Coyote Valley Dam-Lake Mendocino
Russian River, California
Water Control Manual Update

NEPA Identification Code: EAXX-202-00-L3O-1730227937

Final Environmental Assessment

US Army Corps of Engineers ®
San Francisco District

September 2, 2025

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FINDING OF NO SIGNIFICANT IMPACT

THE COYOTE VALLEY DAM-LAKE MENDOCINO WATER CONTROL MANUAL UPDATE MENDOCINO COUNTY, CALIFORNIA

The U.S. Army Corps of Engineers (USACE), San Francisco District has conducted an environmental analysis in accordance with the National Environmental Policy Act of 1969, as amended. The final Environmental Assessment (EA) dated **2 September 2025**, for the Coyote Valley Dam - Lake Mendocino Water Control Manual Update addresses a need for Coyote Valley Dam-Lake Mendocino Water Control Manual update to allow discretionary encroachment into Flood Control Space based on 5-day deterministic streamflow forecasts provided by the National Weather Service, and store an additional 11,650 acre-feet of water above the existing guide curve between November 1 and February 15 each year in an effort to restore some of the diminished water supply reliability resulting from reduced transfers of Eel River water through the Potter Valley Hydroelectric Project without reducing the existing flood protection capacity of Lake Mendocino in the County of Mendocino, California.

The Final EA, incorporated herein by reference, evaluated various alternatives that would improve water supply reliability without reducing the existing flood protection capacity of Lake Mendocino in the study area. The Proposed Action includes:

- An update to the Coyote Valley Dam-Lake Mendocino Water Control Manual, which would allow discretionary encroachment into Flood Control Space based on 5-day deterministic streamflow forecasts as per Lake Mendocino Forecast Informed Reservoir Operation procedures to store an additional 11,650 acre-feet of water above the existing guide curve between November 1 and February 15 each year in an effort to restore some of the diminished water supply reliability without reducing the existing flood protection capacity of Lake Mendocino.

In addition to a "no action" plan, four alternatives were evaluated. The alternatives included Proposed Action (5-day Deterministic Forecast), Ensemble Forecast Operations (EFO), Hybrid, and Modified Hybrid operations which were considered in the Final Viability Assessment (FVA). Three alternatives except Proposed Action were eliminated from further consideration. Please see Section 2, Alternatives, in the EA for full discussion.

For all alternatives, the potential effects were evaluated, as appropriate. A summary assessment of the potential effects of the Proposed Action are listed in Table 1:

Table 1: Summary of Potential Effects of the Proposed Action

	Beneficial effects	Insignificant effects	Insignificant effects as a result of mitigation*	Resource unaffected by action
Aesthetics	☐	☐	☐	☒
Air quality	☐	☐	☐	☒
Invasive species	☐	☐	☐	☒

	Beneficial effects	Insignificant effects	Insignificant effects as a result of mitigation*	Resource unaffected by action
Fish and wildlife habitat	☐	☒	☐	☐
Threatened/Endangered species/critical habitat	☒	☐	☐	☐
Historic properties	☐	☐	☐	☒
Other cultural resources	☐	☐	☐	☒
Tribal trust resources	☐	☐	☐	☒
Floodplains	☐	☐	☐	☒
Hazardous, toxic & radioactive waste	☐	☐	☐	☒
Hydrology and hydraulics	☒	☐	☐	☐
Land use	☐	☐	☐	☒
Noise levels	☐	☐	☐	☒
Public services and utilities	☒	☐	☐	☐
Soils	☐	☐	☐	☒
Recreation	☐	☒	☐	☐
Water quality	☒	☐	☐	☐
Climate and weather	☒	☐	☐	☐

All practicable and appropriate means to avoid or minimize adverse environmental effects were analyzed and incorporated into the Proposed Action. No Best management practices (BMPs) will be implemented.

No compensatory mitigation is required as part of the Proposed Action.

Public review of the draft EA and FONSI was completed on 17 August 2025. All comments submitted during the public review period were responded to in the Final EA and FONSI.

Pursuant to section 7 of the Endangered Species Act (ESA) of 1973, as amended, the National Marine Fisheries Service (NMFS) issued a Biological Opinion (BO), dated 29 April 2025, for the USACE's and Sonoma Water's Russian River Watershed Water Supply and Channel Maintenance Project (Russian River BO). The 2025 Russian River BO assesses the impacts of the USACE's and Sonoma Water's water supply and channel maintenance activities on four species and their respective designated critical habitats listed under the federal Endangered Species Act: Central California Coast Steelhead; Central California Coast Coho Salmon; California Coastal Chinook Salmon, and Southern Resident Killer Whale. The 2025 BO replaces the previous BO from 2008, and all terms and conditions, conservation measures, and reasonable and prudent measures identified in the 2025 BO shall be implemented in order to avoid or minimize adverse effects to threatened or endangered species or designated critical habitats.

The Proposed Action does not include operations beyond the scope of conditions evaluated and considered in the 2025 BO. The Proposed Action would have a beneficial effect on the cold-water pool that supports summer rearing juvenile steelhead trout and the migration of fall-run adult Chinook Salmon. No significant adverse effects to Federally listed, proposed, or candidate species or critical habitat are anticipated from the Proposed Action. No potential for significant effects to Federally listed, proposed, or candidate species or critical habitat under the jurisdiction of the U.S. Fish and Wildlife Service is anticipated.

Pursuant to Section 106 of the National Historic Preservation Act of 1966, as amended, the U.S. Army Corps of Engineers determined that the Proposed Action has no effect on historic properties.

All applicable environmental laws have been considered and coordination with appropriate agencies and officials has been completed. Section 5 of the EA provides discussion of compliance with environmental laws and regulations.

Technical, environmental, cultural, engineering feasibility, economic, and cost effectiveness criteria used in the formulation of alternative plans were those specified in the Water Resources Council's 1983 Economic and Environmental Principles and Guidelines for Water and Related Land Resources Implementation Studies. All applicable laws, executive orders, regulations, and local government plans were considered in evaluation of alternatives. Based on this report, the reviews by other Federal, State and local agencies, Tribes, input of the public, and the review by my staff, it is my determination that the Proposed Action would not cause significant adverse effects on the quality of the human environment; therefore, preparation of an Environmental Impact Statement is not required.

8 OCT 2025
Date

John P. Lloyd
Brigadier General, Corps of Engineers
Division Commander and Engineer

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Appendix B: U.S. Fish and Wildlife Service's (USFWS) Information Planning and Conservation System (IPaC) Database Search Results.

Appendix C: Russian River Biological Assessment and Essential Fish Habitat Assessment. Prepared for Sonoma County Water Agency. Prepared by ESA. August 2023.

Appendix D: Summary of Coordination with National Marine Fisheries Service regarding Lake Mendocino Forecast Informed Reservoir Operations (FIRO) Steering Committee Major Deviation Request from the Coyote Valley Dam – Lake Mendocino Water Control Manual.

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ACRONYMS AND ABBREVIATIONS

APE	Area of Potential Effects
AR	atmospheric river
BA	Biological Assessment
BO	Biological Opinion
C.F.R.	Code of Federal Regulations
CAA	Clean Air Act
CARB	California Air Resources Board
CCC	Central California Coast
CDFW	California Department of Fish and Wildlife
CESA	California Endangered Species Act
cfs	cubic feet per second
CH_4	methane
CNDDB	California Natural Diversity Database
CNRFC	California Nevada River Forecast Center
CO_2	carbon dioxide
CO_{2e}	carbon dioxide equivalent
CVD	Coyote Valley Dam
CW3E	Center for Western Weather and Water Extremes
CWA	Clean Water Act
CWMS	Corps Water Management System
DO	dissolved oxygen
DPS	Distinct Population Segment
EA	Environmental Assessment
ECB	Engineering Construction Bulletin
EFO	Ensemble Forecast Operations
EPA	U.S. Environmental Protection Agency
ESA	Endangered Species Act
ESU	Evolutionarily Significant Units
FCD	Flood Control Diagram
FERC	Federal Energy Regulatory Commission
FIRO	Forecast-informed Reservoir Operations
FR	Federal Register
GHG	Greenhouse Gas Emissions
GWP	global warming potential
HEC	Hydrologic Engineering Center
HQUSACE	Headquarters, U.S. Army Corps of Engineers
IPaC	Information for Planning and Consultation

ITS	Incidental Take Statement
kg	kilogram
km	kilometer
LMHPP	Lake Mendocino Hydroelectric Power Plant
MCAQMD	Mendocino County Air Quality Management District
MCRRFCD	Mendocino County Russian River Flood Control and Water Conservation Improvement District
mgd	million gallons per day
msl	mean sea level
MWh	megawatt hours
N_2O	nitrous oxide
National Register	National Register of Historic Places
NCPA	Northern California Power Association
NCRWQCB	North Coast Regional Water Quality Control Board
NEPA	National Environmental Policy Act
NGVD29	National Geodetic Vertical Datum of 1929
NHPA	National Historic Preservation Act
NMFS	National Marine Fisheries Service
NOAA	National Oceanic and Atmospheric Administration
PG&E	Pacific Gas and Electric
PM	Particulate Matter
PVP	Potter Valley Project
RPM	Reasonable and Prudent Measure
SC-GHG	social cost of greenhouse gas
Sonoma Water	Sonoma County Water Agency
SWRCB	California State Water Resources Control Board
TAC	Technical Advisory Committee
TOC	Top of Conservation
U.S.C.	United States Code
USACE	U.S. Army Corps of Engineers
USFWS	U.S. Fish and Wildlife Service
USGS	United States Geological Survey
UVAP	Ukiah Valley Area Plan
WCM	Water Control Manual
WY	Water Year

1 INTRODUCTION

The Coyote Valley Dam (CVD) and Lake Mendocino (which is a reservoir created by the CVD) project has been operated in accordance with the terms of the facility's Water Control Manual (WCM) to fulfill its authorized purposes since the beginning of operation in January 1959. The most significant revision of the WCM was made in August 1986 with subsequent, periodic additions and updates in 1993 (Exhibit D, Drought Contingency Plan), 2003 (Exhibit A, Standing Instructions to Damtenders), and 2011 (Exhibit E, Operational Requirements for Pre-Flood and Periodic Inspections and Maintenance Activities). After the last significant revision of the WCM was made in 1986, substantial changes have occurred throughout the Russian River system. These changes include: 1) the listing of Central California Coast (CCC) Steelhead (*Oncorhynchus mykiss*)[1], CCC Coho Salmon (*Oncorhynchus kisutch*)[2], and California Coastal Chinook Salmon (*Oncorhynchus tshawytscha*)[3] as threatened or endangered under the Federal Endangered Species Act (ESA); and 2) significant reductions of inflow to Lake Mendocino due to lower diversions from the Eel River through the Pacific Gas and Electric's (PG&E) Potter Valley Project (PVP) since 2006.

Consequently, National Marine Fisheries Service (NMFS) consulted with the U.S. Army Corps of Engineers (USACE), San Francisco District regarding the CVD operation and a suite of activities that are authorized by the USACE and undertaken by the Sonoma County Water Agency (Sonoma Water) and the Mendocino County Russian River Flood Control and Water Conservation Improvement District (MCRRFCD), and issued a Biological Opinion (BO) for Water Supply, Flood Control Operations, and Channel Maintenance conducted by the USACE, Sonoma Water, and the MCRRFCD in the Russian River watershed, with their determination regarding the impacts of the proposed project on the species' likelihood of survival and recovery, and on the value of the listed species' critical habitat in 2008 (NMFS 2008). The 2008 BO expired on September 24, 2023, but consultation with NMFS was reinitiated under Section 7 of ESA, resulting in a new BO issued April 29, 2025.

In addition, USACE, in collaboration with a multi-agency Lake Mendocino Forecast-informed Reservoir Operations (FIRO) Steering Committee[4] has evaluated opportunities to improve water supply reliability and associated environmental conditions of the CVD and Lake Mendocino while still satisfying flood risk management objectives in the Russian River. The multi-agency Lake

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[1] Threatened on August 18, 1997 (62 FR 43937) and January 5, 2006 (71 FR 834); updated April 14, 2014 (79 FR 20802)

[2] Threatened on October 31, 1996 (61 FR 56138) and then Endangered on June 28, 2005 (70 FR 37159); updated April 14, 2014 (79 FR 20802)

[3] Threatened on September 16, 1999 (64 FR 50394) and June 28, 2005 (70 FR 37159); updated April 14, 2014 (79 FR 20802)

[4] The Lake Mendocino FIRO Steering Committee consists of federal, state, and local agencies including Sonoma Water, Scripps Institute of Oceanography (Scripps), USACE, National Oceanic and Atmospheric Administration (NOAA), U.S. Geological Survey (USGS), U.S. Bureau of Reclamation, and the California Department of Water Resources (DWR).

Mendocino FIRO Steering Committee was formed in 2014 to determine whether inflow and storage could be saved to mitigate the sharp decline in trans-basin diversions from the Eel River through the PVP. The FIRO is a reservoir-operations strategy that better informs decisions to retain or release water by integrating additional flexibility in operation policies and rules with enhanced monitoring and improved weather and water forecasts. The FIRO offers the potential to inform reservoir management decisions at Lake Mendocino with improved awareness, and forecasting of Atmospheric Rivers (ARs) and their extremes and absences which lead to floods and droughts, respectively. Flooding and water supply in the Russian River basin are driven almost entirely by ARs, so the success of FIRO at Lake Mendocino would depend on forecasting ARs well. This has allowed the FIRO team to focus efficiently on understanding the role of ARs to improve reservoir operations. The focus on ARs is particularly advantageous because ARs can develop across half the width of the Pacific Ocean, which provides a long lead time for forecasting.

The Preliminary and Final Viability Assessments of Lake Mendocino FIRO (Lake Mendocino FIRO Steering Committee 2017 and 2020) demonstrated that using FIRO at Lake Mendocino was a viable option to improve water supply reliability with consideration of potential environmental impacts of the proposed operational modification for the CVD and Lake Mendocino. Therefore, the Lake Mendocino FIRO Steering Committee requested major deviations from the existing CVD-Lake Mendocino WCM (USACE 1986) for Water Year (WY) 2019, 2020, and 2021-2026; the USACE approved these requests on November 8, 2018, September 21, 2019, and February 11, 2021, respectively.

After having successfully implemented the major deviations in WY 2019, WY 2020, and to date (as part of WY 2021-2026 major deviation), USACE is proposing to update the existing WCM (USACE 1986) in order to fully implement and realize the continued benefits of the Lake Mendocino FIRO procedures. Implementation of the proposed WCM update is considered to be a major Federal action and subject to compliance with National Environmental Policy Act (NEPA).

1.1 Authority

The construction of CVD-Lake Mendocino project was authorized by the Flood Control Act of 1950 as part of the initial state of an adopted comprehensive plan for improvement of the Russian River for the primary purposes of flood risk management and water conservation. Recreational development was added to the project under provisions of Section 4 of the 1944 Flood Control Act and Headquarters, U.S. Army Corps of Engineers (HQUSACE) guidance in letter ENGCW-Y, 5 August 1965, subject: Implementation of the Federal Water Project Recreation Act (Public Law 89-72) in Previously Authorized Projects.

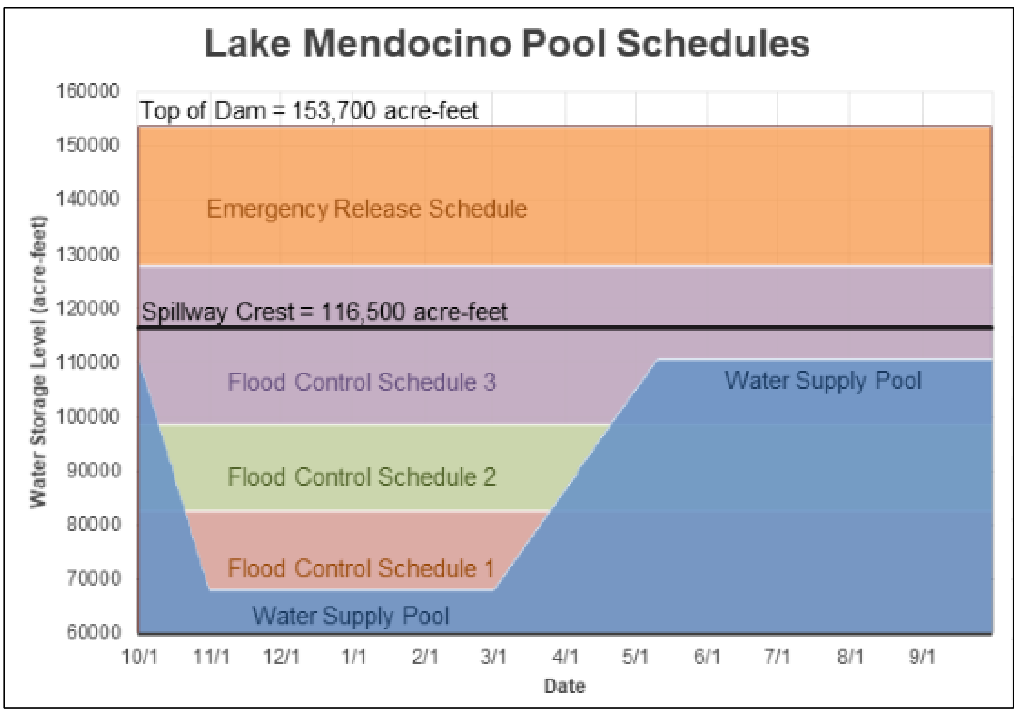
1.2 Description of Coyote Valley Dam-Lake Mendocino Project

The construction of the CVD-Lake Mendocino project began in July 1956 and was completed in January 1959 for the purposes of flood control, water supply, recreation, and streamflow regulation. The project is located approximately 5 miles northeast of City of Ukiah on the East Fork Russian River in Mendocino County, CA. USACE owns and operates flood control pool while Sonoma Water owns storage space in Lake Mendocino for water conservation. The project consists of a 160-feet-high earth-filled dam and a reservoir with an original design storage capacity of 122,500 acre-feet. The storage allocation is expected to slightly change over time as sediment accumulates in the reservoir. Table 1-1 presents the original and current storage allocation for flood control and water conservation of the reservoir. Lake Mendocino's current total storage capacity is 116,500 acre-feet, with a water supply pool between 68,400 acre-feet and 111,000 acre-feet, depending on time of year (Figure 1-1).

Table 1-1. Storage Allocations of Lake Mendocino[1]

Pool Schedule	Original[2] Storage Allocation (acre-feet)	Current Storage Allocation (acre-feet)
Flood control	48,000	48,000
Water conservation	70,000	68,400
Sediment reservation	4,500	100
Gross reservoir storage	**122,500**	**116,500**

Note: 1. Data in this table is based on surveys conducted by Towill, Inc. in April 1994.
2. Data from Design Memorandum No. 2 Hydrology and Hydraulic Analysis (1954) and the original Water Control Manual (1959).



Note: These Pool Schedules are as defined in the 2004 U.S. Army Corps of Engineers Coyote Valley Dam and Lake Mendocino, Russian River, California, Exhibit A, Chart A-10 to Master Water Control Manual, Water Control Diagram

Figure 1-1. Lake Mendocino Flood Control and Water Supply Pool Schedules

CVD is a compacted, impervious, earth-filled embankment that was constructed in zones, comprising impervious clay and silt materials. Elevation at the top of CVD is 784 feet NGVD29 providing 3 feet of freeboard above the spillway design flood pool. The crest length is 3,525 feet. The maximum height of CVD is 160 feet. The spillway for the dam is located 0.6 miles upstream from the left abutment of the dam embankment, and is approximately 1,300 feet long and 250 feet wide. The surface area of Lake Mendocino is approximately 1,846 acres with a current gross pool capacity of 116,500 acre-feet at 764.8 feet at NGVD29 based on the area-capacity table for Lake Mendocino as reported in September 2001.

The outlet works for Lake Mendocino comprise of an approach channel, intake tower, conduit, outlet chute, and an outlet channel. The approach channel extends from the East Fork of the Russian River to the concrete intake structure. The reinforced concrete intake tower is located immediately upstream of CVD, and is accessible via the dam crest. The intake tower contains a machinery room, shaft, and a control house. There are three 5 feet by 9 feet hydraulic slide gates located in the control tower. The outlet chute includes a drop structure and stilling basin, and the outlet channel is about 50 feet wide and protected by riprap.

There is Lake Mendocino Hydroelectric Power Plant (LMHPP; FERC Project No. 2841) below CVD, and it was completed in December 1986. Federal Energy Regulatory Commission (FERC) issued a license to City of Ukiah in 1982 to generate hydroelectric power through the dam. The LMHPP is owned and operated by Ukiah, and is an external facility at the base of the dam. Ukiah has a 50-year FERC license, issued in 1982, for the plant operation. The hydroelectric plant was designed to produce 3 megawatts of power during times of acceptable water flows, which makes up about 10% of Ukiah's overall power production. Table 1-2 summarizes pertinent information for the CVD and Lake Mendocino. Figure 1-2 presents the topographic locational map of Lake Mendocino and its environs.

1.3 Existing Operations

The existing operations of the CVD and Lake Mendocino are based on the 1986 WCM and 2003 Update to the Flood Control Diagram (FCD). The exiting guide curve has a winter Top of Conservation (TOC) at 68,400 acre-feet and a summer TOC of 111,000 acre-feet (Figure 1-3). The TOC is defined as the maximum allowable reservoir storage for water supply purposes. Drawdown to the winter TOC begins October 1 and finishes by November 1. Spring refill begins March 1 and finishes by May 10. Storage above the guide curve is always evacuated as quickly as feasible.

