necessary for blasting activities. YCWA will follow the rules and regulations regarding worker safety around hazardous and toxic substances outline by Cal/OSHA. During operation, the project would require wastewater at the gate control building to be periodically pumped out and disposed offsite at an approved facility.

Regulations governing hazardous materials transport are included in CCR Title 22, the California Vehicle Code (CCR Title 13), and the State Fire Marshal Regulations (CCR Title 19). Transport of hazardous materials can only be conducted under a registration issued by the DTSC or CalEPA for tracking of hazardous waste transporters and for treatment, storage, and disposal facilities that handle hazardous materials. The identification number is used to identify the hazardous waste handler and to track waste from point of origin to final disposal; all material transport takes place under manifest. Businesses that handle hazardous materials are required by law to comply with Federal, State, and local laws, regulations, and policies regarding the handling, storage, reporting, tracking, and cleanup (if any accidental spills occur) of hazardous materials, including preparing a hazardous materials business plan and disclosing hazardous materials inventories. Construction contractors would be required to use,

store, and transport hazardous materials in compliance with Federal, State, and local regulations during project construction. Additionally, if an unforeseen emergency were to occur that could affect the Dam, YCWA would follow the steps outlined in the EAP, including notifying all necessary personnel included in the notification charts. Furthermore, the project would not entail the use or storage of large quantities of hazardous or flammable materials during operations. Use of ammonium nitrate/fuel oil for blasting activities and the potential for accidental spill of hazardous materials during project construction is considered a **potentially significant** impact.

Mitigation Measures: The following mitigation measure has been identified to address this impact.

Mitigation Measure HAZ-1: Implement a Spill Prevention Control and Countermeasures Plan and Other BMPs for Storage, Use, and Transport of Hazardous Materials during Construction Activities.

YCWA will implement a Spill Prevention Control and Countermeasures Plan (SPCCP) and other best management practices (BMPs) in the *Hazardous Materials Management Plan* (FERC 2019) to the extent feasible.

- **Prepare and Implement a Spill Prevention Control and Countermeasures Plan.** YCWA will prepare a SPCCP or require its contractor prepare a SPCCP and the contractor will implement the SPCCP. The SPCCP and all material necessary for its implementation will be accessible onsite prior to initiation of project construction and throughout the construction period. The SPCCP will include a plan for the emergency cleanup of any spills of fuel or other material. Employees/construction workers will be provided the necessary information from the SPCCP to prevent or reduce the discharge of pollutants from construction activities to waters and to use the appropriate measures should a spill occur. YCWA will direct the contractor to immediately stop work in the area in the event of a hazardous materials spill onto the land or in waters and YCWA will notify appropriate Federal, State, and local agencies as may be required by law for the type, quantity, and location of the particular spill. In addition, YCWA will require its contractor to implement the following additional BMPs as part of the SPCCP for the project:
    - Designate a supervisor to oversee and enforce proper spill prevention measures.
    - Provide spill response and prevention education for employees and subcontractors.
    - Stock appropriate clean-up materials onsite near material storage, unloading, and use areas.
    - Designate hazardous waste storage areas away from storm drains or watercourses.
    - Minimize production or generation of hazardous materials onsite or substitute materials used onsite with less hazardous materials.
- **Dispose All Construction-related Debris and Materials at an Approved Disposal Site.** All debris, litter, unused materials, sediment, rubbish, vegetation, or other material removed from the construction areas that cannot reasonably be secured will be removed daily from the project work area and deposited at an appropriate disposal or storage site.

- **Use Safer Alternative Products to Protect Waters.** Every reasonable precaution will be exercised to protect waters from pollution with fuels, oils, and other harmful materials. Safer alternative products (such as biodegradable hydraulic fluids) will be used, where feasible.

- **Prevent Any Contaminated Construction By-products from Entering Flowing Waters; Collect and Transport Such By-products to an Authorized Disposal Area.** Petroleum products, chemicals, fresh cement, and construction by-products containing, or water contaminated by, **any** such materials will not be allowed to enter the Reservoir or river and will be collected and transported to an authorized upland disposal area or off-site for disposal at a facility accepting these materials.

- **Prevent Hazardous Petroleum or Other Substances Hazardous to Aquatic Life from Contaminating the Soil or Entering Waters.** Gas, oil, other petroleum products, or any other substances that could be hazardous to aquatic life and resulting from project-related activities, will be prevented from contaminating the soil and/or entering waters.

- **Properly Maintain All Construction Vehicles and Equipment and Inspect Daily for Leaks; Remove and Repair Equipment/Vehicles with Leaks.** Construction vehicles and equipment will be properly maintained to prevent contamination of soil or water from external grease and oil or from leaking hydraulic fluid, fuel, oil, and grease. Vehicles and equipment will be checked daily for leaks. If leaks are found, the equipment will be removed from the site and will not be used until the leaks are repaired.

- **Refuel and Service Equipment at Designated Refueling and Staging Areas.** Equipment will be refueled and serviced at designated refueling and staging sites. All refueling, maintenance, and staging of equipment and vehicles will be conducted in a location where a spill will not drain directly toward aquatic habitat. Appropriate containment materials will be installed to collect any discharge, and adequate materials for spill cleanup shall be maintained onsite throughout the construction period.

- **Store Heavy Equipment, Vehicles, and Supplies at Designated Staging Areas.** All heavy equipment, vehicles, and supplies will be stored at the designated staging areas at the end of each work period.

- **Install an Impermeable Membrane between the Ground and Any Hazardous Material in Construction Storage Areas.** Storage areas for construction material that contains hazardous or potentially toxic materials will have an impermeable membrane between the ground and the hazardous material and will be bermed as necessary to prevent the discharge of pollutants to groundwater and runoff water.

- **Use Only Nontoxic Materials and Materials with No Coatings or Treatments Deleterious to Aquatic Organisms for Placement in Any Waters.** All materials placed in streams, rivers, or other waters will be nontoxic and will not contain coatings or treatments or consist of substances deleterious to aquatic organisms that may leach into the surrounding environment in amounts harmful to aquatic organisms.

Timing: During construction activities.

Responsibility: YCWA and its construction contractor(s).

Implementation of Mitigation Measure HAZ-1 would reduce potentially significant construction-related impacts from accidental spills of hazardous materials during construction activities by requiring preparation and implementation of an SPCCP along with other BMPs for storage, use, and transport of hazardous materials specifically designed to prevent contamination of the environment. Therefore, the project would have a **less than significant with mitigation.**

Impact HAZ-2: Potential to Create a Significant Hazard to the Public or the Environment Through Reasonably Foreseeable Upset and Accident Conditions Involving the Release of Hazardous Materials into the Environment.

Construction activities would occur over a large area along the ridge and haul route above the North Yuba River and within the New Bullards Bar Reservoir (Reservoir). The hazardous material ammonium nitrate/fuel oil would be used for blasting activities. Fuel leaks, or any other hazardous materials spill from construction equipment or activities, could potentially lead to the release of hazardous material into the environment. If hazardous materials were released into the environment, the Reservoir and North Yuba River could quickly transport these materials throughout the water basin. Use of ammonium nitrate/fuel oil for blasting activities and the potential for accidental spill of hazardous materials during project construction is considered a **potentially significant** impact.

Mitigation Measures: The following mitigation measure has been identified to address this impact.

Mitigation Measure HAZ-1: Implement a Spill Prevention Control and Countermeasures Plan and Other BMPs for Storage, Use, and Transport of Hazardous Materials During Construction Activities.

Please refer to Impact HAZ-1 above for the full text of this mitigation measure.

Implementation of Mitigation Measure HAZ-1 would reduce potentially significant construction-related impacts from accidental spills of hazardous materials during construction activities by requiring preparation and implementation of an SPCCP along with other BMPs for storage, use, and transport of hazardous materials specifically designed to prevent contamination of the environment. Therefore, the project would have a **less than significant with mitigation.**

Impact HAZ-3: Impair Implementation of an Emergency Response Plan or Evacuation Plan.

Yuba County has developed an EOP that addresses the County's planned response to emergencies associated with natural, man-made, and technological disasters. Additionally, Yuba County has developed the MHMP to guide and assist Yuba County in the implementation of effective hazard mitigation strategies, projects, and measures to protect lives and reduce damage to property and the environment.

Policy HS9.4 and Action HS9.1 in the Public Health and Safety Element of the Yuba County 2030 General Plan provide requirements for emergency access and evacuation routes throughout the County. The General Plan identifies Marysville Road as an evacuation route. The measures identified in the Yuba County General Plan include coordination and collaboration with the MHMP. Implementing the general plan policies and action, combined with other relevant State and local regulations, would minimize the potential for effects from potential hazards. If an emergency were to occur at the project site, YCWA would comply with the Yuba County EOP and MHMP. In addition, in the EAP required under the FERC license for the YRDP, Marysville Road is identified as primary access from Dobbins and secondary access from Camptonville to the Dam for emergency purposes.

As discussed in detail in Impact TR-2 in Chapter 3.16 "Transportation," the use of a two-lane detour with a one-way flagging operation stationed upstream and downstream of the construction area for up to 60 days and temporary closures for crossing of construction equipment and blasting (up to twice a day for 15 minutes for 200 days of construction) would have the potential to temporarily impede emergency vehicles trying to travel along Marysville Road in either direction to access areas on the opposite side of the Dam. Temporarily impeding access to emergency vehicles along Marysville Road at the Dam would affect response times for emergency response providers during the project's construction phase and would potentially conflict with Yuba County General Plan policies and the EAP. Therefore, this impact would be **potentially significant**.

Mitigation Measures: The following mitigation measure has been identified to address this impact.

> **Mitigation Measure TR-1: Implement a Traffic Safety Plan and Coordinate with Local Emergency Service Providers.**
>
> Please refer to Impact TR-2 in Chapter 3.16, "Transportation," for the full text of this mitigation measure.

Implementation of Mitigation Measure TR-1 would reduce the impact related to inadequate emergency access along Marysville Road to the extent possible by requiring a traffic plan including coordination with emergency service providers and halting construction activities and temporary road closures during an emergency. With this plan, it is anticipated temporary delays to emergency access through the project site could be avoided or would have minimal effects on response times and potential conflicts with Yuba County General Plan policies and the EAP. Therefore, this impact would be **less than significant with mitigation**.

Residual Significant Impacts

The project would result in potential significant impacts related to hazardous materials, but several mitigation measures would be implemented to reduce potential hazardous materials impacts to a less-than-significant level. Therefore, the project would not result in residual significant impacts related to hazardous materials, and, with imposition of the mitigation measures identified above, the project would not have any significant and unavoidable impacts related to hazardous materials.

3.12 Land Use and Planning

This section addresses existing land uses on and adjacent to the New Bullards Bar Dam Atmospheric River Control (ARC) Spillway Project (project or proposed project) site, with the regulatory setting describing the local and regional planning framework providing land use and planning guidance over the project site. The impact analysis identifies how implementing the project could change those conditions or cause changes that could trigger adverse effects on land use and planning.

3.12.1 Environmental Setting

The project site is located approximately 2.5 miles northwest of SR 49, in unincorporated Yuba County (Figure 1-1). The ARC Spillway would be constructed within and adjacent to the New Bullards Bar Reservoir (Reservoir). The Reservoir has a direct tributary catchment of 485 square miles and controls water flows in the North Yuba River and some flow from the Middle Yuba River and Oregon Creek by diversion tunnels. Land use surrounding the project site includes Yuba County Water Agency (YCWA)-owned land, private-, and United States Forest Service (USFS)-owned land consisting primarily of forested lands and residences farther away from the project site (Figure 2-7). The project is within the Tahoe National Forest (TNF) and Plumas National Forest (PNF), which are heavily used for recreational purposes. The PNF is located on the west of the North Yuba River, where the staging area at the Emerald Cove Marina is located. The project site would not be located on forestland in the PNF.

Regional Land Use

Yuba County 2030 General Plan Land Use Designation and Zoning

The project site is designated as Natural Resources under the existing Yuba County 2030 General Plan and is zoned as Resource Preservation and Recreation District under Yuba County Ordinance No.1556 (Yuba County 2011a, 2016). The purpose of the Resource Preservation and Recreation District is to preserve land containing natural or potential parkland for passive recreational activities and nonstructural uses; identify lake recreation areas and provide for use of these areas for active public recreation purposes; preserve lands whose natural resources are of significant long range social, economic, and environmental importance; and preserve open space and identify high-quality plant areas, critical wildlife habitat, and critical watershed lands in Yuba County. The Yuba County 2030 General Plan identifies a variety of allowable uses within lands designated as Natural Resources: mining; agriculture; natural open space and nature preserves; public facilities and infrastructure, including levees, levee borrow areas, and related facilities; and mitigation banks, parks and recreational uses, and other natural resource-oriented uses.

Tahoe National Forest

The TNF is located in the north central Sierra Nevada range, between Reno, Nevada and Sacramento, California (USFS 2020). Within the project area, the TNF is located east of the North Yuba River and includes the project site, except for the staging area at Emerald Cove Marina. The TNF consists of 794,374 acres of forestland and is managed for a variety of uses in keeping with the USFS mission statement, "Caring for the Land and Serving People." Historically, timber harvest has been a major economic force within the communities within and surrounding the TNF; however, tourism and outdoor recreation has replaced timber harvest activities as the dominant economic force in the area.

Plumas National Forest

The portions of the project site within the PNF boundaries would be part of the temporary haul route along Marysville Road and the staging area located at the Marina parking lot, which are both existing features on developed lands. The project would not be located on any land designated as forestland within the PNF.

Project Site Land Use

The ARC Spillway would be constructed at the left abutment of the New Bullards Bard Dam (Dam), approximately 280 feet south of the existing Primary Spillway. A large parking area servicing the Emerald Cove Marina sits uphill from the Marina adjacent to a staging area for the project. Portions of the project site are currently forestland, as discussed in Chapter 3.8, "Agriculture and Forestry Resources." Recreational uses are present in the vicinity of the project site, as discussed in Chapter 3.15, "Recreation." The nearest residence is located approximately 0.5 mile north of the project site along Marysville Road. See Chapter 3.7, "Aesthetics," for representative photographs of the project site and land uses.

3.12.2 Regulatory Setting

Federal Plans, Policies, Regulations, and Laws

Since only developed portions of the project site are in the PNF, the PNF Land and Resource Management Plan is not discussed.

Tahoe National Forest Land and Resource Management Plan

The purpose of the TNF Land and Resource Management Plan (LRMP) is to direct the management of the TNF and to ensure the wise use and protection of TNF resources; fulfill legislative requirements; and address local, regional, and national issues (USFS 1990). See Chapter 3.8, "Agriculture and Forestry Resources," for a full description of the TNF LRMP. The following management direction pertaining to land use is applicable to the proposed project (USFS 1990).

Management Direction: Lands

1. Consider TNF lands as available for intermingled and adjacent landowners' use only if appropriate and compatible with National Forest purposes.

2. Manage National Forest System lands in Urban/Rural/Wildland interface situations with a commitment to work with private landowners and other agency neighbors to resolve possible conflicts while continuing to provide a wide range of multiple use goods and services.

3. Emphasize coordination with other major landowners to use opportunities for mutual investments and programs to enhance protection or outputs from adjacent lands.

4. Coordinate with local government agencies to protect and enhance TNF resources.

Federal Energy Regulatory Commissions License

The proposed project is within the Federal Energy Regulatory Commission (FERC) boundary for the Yuba River Development Project (YRDP). In 2014, YCWA filed an application for a new/extended license with FERC and included the ARC Spillway. See "FERC License" in Section 2.7, "Regulatory Requirements, Permits, and Approval," for further discussion regarding the project and the FERC License for the YRDP.

State Plans, Policies, Regulations, and Laws

Government Code Section 53091(e) provides that County zoning ordinances do not apply to the location or construction of the project facilities. Except for the California Environmental Quality Act (CEQA), no other State plans, policies, regulations, or laws related to land use and planning are relevant to the analysis of land use and planning impacts for the project.

Regional/Local Plans, Policies, Regulations, and Ordinances

Yuba County 2030 General Plan

The following goal and policies in the Yuba County 2030 General Plan Health and Safety Element (Yuba County 2011a) apply to the project:

GOAL HS1: Reduce flood risk for the County's people and property.

- **Policy HS1.10.** New developments shall provide drainage improvements according to County standards.
- **Policy HS1.11.** Natural waterways should be protected from unnecessary alterations whenever flood protection structures or other forms of construction are proposed.

3.12.3 Environmental Impacts and Mitigation Measures

Thresholds of Significance

The significance criteria used to evaluate the project impacts to land use are based on Appendix G of the State CEQA Guidelines. A significant impact related to land use issues would occur if the project would:

- physically divide an established community; or
- cause a significant environmental impact due to a conflict with any land use plan, policy, or regulation adopted for the purpose of avoiding or mitigating an environmental effect.

Analysis Methodology

Evaluating potential project impacts on land use was based on a review of planning documents pertaining to the project area, particularly the Yuba County 2030 General Plan (Yuba County 2011a), Final Yuba County 2030 General Plan Environmental Impact Report (Yuba County 2011b), Yuba County Development Code (Yuba County 2015), and Yuba County Zoning Map (Yuba County 2016).

This section includes an analysis of potential short-term (construction) and long-term (operation and maintenance) impacts of the project on land use. Regarding consistency with land use plans and policies, the analysis compares the project to policies of relevant land use plans and policies adopted for the purpose of avoiding or mitigating an environmental effect. Impacts are assessed based on changes to the existing conditions described earlier in this section.

Public Comments

Comments submitted in response to the Notice of Preparation were reviewed for relevance to the analysis of environmental consequences and development of mitigation measures. There were no comments submitted regarding land use and planning.

Issues Not Discussed Further in this EIR

Divide an Established Community

The project is located within close proximately to the existing Dam, outside of any designated communities and project implementation would not alter existing means of access to those areas. Therefore, existing land use conditions would remain unchanged and the project would not have the potential to physically divide an established community. Therefore, there would be no impact from the project and this issue is not discussed further in this Environmental Impact Report (EIR).

Impact Analysis

Impact LUP-1: Consistency with Applicable Land use Designation and Zoning and Land Use Plans.

The Yuba County 2030 General Plan provides comprehensive guidance for growth and development in the unincorporated areas of Yuba County. The proposed project would be consistent with goals, objectives, and policies contained in the Plan that address flood risk reduction for the county's residents and property (i.e., Public Health and Safety Goal HS1). An evaluation of the project's consistency with land use and zoning designations is presented below. However, it should be noted that any inconsistency of the project with land use and zoning code designations is an issue related to land use regulation rather than a physical impact of the project on the environment. Where the project could conflict with a land use plan or policy that was adopted specifically for the purposes of preventing or reducing an adverse environmental effect, such potential conflicts are evaluated as stand-alone environmental impacts within each topic area of this EIR.

The project site is zoned as Resource Preservation and Recreation. The ARC Spillway and related facilities would be constructed in the Reservoir and on the steep slope to the west. Due to the steepness of this slope, this land would not able to be used for recreational or timber harvest purposes. The soil and rock disposal area is bare ground with patches of Ponderosa woodland scattered throughout. An access easement for a private landowner to the south would be relocated around the soil and rock disposal area. In the Yuba County Development Code, it states that Major Utilities (i.e., the ARC Spillway and related facilities) are allowable in areas zoned Resource Preservation and Recreation with a conditional use permit. But, because it is a local government agency, YCWA is not required to obtain a conditional use permit for the proposed project. (Govt. Code § 53091(e).)

The existing Overlook Site, managed by USFS, would be relocated to facilitate ARC Spillway construction. The Overlook Site is considered passive recreation and is an allowable land use within the Resource Preservation and Recreation zoning designation. The new Overlook Site would be relocated north of the current Marysville Road and would be used for the same purpose as the current Overlook Site. The proposed project would require temporary and permanently relocating a segment of Marysville Road. Marysville Road is within the Yuba County right-of-way and, therefore, YCWA would obtain an encroachment permit from Yuba County for the temporary and permanent relocation of Marysville Road.

Portions of the USFS Road 0008-010 that would be used for temporary construction access and hauling is located on USFS land. It is anticipated that a USFS Special Use Permit would be required for improvements of the portion of the road on USFS land. Improvements along the temporary access route would not require a land use change as the land would not be maintained following construction activities and would be able to reestablish to forestland. The project would comply with all maintenance direction outlined in the TNF LRMP. The project would not interfere with any land use within the PNF.

The ARC Spillway would provide long-term benefits to valuable natural resources, including forestland, by providing increased protection from future flood damages and would not have a long-term detrimental effect on the management or use of surrounding natural resources or recreation. The project would not change the overall rural character of lands in the vicinity of the project site or result in land use inconsistencies with local and regional plans. Therefore, this impact would be **less than significant**.

Mitigation Measures: No mitigation is required.

Residual Significant Impacts

The project would result in less-than-significant impacts to land use and planning; therefore, the project would have no residual, significant and unavoidable impacts related to land use.

3.13 Noise

This section provides an overview of the existing noise conditions within the New Bullards Bar Dam Atmospheric River Control (ARC) Spillway Project (project or proposed project) vicinity, identifies the regulatory framework for noise, and analyzes potential noise impacts from proposed project implementation.

3.13.1 Environmental Setting

Sound is the mechanical energy of a vibrating object transmitted by pressure waves through a liquid or gaseous medium, such as air. Noise is defined as sound that is unwanted (loud, unexpected, or annoying). Excessive exposure to noise can result in adverse physical and psychological responses (e.g., hearing loss and other health effects, anger, and frustration); interfere with sleep, speech, and concentration; or diminish the quality of life.

Sound levels usually are measured and expressed in decibels (dB), with 0 dB being the lowest threshold of hearing. Decibel levels range from 0 to 140: 50 dB for light traffic is considered a low decibel level, whereas 120 dB for a jet takeoff at 200 feet is considered a high decibel level. Groundborne vibration is energy transmitted in waves through the ground. Vibration attenuates at a rate of approximately 50 percent for each doubling of distance from the source.

Noise Descriptors

The perceived loudness of sounds depends on many factors, including sound pressure level and frequency content. However, within the usual range of environmental sound levels, perception of loudness is relatively predictable, and can be approximated through frequency filtering using the standardized A-weighting network. There is a strong correlation between A-weighted sound levels (decibels expressed as dBA) and community response to noise. For this reason, the A-weighted sound level has become the standard descriptor for environmental noise assessment. All noise levels reported in this section are in terms of A-weighting. Community noise is commonly described in terms of "ambient" or all-encompassing noise level in a given environment. The noise descriptors most often used to describe the environmental noise are defined below.

- **L_{max} (*Maximum* Noise *Level*):** The maximum instantaneous noise level during specific a specific period of time. The L_{max} may also be referred to as the peak noise level.
- **L_{eq} (*Equivalent Noise Level*):** The average noise level. The instantaneous noise levels during a specific period of time in dBA are converted to relative energy values. From the sum of the relative energy values, an average energy value is calculated, which is then converted back to dBA to determine the $L_{eq.}$ In noise environments determined by major noise events, such as aircraft overflights, the L_{eq} value is heavily influenced by the magnitude and number of single events that produce the high noise levels.
- **L_{dn} (*Day-Night Average Noise Level*):** The 24-hour L_{eq} with a 10-dBA "penalty" for noise events that occur during the noise-sensitive hours between 10 p.m. and 7 a.m. In other words, 10 dBA is "added" to noise events that occur in the nighttime hours, and this generates a higher reported noise level when determining compliance with noise standards. The L_{dn} attempts to account for the fact that noise during this specific period of time is a potential source of disturbance with respect to normal sleeping hours.

- **Community Noise Equivalent Level (*CNEL*)** – The energy-average of the A-weighted sound levels occurring over a 24-hour period, with penalties of 10 dB and 5 dB, respectively, applied to A-weighted sound levels occurring during the nighttime hours (10 p.m. to 7 a.m.) and the evening hours (7 p.m. to 10 p.m.). The CNEL is similar to L_{dn}—it is usually within 1 dB of the L_{dn}—and for all intents and purposes, the two measurements are interchangeable. Because it is easier to compute and of more common use, the L_{dn} is used as the long-term noise measurement in this evaluation.[1]

Groundborne Vibration

Vibration is an oscillatory motion that can be described in terms of displacement, velocity, or acceleration. Vibration is typically described by its peak and root-mean-square amplitudes. The root-mean-square value can be considered an average value over a given time interval. The peak vibration velocity is the same as the "peak particle velocity" (PPV), generally presented in units of inches per second. PPV is the maximum instantaneous positive or negative peak of the vibration signal and is generally used to assess the potential for damage to buildings and structures. The root-mean-square amplitude is typically used to assess human annoyance caused by vibration.

Noise Generation

The primary existing noise sources near the project site include vehicular traffic, and low amounts of noise from adjacent residential and recreational activities including boating. The primary existing vibration sources at the project site include periodic heavy truck traffic along Marysville Road. The vicinity of the project area is mostly rural and not frequently subject to high noise or vibration levels.

Noise Receptors

Land uses defined by Federal, State, and local regulations as noise-sensitive vary slightly but typically include schools, hospitals, rest homes, places of worship, long-term care facilities, mental care facilities, residences, convalescent (nursing) homes, hotels, certain parks, and other similar land uses. The Caltrans Technical Noise Supplement (Caltrans 2013) defines a noise receiver or receptor as "any natural or artificial sensor that can perceive, register, or be affected by sound, such as a human ear, or a microphone." The nearest noise-sensitive receptors are residences located approximately 0.6-mile northeast of the ARC Spillway and 0.1 mile north of USFS Road 0008-010.

Noise generated by project activities would also be heard by employees and recreationalists at the New Bullards Bar Marina (Marina), which is located approximately 0.3 mile west of the project site and 0.1 mile from the Marysville Road haul route. Employees and recreationalist at the Marina are typically moving around and are regularly exposed to noise at and around the Reservoir. Recreationalist would be at the Marina infrequently or intermittently. However, employees and recreationalists could still be susceptible to excess noise given their close vicinity to the project site.

[1] L_{dn} and CNEL values rarely differ by more than 1 dB. L_{dn} and CNEL values are considered equivalent as a matter of practice, and this assessment treats them as such.

3.13.2 Regulatory Setting

Federal Plans, Policies, Regulations, and Laws

United States Environmental Protection Agency

The United States Environmental Protection Agency (EPA), Office of Noise Abatement and Control was established to coordinate Federal noise control activities. The Office of Noise Abatement and Control established guidelines in response to the Federal Noise Control Act of 1972 to identify and address the effects of noise on public health and welfare, and the environment. **Table 3.13-1** summarizes EPA's recommended guidelines for noise levels considered safe for community exposure (EPA 1974). The yearly average L_{eq} for a person seeking to avoid hearing loss over his or her lifetime should not exceed 70 dB. To minimize interference and annoyance, noise levels should not exceed 55 dB L_{dn} in outdoor activity areas and 45 dB L_{dn} in residential structures.

Table 3.13-1. Summary of United States Environmental Protection Agency Recommended Noise Level Standards

Effect	Sound Level	Area
Hearing loss	$L_{eq()} \leq 70$ dB	All areas
Interference with and annoyance during outdoor activities	$L_{dn} \leq 55$ dB	Outdoor areas of residences and farms, and other areas where people spend widely varying amounts of time or where quiet is a basis for use
Interference with and annoyance during outdoor activities	$L_{eq(24)} \leq 55$ dB	Outdoor areas where people spend limited amounts of time, such as school yards and playgrounds
Interference with and annoyance during indoor activities	$L_{dn} \leq 45$ dB	Indoor residential areas
Interference with and annoyance during indoor activities	$L_{eq(24)} \leq 45$ dB	Other indoor areas with human activities, such as schools

Notes: dB = decibels; Ldn = day-night average level; Leq(24) = equivalent noise level (the sound energy averaged over a 24-hour period)
Source: United States Environmental Protection Agency 1974:3

Groundborne Vibration

The Federal Transit Administration (FTA) (FTA 2006) has developed guidelines for assessing the significance of vibration produced by transportation sources and construction activity. To address human response (annoyance) to groundborne vibration, FTA has established maximum-acceptable vibration thresholds for different land uses. These guidelines recommend 72 vibration dB for residential uses and buildings where people normally sleep when the source of vibrations is frequent in nature (FTA 2006).

FTA guidelines also provide criteria for groundborne vibration effects with respect to building damage during construction activities (FTA 2006). According to FTA guidelines, a vibration-damage criterion of 0.50 in/sec PPV should be considered for reinforced-concrete, steel, or timber—materials present at the project and existing New Bullards Bar Dam (Dam), Primary Spillway, and associated facilities.

State Plans, Policies, Regulations, and Laws

Other than the California Environmental Quality Act (CEQA), no State plans, policies, regulations, or laws related to noise are relevant to the analysis of impacts for the project.

Regional/Local Plans, Policies, Regulations, and Ordinances

Yuba County Ordinance Code

Chapter 8.20 of the Yuba County Ordinance Code contains the following noise regulations within County limits.

Section 8.20.140 – Ambient Base Noise Level

Table 3.13-2 shows ambient noise levels permitted in Yuba County. When the ambient level is less than designated in Section 8.20.140, the respective maximum noise level permitted in this section shall govern.

Table 3.13-2. Ambient Base Noise Level

Zone	Time	Sound Level A – In decibels Ambient Level	Maximum Noise Level Permitted (Lmax)
Single Family Residential	10:00 p.m. to 7:00 a.m.	45	55
	7:00 p.m. to 10:00 p.m.	50	60
	7:00 a.m. to 7:00 p.m.	55	65
Multi-family Residential	10:00 p.m. to 7:00 a.m.	50	60
	7:00 a.m. to 10:00 p.m.	55	65
Commercial – BP	10:00 p.m. to 7:00 a.m.	55	65
Commercial	7:00 a.m. to 10:00 p.m.	60	70
M-1	Anytime	65	75
M-2	Anytime	70	80

Notes: M-1 = General Industrial; M-2 = Extractive;
Source: Yuba County 2018, adapted by GEI Consultants, Inc. 2020

The project site is zoned as Resource Preservation and Recreation District. Therefore, the County code does not establish a maximum noise level for the project site.

Section 11.26.060 - Vibration

No vibration shall be produced that is transmitted through the ground and is discernible without the aid of instruments by a reasonable person at the property lines of the site. Vibrations from temporary construction, demolition, and vehicles that enter and leave the subject parcel (e.g., construction equipment, trains, trucks, etc.) are exempt from this standard.

Yuba County 2030 General Plan

The following goals and policies from the Yuba County 2030 General Plan Public Health and Safety element are relevant to the proposed project (Yuba County 2011a).

GOAL HS 10: **Noise and Vibration.** Ensure that noise does not substantially reduce the local quality of life.

- **Policy HS 10.3.** New developments that would generate or be affected by non-transportation noise shall be located, designed, and, if necessary, mitigated below maximum levels specified in **Table 3.13-3**, of the General Plan, as measured at outdoor activity areas of affected noise-sensitive land uses.

- **Policy HS 10.4.** If existing noise levels exceed the maximum allowable levels listed in Table 3.13-3, projects are required to incorporate mitigation to reduce noise exposure in outdoor activity areas to the maximum extent feasible and include mitigation to achieve acceptable interior noise levels, as defined in **Table 3.13-4**, of the General Plan.