Down ramping rates for flood control flows and dam inspection flows are included as voluntary conservation measures in the 2008 BO for Water Supply, Flood Control Operations, and Channel Maintenance conducted by the USACE, Sonoma Water, and the MCRRFCD in the Russian River watershed (NMFS 2008) to avoid and minimize potential adverse effects to listed fish species, and to address uncertainties associated with the current status of species and habitat conditions in the watershed.

Table 1-2. Characteristics of Lake Mendocino and Coyote Valley Dam

GENERAL	
Location of Coyote Valley Dam	Lake Mendocino, Ukiah, California
Waterbody	East Fork Russian River, Mendocino County, CA
Operating and Managing Agency	USACE San Francisco District; Sonoma Water owns storage space for water conservation
Purposes	Storage for flood risk management, municipal and industrial water supply, irrigation, recreation, and power
Authorization	1950 Flood Control Act, Section 204
Year Construction Started	July 1956
Year Dam Placed in Operation	January 1959
Drainage Area	105 square miles on the East Fork of the Russian River
DAM	
Type	Earthen dam
Height	160 feet
Crest Elevation	784 feet at NGVD29
Crest Length	3,525 feet
Crest Width	20 feet
Downstream Slope	1 Vertical:3 Horizontal (V:H)
Upstream Slope	1V:4H
SPILLWAY	
Type Gate	Fixed crest-channel control
Crest Elevation	764.8 feet at NGVD29
Spillway Width	250 feet
Maximum water surface, spillway design flood	779.6 feet at NGVD29
Maximum discharge, spillway design flood	30,200 cfs
LAKE	
Elevation	
Winter Conservation	737.5 feet at NGVD29
Summer Conservation	761.8 feet at NGVD29
Gross Pool	764.8 feet at NGVD29
Spillway design flood pool	779.6 feet at NGVD29
Storage Capacity	116,500 acre-feet at spillway crest
	153,700 acre-feet at top of dam
	68,400 acre-feet winter conservation
	111,000 acre-feet summer conservation
Length of spillway at gross pool	6.8 miles
OUTLETS	
Type	Single Conduit
Gates	3 pairs, 5 feet by 9 feet in tandem
Capacity	6,500 cfs
Inlet elevation	637 feet
Conduit diameter	12.5 feet
HYDROELECTRIC POWER PLANT	
Operating and Maintaining Agency	The City of Ukiah operates and maintains the hydroelectric power plant. The power plant began operations in 1986.
Generator Capacity	3.5 megawatts
Turbine/generator units	1,000-kilowatt unit and 2,500-kilowatt unit

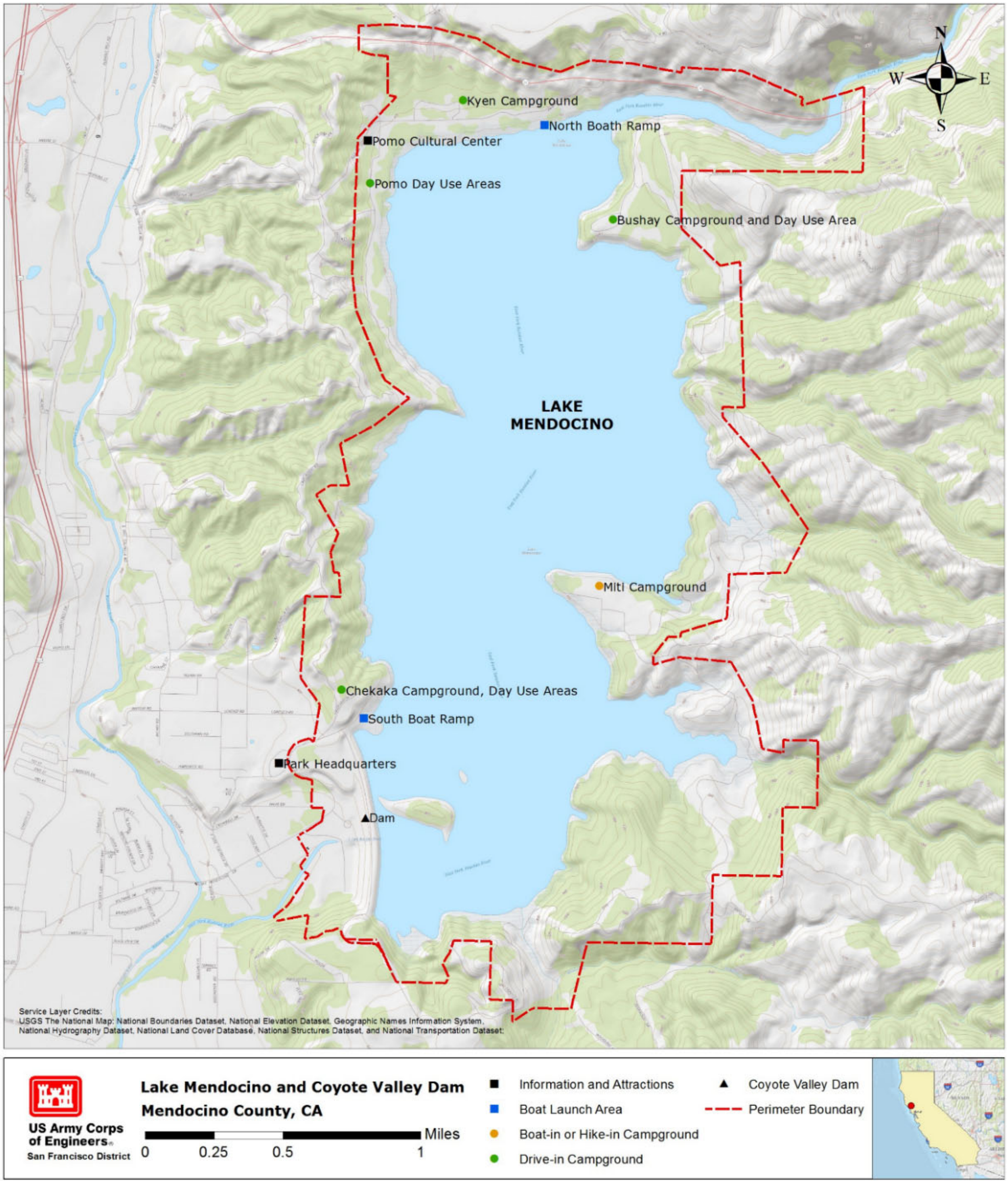


Figure 1-2. Topographic Locational Map of Coyote Valley Dam and Lake Mendocino

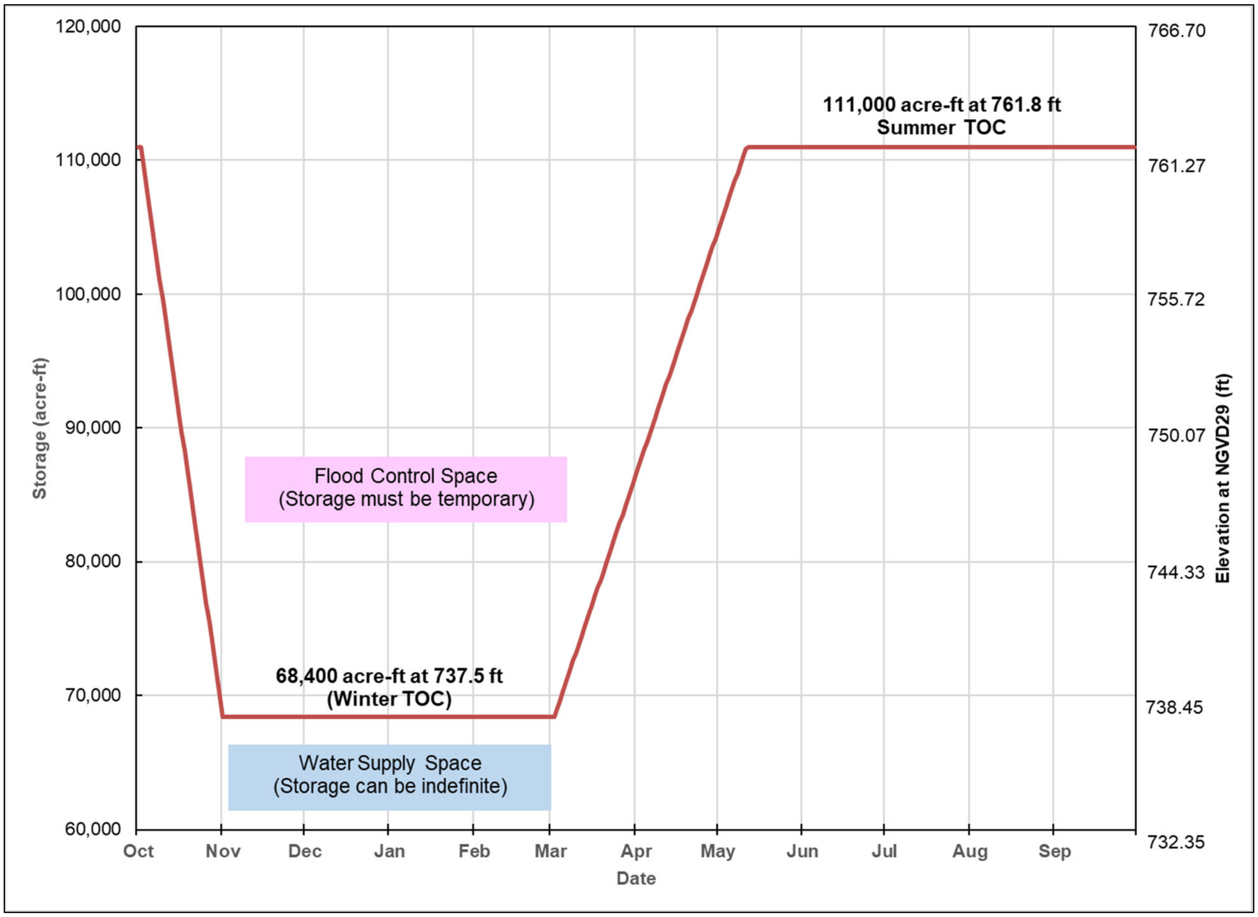


Figure 1-3. Existing Water Control Manual Guide Curve

The basis of the down ramping schedule was generated from studies conducted by USACE and NMFS designed to address reasonable and prudent measures (RPMs). The down ramping schedule for flood control operations is summarized in Table 1-3. These ramping rates are sustained through the issuance of the 2025 BO.

Table 1-3. Down Ramping Rates at Coyote Valley Dam for Flood Control Operations

Flood Release Range	Ramping Rate	Applicable Date Range
2,500 cfs and 4,000 cfs	250 cfs/hour	Prior to March 15
< 2,500 cfs	100 cfs/hour	Prior to March 15
< 250 cfs	25 cfs/hour	March 15 and May 15
< 250 cfs	25 cfs/hour	May 16 and March 14
Source: April 14, 2016 Letter from NMFS to USACE summarizing the results of studies to evaluate ramping rates downstream of Coyote Valley Dam as a component of directives stipulated in RPM-3 in the 2008 BO for Water Supply, Flood Control Operations, and Channel Maintenance conducted by the U.S. Army Corps of Engineers, the Sonoma County Water Agency, and the Mendocino County Russian River Flood Control and Water Conservation Improvement District in the Russian River (NMFS 2016).		

A comprehensive outlet tunnel inspection is required at least every 5 years to support periodic inspection documentation. It does not need to occur coincidentally with other pre-flood/periodic inspection activities. To support a comprehensive inspection, 0 cfs outflow is required. Outlet tunnel inspections of this nature would be conducted at any time when hatchery operations are offline, and natural flows measured at the West Fork of the Russian River are in excess of 300 cfs. These inspections involve ramping down reservoir releases to 0 cfs, followed by a 4-hour inspection period, after which normal operating releases are restored.

The comprehensive outlet tunnel inspections would involve ramping down flow releases from the dam to zero, followed by a 2-hour inspection period with zero flow release, and then ramping up to normal operating flow (Table 1-4).

Table 1-4. Ramping Rates at Coyote Valley Dam for Maintenance and Inspections

Ramping Rate	Applicable Period
12 cfs/hour and no more than 24 cfs/day	Maintenance and Inspection
Source: 2017 NMFS letter in response to State Water Resources Control Board Order approving petitions for temporary petitions for temporary urgency changes to permit terms and conditions (NMFS 2017).	

During the zero-flow release phase of the procedure, USACE will inspect the 5- by 9-foot service and emergency gates, the 720-foot long steel-lined concrete conduit, and the facility outlet works. USACE will coordinate monitoring of the stream reaches below CVD during the pre-flood inspection activities. Two-person stream survey crews will survey specific stream reaches below the dam and make observations related to changes in stream characteristics and fish distribution as a result of the conservation measure.

1.4 Background and History

The watershed contributing to Lake Mendocino encompasses an area of 105 square miles, which is approximately 7% of the Russian River watershed. Inflow into the reservoir consists of unimpaired flows[5] from the contributing watershed and water imported from the Eel River by PG&E's PVP. The average annual inflow into Lake Mendocino is approximately 215,000 acre-feet per year, with a peak annual inflow of 443,000 acre-feet in 1983 and a minimum annual inflow of 38,000 acre-feet in 2021. Unimpaired stream flows create most of the Russian River flows downstream of CVD to the Russian River's confluence with Dry Creek during the rainy season (November through April). During the drier months of May through October, water released from Lake Mendocino storage creates most of the flows in the Russian River upstream of Dry Creek.

Recent reductions in releases from the PVP are the result of an Order issued by FERC in January 2004 that amended PG&E's operating license. Since 2006, when PG&E began operating under the amended license, there has been an approximately 57% reduction in the annual transfer of the Eel River water into the Russian River watershed based on the comparisons of annual average water transfer between 1922-2006 and 2007-2019 (Sonoma Water 2020). Further

[5] Unimpaired flows are the "natural" flows, unaffected by man-made influences like water diversions and reservoir operations.

reductions have occurred beginning in 2021 as a result of equipment failures at the PVP and seismic safety concerns associated with Scott Dam. A considerable portion of the reduced transfer occurs between March 1st and June 1st, and this coincides with the spring refill time period when the water conservation pool begins to increase water levels in the water conservation pool (Figure 1-1 in Section 1.2). As a result, Lake Mendocino has become reliant on late spring storm events to adequately fill in order for Sonoma Water to meet minimum instream flow requirements and downstream demands, and maintain a cold-water pool for summer rearing juvenile steelhead and the migration of fall-run adult Chinook Salmon.

Because late spring storm events do not occur predictably, there have been a number of years since 2006 that Lake Mendocino has not had sufficient storage to meet water supply needs without risking draining the reservoir. Therefore, Sonoma Water had to file Temporary Urgency Change Petitions with the State Water Resources Control Board (SWRCB) in 2007, 2009, 2013, 2014, 2015, 2020, 2021, and 2022 to reduce minimum instream flow requirements in order to prevent draining of Lake Mendocino.

PG&E's license for the PVP expired on April 14, 2022. On April 21, 2022, the FERC issued a notice authorizing PG&E to continue operation of the PVP under an annual license in accordance with the terms and conditions of PG&E's October 4, 1983 FERC license, as amended on January 28, 2004. On July 8, 2022, PG&E filed with FERC a plan and schedule to submit a license surrender application for the PVP within 30 months of FERC's approval of the plan and schedule. On July 29, 2022, FERC approved PG&E's plan and schedule and noted the surrender application is expected to be filed with FERC by January 2025 (SWRCB 2024). The final surrender application was filed by PG&E on July 24, 2025. Thus, the continued transfer of water from the Eel River through the PVP is highly uncertain.

On June 28, 2019, a partnership of Mendocino Inland Water and Power Commission, Sonoma Water, California Trout, the Round Valley Indian Tribes, and the County of Humboldt filed a joint Notice of Intent with FERC to investigate the feasibility of relicensing the project. The partnership subsequently withdrew the notice of intent in April 2023. Even if they had been successful and FERC issued a new operating license for the project, it would likely contain terms and conditions that may be similar to the current order or further reduce the water transfer of the Eel River to the Russian River Watershed, resulting in no improvement of water supply reliability of Lake Mendocino for the region.

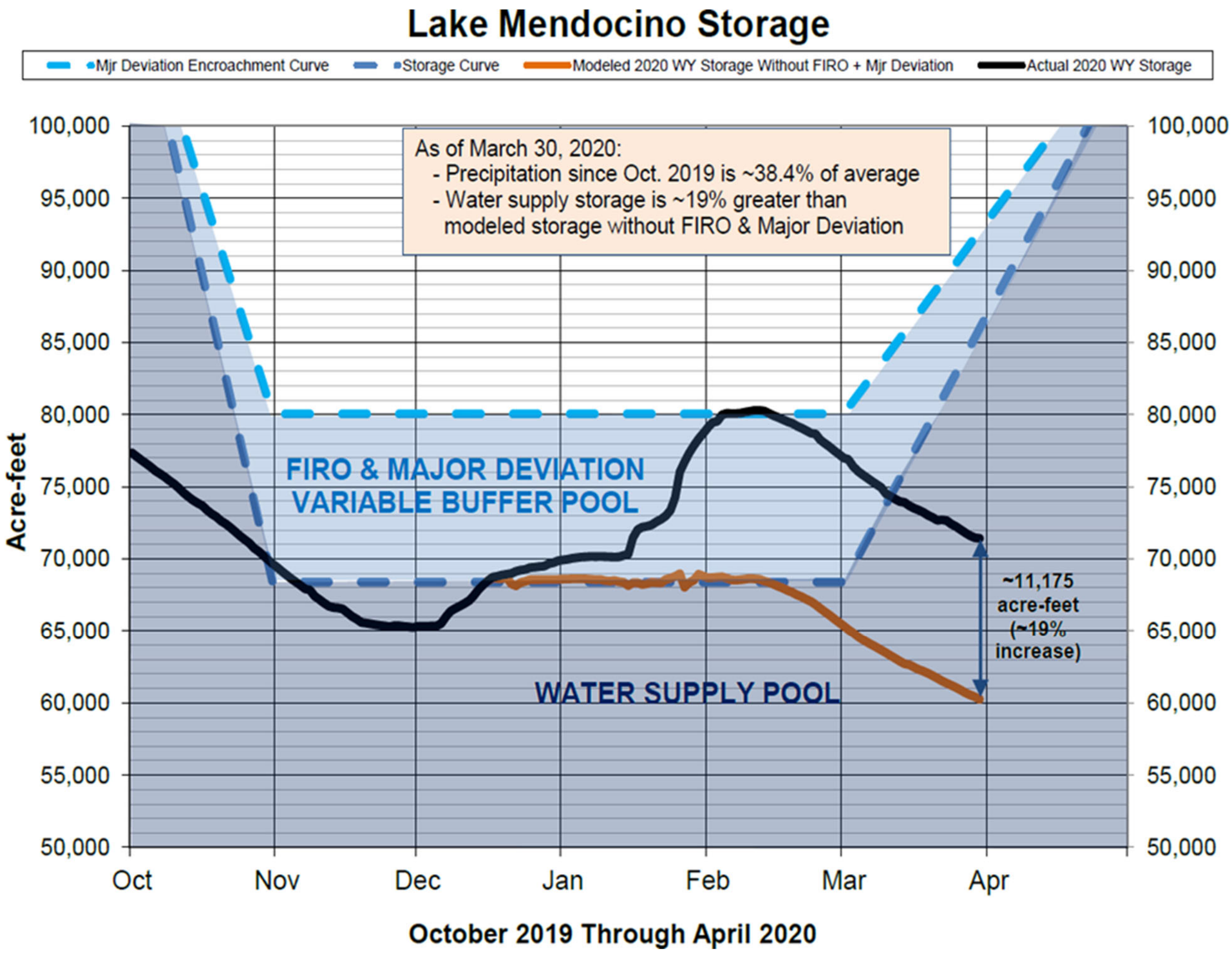
The partnership along with California Department of Fish and Wildlife has continued to work together with the goals of (i) improving fish migration and habitat on the Eel River with the objective of achieving naturally reproducing, self-sustaining, and harvestable native anadromous fish populations, and (ii) maintaining continued water diversion from the Eel River through the existing tunnel to the Russian River to support water supply reliability, fisheries, and water quality in the Russian River Basin. In December 2023, Sonoma Water, Sonoma County, and Mendocino County IWPC formed the Eel Russian Project Authority (ERPA) as a joint powers authority. Round Valley Indian Tribes has a seat on ERPA's Board of Directors. ERPA proposes to construct, operate, and maintain a New Eel-Russian Facility to divert water from the Eel River, at the site of and following the decommissioning and removal of Cape Horn Dam, on terms consistent with restoration of the anadromous fisheries of the Eel River.

With the significant loss of water supply reliability under FERC's 2004 Order, there was an urgent need to evaluate different ways of Lake Mendocino operations in order to offset reductions in water transfer from the Eel River.

As mentioned before, the multi-agency Lake Mendocino FIRO Steering Committee demonstrated that using FIRO at Lake Mendocino is a viable option to improve water supply reliability and environmental conditions, and improve flood risk management objectives in the Russian River (HDR 2024). In addition, significant environmental benefits could be achieved by improving fishery habitat for flows and water temperatures. These conclusions were reached through three independent studies conducted by the USACE's Hydrologic Engineering Center (HEC), Scripps Center for Western Weather and Water Extremes (CW3E), and Sonoma Water. WY 2021-2026 and prior major deviation requests targeted the recovery of the compromised water supply reliability resulting from the changes to the PVP transfers from the Eel River, and also requested that tools be developed as part of the Lake Mendocino FIRO and be included to inform USACE flood managers along with the protocols for managing reservoir operations at Lake Mendocino.

The major deviations provided USACE with a flexibility to apply appropriate meteorologic and hydrologic models and tools in real world operations during WY 2019 through the present day. The major deviations for WY 2019, 2020, and 2021-2026 allowed for limited encroachment into the flood control pool for water conservation purposes; this was often informally referred to as "Major Deviation Variable Buffer Pool". In essence, the major deviations have allowed USACE to exercise its discretion to retain or release storage within that buffer pool based on the information provided by the meteorologic and hydrologic models. Without deviations, USACE is required to empty the entire flood control pool when storms have ended and conditions downstream are safe enough to allow reservoir releases.

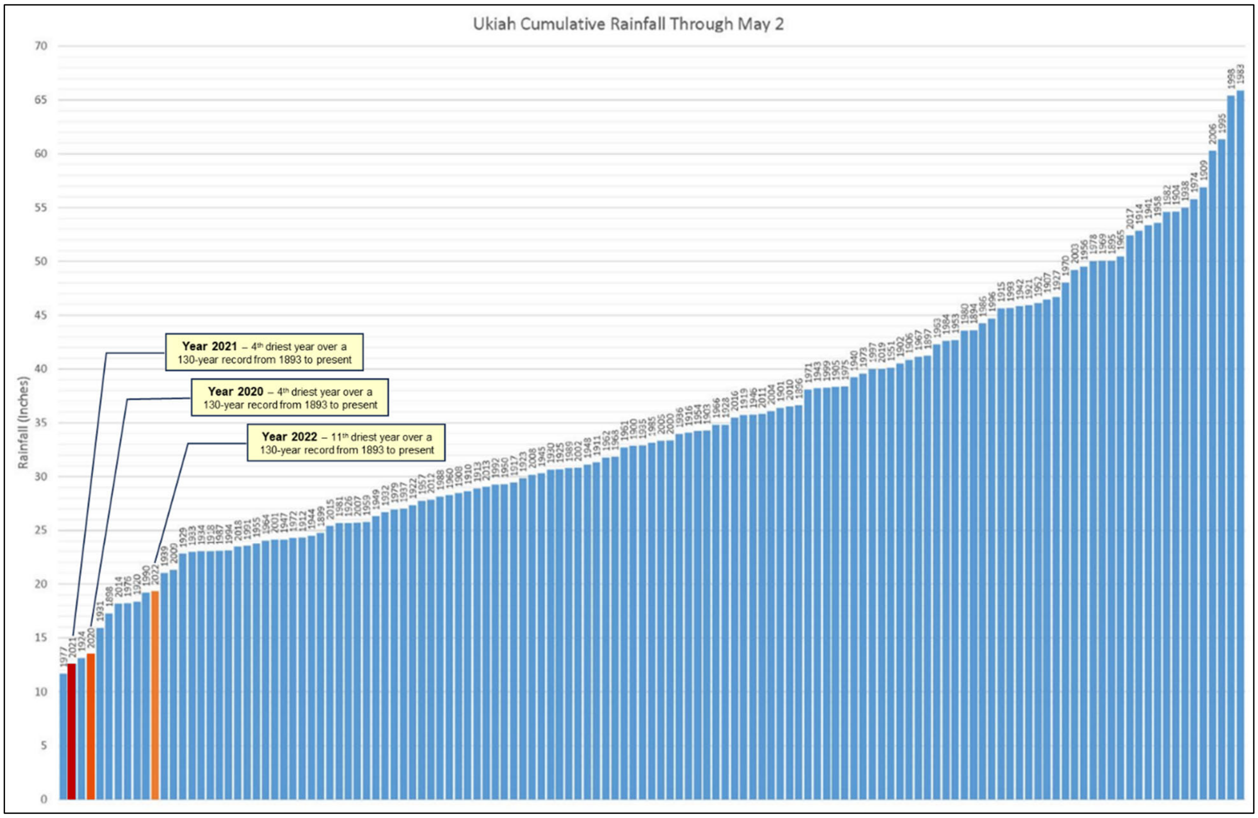
WY 2019 was a relatively wet year, while WY 2020 was the fourth driest year over a 130-year data period from 1893 to present at Ukiah Station. In both years, FIRO increased water supply benefits and managed flood risks. Figure 1-4 presents one of the most notable outcomes of the major deviations occurred in WY 2020, which FIRO enabled a 19% increase in water storage by the end of winter, compared to the modeled storage without FIRO (Lake Mendocino FIRO Steering Committee 2020). USACE's decision to approve the 2021-2026 major deviation request and subsequently to pursue a proposed update to the existing CVD-Lake Mendocino WCM was based on a collaborative process between members of the Lake Mendocino FIRO Steering Committee under which FIRO procedures were tested in real-time during WY 2019 and WY 2020. FIRO allowed for safe management of the reservoir during a wet year (WY 2019), as weather forecasting indicated the need to have flood control space available for rainfall-runoff in January and February. During the following dry year (WY 2020), management under FIRO allowed water to be retained when weather forecasts indicated no significant rainfall-runoff events for the months of February and March (Figure 1-4).



Source: Lake Mendocino FIRO Steering Committee 2020

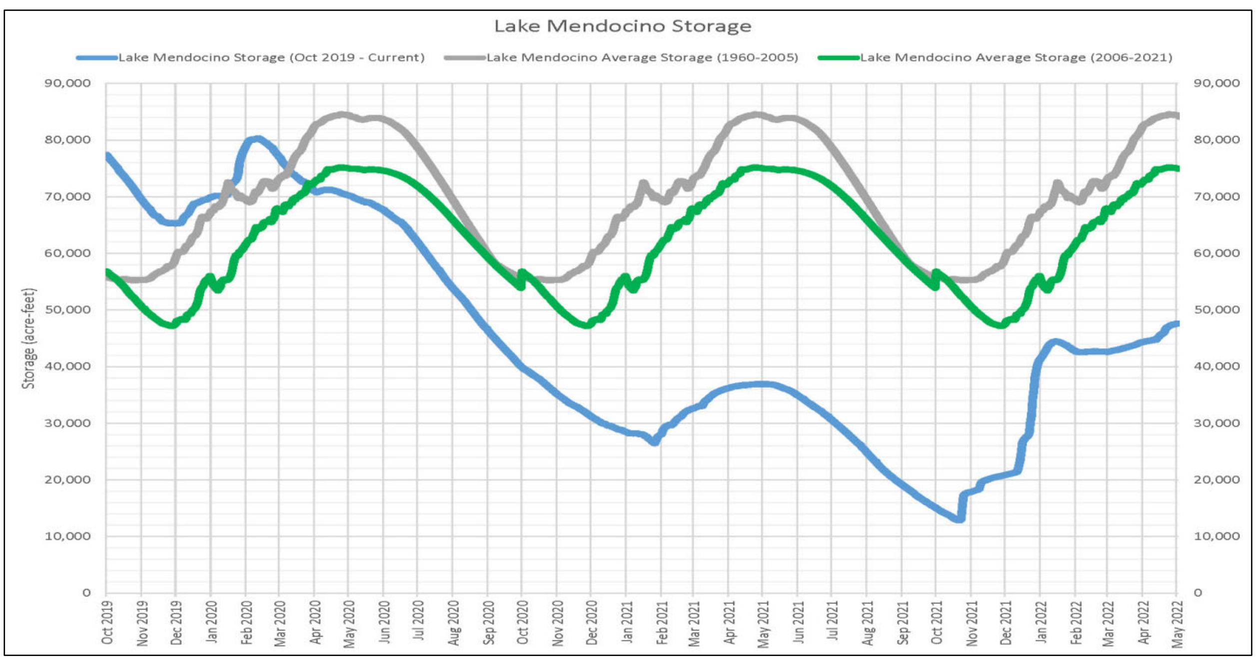
Figure 1-4. Lake Mendocino Storage Increase during Major Deviation Operations in Water Year 2020

Furthermore, since the Lake Mendocino FIRO Steering Committee completed their Final Viability Assessments of Lake Mendocino FIRO (2020), the hydrological condition of the Russian River watershed has remained on the drier side in years 2021 and 2022 based on the historical cumulative rainfall data through May 2 each year using the 130-year period of record (Figure 1-5). Therefore, the average water storage of Lake Mendocino has diminished significantly even with the major deviation operations in place (a blue curve in Figure 1-6; average storage from October 2019 to May 2022), compared to historical average storage data for two comparative periods: prior to the reduction of water diversion from PG&E's PVP (a grey curve; average storage from 1960 to 2005) and post 2006 (a green curve; average storage from 2006 to 2021).



Source: Modified Sonoma Water (n.d.)

Figure 1-5. Historical Cumulative Annual Rainfall through May 2 at Ukiah Station from 1893 to 2022



Source: Sonoma Water (n.d.)

Figure 1-6. Comparisons of Historical Average Storage Data for Lake Mendocino from 1960 to 2022

1.5 Purpose and Need

1.5.1 Purpose

Current operations of the CVD and Lake Mendocino are governed by the existing WCM which was revised in 1986 (USACE 1986) and last updated in 2011 without the benefit of modern weather and streamflow forecasting information. The purpose of the Proposed Action is to update the CVD-Lake Mendocino WCM to allow discretionary encroachment into Flood Control Space based on the 5-day deterministic streamflow forecasts provided by the National Weather Service as per Lake Mendocino FIRO procedures that have been vetted and tried through a series of USACE-approved major deviations during WY 2019, 2020 and 2021-2026. The encroachment would provide water storage of up to 11,650 acre-feet into the flood control space, and USACE reservoir operators retain full operational control and authority.

1.5.2 Need

The Russian River watershed experiences some of the most variable weather patterns in California including frequent droughts and floods. The existing WCM does not account for the climate variability that has taken place in the past 20 to 30 years, does not account for forecast precipitation, and does not account for significant reduction of diversions into Lake Mendocino from the Eel River as mentioned in Section 1.4. In addition, PG&E, the owner and operator of the PVP has filed the license surrender application with the FERC to decommission the project. Consequently, the continued transfer of the Eel River water through the project is highly uncertain. For these reasons, Lake Mendocino's water supply reliability is impaired, and there are significant consequences to downstream municipal and agricultural water users as well as Federally-listed salmonids. Therefore, it is reasonable to update the existing WCM so that the best available science of weather and streamflow forecasting such as FIRO could be utilized in CVD-Lake Mendocino operations to improve water supply reliability and climate adaptation in the Russian River watershed.

1.6 Study Area

NEPA requires Federal agencies to consider direct, indirect, and cumulative impacts. Direct effects are caused by the proposed action and occur at the same time and place. Indirect effects are caused by the action and are later in time or farther removed. Accordingly, a study area should include the areas directly and indirectly affected by the study alternatives, and the study area for this Proposed Action would encompass Lake Mendocino at the gross pool, downstream reach of the East Fork Russian River below CVD, and upper Russian River below the confluence of the East Fork Russian River and Russian River mainstem.

2 ALTERNATIVES

2.1 Alternatives Eliminated from Further Consideration

During the Preliminary and Final Viability Assessments of Lake Mendocino FIRO, the Steering Committee evaluated four FIRO management options (Table 2-1) using 16 objective metrics for the WY 2019, WY 2020, and WY 2021-2026 major deviation requests (Table 2-2). All four alternatives had various forms of flexibility in operations to allow more water storage to be carried into the dry season safely to avoid water supply shortages, and to allow reservoir levels to be lowered to enable additional flood protection when major storms are predicted (Lake Mendocino FIRO Steering Committee 2020). The analysis showed that all four FIRO alternatives would improve water supply reliability while retaining, or even enhancing, flood risk management and environmental objectives relative to baseline (i.e., No Action) operations (Table 2-1).

Table 2-1. Alternatives Considered for FIRO Management

Alternative	Description	Percent Increase in Median May 10th Storage
Existing Operation (Baseline)	Includes the seasonal guide curve and release selection rules from the 1986 water control manual and 2003 update to the flood control diagram. Storage within the water supply space (below the guide curve) can be maintained indefinitely, while storage within the flood control space (above the guide curve) can only be temporary and must be released when conditions downstream are safe.	0%
Ensemble Forecast Operations (EFO)	Allows for storage within the entire flood control space. Required flood control releases are based on 15-day ensemble streamflow forecast and comparison to risk tolerance curve.	27%
Hybrid EFO	Allows for storage within 11,650 acre-feet of the flood control space during the winter and then further increased storage starting on March 1. Required flood control releases are based on 15-day ensemble streamflow forecast and comparison to risk tolerance curve. Remainder of flood control space only allows for temporary storage, consistent with the baseline operation. This alternative was used for major deviation operations in WY 2019 and WY 2020.	15%
Modified Hybrid EFO	Allows for storage within 11,650 acre-feet of the flood control space during the winter and then further increased storage starting on February 15. Required flood control releases are based on 15-day ensemble streamflow forecast and comparison to risk tolerance curve. Remainder of flood control space only allows for temporary storage, consistent with the baseline operation. This alternative was available for use for major deviation operations since WY 2021.	20%
5-Day Deterministic Forecast	Allows for storage within 11,650 acre-feet of the flood control space during the winter and then further increased storage starting on February 15. Required flood control releases are based on 5-day deterministic streamflow forecast and comparison to 5-day cumulative inflow volume threshold of 15,000 acre-feet. Remainder of flood control space only allows for temporary storage, consistent with the baseline operation. This alternative is proposed for the WCM update.	18%

Table 2-2. Summary of Performance Criteria for FIRO Management Options Considered

Metric	Metric Description
M1	Annual maximum flow frequency function at Hopland, Healdsburg, and Guerneville
M2	Annual maximum pool elevation frequency function of Lake Mendocino
M3	Annual maximum pool elevation frequency function of Lake Sonoma
M4	Annual maximum Lake Mendocino total release frequency function
M5	Annual maximum Lake Sonoma total release frequency function
M6	Annual maximum uncontrolled spill frequency function for Lake Mendocino
M7	Annual maximum uncontrolled spill frequency function for Lake Sonoma
M8	Expected annual inundation damage (EAD) at critical Russian River locations
M9	Expected annual potential (statistical) loss of life due to floodplain inundation at critical Russian River locations, assessed as “population exposed” (EAP)
M10	Reliability of water supply delivery, as measured by annual exceedance frequency of Lake Mendocino May 10 reservoir storage levels
M11	The ability to meet instream flows to support threatened and endangered fish during the summer rearing season, as measured by the annual exceedance of the number of days June through September flows exceed 125 cfs
M12	The ability to meet instream flows to support fall spawning migration, as measured by the annual exceedance of the number of days October 15 to January 1 flows exceed 105 cfs
M13	Impacts to the Bushay Campground during the rec season (Memorial Day through Labor Day), as measured by the annual exceedance of the number of days that Lake Mendocino water-surface elevation exceeds 750 ft (elevation of access road)
M14	Impacts to power production of the Coyote Valley Dam powerhouse
M15	Lake Mendocino bank protection, as measured by annual frequency of exceeding elevation 758.8 ft. (Later refined to capture the number of days above 758.8 ft)
M16	Impacts to hours of operation, as measured by the number of required gate changes
Source: Final Viability Assessments of Lake Mendocino FIRO (Lake Mendocino FIRO Steering Committee 2020)	

After considering all evaluation criteria (Table 2-2), the Modified Hybrid Ensemble Forecast Operations (Modified Hybrid EFO) was selected as a preferred option for the most recent WY 2021-2026 major deviation request. This option ranked favorably across all metrics, uses uncertainty in streamflow forecasts, and offers a pathway for growth with improving forecast skill and model refinements. The Lake Mendocino FIRO Steering Committee conducted an economic assessment to quantify the benefits of FIRO for dam operations, water supply, fisheries, recreation, and hydropower. The FIRO would lead to positive benefits in all these areas except hydropower, and the Modified Hybrid EFO would result in total estimated annual benefits of $9.4 million. The Steering Committee also conducted a fisheries temperature study, which concluded that the Modified Hybrid EFO would offer the benefits to summer rearing juvenile steelhead, while an analysis of high-flow frequency concluded that FIRO is unlikely to negatively affect Chinook Salmon spawning and migration. A flood risk study found no significant difference between the baseline and the FIRO alternatives when measuring damages to structures and contents. However, when considering populations at risk in addition to damages, all FIRO alternatives would significantly reduce risk upstream from Hacienda Bridge (near Guerneville).

After the Lake Mendocino FIRO Steering Committee completed its analyses, USACE eliminated EFO and Hybrid EFO alternatives, and conducted further analyses of the Baseline, Modified Hybrid EFO, and 5-Day Deterministic Forecast alternatives to evaluate a preferred option for the WCM update with a focus on flood risk management objectives. The reason for eliminating the EFO alternative for the WCM update was because it would require the use of forecasts within the entire flood control space of the reservoir, which would require a reallocation study and authority change from Congress, so that it was determined infeasible from a policy perspective. Also, USACE eliminated the Hybrid EFO alternative for the WCM update because it was very similar to the Modified Hybrid EFO alternative. The only difference was the start date of the spring refill from March 1 to February 15, and the preference was to have the flexibility to store more water starting from February 15 when there are drought conditions occurring in real time and encroachment into flood control space is allowed. As a result, the Modified Hybrid EFO and 5-Day Deterministic alternatives were carried forward as the FIRO alternatives for the WCM update, along with the Baseline alternative (which would serve as a baseline for comparison with the FIRO alternatives).

There were no significant changes made to the operating parameters for evaluating those alternatives carried forward for the WCM update. The only change was for the input hindcast data using a longer period of record for hydrology. The Modified Hybrid EFO and 5-Day Deterministic Forecast alternatives performed similarly, and both showed that they would provide equal or even better performance for flood risk management compared to the Baseline. However, the Modified Hybrid EFO was further eliminated because the other alternative (i.e., 5-Day Deterministic Forecast) was more practicable and could be seamlessly integrated into the Corps Water Management System (CWMS), which is the USACE standard decision tool for water management. Therefore, the 5-Day Deterministic Forecast alternative was selected as a recommended plan for the proposed WCM update.

2.2 No Action

USACE would not implement the WCM update under No Action Alternative. As a result, the flood control releases from Lake Mendocino would continue to be made in accordance with the existing WCM (USACE 1986) to inform USACE flood managers for managing reservoir operations at Lake Mendocino. Drawdown to the winter TOC pool begins October 1 and is complete by November 1. The increase in spring storage can begin March 1 and complete by May 10. Please refer to Section 1.3 for more detail on the existing guide curve and operation rules. No forecasts would be utilized. Storage above the guide curve is always evacuated as quickly as feasible. FIRO’s goal to help restore some of the diminished water supply reliability without reducing the existing flood protection capacity of Lake Mendocino would not be met and a maximum additional storage of 11,650 acre-feet between November 1 and February 15 would not be achieved.

2.3 Proposed Action

During the major deviations for WY 2019, 2020, and 2021-2026, the Lake Mendocino FIRO procedures have utilized precipitation forecasting advancements to increase water supply reliability without reducing the existing flood protection capacity of Lake Mendocino. The Proposed Action is to update the existing CVD-Lake Mendocino WCM in order to fully implement and realize the continued benefits of the Lake Mendocino FIRO procedures and allow discretionary encroachment into Flood Control Space Schedule 1 (see Figure 1-1 in Section 1.2) based on 5-day deterministic streamflow forecasts provided by the National Weather Service.

Figure 2-1 presents the existing guide curve for the CVD-Lake Mendocino WCM, and the shaded green area is the potential water storage that can be added in the flood control space if USACE determines to retain water above the guide curve and under the proposed encroachment limit.