- **Policy HS 10.6.** New developments shall provide all feasible noise mitigation to reduce construction and other short-term noise and vibration impacts as a condition of approval.

- **Policy HS 10.7.** New developments shall ensure that construction equipment is properly maintained and equipped with noise control components, such as mufflers, in accordance with manufacturers' specifications.

Table 3.13-3. Maximum Allowable Noise Exposure from Non-transportation Noise Sources at Noise-sensitive Land Uses

Noise Level Descriptor	Daytime (7 a.m. – 10 p.m.)	Nighttime (10 p.m. – 7 a.m.)
Hourly L_{eq}	60 dBA	45 dBA
L_{max}	75 dBA	65 dBA

Notes: dBA = A-weighted decibels; Leq = energy-equivalent noise level; Lmax = maximum noise level.
Each of the noise levels specified shall be lowered by 5 dBA for simple tone noises, noises consisting primarily of speech, music, or for recurring impulsive noises. These noise-level standards do not apply to residential units established in conjunction with industrial or commercial use (e.g., caretaker dwellings). Noise-sensitive land uses include schools, hospitals, rest homes, long-term care facilities, mental care facilities, residences, and other similar land uses.
Source: Yuba County 2011a, adapted by GEI Consultants, Inc. 2020

Table 3.13-4. Maximum Allowable Noise Exposure from Transportation Noise Sources at Noise-sensitive Land Uses

Land Use Type	Interior Spaces (dBA L_{DN})	Highest Level of Noise Exposure That is Regarded as "Normally Acceptable" in Outdoor Activity Areas (L_{max})
Residences	45	60 dBA
Transient Lodging- Motels, Hotels	45	60 dBA
Schools, Libraries, Churches, Hospitals, Nursing Homes	45	60 dBA
Auditoriums, Concert Halls, Amphitheaters	35	Conditionally Acceptable*
Sports Arena, Outdoor Spectator Sports		Conditionally Acceptable*
Playgrounds, Neighborhood Parks		70 dBA
Golf Courses, Riding Stables, Water Recreation, Cemeteries		70 dBA
Office Buildings- Businesses, Commercial and Professional	45	65 dBA
Industrial, Manufacturing, Utilities, Agriculture		70 dBA

* New construction or development should be undertaken only after a detailed analysis of the noise reduction requirements is made and needed noise insulation features included in the design. dBA = A-weighted decibels; Lmax = maximum noise level. L_{DN} =day-night average noise level
Source: Yuba County 2011a, adapted by GEI Consultants, Inc. 2020

3.13.3 Environmental Impacts and Mitigation Measures

Thresholds of Significance

The significance criteria used to evaluate the project impacts to noise and vibration are adapted from **Appendix G** of the State CEQA Guidelines to include thresholds of significance adopted by the County in the General Plan. A significant impact related to noise and vibration issues would occur if the project would:

- generate a substantial temporary or permanent increase in ambient noise levels in the vicinity of the project in excess of standards established in General Plan Policy HS 10.3**,** which establishes maximum allowable daytime (7 a.m. to 10 p.m.) and nighttime (10 p.m. to 7 a.m.) noise exposure at sensitive land uses, specifically: hourly L_{eq} 60 dBA daytime, 45 dBA nighttime and L_{max} 75 dBA daytime, 65 dBA nighttime, respectively; and each of the noise levels specified shall be lowered by 5 dBA or for recurring impulsive noises[2], such as blasting;
- generate excessive groundborne vibration or groundborne noise levels; or
- for a project located within the vicinity of a private airstrip or an airport land use plan or, where such a plan has not been adopted, within 2 miles of a public airport or public use airport, would the project expose people residing or working in the project area to excessive noise levels.

Analysis Methodology

Noise associated with project operations and maintenance activities at the nearest existing sensitive receivers was assessed qualitatively. Noise generated by construction activities was modeled as discussed below and then compared to the standards established in the *Yuba County 2020 General Plan* policies, as identified above.

Section 11.26.060 of the Yuba County Ordinance Code states that vibrations from temporary construction activities are exempt from Yuba County's vibration standards. However, groundborne vibrations from construction were analyzed given the longer than usual construction period. Vibration levels were predicted for the project based on construction equipment proposed and compared against the FTA-designated threshold of significance for construction vibration damage criteria (0.5 PPV in/sec) (FTA 2006).

Modeling of Project Construction Noise Generation

Anticipated noise levels associated with project construction were assessed by modeling noise generation using the Federal Highway Administration's (FHWA's) Roadway Construction Noise Model (RCNM) and heavy equipment/equipment usage factors at the nearest sensitive receptor and at the Marina. The distance to nearest sensitive receptor and Marina is as follows:

- a residence northeast of the project site, approximately 0.5-mile from the ARC Spillway and 0.1 mile from the USFS 0008-010 haul route.
- the Marina located 0.3 mile west of the construction site and 0.1 mile from the Marysville Road haul route; and

[2] Impulsive noises are sounds of short duration, usually less than one second, with an abrupt onset and rapid decay such as the discharge of firearms (Yuba County 2011b).

It is helpful to note that RCNM captures a snapshot of the most intensive noise-generating construction period and, therefore, it does not capture the fluctuation in noise levels throughout the day, just the time period when the most construction equipment would be operating. Due to the long duration of project construction and overlapping phases, the most intensive noise-generating construction scenarios were modeled (refer to Table 2-1 for construction phases and equipment use). Specifically, concurrent equipment use during the following overlapping phases was modeled: 1) Phases 4 and 5, and 2) Phases 6 and 7. Additionally, Phase 1, the anticipated lowest noise level phase, was modeled to show the variation and range of noise levels generated during the construction period. Blasting would occur intermittently during certain construction phases but would not occur at night. Daytime noise generation was modeled for scenarios with and without blasting, except for Phase 1 when blasting would not occur. Operation of construction equipment may occur at night.

Typical noise levels generated 50 feet from equipment associated with project construction are detailed in **Table 3.13-5.** These reference noise levels were used as inputs for the RCNM developed for the project. Modeled noise generation at the sensitive receptors is shown in **Table 3.13-6**. The remainder of this section discusses project noise generation and ambient noise in the project vicinity.

Table 3.13-5. Construction Equipment and Typical Equipment Noise Levels

Type of Equipment	Noise Levels (dBA) Lmax at 50 Feet
Equipment/Supply Transport Trucks	80
Front-end Loader	79
Excavator	81
Crane	81
Blade	85
Bulldozer	85
Highway Dump Truck	76
Water Truck	N/A
Roller	80
Forklift	N/A
Blasting	94
Rock Drill	85
Man Lift	75
Vacuum Truck	82
Concrete Pickup Truck	81
Pick-up Truck	75

Note: Lmax = maximum instantaneous sound level; dBA = decibels
Source: Construction equipment list based on Federal Highway Administration 2006, adapted by GEI Consultants, Inc. 2020

Table 3.13-6. Project Construction Noise Generation and Threshold Exceedances

Sensitive Receptor / Significance Threshold	dBA Leq[3]	dBA Lmax[2]
Yuba County General Plan Noise Thresholds		
Daytime Threshold – No Blasting	60	75
Daytime Threshold – With Blasting[5]	55	70
Nighttime Threshold – No Blasting	45	65
Phase 1 Construction Only (No Blasting)		
Residence RCNM Noise Level	39	37
Marina RCNM Noise Level	57	61
Daytime Threshold – No Blasting Exceedance?	*No*	*No*
Daytime threshold – With Blasting Exceedance?	*N/A*	*N/A*
Nighttime Threshold – No Blasting Exceedance?	*No*	*No*
Nighttime Threshold – No Blasting Exceedance?	*Yes: Marina*	No
Phase 4 and 5 Concurrent Construction Equipment Use		
Residence RCNM Noise Level – No Blasting	55	53
Residence RCNM Noise Level – With Blasting	55	53
Marina RCNM Noise Level- No Blasting	62	62
Marina RCNM Noise Level- With Blasting	62	62
Daytime Threshold – No Blasting Exceedance?	*No: Residence*	*No*
Daytime Threshold – No Blasting Exceedance?	*Yes: Marina*	*No*
Daytime Threshold – With Blasting Exceedance?	*No: Residence*	*No*
Daytime Threshold – With Blasting Exceedance?	*Yes: Marina*	*No*
Nighttime Threshold – No Blasting Exceedance?	*Yes: Marina and Residence*	*No*
Phase 6 and 7 Concurrent Construction Equipment Use		
Residence RCNM Noise Level – No Blasting	55	53
Residence RCNM Noise Level – With Blasting	55	53
Marina RCNM Noise Level- No Blasting	64	62
Marina RCNM Noise Level- With Blasting	64	64
Daytime Threshold – No Blasting Exceedance?	*No: Residence*	*No*
Daytime Threshold – No Blasting Exceedance?	*Yes: Marina*	*No*
Daytime threshold – With Blasting Exceedance?	*No: Residence*	*No*
Daytime threshold – With Blasting Exceedance?	*Yes: Marina*	*No*
Nighttime Threshold – No Blasting Exceedance?	*Yes: Marina and Residence*	*No*

Notes: yellow shading indicates exceedance of applicable noise threshold at the specified sensitive receptor

dBA = A-weighted decibels; Leq = energy-equivalent noise level; Lmax = maximum noise level; RCNM = Roadway Construction Noise Model; N/A = not applicable

[1] Blasting would be limited to 10 a.m. to 7 p.m. and would not occur during nighttime, as defined by the *Yuba County 2030 General Plan*.

[2] Lmax is the maximum among individual equipment Lmax values.

[3] Leq is a summation of all individual Leq values.

[4] This scenario does not include 'rock excavation for control structure and spillway chute' for Phase 4, and 'discharge channel foundation cleaning, and spillway chute rock anchors and concrete' (Table 2-1) for Phase 5 since these activities do not overlap with the rest of Phase 4 or 5.

[5] The Yuba County 2030 General Plan states each of the noise levels thresholds shall be lowered by 5 dBA for recurring impulsive noises, such as blasting.

The following construction equipment swaps were made due to some equipment not being available within the model. Dump truck was used for water truck and haul truck, manlift was used for forklift, rock drill was used from boom drill, and grader was used for blade.

Significant noise level thresholds for impact equipment which generates impulsive noise, where impulsive noise is defined as short duration (generally less than 1 second), high intensity, abrupt onset, rapid decay, and often rapidly changing spectral composition (i.e., blasting) was reduced by 5 dBA as directed by the Yuba County 2030 General Plan (see notes in Table 3.13-4).

Project Noise Generation

The RCNM developed for the project considers hauling along the Marysville Road and USFS 0008-010 haul routes, operating construction equipment at the ARC Spillway construction site, and blasting at the ARC Spillway construction site. The staging area adjacent to the Marina would primarily be used as a parking and refueling areas and would not generate additional noise beyond what other vehicles using this area would generate. The staging area/batch plant sites adjacent to the ARC Spillway and soil and rock disposal area are located within 0.1 mile of the ARC Spillway site. One haul truck per phase was modeled using the distance from the nearest portion of the haul route to the residence (264 ft), which captures noise generated at the residence for the off haul of material to the rock and soil disposal area and transport of material from the batch plant site to the construction area (while other construction equipment is concurrently operating).

The RCNM does not account for topographic interference or attenuation of noise associated with topography and noise outputs from the RCNM could be higher than what would actually occur.

However, the RCNM provides recommended reductions in equipment dBA for different levels of shielding, as follows (FHWA 2006):

- If a noise barrier or other obstruction (like a dirt mound) just barely breaks the line-of sight between the noise source and the receptor, use 3 dBA.
- If the noise source is completely enclosed OR completely shielded with a solid barrier located close to the source, use 8 dBA. If the enclosure and/or barrier has some gaps in it, reduce the effectiveness to 5 dBA.
- If the noise source is completely enclosed andcompletely shielded with a solid barrier located close to the source, use 10 dBA.
- If a building stands between the noise source and receptor and completely shields the noise source, use 15 dBA.
- If a noise source is enclosed or shielded with heavy vinyl noise curtain material (e.g., SoundSeal BBC-13-2" or equivalent), use 5 dBA.
- If dilapidated windows are replaced with new acoustical windows, or quality internal or exterior storm sashes, use an incremental improvement of 10 dBA for an overall Outside-to-Inside Noise Reduction of 35 dBA.
- If work is occurring deep inside a tunnel using the "top-down" construction method (i.e., cover the tunnel work with concrete roadway decks to allow surface traffic and then excavate underneath the roof deck), use 12 dBA.

In a few circumstances where full or partial shielding would occur, shield factors were input into the RCNM for select project equipment. Marysville Road is at a significantly higher elevation than the Marina—1,900 feet and 1,869 feet, respectively. Therefore, due to work at the discharge channel being at a much lower elevation and the Dam providing partial shielding, for noise output modeled at the Marina, a shielding reduction of 5 dBA was applied to construction of the discharge channel in phase 5. Additionally, due to shielding from heavily forested areas and sloping topography, for noise output modeled at the Residence, a shielding reduction of 3 dBA was applied to all haul trucks and a shielding reduction of 8 dBA was applied to all other construction equipment that would be operated at the ARC Spillway construction site. The haul trucks received a smaller reduction due to the inconsistent shielding and gaps within the forested area.

Ambient Noise in the Project Vicinity

Although general ambient noise level information for Yuba County is provided in the General Plan and County Code, ambient noise information developed in support of the 2011 Yuba County General Plan EIR (Yuba County 2011b) more accurately represents conditions in the project vicinity, as detailed below, and was used as inputs for the RCNM prepared for the project. Additionally, the Yuba County General Plan Ambient Base Noise Level Table (**Table 3.13-2**) includes maximum noise levels permitted. The proposed project would be subject to these maximum noise levels.

Residences

To analyze potential effects to sensitive residences, ambient noise levels observed during a community noise survey conducted in rural areas of the County during development of the General Plan EIR, distant from major noise sources and close to the project site, were used to establish a representative ambient noise level at the nearest residence to the project site. The community noise survey's nearest representative location to project vicinity residences is 10790 Texas Hill Road – Dobbins. The ambient noise levels observed during the community noise survey were 47.1 dBA Leq (daytime), 45.5 dBA Leq (evening), and 39.3 dBA Leq (nighttime) (Yuba County 2011b: Table 4.11-6).

Recreational Users

The General Plan EIR modeled traffic noise (using FHWA Highway Noise Prediction Model with the California Vehicle Noise Emission level vehicle noise emission curves) along all roadways in Yuba County and provides ambient noise levels along all the roadways included within the model. To analyze effects to sensitive recreational users and employees in the vicinity of the Marina, the results of traffic noise modeling from the General Plan EIR were used to represent ambient roadway noise along the closest road segment to the project site (Marysville Road between Oregon Hill Road and SR 49). Highway traffic along Marysville Road generates the most frequent noise output nearest to the Marina. The ambient noise levels for 2007 and 2030 conditions, during preparation of the General Plan EIR, were 55 dBA Ldn (2007) and 60 Ldn (2030), respectively. However, to develop the most conservative estimate, the lower value of 55 dBA Ldn for 2007 conditions was used in the RCNM prepared for the proposed project.

Public Comments

Comments submitted in response to the Notice of Preparation were reviewed for relevance to the analysis of environmental consequences and development of mitigation measures. There were no comments submitted regarding noise and vibration.

Issues Not Discussed Further in this EIR

Expose People Residing or Working in the Project Area to Excessive Noise Levels Generated by Private or Public Airports

The project is located more than 2 miles from the nearest public airport or private airstrip. Therefore, the project would not expose people to excess noise levels due to the proximity to a public airport or private airstrip. No impact would occur from the project and this issue is not discussed further in this EIR.

Impact Analysis

Impact NOI-1: Temporary Construction-related Increases in Ambient Noise Levels in Excess of Yuba County Standards.

The proposed project would generate noise from construction equipment operating at the project site, transport of construction workers and construction materials along construction access and haul routes and blasting of rock. Project site access and materials deliveries/off hauling would occur along Marysville Road to the project site from the east and west, segments of USFS Road 0008-010, and a temporary off-road route constructed between the ARC Spillway and soil and rock disposal area, as shown in Figure 2-7. Blasting would be used to remove rock for excavation at the ARC Spillway facility, except at the discharge channel. Blasting, which would be limited to between 10 a.m. and 7 p.m., would be conducted up to twice per day for up to 200 days of construction. The project would also result in temporary, short-term increases in ambient noise levels during construction equipment operation. The estimated construction noise levels were compared to Maximum Allowable Noise Exposure and Noise-Sensitive Land Uses thresholds set forth in General Plan Policy HS 10.3 to determine if these thresholds would be exceeded. Since blasting is limited to daytime hours, noise generation with blasting is not compared to the nighttime threshold.

Daytime Noise Generation

As shown in **Table 3.13-6**, there would be an exceedance of the L_{eq} noise threshold during daytime construction at the Marina during the overlapping construction phases, both when blasting does and does not occur, but no exceedance would occur during Phase 1 only. Substantial noise generation during the daytime would be limited to instantaneous noise generation from construction equipment. Daytime construction noise would not exceed the noise threshold at the nearest residence.

Nighttime Noise Generation

As shown in **Table 3.13-6**, there would be an exceedance of the L_{eq} noise threshold at the Marina during nighttime construction for all construction phases and at the nearest residence during the overlapping construction phases, but no exceedance would occur at the residence during Phase 1 only. When less equipment is being operated concurrently, including during overlapping construction phases, nighttime noise generation may be below the L_{eq} threshold at the Marina and residences. There would be no exceedance of the L_{max} threshold during nighttime construction at the Marina or the residence, meaning that substantial noise generation during nighttime is limited to instantaneous noise generation from construction equipment.

As stated in Section 8.20.310 of the General Plan, outside construction activities between the hours of 10:00 p.m. of one day and 7:00 a.m. of the following day, conducted in such a manner that a reasonable person of normal sensitiveness residing in the area is caused discomfort or annoyance, a permit must be obtained beforehand from the Community Development and Services Agency's Director of the Planning Department. YCWA would need to confer with Yuba County to determine if a permit would indeed need to be obtained.

Impact Conclusion

During the daytime, noise generation from construction equipment and blasting is anticipated to be substantial for recreation users at the Marina and nearby, including boaters, during intensive construction periods. During the nighttime, noise generation is anticipated to be substantial at the Marina and nearby, including boaters, throughout construction and at the nearest residences during intensive construction periods. Therefore, this impact would be **significant**.

Mitigation Measures: The following mitigation measures have been identified to address this impact.

Mitigation Measure NOI-1: Implement Feasible Measures to Reduce Construction Noise Effects.

YCWA will require its primary contractor(s) for engineering design and construction to implement the following measures to avoid and minimize construction noise effects on sensitive receptors. To the extent feasible and practicable, the primary construction contractor(s) will employ noise-reducing construction practices such that noise effects are limited to the maximum degree practical during construction. Measures that will be used to limit noise will include, but not be limited to, the measures listed below.

- No construction will be performed within 1,000 feet of an occupied dwelling unit on Sundays, legal holidays, or between the hours of 10 p.m. and 7 a.m. on other days without the approval of the YCWA construction project manager.
- All equipment used will have sound-control devices no less effective than those provided on the original equipment. No equipment will have unmuffled exhaust.
- All equipment will comply with pertinent equipment EPA noise standards.
- Construction and haul routes will be planned to minimize construction and traffic during nighttime hours, and route haul traffic away from residential receptors, to the extent feasible and practicable. Construction activities would only occur at night when necessary.
- A disturbance coordinator will be designated. The disturbance coordinator’s phone number will be conspicuously posted around the project site, in adjacent public spaces, and in construction notifications. The disturbance coordinator will be responsible for responding to any complaints about construction activities. The disturbance coordinator will receive all public complaints about construction disturbances and be responsible for determining the cause of the complaint and implement any feasible measures to alleviate the complaint. The disturbance coordinator will have the authority to halt noise-generating activity, if necessary and feasible, to protect public health.

Timing: Before and during construction.

Responsibility: YCWA and its construction contractor(s).

Mitigation Measure NOI-2: Notify Nearby Residences and Lake Recreationists of Construction Work Activities.

The following measures will be implemented to notify nearby residences and Lake recreationists of construction work activities:

- Signage will be posted at the Marina and nearby recreation areas such as the Yuba Rim Trail, New Bullards Bar Trail, Cottage Creek boat launch, and the Dark Day boat launch notifying people that excessive noise generation from construction activities and blasting will occur at times.

- Prior to implementing any nighttime (10:00pm – 7a.m.) construction work, residences within the 0.75-mile of the project site will be notified in writing (email or letter) at least 48 hours in advance of any potential or planned nighttime construction work with the estimated schedule (dates) for such nighttime work. In addition, the same notification will be posted at the Marina of potential nighttime construction work.

Timing: Before and during construction.

Responsibility: YCWA and its construction contractor(s).

Mitigation Measure GEO-1: Prepare and Implement Blasting Plan

Please refer to Impact GEO-2 in Chapter 3.9, "Geology and Soils," for the full text of this mitigation measure.

Implementing Mitigation Measures NOI-1, NOI-2, and GEO-1 would reduce construction-related noise generation to the extent feasible by minimizing nighttime construction only to activities that cannot be completed during the daytime and by notifying sensitive users of excessive noise generation during the day and nighttime.

Additional potential mitigation to reduce noise traveling from the source to the Marina includes constructing barriers along the perimeter of the project site to mask noise generated from construction activities at the Marina. Barriers would need to be installed between the project site and the Marina in the Reservoir. However, due to the Reservoir topography, regularly rising and falling Reservoir water levels, and depth of excavations, the use of barriers in the Reservoir is not feasible mitigation. No further mitigation measures are feasible for YCWA to implement to further reduce construction-related noise impacts. Since construction noise exceeding the Leq thresholds would still be generated during the daytime and nighttime after implementation of all feasible mitigation measures, this impact would be **significant and unavoidable**.

Impact NOI-2: Increases in Ambient Noise Levels in Excess of Yuba County Standards from Operations and Maintenance Activities.

Following construction activities, operations and maintenance activities at the site would occur periodically. It is anticipated that operations and maintenance activities (including inspections) for the proposed project would primarily be coordinated and combined with existing maintenance trips, which involve YCWA staff travel to and around the site via pickup truck. Additionally, noise could be generated from routine activities at the operations platform, including operation of the gate hoist and the emergency generator. However, all noise generated from operation of the ARC Spillway would be temporary, of short duration (hours), and occur intermittently and infrequently. Operation activities would not require heavy and noisier construction equipment and would create substantially less noise than construction activities. Sensitive receptors are far enough away that noise from operation activities would be greatly reduced before reaching the sensitive receptors. Therefore, noise generated from operation and maintenance activities is unlikely to go above the allowable noise exposure levels detailed in Policy HS 10.3 of the *Yuba County 2030 General Plan*. This impact is considered **less than significant**.

Mitigation Measures: No mitigation is required.

Impact NOI-3: Generate Excessive Ground Vibration or Groundborne Noise Levels from Construction Activities.

The project would generate temporary groundborne vibrations from construction activities and transient groundborne vibration from construction equipment use. As stated in Section 11.26.060 of the Yuba County Ordinance Code, vibrations from temporary construction activities are exempt from Yuba County's vibration standards (see Section 3.13.3, "Regulatory Setting," above). However, an analysis of vibration associated with project construction is presented because of the long construction period. **Table 3.13-7** presents ground vibration levels associated with various construction equipment used during project construction. The project may cause random and/or transient groundborne vibration from construction equipment use. Additionally, the staging area located adjacent to the Marina would not generate much vibration as it would primarily be used as a parking and refueling area for the construction contractor. Based on the vibration levels discussed above and presented in Table 3.13-7, and a distance of 0.3-mile to the Marina, predicted vibration levels would not be anticipated to exceed the threshold of 0.3 inch per second PPV for continuous vibration sources at the nearest receptor structure (FTA 2006).

Table 3.13-7. Representative Vibration Source Levels for Typical Construction Equipment

Type of Equipment	Peak Particle Velocity at 25 feet (inches per sec)	Estimated Peak Particle Velocity at Nearest Sensitive Receptor
Large Bulldozer	0.089	0.001
Loaded Trucks	0.076	0.001
Small Bulldozer	0.003	0.000

Notes: Estimated peak particle velocity (ppv) at the nearest receptor calculated using PPVEquipment = PPVRef (25/D)n (inches/second), where D is the distance from the equipment to the receiver (in this case, 1,584 feet), and n is 1.1, a value related to the attenuation rate through ground. (Caltrans 2013 Equation 12.)

Source: Federal Transportation Authority 2006

Construction for the ARC Spillway would require drilling to place charges and subsequent blasting. Vibration from blasting varies depending on the weight of the charge, geologic characteristics, and distance to the source. Caltrans recommends thresholds of 0.5 inch per second ppv for transient vibration sources such as blasting to avoid structural damage to older residential structures (Caltrans 2013). Based on these thresholds, a typical 4-pound charge, and a distance of 0.3 mile to the Marina predicted vibration levels from blasting (0.001 ppv) would be well below the threshold of 0.5 inch per second ppv for transient sources at the nearest receptor structure. The nearest residences are 0.5- and 0.6-mile away from the blasting area so blasting vibration would be further attenuated. Therefore, this impact would be **less than significant**.

Mitigation Measures: No mitigation is required.

Impact NOI-4: Generate Excessive Groundborne Vibration or Groundborne Noise Levels from Operations and Maintenance Activities.

The project would generate groundborne vibrations from periodic flood control releases through the ARC Spillway. Since the ARC Spillway is approximately half the size of the Primary Spillway, these vibrations would be similar to or less than vibrations that are currently generated from use of the Primary Spillway. Vibrations from operations of project facilities would occur intermittently, such as raising and lowering gates. Ground vibration and groundborne noise levels generated from operation and maintenance activities would be less than what is expected to be generated during construction due to the lack of heavy equipment needs during operations and maintenance. Vibration levels would not be anticipated to exceed the threshold of 0.3 inch per second ppv for continuous vibration sources at the Marina or at the nearest residences (FTA 2006). Therefore, this impact would be **less than significant**.

Mitigation Measures: No mitigation is required.

Residual Significant Impacts

The project would result in potentially significant impacts related to noise and vibration. Mitigation measures would be implemented to reduce noise during construction, notify others in the area of construction activities, and implement a blasting plan. However, even with all feasible mitigation measures implemented, construction noise would still exceed the Leq thresholds both during the daytime at the Marina and during the nighttime at the Marina and nearby residences. With imposition of mitigation measures identified above, the project would have residual, significant and unavoidable impacts related to construction-related noise.

3.14 Public Services

This section characterizes the existing environmental setting for public services available to the New Bullards Bar Dam Atmospheric River Control (ARC) Spillway Project (project or proposed project) site, summarizes applicable policies, and evaluates the public services impacts that would result from project implementation.

3.14.1 Environmental Setting

Public Safety

The Yuba County Sheriff's Department and California Highway Patrol (CAHP) provide law enforcement services in the unincorporated portion of the County. There is a minimum of seven Sheriff's deputies on duty at any given time. The Marysville Police Department and Wheatland Police Department may provide mutual aid during some incidents in the unincorporated areas of Yuba County (Yuba County 2011a).

Fire Protection

The project is located within a very high severity fire hazard zone (CAL FIRE 2007a; 2007b). Fire protection services in Yuba County are provided by the California Department of Forestry and Fire Protection (CAL FIRE), United States Forest Service (USFS), several local fire protection agencies, and, at the project site, primarily the Camptonville Community Service District. The Camptonville Community Service District consists of local volunteers (Camptonville Community Health Action Team 2008) and would serve as the lead agency for emergency response and vehicle fires. Structural fires and wildfires are within the jurisdiction of CAL FIRE since the project site falls within a State Responsible Area (SRA) (Yuba County 2011a).

School Facilities

The project area is located within the boundaries of the Camptonville Union School District (Yuba County 2011a). The nearest school facility to the project site is the Oak Tree Elementary School, located approximately 3 miles southeast of the project site.

Emergency Services

USFS Road 0008-010 is currently closed and motorized traffic is prohibited (USFS 2020). Therefore, this road has not previously been used to respond to emergencies.

Marysville Road is used by CAL FIRE, USFS, the CAHP, as well as local protection agencies such as the Camptonville Community Service District, Yuba County Sheriff's Department, Marysville Police Department, and Wheatland Police Department, to provide emergency services to a large portion of Yuba County.

3.14.2 Regulatory Setting

Federal Plans, Policies, Regulations, and Laws

No Federal plans, policies, regulations, or laws related to public services are relevant to the analysis of public services and related impacts from the project.

State Plans, Policies, Regulations, and Laws

Other than the California Environmental Quality Act (CEQA), no State plans, policies, regulations, or laws related to public services are relevant to the analysis of public services and related impacts from the project.

Regional/Local Plans, Policies, Regulations, and Ordinances

Yuba County 2030 General Plan

The following goal and policies in the Yuba County 2030 General Plan Community Development Element apply to the project (Yuba County 2011a).

GOAL CD 12: Level of Services: Public Services and Facilities. Ensure high-quality public services, infrastructure, and facilities with adequate capacity to meet the needs of Yuba County's existing and future residents, businesses, industries, and employers.

Policy CD 12.2. New developments will be required to construct and dedicate and/or fund on a fair share basic wastewater collection, conveyance, and treatment facilities consistent with applicable local, State, and Federal standards.

Policy CD 12.4. The County will approve new development projects only if adequate capacity exists to accommodate solid waste demands, including processing, recycling, transportation, and disposal.

Policy CD 12.5. New developments shall demonstrate the availability of adequate fire flow pressure, storage, system gridding, hydrant spacing, and sprinkle systems prior to approval.

3.14.3 Environmental Impacts and Mitigation Measures

Thresholds of Significance

The significance criteria used to evaluate the project impacts to public services are based on Appendix G of the State CEQA Guidelines. A significant impact related to public services would occur if the project would:

- Result in substantial adverse physical impacts associated with the provision of new or physically altered governmental facilities, or the need for new or physically altered governmental facilities, the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios, response times, or other performance objectives for any of the public services:
    - fire protection,
    - police protection,
    - schools,
    - parks, or
    - other public facilities.

Potential impacts related to emergency access are evaluated in Chapter 3.16, "Transportation." Potential impacts related to relocating the Overlook Site, a recreation facility covered by the Federal Energy Regulatory Commission license for the Yuba River Development Project, are discussed in Chapter 3.15, "Recreation." Potential impacts related to utility services are evaluated in Chapter 3.17, "Utilities and Systems."

Analysis Methodology

Evaluation of the potential impacts of the proposed project on public services was based on a review of planning documents pertaining to the project area, particularly the Yuba County 2030 General Plan (Yuba County 2011a) and the Final Yuba County 2030 General Plan Environmental Impact Report (Yuba County 2011b). Public facility requirements are based on the number of residents and workers in a service area. Service demand is primarily tied to population, not building size or construction footprint. For example, because emergency calls typically make up most responses provided by police and fire departments, as the number of residents and workers increases, so does the number of emergency calls. If there is an increased need for services, a determination of whether the increased need requires the construction of a facility to provide the services is made. If the construction of a facility is required, a determination of whether the construction of the new or altered facility could cause a significant effect is evaluated.

Public Comments

Comments submitted in response to the Notice of Preparation were reviewed for relevance to the analysis of environmental consequences and development of mitigation measures. There were no comments submitted regarding impacts to public services.

Issues Not Discussed Further in this EIR

Police Protection, Schools, and Parks

The proposed project would not require additional police protection, schools, or park facilities. The project would not involve constructing new residences, generate additional sources of permanent employment, or develop new facilities that would significantly increase local or regional public services need. Maintenance and operation activities for the ARC Spillway would be supported by existing Yuba County Water Agency staff levels. Therefore, there would be no impact from the project and these issues are not discussed further in this Environmental Impact Report.

Impact Analysis

Impact PS-1: Service Disruptions for Fire Protection.

The proposed project would not increase the need for fire protection. The proposed project would include the construction and operation of the ARC Spillway, approach channel, control structure, spillway chute, discharge channel, gate control building (GCB), electrical system, access routes, relocated utilities along Marysville Road, relocated Dam Overlook Observation Site, and soil and rock disposal area. The GCB would include an electrical room for equipment, two offices for operations staff, and a restroom. The GCB would be provided with a fire protection system, heating and ventilating equipment, and a domestic water system. Fire protection would be provided for the power and electrical equipment located inside the GCB and would be based on the Camptonville Community Services District requirements, the applicable California Building Code's standards, and the equipment manufacturer's recommendation. Construction and operation of the proposed project would not impact existing fire protection facilities because no increase in population would occur as a result of implementing the proposed project. No increase in use of fire protection is anticipated. Therefore, there would be no new physical impacts to the environment as a result of the construction or expansion of fire protection services or facilities. This impact is considered **less than significant**.

Mitigation Measures: No mitigation is required.

Residual Significant Impacts

The project would result in less-than-significant impacts to public services; therefore, the project would have no residual, significant and unavoidable impacts related to land use.

3.15 Recreation

This section describes both water- and land-based recreational resources and facilities in the New Bullards Bar Dam Atmospheric River Control (ARC) Spillway Project (project or proposed project) vicinity and analyzes the potential impacts of the proposed project on those resources and facilities.

3.15.1 Environmental Setting

Water-based Recreational Opportunities

New Bullards Bar Reservoir

The New Bullards Bar Reservoir (Reservoir) has a direct tributary catchment of 485 square miles and controls water flows from the North Yuba River and receives some water from the Middle Yuba River and Oregon Creek. The Reservoir offers recreational activities including fishing, boating, houseboating, swimming, water skiing, jet skiing, wildlife viewing, and lake side camping, which is only accessible by boat. The California Department of Fish and Wildlife is responsible for stocking catchable fish within the Reservoir (Yuba County Water Agency [YCWA] 2016). The Reservoir also offers anglers shoreline and boat-based fishing opportunities with varied settings including deep and large pools near the New Bullards Bar Dam (Dam) (Federal Energy Regulatory Commission [FERC] 2019).

Motorized boating including houseboating is one of the most popular activities at the Reservoir. Three boat launch facilities can be accessed around the Reservoir at the Emerald Cove Marina and the Cottage Creek and Dark Day Boat Launch Facilities. The Marina is located just north of the Dam and offers boat rentals, fuel stations, boat moorage, and camping reservations. The three boating facilities are open year-round; however, the typical boating season is from early May through October. Since the Reservoir shoreline tends to be steep, public access to the water for recreation is limited to the three boating facilities (FERC 2019). High-quality whitewater boating opportunities are present just downstream of the Dam in the North Yuba River and additional whitewater boating opportunities are present upstream of the Reservoir.

No public/recreation access is provided to the North Yuba River immediately below the Dam near the project site.

Land-based Recreational Opportunities

Yuba County is the primary provider of park facilities in unincorporated Yuba County. The ARC Spillway, soil and rock disposal area, construction areas, and the majority of the haul routes are within the Tahoe National Forest (TNF). The staging area at the Marina parking lot and a small portion of the haul route along the existing Marysville Road is within the Plumas National Forest (PNF). The National Forests provide a multitude of recreational opportunities. Land-based recreational opportunities in Yuba County include wildlife viewing, hiking, mountain biking, horseback riding, picnicking, and camping.

Several campgrounds within the vicinity of the project are located around the Reservoir with the closest being the Hornswoggle Group Campground and Schoolhouse Campground located within the TNF approximately 2 miles northeast of the project site and the Burnt Bridge Campground located within the PNF approximately 2.5 miles northwest of the project site.

The New Bullards Bar Trail is located approximately 1 mile north of the project site and consists of a 17-mile-long loop that includes a portion of the Reservoir shoreline and circles back through the TNF. Additionally, the Yuba Rim Trailhead is located off Marysville Road, adjacent to the temporary construction haul route, but outside of the area of Maryville Road relocated by the project. The Yuba Rim Trailhead is an approximately 2.5-mile-long, one-way trail that provides views of the Yuba River.

The Overlook Site is located within the project boundaries adjacent to Marysville Road and provides views of the Reservoir. As part of the proposed project, the Overlook Site would be relocated north of Marysville Road.

3.15.2 Regulatory Setting

Federal Plans, Policies, Regulations, and Laws

Since only developed portions of the project site are in the PNF, the PNF Land and Resource Management Plan (LRMP) is not discussed.

Tahoe National Forest Land and Resource Management Plan

The purpose of the TNF LRMP is to direct the management of the TNF to ensure the wise use and protection of TNF resources; fulfill legislative requirements; and address local, regional, and national issues (United States Forest Service [USFS] 1990). See Chapter 3.8, "Agriculture and Forestry Resources," for a full description of the TNF LRMP. The following management direction pertaining to recreation from the TNF LRMP is applicable to the proposed project.

Management Direction: Recreation

1) Recreation management will be in concert and cooperation with appropriate City, County, State, and other Federal agencies.

2) Work with cooperating water agencies and irrigation districts to maintain desirable water levels on all reservoirs within TNF through the entire length of the recreation season.

3) In recognition of increasing public interest and concern about wildlife, provide the public with wildlife viewing opportunities as an integral part of recreation and wildlife management planning. Identify habitats where the primary purpose of management is for viewing opportunities in a variety of settings, from developed sites to natural undeveloped areas. Wildlife and recreation managers will work together to develop one management plan per year on the Forest.

State Plans, Policies, Regulations, and Laws

There are no State plans, policies, regulations, or laws that would apply to recreation and the proposed project.

Regional/Local Plans, Policies, Regulations, and Ordinances

Yuba County 2030 General Plan

The following goal and policy from the Yuba County 2030 General Plan Natural Resources Element regarding recreational resources apply to the project (Yuba County 2011a).

GOAL NR1: Recreational Areas. High-quality, accessible public recreational open space.

- **Policy NR1.1:** The County will collaborate with other agencies to ensure a quality park, recreation, natural open space, and trail system that is efficient to administer and cost-effective to maintain.

3.15.3 Environmental Impacts and Mitigation Measures

Thresholds of Significance

Significance criteria are based on Appendix G of the State CEQA Guidelines. The proposed project would have a significant impact on recreational resources if implementing the project would:

- increase the use of existing neighborhood and regional parks or other recreational facilities such that substantial physical deterioration of the facility would occur or be accelerated; or
- include recreational facilities or require the construction or expansion of recreational facilities that might have an adverse physical effect on the environment.

Analysis Methodology

Evaluation of the potential impacts of the proposed project on recreation was based on a review of planning documents pertaining to the project area, particularly the Yuba County 2030 General Plan (Yuba County 2011a) and the Final Yuba County 2030 General Plan Environmental Impact Report (Yuba County 2011b), as well as the TNF LRMP (USFS 1990).

Public Comments

Comments submitted in response to the Notice of Preparation were reviewed for relevance to the analysis of environmental consequences and development of mitigation measures. Comments regarding recreation included concerns about public access to rivers boaters, anglers and other recreational uses.

Issues Not Discussed Further in this EIR

Increase in Use of Existing Recreational Facilities

Increases in permanent demand for recreational facilities typically are associated with substantial population increases, either because new residences have been constructed or because a major job generator has been created that would indirectly increase the number of residents in an area. The project would not involve constructing new residences, generate additional sources of permanent employment, or develop new facilities that would significantly increase local or regional recreation use. Maintenance and operation activities for the ARC Spillway would be supported by existing YCWA staff levels. Therefore, the project would not increase the demand for existing recreation facilities and would not accelerate physical deterioration of existing recreation facilities. The project would also not increase recreational use in general as it offers no new or improved recreational facilities or recreational opportunities. Therefore, there would be no impact from the project and this issue is not discussed further in this Environmental Impact Report. Relocation of the Overlook Site is discussed in the impact analysis below.

Impact Analysis

Impact REC-1: Require the Temporary Closure or Relocation of Recreational Facilities.

The proposed project would require the relocation of the existing Overlook Site located off Marysville Road approximately 150 feet northeast of the existing Primary Spillway. The Overlook Site would be relocated north of Marysville Road approximately 200 feet east of the existing Overlook Site (Figure 2-1). The Overlook Site would be closed throughout construction. The existing Overlook site would be demolished during Year 1, constructed at its new location during construction, and made available to the public again following the completion of construction activities in Year 5. The new Overlook Site would provide the same monument and parking capacity as the existing Overlook Site and access to the new Overlook Site would continue to be provided by Marysville Road. While the existing Overlook Site would be inaccessible for a period of approximately 3 years, this impact would be temporary, and the new Overlook Site would provide the same recreational benefits as the existing Overlook Site. Changes in views from the Overlook Site are evaluated in Chapter 3.7, "Aesthetics."

During construction, the natural rock cofferdam would be used to maintain dry conditions at the project site downstream of the Dam and water levels in the Reservoir. If water is high in the Reservoir when the approach channel needs to be connected to the control structure, then construction would be delayed to avoid needing to substantially lower water levels in the Reservoir. Therefore, the proposed project would not restrict recreational boat use at the Reservoir, result in any temporary closure to the Marina, or impact other recreational activities on the Reservoir during construction.

Recreational facilities within the vicinity of the project site, such as the Marina and New Bullards Bar Trail, would continue to be accessible during construction of the proposed project. Whitewater boating opportunities present downstream and upstream of the Reservoir would also continue to be accessible. Recreational facilities located within Yuba County are outlined in the Yuba County Parks Master Plan (Yuba County 2008). The project may result in temporary traffic delays to nearby recreation facilities and whitewater boating opportunities from the movement of heavy equipment along Marysville Road and short-term closure of Marysville Road when setting up or unloading large equipment at the project site. However, these delays would be relatively short (5 to 30 minutes), and access without any delays to nearby recreational facilities would return to pre-project conditions following the completion of construction activities. Since no recreational facilities will be adversely affected except the temporary traffic delays to reach some of these facilities, and the temporary closure of the Outlook Site, this impact is considered to be **less than significant**.

Mitigation Measures: No mitigation is required.

Impact REC-2: Adverse Effect to Recreational Facilities during Operations and Maintenance.

Use of the ARC Spillway during operations would occur infrequently prior to and during large storm events and would not change the water surface elevations of the Reservoir, Englebright Reservoir, or flows in the North Yuba River and downstream outside of these infrequent uses. As discussed in Chapter 3.1, "Hydrology and Water Quality," operational flow modeling conducted for the proposed project found that slight temporary reductions in Reservoir water surface elevation typically would occur for a few to several days with the project as compared to existing conditions. Additionally, operational flow modeling found that there typically was not a change in water surface elevation in Englebright Reservoir during the proposed project compared to existing conditions, except at the beginning of some large flow events. In summary, changes in reservoir storage/water surface elevations and flows in the North Yuba River and downstream in the Yuba River would be minor, temporary (up to 3 weeks in duration), and would not adversely affect recreational boat use in the Reservoir, whitewater use downstream, and any other recreational facilities and opportunities in the area. This impact would be **less than significant**.

Mitigation Measures: No mitigation is required.

Residual Significant Impacts

The project would result in less-than-significant impacts to recreational resources in the project vicinity; therefore, the project would have no residual, significant and unavoidable impacts related to recreation.

3.16 Transportation

This section discusses existing transportation and circulation issues within the New Bullards Bar Dam Atmospheric River Control (ARC) Spillway Project (project or proposed project) vicinity; describes applicable Federal, State, regional, and local regulations; and analyzes potential short- and long-term impacts of the project on the transportation system including roadways, freeways, and bicycle/pedestrian facilities.

3.16.1 Environmental Setting

The project site is located within the rural foothills of unincorporated Yuba County (County). Regional access to the project site is provided via State Route (SR 20) and SR 49, with local access provided via Marysville Road (as shown in Figure 1-1). Additionally, United States Forest Service (USFS) Road 0008-010 is located within the Tahoe National Forest (TNF) and would be used for construction access and hauling. This section describes the existing condition of these roadways and other modes of travel within the project vicinity (i.e., bicycle, pedestrian, and transit networks).

Highway and Road Definitions

Yuba County is served by a system of State highways and county roads. The State highway system consists of both controlled-access freeways and conventional highways. The County roadway system comprises major roads, collector roads, and local residential streets. Each type of facility is described within the Yuba County 2030 General Plan and is summarized below.

- **Freeway:** A multilane, divided highway with a minimum of two lanes in each direction and access provided at interchanges.
- **Conventional Highway:** A roadway with limited access and few cross streets generally along high-volume corridors that connect cities or unincorporated communities.
- **Major Road:** In Yuba County, a divided highway with a center median. A 110-foot right-of-way is designated, with a 64-foot pavement section in rural areas and an 86-foot section (capable of providing on street parking) in urban areas. Both sections provide four through-travel lanes and a center median.
- **Collector Road:** In urban areas, roads that have a 64-foot pavement section and are capable of providing four travel lanes with parking, or five lanes without parking at intersections. In rural areas, roads that have a 40- foot pavement section and are capable of providing two travel lanes and on-street parking, or three travel lanes without parking at intersections.
- **Local Residential Street:** In Yuba County, a street constructed within a 40-foot pavement section, with on-street parking. A 28-foot pavement standard is used in rural areas.

Regional and Local Roadways

Regional access to the project site is provide by the following facilities:

- **SR 20** is a regional east-west facility linking the coastal area in the west to the Sierra Nevada in the east. In the project vicinity, SR 20 provides one travel lane in each direction. Caltrans reports that average daily traffic volumes on SR 20 are approximately 9,000 vehicles between Hammonton Road and Smartville Road (Caltrans 2016).

- **SR 49** serves regional north-south traffic in the northeastern area of Yuba County. Within Yuba County, it is a two-lane conventional highway through rolling and mountainous terrain, servicing the Camptonville and Log Cabin communities, as well as communities in adjacent Nevada County. Caltrans reports that average daily traffic volumes on SR 20 are approximately 1,050 vehicles near Camptonville Road (Caltrans 2016).

Local Roadways

Marysville Road is a major route through the project site and is the sole road providing access across the New Bullards Bar Dam (Dam) in the north and south directions. Marysville Road intersects the project site at the ARC Spillway and continues northeast for approximately 5.5 miles until it comes to an end at SR 49. Additionally, from the intersection of Marysville Road and the ARC Spillway, Marysville Road continues southwest for approximately 25 miles before intersecting with SR 20. In 2007, the portion of Marysville Road from Oregon Hill Road to SR 49 experienced 663 average daily trips (ADT). The predicted ADT in 2030 is anticipated to be 3,200. (Yuba County 2011a.)

Bicycle Facilities

The *Yuba County Bikeway Master Plan Update* (Yuba County 2012) designates all bicycle lanes in Yuba County. Currently, however, there are no bicycle facilities within the vicinity of the project site. The closest bicycle facility to the project area is a bicycle lane (Class II) located along portions of Willow Glen Road within the Challenge-Brownsville community.

Airports

There are no airports located within the project vicinity. The closest airport is the Milhous Ranch Airport, located approximately 5.5 miles southeast of the project site. The Brownsville Aero Pine Airport is located approximately 9 miles northeast of the project site.

Transit

There are no transit services located within the project vicinity. The closest transit services are located within the City of Marysville.

Railroads

There are no railroads located within the project vicinity. Two separate Union Pacific Railroads run parallel to the Feather River through Yuba County.

3.16.2 Regulatory Setting

Federal Plans, Policies, Regulations, and Laws

Since only developed portions of the project site are in the Plumas National Forest (PNF), the PNF Land and Resource Management Plan (LRMP) is not discussed.

Title 49 of the Code of Federal Regulations

These regulations are administered by the United States Department of Transportation and govern the packing, labeling, materials compatibility, drivers' qualifications, and transport of hazardous materials. These regulations require that vehicles carrying explosive materials must be well maintained, properly marked with placards, and have a non-sparking floor. Prior to loading a vehicle with explosives, the vehicle must be fully fueled and inspected to ensure its safe operation, materials in contact with the explosives will be non-sparking, and the load will be covered with a fire- and water-resistant tarpaulin. Additionally, vehicles must be equipped with fire extinguishers and a copy of the Emergency Response Guidebook.

Tahoe National Forest Land and Resource Management Plan

The purpose of the TNF LRMP is to direct the management of the TNF and to ensure the wise use and protection of TNF resources; fulfill legislative requirements; and address local, regional, and national issues (USFS 1990). See Chapter 3.8, "Agriculture and Forestry Resources," for a full description of the TNF LRMP. The following management direction from the TNF LRMP pertaining to transportation is applicable to the proposed project.

Management Direction: Facilities

1. Develop an efficient and environmentally sound transportation system that provides access to TNF lands and appropriate access to private lands.

2. Manage existing transportation facilities to facilitate resource management, protect wildlife, meet water quality objectives, and provide safe recreation access.

The following Forest-wide Standards and Guidelines pertaining to transportation are applicable to the proposed project.

68. Transportation System Management

1. Restrict road, trail, and off-highway use to the extent necessary for protection of threatened, endangered, and sensitive plants or animals, essential wildlife functions, cultural resources, riparian zones and wetlands.

2. Eliminate motorized vehicle use in riparian areas and wetlands except on system roads and designated routes and stream crossings.

State Plans, Policies, Regulations, and Laws

Other than the California Environmental Quality Act (CEQA), no State plans, policies, regulations, or laws related to transportation/traffic apply to the project.

Regional/Local Plans, Policies, Regulations, and Ordinances

Metropolitan Transportation Plan/Sustainable Communities Strategy 2035

The Sacramento Area Council of Governments (SACOG) is an association of local governments in the six-county Sacramento region; members include the Counties of El Dorado, Placer, Sacramento, Sutter, Yolo, and Yuba, as well as 22 cities. SACOG provides transportation planning and funding for the region. In addition to preparing the region's long-range transportation plan, SACOG approves the distribution of affordable housing in the region and assists in planning for transit, bicycle networks, clean air, and airport land uses.

SACOG is the metropolitan planning organization responsible for developing the State- and Federally required metropolitan transportation plan (MTP) every 4 years. The *Metropolitan Transportation Plan/Sustainable Communities Strategy* (SACOG 2019) is the Federally mandated long-range planning document for identifying and programming roadway improvements throughout the Sacramento region. To receive Federal funding, transportation projects nominated by cities, counties, and agencies must be consistent with the MTP. The MTP was also adopted by the Yuba County Transportation Commission to serve as the County's regional transportation plan, a planning document developed by regional transportation planning agencies such as the Yuba County Transportation Commission in cooperation with Caltrans and other stakeholders. The plans are developed to provide a clear vision of regional transportation goals, policies, objectives, and strategies. This vision must be realistic and within fiscal constraints.

Yuba County 2030 General Plan

The following goals and policies from the Yuba County 2030 General Plan Community Development Element are relevant to transportation and the proposed project (Yuba County 2011a).

GOAL CD 20: **Connectivity**. Multiple connections to promote circulation and emergency access throughout valley and foothill communities.

- **Policy CD 20.1.** New developments shall be designed to discourage concentration of traffic at a few intersections. Multiple points of access shall be provided, wherever feasible.

3.16.3 Environmental Impacts and Mitigation Measures

Thresholds of Significance

The significance criteria used to evaluate the project impacts to transportation and circulation are based on **Appendix G** of the State CEQA Guidelines. A significant impact related to transportation would occur if the project would:

- conflict with a program, plan, ordinance or policy addressing the circulation system, including transit, roadway, bicycle, and pedestrian facilities;
- conflict or be inconsistent with State CEQA Guidelines Section 15064.3, subdivision (b);
- substantially increase hazards due to a geometric design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment); or
- result in inadequate emergency access.

Yuba County has adopted an Emergency Operations Plan (EOP) (2015) that outlined procedures to follow in the event of a natural, man-made, or technological disaster. Refer to Chapter 3.11, "Hazards and Hazardous Materials," for further discussion of impacts related to the EOP. This section evaluates potential impacts related to emergency access on Marysville Road.

Analysis Methodology

Evaluation of the potential impacts of the proposed project on transportation was based on a review of planning documents pertaining to the project area, particularly the Yuba County 2030 General Plan (Yuba County 2011a) and the Final Yuba County 2030 General Plan Environmental Impact Report (Yuba County 2011b), and the TNF LRMP (USFS 1990). Estimates of vehicles miles traveled (VMT) from project construction activities were obtained from the CalEEMod model used to estimate criteria air pollutant and greenhouse gas emissions.

Public Comments

Comments submitted in response to the Notice of Preparation were reviewed for relevance to the analysis of environmental consequences and development of mitigation measures. There was one verbal comment regarding temporary impacts to Marysville Road.

Issues Not Discussed Further in this EIR

Conflict with a Program, Plan, Ordinance, or Policy Addressing the Circulation System

The proposed project would not alter the compatibility of uses served by the roadway network since the project would not result in a permanent increase in vehicular traffic or other modes of transportation. Furthermore, the project would not conflict with any programs, plans, ordinances, or policies addressing the circulation system in Yuba County. Therefore, there would be no impact from the project and this issue is not discussed further in this Environmental Impact Report (EIR).

Conflict with State CEQA Guidelines Section 15064.3(b) during Operations

Operation and maintenance of the ARC Spillway and related facilities would occur during existing inspections and maintenance trips conducted by Yuba County Water Agency (YCWA) staff for the Dam and Primary Spillway. The project would not generate new vehicle trips and VMT and would not conflict with State CEQA Guidelines Section 15064.3(b) during project operations and maintenance. Therefore, there would be no impact from the project and this issue is not discussed further in this EIR.

Impact Analysis

Impact TR-1: Temporary Increase in Vehicle Miles Traveled During Construction.

The proposed project would generate a temporary increase in VMT during the construction period from mobilization and demobilization of construction equipment, materials deliveries, off hauling construction debris, hauling of excavated soil and rock to the disposal area, and worker vehicle trips. Daily worker commutes and hauling trips for disposal of soil and rock would generate the most trips. Up to 75 construction workers would be present at any given time and would generate approximately 3,521,610 VMT from total workers trips over the construction period. Additionally, over the construction period, the project would generate 167,111 VMT from import and export of materials, 2,153 VMT from concrete transfers, and 100,298 VMT from delivery of construction equipment to the site, all during the construction phase. No reduction in VMT from the proposed project is possible since

trips would be generated solely for construction activities. VMT from hauling excavated soil and rock would be minimized from development of the soil and rock disposal area nearby the areas where this material is excavated—the ARC Spillway and relocated Overlook Site and Marysville Road sites. VMT generated from the proposed project would be limited to construction activities and temporary during the construction period. Therefore, this impact is **less than significant**. Other impacts associated with additional VMT generated by the proposed project are evaluated in Chapter 3.5, "Air Quality," and Chapter 3.6, "Greenhouse Gas Emissions."

Mitigation Measures: No mitigation is required.

Impact TR-2: Result in Inadequate Emergency Access along Marysville Road During Construction.

Emergency access through the project site and vicinity is provided via Marysville Road, which consists of a two-lane road that services much of Yuba County. Marysville Road is the only roadway that provides access from the City of Marysville to the project site and through to SR 49. A two-lane temporary detour of Marysville Road would be established north of the current alignment for approximately 3 years during construction. Vehicle speed would be reduced to 20 miles-per-hour on and within the vicinity of the temporary detour. Additional or different traffic controls through the detour would be implemented as required by the Yuba County encroachment permit.

For most of this 3-year period the temporary detour would have two lanes, allowing two-way traffic to continue along Marysville Road through the project site. However, a one-way flagging operation stationed upstream and downstream of the construction area would be in place along the temporary detour for no more than 60 days during the final stages of constructing the permanent Marysville Road relocation.

Emergency access would be maintained through the project site and vicinity the same as the existing roadway. After the downstream construction phase, an approximately 1,150-foot permanent two-lane relocation of Marysville Road would be constructed, as shown in Figure 2-1. Yuba County has provided input on the design of the road relocation and would issue an encroachment permit for approval of the final design. The relocated Marysville Road would provide emergency access through the project site and vicinity the same as the existing roadway. Construction equipment would periodically need to perpendicularly cross the relocated road to finish construction of the approach channel and would be controlled as required by the Yuba County encroachment permits, such as with use of a flagger.

Haul trucks would use Marysville Road to access the project site for deliveries during construction. Hauling of excavated soil and rock to the disposal area would primarily occur on temporary haul routes established for the project on YCWA-owned lands and USFS Road 0008-010. However, a small portion of hauling truck trips may use Marysville Road from the project site to the south (not over the Dam) to access USFWS Road 0008-010. In addition, construction equipment would periodically travel along Marysville Road to access the project site and the staging area north of the Dam near the parking area for the Emerald Cove Marina. These uses of Marysville Road for construction equipment would temporary slow traffic speeds but would not impede emergency vehicles traveling along Marysville Road.

The proposed project would result in temporary traffic delays due to road closures from blasting and use of heavy construction equipment from implementation of the proposed project. During approximately 200 days of construction, it is anticipated that one to two 15-minute delays per day would be needed on Marysville Road to conduct blasting activities. The use of a temporary detour and closures for blasting and equipment crossing has the potential to temporarily slow down or impede emergency vehicles trying to travel along Marysville Road in either direction to access areas on the opposite side of the Dam. Temporarily impeding access to emergency vehicles along Marysville Road at the Dam would affect response times for emergency response providers during the project's construction phase. Therefore, this impact would be **potentially significant**.

Mitigation Measures: The following mitigation measure has been identified to address this impact.

Mitigation Measure TR-1: Implement a Traffic Safety Plan and Coordinate with Local Emergency Service Providers.

a) The construction contractor(s) will develop a traffic safety and management plan for portions of Marysville Road that would be affected by construction traffic. Before the start of construction-related activities involving high volumes of traffic, the plan will be submitted for review by Yuba County, the agency with responsibility for public roadway safety at the project site. A fundamental goal of the Traffic Safety Plan will be to minimize construction-related delays to the greatest extent feasible. The plan will call for the following elements:

   - in the event of an emergency, procedures for halting construction activities including blasting and flagging operations to allow emergency vehicles to pass more easily;
   - posting warnings about the potential presence of slow-moving vehicles;
   - using traffic control personnel when appropriate; and
   - placing and maintaining barriers and installing traffic control devices necessary for safety, as specified in Caltrans's California Manual on Uniform Traffic Control Devices (2014) and in accordance with county requirements.

b) The contractor(s) will train construction personnel in appropriate safety measures as described in the traffic safety and management plan and will implement the plan. The plan will include the prescribed locations for staging equipment and parking trucks and vehicles. Provisions will be made for overnight parking of haul trucks to avoid causing traffic or circulation congestion.

c) Before project construction begins, YCWA and/or its construction contractor(s) will provide notification of project construction and potential delays and closure of Marysville Road to all appropriate emergency service providers in Yuba County, and will coordinate with providers throughout the construction period to maintain emergency access through construction areas to the extent possible. Coordination shall include notice of when temporary road closures are anticipated.

d) YCWA and/or its construction contractor(s) will suspend construction blasting activities and closures of Marysville Road during a fire requiring evacuations and emergency crews on Marysville Road.

Timing: Before and during construction.

Responsibility: YCWA and its construction contractor(s).

Implementation of Mitigation Measure TR-1 would reduce the impact related to inadequate emergency access along Marysville Road by requiring a traffic plan focused on minimizing construction-related traffic delays, coordination with emergency service providers, and halting construction activities and temporary road closures during an emergency. With this plan, it is anticipated temporary delays to emergency access through the project site could be avoided or would have minimal effects on response times. Therefore, this impact would be **less than significant with mitigation**.

Impact TR-3: Increase Hazards Due to Relocating Marysville Road.

As stated in Impact TR-2 above, Marysville Road would first be modified for a temporary construction detour for approximately 3 years of construction and then permanently relocated as part of the proposed project. The temporary detour would feature a two-way road with reduced speeds and a one-way flagging operation stationed upstream and downstream of the construction area for up to 60 days. Both the permanent relocation of Marysville Road and the temporary detour are subject to the Yuba County encroachment permit. Neither the temporary detour nor the relocated Marysville Road would not introduce sharp curves. Horizontal curves within the temporary section would be designed to accommodate a WB-50 Truck, which has a minimum turning radius of 45 feet. A 100-foot-long lane taper length would be used for transition into the one lane – two-way traffic control section. The permanent road would be an asphalt-concrete paved road of similar width and characteristics to the existing road. The design standards for the permanent road would be the same as those applicable to the existing road. Therefore, the temporary construction detour and permanent relocation of Marysville Road would not increase hazards due to a geometric design feature. This impact would be **less than significant**.

Mitigation Measures: No mitigation is required.

Residual Significant Impacts

The project would result in potential significant impacts related to inadequate emergency access, but a mitigation measure would be implemented to reduce potential impacts a less-than-significant level. Therefore, the project would not result in residual significant impacts related to transportation, and, with imposition of the mitigation measures identified above, the project would not have any significant and unavoidable impacts related to transportation.

3.17 Utilities and Service Systems

This section characterizes the existing utilities and service systems within and near the New Bullards Bar Dam Atmospheric River Control (ARC) Spillway Project (project or proposed project) site and evaluates impacts to utilities and service services that would result from implementing the proposed project.

3.17.1 Environmental Setting

Water Supply

Formed in 1959, the Yuba County Water Agency (YCWA) manages surface water supplies in Yuba County. YCWA is a major water rights holder on the Yuba River. YCWA diverts water for consumptive uses, and under YCWA's permits directs diversions of up to a total rate of 1,593 cfs from the Lower Yuba River from September 1 to June 30 for irrigation and other uses, and up to 1,250,000 af from October 1 to June 30 to storage in the Reservoir (YCWA Integrated Regional Water Management Group 2018). YCWA provides approximately 260,000 af of wholesale water supplies to its eight member units which includes: Brophy Water District, Browns Valley Irrigation District, Cordua Irrigation District, Dry Creek Mutual Water Company, Hallwood Irrigation District, Ramirez Water District, South Yuba Water District, and Wheatland Water District.

In addition to water supply, YCWA's functions also include flood protection, fisheries enhancement, recreation, and the development and sale of hydroelectric power. YCWA has actively facilitated the conjunctive use of groundwater by its member units to reduce demand for surface water in times of limited supply, and to increase Statewide water supplies by making surface water available for transfer to meet environmental or other demands through groundwater substitution.

The New Bullards Bar Reservoir (Reservoir), owned and operated by YCWA, has a gross storage capacity of 966,400 af, and provides water supply for both irrigation and domestic purposes. Releases from the Reservoir are made through the New Colgate Powerhouse on the Yuba River, the New Bullards Bar Minimum Flow Powerhouse at the base of the dam, a low-level outlet at the base of the dam, and/or the gated Primary Spillway (YCWA Integrated Regional Water Management Group 2018). To get to the New Colgate Powerhouse, water is carried nearly 5 miles from the Reservoir through a 26-foot-diameter tunnel, and then makes its way down a 15-foot-diameter penstock to two cast turbines at the New Colgate Powerhouse.