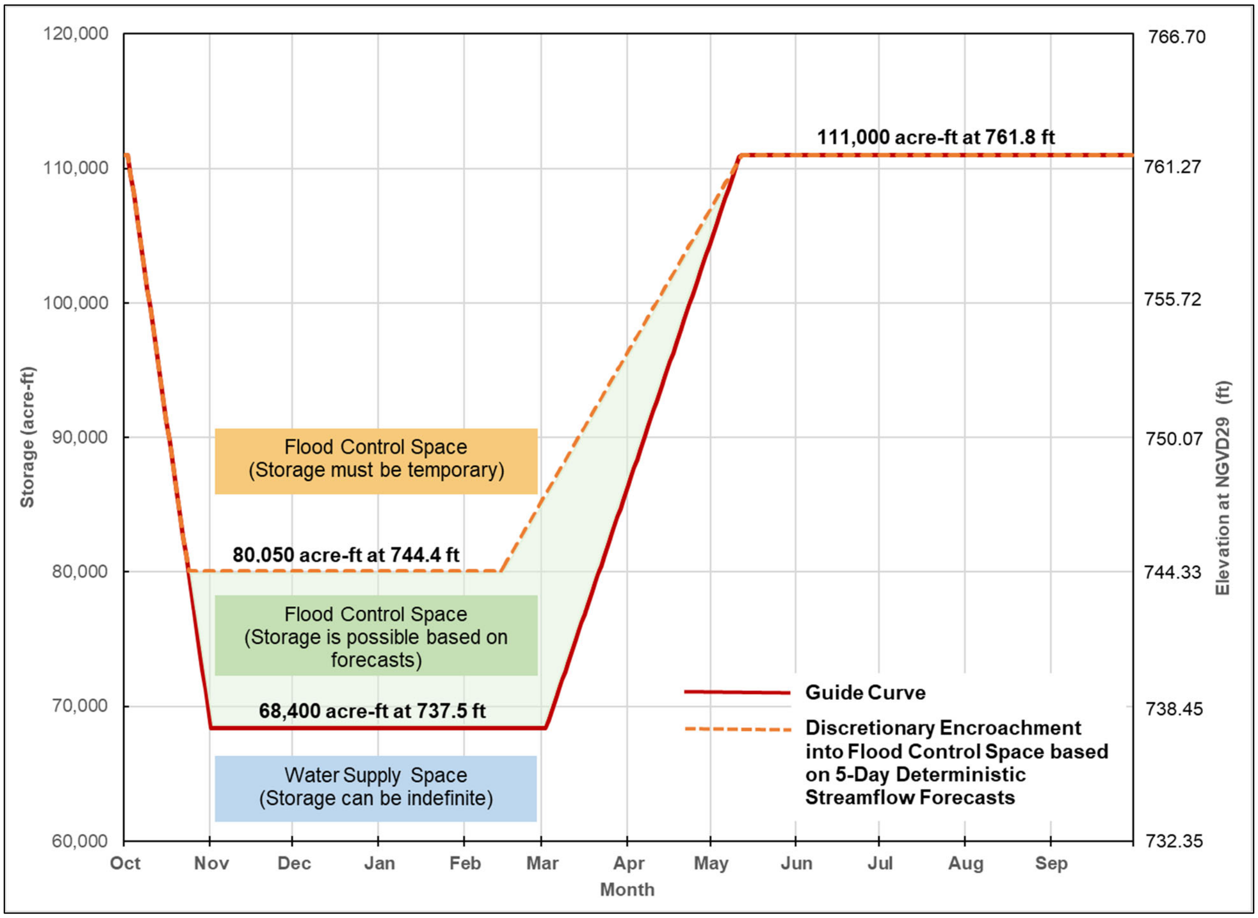


Figure 2-1. Discretionary Encroachment into Flood Control Space based on 5-Day Deterministic Streamflow Forecast

Hydrologic forecasts would be utilized as part of daily operations. They are used to estimate long-term and short-term future pool elevations and to anticipate outflow rates so that river stages and downstream flows may be controlled, insofar as possible, without causing damages downstream. The updated WCM will contain formalized rules for using forecasted inflow from the time of "water-on-the-ground" to 5 days into the future. The decision to retain water above the Winter TOC will be at the discretion of USACE flood managers, and will be based on careful consideration of forecasting methodologies that incorporate future precipitation and/or runoff, and identification of the associated risks and benefits.

Under the Proposed Action, storage of Lake Mendocino would potentially reach a maximum of 80,050 acre-feet during the flood season (between October 23 and February 15), which represents an increase of 11,650 acre-feet compared to the amount prescribed in the existing WCM. From February 15, the FIRO space would increase by approximately 355 acre-feet per day until May 10 when it intersects the guide curve for a maximum storage of 111,000 acre-feet. USACE reservoir operators retain full operational control and authority, which is consistent with relevant guidance including Engineering Manual 1110-2-1420 Engineering and Design Hydrologic Engineering Requirements for Reservoirs.

USACE would exercise a discretion to release or retain water in the flood control space above the existing guide curve (solid red line in Figure 2-1) below the allowable encroachment curve (dashed orange line in Figure 2-1) based on 5-day deterministic streamflow forecasts and comparison to a 5-day cumulative inflow volume threshold of 15,000 acre-feet. The remainder of flood control space above the encroachment curve only allows for temporary storage consistently with the existing operation rules. This would bring the retention of storage up to 80,050 acre-feet. Above this storage level, excess water would be released according to the release constraints defined in the WCM. Down ramping rates for flood control flows and dam inspection flows would remain the same as the existing WCM.

Storage in the flood control space up to 80,050 acre-feet would be guided by procedures identified as part of Lake Mendocino FIRO primary process steps for the discretionary action to be taken by the USACE reservoir operators. The Proposed Action includes the option to conditionally draft into the water conservation space in advance of significant storm events. Such pre-releases would be allowed if: (1) such a release is recommended by the FIRO decision support tools; and (2) Sonoma Water is consulted about the pre-releases and approves of the action in coordination with the NMFS.

USACE reservoir operators will retain full authority for flood control. As shown in the flowchart (Figure 2-2), the actions taken may be iterative based on available forecast data, as that data can often change on a daily and sometimes hourly basis. USACE will use any applicable numerical model available at its discretion. While the California Nevada River Forecast Center (CNRFC) is the primary provider of forecast data, there are various other state and local organizations that produce applicable forecast data that USACE may use at its discretion as well.

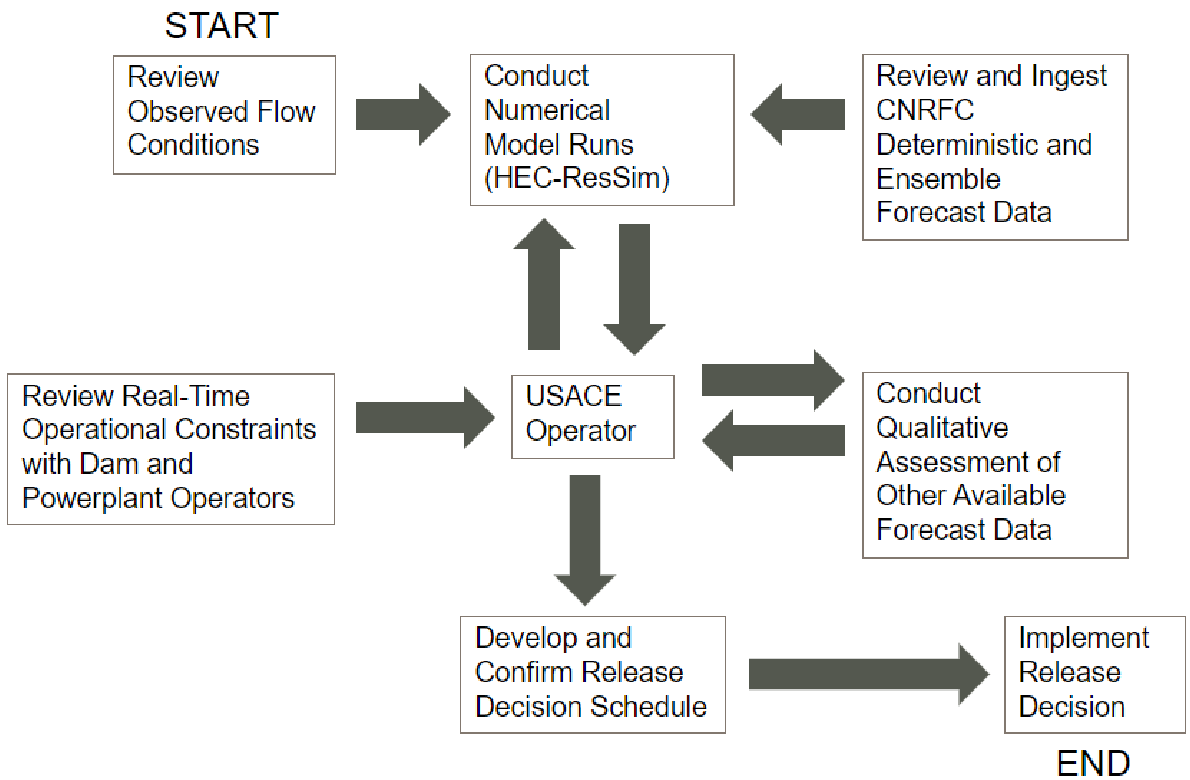


Figure 2-2. Flowchart for FIRO Implementation at Coyote Valley Dam-Lake Mendocino

3 AFFECTED ENVIRONMENT - EXISTING CONDITIONS

No Action alternative forecasts the future conditions within the study area should the proposed action (as described in Section 2.3) not be authorized, is evaluated against the existing (baseline) conditions, and forms the basis for comparison of the Proposed Action. As mentioned above, the Proposed Action is to update the existing CVD-Lake Mendocino WCM (USACE 1986) with implementation of the Lake Mendocino FIRO procedures to allow discretionary encroachment into the flood control space. Because the Lake Mendocino FIRO procedures have already been incorporated into the CVD operations based on the major deviation requests since WY 2019, the baseline would be resource conditions prior to WY 2019.

In addition, it is anticipated that not all resources would result in changes under No Action and Proposed Action alternatives from the baseline. For example, resources such as geology and seismicity, air quality, land use, noise and traffic are not expected to be altered from the baseline when compared to the alternatives being considered. Resources that may result in some differences from the baseline for the No Action and Proposed Action alternatives include hydrology and hydraulics, water quality, fisheries, vegetation and wildlife, special status species, recreation, and public services and utilities. This section describes the baseline (existing) conditions that would have been observed prior to WY 2019 major deviations for the resources that may be potentially affected by the alternatives.

Based on the historical cumulative rainfall data at Ukiah Station through May 2 of each water year from 1893 to present, estimated annual average precipitation over a water year is 36.67 inches (Sonoma Water [n.d.]) as shown in Figure 1-5 under Section 1.4, and the annual rainfall during 2016 was similar to the estimated annual average of 36.67 inches. Therefore, the year 2016 is considered a representative of hydrological conditions in the Russian River watershed, and will be used to describe existing conditions for the water quality resource category in Section 3.3.

3.1 Environment Not Considered in Detail

As discussed above, initial evaluation of the effects of No Action and Proposed Action alternatives indicated little to no effect on several resources. These resources are briefly discussed in Sections 3.1.1 through 3.1.5 to provide context and help the overall understanding of the effects of alternatives.

3.1.1 Geomorphology, Seismicity and Soils

Throughout California North Coast mountain ranges, the dominant geological features are the northwest trending faults and folds, which control the course of the middle and upper Russian River and much of the major drainage and ridge patterns within Mendocino County. The San Andreas Fault is located about 40 miles west of the Russian River, in addition to two other recognized faults (i.e., Vichy and Ukiah faults) located in the Ukiah region (USACE 1986). The Vichy Fault is located about 2 miles east of Ukiah, and the Ukiah Fault lies along the east side of the Russian River north of Hopland.

Coyote Valley is a southerly trending valley that is about 1 to 1.5 miles wide by 3 miles long, and lies about a mile east of the Redwood and main Ukiah Valleys. It is flanked by rolling hills that rise 400 feet above the valley floor to the west of Lake Mendocino and abuts against the steeper Franciscan bedrock hills to the east. The upstream end of Lake Mendocino extends north-eastward up the gorge of the East Fork toward the mouth of Cold Creek. Elevations above mean sea level range from about 600 feet in the valleys near Ukiah to about 3,975 feet on top of Cow Mountain, which is east of Lake Mendocino. The lower ridges and hills that divide Coyote Valley from the adjacent valleys are somewhat rounded, but their shape is modified locally by the presence of old terraces.

The Coyote Valley is underlain primarily by metamorphic rocks from the Franciscan formation. Metamorphic rocks of the Franciscan Formation underlie almost all of the study area. This formation is characterized by rocks which are fractured and contain numerous faults and local zones of intense shearing. Most of the recreation areas located within the Lake Mendocino boundary have 6 to 12 inches of silt, or sandy silt, overlying the gravelly phase, Older Alluvium. The Older Alluvium is a highly consolidated formation of alluvium deposits consisting of variable mixtures of clay, silt, sand, gravel, and cobbles (USACE 2019).

3.1.2 Air quality

Regulation of air pollution is achieved through both National and State ambient air quality standards and emission limits for individual sources of air pollutants as required by the Federal Clean Air Act (CAA). As required by the CAA, the U.S. Environmental Protection Agency (EPA) identifies seven criteria pollutants to protect public health and welfare: Ozone, Nitrogen Dioxide, Sulfur Dioxide, Carbon Monoxide, Particulate Matter less than 10 microns in diameter (PM_{10}), Particulate Matter less than 2.5 microns in diameter ($PM_{2.5}$), and Lead. California standards exist for all the seven pollutants under the Federal standards, plus four more: Sulfates, Hydrogen Sulfide, Vinyl Chloride (chloroethene), and Visibility Reducing Particles.

Mendocino County is located within North Coast Air Basin. The North Coast Air Basin is comprised of the counties of Del Norte, Trinity, Humboldt, Mendocino, and the region of Sonoma County designated as the Northern Sonoma County Air Pollution Control District. For the purposes of regulating and monitoring air quality, Lake Mendocino and Mendocino County are under the jurisdiction of the Mendocino County Air Quality Management District (MCAQMD), whose boundaries are coterminous with the existing boundaries of Mendocino County.

According to EPA's Current Nonattainment/Maintenance Status for Each County by Year for All Criteria Pollutants (Greenbook), the study area is not located in a county that is in non-attainment or maintenance for any criteria pollutants as regulated under the CAA (EPA 2024). However, the MCAQMD is designated as non-attainment for airborne PM_{10} (MCAQMD 2005) based on State ambient air quality standards and emission limits. The California Clean Air Act of 1988 requires that any District that does not meet the PM_{10} standard make continuing progress to attain the standard at the earliest practicable date. While PM levels have dropped over the last 20 years, the MCAQMD still exceeds the state standard several times a year. The majority of these exceedances result from unpaved roads, wildfires, residential wood burning and construction activities.

3.1.3 Land Use

Lake Mendocino falls within the Ukiah Valley Area Plan (UVAP) for Mendocino County, California. The UVAP is an element in the Mendocino County General Plan governing land use and development on the unincorporated lands in the Ukiah Valley. However, this portion of the county is not subject to Mendocino County's government land use planning authority (Sonoma Water 2020). The land acquired by USACE for the CVD-Lake Mendocino project were originally acquired for the purposes of flood risk management and water conservation. The land allocation for the project is operations as the lands were acquired for the purpose of constructing and operating the CVD and Lake Mendocino. Recreation was later added as a purpose for the project (USACE 2019). Figure 3-1 presents land use classifications for the current Lake Mendocino Master Plan (USACE 2019).

3.1.4 Noise

Major noise sources in Mendocino County consist of highway and local traffic, railroad operations, airports, commercial and industrial uses, and recreational and community facilities. Highways with traffic that generate significant noise include U.S. Highway 101 and State routes 1, 20, 128, 162 175, and 253. The only active railroad operation in Mendocino County is the Skunk Train passenger line, which runs between the cities of Fort Bragg and Willits. Public use airports are located in or near Ukiah, Willits, Covelo, Boonville, Gualala, and Little River. Major industrial noise sources are primarily lumber mills and timber products facilities. Sources of noise at Lake Mendocino include that from recreational boat traffic, occasional construction, and occasional public events (USACE 2019).

3.1.5 Transportation

Lake Mendocino can be accessed either from the west on U.S. Highway 101 and across Ukiah surface streets or directly from State Highway 20 from the north. There is no direct access by bus to the lake but the Mendocino Transit Authority has service to Lake Mendocino Drive and Seiji Way, which is a 30-minute walk to the lake. Access to specific locations within Lake Mendocino is provided by a network of two-lane local roads.

Within the project boundary, a mix of paved and unpaved roads, parking lots, and trails provide access to different recreation areas. Also, internal access is provided by regional trails, such as the Kaweyo and Shakota Trails. Transportation to/from Lake Mendocino is also facilitated by the existing marina and numerous boat ramps. These roads and parking lots are confined to areas that support developed recreational sites. The undeveloped portions of the study area have limited transportation infrastructure. Trails run throughout the study area and provide access to certain portions of these lands.

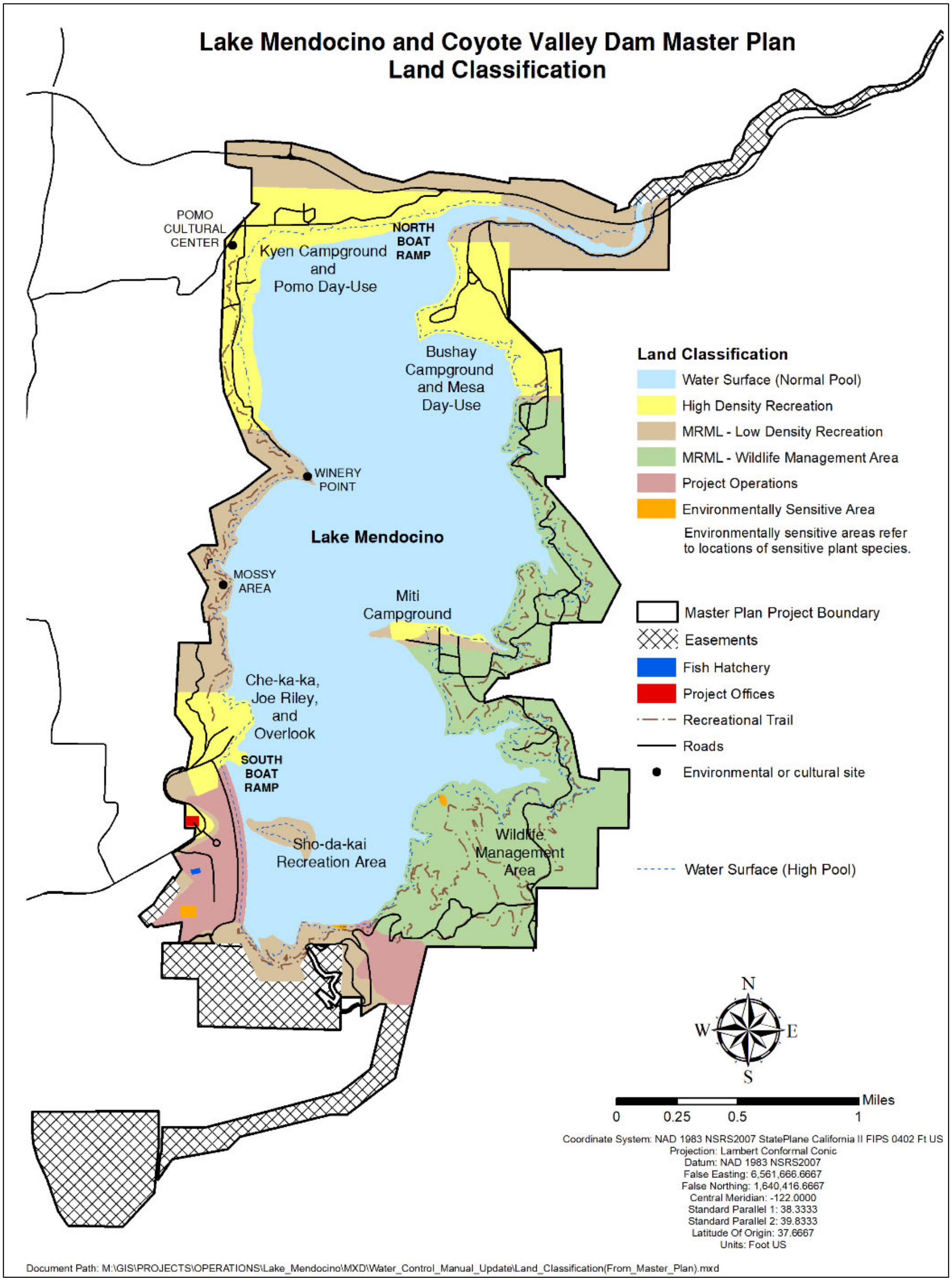


Figure 3-1. Land Classification in Lake Mendocino and Coyote Valley Dam Master Plan

3.1.6 Greenhouse Gas Emissions

Increasing greenhouse gas (GHG) concentrations in the atmosphere resulting from human activity since the 19th century, such as fossil fuel combustion, deforestation, and other activities, are believed to be a major factor in climate and weather events. GHGs in the atmosphere trap heat by impeding the exit of solar derived radiation that is otherwise reflected or re-radiated back into space - a phenomenon referred to as the “greenhouse effect.” Some GHGs occur naturally and are necessary for keeping the earth’s surface habitable, such as water vapor. However, increases in the concentrations of other greenhouse gases in the atmosphere during the last 100 years such as methane and nitrous oxide have trapped additional solar radiation, intensifying the natural greenhouse effect and resulting in an increase in global average temperature at an average rate of 0.17 °F per decade since 1901 (EPA 2022).

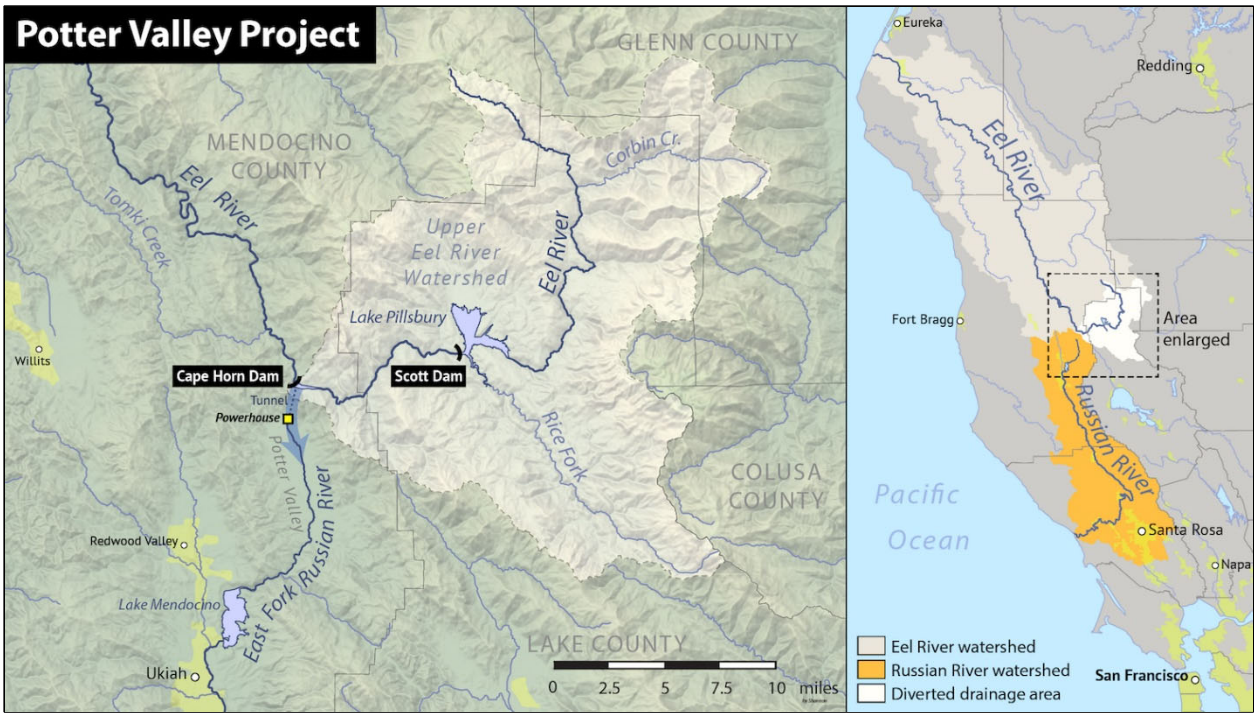
Carbon dioxide (CO_2), Methane (CH_4), Nitrous Oxide (N_2O), Hydrofluorocarbons, Perfluorocarbons, and Sulfur Hexafluoride are the principal GHGs emitted which contribute to global warming. When concentrations of these gases exceed historical concentrations in the atmosphere, the greenhouse effect is intensified. Carbon dioxide, methane, and nitrous oxide occur naturally and are also generated by human activity. Emissions of CO_2 are largely byproducts of fossil fuel combustion, while methane results from off-gassing, natural gas leaks from pipelines and industrial processes, and incomplete combustion associated with agricultural practices, landfills, energy providers, and other industrial facilities. N_2O emissions are also largely attributable to agricultural practices and soil management. CO_2 sinks (i.e., absorb more carbon from the atmosphere than they release) include vegetation and the ocean, which absorb CO_2 through sequestration and dissolution, and are two of the largest reservoirs of CO_2 sequestration. Other human-generated GHGs include fluorinated gases such as hydrofluorocarbons, perfluorocarbons, and sulfur hexafluoride, which have much higher potential for heat absorption than CO_2 and are byproducts of certain industrial processes.

Among the potential global warming impacts in California are loss of snowpack, sea level change, more extreme-heat days per year, an increase in the number of days with high ground-level ozone, larger forest fires, and increased drought in some parts of the state. Secondary effects are likely to include the displacement of thousands of coastal businesses and residences (as a result of sea level rise), impacts on agriculture, changes in disease vectors, and changes in habitat and biodiversity.

This section is still included in the Final Environmental Assessment for the sake of consistency with the draft Environmental Assessment, in compliance with Interim Final Rule (90 Fed. Reg. 29461-29465) "Procedures for Implementing NEPA; Removal" (Army will use the rules in place at the time the action was started). This publication was drafted under rules in effect prior to the publication of this interim final rule on July 3, 2025 (omits greenhouse gas emissions). This section was written and published in the draft Environmental Assessment before the Environmental Protection Agency rescinded its findings on greenhouse gas emissions.

3.2 Hydrology and Hydraulics

The CVD-Lake Mendocino project regulates natural runoff from approximately 105 square miles of Coast Range Mountains and trans-basin water diversions from the Eel River to the Russian River via PG&E's PVP No. 77 which is located in the Eel River Watershed (Figure 3-2). Lake Mendocino is regulated for flood control and water supply. Approximately 90% of the natural runoff in the East Fork Russian River basin occurs from November through April. Runoff during the months of July through October is negligible. Diverted water from the Eel River through the PVP and releases from storage maintain the flow in the East Fork and the Russian River below Lake Mendocino during the summer months.



Source: Right panel figure from Russian River Water Forum (2024) modified by Shannon1; credit to Creative Commons
Note: This map is provided as a visual display of a relationship between Eel River and Russian River Watershed; reasonable effort has been made to ensure the accuracy of the map and data provided, nevertheless some information may not be accurate.

Figure 3-2. Trans-basin Diversion from Eel River to Russian River by PG&E's Potter Valley Project

3.2.1 Russian River Watershed

The watershed contributing to Lake Mendocino encompasses an area of 105 square miles, which is approximately 7% of the Russian River watershed. The Russian River watershed drains an area of 1,485 square miles that includes substantial portions of Sonoma and Mendocino counties. The headwaters of the West Fork Russian River are located in central Mendocino County, approximately 15 miles (24 km) north of Ukiah.

The drainage basin, about 80 miles long and 10 to 30 miles wide, lies between adjoining ridges of the Coast Range Mountains and is roughly parallel to the coastline. The Russian River is approximately 110 miles (177 km) long and runs generally southward to Forestville, where the channel's direction changes westward to the Pacific Ocean near Jenner, approximately 20 miles

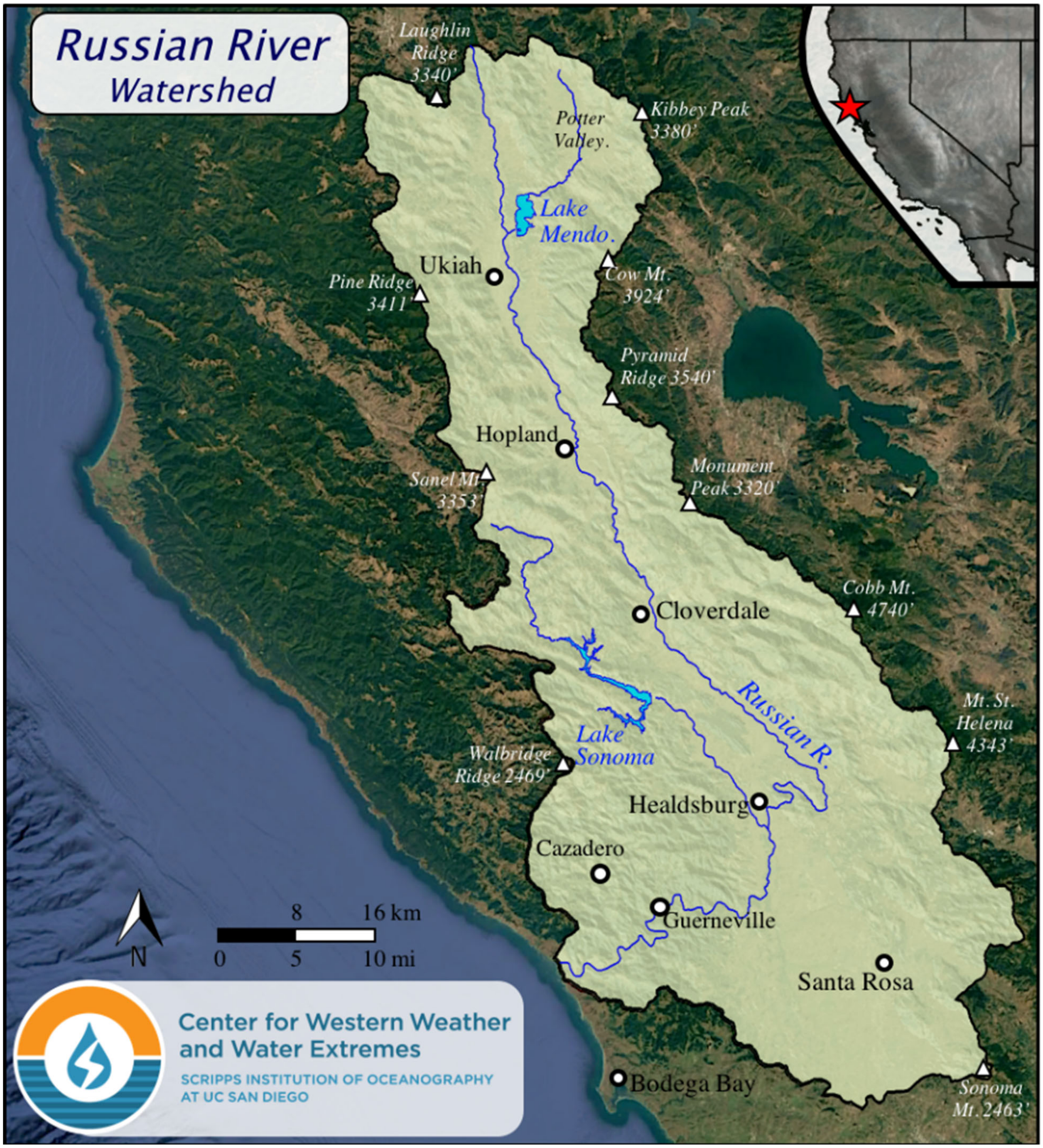
(32 km) west of Santa Rosa (Figure 3-3). The Russian River flows in a southwesterly direction through broad pastured valleys and scenic mountain gorges from Redwood Valley, north of Ukiah, to the Pacific Ocean at Jenner, 110 miles away.

From its source, the Russian River flows through several physio-graphically distinct sections beginning with an upper section comprised of a series of northwest trending alluvial valleys separated by bedrock constrictions that form the Ukiah, Hopland and Alexander valleys. The valleys occur along fault traces within extensional valleys formed by recent tectonic activity. A middle section begins near the City of Healdsburg where the river turns abruptly west through a sinuous bedrock canyon, then south through an alluvial valley confined by a bedrock constriction near the Wohler Bridge near Forestville. The lower portion flows west through a series of canyons and alluvial valleys cutting across the Coast Ranges to the Russian River Estuary and the Pacific Ocean (Figure 3-3; Delaney and Mendoza 2016).

Principal tributaries of the Russian River are the East Fork Russian River, Big Sulphur Creek, Maacama Creek, Dry Creek, Mark West Creek, and Austin Creek. Near the community of Duncans Mills, the lower section of the Russian River becomes an estuary (Russian River Estuary), where the tidal influence of the Pacific Ocean causes ocean water to mix with Russian River water, forming estuarine conditions.

There are USGS stream gages upstream of Lake Mendocino on East Fork Russian River near Calpella, CA (USGS Gage #11461500) which is located approximately 2.0 miles upstream of the northern boundary of the reservoir, and downstream on the main stem Russian River near Talmage, CA (USGS Gage #11462080) which is located approximately 7.5 miles downstream of CVD. The USGS Gage #11461500 East Fork Russian River near Calpella, CA has a drainage area of 92.2 square miles and available stream flow data from 1942 to present. The USGS Gage #11462080 Russian River near Talmage, CA has a drainage area of 286 square miles and available stream flow data from 2009 to present. Historical monthly mean, maximum and minimum flows were obtained although the two gages have different periods of available data (Table 3-1).

Monthly mean flows at East Fork Russian River near Calpella, CA (USGS #11461500) range from 121 cfs (occurred in July and August) to 569 cfs (occurred in January) with an annual average of 294 cfs. Monthly mean flows at Russian River near Talmage, CA (USGS #11462080) range from 124 cfs (occurred in June) to 857 cfs (occurred in January) with an annual average of 363 cfs.



Source: Center For Western Weather and Water Extremes (CW3E) 2017

Figure 3-3. Russian River Watershed

Table 3-1. Historical Monthly Mean, Maximum and Minimum Flows (in cfs) in the Upstream and Downstream of Lake Mendocino

Month	Flows (cfs) at USGS Gage #11461500 East Fork Russian River near Calpella, CA[1]					Monthly Flows (cfs) at USGS Gage #11462080 Russian River near Talmage, CA[2]				
	Mean	Max	(WY)	Min	(WY)	Mean	Max	(WY)	Min	(WY)
Oct	189	352	1963	4.89	1960	180	529	2011	49.3	2023
Nov	237	738	1982	14.7	2023	180	462	2011	36.2	2023
Dec	444	1,476	1965	26.5	2014	613	1,910	2013	104	2014
Jan	569	1,719	1970	11.7	2014	857	3,032	2017	38.1	2014
Feb	558	1,815	1998	21.5	1977	679	2,753	2019	98.7	2022
Mar	472	1,611	1983	42.7	1977	809	2,307	2011	43.2	2022
Apr	310	847	1982	11.9	1977	342	966	2010	43.2	2021
May	206	429	2003	23.5	1977	161	422	2019	44.8	2014
Jun	144	363	1998	15.3	1977	124	209	2010	67.3	2021
Jul	121	275	1967	8.25	1977	129	165	2017	67.1	2022
Aug	121	277	1952	11.3	2021	143	188	2017	72.7	2022
Sep	159	298	1967	12.7	2021	134	183	2017	66.8	2021
Average	294	850	N/A	17	N/A	363	1094	N/A	61	N/A

Note: Physical locations of the stream gages are shown below:

1. Lat 39°14'48", long 123°07'45" referenced to North American Datum of 1927, in NW 1/4 NW 1/4 sec.18, T.16 N., R.11 W., Mendocino County, CA, Hydrologic Unit 18010110, on left bank, 0.1 mi downstream from Cold Creek, and 3.9 mi east of Calpella.

2. Lat 39°06'47", long 123°10'55" referenced to North American Datum of 1927, Mendocino County, CA, Hydrologic Unit 18010110, in Yokaya Land Grant, on right bank at City of Ukiah Sewage Treatment Plant, 1 mi upstream of Robinson Creek, and 1.6 mi southwest of Talmage.

N/A = Not Applicable

Data Source: USGS 2024

3.2.2 Lake Mendocino

The amount of water in the Russian River has always been significantly affected by season - low in the dry summer months and high at flood levels in the wet winter months. The drainage basin receives little or no rainfall during the summer and fall. The natural runoff from the East Fork Russian River watershed decreases rapidly after the spring rains and is virtually nonexistent in the late summer and early fall. Prior to 1908 when Eel River water was first diverted into the East Fork Russian River, the river nearly dried up in July, August and September. An early flour mill located on the East Fork in Coyote Valley had to turn its wheel in the summer and fall by means of water diverted from year-round Cold Creek to the east through 1 miles of flume. On the other hand, in winter, heavy rains often swelled the river to flood stage. The frequency of flooding on the Russian River was one of the highest in the state before the construction of the CVD-Lake Mendocino project. Flood conditions resulted from prolonged moderate to heavy precipitation, followed by a period of short but intense rainfall. The absence of snowpack to lessen the amount of ground water, coupled with the area's steep slopes caused rapid runoff and the subsequent accumulation of flood flows which rushed to the ocean within a few hours or, at most, two to three days after the rain stopped (Kaplan 1979).

Sonoma Water is the local sponsor of Lake Mendocino, and determines water releases when the water level remains in the water supply pool, while USACE is responsible for managing the releases when the water level rises to the flood control pool of Lake Mendocino to ensure flood risk management. Water released from Lake Mendocino flows southward, where the East and West Forks meet. Flow continues southward to Hopland, Cloverdale, and Healdsburg. Below Healdsburg, Dry Creek (Lake Sonoma) joins the Russian River. Sonoma Water operates a riverbank filtration system adjacent to the Russian River near the town of Forestville. This system consists of six radial collector wells, a seasonal inflatable dam, and recharge basins. Groundwater is extracted by each collector well from the alluvial aquifer adjacent to and beneath the Russian River. The Russian River continues through the town of Guerneville and to the Pacific Ocean at Jenner.

Since the lake level rarely exceeds the conservation space in the fall, Sonoma Water has jurisdiction over the releases. Sonoma Water currently holds four permits (12947A, 12949, 12950, and 16596) that allow them to appropriate water from the Russian River, East Fork Russian River, and Dry Creek and redivert water released from storage from Lake Mendocino and Lake Sonoma for domestic, industrial, municipal, irrigation, and recreational uses. Per California State Water Resources Control Board Decision 1610 issued 17 April 1986, a minimum flow of 25 cfs is required immediately below CVD. The minimum in-stream flow requirement for the Russian River between the confluence with the East Fork Russian River and the confluence with Dry Creek varies depending on whether the year is classified as wet, dry, or critical.

3.3 Water Quality

Mendocino County and Lake Mendocino are located within the jurisdiction of the North Coast Regional Water Quality Control Board (NCRWQCB). Water quality objectives for the Russian River and its tributaries are specified in the Water Quality Control Plan for the North Coast Region (Basin Plan) prepared in compliance with the Federal Clean Water Act (CWA) and the State Porter-Cologne Act (NCRWQCB 2018). The Basin Plan identifies the existing and potential beneficial uses of water within the North Coast Region and the water quality objectives necessary to protect those uses. Section 401 of the CWA also gives the NCRWQCB the authority to review any proposed, Federally permitted, or Federally licensed activities that may impact water quality and to certify, condition, or deny the activity if it does not comply with State water quality standards.

3.3.1 Designated Beneficial Uses

The designated beneficial uses of the Coyote Valley Hydrologic Subarea in the Upper Russian River Hydrologic Area as outlined in the Basin Plan (NCRWQCB 2018) are presented in Table 3-

2. Every 6 years, the NCRWQCB evaluates water quality information and identifies water bodies that do not meet water quality standards and are not supporting their beneficial uses. Those waters are placed on a list of impaired water bodies, which identifies a pollutant or stressor causing impairment and establishes a schedule for developing a control plan to address the impairment (NCRWQCB 2018).

Table 3-2. Beneficial Uses of Upper Russian River Hydrologic Area

Symbols	Beneficial Uses	E or P	Symbols	Beneficial Uses	E or P
MUN	Municipal and Domestic Supply	E	SAL	Inland Saline Water Habitat	-
AGR	Agricultural Supply	E	WILD	Wildlife Habitat	E
IND	Industrial Service Supply	E	RARE	Rare, Threatened, or Endangered Species	E
PRO	Industrial Process Supply	P	MAR	Marine Habitat	-
GWR	Groundwater Recharge	E	MIGR	Migration of Aquatic Organisms	E
FRSH	Freshwater Replenishment	E	SPWN	Spawning, Reproduction, and/or Early Development	E
NAV	Navigation	E	SHELL	Shellfish Harvesting	P*
POW	Hydropower Generation	E	EST	Estuarine Habitat	-
REC-1	Water Contact Recreation	E	AQUA	Aquaculture	P
REC-2	Non-Contact Water Recreation	E	CUL	Native American Culture	-
COMM	Commercial and Sport Fishing	E	FLD	Flood Peak Attenuation/ Flood Water Storage	-
WARM	Warm Freshwater Habitat	E	WET	Wetland Habitat	-
COLD	Cold Freshwater Habitat	E	WQE	Water Quality Enhancement	-
ASBS	Preservation of Areas of Special Biological Significance	-	FISH	Subsistence Fishing	-

Note: E = Existing Beneficial use; P = Potential Beneficial Use; P* = Potential Beneficial Use for Ukiah Hydrological Subarea (HU/HA/HSA #114.31) Only

Data Source: North Coast Basin Plan (June 2018 Edition)

The Regional Board listed the entire Russian River on 2010 CWA Section 303(d) List of Water Quality Limited Segments for sedimentation/siltation and temperature impairments. Lake Mendocino is also on the 303(d) List for mercury impairments in fish tissue. Mercury (also called quicksilver) is a heavy metal and potent neurotoxin that is harmful to humans and wildlife, and occurs due to the presence of mercury mines in the Russian River Watershed (NCRWQCB 2018). Mercury builds up in the bodies of fish and also in people who eat contaminated fish. There is a statewide effort currently in development for a control program for reservoirs, including Lake Mendocino, that will address controlling sources of mercury and water quality objectives for this pollutant.

3.3.2 Reservoir stratification

Reservoirs can undergo thermal stratification, which can affect water temperature and dissolved oxygen (DO) levels in the water releases. Lake Mendocino is typical of Northern California reservoirs thermally, becoming isothermal in the fall/winter months and developing strong stratification in the summer months during low inflows. In general, reservoirs could stratify into three layers: a warm surface layer (i.e., the epilimnion), a narrow middle layer where the temperature rapidly declines (i.e., the thermocline); and a cold bottom layer (i.e., the hypolimnion). The density difference between the epilimnion and hypolimnion, which prevents vertical mixing, affects water quality. As the epilimnion is in contact with the atmosphere, it warms due to solar radiation and remains well oxygenated while the hypolimnion is isolated, and biological/chemical oxygen demand slowly depletes oxygen in the bottom layer over time. The cold hypolimnion (i.e., bottom layer) where there are organic substrates that exert sediment oxygen demands, can potentially become anoxic.

Depending on the depth of a release outlet in relation to the coldwater pool, water released from a reservoir may range from warm to cold and from oxygenated to anoxic. Lake Mendocino has one release point at the bottom of the reservoir where the water typically remains colder than surface until the overturn of the stratified water layers occurs in late summer/early fall. In addition, the size of a reservoir significantly affects downstream water quality. While larger reservoirs support a large cold-water pool, available cold water is substantially less in smaller reservoirs like Lake Mendocino and can be depleted on a regular basis.

3.3.3 Turbidity

Turbidity has traditionally been a main water quality problem associated with the CVD-Lake Mendocino project. The reservoir generally becomes turbid with the first heavy runoff of the year and remains turbid until early summer. USACE recently analyzed the turbidity data collected in the Russian River and provided initial analysis, interpretation, and summaries for selected years and locations (Appendix A of this document). The USACE assessment found that measurements collected at six stations between 2012 and 2021 (Calpella, CVD Outlet, Hopland, West Fork, Jimtown in the Russian River, and Lambert Bridge on Dry Creek) consistently identified high levels of turbidity tied to releases from CVD.