Within the project site, a water line extending in Marysville Road to a nearby campground would require relocation as part of the project.

Stormwater Drainage

Much of the rainfall from winter storms in the project vicinity percolates through the ground as groundwater recharge. To control stormwater runoff, Yuba County operates and maintains a drainage system consisting of roads with drainage systems, catch basins, water basins, detention basins, constructed wetlands, artificial channels, curbs, gutters, ditches, sumps, pumping stations, storm drain inlets, and storm drains, which provide stormwater drainage to unincorporated county lands (Yuba County 2011b).

Wastewater

The project site is not located within the boundaries of the 11 State-regulated wastewater treatment facilities in Yuba County (Yuba County 2011a). Properties not served by a public wastewater provider generally use private septic systems.

Solid Waste

Solid waste in Yuba County is disposed of at the Recology Ostrom Road Landfill located in Wheatland, California (CalRecycle 2019). The facility consists of 261 acres and has a remaining capacity of 39,223,000 cubic yards. The site is permitted to accept municipal and industrial solid waste, agricultural waste, ash, wastewater treatment sludge (biosolids), construction and demolition debris, green waste and food waste, contaminated soils, tires, and nonfriable asbestos (CalRecycle 2019).

Electrical Service

Pacific Gas and Electric (PG&E) provides electricity and natural gas to Yuba County. Local water agencies have hydroelectric facilities that generate electricity, such as the New Bullards Bar Dam (Dam), but all electricity generated at these facilities is delivered to PG&E. Overhead power lines located along Marysville Road and approximately 320 feet south of the northern opening of the United States Forest Service Road 0008-010 and extending approximately 1.2 miles before connecting with Marysville Road distribute electricity to the project site.

3.16.1 Regulatory Setting

Other than the California Environmental Quality Act (CEQA), no Federal, State, regional, or local plans, policies, regulations, or laws related to utilities and public services apply to the project site.

3.16.2 Environmental Impacts and Mitigation Measures

Thresholds of Significance

Significance criteria are based on Appendix G of the State CEQA Guidelines. Implementing the project would have a significant impact on utilities and service systems if it would:

- require or result in the relocation or construction of new or expanded water, wastewater treatment or storm water drainage, electric power, natural gas, or telecommunications facilities, the construction or relocation of which could cause significant environmental effects;
- lack sufficient water supplies to serve the project and reasonably foreseeable future development during normal, dry, and multiple dry years;
- require or result in the construction of new water or wastewater treatment facilities or expansion of existing facilities, the construction of which could cause significant environmental effects;
- result in a determination by the wastewater treatment provider that serves or may serve the project that it lacks adequate capacity to serve the project's projected demand in addition to the provider's existing commitments;
- generate solid waste in excess of State or local standards, or in excess of the capacity of local infrastructure, or otherwise impair the attainment of solid waste reduction goals; or

- not comply with Federal, State, and local management and reduction statutes and regulations related to solid waste.

Water deliveries to downstream water users/water right holders is addressed in Chapter 3.1, "Hydrology and Water Quality."

Analysis Methodology

The evaluation of potential utilities and service systems impacts was based on a review of documents pertaining to the project area, including the Final Yuba County 2030 General Plan Environmental Impact Report (Yuba County 2011b).

Public Comments

Comments submitted in response to the Notice of Preparation were reviewed for relevance to the analysis of environmental consequences and development of mitigation measures. There were no comments submitted regarding utilities and service system impacts.

Impact Analysis

Impact UTL-1: Relocation of Existing Utility Infrastructure.

As discussed in Chapter 2, "Project Description," the relocation of existing utilities within the vicinity of Marysville Road would be required as part of the project. At least one of the existing power poles on the existing PG&E 12.5kV overhead line would need to be relocated as part of the project. A new overhead line would be installed extending from an existing pole to a new pole at the operations pad and 12.5 kV power conductors would be installed in an underground duct bank to a new pad-mounted transformer. These activities would occur within the potential construction areas for the project. Additionally, a portion of Marysville Road would require removal, establishing a temporary detour, and then permanent relocation as part of the project. During the relocation of Marysville Road, the water line to the campground and any other utilities in Marysville Road would be managed in-place during the temporary construction detour and temporary relocated for a time (within the project site) before final relocation in the new Marysville Road alignment. Relocation of existing utilities would occur within the potential construction areas for the project.

Due to the temporary removal and relocation of the above-mentioned utilities, coordination with the utility owners/providers would be required in advance of construction to identify infrastructure locations and appropriate protection measures, and temporary bypasses may be required for some. Any required utility relocation would be conducted either in advance of or concurrent with project construction activities.

Although steps would be taken to minimize potential impacts to utilities, project construction activities, including grading and excavation, could inadvertently damage identified and unidentified utility equipment and facilities. In addition, required relocation of existing utilities could result in interruptions in service. Furthermore, the extent and intensity of project construction activities could affect service providers' abilities to quickly repair damage and/or restore interrupted service. Therefore, this temporary impact would be **potentially significant**.

Mitigation Measures: The following mitigation measure has been identified to address this impact.

Mitigation Measure UTL-1: Verify Utility Locations, Coordinate with Affected Utility Providers, Prepare and Implement a Response Plan, and Conduct Worker Training with Respect to Accidental Utility Damage.

YCWA will implement the following measures before construction begins to avoid and minimize potential damage to utilities, infrastructure, and service disruptions during construction.

- Coordinate with applicable utility and service providers to implement orderly relocation of utilities that need to be removed or relocated.
- Provide notification of any potential interruptions in service to the appropriate agencies and affected landowners.
- Verify through field surveys and Underground Service Alert service the locations of buried utilities in the project site, including natural gas, petroleum, and sewer pipelines. Any buried utility lines will be clearly marked in the area of construction (e.g., in the field) and on the construction specifications in advance of any earth-moving activities.
- Prepare and implement a response plan that addresses potential accidental damage to a utility line. The plan will identify chain-of-command rules for notification of authorities and appropriate actions and responsibilities regarding the safety of the public and workers. A component of the response plan will include worker education training in response to such situations.
- Stage utility relocations prior to and during construction to minimize interruptions in service.
- Coordinate with PG&E to relocate electrical and natural gas transmission lines and associated infrastructure such as power poles.

Timing: Before and during construction activities.

Responsibility: YCWA and its construction contractor(s).

Implementing Mitigation Measure UTL-1 would reduce the potentially significant impact associated with disruption of utilities because YCWA would coordinate with affected utility service providers and consumers to minimize utility interruptions and inadvertent damage to unknown buried utilities to the maximum extent feasible, prepare a response plan to address service interruptions, and relocate and install disturbed utilities comparable to existing conditions. Therefore, the project would result in a **less than significant with mitigation**.

Impact UTL-2: Have Sufficient Water Supply.

The project would not require the construction of new water treatment facilities. The gate control building (GCB) would require domestic water for the toilet and kitchenette; however, this water would be provided by an existing water line in Marysville Road or a tank to be filled with potable water would be installed. Water use at the GCB would be minimal as the GCB would store equipment and only be used by individuals to oversee operations and maintenance activities. No other water supply would be needed for the operations and maintenance of the project as the purpose of the project is to improve flood protection. Therefore, this impact would be **less than significant**.

Mitigation Measures: No mitigation is required.

Impact UTL-3: Inadequate Wastewater Service Capacity.

The project would not require the construction of new wastewater treatments facilities; however, a small amount of wastewater would be generated at the GCB and stored in an on-site below-ground storage tank before being periodically pumped out by a truck-mounted pump and tank for proper disposal offsite. Due to the minimal amount of wastewater that would be generated, the proposed project would have a **less than significant** impact.

Mitigation Measures: No mitigation is required.

Impact UTL-4: Generation of Solid Waste Potentially Exceeding Permitted Capacity of Local Landfills.

Project construction activities would generate organic and non-organic solid waste. Sources of organic waste related to construction activities would include soils, rocks, cleared vegetation, and woody debris. Soil and rocks excavated for the implementation of the proposed project would be reused onsite to the extent possible. Excess soil and rock and some woody vegetation would be disposed of at the soil and rock disposal area developed with the project (Figures 2-5 and 2-6).

Non-organic solid waste would include construction debris and structural debris such as roadway pavement. Generation of construction debris would be primarily from construction of the control structure and GCP and is anticipated to be minimal. Some vegetation would also require offhauling. The existing pavement that would be demolished for the relocation of Marysville Road and additional pavement used for the temporary detour of Marysville Road would be demolished. Construction debris and pavement would be disposed of at an off-site recycling or disposal facility, such as the Recology Ostrom Road Landfill. Waste generated from the project would represent a negligible amount of remaining capacity at this landfill (39,223,000 cubic yards). Since only a small amount of material would be disposed of off-site, this impact would be **less than significant**.

Mitigation Measures: No mitigation is required.

Residual Significant Impacts

The project would result in potential significant impacts related to utilities and service systems, but a mitigation measure would be implemented to reduce potential utility impacts to a less-than-significant level. Therefore, the project would not result in residual significant impacts related to utilities and service systems, and, with imposition of the mitigation measure identified above, the project would not have any significant and unavoidable impacts related to utilities and service systems.

3.18 Wildfire

This section characterizes the existing environmental setting (including wildfire sources and conditions) of the New Bullards Bar Dam Atmospheric River Control (ARC) Spillway Project (project or proposed project) area, summarizes applicable policies, and evaluates the potential for wildfire impacts that would result from implementing the proposed project.

3.18.1 Environmental Setting

The combination of hot and dry summer weather, steep topography, and dense vegetation in portions of the unincorporated rural portion of Yuba County creates hazardous fire conditions. The foothill and mountain areas tend to be most vulnerable to fire hazard in the county. The county has a Mediterranean climate characterized by hot dry summers and mild to cool winters typical of much of the Sierra Nevada Mountain Range. There is only minor precipitation from June through October, and most precipitation falls from November through April. Precipitation increases with elevation, and ranges from about 20 inches at Browns Valley to over 70 inches at Camptonville. Vegetation growth correlates with precipitation, and the higher elevation areas, including within the Camptonville Community Service District, where the project is located, and Foothill Fire Protection District have substantially higher loads of shrub, oak, and conifer vegetation (Yuba Watershed Protection & Fire Safe Council 2014).

As defined by the Public Resources Code (PRC) 4126, State Responsibility Areas (SRAs) are State- and privately owned forest, watershed, and rangeland for which the primary financial responsibility of preventing and suppressing wildland fires rests with the State. SRAs, by definition, do not include any lands within city limits. The proposed project lies entirely within an SRA and is designated by the California Department of Forestry and Fire Protection (CAL FIRE) as containing both moderate and very high severity fire zone (**Figure 3.18-1**) (CAL FIRE 2022). Adjacent to the project site are areas of Federal Responsibility Areas, where Federal agencies have the financial responsibility of preventing wildfires.

Half of Yuba County is susceptible to wildland fires; the area from Loma Rica to Challenge and Camptonville is particularly vulnerable. High temperatures, low humidity, and high winds may exacerbate the potential for wildland fires. The Yuba Watershed Protection & Fire Safe Council has prepared the Yuba County Foothills Community Wildfire Protection Plan (2014) to assist public agencies in making valid and timely decisions for wildfire evacuations and identify methods to use to provide wildfire prevention and mitigation. Additionally, the Yuba Watershed Protection & Fire Safe Council has recently targeted fuel reduction along roads as a focus of activity in the Yuba County foothills. The Council has partnered with the Yuba County Public Works Department to reduce fuels along public roadways that prevent or slow the spread of vehicle fires into adjacent wildlands (Yuba County 2011b).

The Yuba County Foothills Community Wildfire Protection Plan states that the Camptonville Community Service District has a very high level of fire risk due to the high number of forestland parcels (Deer Creek Resources, LLC et al. 2014). Fire protection services are provided through CAL FIRE, the United States Forest Service (USFS), and the Camptonville Community Service District.

Site Characteristics

The project site is located in the northern Sierra Nevada within a terrain subregion characterized by rolling to flat ridge tops interspersed with deep valleys. The ARC Spillway, soil and rock disposal area, construction areas, and the majority of the haul routes are within the Tahoe National Forest. The staging area at the New Bullards Bar Marina (Marina) parking lot and a small portion of the haul route along the existing Marysville Road is within the Plumas National Forest. The area surrounding the New Bullards Bard Dam (Dam) includes dense forest cover consisting of mixed conifer, live oak, black oak, and madrone–typical of the foothills transition areas and lower elevations of the Sierra Nevada. The land at the project site is zoned as Resource Preservation and Recreation District.

Fire History

On an annual basis between May through October, the foothill areas of Yuba County face a serious threat from wildland fires. Fires have destroyed thousands of acres of property and vegetation in the County. The fire history data for the area surrounding the project site are based on CAL FIRE's California Statewide Incident Maps and CAL FIRE's Fire Resource Assessment Program, *California's Forests and Rangeland 2017 Assessment*, which assesses the amount and extent of California's forests and rangelands, analyzes their conditions, and identifies alternative management and policy guidelines (CAL FIRE 2017 and 2023). According to data available from CAL FIRE's Incident Maps, there have been 28 fires within Yuba County since 2013. Of these fires, the largest ones that occurred in the vicinity of the project site include: (1) the Rice's Fire, which burned 904 acres from June 28 to July 11, 2022, at Rice's Crossing Road and Cranston Road, (2) the Cascade Fire, which burned 9,989 acres from October 8, 2017, to February 9, 2018, along Cascade Way and Marysville Road north of Collins Lake, and (3) the Bullard Fire, which burned 1,307 acres from August 27 to 31 2010 at Bullards Bar Dam and Marysville Road – 3 miles east of Dobbins.

Emergency Response

Marysville Road is used by CAL FIRE, USFS, and the California Highway Patrol, as well as local protection agencies such as the Camptonville Community Service District, Yuba County Sheriff's Department, Marysville Police Department, and Wheatland Police Department, to provide emergency services to a large portion of Yuba County. During large emergency events, the Yuba County Office of Emergency Services (OES) coordinates all emergency management between public safety and service providers. During emergency events, the County uses the Standardized Emergency Management System and the Incident Command System to coordinate between police, fire, military personnel, medical service providers, the Federal Emergency Management Agency, and other agencies.

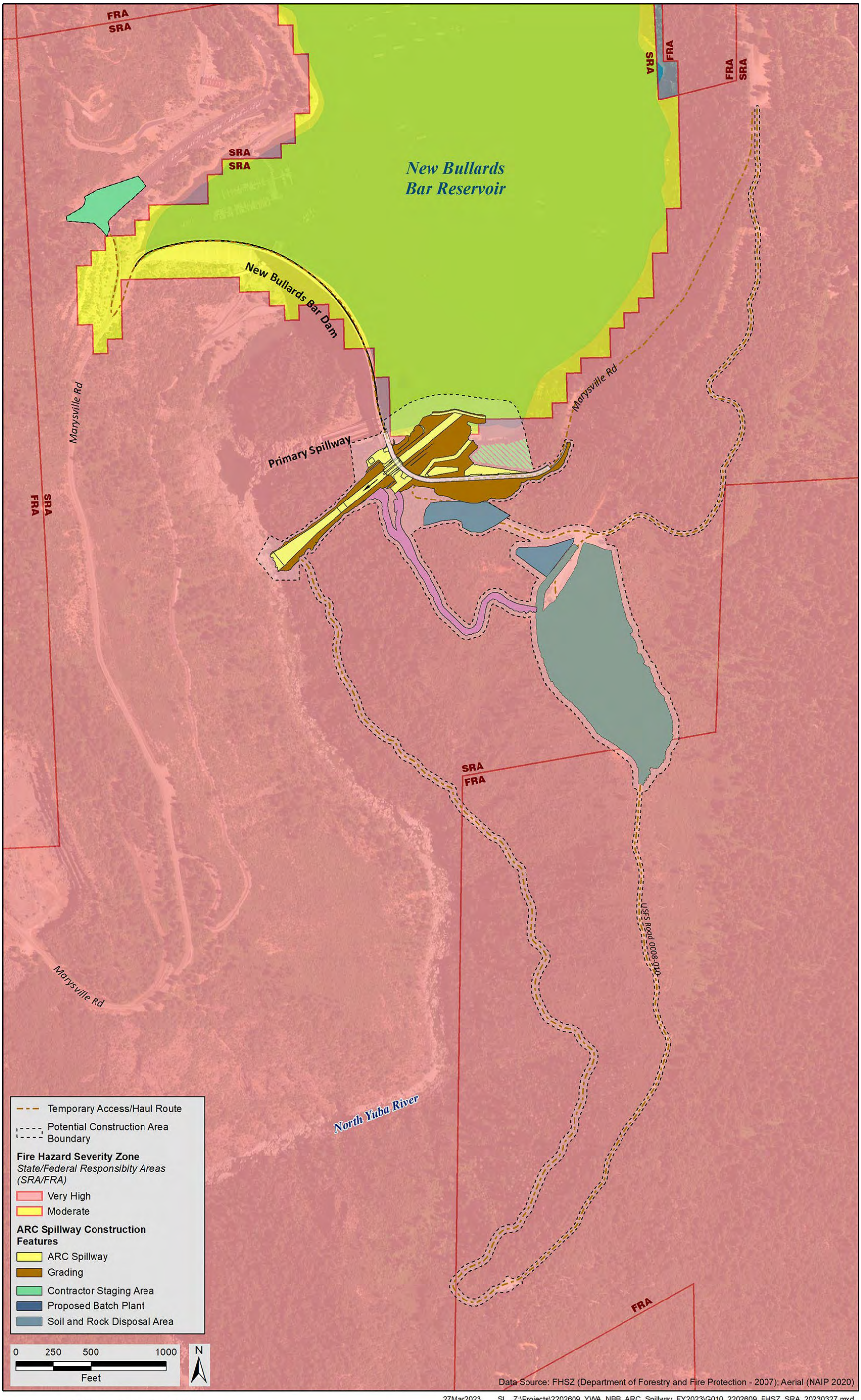


Figure Source: GEI Consultants, Inc. 2023.
Data source: CAL FIRE 2022

Figure 3.18-1 CAL FIRE Fire Hazard Severity Zones in State Responsibility Areas

3.18.2 Regulatory Setting

Federal Plans, Policies, Regulations, and Laws

No Federal plans, policies, regulations, or laws related to wildfire resources apply to the proposed project.

State Plans, Policies, Regulations, and Laws

California Department of Forestry and Fire Protection

CAL FIRE is dedicated to protecting the people of California from fires, hazardous material spills, train wrecks, floods, and earthquakes, and providing medical aid, swift water rescues, and search and rescue missions. The Office of the State Fire Marshal supports the CAL FIRE mission to protect life and property through fire prevention engineering programs, law and code enforcement, and education. CAL FIRE's mission emphasizes managing and protecting California's natural resources, a goal that is accomplished through ongoing assessment and study of the State's natural resources and an extensive CAL FIRE Resource Management Program. CAL FIRE oversees enforcement of California's forest practice regulations, which guide timber harvesting on private lands. Reviews and inspections ensure protection of watershed and wildlife, as well as renewal of timber resources. Department foresters and fire personnel work closely to encourage and implement fuels management projects to reduce the threat of uncontrolled wildfires.

California Public Resources Code

The PRC contains law relating to natural resources; the conservation, utilization, and supervision thereof, along with mines and mining, oil and gas, and forestry. The following sections of the PRC are relevant to the proposed project:

PRC 4201 – 4204 – Fire Hazard Severity Zones

California PRC Sections 4201 – 4202 and Government Code Sections 51175-89 direct CAL FIRE to map areas of significant fire hazard, known as fire hazard severity zones, based on fuels, terrain, weather, and other relevant factors. Fire hazard severity zones were defined to identify measures to be taken to retard the rate of spreading and to reduce the potential intensity of uncontrolled fires that threaten to destroy resources, life, or property.

During the fire hazard season, these regulations include:

a) restrict the use of equipment that may produce a spark, flame, or fire;

b) require the use of spark arrestors on any equipment that has an internal combustion engine;

c) specify requirements for the safe use of gasoline-powered tools in fire hazard areas; and

d) specify fire suppression equipment that must be provided onsite for various types of work in fire-prone areas.

CAL FIRE has primary responsibility for fire protection within SRAs An SRA is defined as the part of the State where CAL FIRE is primarily responsible for providing basic wildland fire protection assistance. Areas under the jurisdiction of other fire protection services are Local Responsibility Areas or on Federal lands are considered Federal Responsibility Areas.

PRC 4290

a) The board shall adopt regulations implementing minimum fire safety standards related to defensible space that are applicable to state responsibility area lands under the authority of the department, and to lands classified and designated as very high fire hazard severity zones, as defined in subdivision (i) of Section 51177 of the Government Code. These regulations apply to the perimeters and access to all residential, commercial, and industrial building construction within SRAs approved after January 1, 1991, and within lands classified and designated as very high fire hazard severity zones, as defined in subdivision (i) of Section 51177 of the Government Code, after July 1, 2021. The board may not adopt building standards, as defined in Section 18909 of the Health and Safety Code, under the authority of this section. As an integral part of fire safety standards, the State Fire Marshal has the authority to adopt regulations for roof coverings and openings into the attic areas of buildings specified in Section 13108.5 of the Health and Safety Code. The regulations apply to the placement of mobile homes as defined by National Fire Protection Association standards. These regulations do not apply where an application for a building permit was filed prior to January 1, 1991, or to parcel or tentative maps or other developments approved prior to January 1, 1991, if the final map for the tentative map is approved within the time prescribed by the local ordinance. The regulations shall include all of the following:

    i) Road standards for fire equipment access.
    ii) Standards for signs identifying streets, roads, and buildings.
    iii) Minimum private water supply reserves for emergency fire use.
    iv) Fuel breaks and greenbelts.

b) The board shall, on and after July 1, 2021, periodically update regulations for fuel breaks and greenbelts near communities to provide greater fire safety for the perimeters to all residential, commercial, and industrial building construction within SRAs and lands classified and designated as very high fire hazard severity zones, as defined in subdivision (i) of Section 51177 of the Government Code, after July 1, 2021. These regulations shall include measures to preserve undeveloped ridgelines to reduce fire risk and improve fire protection. The board shall, by regulation, define “ridgeline” for purposes of this subdivision.

c) These regulations do not supersede local regulations which equal or exceed minimum regulations adopted by the State.

d) The board may enter into contracts with technical experts to meet the requirements of this section.

PRC 4427

During any time of the year when burning permits are required in an area pursuant to this article, no person shall use or operate any motor, engine, boiler, stationary equipment, welding equipment, cutting torches, tarpots, or grinding devices from which a spark, fire, or flame may originate, which is located on or near any forest-covered land, brush-covered land, or grass-covered land, without doing both of the following:

a) First clearing away all flammable material, including snags, from the area around such operation for a distance of 10 feet.

b) Maintain one serviceable round point shovel with an overall length of not less than forty-six (46) inches and one backpack pump water-type fire extinguisher fully equipped and ready for use at the immediate area during the operation.

This section does not apply to portable power saws and other portable tools powered by a gasoline-fueled internal combustion engine.

PRC 4428

No person, except any member of an emergency crew or except the driver or owner of any service vehicle owned or operated by or for, or operated under contract with, a publicly or privately owned utility, which is used in the construction, operation, removal, or repair of the property or facilities of such utility when engaged in emergency operations, shall use or operate any vehicle, machine, tool or equipment powered by an internal combustion engine operated on hydrocarbon fuels, in any industrial operation located on or near any forest, brush, or grass-covered land between April 1 and December 1 of any year, or at any other time when ground litter and vegetation will sustain combustion permitting the spread of fire, without providing and maintaining, for firefighting purposes only, suitable and serviceable tools in the amounts, manner and location prescribed in this section.

a) On any such operation a sealed box of tools shall be located, within the operating area, at a point accessible in the event of fire. This fire toolbox shall contain: one backpack pump-type fire extinguisher filled with water, two axes, two McLeod fire tools, and a sufficient number of shovels so that each employee at the operation can be equipped to fight fire.

b) One or more serviceable chainsaws of three and one-half or more horsepower with a cutting bar 20 inches in length or longer shall be immediately available within the operating area, or, in the alternative, a full set of timber-felling tools shall be located in the fire toolbox, including one crosscut falling saw six feet in length, one double-bit ax with a 36-inch handle, one sledge hammer or maul with a head weight of six, or more, pounds and handle length of 32 inches, or more, and not less than two falling wedges.

c) Each rail speeder and passenger vehicle, used on such operation shall be equipped with one shovel and one ax, and any other vehicle used on the operation shall be equipped with one shovel. Each tractor used in such operation shall be equipped with one shovel.

d) As used in this section:

    (1) “Vehicle” means a device by which any person or property may be propelled, moved, or drawn over any land surface, excepting a device moved by human power or used exclusively upon stationary rails or tracks.

    (2) “Passenger vehicle” means a vehicle which is self-propelled and which is designed for carrying not more than 10 persons including the driver, and which is used or maintained for the transportation of persons, but does not include any motortruck or truck tractor.

PRC 4431

During any time of the year when burning permits are required in an area pursuant to this article, no person shall use or operate or cause to be operated in the area any portable saw, auger, drill, tamper, or other portable tool powered by a gasoline-fueled internal combustion engine on or near any forest-covered land, brush-covered land, or grass-covered land, within 25 feet of any flammable material, without providing and maintaining at the immediate locations of use or operation of the saw or tool, for firefighting purposes one serviceable round point shovel, with an overall length of not less than 46 inches, or one serviceable fire extinguisher. The Director of Forestry and Fire Protection shall by administrative regulation specify the type and size of fire extinguisher necessary to provide at least minimum assurance of controlling fire caused by use of portable power tools under various climatic and fuel conditions.

The required fire tools shall at no time be farther from the point of operation of the power saw or tool than 25 feet with unrestricted access for the operator from the point of operation.

PRC 4442

Except as otherwise provided in this section, no person shall use, operate, or allow to be used or operated, any internal combustion engine which uses hydrocarbon fuels on any forest-covered land, brush-covered land, or grass-covered land unless the engine is equipped with a spark arrester, as defined in subdivision (c), maintained in effective working order or the engine is constructed, equipped, and maintained for the prevention of fire pursuant to Section 4443.

a) Spark arresters affixed to the exhaust system of engines or vehicles subject to this section shall not be placed or mounted in such a manner as to allow flames or heat from the exhaust system to ignite any flammable material.

b) A spark arrester is a device constructed of nonflammable materials specifically for the purpose of removing and retaining carbon and other flammable particles over 0.0232 of an inch in size from the exhaust flow of an internal combustion engine that uses hydrocarbon fuels or which is qualified and rated by the United States Forest Service.

c) Engines used to provide motive power for trucks, truck tractors, buses, and passenger vehicles, except motorcycles, are not subject to this section if the exhaust system is equipped with a muffler as defined in the Vehicle Code.

d) Turbocharged engines are not subject to this section if all exhausted gases pass through the rotating turbine wheel, there is no exhaust bypass to the atmosphere, and the turbocharger is in effective mechanical condition.

e) Motor vehicles when being operated in an organized racing or competitive event upon a closed course are not subject to this section if the event is conducted under the auspices of a recognized sanctioning body and by permit issued by the fire protection authority having jurisdiction.

California Building Code

The California Building Code (CBC) includes regulations that are consistent with nationally recognized and acceptable practice, intended to facilitate protection of life and property from hazards of fire explosion; management and control of the storage, handling, and use of hazardous materials and devices; mitigation of conditions considered hazardous to life or property in the use or occupancy of buildings; and provisions to assist emergency response personnel.

Chapter 7 of the CBC details the materials, systems, and assemblies used in the exterior design and construction of new buildings located within an SRA or Wildland-Urban Interface Fire Area. A Wildland-Urban Interface Area is defined in Section 702A as a geographical area identified by the areas of a fire hazard severity zones in accordance with PRC Sections 4201 through 4204 and Government Code Sections 51175 through 51189, or other areas designated by the enforcing agency to be at a significant risk from wildfires. Fire hazard severity zones are geographical areas classified as Very High, High, or Moderate in SRAs or as Local Responsibility Areas as Very High Fire Hazard Severity Zones. Fire hazard severity zones, which are determined based on factors such as fuel, slope, and fire weather, do not predict when or where a wildfire will occur, but they do identify the degree of fire hazard (very high, high, or moderate). The CBC details the materials, systems, and assemblies used for structural fire resistance and fire-resistance-rated construction separation of adjacent spaces to safeguard against the spread of fire and smoke within a building and the spread of fire to or from buildings.

Regional/Local Plans, Policies, Regulations, and Ordinances

Yuba County 2030 General Plan

GOAL HS2: **Fire Risk**. Protect people and property from wildland and urban fire risk and create more fire-resilient communities.

- **Policy HS 2.1.** Prior to approval, new developments proposed in areas of very high, high, or moderate fire hazard, as designated on maps maintained by CAL FIRE, shall demonstrate compliance with Fire Safety Regulations and local regulations for defensible space, ignition-resistance construction materials, property maintenance, to reduce fuels natural hazard disclosure requirements, emergency access points, availability of water for fire suppression, and other relevant building and development standards.
- **Policy HS 2.2.** The County will communicate with appropriate local, State, and Federal fire protection personnel during the development review process and will condition projects considering input from these agencies to require defensible space, fire-wise landscaping, fuel breaks, emergency access, fire flow, hydrants, sprinkler systems, fire stations and other improvements and conditions, as appropriate.
- **Policy HS 2.3.** New developments shall pay on a fair-share basis for fire stations, equipment, and other fire suppression improvements necessary to provide adequate fire protection services.
- **Policy HS 2.5.** Road and buildings constructed on slopes of more than 15 percent is strongly discouraged and will only be approved if consistent with County standards and the Yuba County Wildfire Safety Plan.
- **Policy HS 2.8.** Communication and electricity infrastructure in areas prone to wildfire should be located and designed to avoid interruptions during periods of fire activity.

- **Policy HS 2.10.** New developments shall provide access that will allow safe evacuation and movement of firefighting equipment during a wildfire. Evacuation routes shall have the capacity to accommodate traffic in relation to the population served.
- **Policy HS 2.11.** New developments in moderate, high, or very high fire hazard areas cannot propose limited access roads unless such access limitations do not adequately affect fire response and suppression.
- **Action HS 2.1 Fire Standards.** The County will maintain a planning and entitlement review process that documents compliance with State and local standards for fire safety. The County will update zoning, development, improvement standards, and building standards, as necessary, to maintain compliance with relevant fire codes, including those maintained by CAL FIRE. County Codes would be anticipated to address such topics as landscaping standards and fire-resistant plant materials, fire resistant building materials for exterior walls and other exterior features of structures, defensible space standards for different topographic conditions, sprinklers, emergency access, water supply and pressure for firefighting, building and road construction in areas prone to fire risk and greater slopes, and other relevant topics.

Yuba County Municipal Code Section 11.22 – Fire Safe Regulations

The provisions of this Chapter shall apply to the approval of new parcels, building permits for new construction or significant improvement to existing structures (within a three-year period: 50 percent expansion of floor area or improvements valued at $25,000.00), and road construction and road extension projects contained in Yuba County and located in a Cal Fire SRA. All specified or referenced distances shall be measured along the ground unless otherwise stated. Basic emergency access and perimeter wildlife protection measures specified in the sections to follow provide standards for emergency access, signing and building numbering, private water supply reserves for emergency fire use, and vegetation and modification.

Yuba County Municipal Code Section 11.26.120 – Fire and Explosive Hazards

All activities, processes, and uses involving the use of, or storage of, flammable and explosive materials shall be provided with adequate safety devices against the hazard of fire and explosion. Firefighting and fire suppression equipment and devices standard in the industry shall be approved by the local fire district. Except for waste allowed by the fire authority and air quality management district, all incineration is prohibited with the exception of those substances such as, but not limited to, chemicals, insecticides, hospital materials, and waste products required by law to be disposed of by burning, and those instances wherein the fire authority deems it a practical necessity.

Yuba County Emergency Operations Plan

The Emergency Operations Plan addresses the County's planned response to emergencies associated with natural, man-made and technological disasters. It provides an overview of operational concepts and identifies components of the County’s emergency management organization within the Standardized Emergency Management System and the National Incident Management System. It further describes the overall responsibilities of the local, State, and Federal entities for protecting life and property and assuring the overall well-being of the population (Yuba County 2015).

3.18.1 Environmental Impacts and Mitigation Measures

Thresholds of Significance

Significance criteria are based on Appendix G of the State California Environmental Quality Act Guidelines. Implementing the proposed project would have a significant impact on wildfire if located within or near SRAs or lands classified as very high fire hazard severity zones and would:

- substantially impair an adopted emergency response plan or emergency evacuation plan;
- due to slope, prevailing winds, and other factors, exacerbate wildfire risks, and thereby expose project occupants to, pollutant concentrations from a wildfire or the uncontrolled spread of a wildfire;
- require the installation or maintenance of associated infrastructure (such as roads, fuel breaks, emergency water sources, power lines, or other utilities) that may exacerbate fire risk or that may result in temporary or ongoing impacts to the environment; or
- expose people or structures to significant risks, including downslope or downstream flooding or landslides, as a result of runoff, post-fire slope instability, or drainage changes.

Analysis Methodology

Evaluation of the potential impacts of the proposed project on wildfire was based on a review of planning documents pertaining to the project area, particularly the *Yuba County 2030 General Plan* (Yuba County 2011b) and the *Final Yuba County 2030 General Plan Environmental Impact Report* (Yuba County 2011a), the CAL FIRE fire severity zone map (CAL FIRE 2022), CAL FIRE's California Statewide Incident Maps (CAL FIRE 2023), CAL FIRE's *California's Forests and Rangeland 2017 Assessment* (CAL FIRE 2017), and field and aerial photographic review. Both construction- and operations-related activities resulting from the proposed project were evaluated for their ability to affect wildfire conditions within the study area.

Public Comments

Comments submitted in response to the project's Notice of Preparation were reviewed for relevance to the analysis of environmental consequences and development of mitigation measures. There were no comments submitted regarding potential wildfire impacts.

Issues Not Discussed Further in this EIR

Impair an Adopted Emergency Response Plan or Emergency Evacuation Plan During Operation

Operation and maintenance of the ARC Spillway and related facilities would occur during existing and regular inspections and maintenance trips conducted by Yuba County Water Agency (YCWA) staff for the existing Dam and Primary Spillway. The proposed project would not generate any new vehicle trips that could impair emergency response or evacuation. Therefore, there would be no impact from the proposed project and this issue is not discussed further in this Environmental Impact Report (EIR).

Expose People or Structures to a Significant Risk of Loss, Injury or Death Involving Wildland Fires or Uncontrolled Spread of Wildfire During Operation

As stated above, operation and maintenance of the ARC Spillway and related facilities would occur during existing and regular inspections and maintenance trips conducted by YCWA staff for the Dam and Primary Spillway. The proposed project would not require the use of heavy-duty equipment that could expose people or structures to risk due to wildland fire or uncontrolled spread of wildfire. Therefore, there would be no impact from the proposed project and this issue is not discussed further in this EIR.

Impact Analysis

Impact WF-1: Substantially Impair an Adopted Emergency Response Plan or Emergency Evacuation Plan During Construction

The proposed project site is located within an SRA, in both moderate and very high fire hazard severity zones. The Yuba County Foothills Community Wildfire Protection Plan designates Marysville Road as a primary evacuation route. Marysville Road is the only roadway that provides access from the City of Marysville to the project site and through to Sate Route (SR) 49. A two-lane temporary detour of Marysville Road would be established north of the current alignment for approximately 3 years of the total 4-year construction period. Vehicle speed would be reduced to 20 miles-per-hour on and within the vicinity of the temporary detour. Additional or different traffic controls through the detour would be implemented as required by the Yuba County encroachment permit. For most of this 3-year period, the temporary detour would have two lanes, allowing two-way traffic to continue along Marysville Road through the project site as traffic does now under existing conditions. However, a one-way flagging operation stationed upstream and downstream of the construction area would be in place along the temporary detour for no more than 60 days during the final stages of constructing the permanent Marysville Road relocation.

Emergency access and evacuation routes would be maintained through the project site and vicinity the same as the existing roadway, with the exception of the 60-day period just described. After the downstream construction phase, an approximately 1,150-foot permanent two-lane relocation of Marysville Road would be constructed, as shown in Figure 2-1. The relocated Marysville Road would provide an alternative evacuation route and emergency access through the project site and vicinity the same as the existing roadway. Construction equipment would periodically need to perpendicularly cross the relocated road to finish construction of the approach channel and would be controlled as required by the Yuba County encroachment permits, such as with use of a flagger.

Project construction would generate additional truck trips on Marysville Road during the 4-year construction period that would periodically and temporarily slow traffic speeds but would not impede evacuation or emergency vehicles traveling along Marysville Road. Additionally, hauling excavated soil and rock to the disposal area would primarily occur on temporary haul routes established for the proposed project on YCWA-owned lands and USFS Road 0008-010 to reduce truck traffic on Marysville Road.

Temporary traffic delays from road closure during blasting and use of heavy construction equipment would occur. During approximately 200 days of construction, it is anticipated that one to two 15-minute delays per day would be needed on Marysville Road to conduct blasting activities. The use of the temporary detour and closures for blasting and equipment crossing, although of short and limited duration of up to two 15-minute delays per day for 200 days of construction, would temporarily slow

down or impede evacuation and emergency vehicles trying to travel along Marysville Road in either direction during these two 15-minute delays per day to access areas on the opposite side of the Dam. Temporarily impeding access to evacuation routes and emergency vehicles along Marysville Road at the Dam would affect response times for emergency response providers during the project's construction phase. Therefore, this impact would be **potentially significant**.

Mitigation Measures: The following mitigation measure has been identified to address this impact.

> **Mitigation Measure TR-1: Prepare and Implement a Traffic Safety Plan and Coordinate with Local Emergency Service Providers.**
>
> Please refer to Impact TR-2 in Chapter 3.16, "Transportation," for the full text of this mitigation measure.

Implementation of Mitigation Measure TR-1 would reduce the impact related to impairment of an adopted emergency response plan or emergency evacuation plan by requiring a traffic plan focused on minimizing construction-related traffic delays, coordination with emergency service providers, and halting construction activities and temporary road closures during an emergency. Suspending blasting activities during any wildfire requiring emergency vehicles to use Marysville Road would be one component of Mitigation Measure TR-1, which would result in no impact during any wildfire in the area requiring use of Marysville Road. With this plan, it is anticipated that temporary delays to emergency response and evacuation through the project site could be avoided or would have minimal effects on response times. Therefore, this impact would be **less than significant with mitigation.**

Impact WF-2: Expose People or Structures to a Significant Risk of Loss, Injury, or Death Involving Wildland Fires or Uncontrolled Spread of Wildfire During Construction.

The project site is in an area of moderate and very high fire risk due to the surrounding forestland and presence of vegetated slopes and prevailing winds from the Sacramento metropolitan area. The project site supports a variety of habitats and unvegetated land cover types, as detailed further in Chapter 3.3, "Terrestrial Biological Resources." Vegetation present in the project area is highly flammable.

The project is not located within a residential area nor is it within close proximately to a city center where many people would be exposed to pollutants from fire. However, there are scattered rural residences in the vicinity of the project, with one residence located approximately 0.1 mile east of the haul route on Marysville Road and 0.6 mile from the ARC Spillway, and a second residence located 0.5 mile north of the haul route on USFS Road 0008-010. Therefore, if an accidental fire was to occur, occupants at these two residences and temporary project workers could be exposed to pollutant concentrations from wildfire.

Equipment used during project construction could increase fire risk as a result of using diesel-powered vehicles (i.e., from vehicle mufflers), gasoline-powered tools, and other equipment that could potentially create a spark, fire, or flame. However, all personnel on the project site would comply with PRC Sections 4290, 4427, 4428, 4431, and 4442, which include regulations related to fire protection. Implementation of fire protection procedures such as regular inspection and routine mechanical maintenance of equipment and vehicles on-site, and accessibility to firefighting equipment, proper storage of combustible liquids, no smoking in the service and refueling area, and workers training for firefighting extinguisher use would reduce the risk of accidental fires and allow for quick containment of unforeseen fires. Additionally, a water truck would be on-site during construction activities and could be used in the case of a fire. Given the recent history of wildfires in Sierran foothills, fire protection activities during project construction would be greatly emphasized and implemented daily.

Approximately 720,000 cy of earthen material would be excavated during construction. Site alteration through movement of substantial quantities of soil and earth materials could cause landslides as a result of runoff or drainage changes during construction. However, given that the size of the proposed project exceeds one acre, the project must comply with the National Pollutant Discharge Elimination System (NPDES) General Permit for Discharges of Storm Water Runoff Associated with Construction and Land Disturbance Activities (Order 2009-0009-DWQ, NPDES No. CAS000002; as amended by Orders 2010-0014-DWQ and 2012-006-DWQ) (Construction General Permit). The Construction General Permit requires preparing and implementing a Stormwater Pollution Prevention Plan (SWPPP), which requires appropriate best management practices (BMPs) be developed and implemented to control runoff from construction work sites. The BMPs would include, but would not be limited to, physical barriers to prevent erosion and sedimentation, construction of sedimentation basins, limitations on work periods during storm events, use of infiltration swales, protection of stockpiled materials, and a variety of other measures that would substantially reduce or prevent erosion from occurring during construction. If a wildland fire is followed by a rain event, and results in downstream flooding or landslides as a result of post-fire runoff, the BMP measures required to be implemented under the SWPPP would reduce the risk of runoff, post-fire slope instability, and drainage channels. BMPs specific to direct and indirect impacts related to wildland fires would be included in the proposed project's SWPPP.

The project would comply with all applicable fire codes and provide design features for fire suppression. However, wildfire ignition from construction activities could expose nearby residents and construction workers to pollutant concentrations from a wildfire or the uncontrolled spread of a wildfire. Therefore, this impact is considered **potentially significant**.

Mitigation Measures: The following mitigation measures have been identified to address this impact.

Mitigation Measure WF-1: Prepare and Implement BMPs for Wildland Fire Prevention.

As part of its Construction General Permit, YCWA shall develop and implement a SWPPP with BMPs for wildland fire prevention. As part of these BMPs, YCWA shall ensure that the construction contractor will clear dried vegetation or other materials that could serve as fuel for combustion from construction or building areas. To the extent feasible, the contractor shall keep these areas clear of combustible materials to maintain a firebreak. Construction contractors shall ensure that any construction equipment that normally includes a spark arrester shall be equipped with an arrester in good working order. This includes, but is not limited to, vehicles, heavy equipment, and chainsaws. Additionally, YCWA will provide construction workers with education regarding wildfire risk and fire prevention measures during tailgate safety meetings.

Timing: Before and during construction.

Responsibility: YCWA and its construction contractor(s).

Mitigation Measure WF-2: Prepare and Implement Fire Safety Plan.

YCWA shall prepare and implement a Fire Safety Plan during project construction. The plan will describe the fire prevention process for construction activities, weather conditions during which fire risk is elevated and all equipment operation shall cease and other measures taken to reduce fire risk, equipment used to prevent fire and respond to a fire immediately, and responsibilities of the work crews when conducting construction activities.

Timing: Before and during construction

Responsibility: YCWA and its construction contractor(s).

Implementation of Mitigation Measures WF-1 and WF-2 would reduce potentially significant impacts associated with wildfire ignition and spread by requiring use of BMPs during construction to reduce the likelihood of accidental fires, and preparing and implementing a fire safety plan. Additionally, YCWA would coordinate with the construction contractor to make sure that the requirements outlined in these measures are implemented during construction activities. Impacts would be **less than significant with mitigation**.

Impact WF-3 Installation or Maintenance of Infrastructure that May Exacerbate Fire Risk.

The proposed project would include the construction and operation of the ARC Spillway including the approach channel, control structure, spillway chute, discharge channel, gate control building (GCB), electrical system, access routes, relocated utilities along Marysville Road, relocated Dam Overlook Observation Site, and soil and rock disposal area. While none of these primary and ancillary infrastructure components are likely to increase fire risk, the GCB may increase fire risk due to the storage of electrical controls for the operation of the intake gates, local control cabinet, and Supervisory Control and Data Acquisition equipment for the gate operation. However, all infrastructure installed as part of the proposed project would adhere to CCR Title 24, the CBC, and would include fire protection based on the requirements of the Camptonville Community Services District, the applicable National Fire Prevention Association standards, and recommendations of the equipment manufacturer. Therefore, this impact would be **less than significant**.

Mitigation Measures: No mitigation is required.

Residual Significant Impacts

The project would result in potential significant impacts related to wildfire. Implementation of the mitigation measures identified above would reduce potential wildfire impacts to a less-than-significant level and therefore, would not result in significant residual impacts regarding wildfire. With imposition of the mitigation measures identified above, the project would not have any significant and unavoidable impacts related to wildfire.

Chapter 4. Other CEQA Considerations

4.1 Introduction

This chapter describes other types of potential impacts that the State California Environmental Quality Act (CEQA) Guidelines require in Environmental Impact Reports (EIRs), including growth-inducing impacts, significant and unavoidable impacts, significant irreversible and irretrievable commitment of resources, and relationship between short-term use of the environment and the maintenance and enhancement of long-term productivity. Additionally, this section addresses cumulative impacts from the New Bullards Bar Dam Atmospheric River Control (ARC) Spillway Project (project or proposed project) in conjunction with past, present, and probable (reasonably foreseeable) future projects.

4.2 Growth-inducing Impacts

State CEQA Guidelines Section 15126.2(e) requires that an EIR evaluate the growth-inducing impacts of a proposed project. The State CEQA Guidelines describe the required growth-inducement analysis as follows:

Discuss the ways in which the proposed project could foster economic or population growth, or the construction of additional housing, either directly or indirectly, in the surrounding environment. Included in this definition are projects which would remove obstacles to population growth. . . . Increases in the population may tax existing community service facilities, requiring construction of new facilities that could cause significant environmental effects. Also discuss the characteristic of some projects which may encourage and facilitate other activities that could significantly affect the environment, either individually or cumulatively. It must not be assumed that growth in any area is necessarily beneficial, detrimental, or of little significance to the environment.

A project can have the potential for direct and/or indirect growth inducement. Direct growth inducement would result if a project involved construction of new housing which would facilitate new population in an area. Indirect growth inducement or secondary growth-inducement potential could be present if the project would establish substantial new permanent employment opportunities (e.g., commercial, industrial, or governmental enterprises), or if it would involve a substantial construction effort with substantial long-term employment opportunities which could indirectly stimulate the need for additional housing and services to support the new employment demand.

Similarly, a project could indirectly induce growth if it would remove a physical obstacle to additional growth and development, such as removing a constraint or adding a required public service. Examples of removing a physical obstacle would include construction of a new roadway into an undeveloped area or construction of a wastewater treatment plant with sufficient capacity to serve additional new development. Construction of these types of infrastructure projects cannot be considered isolated from the immediate development that they facilitate and serve. Projects that physically remove obstacles to growth, or projects that indirectly induce growth, are those that may provide a catalyst for future unrelated development in the area. The growth-inducing potential of a project could also be considered significant if it fosters growth in excess of what is assumed in the local master plans and land use plans, or in projections made by regional planning agencies.

4.2.1 Direct Growth Inducement

The proposed project does not include the construction of new housing or businesses, require acquisition of private property, or create new connections to undeveloped land. The proposed project would relocate two segments of Marysville Road; however, it would not develop any new roadways or expand the capacity of Marysville Road. The proposed project aims to reduce flood risk by constructing the ARC Spillway, which would allow for releases from the New Bullards Bar Dam (Dam) at a lower New Bullards Bard Reservoir (Reservoir) water elevation than is currently provided from the Primary Spillway. The urban areas potentially affected by Yuba River flood flows in Yuba County, such as Marysville, Linda, Olivehurst, and Plumas Lake, already receive a 200-year level of flood protection consistent with current regulatory standards for urban areas. Urban development is already allowed in these areas because they have attained the 200-year level of flood protection. The project will further reduce flood risks and provide protection beyond the 200-year level, but this additional protection does not induce development or remove any existing impediments to urban growth. The proposed project also will not create permanent employment as construction activities are temporary and inspections and maintenance activities for the proposed project would primarily be coordinated and combined with existing maintenance activities of the Dam and existing spillway.

4.2.2 Indirect Growth Inducement

The proposed project would not establish new permanent employment opportunities, but project construction activities would generate temporary and short-term employment. These construction jobs are anticipated to be filled from the existing local employment pool, and they would not indirectly result in a population increase or induce growth by creating permanent new jobs. Furthermore, the project would not involve constructing businesses or extending roadways or other infrastructure and would not indirectly induce population growth. Consequently, the project would not induce growth leading to changes in land use patterns and population densities and related impacts on environmental resources. As noted above, the additional flood risk reduction from the proposed project, which is beyond a 200-year level of flood protection, would not induce development or growth. Furthermore, the local jurisdictions of Yuba County and the cities of Marysville and Yuba City have adopted general plans consistent with State law, which provide an overall framework for growth and development in the County and these Cities. The proposed project also would not increase water releases or modify Reservoir storage such that additional water supply is available for local or regional water uses. Consequently, no indirect growth-inducing effects would occur.

4.3 Irreversible and Irretrievable Commitment of Resources

State CEQA Guidelines Section 15126.2(d) describes irreversible environmental changes as follows:

Uses of nonrenewable resources during the initial and continued phases of the project may be irreversible since a large commitment of such resources makes removal or nonuse thereafter unlikely. Primary impacts and, particularly, secondary impacts (such as highway improvement which provides access to a previously inaccessible area) generally commit future generations to similar uses. Also irreversible damage can result from environmental accidents associated with the project. Irretrievable commitments of resources should be evaluated to assure that such current consumption is justified.

The State CEQA Guidelines refer to the need to evaluate and justify the consumption of nonrenewable resources and the extent to which the proposed project commits future generations to similar uses of nonrenewable resources. In addition, CEQA requires that irreversible damage which could result from an environmental accident associated with the project be evaluated. As described below, proposed project implementation would result in the irreversible and irretrievable commitments of energy and material resources during project construction, operations, and maintenance, including the following:

- construction materials, including such resources as soils and rocks;
- land committed to new/expanded facilities such as the new ARC spillway; and
- energy expended in the form of electricity, gasoline, diesel fuel, and oil for equipment and transportation vehicles that would be needed for project construction.

Construction of the proposed project would commit nonrenewable natural resources used in the construction process and during operation, including petroleum products and other materials. As described in Chapter 2, "Project Description," the proposed project would excavate and blast rock from a large area; however, the soil and rock generated from these activities would be disposed of in the designated soil and rock area adjacent to the project site and would not be transported to a landfill or disposed of elsewhere. In addition, the project does not involve demolition or removal of existing buildings or infrastructure that would generate large amounts of construction waste. However, the proposed project does commit lands to the new ARC Spillway.

Construction and operation of the proposed project would also commit energy resources such as fossil fuels and electricity. Direct energy used during construction and operation would use petroleum products and electricity to operate equipment, and indirect energy use would consume energy to extract raw materials, manufacture items, and transport the goods and people necessary for construction activities. Construction-related energy consumption would be temporary and would be confined to the construction period. Nevertheless, construction activities would, as with any construction project, cause irreversible and irretrievable commitments of finite nonrenewable energy resources, such as gasoline and diesel fuel. The selected construction contractor(s) would use the best available engineering techniques, construction practices, and equipment operating procedures. A temporary fuel tank and fueling pad would be set up at the staging area to allow for the onsite refueling of construction vehicles. The fuel tank and fueling pad onsite would significantly reduce the amount of energy used during vehicle transport as it would limit the distance vehicles would need to drive to refuel. Fuel consumption associated with vehicle trips generated by the project would not be considered inefficient, wasteful, or unnecessary, and would be similar to that associated with other, similar rural counties.

Finally, construction of the proposed project has the potential for accidental release of hazardous materials which may lead to irreversible damage. However, as stated in Chapter 3.11, "Hazards and Hazardous Materials", hazardous materials used during construction would be typical of common construction activities, and the project would implement a Spill Prevention Control and Countermeasure Plan and other best management practices (BMPs) as defined in Mitigation Measure HAZ-1. This plan, along with other BMPs for storage, use, and transport of hazardous materials, would be specifically designed to prevent contamination of the environment in the event of a construction accident or other event that caused an unintentional release of hazardous materials.

Although there is some irreversible and irretrievable commitment of resources associated with the proposed project as described above, the amount consumed by the project is ordinary and the types of consumption are unavoidable with a construction project of this nature and magnitude. These impacts are, therefore, less than significant.

4.4 Cumulative Impacts

As defined in State CEQA Guidelines Section 15355, a cumulative impact is an environmental impact that is created as a result of the combination of the incremental contribution of the project together with other projects causing related impacts. CEQA requires that an EIR discuss cumulative impacts of a project when the project's incremental effect is cumulatively considerable (State CEQA Guidelines Section 15130(a)).

"Cumulatively considerable" means that the incremental effects of an individual project are considerable when viewed in connection with the effects of past, current, and probable future projects (State CEQA Guidelines Section 15065(a)(3), though it should be noted that the effects of past projects are encompassed in the baseline environmental conditions, as described in the environmental setting, consistent with State CEQA Guidelines Section 15125(a). If an incremental effect is not cumulatively considerable, then the lead agency does not need to consider that effect significant and must briefly describe the reason why (State CEQA Guidelines Section 15130(a)).

State CEQA Section 15130(b) states that the discussion of cumulative impacts need not provide as much detail as the discussion of the effects attributable to the project. The level of detail should be guided by what is practical and reasonable.

The elements provided below are necessary for an adequate discussion of significant cumulative impacts (State CEQA Guidelines Section 15130(b)).

- A list of past, present, and probable future projects producing related or cumulative impacts, including, if necessary, those projects outside the control of the agency; or a summary of projections contained in an adopted general plan or related planning document, or in a prior environmental document which has been adopted or certified, which described or evaluated regional or areawide conditions contributing to the cumulative impact. Any such planning document shall be referenced and made available to the public at a location specified by the lead agency.
- A defined geographic scope of the area affected by the cumulative effect and a reasonable explanation for the geographic limits identified.
- A summary of expected environmental effects that might be produced by those projects with specific reference to additional information stating where that information is available.
- A reasonable analysis of the cumulative impacts of the relevant projects. An EIR shall examine reasonable, feasible options for mitigating or avoiding the project's contribution to any significant or potentially significant cumulative effects.

4.4.1 Cumulative Analysis Methodology

This cumulative impact analysis has three steps as defined below.

- Define and present the geographic scope of potential cumulative impacts (Section 4.4.2, "Geographic Scope of Cumulative Impacts").
- List and summarize past, present, and reasonably foreseeable projects to include in the cumulative analysis (Section 4.4.2, "List of Projects Considered in Cumulative Impact Analysis").
- Conduct cumulative impact analyses (Section 4.5.4, "Cumulative Impact Analysis by Topic Area").

4.4.2 List of Projects Considered in Cumulative Impact Analysis

The list of projects for the cumulative impact analysis was developed by first identifying projects proposed by Yuba County Water Agency (YCWA) and others at the Reservoir, within the Yuba River watershed, and along the North Yuba River and Yuba River downstream of the Dam to the confluence with the Feather River. A screening analysis of these projects was then conducted to determine the status of projects and if they may result in environmental impacts related to those from the proposed project. Based on this screening analysis, the following projects were not included in the cumulative impact analysis.

- **Water Control Manual (WCM) Update – United States (U.S.) Army Corps of Engineers.** This project is briefly discussed in Section 2.9.2, "Review of Other YCWA Activities." If and after U.S. Army Corps of Engineers adopts a WCM update, the ARC Spillway would be operated pursuant to the updated WCM. However, because the WCM Update was not complete at the time this EIR was prepared, any operational changes from the WCM Update were unknown.
- **Narrows 1 Federal Energy Regulatory Commission (FERC) Project No. 1403 Relicensing – YCWA.** The Narrows 1 powerhouse is located 0.2 mile downstream of Englebright Dam on the Yuba River and was purchased by YCWA from Pacific Gas and Electric Company (PG&E) in 2020. The existing license expired on January 31, 2023, and YCWA has initiated the relicensing process. Because the relicensing process was ongoing at the time this EIR was prepared, however, any changes to operations from the Narrows 1 powerhouse due to a new FERC license were unknown.
- **Framework of Settlement Agreement for Yuba River Watershed Habitat Restoration Plan – YCWA, California Department of Fish and Wildlife, and National Marine Fisheries Service.** A Term Sheet between YCWA, California Department of Fish and Wildlife, and National Marine Fisheries Service to partner on a comprehensive restoration agreement for the Yuba River was announced in May 2023. The Term Sheet sets forth a non-binding framework for developing a Settlement Agreement to implement certain restoration measures, including the potential for construction of a new fishway and modernized water diversion at Daguerre Point Dam and initiation of a comprehensive program to reintroduce spring-run Chinook salmon. At the time this EIR was prepared, negotiations for implementation of the Term Sheet had just begun and a timeline for completion of the actions contemplated in the Term Sheet was uncertain.

- **Lower Yuba River Accord Water Transfer Program Extension – YCWA.** This project is briefly discussed in Section 2.9.2, "Review of Other YCWA Activities." No substantial changes to the Yuba Accord Water Transfer Program are proposed, and the environmental review process for the Extension was underway at the time of the preparation of this EIR with an uncertain timeline for completion. Additionally, because the program is presently being implemented and there are no proposed changes to the existing Yuba Accord Water Transfer Program, the extension does not represent a change in the baseline conditions considered in this EIR and, accordingly, is not expected to result in any incrementally cumulative impacts.
- **Bay-Delta Voluntary Agreement (VA) – State Water Resources Control Board, Department of Water Resources, Department of Fish and Wildlife, YCWA and other water districts.** This project is briefly discussed in Section 2.9.2, "Review of Other YCWA Activities." In March 2022, YWA and several other water districts and state agencies signed a VA Memorandum of Understanding, which was a non-binding commitment among its signatories to continue working towards a finalized and legally binding VA as reflected in the Term Sheet. No action will be taken to implement the VA until the State Water Resources Control Board (SWRCB) adopts a Substitute Environmental Document and a resolution to update the Bay-Delta Plan and the parties sign legally-binding VA commitments. At the time of preparation of this EIR, the VA negotiations and the SWRCB's environmental review for the Bay-Delta Plan update were ongoing with uncertain timelines for completion. Additionally, it is expected that any VA measures will undergo project-specific environmental review, as appropriate, prior to implementation.

A list of past, current, and probable (reasonably foreseeable) future projects producing related or cumulative impacts was compiled using information from YCWA. The past, present, and probable future projects (often referred to herein as the "collective projects") proposed by YCWA and other entities that could combine with proposed project impacts in a cumulative manner are presented in **Table 4-1**.

Table 4-1. List of Past, Present, and Probable Future Projects Potentially Contributing to Cumulative Impacts

Project, Agency	Status	Location	Description
Yuba River Development Project FERC Project No. 2246 Relicensing, YCWA	Reasonably Foreseeable	Yuba County	The YRDP is discussed in Section 1.1.1, "Yuba River Development Project" and FERC relicensing is briefly discussed in Section 2.9.2, "Review of Other YCWA Activities." The FERC license application filed by YCWA on April 28, 2014, would allow for continued operation of the YRDP for 30 to 50 years. FERC relicensing is a lengthy process that can take many years. Therefore, terms that will be imposed in the new license at the conclusion of this process are speculative at this time. However, YCWA has proposed a set of operating conditions to FERC and has submitted volumes of scientific evidence to support those conditions. While it is unknown how much of YCWA's preferred alternative FERC will accept, it is reasonably foreseeable that FERC will accept, at a minimum, the proposals YCWA has made to minimize environmental impacts of the YRDP. Elements of YCWA's proposals that are relevant to the proposed project are summarized below. YCWA's proposal for the new license includes the addition of a tailwater depression system at New Colgate Powerhouse (approximately 7.5 miles downstream of the ARC Spillway) to maintain power generation at high flows. The YRDP would continue to be operated in the same manner with minor changes proposed by YCWA, including: 1) minor modifications to the flow downstream of Englebright Dam during very dry years, 2) managing fluctuations in the flow of the Yuba River downstream of the Englebright Dam by coordinating operation with the Narrows 1 Powerhouse, and 3) operation of the proposed tailwater depression system, which would increase New Bullards Bar Reservoir's release capacity during flood events.
Marysville Ring Levee, USACE	In Progress	Marysville	This project reinforces the 7.5-mile-long Marysville Ring Levee, slated for completion by 2024. The levee system reduces flood risk for the historic City of Marysville including from flooding along the lower Yuba River.
Yuba River North Training Wall Project, TRLIA	Phase 1 completed; Phase 2 in progress	Lower Yuba River	TRLIA is reshaping the existing Yuba River North Training Wall and constructing a new embankment to extend the wall upstream to meet high ground and provide 100-year flood protection to the community of Hallwood.
Hallwood Side Channel and Floodplain Restoration, YCWA	Phase 3 Completed; Phases 4 in Progress	Lower Yuba River	The project is designed to enhance the lower Yuba River ecosystem by increasing available juvenile salmon habitat to improve the natural production of Chinook salmon and Central Valley steelhead. The project will also reduce flood risk through lower water surface elevations and velocities during flood events. The project would enhance up to 157 acres of seasonally inundated riparian floodplain; approximately 1.7 miles of perennial side channels; and approximately 6.1 miles of seasonally inundated side channels, alcoves, and swales. Enhancements would be made through land surface changes, riparian planting, and placement of large woody material.
The North Yuba Forest Partnership, YCWA and Several Agencies	In Progress	North Yuba River Watershed	This is a partnership effort of nine agencies, including YCWA, working together to implement forest restoration across 275,000 acres through ecological thinning and prescribed fire. Treatment areas have been identified including north and east of New Bullards Bar Reservoir. No treatment areas are located at the project site or immediate vicinity.
Camptonville Community Partnership and YCWA Camptonville Biomass Plant	Reasonably Foreseeable	Camptonville	A 5 megawatt conventional direct combustion, forest biomass to renewable energy project, located in Camptonville. The proposed plant will have the capacity to process 40,000 bone dry tons of woody material per year. This project will provide a means to dispose of excess forest biomass, reduce fire hazard, revitalize Camptonville's former sawmill site and boost the local economy, reduce regional air emissions from open pile burning, promote forest health in and around Camptonville and neighboring communities, maintain the region's water quality, quantity and reliability for local and downstream users, and produce renewable energy. This project is not located at the project site or immediate vicinity.