The persistent turbidity problem may be due to multiple sources that operate during different seasons and also may interact. For example, winter turbidity levels during and after high flow events are sometimes, but not always, associated with higher inflows into Lake Mendocino. High turbidity associated with the inflow has been ascribed to turbid water diverted from the Eel River. However, elevated inflow may also cause scour of the sediment deposited at the bottom of Lake Mendocino. Also, turbidity levels can be high during the summer and are not necessarily correlated with inflow or outflow. Bank erosion due to boat wakes has been suggested as one possible cause of high summer turbidity levels. Lake profiles have shown that turbidity often is higher near the bottom, especially when the lake stratifies. Overall, the exact mechanism controlling the turbidity resulting from reservoir releases, and the extent of downstream effects, remain unclear. Differences in turbidities were evident from the comparisons of all six sites. Importantly, turbidity data were not collected on the same days or even in the same years across monitoring stations. Therefore, despite turbidity being highest at the stations close to the release point, turbidity effects from CVD releases on downstream locations remain difficult to quantify.

The 2025 BO concluded that CVD flood control and water supply operations result in increased turbidity levels downstream, which could have an adverse effect on incubating and rearing Chinook Salmon and steelhead. In response, the 2025 BO included multiple RPM designed to monitor, evaluate, address turbidity to minimize reservoir flood control and water supply operations impacts on salmonids below CVD.

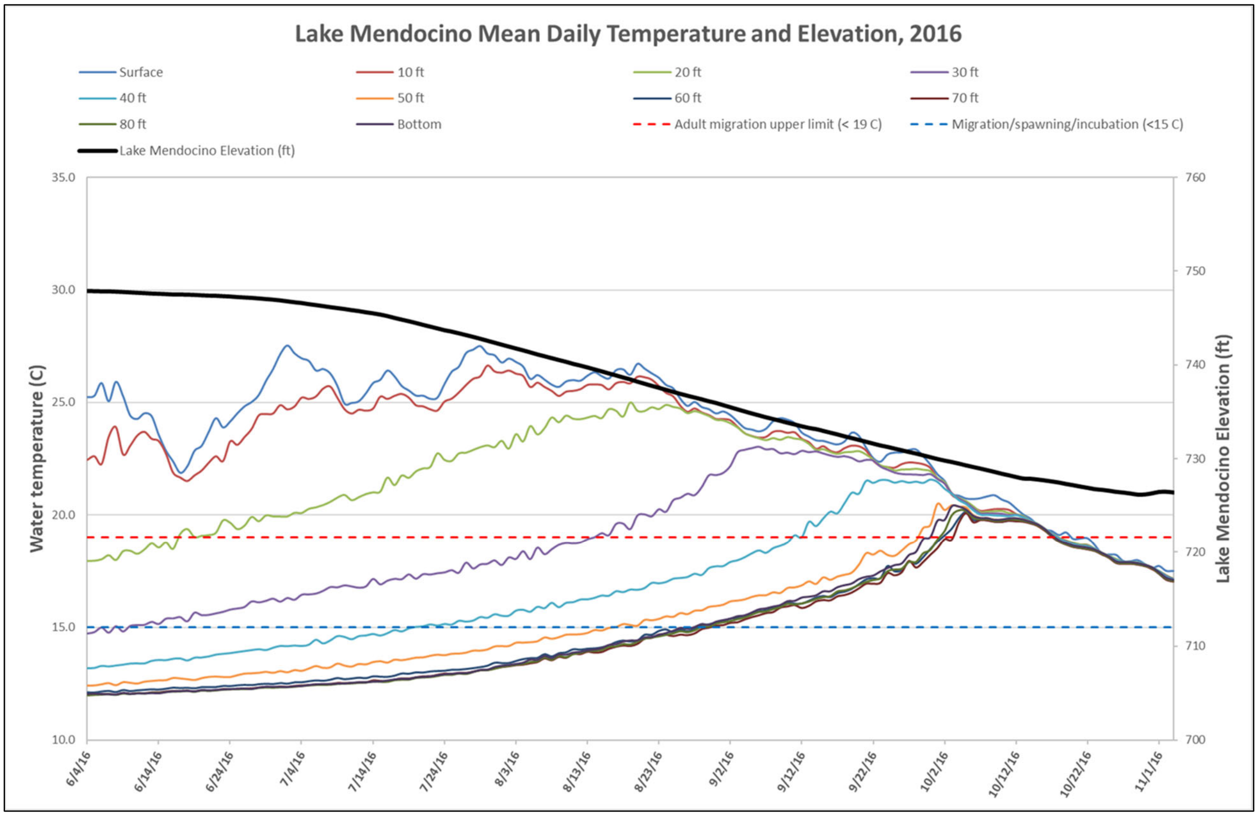
USACE has formed a technical advisory committee (TAC) including fishery biologists and water quality specialists, and is in the process of engaging two hydrological and engineering technical specialists. On-going efforts include developing a conceptual model of turbidity and a sediment dynamics model for the Russian River watershed including Lake Mendocino. The TAC will also be used to review potential short-, medium-, and long-term actions that can serve to reduce turbidity.

The USACE has assessed existing turbidity data from the Russian River watershed in a report (see Appendix A of this document) and is actively collecting new turbidity data from seven locations, which will be summarized in an annual report and submitted to the TAC and NMFS for review. USACE will submit a plan to complete or adjust turbidity data collection locations on December 31, 2025.

3.3.4 Water Temperature

Since the construction of CVD and the consequent filling and operation of Lake Mendocino, the Russian River has been transformed into a perennial stream with highly regulated flood flows and dry season base flows. Atmospheric conditions tend to increase surface water temperatures in the reservoir during the dry season (June through October). Figure 3-4 presents daily mean water temperature measured at different water depths in the reservoir during dry season in 2016 (which is an assumed baseline year for existing conditions). Based on the observational data shown in Figure 3-4, the maximum difference in water temperature between surface and bottom layers is approximately 15 C° in early July, the difference gradually decreases over time, and eventually the lake becomes well mixed by mid-October. This trend has been somewhat consistent throughout years based on historical data although it may vary slightly year to year due to atmospheric conditions.

Water temperatures in the upper Russian River are largely regulated by the temperature of water releases from Lake Mendocino downstream to the Hopland area with seasonal maximum temperatures typically ranging between 10 and 20°C. Lake Mendocino has one release point at the bottom of the reservoir where the water typically remains colder than the surface during the dry season until mixing of the stratified water layers occurs in late summer/early fall.



Source: Figure provided by Sonoma Water

Figure 3-4. Daily Mean Water Temperature in Lake Mendocino during Dry Season in 2016

3.3.5 Mercury

Lake Mendocino has been listed under Section 303(d) of CWA for mercury pollution measured in fish tissue. Possible mercury sources include naturally occurring mercury contained in soils, gold mine spoils, soil erosion due to human activities such as logging and road construction, and airborne sources from North America and Asia. Erosional sources that contribute to mercury accumulation in fish tissue are associated with the active transport of mercury-containing soils into the receiving water body.

The degree of mercury accumulation due to erosional sources is dependent in large part on current and past land use practices upstream of the receiving water body coupled with rain and wind transport. Depositional sources are associated with atmospheric mercury that is released into the air as a result of industrial production activities and is also dependent on rainfall and wind transport. The SWRCB is currently developing a statewide mercury program that will include a control program for reservoirs that will address controlling sources of mercury and water quality objectives for mercury. The EPA recommended water quality criterion for concentrations of methylmercury in fish tissue is 0.3 mg methylmercury/kg fish. This is the concentration in fish tissue that should not be exceeded based on a total fish and shellfish consumption-weighted rate of 0.0175 kg (17.5 grams) fish/day.

3.3.6 Dissolved Oxygen

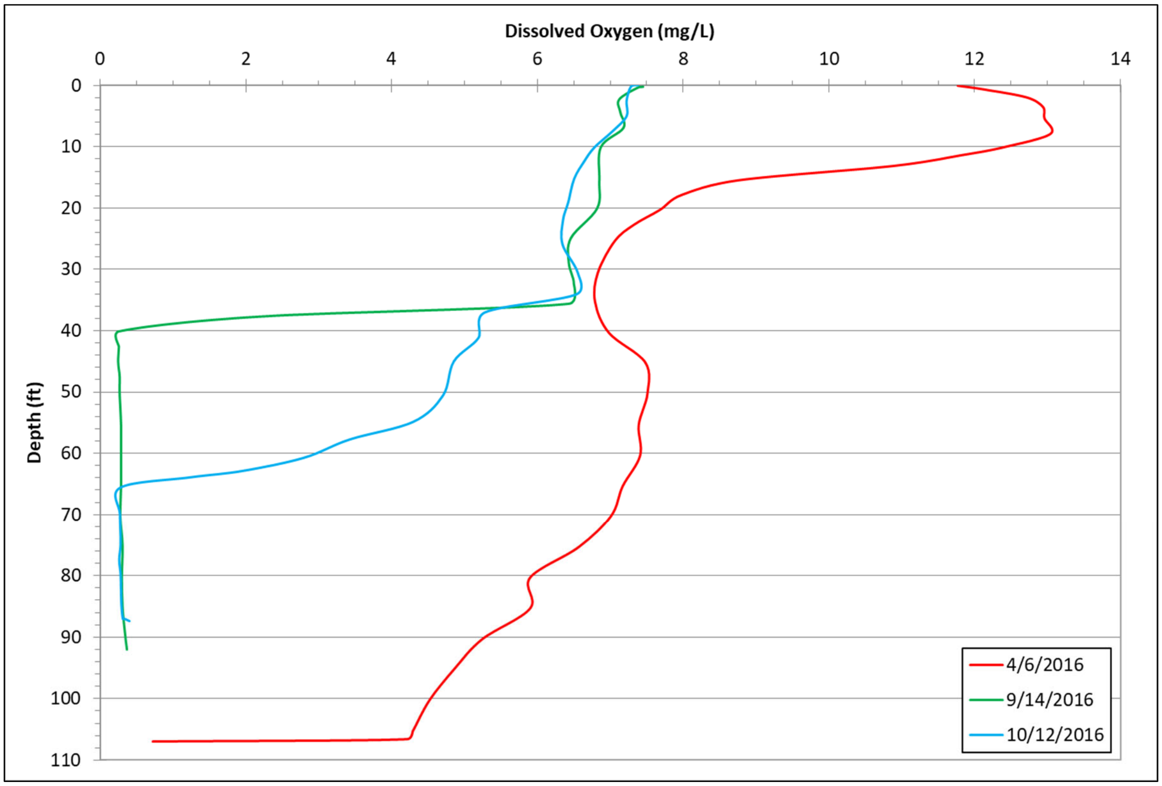
As mentioned in Section 3.3.2, Lake Mendocino experiences thermal stratification during summer months, which also affects DO levels in different strata in the reservoir and in the water released from the reservoir. During the late fall, winter, and early spring, water stored in Lake Mendocino is typically well mixed; therefore, water released from the reservoir is well oxygenated. In addition, atmospheric conditions and tributary input help to maintain DO levels at or near saturation during non-summer months. However, from May in most years, DO levels in the water released from the reservoir begins to decrease. This continues through the summer and early fall until the reservoir "turns over" and the process starts anew as the general pattern of DO levels follows thermal stratification and turn-over in Lake Mendocino. Accordingly, the anoxic conditions near the bottom of the reservoir persists until the late summer. Because of the bottom release of the reservoir water, issues with odors related to hydrogen sulfide formation (which occurs in anoxic conditions during the decomposition of organic matters on bottom substrates) tend to occur in the summer, although the bottom release of colder water has created a good summer habitat area for cold-water fish.

Figure 3-5 presents DO measurements at the various depths in Lake Mendocino before CVD in 2016. Lake Mendocino DO concentrations tend to decline at depth in the late spring, often resulting in low DO conditions in the East Fork Russian River immediately below CVD. DO levels within the cold-water pool typically remain depressed through the summer months until the lake seasonally mixes. The top layer at 0 to 30 feet of water in Lake Mendocino that is exposed to sunlight (photic zone) remains well oxygenated. However, the anoxic bottom layer is observed at water depths approximately from 40 to 90 feet in September and 65 to 90 feet in October of 2016. Typically, the anoxic bottom layer gets oxygenated via thermal turn-over and starts to mix with the highly oxygenated surface layer in late October. In the late fall/winter, the DO concentration increases in the bottom layer and decreases in the photic zone, and become vertically somewhat uniform.

Based on the historical data collected by USGS along the Russian River below CVD, DO concentrations tend to be higher during wet season months (November through April) when water temperatures are cooler, and decrease during dry season months (June through October). The DO levels in the downstream of CVD are also affected by the bottom water release from the reservoir during dry season when the bottom layer is typically anoxic (Sonoma Water 2020).

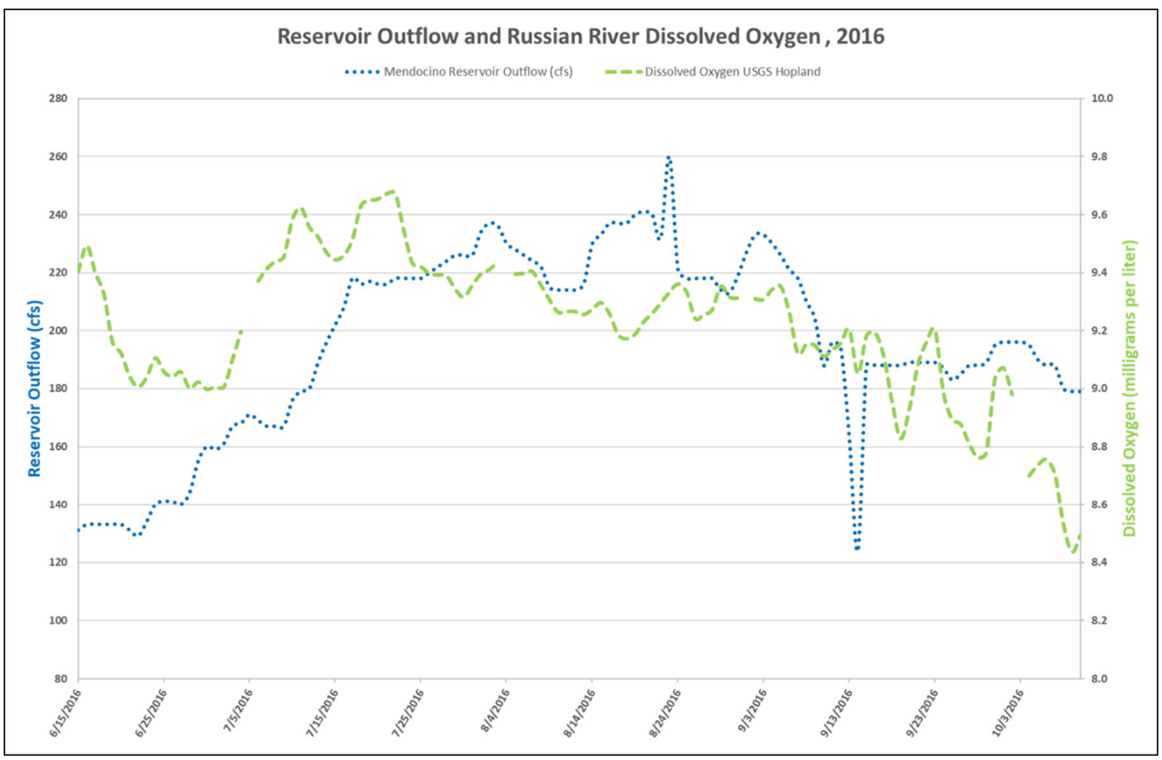
Figure 3-6 presents the DO measurements at USGS gage at Hopland in the summer of 2016 compared to the outflow from the reservoir. It is evident that the DO at Hopland and the outflow from the reservoir in the summer is inversely correlated.

In addition, the availability of nutrients in the water column can also affect DO concentrations. Nutrients can promote excessive plant and algal growth that can alter the DO concentration through photosynthesis and respiration. Supersaturated DO concentrations can be caused by excessive plant and algal growth during photosynthesis in which excess oxygen is produced and released into the water column typically during the daytime, whereas depressed DO concentrations can be the result of excessive plant and algal respiration and decomposition when oxygen in the water column is consumed typically at night.



Source: Figure created by USACE using the data provided by Sonoma Water

Figure 3-5. Dissolved Oxygen Measurements at Various Depths in Lake Mendocino before Coyote Valley Dam in 2016



Source: Figure provided by Sonoma Water

Figure 3-6. Dissolved Oxygen Measurements vs. Lake Mendocino Outflow, Summer 2016

3.4 Fisheries

The fish community in Lake Mendocino is dominated by non-native, warm water species such as Largemouth Bass (*Micropterus salmoides*) and Redear Sunfish (*Lepomis microlophus*), with lesser numbers of Smallmouth Bass (*M. dolomieu*), Green Sunfish (*L. cyanellus*), Bluegill (*L. macrochirus*), and Channel Catfish (*Ictalurus punctatus*). A few native species such as Sacramento Sucker (*Catostomus occidentalis*) and Sacramento Pikeminnow (*Ptychocheilus grandis*) are also present in the reservoir.

3.4.1 Native Fish Species

Native fish species that currently inhabit, or that have historically inhabited the East Fork Russian River, include CCC Steelhead, CCC Coho Salmon, California Coastal Chinook Salmon, Coastal Rainbow Trout (*O. mykiss irideus*), Hardhead (*Mylopharodon conocephalus*), Pacific Lamprey (*Entosphenus tridentatus*), Sacramento Pikeminnow, Sacramento Sucker, and Russian River Tule Perch (*Hysterocarpus traskii pomo*).

Construction of CVD created a barrier to upstream migration for anadromous salmonids resulting in the loss of spawning habitat above the dam. The Don Clausen Fish Hatchery at Lake Sonoma along with the imprinting ponds and egg collection facility below CVD provide for the release of 40,000 steelhead smelt annually. These releases are to mitigate for the loss of upstream spawning habitat on the East Fork Russian River (Sonoma Water 2020).

3.4.2 Non-Native Fish Species

Fish habitat in the area inundated by CVD has been significantly altered. After the construction of CVD, water temperatures and oxygen levels no longer support cold water, native species like Rainbow Trout. In addition, reservoir management normally causes 20 feet of annual variation in water levels. This prevents the establishment of emergent and submerged vegetation around the lake perimeter. The resulting lack of cover and food sources has created challenges for fisheries management at Lake Mendocino. As stated above, common species in Lake Mendocino now include a variety of non-native bass, sunfish, and catfish as well as non-game species such as Golden Shiner (*Notemigonus crysoleucas*) and Western Mosquitofish (*Gambusia affinis*) (USACE 2019).

3.4.3 Fish Stocking Practices

California Department of Fish and Wildlife (CDFW) through their Inland Fisheries Division has an overall responsibility for the fishery program at Lake Mendocino. The fish management program is supervised by professionally trained fisheries biologists stationed in Ukiah and Redding, California. The goal of the State's fisheries program is to produce the best fishing opportunities possible for the maximum number of people. The fisheries management program is geared to test, evaluate and provide a greater variety of fishing opportunities by using techniques to primarily favor native species. Lake Mendocino is stocked with Largemouth Bass and Smallmouth Bass, White Crappie (*Pomoxis annularis*), and Black Crappie (*P. nigromaculatus*), Bluegill, and Channel Catfish. Striped Bass (*Morone saxatilis*) are also stocked in years when the local Striped Bass Club has the funding to conduct the stocking (USACE 2019).

3.4.4 Coyote Valley Fish Facility

The Coyote Valley Fish Facility at Lake Mendocino is open from January through April to facilitate a key stage of the steelhead's lifecycle and spawning. The facility is operated by the CDFW and collects eggs from the steelhead but does not hatch them on site. The collected eggs are fertilized at Lake Mendocino then sent to Don Clausen Fish Hatchery at Lake Sonoma to hatch. They are raised for a year at Lake Sonoma and are then brought back to Lake Mendocino and put into one of the eight raceways. They spend about 30 days in the raceways imprinting - learning the smell of water so they know where to return. Finally, they are released into the Russian River, and expected to return in 3 to 5 years to spawn (USACE 2024a).

3.5 Vegetation and Wildlife

Vegetation and landcover reflect climate, and past and present land use. The watershed transitions from a dry interior portion dominated by hardwood forests, oak savannah, chaparral, and grasslands to a fog-influenced portion near the coast characterized by conifer forests. Cool coastal conditions moderate temperatures year-round in the lower Russian River. In contrast, the inland Russian River mainstem has hot, dry summers. Bank vegetation ranges from sparse to dense riparian forest. Some riverbanks are armored with rock riprap. Adjacent to the river, habitats vary from urban, ruderal, agricultural, woodland, to forest. Largely, scouring during winter high flows provides the dominant force that dictates where vegetation can establish and persist. In the Ukiah, Hopland, and Alexander valleys most lands are agricultural, typically vineyards. The lower Russian River is primarily forested lands, with interspersed vineyards, and development associated with communities in the Healdsburg, Forestville, Guerneville and Monte Rio areas.

Riparian and marsh habitat at Lake Mendocino is generally absent from the shoreline of the lake due to managed, fluctuating water levels. The shoreline is typically barren with an upland plant community at the high-water line. USACE owns Lake Mendocino, including the surrounding uplands at a total of approximately 3,500 acres. Mountainous north-facing slopes contain hardwood and coniferous forests, and on foothills oak woodlands and grasslands are common. Chaparral and grassland exist on shallow soils of south-facing slopes.