Notes: FERC= Federal Energy Regulatory Commission, PG&E= Pacific Gas and Electric Company, TRLIA= Three Rivers Levee Improvement Authority, USACE= U.S. Army Corps of Engineer, YCWA=Yuba County Water Agency

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4.4.3 Cumulative Impact Analysis

The proposed project's adverse impacts are construction-related and primarily limited to a specific location during construction. The proposed project would reduce peak flood flows downstream and all of the project's long-term, ongoing impacts relate to these resulting changes in Yuba River flows and the indirect effects of these changes.

Resource Topics

Cumulative Impact HWQ: Cumulative Impacts to Hydrology and Water Quality.

The geographic area of analysis of cumulative impacts to hydrology and water quality is the Reservoir, Yuba River Watershed and downstream receiving waters – the North Yuba River, Englebright Lake, Lower Yuba River, and Feather River.

Project-related construction activities would involve grading, excavation, and other earth-moving activities, thereby exposing soil to wind or water erosion. If uncontrolled, suspended sediment could enter adjacent water bodies and result in increased turbidity. However, Mitigation Measures HWQ-1, HWQ-3, HWQ-4, and HAZ-1 would reduce the project's potentially significant construction and operation-related erosion impacts to a less-than-significant level. The North Yuba Forest Partnership would not involve earth-moving activities but could result in some minor ground disturbance at locations around the Reservoir, but not at the project site or immediate vicinity. The biomass plant in Camptonville would involve earth moving activities, but not at the project site or immediate vicinity. The tailwater depression system at New Colgate Powerhouse and the remaining three related projects along the lower Yuba River and in Marysville would cause ground disturbance far downstream of the proposed project site. Ground-disturbing activities would expose soil to erosion from wind and water; therefore, these projects could also have significant impacts. However, each related project that would disturb 1 acre of land or more would be required to comply with National Pollutant Discharge Elimination System (NPDES) discharge permits from the Central Valley Regional Water Quality Control Board (RWQCB), which require preparation of a Stormwater Pollution Prevention Plan and implementation of erosion control BMPs. Related projects would also be implemented by or overseen by YCWA and would likely be subject to YCWA's spill prevention and countermeasure procedures, for protection against environmental contamination during construction. Because the project and related projects would obtain required permits to reduce erosion impacts and follow standard best practices for spill prevention, the proposed project would not generate a cumulatively considerable incremental contribution to a significant cumulative impact from construction- or operations-related erosion.

Construction dewatering associated with construction or operation of related projects located downstream would require obtaining site-specific authorization for those projects under the General Order for Limited Threat Discharges to Surface Water (NPDES No. CAG995002/ Order R5-2016-0076-01. Since each project would be evaluated and effluent would be managed under separate NOIs by the Central Valley RWQCB, there would be no cumulatively considerable incremental contribution to a significant cumulative impact to water quality associated with dewatering during project construction or operation.

During larger storm events, the proposed project would affect operations at the Dam, causing changes to peak flows and durations and reduced water surface elevations in the North Yuba River and Yuba River downstream of the project site. The Yuba River Development Project (YRDP) FERC relicensing would cause minor operational changes in flows downstream of the project site. The three related projects downstream of Englebright Reservoir, along the lower Yuba River, and in Marysville would also reduce flood risk to surrounding lands and communities. Thus, the proposed project and the three projects downstream of Englebright Reservoir would work in tandem to minimize flood risk in the lower Yuba River such that the cumulative impact from these projects is beneficial. Implementation of the proposed project along with other reasonably foreseeable projects would not generate a cumulatively considerable incremental contribution to a significant cumulative adverse impact to flood risk.OBJ

Cumulative Impact FISH: Cumulative Impacts to Fisheries Resources.

The geographic area of analysis of cumulative impacts to fisheries resource is the Reservoir, Yuba River Watershed, and downstream receiving waters – the North Yuba River, Englebright Lake, Lower Yuba River, and Feather River.

Construction and operation of the proposed project, in combination with other collective projects in the area, has the potential to make a cumulatively considerable incremental contribution to a significant cumulative impact to fisheries resources due to an overlap of the potential construction and/or operations-related impacts of the collective projects to a variety of fish species and their habitats. All operations-related impacts of the proposed project on fisheries resources would be less than significant as they are limited to a few days during very high flood-flow events. During construction, the proposed project would have potentially significant water quality-related impacts on fish species and their habitats in the Reservoir and North Yuba River. These potentially significant impacts would be reduced to less-than-significant levels by implementing Mitigation Measures HWQ-1 and HAZ-1. Implementing these mitigation measures would reduce the project's potential contribution to cumulative impacts on fisheries resources. YCWA's Hallwood Side Channel and Floodplain Restoration Project includes habitat restoration and enhancement activities that would improve fish habitat conditions in the Yuba River. In addition, adverse impacts of the related probable future projects are likely to be mitigated in a similar manner as the proposed project. Therefore, the proposed project would not have a cumulatively considerable incremental contribution to a significant cumulative impact on fisheries resources.

Cumulative Impact BIO: Cumulative Impacts to Terrestrial Biological Resources.

The geographic area of analysis of cumulative impacts to terrestrial biological resource is the project site and immediate vicinity and the Reservoir, Yuba River Watershed, and downstream receiving waters – the North Yuba River, Englebright Lake, Lower Yuba River, and Feather River.

Construction and operation of the proposed project, in combination with related projects in the area, has the potential to contribute to a cumulatively significant impact to special-status plants, fungi, amphibians, reptiles, birds, and mammals; sensitive habitats; and wildlife movement corridors and nursery sites. All operations-related impacts of the proposed project on terrestrial biological resources would be less than significant and construction-related impacts on riparian habitat and other sensitive natural communities and wildlife migratory and movement corridors and nursery sites would also be less than significant. The proposed project would have potentially significant construction-related impacts on special-status plant, amphibian, reptile, bird, and mammal species and Federally and State-protected waters at the project site. These potentially significant impacts would be reduced to less-than-significant levels by implementing Mitigation Measures BIO-1, BIO-2, BIO-3, BIO-4, BIO-5, BIO-6, BIO-7,

HWQ-1, and HAZ-1. Implementing these mitigation measures would reduce the project's potential contribution to cumulative impacts on special-status species and Federally and State-protected waters. In addition, adverse impacts of the related probable future projects, primarily those projects with construction activities implemented by YCWA, would be mitigated in a similar manner as the proposed project. Furthermore, the YRDP FERC relicensing proposal includes several species-specific management plans for special-status species that, if incorporated into a new license by FERC, would provide benefits to these species and/or their habitats. Therefore, the proposed project would not have a cumulatively considerable incremental contribution to a significant cumulative impact on terrestrial biological resources.

Cumulative Impact CUL: Cumulative Impacts to Cultural and Tribal Cultural Resources.

The geographic area of analysis of cumulative impacts to cultural resource is the project site and immediate vicinity. This is because impacts relative to cultural resources and tribal cultural resources are generally site-specific. None of the other projects listed in Table 4-1 would be located at the project site or immediate vicinity and would not cause ground disturbance in the same areas as the proposed project. Therefore, the proposed project would not contribute to cumulative impacts to cultural and tribal cultural resources.

Cumulative Impact AIR: Cumulative Impacts to Air Quality.

The geographic area of analysis of cumulative impacts for air quality includes the project site and immediate vicinity for toxic air contaminants (i.e., diesel particulate matter) and the Sacramento Valley Air Basin for construction- and operations-related emissions of criteria air pollutants. The projects listed in Table 4-1 include a range of project types which would contribute to the overall air quality in the local area and region (Yuba County).

Nonattainment of air pollutant standards in the Sacramento Valley Air Basin is considered a cumulatively significant impact. Yuba County is classified as nonattainment for the particulate matter equal to or less than 2.5 micrometers in diameter ($PM_{2.5}$) national standard and attainment or unclassified for all other national standards. Yuba County is classified as nonattainment-transitional for the 1- and 8-hour state ozone standards and nonattainment for the State PM_{10} standard. Yuba County is classified as attainment or unclassified for all remaining State standards.

The Feather River Air Quality Management District (FRAQMD) established thresholds to identify projects that would result in significant regional air pollution emissions. Therefore, according to FRAQMD, a project would have a significant impact on air quality if the project would generate average daily construction-related emissions of reactive organic gases (ROG) or oxides of nitrogen (NO_X) that exceed 25 lb/day or 4.5 tons per year; generate maximum daily construction-related emissions of PM equal to or less than 10 micrometers in diameter (PM_{10}) that exceed 80 lb/day; or generate daily operational emissions of ROG or NO_X that exceed 25 lb/day or PM_{10} emissions that exceed 80 lb/day.

The discussions of air emissions generated by project construction in Impacts AIR-3 and generated by project operations in AIR-4 in Chapter 3.5, "Air Quality," are inherently cumulative impact discussions. During construction, the proposed project would generate emissions from exhaust from use of off-road construction equipment, haul trucks, and worker vehicle commute trips. In addition, dust/particulate matter would be generated from ground-disturbing activities, use of hauling trucks on unpaved haul routes, and blasting. Table 3.5-2 provides a summary of criteria air pollutant emissions during construction. Implementation of Mitigation Measures AIR-1, AIR-2, and AIR-3 would reduce NO_X

emissions to a less-than-significant level. However, implementation of these measures would not reduce PM_{10} to a less-than-significant level. Therefore, the proposed project would make a short-term (during construction only) cumulatively considerable incremental contribution to significant cumulative impacts related to PM_{10} levels. This contribution is a significant and unavoidable cumulative impact.

Cumulative Impact GHG: Cumulative Impacts to Greenhouse Gas Emissions.

The projects listed in Table 4-1 include a range of project types which would contribute to both regional and global climate change. The greenhouse gas (GHG) emissions of the proposed project alone would not cause a direct physical change in the environment. According to the California Air Pollution Control Officers Association, "GHG impacts are exclusively cumulative impacts; there are no non-cumulative GHG emission impacts from a climate change perspective" (CAPCOA 2008). It is global GHG emissions in their aggregate that contribute to climate change, not any single source of GHG emissions alone. The impact analysis of the proposed project's GHG emissions and consistency with existing plans and policies related to GHG emissions provided in Chapter 3.6, "Greenhouse Gas Emissions," serves as a cumulative impact analysis.

As discussed in Chapter 3.6, "Greenhouse Gas Emissions," FRAQMD has not established an applicable threshold for GHG; and therefore, Sacramento Metropolitan Air Quality Management District (SMAQMD's) construction threshold of 1,100 metric tons CO_2-equivalents was used. GHG emissions resulting from project construction are shown in Table 3.6-1. During construction, GHG emissions would be generated from vehicle engine exhaust from operation of heavy-duty construction equipment, haul trips, and construction worker vehicle trips. Additionally, the proposed project would generate operations-related GHG emissions on an on-going basis, primarily from electricity use from connection to the exiting PG&E electrical line at the project site.

The project would exceed SMAQMD's threshold of significance during construction. However, Mitigation Measures GHG-1 and GHG-2 would be implemented to reduce construction-related GHG emissions to less-than-significant levels. Therefore, the proposed project would not make a cumulative considerable incremental contribution to a significant cumulative impact from construction-related GHG emissions.

Cumulative Impact AES: Cumulative Impacts to Aesthetics.

The geographic extent of cumulative impacts related to aesthetics includes viewsheds in which the project is visible, which generally includes the project site and surrounding areas on Marysville Road, and trails at the southwest end of the Reservoir with views of the Dam, as shown in Figure 3.7-1. There are no treatment areas for the North Yuba Forest Partnership that would be visible within viewsheds of the project site. YRDP FERC relicensing does not propose projects that would be visible within viewsheds of the project site. The remaining projects listed in Table 4-1 occur in different locations far downstream and also would not be visible. Since none of the related projects would entail construction and operation of new facilities that would be visible from key observation points associated with the proposed project, as shown in Figure 3.7-1, the proposed project would not contribute to cumulative impacts related aesthetics.

Cumulative Impact AGF: Cumulative Impacts to Agriculture and Forestry Resources.

The geographic extent of cumulative impacts related to agriculture and forestry resources includes Tahoe National Forest (TNF) and Plumas National Forest (PNF), as these forests surround and encompass the project site. The western boundary of TNF is located along the North Yuba River and extends eastward, away from Emerald Cove Marina and towards the project site. The eastern boundary of PNF is along the North Yuba River, and extends west towards the Emerald Cove Marina, away from the project site. The project construction area is within TNF. The project staging area adjacent to the Marina and the Marysville Road haul route are within PNF. The North Yuba Forest Partnership and biomass plant in Camptonville are within the TNF. The remaining projects listed in Table 4-1 are not within TNF, PNF, or other forested areas.

The proposed project would have no impact with respect to agricultural resources, conversion of prime farmland, unique farmland, or farmland of statewide importance to non-agricultural uses, or conflicts with any Williamson Act Contracts. Accordingly, the proposed project could not contribute to cumulative impacts related to agriculture and are not discussed further.

The North Yuba Forest Partnership would provide forest restoration and reduce wildlife risk across 275,000 acres of the North Yuba River Watershed within the TNF. Construction of the biomass plant in Camptonville has a very low likelihood to impact forestry resources, and operation of this project would support forest health and reduce wildlife risk. The proposed project would not conflict with existing zoning or cause rezone of forestland, or convert forestland to non-forest land, or result in a significant loss of forestland. Existing areas surrounding and adjacent to the project site would not be impacted from constructing or operating the proposed project and, therefore, would continue to be used as Resource Preservation and Recreation, which includes forestland. Project construction would disturb approximately 40 acres of forestland; however, the proposed project represents loss of less than a 0.04 percent (40 of 95,000 acres) of forestlands in Yuba County. Where trees are removed, it is anticipated that trees would eventually become re-established returning these areas to forestland matching contiguous areas, with the exception of the new spillway. The proposed project would provide long-term benefits to surrounding forestland by providing increased protection from future flood damages and would not have a short- or long-term detrimental effect on the management or use of surrounding forestland. Therefore, the proposed project would not have a cumulatively considerable incremental contribution to a significant cumulative impact to forestry resources.

Cumulative Impact EN: Cumulative Impacts to Energy.

Since PG&E will provide electrical service to the project site, the geographic context for the cumulative analysis of energy is the PG&E service area. Growth within this service area is anticipated to increase the demand for electricity and natural gas, and the need for infrastructure such as new or expanded facilities. A cumulative impact would occur if the proposed project, in conjunction with collective projects listed in Table 4-1, would result in a combined energy usage that conflicted with a State or local plan for renewable energy efficiency, or cause wasteful, inefficient, or unnecessary consumption of energy usage.

The proposed project would have no impact with respect to conflicting with or obstructing the State's Climate Commitment. Accordingly, the proposed project could not contribute to cumulative impacts related to this topic and it is not discussed further.

The proposed project would involve the use of diesel and gasoline fuel from construction activities and transport of material, and project operations would use 28,720 kilowatts per hour per year of electricity. Energy consumption during project operations would be limited to what is needed for the operation of the ARC Spillway and associated facilities. Therefore, the project's energy consumption for construction and operations would not be considered wasteful, inefficient, or unnecessary, and the proposed project would not make a cumulatively considerable incremental contribution to a significant cumulative impact on energy.

Cumulative Impact GEO: Cumulative Impacts to Geology and Soils.

The geographic scope of analysis for cumulative geologic impacts encompasses and is limited to the project site and its immediately adjacent area. This is because impacts relative to geologic hazards are generally site-specific. None of the other projects listed in Table 4-1 would be located at the project site or immediate vicinity and would not cause ground disturbance in the same areas as the proposed project. Therefore, the proposed project would not contribute to cumulative impacts to geology and soils.

Cumulative impacts related to erosion are covered above in Cumulative Impact HWQ: "Cumulative Impacts to Hydrology and Water Quality."

Cumulative Impact HAZ: Cumulative Impacts of Hazards and Hazardous Materials.

The geographic scope of analysis for cumulative hazardous materials impacts encompasses and is limited to the proposed project site and its immediately adjacent area. This is because impacts relative to hazardous materials are generally site-specific and depend on the nature and extent of the hazardous materials release, and existing and future soil and groundwater conditions. None of the other projects listed in Table 4-1 would be located at the project site or immediate vicinity and would not result in use of hazardous materials at the project site or immediate vicinity. Therefore, the proposed project would not contribute to cumulative impacts to hazards and hazardous materials.

Cumulative impacts related to impairment of an emergency response or evacuation plan are covered discussed below in Cumulative Impact TR: "Cumulative Impacts to Transportation."

Cumulative Impact LUP: Cumulative Impacts to Land Use and Planning.

The geographic scope for potential cumulative impacts to land use and planning include the local area and TNF and PNF. Impacts involving adopted land use plans or policies and zoning are project-specific and generally would not combine to result in significant cumulative impacts related to land use. The proposed project would have no impact with respect to dividing an established community.

Any inconsistency of the proposed project or related projects with land use and zoning code designations is an issue related to land use regulation rather than a physical impact of the project on the environment. Where the project could conflict with a land use plan or policy that was adopted specifically for the purposes of preventing or reducing an adverse environmental effect, such potential conflicts are evaluated as stand-alone environmental impacts within each topic area of this EIR. As described in Chapter 3.12, "Land Use and Planning," the proposed project would be consistent with goals, objectives, and policies contained in the Yuba County 2030 General Plan that address flood risk reduction for the county's residents and property; YCWA is not required to obtain a conditional use permit for the proposed project per Government Code § 53091(e); YCWA would obtain an encroachment permit from Yuba County for the temporary and permanent relocation of Marysville Road; and it is anticipated that a U.S. Forest Service (USFS) Special Use Permit would be required for

improvements of the portion of the road on USFS land. The ARC Spillway would provide long-term benefits to valuable natural resources, including forestland, by providing increased protection from future flood damages and would not have a long-term detrimental effect on the management or use of surrounding natural resources or recreation. The proposed project would not change the overall rural character of lands in the vicinity of the project site or result in land use inconsistencies with local and regional plans. Therefore, the proposed project would not make a cumulatively considerable incremental contribution to significant cumulative impacts related to land use and planning.

Cumulative Impact NOI: Cumulative Impacts of Noise.

The geographic scope for potential cumulative impacts of noise and vibration includes the project site and immediate vicinity. This is because impacts relative to noise and vibration are generally site-specific; noise dissipates exponentially over distance. None of the other projects listed in Table 4-1 would be located at the project site or immediate vicinity and none of them would cause noise or vibrations in the same areas as the proposed project. Therefore, the proposed project would not contribute incrementally cumulative impacts to noise.

Cumulative Impact PS: Cumulative Impacts to Public Services.

The geographic scope for potential cumulative impacts to public services is services provided by the Camptonville Community Service District. Additionally, cumulative impacts are limited to fire protection services. This is because impacts relative to public services from the proposed project are limited to the gate control building (GCB) and the need for fire protection.

None of the other projects listed in Table 4-1 require fire protection services from the Camptonville Community Service District, except the biomass plant in Camptonville. The proposed GCB would include fire protection based on the requirements of the Camptonville Community Service District, the applicable National Fire Prevention Association standards, and recommendations of the equipment manufacturer. Additionally, operation of the biomass plant and the North Yuba Forest Partnership would reduce wildlife risk to structures including those serviced by the Camptonville Community Service District. Therefore, the proposed project would not make a cumulatively considerable incremental contribution to a significant cumulative impact on public services.

Cumulative Impact REC: Cumulative Impacts to Recreation.

The geographic scope for potential cumulative impacts to recreational resources is the project site and local vicinity. A cumulative impact would occur if one or more collective projects, in conjunction with the proposed project, would result in an increase of use of existing recreational facilities such that physical deterioration of the facility would occur or be accelerated; or if the project, in conjunction with collective projects, would include recreational facilities or require the construction or expansion of recreational facilities, which might have an adverse physical impact on the environment.

The Yuba County 2030 General Plan contains policies to ensure high-quality recreational facilities and maximize access to recreational facilities and programs. The Reservoir and surrounding TNF and PNF include a multitude of recreation facilities and services for the project area. Project-related construction activities would result in the Reservoir and surrounding TNF and PNF including a multitude of recreation facilities and services for the project area. Project-related construction activities would result in temporary and short-term changes in recreational activities. Additionally, temporary road closures and/or road detours may affect access to nearby recreational facilities. Finally, recreationists using the Reservoir may experience a temporary reduction in the quality of recreational opportunities because of noise, dust, and visual changes from construction activities. Project impacts to recreational resources would be short-term and would not be considered significant.

None of the related projects listed in table in Table 4-1 is in the local vicinity, expect the North Yuba Forest Partnership, which has the potential to result in temporary closure of recreational trails and facilities nearby the Reservoir (at different locations than the proposed project) during treatment activities. Due to the nature of treatment activities, any closures would be limited in duration at any one location, and abundant recreation opportunities would remain in the local vicinity. Therefore, when considered together with collective projects, the proposed project would not make a cumulatively considerable incremental contribution to a significant cumulative impact to recreation.

Cumulative Impact TR: Cumulative Impacts to Transportation.

The geographic scope for potential cumulative impacts to transportation includes regional and local roadways within the project area and region, as defined within Chapter 3.16, "Transportation." The potential for cumulative transportation impacts exists where there are multiple projects proposed in common geographic area that have overlapping construction schedules and/or project operations that together could result in a substantial contribution to increased vehicle trips (due to material delivery and worker commutes) throughout the surrounding roadway network. However, none of the related projects listed in Table 4-1 would cause an increase in vehicle trips at the project site or immediate vicinity, and the proposed project would not make a cumulatively considerable incremental contribution to a significant cumulative impact related to inadequate emergency access or hazards and these issues are not discussed further. The remainder of this analysis focuses on cumulative impacts at a regional level.

The proposed project would have no impact with respect to a conflict with a program, plan, ordinance, or policy addressing the circulation system, or conflict with State CEQA Guidelines Section 15064.3(b) during operations.

The proposed project could generate vehicle trips and VMT simultaneously with related projects, potentially on the same roadways in the region. Vehicle trips and VMT generated from the proposed project and related projects would primarily be limited to temporary construction activities during the construction period for each project. The proposed project would not generate permanent new vehicle trips and VMT duration operations. Any long-term vehicle trips and VMT generation from related projects would be small, due to the nature of these projects. Therefore, the proposed project's contribution to potential cumulative impacts associated with increases in VMT would not be considered a cumulatively considerable incremental contribution to a significant cumulative impact.

Cumulative Impact UTL: Cumulative Impacts to Utilities and Service Systems.

The geographic scope of analysis for cumulative utilities and service systems impacts is the project site and surrounding vicinity, as well as the utilities and services systems that supply the project site with water, solid waste disposal services, electric power, and wastewater. None of the other projects listed in Table 4-1 would be located at the project site or immediate vicinity and would not potentially impact utilities lines relocated by the proposed project. The project would not increase use of other resources, such as natural gas or telecommunications.

Construction and operation of the proposed project would have less-than-significant impacts to water supplies, wastewater service capacity, and solid waste as it relates to local infrastructure capacities and regulatory reduction goals. Therefore, significant cumulative impacts related to utilities and services could occur if incremental impacts of the proposed project combined with one or more of the collective projects would substantially reduce water supply availability, generate wastewater in excess of treatment capacity available to the project area, or generate solid waste in amounts that exceed local infrastructure capacities or otherwise impair the attainment of solid waste reduction goals. Most of the related projects listed in Table 4-1 are construction projects, which, similar to the proposed project, are not anticipated to require the construction or expansion of water supply, treatment, or conveyance facilities to serve the project. However, the biomass plant in Camptonville may require a water supply and wastewater services, but would also generate energy for PG&E. This project would be developed in compliance with all Federal, State, and local statues and regulations related to water supplies and wastewater services. Therefore, the proposed project would not make a cumulatively considerable incremental contribution to a significant cumulative impact related to water supplies and wastewater services.

As described in Chapter 3.17, "Utilities and Service Systems," the proposed project would have a less-than-significant impact to landfill capacities and solid waste reduction goals, since Recology Ostrom Road Landfill has adequate capacity to accept construction waste that would be generated during temporary periods of construction and scheduled maintenance, and because the proposed work would be conducted in compliance with all Federal, State, and local statues and regulations related to solid waste and its disposal. Similarly, construction and operation of collective projects would generate solid waste over temporary time periods in accordance with planned construction schedules and maintenance activities. Landfills in the project region have adequate capacity to accept wastes generated by each of the collective projects into the foreseeable future. Further, the collective projects are required to comply with all Federal, State, and local statutes and regulations related to solid waste and its disposal. Compliance with regulatory measures as they relate to solid waste generation would ensure that cumulative impacts remain less than significant through each project's operation schedule. Furthermore, the biomass plant in Camptonville would use biomass as an energy supply, potentially diverting some waste from landfill disposal. Therefore, the proposed project would not make a cumulatively considerable incremental contribution to a significant cumulative impact related to solid waste generation.

Cumulative Impact WF: Cumulative Impacts of Wildfire.

The geographic scope of analysis for cumulative wildfire impacts encompasses and is limited to the collective project sites within and immediately adjacent to the project area, which is the TNF and PNF. This is due to the site-specific nature of the project and potential impacts to wildfire such as fuels (vegetation), climate conditions, and fire history. Fire risk in Yuba County is greatest in the foothills and mountain areas such as the project area. As designated by CAL FIRE, the project site is located within an area of moderate and very high fire severity zone. The North Yuba Forest Partnership and biomass

plant in Camptonville are within the TNF and may include work within very high fire hazard severity zones. The remaining projects listed in Table 4-1 are not within TNF, PNF, or other forested areas. None of the related projects listed in Table 4-1 are located at the project site or immediate vicinity, and the proposed project would not make a cumulatively considerable incremental contribution to a significant cumulative impact related to an adopted emergency response plan or emergency evacuation plan during construction and these issues are not discussed further.

Construction and operation of the proposed project would have a less-than- significant impact with regard to the installation or maintenance of infrastructure that may exacerbate fire risk. The related projects in the TNF and proposed project would have potential impacts during construction due to construction equipment and vehicles that use fuel contributing to potential ignition sources in the project area. The related project and proposed projects would comply with all applicable fire codes and provide design features for fire suppression. However, wildfire ignition from construction activities could expose nearby residents and construction workers to pollutant concentrations from a wildfire or the uncontrolled spread of a wildfire. The North Yuba Forest Partnership would provide forest restoration and reduce wildlife risk across 275,000 acres of the North Yuba River Watershed within the TNF. Operation of the biomass plant in Camptonville would also support forest health and reduce wildlife risk. Implementation of Mitigation Measures WF-1 and WF-2 would reduce potentially significant impacts associated with wildfire ignition and spread from the proposed project by requiring use of BMPs during construction to reduce the likelihood of accidental fires and preparing and implementing a fire safety plan. Additionally, YCWA would coordinate with the construction contractor to make sure that the requirements outlined in these measures are implemented during construction activities. With implementation of mitigation measures, the proposed project in conjunction with cumulative projects would not create or contribute to significant cumulative impacts related to the exposure of people or structures to wildland fires or uncontrolled spread of wildfire.

4.5 Significant and Unavoidable Impacts

State CEQA Guidelines Section 15126(b) requires an EIR to "describe any significant impacts, including those which can be mitigated but not reduced to a level of insignificance. Where there are impacts that cannot be alleviated without imposing an alternative design, their implications, and the reasons why the proposed project is being proposed, notwithstanding their effect, should be described."

Chapter 3, "Environmental Setting and Impact Analysis," describes the potential environmental impacts of the proposed project and recommends mitigation measures to reduce potentially significant or significant impacts to a less-than-significant level, where feasible. Section 5.5, "Cumulative Impacts," presents cumulative impacts. After implementation of all feasible and available mitigation measures, the following impacts were determined to be significant and unavoidable for the proposed project:

- **Impact AIR-1.** Temporary Conflicts with Applicable Air Quality Plan from Construction Activities.
- **Impact AIR-3.** Temporary Cumulatively Considerable Net Increases of Any Criteria Pollutant from Construction Activities.
- **Impact AES-1.** Temporary Visual Changes from Construction Equipment.
- **Impact AES-2.** Temporary Visual Changes from Construction Activities.
- **Impact NOI-1.** Temporary Construction-Related Increases in Ambient Noise Levels in Excess of Yuba County Standards.

- **Cumulative Impact AIR.** Cumulative Impact to Air Quality.

The rationale for these conclusions and lack of available and feasible mitigation measures is described in Chapter 3.5, “Air Quality,” Chapter 3.7, “Aesthetics,” Chapter 3.13, “Noise,” and Section 4.4, “Cumulative Impacts.”

Chapter 5. Alternatives

5.1 Introduction

The California Environmental Quality Act (CEQA) states that a lead agency shall not approve a project as proposed if there are feasible alternatives or mitigation measures available which would substantially lessen the significant environmental effects of the project. The impact evaluations conducted in Chapter 3, "Environmental Setting and Impact Analysis," of this Environmental Impact Report (EIR) identify feasible mitigation measures to address potentially significant impacts of the New Bullards Bar Dam Atmospheric River Control (ARC) Spillway Project (project or proposed project). However, even with the imposition of all feasible mitigation measures, the project will have some significant environmental impacts. This chapter of the Draft EIR identifies potentially feasible alternatives to the proposed project or its location that could be capable of meeting the project objectives and avoiding or lessening the significant effects of the project that cannot be mitigated to a less than significant level, evaluates the comparative merits of each alternative, and identifies an environmentally superior alternative. Alternatives that were considered but rejected are also presented.

5.2 CEQA Requirements for Evaluating Alternatives

The principles used to guide selection and evaluation of project alternatives are identified in Section 15126.6 of the State CEQA Guidelines, which specifies that an EIR must do the following:

- Describe a reasonable range of potentially feasible alternatives to the project that could attain most of the basic project objectives, while avoiding or reducing any significant environmental impacts.
- Evaluate the comparative merits of each potentially feasible alternative selected for evaluation against the proposed project.
- Evaluate a no-project alternative.
- Identify alternatives initially considered but removed from detailed evaluation and briefly describe the reasons for the dismissal.
- Identify the environmentally superior alternative.

The selection of alternatives considered by the lead agency is governed by the "rule of reason" as discussed in 15126.6(f) of the State CEQA Guidelines. That is, an EIR need not consider every conceivable alternative to a project. Rather, an EIR needs to describe and evaluate only those alternatives necessary to permit a reasonable choice and to foster informed decision-making and informed public participation. The EIR should discuss a reasonable range of potentially feasible alternatives that are capable of meeting most of the project's basic objectives. The EIR's identification of an alternative as potentially feasible does not preclude the lead agency's decision-making body from finding, at the conclusion of the CEQA process, that an alternative is infeasible. Alternatives may be deemed infeasible when they cannot be accomplished in a successful manner within a reasonable period of time, considering economic, environmental, social, and technological factors. CEQA also does not require alternatives to be evaluated at the same level of detail as the proposed project. The discussion of

alternatives properly focuses on how they could be implemented to reduce or avoid the project's significant environmental impacts.