3.5.1 Valley and Foothill Woodland (Oak Savannah)

On the dryer, inland slopes of the North Coast Ranges, conifers can be found with hardwoods such as California black oak (*Quercus kelloggii*), coast live oak (*Quercus agrifolia*), California bay laurel (*Umbellularia californica*), and Pacific madrone (*Arbutus menziesii*). The north coast forest habitat provides important foraging and nesting habitat for several wildlife species. Berries, forbs, conifer seeds, and oak acorns provide important food sources for species including western gray squirrel (*Sciurus griseus*), dusky-footed woodrat (*Neotoma fuscipes*), mule deer (*Odocoileus hemionus*), various species of woodpecker, and Steller's jay (*Cyanocitta stelleri*). Avian predators such as Cooper's hawk (*Accipiter cooperii*) and great horned owl (*Bubo virginianus*) prey upon rodents and small birds in this habitat. In addition, the north coastal forest provides shelter and breeding habitat for wildlife species such as nesting raptors; cavity nesters such as woodpeckers, western screech-owl (*Megascops kennicottii*), and pygmy nuthatch (*Sitta pygmaea*); mammals including ringtail (*Bassariscus astutus*) and long-tailed weasel (*Mustela frenata*); and reptile and amphibians such as northern alligator lizard (*Elgaria coerulea*), ring-necked snake (*Diadophis punctatus*), and California giant salamander (*Dicamptodon ensatus*).

Within the study area, valley and foothill woodland is dominated by oak species with varying degrees of canopy cover, and with grasses and scattered low shrubs between trees. Oak woodlands, while common in California, are considered in decline due to seedling predation and loss due to development. This habitat provides important foraging for numerous wildlife species. Oak acorns provide an important food source for species including western gray squirrel, California ground squirrel, mule deer, various species of woodpecker, and California scrub jay (*Aphelocoma californica*). Avian predators such as golden eagle (*Aquila chrysaetos*), red-tailed hawk (*Buteo jamaicensis*), and Cooper's hawk, prey upon rodents and small birds in this habitat. In addition, oak woodlands and savannahs provide shelter and breeding habitat for wildlife species such as nesting raptors; cavity nesters such as woodpeckers (Picidae), house wrens (*Troglodytes aedon*), and western bluebirds (*Sialia mexicana*); mammals including mule deer, raccoon (*Procyon lotor*), brush rabbit (*Sylvilagus bachmani)*, and feral pig (*Sus scrofa)*; and reptile and amphibians such as western fence lizard (*Sceloporus occidentalis*), gopher snake (*Pituophis catenifer*), arboreal salamander (*Aneides lugubris*) and Pacific treefrog (*Pseudacris regilla*).

3.5.2 Chaparral

Chaparral is one of the most characteristic plant communities of California, and occurs only in California. It is characterized by hard-leaved low-growing shrubs, and is typically devoid of tree and herbaceous plant species. This is in part attributable to shading and competition from the dense growing brush. Characteristic plant species include manzanita, chamise (*Adenostoma fasciulatum*), toyon (*Heteromeles arbutifolia*), and California lilac (*Ceanothus* sp.). Chaparral occurs in the study area on hot, dry southern slopes. Wildlife species that occur within chaparral are those that inhabit drier, more arid regions of the county and include western fence lizard (*Sceloporus occidentalis*), California ground squirrel (*Otospermophilus beecheyi*), and brush rabbit (*Sylvilagus bachmani*). Birds such as common bushtit, California quail (*Callipepla californica*), and wrentit (*Chamaea fasciata*) are commonly occurring species that use chaparral for foraging, cover, and nesting. Predators include coyote (*Canis latrans*) and American badger (*Taxidea taxus*) that utilize open areas in chaparral for hunting prey.

3.5.3 Valley Grassland

Valley grassland occurs most extensively in the Central Valley of California, but also is present in some of the low valleys or gentle slopes of the Coast Ranges, including the study area. Non-native grassland habitat is commonly distributed in valley and foothills of most of California, except for the north coastal and desert regions. Valley grassland (native and non-native) occurs in the open areas adjacent to or within woodland and forest habitats. Within the project area valley grassland may fringe the riparian zone along the Russian River. This habitat typically occurs on fine-textured soils, usually clay, moist, or even waterlogged during the winter rainy season, and very dry during the summer and fall. European settlement of the area introduced non-native annual grasses, which have, for the most part, replaced the native perennial grasses that used to dominate this biotic community.

Plant species characteristic of valley grassland in the project area include Harding grass (*Phalaris aquatica*), soft chess (*Bromus hordeaceus*), slender oats (*Avena barbata*), clover (*Trifolium* spp.), lotus (*Lotus* spp.), California burclover (*Medicago polymorpha*), and vetch (*Vicia* spp.). Wildlife species typically observed foraging in valley grasslands include song sparrow (*Melospiza melodia*), red-winged blackbird (*Agelaius phoeniceus*), and American pipit (*Anthus rubescens*). Valley grasslands provide cover and foraging habitat for small mammals, reptiles, and avian species, including Botta's pocket gopher (*Thomomys bottae*), common gopher snake, common kingsnake (*Lampropeltis getula*), and raptors such as red-tailed hawk (*Buteo jamaicensis*). This habitat is also important for common ground nesting birds such as western meadowlark (*Sturnella neglecta*) and mourning dove (*Zenaida macroura*). Grasslands provide open foraging habitat for wildlife species such as white-tailed kite (*Elanus leucurus*) and mule deer that seek cover in adjacent woodland.

3.5.4 Riparian Woodland

Riparian vegetation, or the plants associated with a stream environment, once covered much of the Russian River floodplain and tributaries. Generally, riparian areas are associated with and/or encompass elevations adjacent to streams up to the floodplain elevation that matches the 100 to 500 year storm event. These large intense events along a river system are the primary driver for mobilizing sediments, scouring vegetation, and creating new places for vegetation to colonize. Historically, riparian vegetation along the Russian River was removed for agriculture, gravel mining, logging, flood control, and urbanization. Today, riparian vegetation along the Russian River and numerous tributaries exists in thin and in some places discontinuous strips. Riparian plant communities often show abrupt changes in species composition along stream banks due to differing preferences of seasonal water levels and tolerance to scouring during winter floods.

With close proximity to water and a multi-story canopy, riparian habitats provide important breeding, foraging, migration, dispersal, and cover habitat for numerous wildlife species. Riparian habitats benefit fish and other aquatic organisms through nutrients provided in the form of leaf litter and insects; shelter provided by scour pools, woody debris, and root masses; and cool water temperatures maintained by shading of all or parts of streams. Trees in riparian areas provide stabilization of banks and erosion control and prevent woody debris from entering agricultural lands during peak flood flows. Riparian areas also link fragmented upland habitats together. Because of its importance to terrestrial and aquatic wildlife species, riparian habitat has been afforded special regulatory protection by CDFW.

Wildlife species commonly found in riparian habitats include mule deer, dusky-footed woodrat, gray fox (*Urocyon cinereoargenteus*), raccoon, downy woodpecker (*Dryobates pubescens*), belted kingfisher (*Megaceryle alcyon*), Bullock's oriole (*Icterus bullockii*), California towhee (*Melozone crissalis*), common bushtit (*Psaltriparus minimus*), song sparrow, and common kingsnake. Neotropical migrant songbirds use these habitats as movement corridors and nesting habitat. Raptors often nest in riparian areas and forage in adjacent grasslands and agricultural fields. Characteristic riverine species that also use riparian habitats include river otter (*Lontra canadensis*), Pacific treefrog, and western pond turtle (*Actinemys marmorata)*.

3.6 Special-status Species

For the purpose of this EA, special-status species include threatened, endangered, rare, candidate, and other sensitive species identified by U.S. Fish and Wildlife Service (USFWS) and NMFS. The special-status species also include Bald and Golden eagles Protected by the Federal Bald and Golden Eagle Protection Act (16 United States Code [U.S.C.] Section 668). Appendix B of this document provides the results of species occurrence database queries from USFWS' Information for Planning and Consultation (IPaC) website. Also, NMFS California Species List Tools website search was conducted to identify any Federally endangered and threatened species that may potentially be found in the action area. Action area means all areas to be affected directly or indirectly by the Federal action and not merely the immediate area involved in the action (50 C.F.R. § 402.02). For the IPaC database searches, the action area was defined as an area encompassing Lake Mendocino at the gross pool and 2-mile downstream reach of the East Fork Russian River below CVD (Figure 3-7).

A focused list of special-status plant and animal species that could potentially occur in the action area or be affected by the proposed action is provided in Table 3-3. The listed species' potential to occur in the action area is further evaluated by the presence and absence data based on previous special-status record locations, the species' known ranges, and current site conditions using RareFind5 in CDFW's California Natural Diversity Database (CNDDB).

There are three salmonids inhabiting the Russian River that are listed under the Federal ESA: CCC Steelhead, California Coastal Chinook Salmon, and CCC Coho Salmon. Coho Salmon are also listed under the California Endangered Species Act (CESA). They exhibit a similar life history strategy known as anadromy. With an anadromous lifestyle, juveniles rear in freshwater before migrating to the ocean where they grow and mature; finally returning as adults to freshwater to lay their eggs and begin the lifecycle anew. Although there are specific differences between salmonids, they all share several life history traits. After growing and maturing in the ocean, the adults of all three species return (generally) to the stream where they were born. Eggs are laid in a nest, called a redd. The freshwater residency is highly variable between the three species, but is marked by rapid growth followed by a physiological change known as smoltification. A salmonid undergoing this change is called a smolt. The smoltification process is necessary for salmon to convert from a physiology adapted to living in freshwater to one adapted to living in salt water.

Following the review of listed species presented in Table 3-3, it was determined that no Federally-listed special-status species are likely to occur in action area except steelhead and Chinook Salmon (see Table 3-3). These species do not occur in Lake Mendocino or upstream in the East Fork Russian River. However, critical habitats for steelhead and Chinook Salmon overlap the action area (Figure 3-7), and they occur in the mainstem Russian River downstream of Lake Mendocino.

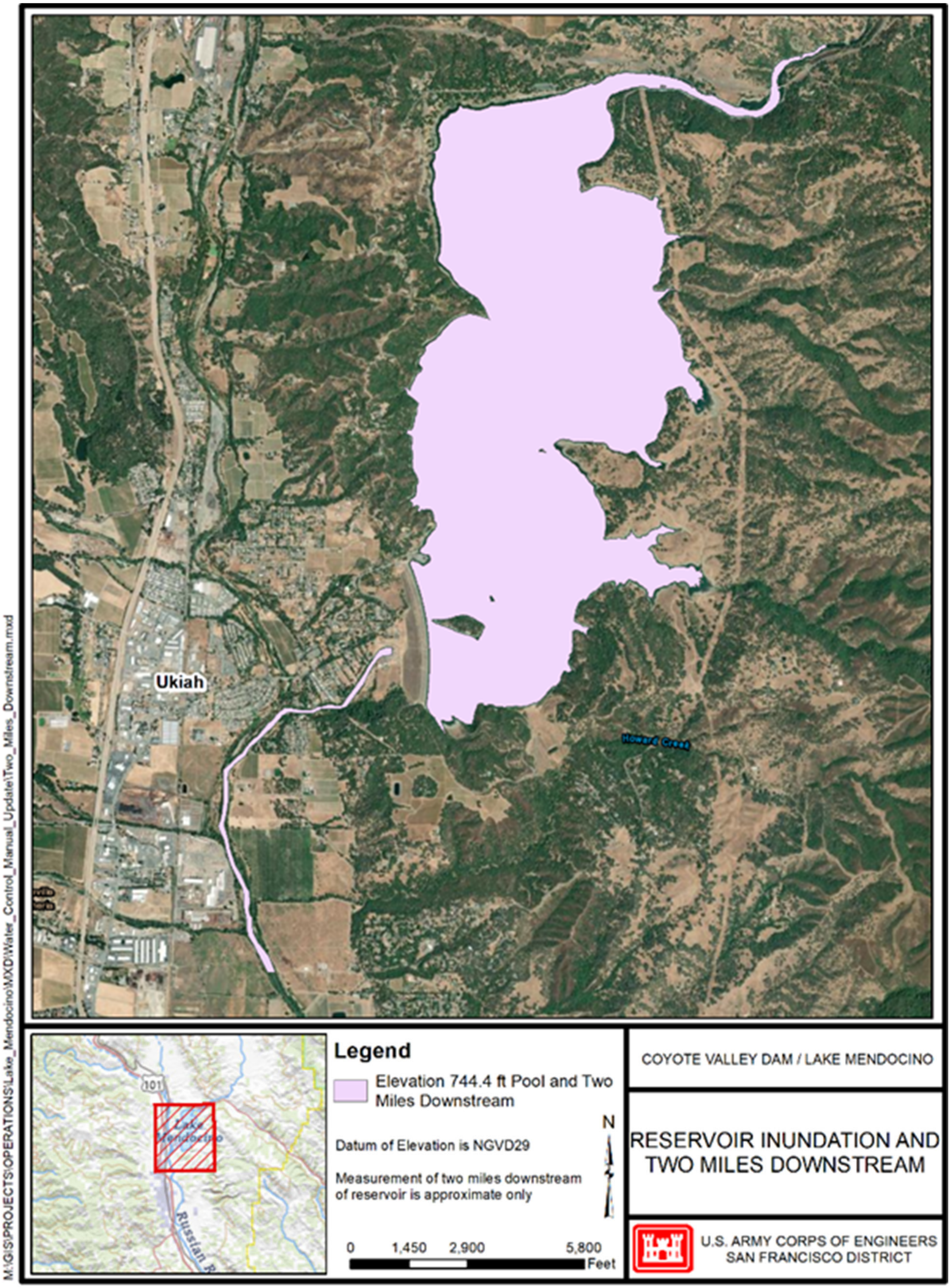


Figure 3-7. Action Area of Coyote Valley Dam-Lake Mendocino Project

Table 3-3. Federally-listed Special-Status Species Potentially to Occur in Action Area or Be Affected by Proposed Action

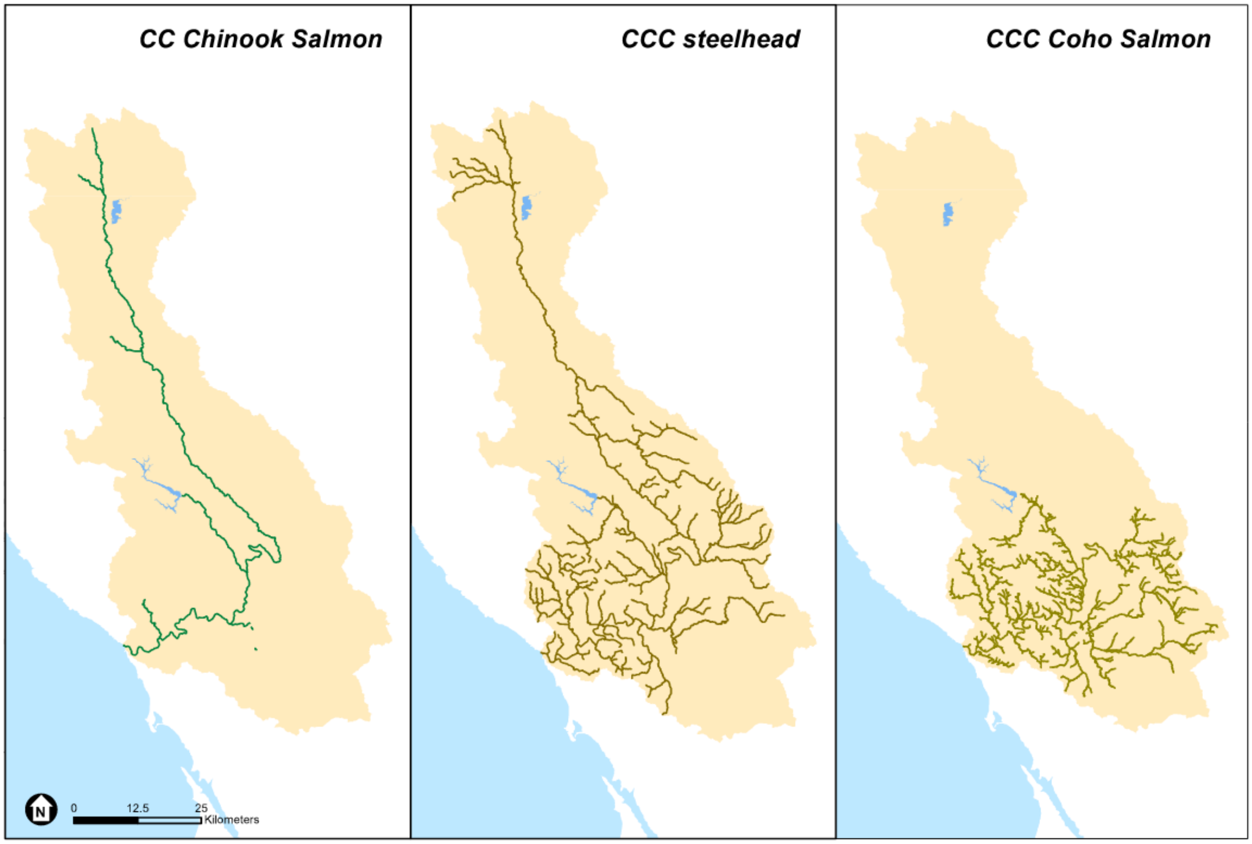
Common Name	Scientific Name	Status	Potential to Occur in Action Area or to Be Affected by Proposed Action
Birds			
Northern Spotted Owl	*Strix occidentalis caurina*	Threatened	Unlikely – This species' critical habitat does not overlap the action area; no record of occurrence on CNDDB.[1,2]
Western Snowy Plover	*Charadrius nivosus nivosus*	Threatened	
Yellow-billed Cuckoo	*Coccyzus americanus*	Threatened	
Fish			
Central California Coast Steelhead	*Oncorhynchus mykiss*	Threatened	**Likely** – This species' critical habitat overlaps the action area[3]; steelhead juveniles are reared at fish imprinting facility (Coyote Valley Fish Facility) below CVD; 55 steelhead observed in the fastwater habitat (i.e., riffle and cascade) in the upper portion of Ukiah reach near approx. 1 mile downstream of the confluence of East Fork and Russian River mainstem during Upper Russian River Steelhead Distribution Study in Summer and Fall 2001 (Cook 2003).
California Coastal Chinook Salmon	*Oncorhynchus tshawytscha*	Threatened	**Likely** – This species' critical habitat overlaps the action area[3]; migrating adult Chinook salmon observed in the upper Russian River; migrating typically begins in late summer when river flows are low and then migration activity peaks with rising river flows during the cool fall rainy season; the density of redds was observed highest in the upper Russian River near the action area during Chinook Salmon Spawning Study in Fall 2002-2007 (Cook 2008). Juveniles are expected to outmigrate in the spring.

Common Name	Scientific Name	Status	Potential to Occur in Action Area or to Be Affected by Proposed Action
Central California Coast Coho Salmon	*Oncorhynchus kisutch*	Endangered	Unlikely – This species' critical habitat does not overlap the action area[3]; this species primarily occupies tributaries in the lower Russian River watershed and do not spawn or rear in the mainstem Russian River (Sonoma Water 2020).
Reptiles			
Northwestern Pond Turtle	*Actinemys marmorata*	Proposed Threatened	Unlikely – No critical habitat has been designated for this species[2]; this species may be present along the lake's edge, shallow lake area and/or riparian habitat downstream of CVD; however, this species would not be affected by the Proposed Action because reservoir storage and releases would not fluctuate more than the existing operating ranges.
Insects			
Monarch Butterfly	*Danaus plexippus*	Candidate	Unlikely – No critical habitat has been designated for this species; no record of occurrence on CNDDB.[1,2]
Flowering Plants			
Burke's Goldfields	*Lasthenia burkei*	Endangered	Unlikely – No critical habitat has been designated for this species; there is a record of occurrence on CNDDB immediately below CVD[1,2]; however, the location of species occurrence is outside of the action area.
Contra Costa Goldfields	*Lasthenia conjugens*	Endangered	Unlikely – This species' critical habitat does not overlap the action area; no record of occurrence on CNDDB.[1,2]
Lassics Lupine	*Lupinus constancei*	Endangered	
Showy Indian Clover	*Trifolium amoenum*	Endangered	Unlikely – No critical habitat has been designated for this species; no record of occurrence on CNDDB.[1,2]

Source:
1. CDFW 2024 – Based on RareFind 5 database searches in CNDDB; available online at https://wildlife.ca.gov/Data/CNDDB/Maps-and-Data#43018407-rarefind-5
2. USFWS 2024 – Available online at https://ecos.fws.gov/
3. NMFS 2024 – Available online at https://www.fisheries.noaa.gov/species-directory/threatened-endangered

3.6.1 Critical Habitats for Federally-listed Salmonids

Figure 3-8 provides the graphical illustration of designated critical habitats for CCC Steelhead, California Coastal Chinook Salmon, and CCC Coho Salmon.



Source: NMFS 2016

Figure 3-8. Critical Habitats for Listed Salmonids in Russian River Watershed

Central California Coast Steelhead

Critical habitat for CCC Steelhead DPS (Distinct Population Segment) encompasses the current freshwater and estuarine range inhabited by the DPS (i.e., from the Russian River [inclusive] south to Aptos Creek [inclusive], including the San Francisco Bay tributaries). Critical habitat consists of all waterways, substrate, and adjacent riparian zones below long-standing, naturally-impassable barriers. Areas specifically excluded from critical habitat included historically occupied habitat upstream of specific dams identified in the Federal Register (FR) notice (designated May 5, 1999 [64 FR 24049]) (including CVD), and Indian tribal lands. However, the critical habitat for the CCC Steelhead overlaps the action area with 1 mile downstream of the East and West Fork confluence.