5.3 Alternatives Development

Developing and selecting the alternatives evaluated in this Draft EIR was informed by the project objectives, as identified by Yuba County Water Agency (YCWA) staff; findings of planning and feasibility studies; engineering design reports; the environmental evaluation conducted in Chapter 3, "Environmental Setting and Impact Analysis," of this Draft EIR; and information gathered during the EIR scoping process, as discussed below.

5.4 YCWA Project Development Process

As described in Chapter 1, "Introduction," of this Draft EIR, the Yuba-Feather River system has a history of catastrophic flood events. Since 1950, five major floods have resulted in loss of life, caused significant property damage, and constrained economic development in the region. Yuba County has been partially protected by a system of flood control levees and/or upstream storage reservoirs since 1940, but the system does not provide adequate flood protection. Following the last major flood in 1997, YCWA initiated feasibility studies evaluating the effectiveness and cost to construct various flood protection measures along the Yuba and Feather Rivers with the eventual goal of protecting against a 1-in-500-year flood event for the Yuba River watershed. The first phase of studies, completed in March 1998, focused on the history of flooding, existing flood control facilities on the Yuba-Feather Rivers, risks and economic impacts, and a process for developing a flood risk management improvement program.

In 2003, YCWA completed the Yuba-Feather Supplemental Flood Control Project Feasibility Study (Feasibility Study). The Feasibility Study considered a range of options from operational changes providing an increment of flood volume reduction to constructing new dams with substantial flood volume reductions. The Feasibility Study recommended upstream flood management using Forecast -Informed Reservoir Operations (FIRO) as the protection method with greatest certainty of reliability. FIRO is intended to operate reservoirs in a more efficient fashion by scheduling water releases from the reservoir pool based on forecasted future inflow to the New Bullards Bar Reservoir (Reservoir). Early release of flows prior to a major weather event will provide more flood storage in the Reservoir pool to capture peak inflows. The early and gradual release of water from the Reservoir pool avoids substantially increasing water surface elevations in downstream segments of the Yuba and Feather Rivers as currently occurs during a peak release.

Currently, the New Bullards Bar Dam's outlet facilities lack adequate release capacity to take full advantage of the advances in FIRO and cannot achieve the desired level of flood protection and reliability identified by the Feasibility Study. Further analysis indicated that the greatest flexibility and benefit would be provided by facilitating additional release capabilities at the bottom of the current flood pool level, at Elevation (El.) 1920.8 feet, and at higher Reservoir stages/elevations. The Feasibility Study developed a few conceptual alternatives that would provide this capacity at the Reservoir.

The proposed project does not include any changes to the existing Flood Control Manual (including for implementation of FIRO), as discussed in Chapter 2, "Project Description"; the new ARC Spillway would be operated under the existing Manual's requirements to better meet the Manual's downstream target flow objectives. YCWA expects that the United States (U.S.) Army Corps of Engineers (USACE)

will update and amend the Flood Control Manual at some point following construction of the ARC Spillway, but those changes are uncertain and unknowable at this time.

After the Feasibility Study was prepared in 2003, YCWA continued evaluating these conceptual alternatives. YCWA ultimately decided to pursue a project to develop a conveyance tunnel outlet spillway design to provide the desired secondary release capacity. However, in 2020, YCWA conducted value engineering to evaluate design and construction options for the ARC Spillway in consideration of project objectives, constructability and risks, and costs, including consideration of the conveyance tunnel outlet spillway design, open-cut design, and other alternatives. After this evaluation, YCWA modified the proposed ARC Spillway to an open-cut design, which is the proposed project evaluated in this EIR. During the planning process, YCWA also evaluated options for project operations (under the existing Flood Control Manual) and construction activities and selected alternatives/options that would minimize potential environmental impacts while meeting project objectives, to the extent possible.

During the EIR's CEQA scoping process, two comment letters were received from the public that provided general information about alternatives to be evaluated in the EIR. These comments were considered and incorporated into the alternatives analysis in this chapter.

5.4.1 Project Objectives

As stated previously in Chapter 2, "Project Description," the project objectives are to:

- Provide improved flood risk reduction in the Yuba-Feather River system.
- Provide operational flexibility and redundancy for Reservoir releases in high-flow events.
- Provide redundant spillway/Reservoir release capacity in the event of structural, operational, or other problems with the existing Dam or Primary Spillway.
- Avoid impacting Reservoir operations and recreation use during construction activities to the extent possible.
- Allow for adequate operation, inspection, and maintenance access to the ARC Spillway.
- Minimize the need to transport excavated soil and rock.
- Address and accommodate uncertainty in hydrologic predictions due to climate change and other factors and improve water conveyance flexibility and integrate enhanced operations to respond to these changes.

5.4.2 Significant Environmental Effects

Consistent with the State CEQA Guidelines (Section 15126.6), alternatives should be capable of avoiding or substantially lessening one or more of the significant environmental effects of the proposed project. The analyses contained in Chapter 3.1, "Hydrology and Water Quality," through Chapter 3.18, "Wildfire," of this Draft EIR for the proposed project identified potentially significant but mitigable impacts for 11 resource topics. Significant and unavoidable impacts of the proposed project were identified for three resource topics. A list of potentially significant and significant and unavoidable impacts by type is provided below.

Potentially Significant but Mitigable Project Impacts

The following impacts were determined to be potentially significant for the proposed project but have been reduced to less-than-significant levels with incorporation of mitigation measures.

- **Impact HWQ-1.** Violate Surface Water Quality Standards from Ground Disturbance and Accidental Discharge of Wastes during Construction.
- **Impact HWQ-2.** Violate Surface Water Quality Standards from Discharge of Water Encountered during Construction.
- **Impact HWQ-3.** Violate Surface Water Quality Standards from Drainage Water Discharges during Operations.
- **Impact HWQ-4.** Potential Long-term Erosion from Development of the Project Site.
- **Impact HWQ-5.** Potential Long-term Erosion Impacts from Use of the ARC Spillway.
- **Impact FISH-1.** Potential Construction-related Impacts on Fish and Their Habitats.
- **Impact BIO-1.** Impacts to Special-status Plants and Fungi.
- **Impact BIO-4.** Impacts on Foothill Yellow-legged Frog.
- **Impact BIO-6.** Impacts on Western Pond Turtle.
- **Impact BIO-7.** Impacts on Bald Eagle.
- **Impact BIO-8.** Impacts on American Peregrine Falcon.
- **Impact BIO-10.** Impacts on California Spotted Owl.
- **Impact BIO-12.** Impacts on Ringtail.
- **Impact BIO-13.** Impacts on Special-status Bats.
- **Impact BIO-16.** Impacts on Federal- and State-protected Waters.
- **Impact CUL-1.** Substantial Adverse Change in the Significance of a Historical Resource or an Archaeological Resource pursuant to California Code of Regulations Section 15064.5.
- **Impact CUL-2.** Disturbance of Human Remains, including Remains Interred Outside of Dedicated Cemeteries.
- **Impact CUL-3.** Substantial Adverse Change in the Significance of an Unidentified Tribal Cultural Resource, as defined in Public Resources Code 21074.
- **Impact GHG-1.** Generation of greenhouse gas (GHG) Emissions from Construction Activities.
- **Impact GHG-3.** Conflict with a GHG Reduction Plan.
- **Impact AES-3.** Permanent Alteration of the Visual Character or Quality of the Project Area, including Scenic Vistas.

- **Impact GEO-2.** Adverse Effects from Blasting Vibrations during Construction.
- **Impact HAZ-1.** Create a Significant Hazard to the Public or the Environment Through the Routine Transport, Use, or Disposal of Hazardous Materials.
- **Impact HAZ-2.** Potential to Create a Significant Hazard to the Public or the Environment Through Reasonably Foreseeable Upset and Accident Conditions Involving the Release of Hazardous Materials into the Environment.
- **Impact HAZ-3.** Impair Implementation of an Emergency Response Plan or Evacuation Plan.
- **Impact TR-2.** Result in Inadequate Emergency Access along Marysville Road During Construction.
- **Impact UTL-1.** Relocation of Existing Utility Infrastructure.
- **Impact WF-1.** Substantially Impair an Adopted Emergency Response Plan or Emergency Evacuation Plan During Construction.
- **Impact WF-2.** Expose People or Structures to a Significant Risk of Loss, Injury or Death Involving Wildland Fires or Uncontrolled Spread of Wildfire During Construction.
- **Cumulative Impact HWQ.** Cumulative Impact to Hydrology and Water Quality.
- **Cumulative Impact FISH.** Cumulative Impact to Fisheries Resources.
- **Cumulative Impact BIO.** Cumulative Impact to Terrestrial Biological Resources.
- **Cumulative Impact GHG.** Cumulative Impact to Greenhouse Gas Emissions.
- **Cumulative Impact WF.** Cumulative Impact to Wildfire.

Significant and Unavoidable Project Impacts

The following impacts were determined to be significant and unavoidable for the proposed project, even with implementation of all feasible mitigation measures.

- **Impact AIR-1.** Conflicts with Applicable Air Quality Plan from Construction Activities.
- **Impact AIR-3.** Results in Cumulatively Considerable Net Increase of Any Criteria Pollutant from Construction Activities.
- **Impact AES-1.** Temporary Visual Changes from Construction Equipment.
- **Impact AES-2.** Temporary Visual Changes from Construction Activities.
- **Impact NOI-1.** Temporary Construction-related Increases in Ambient Noise Levels in Excess of Yuba County Standards.
- **Cumulative Impact AIR.** Cumulative Impact to Air Quality.

5.5 Alternatives Considered and Dismissed

Several alternatives that were initially considered by YCWA but ultimately dismissed for (i) failure to meet most of the basic project objectives, (ii) infeasibility, or (iii) inability to avoid significant environmental impacts associated with the proposed project. The alternatives dismissed included:

- Two Additional Primary Spillway Bays Alternative
- Raising New Bullards Bar Dam Alternative
- Notching the Primary Spillway Alternative
- Pumping Water Over the Dam Alternative
- Soil and Rock Disposal Sites on Other Properties Alternative
- More Frequent ARC Spillway Operations Alternative

Each of these alternatives is described further below, along with the specific reasons for dismissal.

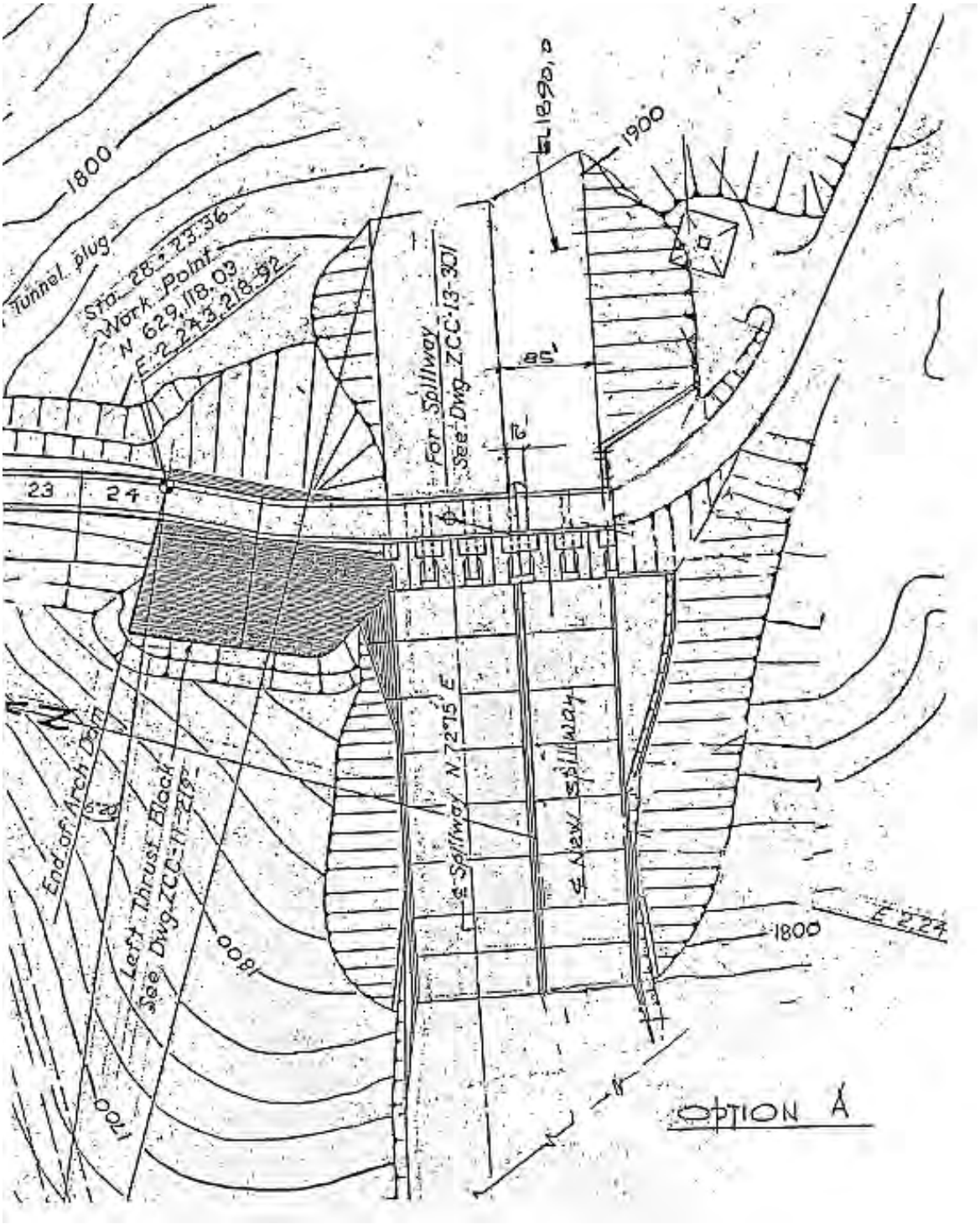
5.5.1 Two Additional Primary Spillway Bays Alternative

The Two Additional Primary Spillway Bays Alternative considers modifying the Primary Spillway to allow for increased flood flow discharges by installing two additional spillway bays adjacent to the Primary Spillway, as shown in **Figure 5-2**. This alternative would be located about 200 to 280 feet north of the proposed project's new spillway. The Two Additional Primary Spillway Bays Alternative involves constructing two 30-feet-wide spillway bays along the south side and parallel to the Primary Spillway, a new approximately 85-feet-wide by 260-feet-long approach channel leading to the new spillway, a new approximately 370-feet-long by 84-feet-wide spillway chute, and a new approximately 84-feet-wide discharge channel. The new spillway bays would operate together with the existing bays at the Primary Spillway to provide the desired flood flow releases. The new spillway bays would have a discharge capacity of approximately 20,800 cubic-feet per second (cfs) at the bottom of the flood pool and the combined discharge capacity of the existing and new spillway bays would be approximately 40,000 cfs at the bottom of the flood pool.

The most significant issue with this alternative is that it requires modifying the existing Primary Spillway, including removing portions of the intake structure and the southern training wall and cutoff wall extending into the left Dam abutment. These modifications would result in periods where the Primary Spillway is inoperable during construction. Not having the Primary Spillway available for use even temporarily presents a significant dam safety issue. This alternative would also require lengthening of the existing bridge over the Primary Spillway a sufficient distance to span the new spillway chute, and use of a temporary bridge to keep Marysville Road open during construction. Construction of the temporary bridge would require closure of Marysville Road while the bridge is being built.

Additionally, due to its location next to the Primary Spillway, this alternative requires more excavation within the Reservoir below the top of the flood pool (when compared to the proposed project), which could make it more difficult to work in dry conditions in the Reservoir. As a result, changes in operations or use of cofferdams could be required to maintain a dry work area. The constructability risks and high costs associated with using cofferdams for this alternative would be similar to those discussed for the "Conveyance Tunnel Spillway Alternative" in this section.

This alternative was rejected as infeasible and is not evaluated further in this EIR due to the combination of the following significant issues: increased dam safety risk due to temporarily taking the Primary Spillway out of service, preclusion of emergency access across the Dam due to temporary closure of Marysville Road, and significant environmental and other impacts from use of a cofferdam in the Reservoir. This alternative also would not avoid or substantially lessen any of the potentially significant impacts and significant and unavoidable impacts associated with the proposed project.



Source: Yuba–Feather Flood Control Study Team 2003.

Figure 5-1. Two Additional Primary Spillway Bays Alternative – Plan View

5.5.2 Raising New Bullards Bar Dam Alternative

The Raising New Bullards Bar Dam Alternative considers enlarging the Reservoir by raising the 635-feet-tall Dam to provide a similar level of flood protection as the proposed project. The normal maximum surface area of the Reservoir is 4,810 acres and a 10-feet increase in height of the Dam would create 50,000 acre-feet of new storage capacity in the Reservoir. However, this additional storage would require modifying the Reservoir's existing flood control operational rules and Flood Control Manual, which is not part of the proposed project and precludes this alternative from meeting the basic project objectives, as discussed below.

The increased storage of water behind the Dam would be a substantially larger project with more potentially significant environmental impacts. This alternative would result in significant increases in foundation water pressures and leakage concerns and further analysis would be required to understand the extent of these issues. As a result of these issues, this alternative may not be approved by the California Department of Water Resources, Division of Safety of Dams (DSOD) or the Federal Energy Regulatory Commission (FERC). The additional flood storage capacity provided under this alternative would inundate areas around the Reservoir that are primarily owned by the U.S. Forest Service (USFS). In addition, the North Yuba River upstream of the Reservoir is proposed for designation as a scenic river under the Federal Wild and Scenic Rivers Act. It is uncertain whether approvals could be obtained from USFS for inundating new areas on their land around the Reservoir and increasing backwater effects into a reach of the river that was proposed for designation because of its free-flowing status.

Raising the Dam also requires structural modifications to the Dam crest and Marysville Roadway and replacement of the Primary Spillway gates and gate operators. Modification of the Primary Spillway would result in periods where the Primary Spillway is inoperable during construction. Not having the Primary Spillway available for use presents a significant dam safety issue. Construction would be completed in stages to minimize impacts to Marysville Road to the extent possible; however, temporary closure of Marysville Road would be required and likely for much longer periods of time than would be required for the Proposed Project.

This alternative was rejected because it would not satisfy the basic project objectives without modification of the Flood Control Manual and was deemed infeasible for a variety of reasons summarized below, and it is not evaluated further in this EIR. This alternative was deemed infeasible due to the combination of the following significant issues: uncertainty in ability to obtain permits from DSOD, FERC, and USFS; dam safety risk due to temporarily taking the Primary Spillway out of service; preclusion of emergency access across the Dam due to temporary closure of Marysville Road; encroachment on USFS lands including inundation of a reach proposed for designation as a scenic river under the Federal Wild and Scenic Rivers Act; and substantially more construction-related impacts due to the much larger size of this alternative compared to the proposed project. Perhaps most importantly, none of the significant and unavoidable impacts under the proposed project would be avoided or substantially lessened, and all of those impacts would be much greater with the Raising New Bullards Bar Dam Alternative compared to the proposed project.

5.5.3 Notching the Primary Spillway Alternative

The Notching the Primary Spillway Alternative consists of constructing a notch in the Primary Spillway by excavating into the Dam face. This alternative was rejected due to concerns over constructability. This alternative would require deep excavations near the gravity block that supports the loading of the concrete arch dam, which would be dangerous to Dam integrity. Additionally, only a small window of time is available for construction to occur because the Primary Spillway must remain fully operational during fall, winter, and spring months. Notching the existing spillway would also not meet regulatory requirements and likely would not be approved by either DSOD or FERC due to the intricacies of lowering the existing spillway (which is adjacent to the main arch dam and serves as the foundation for the gravity block). This alternative was rejected as infeasible from an engineering perspective and because it will increase flood risk during construction, thereby failing to meet the fundamental project objective of reducing flood risk in the Yuba-Feather River system. This alternative is not evaluated further in this EIR due to the impracticality of constructing the alternative while maintaining safe spillway operations.

5.5.4 Pumping Water Over the Dam Alternative

The Pumping Water Over the Dam Alternative consists of installing new permanent pumps near the Primary Spillway to lower the Reservoir water in advance of oncoming floods. Locating the pumps near the Primary Spillway would minimize the required lift. The pumps must have capacity to pump over 40 feet of head and hundreds of thousands of acre-feet of water. Based on this objective, the capacity of a pump system would require substantial flow capacity on the order of 25,000 to 35,000 cfs. This is significant for pumps and unprecedented for pumping water over a dam. Reservoirs have rarely relied on a pumping system for either emergency drawdown or for water supply (although in a few cases, small reservoirs have been retrofitted with a pump system when a gravity system was not part of the original design). In addition, large pumping systems also require large intake structures and significant power (and possibly transmission lines for power), resulting in significant cost. A pumping system also would not have the reliability compared to a gravity system. This alternative was rejected as infeasible because the number, size, and cost of pumps to meet the desired capacity is considered impractical and too costly, and the engineering design required for this alternative would be questionable and untested.

5.5.5 Other Soil and Rock Disposal Site Alternatives

YCWA identified alternative soil and rock disposal sites on other properties and within the Reservoir to dispose of soil and rock excavated/removed during project construction. The soil and rock disposal site proposed on top of the ridge south of the ARC spillway for the proposed project would not be developed. Otherwise, design and construction of the ARC Spillway in this alternative would be the same as the proposed project.

Soil and Rock Disposal Sites on Other Properties

The alternative sites identified for soil and rock disposal are on other properties off Marysville Road to the west of the Dam and the North Yuba River Canyon. YCWA identified approximately 30 acres on USFS lands at an old quarry and adjacent lands and approximately 20 acres on privately owned property. These disposal sites would require hauling material approximately 1.8 miles each way from the primary area of the project site (3.6 miles round trip) and longer for the discharge channel, substantially longer distances than the soil and rock disposal area proposed for the project.

To be feasible, disposal on USFS lands would require authorization from USFS with a Special Use Permit and disposal on private property would require authorization/easements from the property owner. The soil and rock disposal area proposed for the project is located on YCWA-owned property and does not require easements or additional land rights.

The increase in hauling associated with these alternatives would result in increased criteria air pollutant and Greenhouse Gas (GHG) emissions compared to the proposed project. These alternatives would avoid potentially significant impacts associated with permanent changes in visual character resulting from developing the soil and rock disposal area on the ridge adjacent to the ARC Spillway; however, these alternatives would result in a similar impact because they would permanently change the visual character of the alternative disposal sites adjacent to Marysville Road. In other words, these alternative disposal sites would change the location, but not the nature or scope, of the visual impact. Since all other construction activities and operations of these alternatives would be similar to the proposed project, all other potentially significant construction- and operations-related impacts would be the same or similar to the proposed project. Therefore, these alternatives would not reduce any of the potentially significant impacts of the proposed project.

Soil and Rock Disposal within the Reservoir

The Reservoir disposal site would consist of an approximately 4.5-acre area along the shoreline and flood pool immediately to the east of the project site. This alternative would require similar hauling distances as the proposed project (some areas of the project site would be further and others closer to the Reservoir disposal site). Soil and finer material would be placed first and covered with larger rocks and boulders. Material would be disposed of in dry conditions to the extent possible; however, Reservoir water would likely intermittently inundate the disposal area during the multi-year construction period and in-water disposal of material is anticipated to some extent. After construction is completed and temporary water quality controls are removed, some sediment is anticipated to become mobilized into the Reservoir during inundation.

To be feasible, this alternative would require obtaining authorization under a California Water Act (CWA) Section 404 permit from USACE and a CWA Section 401 Water Quality Certification from the Central Valley Regional Water Quality Control Board (RWQCB), because of the discharge into the Reservoir, which is a jurisdictional waterway. It is anticipated that the Central Valley RWQCB and possibly USACE (if a letter of permission or individual permit is needed) would require an alternatives analysis and identification of the least environmentally damaging practicable alternative. Since there are alternatives to dispose of sediment outside of waters of the U.S./State, the Reservoir disposal site may not qualify as the least environmentally damaging practicable alternative.

Disposal within the Reservoir would avoid potentially significant impacts associated with permanent changes in visual character due to developing the soil and rock disposal area on the ridge adjacent to the ARC Spillway; however, this option would result in a similar impact because there would be a permanent change in the visual character along the Reservoir shoreline, which would be visible from the key observation points including the Overlook Site located adjacent to this disposal site. Since hauling distances would be similar to the proposed project, criteria air pollutant and GHGs emissions would also be similar to the proposed project. All other construction activities and operations of these alternatives would also be similar to the proposed project; and, therefore, all other potentially significant construction- and operations-related impacts would be the same or similar to the proposed project. Consequently, this alternative would not reduce at least one of the potentially significant impacts of the proposed project.

5.5.6 More Frequent or Less Frequent ARC Spillway Operations Alternatives

YCWA evaluated alternatives to operating the ARC Spillway under the existing Flood Control Manual. Design and construction of the ARC Spillway under this alternative would be the same as the proposed project. Using the ARC Spillway more frequently than is proposed by the project – during more frequent, smaller flood events – would provide the desired level of flood risk reduction but would not avoid or minimize any of the potentially significant and significant and unavoidable impacts of the proposed project. Furthermore, initial investigations by YCWA determined that more frequent use of the ARC Spillway under the existing Flood Control Manual could result in greater and more frequent changes in water temperature downstream during periods of release from the ARC Spillway; further investigation and hydraulic modeling would be required to identify and evaluate additional potential changes in temperature and water quality, and their related environmental impacts.

Likewise, using the ARC Spillway less frequently would not provide the desired level of flood risk reduction and would still result in the same significant and unavoidable environmental impacts. Reducing the use of the ARC Spillway would also increase erosion because peak flows would not be reduced as much as under the proposed project and greater flood risks would occur because the ARC Spillway would not be used as frequently to minimize peak flow releases.

5.6 Alternatives Considered and Retained for Analysis

One alternative – the Conveyance Tunnel Outlet Spillway Alternative – has the potential to meet most of the proposed project objectives, be feasible, and avoid or reduce one or more significant impacts of the proposed project (**Table 5-1**). In addition to the Conveyance Tunnel Outlet Spillway Alternative, this section also discusses the No Project Alternative, as required by CEQA. In the remainder of this section, the No Project Alternative and Conveyance Tunnel Outlet Spillway Alternative are described, including the ability of each of these alternatives to satisfy project objectives, and their environmental impacts as compared to those of the proposed project, including tradeoffs in benefits and effects.

Table 5-1. Impact Conclusions for Alternatives Compared to the Proposed Project

Environmental Topic	Proposed Project	No Project Alternative [1]	Conveyance Tunnel Spillway Alternative [2]
Hydrology and Water Quality	LTSM	SU	LTSM
Fisheries Resources	LTSM	NI	LTSM
Terrestrial Biological Resources	LTSM	NI	LTSM
Cultural and Tribal Cultural Resources	LTSM	NI	LTSM
Air Quality	SU	NI	SU
Greenhouse Gas Emissions	LTSM	NI	LTSM
Aesthetics	SU	NI	SU
Agricultural and Forestry Resources	LTS	NI	LTS
Energy	LTS	NI	LTS
Geology and Soils	LTSM	NI	SU
Hazards and Hazardous Materials	LTSM	NI	LTSM
Land Use and Planning	LTS	NI	LTS
Noise	SU	NI	SU
Public Services	LTS	NI	LTS
Recreation	LTS	NI	LTS
Transportation	LTSM	NI	LTS
Utilities and Service Systems	LTSM	NI	LTS
Wildfire	LTSM	NI	LTSM

Notes: NI = no impact, LTS = less-than-significant impact, LTSM = less-than-significant impact with mitigation, SU = significant and unavoidable impact

[1] Assumes that a flood event does not occur under existing conditions that the proposed project may have avoided or reduced.

[2] Several potentially significant impacts would either be reduced or increased compared to the proposed project, however, the overall impact conclusions for the resource does not necessarily change compared to the proposed project.

5.6.1 No Project Alternative

Section 15126.6(e) (1) of the State CEQA Guidelines requires that a No Project Alternative must be considered by the lead agency. The purpose of evaluating the No Project Alternative is to allow decision-makers to compare the potential consequences of the proposed project with the consequences that would occur without implementation of the proposed project. The No Project Alternative analysis must discuss the existing conditions at the time the NOP is published, as well as what would be reasonably expected to occur in the foreseeable future, based on current plans and consistent with available infrastructure and community services, if YCWA were not to adopt and implement the proposed project (State CEQA Guidelines Section 15126.6(e)(2)). Furthermore, because no project or alternative is implemented under the No Project Alternative, no mitigation is provided for any adverse impacts that would occur under this alternative.

Description

The ARC Spillway would not be constructed under the No Project Alternative. As a result, YCWA would not have the ability to release flows downstream in anticipation of large storms to provide increased capacity in the Reservoir during high-precipitation events. The Primary Spillway would continue to be used as it has in the past and the flood risk for the area would remain unchanged.

Under the No Project Alternative, there would be no new ARC Spillway and no changes to release of flood flows downstream before large flood events due to use of the ARC Spillway. In addition, project

elements and construction activities required due to development of the ARC Spillway would not occur, including: temporary and permanent relocation of Marysville Road, relocation of the Overlook Site, excavation within the Reservoir, blasting and excavation of the hillside adjacent to the left abutment of the Dam, excavation of the discharge channel on the hillside adjacent to the North Yuba River, tree removal, extensive use of heavy construction equipment, and development of the soil and rock disposal area.

The No Project Alternative fails to achieve any of the basic project objectives. YCWA would not be able to release water at lower elevations, would continue to lack the operational flexibility to dynamically manage and improve the desired operational flexibility, would not have alternative means of Reservoir release in the event of problems at the Primary Spillway, and would not allow for improved Reservoir operations to respond to the uncertainty of flood forecasting and minimize peak flood flow releases.

Impact Analysis

The No Project Alternative would avoid all construction-related potentially significant and significant and unavoidable adverse impacts of the proposed project because no construction would occur, and the entirety of the project area would be unchanged. The No Project Alternative would avoid significant and unavoidable impacts of the proposed project related to construction emissions of criteria air pollutants, substantial temporary changes in aesthetics during construction, and increases in ambient noise levels during construction activities. The No Project Alternative would also avoid potentially significant construction impacts of the proposed project that could be mitigated to a less-than-significant level, including those related to water quality, fisheries and terrestrial biological resources, cultural and tribal cultural resources, GHGs, aesthetics, geology and soils, hazards and hazardous materials, noise, transportation, and wildfire, as well as long-term erosion impacts related to development of the project site and use of the ARC Spillway.

Although the No Project Alternative would result in fewer significant and potentially significant and unavoidable impacts of the proposed project (refer to Section 5.3.3 and Table 5-1 above), and existing conditions would likely remain unchanged, the No Project Alternative would not achieve the benefits of the proposed project's reduction in flood risk or meet any of the project's objectives. Without the proposed project and with the increasing threat of more frequent flooding from climate change, if a flood event occurred due to a levee failure that would not have otherwise occurred with the proposed project, there could be substantial environmental and other impacts to the local area flooded as follows:

- loss of life and property;
- extensive damage to residential, commercial, agricultural, and industrial structures;
- extensive damage to utilities, roadways, and other infrastructure systems;
- disruptions to water supply, sewage, electrical, and natural gas facilities;
- contamination by chemicals released from inundated structures, facilities, and equipment;
- abandonment of or prolonged delay in cultivation of flooded agricultural lands;
- loss of topsoil and agricultural crops through erosion;
- public health hazards from hazardous materials, mold, mosquitoes, and other disease vectors;
- emergency response disruptions;

- damage to natural and cultural resources from water quality and flooding effects; and
- substantial clean-up activities that would require heavy construction equipment that would impact air quality, water quality, noise, aesthetics, and biological resources.

A comparison of the No Project Alternative to the potentially significant impacts of the proposed project is provided below *assuming that the increased risk of a flood that could have been prevented or reduced by the proposed project does not occur*.

Hydrology and Water Quality

The No Project Alternative would avoid all impacts of the proposed project related to erosion and water quality because there would be no construction activities, development of the project site, and no operation of a new spillway. There would be no potential for significant construction-related impacts from ground disturbance and accidental discharge of wastes, or discharge of water encountered in excavations. There would be no potential for significant operations-related impacts from discharge of drainage water collected in the spillway control structure. There would be no significant long-term impacts related to erosion from development of the project site including the soil and rock disposal area and use of the discharge channel during flood control operations.

Under the No Project Alternative, water storage in the Reservoir would not change, flows could not be released earlier during large storm events, and peak flood flows released downstream would not change during large flood events. The benefits of the proposed project would not be realized because the ongoing safety risk of flooding in the Yuba-Feather River system during large flood events would not improve. Consequently, the No Project Alternative would eventually have greater impacts than the proposed project related to potential flood flows downstream (and flood-related impacts listed above) and these potential flood risks would continue to be a **significant and unavoidable** impact.

Fisheries Resources

Under the No Project Alternative, there would be no potential construction impacts to special-status fish from high turbidity/contaminant concentrations, as compared to the proposed project. There would be **no impact**.

Terrestrial Biological Resources

The No Project Alternative would not involve any construction activities or operation of a new spillway and would therefore not alter existing site conditions within and around the Dam and Reservoir. Because of this, the No Project Alternative would avoid all potential impacts to special-status plants, fungi, and other species including Foothill Yellow-legged Frog, Western Pond Turtle, Bald Eagle, American Peregrine Falcon, California Spotted Owl, Ringtail, and bats. Similarly, there would be no impact on Federally and State-protected waters as compared to the proposed project. There would be **no impact**.

Cultural and Tribal Cultural Resources

The No Project Alternative would avoid all potential impacts on cultural and tribal cultural resources of the proposed project because no construction activities would occur. Therefore, there would be no potential for significant impacts on previously unidentified historical, archeological, or tribal resources or human remains. There would be **no impact**.

Air Quality

Under the No Project Alternative, there would be no short-term, temporary use of heavy equipment during project construction and maintenance activities and no associated criteria air pollutant emissions, as would occur for construction of the proposed project. There would be **no impact**.

Greenhouse Gas Emissions

Under the No Project Alternative, there would be no short-term, temporary use of heavy equipment during project construction and maintenance activities and no associated GHG emissions, as would occur for construction of the proposed project. There would be **no impact**.

Aesthetics

Under the No Project Alternative, the visual character of the project site would remain the same as under existing conditions. There would be no short-term, temporary significant impact from heavy equipment operation or dust during project construction, as compared to the proposed project. Further, because no permanent visual changes to the project area would be made, no significant permanent degradation of scenic views or visual character of the area would occur, as compared to the proposed project. Additionally, under the No Project Alternative, there would be no new introduction of light or glare into the project area, as would occur with proposed project implementation. There would be **no impact**.

Agricultural and Forestry Resources

Under the No Project Alternative, no Encroachment Permit would be required from Yuba County and no forestland would be disturbed, as would occur under the proposed project. There would be **no impact**.

Energy

Under the No Project Alternative, no construction or operation of facilities would occur; therefore, no energy resources would be used, as would occur under the proposed project. There would be **no impact**.

Geology and Soils

The No Project Alternative would not involve any construction activities or operation of a new spillway. As a result, potential geologic impacts related to ground shaking, soil hazards, vibration impacts due to blasting, and erosion would not occur, as would occur under the proposed project. Similarly, since the No Project Alternative would not result in any ground-disturbing activities, there would be no potential to uncover paleontological resources, as would occur under the proposed project. There would be **no impact.**

Hazards and Hazardous Materials

No new facilities would be constructed or operated under the No Project Alternative. Therefore, there would be no potential for accidental release or spills of hazardous materials into the environment, as would occur for the proposed project. Similarly, because no construction would occur under the No Project Alternative, there would be no potential impairment of evacuation routes or emergency response in the area, as would occur under the proposed project. There would be **no impact**.

Land Use and Planning

Under the No Project Alternative, no access easements, Encroachment Permit, or Special Use Permit would be required, as would be with the proposed project. There would be **no impact**.

Noise

Because no construction or blasting would occur under the No Project Alternative, there would be no day/night noise or vibration generation in exceedance of standards, as compared to the proposed project. There would be **no impact**.

Public Services

Under the No Project Alternative, there would be no potential service disruptions for fire protection as compared to the proposed project. There would be **no impact**.

Recreation

Recreational resources within the project area including the Overlook Site would not be temporarily closed or relocated, as compared to the proposed project. Further, there would be no potential construction traffic delays associated with accessing local recreational facilities, as compared to the proposed project. There would be **no impact**.

Transportation

Under the No Project Alternative, because no construction of facilities would occur, there would be no temporary increases in vehicle miles traveled or potential for inadequate emergency access along Marysville Road, as compared to the proposed project. There would be **no impact**.

Utilities and Service Systems

Under the No Project Alternative, a new spillway and other associated facilities would not be implemented; therefore, there would be no need for relocation of existing utility infrastructure which may result in temporary service interruptions in the area, as compared to the proposed project. There would be **no impact**.

Wildfire

The project area is located within a very high fire hazard severity zone. Because no construction activities would be implemented under the No Project Alternative, there would be no potential impacts associated with the impairment of evacuation or emergency response plans or the exposure of people or structures to wildland fires or uncontrolled spread of wildfire. There would be **no impact**.

5.6.2 Conveyance Tunnel Spillway Alternative

Description

As mentioned previously, YCWA initially proposed to develop a conveyance tunnel spillway for the project instead of the proposed open-cut spillway. However, after the value engineering evaluation, the conveyance tunnel design was abandoned as the preferred design due to constructability challenges, risks, and costs. The Conveyance Tunnel Spillway Alternative potentially meets most of the project objectives; however, this alternative would have a higher constructability risk and construction costs, as further described below.

The Conveyance Tunnel Spillway Alternative involves construction of an approximately 440-feet-long, by 38-feet-high, by 38-feet-wide concrete-lined tunnel through the left abutment of the dam, at generally the same location as the proposed project, as shown in **Figure 5-2**. This alternative would have a discharge capacity of 45,000 cfs at the bottom of the flood pool at El. 1,918 feet (but could also be designed at 35,000 cfs). The Conveyance Tunnel Spillway Alternative would be operated similarly to the proposed project and would provide the same levels of flood risk reduction and operational flexibility and redundancy for the system as the proposed project.

Both the Conveyance Tunnel Spillway Alternative and the proposed project would require construction of a new approach channel, discharge channel, gate control building, electrical systems, permanent access route, and relocation of the Overlook Site. Water would be directed to the intake by the newly constructed approach channel. A reinforced concrete control structure housing six roller-type slide gates, each approximately 17-feet- wide by 31-feet-high and separated by reinforced concrete piers, would regulate the rate of water flow entering the tunnel intake.

The phasing of construction activities and types of construction equipment used would be similar for the Conveyance Tunnel Spillway Alternative and the proposed project. However, the Conveyance Tunnel Spillway Alternative would be a tunnel design, and YCWA would not need to excavate the left abutment of the Dam. As a result, under this alternative, Marysville Road would not be permanently relocated, no blasting would be needed to remove the hillside, less material would need to be excavated and hauled offsite, and fewer trees would be removed. Since less material would be hauled offsite, the soil and rock disposal area would be smaller compared to the proposed project. Consequently, this alternative overall would have less environmental impacts than the proposed project, and substantially lessen significant impacts related to Marysville Road transportation and emergency access as well as blasting-related significant noise impacts.

Constructability Risks

The Conveyance Tunnel Spillway Alternative requires extensive and challenging work within the Reservoir over multiple years. The challenges related to the constructability of this alternative are primarily associated with the geologic conditions and unique approach to constructing a cofferdam to prevent flow of Reservoir water through the construction site. When compared to the proposed project, using a cofferdam requires multiple years of extensive work within the Reservoir pool and would substantially increase construction schedule within the Reservoir, construction costs, and construction safety risk.

A natural cofferdam was not an option when considering the tunnel design. Several cofferdam options were evaluated including roller-compacted concrete, cellular, and large diaphragm cofferdams. These cofferdam options are specialized and somewhat complex, and the constructability of each depends

heavily on the site geology. The rock materials at the Dam site include some with compressive strengths well above 25,000 pounds-per-square-inch, which would be at or above the threshold for diaphragm wall construction using traditional hydromill techniques. However, leakage or seepage issues would present uncertainties and constructability challenges for all three cofferdam options. Large amounts of material would be required for either the cellular or roller-compacted cofferdams that would need to be removed or at least partially removed once the tunnel was complete. Additionally, the cofferdam would be constructed on the critical path and would rely heavily on Reservoir pool timing for its completion.

The Conveyance Tunnel Spillway Alternative also poses higher geotechnical risk than the proposed project's open-cut chute in that the tunnel construction has limitations to geotechnical solutions while geotechnical features in an open-cut chute can be approached with a broader spectrum of remedies. Typically, geotechnical issues encountered during tunneling tend to impede construction at the tunnel heading, whereas in an open-cut design similar issues can be corrected while other areas proceed with construction.

The complex tunnel transition geometry also increases the difficulty in construction of that structure. The Conveyance Tunnel Spillway Alternative contains a hydraulically complex tunnel transition section with high velocities throughout the length of the spillway. YCWA and the design team are unaware of any similar tunnel spillways, so there is limited information available to ensure the structure's long-term performance. Given the hydraulic conditions observed in modelling, there are significantly more uncertainties regarding the hydraulic conditions and more potential for adverse hydraulic conditions to develop when compared with a more traditional open-cut chute design.

Feasibility

During engineering evaluation, the Conveyance Tunnel Spillway Alternative was determined to have a high level of constructability risk, construction safety risk, and construction cost. While these risks and elevated costs make the project substantially more difficult to construct, it is possible to construct this alternative and it was not determined to be infeasible. However, due to these risks and costs, YCWA staff identified the open-cut chute design as the preferred proposal for the project, which would eliminate the need for constructing a tunnel and cofferdam and the associated risks, reduce the construction schedule, and substantially reduce the construction costs. Nevertheless (and as explained below), the Conveyance Tunnel Spillway Alternative would avoid or substantially reduce some of the environmental impacts associated with the proposed project, including substantially reducing transportation-related and emergency access impacts and avoiding the significant noise impacts of the proposed project, which are blasting-related. The impacts associated with this alternative are being analyzed below.

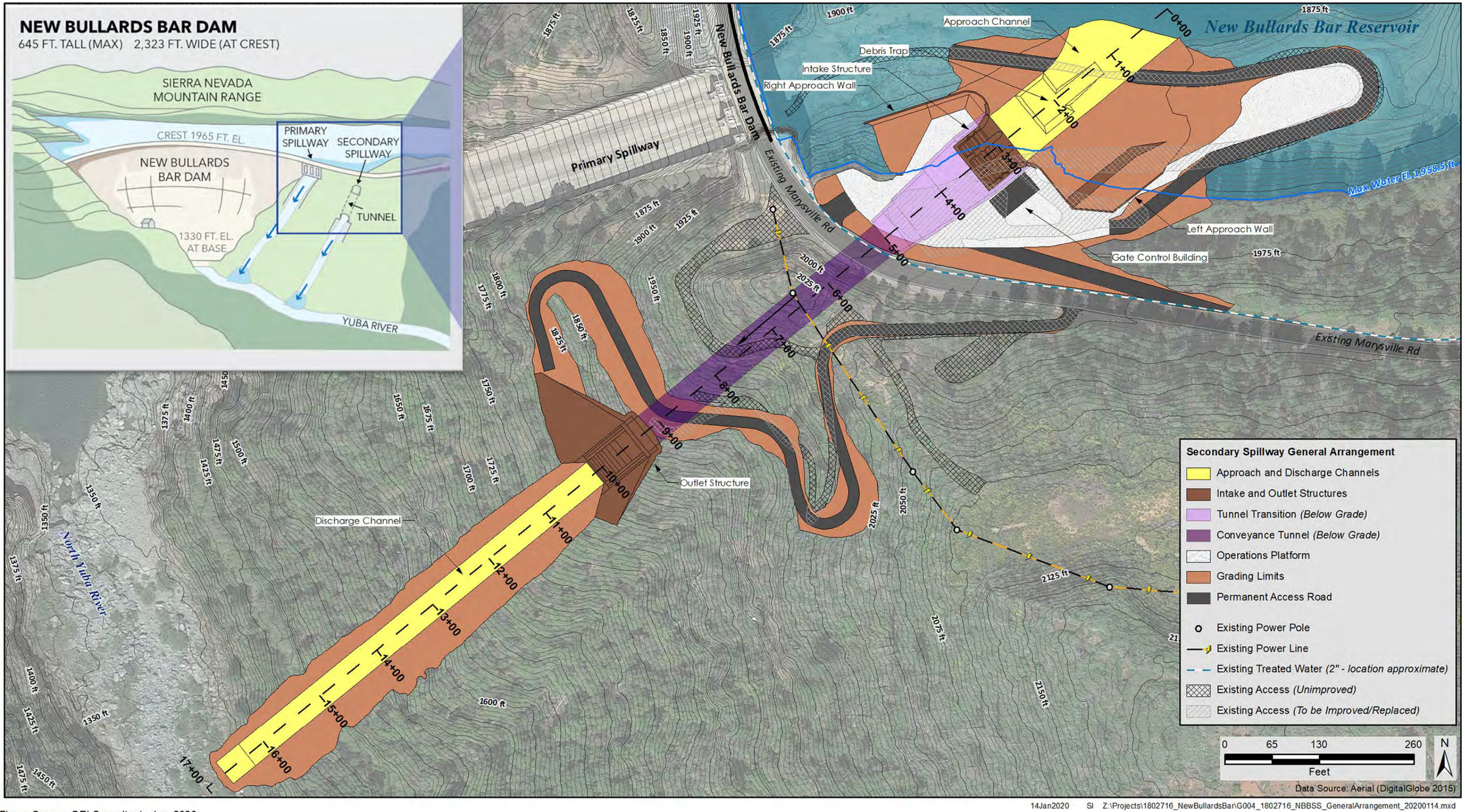


Figure Source: GEI Consultants, Inc. 2020.

Figure 5-2. Conveyance Tunnel Outlet Alternative

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Impact Analysis

The Conveyance Tunnel Spillway Alternative would result in similar construction activities and operations as the proposed project but would require a longer construction schedule for work within the Reservoir. As such, this alternative would not change potentially significant construction-related impacts outside of the Reservoir except where these impacts are dependent on the duration of construction activities. This alternative would also result in significant and unavoidable impacts related to construction emissions of criteria air pollutants, substantial temporary changes in aesthetics during construction, and increases in ambient noise levels during construction activities, similar to the proposed project, although the duration of these impacts would be longer due to the longer construction period. Potentially significant construction-related impacts of the proposed project that could be mitigated to a less-than-significant level, as related to aesthetics, geology and soils, GHGs, fisheries, terrestrial biological resources, hazards and hazardous materials, hydrology and water quality, noise, and wildfire; would remain similar to the proposed project under the Conveyance Tunnel Spillway Alternative.

Since this alternative would not require relocation of Marysville Road, impacts to transportation and utilities and service systems associated with the proposed project would be reduced to less-than-significant levels under this alternative and would no longer require mitigation. Additionally, because this alternative would not involve blasting, impacts to geology and soils from blasting required for the proposed project would be completely avoided and no mitigation would be necessary.

The Conveyance Tunnel Spillway Alternative would maintain the benefits of the proposed project to flooding downstream during large flow events. Although several environmental impacts overall would be lessened under this alternative (see each resource analysis below for more detail), implementation of the tunnel design would increase the overall construction schedule (which is associated with most potential resource impacts) and increase risk to water quality and fish within the Reservoir because of the more extensive construction work required in the Reservoir. All impact conclusions identified in Chapter 3 and summarized above in Table 5-1 would remain similar (refer to Section 5.3.3). A comparison of the Conveyance Tunnel Spillway Alternative impacts to the potentially significant impacts of the proposed project is provided below.

Hydrology and Water Quality

As described previously, the Conveyance Tunnel Spillway Alternative would require extensive work and significantly lengthen construction time within the Reservoir. Under this alternative, a concrete cofferdam would need to be developed and maintained within the Reservoir. This would potentially increase environmental issues associated with hydrology and water quality because of the risk of working within the Reservoir pool. Specifically, potential impacts related to erosion and its effects on water quality during construction would be greater than with the proposed project. Similar to the proposed project, there would be potential for significant construction-related impacts from ground disturbance, accidental discharges of wastes, and discharges of water encountered in excavations, to occur.

The Conveyance Tunnel Spillway Alternative would be operated the same as the proposed project and would result in beneficial effects by reducing downstream flood risk, similar to the proposed project. This alternative, however, would not change potentially significant impacts of the proposed project related to discharges of drainage water and long-term erosion from use of the ARC Spillway. Although the risk of potential erosion and water quality impacts in the Reservoir during construction are increased under this alternative, all impact conclusions would remain the same as the proposed project. These impacts would remain **potentially significant**, and mitigation would be the same as identified in Section 3.1 for the proposed project. Significance after mitigation would remain **less than significant**.

Fisheries Resources

Because of the extensive work required within the Reservoir under the Conveyance Tunnel Spillway Alternative, there would be a greater potential for construction impacts on special-status fish from high turbidity/contaminant concentrations to occur. Overall, **potentially significant** construction impacts to hardhead, kokanee, rainbow trout, largemouth and smallmouth bass would be similar to the proposed project and would require the same mitigation measures as identified in Chapter 3.2 for the proposed project. Impacts would remain **less than significant** after mitigation is incorporated.

Terrestrial Biological Resources

Under the Conveyance Tunnel Spillway Alternative, no blasting would occur; therefore, potential impacts to bird species would be lessened as compared to the proposed project. Because of the extensive work required within the Reservoir under the Conveyance Tunnel Spillway Alternative, there would be a greater potential for construction impacts on special-status species such as amphibians from high turbidity/contaminant concentrations to occur and the larger work area in the Reservoir. Additionally, because of the longer construction work duration under the Conveyance Tunnel Spillway Alternative, potential impacts to special-status species from the greater duration of construction activities and associated noise would be greater than the proposed project. However, all impact conclusions would remain the same as **potentially significant**. Mitigation measures for potentially significant impacts would be the same as identified in Chapter 3.3 for the proposed project and significance after mitigation would remain **less than significant**.

Cultural and Tribal Cultural Resources

Under the Conveyance Tunnel Spillway Alternative, the overall disturbance area would increase in the Reservoir for construction of the cofferdam; therefore, potential impacts to cultural and tribal cultural resources during construction would potentially be slightly increased compared to the proposed project. Impacts of construction on previously unidentified historical archeological, tribal resources, and/or human remains would be **potentially significant**. Mitigation measures for these impacts would be the same as identified in Chapter 3.4 for the proposed project and significance after mitigation would remain **less than significant**.

Air Quality

Under the Conveyance Tunnel Spillway Alternative, less material would be excavated and require hauling to the soil and rock disposal area, which would lessen potential emissions of air pollutants including NO_x and PM_{10}. However, construction of the cofferdam would require additional material and the construction period in the Reservoir would be lengthened, resulting in both oxides of nitrogen (NO_x) and particulate matter equal to or less than 10 micrometers in diameter (PM_{10}) emissions to be generated over a greater period of time. It is possible that there would be an overall net reduction or increase of

maximum daily and annual emissions of criteria pollutants with implementation of this alternative. Because this alternative would require the temporary use of a large amount of heavy equipment over several years, criteria air pollutant impacts would remain **potentially significant** and similar to the proposed project. Mitigation measures would be the same as identified in Chapter 3.5 for the proposed project. Additional air quality modeling would be needed to reach a definitive significance determination; however, it is highly likely that even after implementing mitigation measures, impacts would remain **significant and unavoidable** because both this alternative and the proposed project are major construction projects in an air basin that is highly sensitive to construction-related activities, and no feasible mitigation measures are available to reduce this impact. Due to the longer construction period, these impacts are likely to be greater under this alternative than they would be under the proposed project.

Greenhouse Gas Emissions

Similar to the discussion above under Air Quality, the Conveyance Tunnel Spillway Alternative would require less excavation and hauling, but additional hauling of material for the cofferdam and an extended construction period. As a result, GHG emissions would be generated over a greater period of time, and it is possible there would be an overall net reduction or increase in maximum annual GHG emissions, depending on the construction schedule. Because this alternative would require the temporary use of a large amount of heavy equipment over several years, GHG emission impacts would remain **potentially significant** and similar to the proposed project. Mitigation measures would be the same as identified in Chapter 3.6 for the proposed project. Impacts would remain **less than significant** after mitigation.

Aesthetics

Under the Conveyance Tunnel Spillway Alternative, fewer trees would be removed at the spillway chute location, and therefore, impacts of aesthetic/visual change to the natural environment would be slightly lessened as compared to the proposed project. While there would be less material excavated for disposal at the spillway chute location, there would be additional material required for the cofferdam, which could require disposal after construction is complete. As a result, the soil and rock disposal area could be reduced or greater in height compared to the proposed project. Because the construction duration would be longer under this alternative, there would also be an increase in overall temporary visual change impacts from construction equipment and activities. All impact conclusions would remain the same as the proposed project under this alternative and would include **potentially significant** impacts associated with temporary visual changes to the environment. Mitigation measures for these potentially significant impacts would be the same as identified in Chapter 3.7 for the proposed project. Impacts after mitigation would remain **significant and unavoidable** after all feasible mitigation measures are implemented.

Agricultural and Forestry Resources

As described above, under the Conveyance Tunnel Spillway Alternative, less trees would be removed overall and impacts to these forested areas would be reduced as compared to the proposed project. Impact conclusions would remain the same as described in Chapter 3.8 for the proposed project. Impacts would remain **less than significant**, and no mitigation would be required.

Energy

The Conveyance Tunnel Spillway Alternative would include similar construction activities overall and operations would be the same as the proposed project. Therefore, similar energy resources would be used as compared to the proposed project. All conclusions would remain the same as discussed in Chapter 3.9 for the proposed project. Impacts to energy sources would remain **less than significant** and no mitigation measures would be required.

Geology and Soils

Blasting would not occur under the Conveyance Tunnel Spillway Alternative; and therefore, potential geologic risks to existing structures at the project site due to vibrations from the proposed project would be avoided. No impact would occur and Mitigation Measure GEO-1 developed for this potentially significant impact of the proposed project would not be required. However, the Conveyance Tunnel Spillway Alternative poses higher geotechnical risk and introduces new **potentially significant** impacts related to geologic conditions. Due to the unprecedented nature of the Conveyance Tunnel Spillway Alternative, it is unknown if mitigation measures could be developed to mitigate this risk below a level of significance. Given this uncertainty, the risks related to potential geotechnical instability with the Conveyance Tunnel Spillway Alternative are deemed **significant and unavoidable impacts**. Because the potentially significant geotechnical risk from the tunnel design is considered greater than the risk from blasting for the proposed project, this risk was one of the primary reasons the Conveyance Tunnel Spillway Alternative was not pursued further.

Other **potentially significant** geologic impacts related to erosion would remain similar to the proposed project. Further, since this alternative would result in ground-disturbing activities, there is potential to uncover paleontological resources, as would occur under the proposed project. As such, the impact conclusions would be the same as, or greater than, the proposed project and mitigation measures for potentially significant impacts would be the same as identified in Chapter 3.10 for the proposed project. Even with all feasible mitigation, this alternative would have some **significant and unavoidable impacts** related to geology and soils that the proposed project would not have.

Hazards and Hazardous Materials

The Conveyance Tunnel Spillway Alternative would not require the permanent relocation of Marysville Road, and therefore, would not require temporary relocation of this road during construction. Because Marysville Road would not be relocated and blasting would not occur, the potential impact of interfering with an emergency response or evacuation plan would be substantially lessened as compared to the proposed project. A **less-than-significant impact** would occur, and Mitigation Measure TR-1 developed for the proposed project would not be required.

Under this alternative, impacts associated with accidental release or spills of hazardous materials into the environment would remain **potentially significant**, similar to the proposed project. As such, the impact conclusions would remain the same as for the proposed project and mitigation measures for potentially significant impacts would be the same as identified in Chapter 3.11 for the proposed project (except for Mitigation Measure TR-1). Significance after mitigation would remain **less than significant**.

Land Use and Planning

The Conveyance Tunnel Spillway Alternative would not require the permanent relocation of Marysville Road but would require drilling the conveyance tunnel beneath Marysville Road and would likely still require an Encroachment Permit. Impacts to land use and planning would remain **less than significant** and no mitigation would be required.

Noise

Blasting would not occur under the Conveyance Tunnel Spillway Alternative; therefore, significant impacts regarding increases in ambient noise levels during construction from blasting would be substantially lessened as compared to the proposed project. Mitigation Measure GEO-1 developed for the proposed project would not be required. Nonetheless, impacts associated with ambient noise levels during construction would remain **potentially significant**. Mitigation measures for potentially significant impacts would be the same as identified in Chapter 3.13 for the proposed project (except for Mitigation Measure GEO-1). Impacts associated with construction-generated noise would remain **significant and unavoidable** after all feasible mitigation is implemented.

Public Services

Potential service disruptions for fire protection would be **less than significant**, similar to the proposed project (Chapter 3.14). No mitigation would be required.

Recreation

Impacts to recreational resources would be the same as described for the proposed project in Chapter 3.15. All impact conclusions under this alternative would remain **less than significant**. No mitigation would be required.

Transportation

The Conveyance Tunnel Spillway Alternative would not require the permanent relocation of Marysville Road and would therefore not require road detour during construction. Because of this, the potential impact of interfering with an emergency response or evacuation plan would be substantially lessened as compared to the proposed project. A less-than-significant impact would occur, and Mitigation Measure TR-1 developed for the proposed project would not be required. All other impact conclusions would be the same as described for the proposed project in Chapter 3.16. These impacts would remain **less than significant**, and no mitigation would be required.

Utilities and Service Systems

Because the Conveyance Tunnel Spillway Alternative would not require the permanent relocation of Marysville Road, no relocation of existing utility infrastructure would be required as under the proposed project. Therefore, this potential impact would be substantially lessened as compared to the proposed project. A less- than-significant impact would occur, and Mitigation Measure UTL-1 developed for the proposed project would not be required. All other impact conclusions would be the same as described for the proposed project in Chapter 3.17. These impacts would be **less than significant**, and no mitigation would be required.

Wildfire

The Conveyance Tunnel Spillway Alternative would not require the permanent relocation of Marysville Road and would therefore not require road detour during construction. Because of this, the potentially significant impact of interfering with an emergency response or evacuation plan within a fire hazard zone would be substantially lessened compared to the proposed project. A **less-than-significant impact** would occur, and Mitigation Measure TR-1 developed for the proposed project would not be required.

Under this alternative, impacts associated with the exposure of people or structures to a significant risk of loss, injury, or death involving wildland fires or uncontrolled spread of wildfire would be **potentially significant**, similar to the proposed project. As such, the impact conclusions would remain the same as for the proposed project and mitigation measures for potentially significant impacts would be the same as identified in Chapter 3.18 for the proposed project (except for Mitigation Measure TR-1). Significance after mitigation would remain **less than significant**.

5.7 Environmentally Superior Alternative

State CEQA Guidelines Section 15126(e)(2) requires identification of an "environmentally superior alternative." If the environmentally superior alternative is the "no project" alternative, the State CEQA Guidelines Section 15126.6(e)(2) requires identification of an environmentally superior alternative among the action alternatives.

Based on the comparison of relevant impacts of the alternatives, as described in Section 5.5 and summarized in Table 5-1, the proposed project is considered the environmentally superior alternative among all alternatives.

The No Project Alternative would not result in potentially significant impacts associated with cultural resources, greenhouse gas emissions, permanent alterations to the visual character of the project area, light and glare, geologic effects of blasting, hazardous materials release, utilities, or wildfire as does the proposed project, although these impacts would be reduced to less than significant with mitigation incorporated. Additionally, this alternative would not result in significant and unavoidable impacts associated with the proposed project related to air quality during construction, temporary visual changes to the environment from construction equipment, emergency response plan or evacuation plans, ambient noise levels during construction, or emergency access along Marysville Road during construction. More importantly, the No Project Alternative would not improve flood protection and management or provide public safety benefits within the Yuba-Feather River system. Consequently, the potential risk of a downstream flood event remains higher than desired and would result in numerous significant and unavoidable environmental impacts as identified in Section 5.5.1, "No Project Alternative." These long-term potentially significant impacts are considered greater than the potentially significant and significant and unavoidable construction impacts discussed above for all of the action alternatives.

Compared to the proposed project, the Conveyance Tunnel Spillway Alternative requires constructing a large cofferdam in the Reservoir, which would increase temporary construction impacts in the Reservoir related to water quality, fisheries, terrestrial biological resources, and cultural and tribal cultural resources. Additionally, the Conveyance Tunnel Spillway Alternative poses higher geotechnical risk and introduces new significant impacts related to geologic conditions. While the cofferdam would require additional material for construction, the Conveyance Tunnel Spillway Alternative would require hauling less material for construction of the spillway chute, and as a result, impacts related to hauling would be similar to the proposed project. The Conveyance Tunnel Spillway Alternative does not require blasting

or relocation of Marysville Road, and as a result, would reduce temporary construction-related impacts to geology, noise and vibrations, terrestrial biological resources, transportation, hazards, utilities and service systems, and wildfire. However, the Conveyance Tunnel Spillway Alternative would result in an extended construction period and additional years of temporary impacts related to water quality, aesthetics, air quality, GHGs, noise and vibrations, transportation, wildlife, fisheries, terrestrial biological resources, and hazards and hazardous materials. In summary, the extensive additional work in the Reservoir for the cofferdam, geotechnical risk, and prolonged construction schedule required under this alternative would result in potentially greater significant impacts than the proposed project, and while some construction-related impacts would be reduced or avoided by this alternative, numerous temporary impacts associated with construction would be extended over additional years. Therefore, the Conveyance Tunnel Spillway Alternative would not avoid any of the project's significant impacts or reduce them below the threshold of significance.

The analysis and discussion above substantiate that the proposed project is the environmentally superior action alternative and would result in the least amount of overall environmental impact when compared to the other action alternative, the Conveyance Tunnel Spillway Alternative.

Chapter 6. Report Preparers and Reviewers

As required by the California Environmental Quality Act (CEQA), this chapter identifies the preparers of this Environmental Impact Report (EIR).

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Executive Summary

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2.0 Project Description

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5.0 Alternatives Analysis

No references sited.

6.0 Report Preparers and Reviewers

No references sited.