California Coastal Chinook Salmon

Critical habitat for the California Coastal Chinook ESU (Evolutionarily Significant Units) encompasses accessible reaches of all rivers (including estuarine areas and tributaries) within the current range inhabited by the ESU (i.e., from Redwood Creek [inclusive] in Humboldt County south through the Russian River [inclusive]). As with CCC Steelhead, habitat excluded from critical habitat included river reaches upstream of several dams that block access to former anadromous habitats (including CVD), and Indian tribal lands; however, the critical habitat for the California Coastal Chinook ESU overlaps the action area with 1 mile downstream of the East and West Forks confluence.

Central California Coast Coho Salmon

Critical habitat for the CCC Coho Salmon ESU encompasses all accessible river reaches within the ESU (i.e., from Punta Gorda south to the San Lorenzo River), including two streams entering San Francisco Bay: Arroyo Corte Madera del Presidio and Corte Madera Creek. Critical habitat consists of all waterways, substrate, and adjacent riparian zones below long-standing, naturally-impassable barriers (i.e., natural waterfalls in existence for at least several hundred years). As with CCC Steelhead and California Coastal Chinook, habitat excluded from critical habitat included river reaches upstream of several dams that block access to former anadromous habitats (including CVD), and Indian tribal lands. The critical habitat for the CCC Coho Salmon does not overlap with the action area. Furthermore, this species was not evaluated further because it primarily occurs in streams in the lower Russian River watershed, mainly from the Maacama Creek sub-watershed downstream, and do not spawn or rear in the action area.

3.6.2 Central California Coast Steelhead

Steelhead are the most widely distributed salmonid in the Russian River watershed, inhabiting most permanent tributary streams. Steelhead also utilize the mainstem Russian River as spawning and rearing habitat. Spawning habitat overlaps with Chinook Salmon (mainly above Cloverdale).

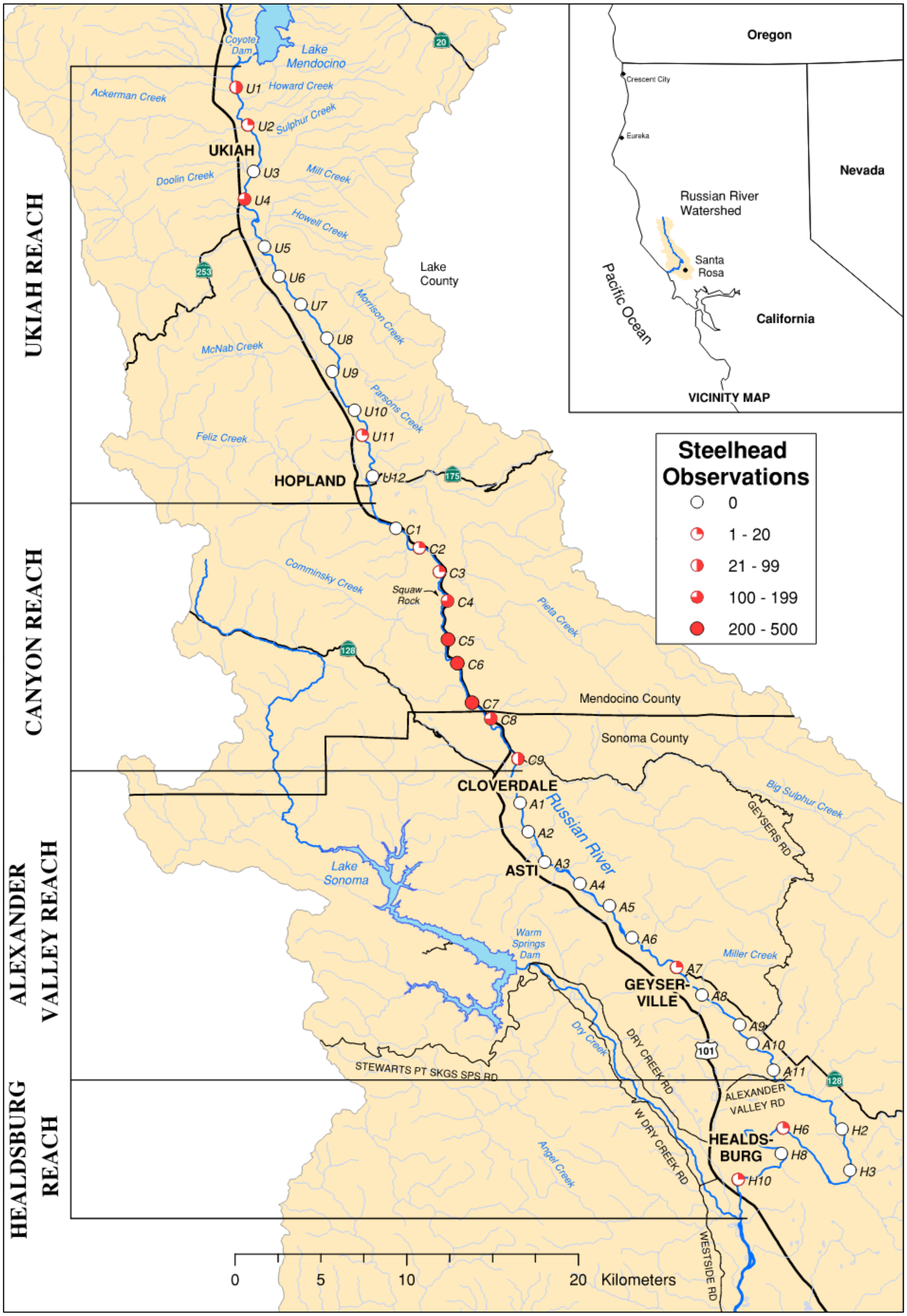
Steelhead are flexible in their life history strategies and habitat requirements. Adult steelhead migrate primarily during the winter so they are considered winter run in the Russian River. The exact timing of upstream migration is correlated with seasonal high flows and associated lower water temperatures. Steelhead begin returning to the Russian River in December, with the run continuing into April. Most spawning takes place from January through April. The minimum stream depth necessary for successful upstream migration is about 18 cm and the preferred water velocity for upstream migration is in the range of 40-90 cm/s, with a maximum velocity, beyond which upstream migration is not likely to occur, of 240 cm/s (Thompson 1972). Steelhead spawn in the upper mainstem river as well as most tributaries throughout the basin. In contrast to other species of the genus Oncorhynchus, steelhead are iteroparous (they may spawn in multiple return years), but most adult steelhead in a given return year are first time spawners (Shapovalov and Taft 1954).

The number of days required for steelhead eggs to hatch is inversely proportional to water temperature and varies from about 19 days at 15.6°C to about 80 days at 5.6°C. Fry typically emerge from the gravel 2 to 3 weeks after hatching (Barnhart 1986). Upon emerging from the gravel, fry rear in edgewater habitats and move gradually into pools and riffles as they grow larger. Instream cover is an important habitat component for juvenile steelhead both as velocity refuge and as a means of avoiding predation. However, in contrast to summer rearing habitat of other stream-dwelling species of salmonids, steelhead tend to use riffles and other habitats not strongly associated with cover. Young steelhead feed on a wide variety of aquatic and terrestrial insects, and emerging fry are sometimes preyed upon by older juveniles. In winter, they become inactive and hide in any available cover, including gravel or woody debris.

Rearing steelhead juveniles prefer water temperatures of 7.2 to 14.4°C and have an upper lethal limit of 23.9°C; however, they can survive short periods up to 27°C with saturated DO conditions and a plentiful food supply. Fluctuating diurnal water temperatures also aid in survivability of salmonids (Busby et al. 1996). Low DO levels decrease juvenile steelhead swimming speed, growth rate, food consumption rate, efficiency of food utilization, threat avoidance behavior, and ultimately survival and DO levels at or below 6.5 to 7.0 mg/L affect the migration and swimming performance of steelhead juveniles at all temperatures (Davis et al. 1963). Bjornn and Reiser (1991) recommended that DO concentrations remain at or near saturation levels with temporary reductions no lower than 5.0 mg/L for successful rearing of juvenile steelhead.

During early life stages, suspended and deposited fine sediments can directly affect salmonids by clogging redds, abrading and clogging gills, and indirectly through reduced feeding, slower avoidance reactions, destruction of food supplies, reduced egg and alevin survival, and changed rearing habitat. Bell (1991) found that suspended silt loads of less than 25 mg/L permit good rearing conditions for juvenile salmonids. It is unlikely that steelhead differ substantially from other salmonids in this respect, so it is assumed this finding applies to steelhead as well.

The Upper Russian River Steelhead Distribution Study was conducted by Sonoma Water based on underwater visual observations of fish during dive (snorkel) surveys within selected segments of the Russian River during Summer 2002 (from July 31 through September 19, 2002). The study area was the upper Russian River from the confluence of the East and West forks of the Russian River near Ukiah to the confluence with Dry Creek near Healdsburg. A total of 1,436 steelhead were observed in the 37 sample segments. Each segment was approximately 0.5 km in stream length. Steelhead were found in the upper portion of the Ukiah reach, throughout most the Canyon reach, and infrequently in the Alexander Valley and Healdsburg reaches (Figure 3-9; Cook 2003).



Source: Cook 2003

Figure 3-9. Steelhead Distribution and Relative Abundance based on Upper Russian River Steelhead Distribution Study during Summer 2002

The fish composition of the study reaches included 12 native and non-native fish species. Steelhead composed <1% to 5% of the counted fish. The largest numbers of steelhead were observed in the Canyon reach at 265 steelhead/km followed by the Ukiah reach at 37 steelhead/km. The Alexander Valley and Healdsburg reaches had relatively few steelhead observations at <1 and 7 steelhead/km, respectively. Fish numbers were determined by visually counting fish during dive surveys and were not population estimates. Most of the habitats within reaches were composed of flatwater with relatively low frequencies of cascade, riffle, and deep pool habitats.

Dive observations indicated that steelhead were almost exclusively found in riffle and cascade habitats, and flatwater and deep pool habitats were seldom utilized. Riffle and cascade habitats occur in moderate to high gradient stream sections and were most frequently found in the Canyon reach with an average slope of 0.0026%. In comparison, the Ukiah, Alexander Valley, and Healdsburg reaches had average gradients approximately half of the Canyon reach and ranged from a slope of 0.0012% to 0.0014% (Cook 2003).

Water temperature can affect the growth rate and survival of steelhead. Exposure to short duration of high temperatures can cause mortality and long-term exposure to elevated temperatures can retard growth. Dive surveys were conducted in late summer when annual temperatures and potential stress on steelhead were highest (Cook 2003). Maximum water temperatures of study reaches generally increased with distance downstream and had similar patterns in temperature fluctuations. The weekly maximum temperature ranged from 17.8 to 22.0°C during July to September 2002.

3.6.3 California Coastal Chinook Salmon

Chinook Salmon occupy the upper and lower Russian River seasonally from the estuary upstream into the West Fork Russian River, as well as Dry Creek. Chinook Salmon have been documented to spawn in some tributaries to the Russian River, but usage of tributaries appears to be limited. Chinook Salmon primarily spawn in the Russian River, upstream of Healdsburg. Adult Chinook Salmon have been observed at the Mirabel fish counting station as early as the last week in August through at least early February; however, the adult upstream migration consistently peaks in October and November (Chase et al. 2007; Martini-Lamb and Manning 2014).

Chinook Salmon exhibit two main life history strategies: “ocean type” and “river type”. Ocean type fish typically are fall or winter run fish that spawn shortly after entering freshwater, and their offspring emigrate shortly after emergence from the redd. California Coastal Chinook Salmon are fall-run, ocean-type fish. Chinook Salmon in the California Coastal Chinook Salmon ESU generally remain in the ocean for 2 to 5 years and tend to stay along the California and Oregon coasts. California Coastal Chinook Salmon usually enter rivers from August to January. These fall-run Chinook Salmon typically enter freshwater at an advanced stage of maturity, move rapidly to their spawning areas on the mainstem or lower-river tributaries, and spawn within a few weeks of freshwater entry. Spawn timing is, in part, a response to stream flow characteristics, with most spawning occurring in November and December.

Chinook Salmon eggs incubate for 90 to 150 days, depending on water temperature. Successful incubation depends on several factors including DO levels, temperature, substrate size, amount of fine sediment, and water velocity. Maximum survival of incubating eggs and pre-emergent fry occurs at water temperatures between 5.6 and 13.3°C with a preferred temperature of 11.1°C. Fry emergence begins in December and continues into mid-April (Leidy 1984).

After emergence, Chinook Salmon fry seek out areas behind fallen trees, back eddies, undercut banks, and other areas of bank cover. As they grow larger, their habitat preferences change (Everest and Chapman 1972). Juveniles move away from stream margins and begin to use deeper water areas with slightly faster water velocities but continue to use available cover to minimize the risk of predation and reduce energy expenditure. Fish size appears to be positively correlated with water velocity and depth (Chapman and Bjornn 1969).

Optimal temperatures for both Chinook Salmon fry and fingerlings range from 12 to 14°C, with maximum growth rates at 12.8°C (Boles 1988). Chinook Salmon feed on small terrestrial and aquatic insects and aquatic crustaceans. Cover, in the form of rocks, submerged aquatic vegetation, logs, riparian vegetation, and undercut banks provide food, shade, and protection from predation. Ocean-type pre-smolt Chinook Salmon migrate downstream immediately after emerging from spawning beds and may take up residence in estuaries while they complete their transition to smolts. Juvenile Chinook emigrate through the Russian River from approximately late-February through July, with peak emigration from mid-April through mid-May.

The Chinook Salmon Spawning Study in the Russian River was conducted by Sonoma Water based on redd surveys in the upper Russian River basin during fall 2002 to 2007, and video monitoring of migrating adult Chinook Salmon conducted as part of the Sonoma Water's Mirabel Inflatable Dam/Wohler Pool Fish Sampling Program. Chinook Salmon redd surveys were initiated after video monitoring indicated a peak in adult Chinook Salmon migration. The study area included approximately 114 km of the Russian River mainstem from Riverfront Park (40 rkm) located south of Healdsburg upstream to the East and West Forks of the Russian River (154 rkm) near Ukiah. River kilometers (rkm) were linear river distances and were measured from the river at the Pacific Ocean or creek mouth (0 rkm) upstream (Cook 2008). The northern boundary near Ukiah for this study area was similar to the Upper Russian River Steelhead Distribution Study conducted in 2003.

Based on the observational data from redd surveys during the fall from 2002 to 2007, redd numbers in the Russian River mainstem were highest during 2002 at 1,036 redds and were as low as 402 redds in 2006. In 2007, there was a slight increase over the previous year with 406 redds recorded. Redd numbers in Dry Creek have ranged from 201 to 342 redds with no apparent pattern with mainstem annual redd abundances. Redd counts in 2007 were 231 in Dry Creek. Based on reach length, the relative contribution of redds in Dry Creek was proportionately greater than in the Russian River mainstem. The Dry Creek reach included 16.0% (21.7 rkm) of the study area compared to 84.0% (113.9 rkm) of the upper Russian River mainstem. However, Dry Creek contributed from 22.1% to 38.0% of the redds observed annually. During 2007, Dry Creek contributed 36.3% of the observed redds in the study area, which is the second highest contribution since 2003 (Table 3-4; Cook 2008).

Table 3-4. Chinook Salmon Redd Abundances by Reach, Upper Russian River and Dry Creek, 2002-2007

Reach	Reach (rkm)	Redd Observations					
		2002	2003	2004	2005	2006	2007
Lower Healdsburg (River Park- Dry Cr)	8.2	6	0	7	*	1	2
Upper Healdsburg (Dry Creek-AV Rd)	25.6	79	40	8	*	23	67
Alexander (AV Rd-Sulphur Creek)	26.2	163	213	90	*	62	131
Canyon (Sulphur Cr-Hwy 101)	20.8	277	190	169	*	68	88
Ukiah (Hwy 101-Forks)	33.1	511	458	284	*	248	118
Russian River Subtotal	**113.9**	**1036**	**901**	**558**		**402**	**406**
Dry Creek (Russian River- WS Dam)	21.7	*	256	342	*	201	231
Total	**135.6**		**1157**	**900**		**603**	**637**
Relative Contribution of Redds							
Russian River	84.0%		77.9%	62.0%		66.7%	63.7%
Dry Creek	16.0%		22.1%	38.0%		33.3%	36.3%
Total	100%		100%	100%		100%	100%

Note: *Survey either not conducted or incomplete.
Source: Cook 2008

In general, the abundance of redds progressively increased upstream in the Russian River mainstem and this pattern occurred annually. Most of the Chinook salmon spawning occurred in the upper Russian River mainstem and in Dry Creek. The Lower and Upper Healdsburg reaches had relatively low frequencies of redds compared to the Alexander Valley, Canyon, and Ukiah reaches located upstream. Based on those survey years Ukiah reach has been the most productive for Chinook Salmon along the mainstem. The below-normal rainfall in 2007 resulted in reduced water releases from CVD at Lake Mendocino that may have influenced the distribution of spawning in upper Ukiah reach. Chinook Salmon redds were typically concentrated in the Ukiah and Dry Creek reaches near the termini with dams. Releases of relatively cool, high flows of water from these dams are strong attractants for migrating Chinook Salmon. Also, the gradient and relatively higher flows appear to provide good spawning substrate in these reaches, although substrate particle size and embeddedness in these reaches has not been quantified (Cook 2008).

3.6.4 Burke's Goldfields

Burke's goldfields (*Lasthenia burkei*) is state- and Federally-listed as endangered. It is an annual herb in the Aster family (Asteraceae) with a blooming period that extends from April to June. This plant grows in meadows, seeps vernal pools, and swales and occurs in Mendocino, Sonoma, Lake, and Napa counties.

The margins of the Russian River may contain seasonal wetlands, which may provide suitable habitat for Burke's goldfields. The study area contains sparse patches of marsh and grassland, which are potential habitat for the Burke's goldfields but likely experience inundation and flow velocities that would preclude its presence. The closest known occurrence was reported in 2010 near Coyote Valley Dam. Given the potential presence of suitable habitat and proximity to an occurrence record near CVD; however, there is no occurrence of this species in the action area. Therefore, this species is not advanced for effects analysis in Section 4.

3.6.5 Northwestern Pond Turtle

Northwestern pond turtle (*Actinemys marmorata*) is proposed to be Federally-listed as threatened. Since the petition for listing under ESA in July 2012, the western pond turtle was split into two separate species: the northwestern pond turtle and southwestern pond turtle (*Actinemys pallida*). The current range of the northwestern pond turtle includes populations from the San Joaquin Valley north, all populations in California north of the middle of Monterey Bay, the Coastal and Cascade Ranges of Oregon and Washington State, and an outlying population in Nevada (USFWS 2023). This aquatic turtle lives in streams, ponds, lakes, and permanent and ephemeral wetlands. Pond turtles spend most of their lives in water, but they also require terrestrial habitats for nesting. Western Pond turtles are omnivorous. They eat a variety of insects, tadpoles, frog eggs, snails, leeches, aquatic beetles, dragonfly larvae and fish. Plant foods include filamentous algae, lily pods, tule and cattail roots (USFWS 2024).

Female pond turtles usually reach sexual maturity around 10-15 years of age. Males mature quicker at 8-12 years. Mating in the wild takes place in the spring and sometimes in the fall. Nesting occurs from late May until the middle of July. Females find a suitable site, usually with dry soil, sparse vegetation and a southern exposure. The female digs a hole for the nest - first by softening the soil with urine and then scooping out the soil using her hind feet, one after the other. Once the site is prepared, she deposits a clutch of 3 to 13 eggs. After laying the eggs, the hole is filled with a mixture of vegetation and dirt to provide an air space, then covered with wet soil to keep the eggs in a humid environment. This slow process can take anywhere from two to four hours. The eggs incubate naturally underground for 90-130 days, depending on summer temperatures (USFWS 2024).

Western Pond Turtle is the only freshwater turtle endemic to California (MCRCD 2024). The Western Pond turtles occupy the shallow lake and river areas, and may be present along the lake's edge, shallow lake area and/or riparian habitat downstream of CVD; however, this species would not be affected by the Proposed Action because reservoir storage and releases would not fluctuate more than the existing operating ranges. Therefore, this species is not advanced for effects analysis in Section 4.

3.7 Cultural Resources

3.7.1 Area of Potential Effects

Section 106 of the National Historic Preservation Act (NHPA) requires Federal agencies to consider the effects of a proposed undertaking on properties that have been determined to be eligible for listing or are listed in the National Register of Historic Places (National Register). The regulations implemented for the NHPA by the Advisory Council on Historic Preservation fall under Protection of Historic Properties 36 C.F.R. § 800. For purposes of complying with Section 106 of the NHPA, 54 U.S.C. § 306108, a Federal agency will decide the Area of Potential Effects (APE) for the project or undertaking. The APE is defined under 36 C.F.R. § 800.16(d) as "the geographic areas or areas within which an undertaking may directly or indirectly cause alterations in the character or use of historic properties, if any such properties exist.” Additionally, the APE “is influenced by the scale and nature of an undertaking and may be different for different kinds of effects caused by the undertaking”. The APE was defined by USACE based on the geographical area where alternatives would have direct and indirect impacts to cultural resources, and encompasses the reservoir and flood control pool.

An overview of archaeological, ethnographic, and historic resources within the APE is summarized from the following report completed for the USACE by SRI, Inc. in 2011: *American Recovery and Reinvestment Act 2009 Section 110 Compliance Report for the U.S. Army Corps of Engineers, San Francisco District: Section 110 Survey and Condition Assessment of 15 Sites at Lake Mendocino, Mendocino County, California*. Figure 3-10 presents the APE for this project.

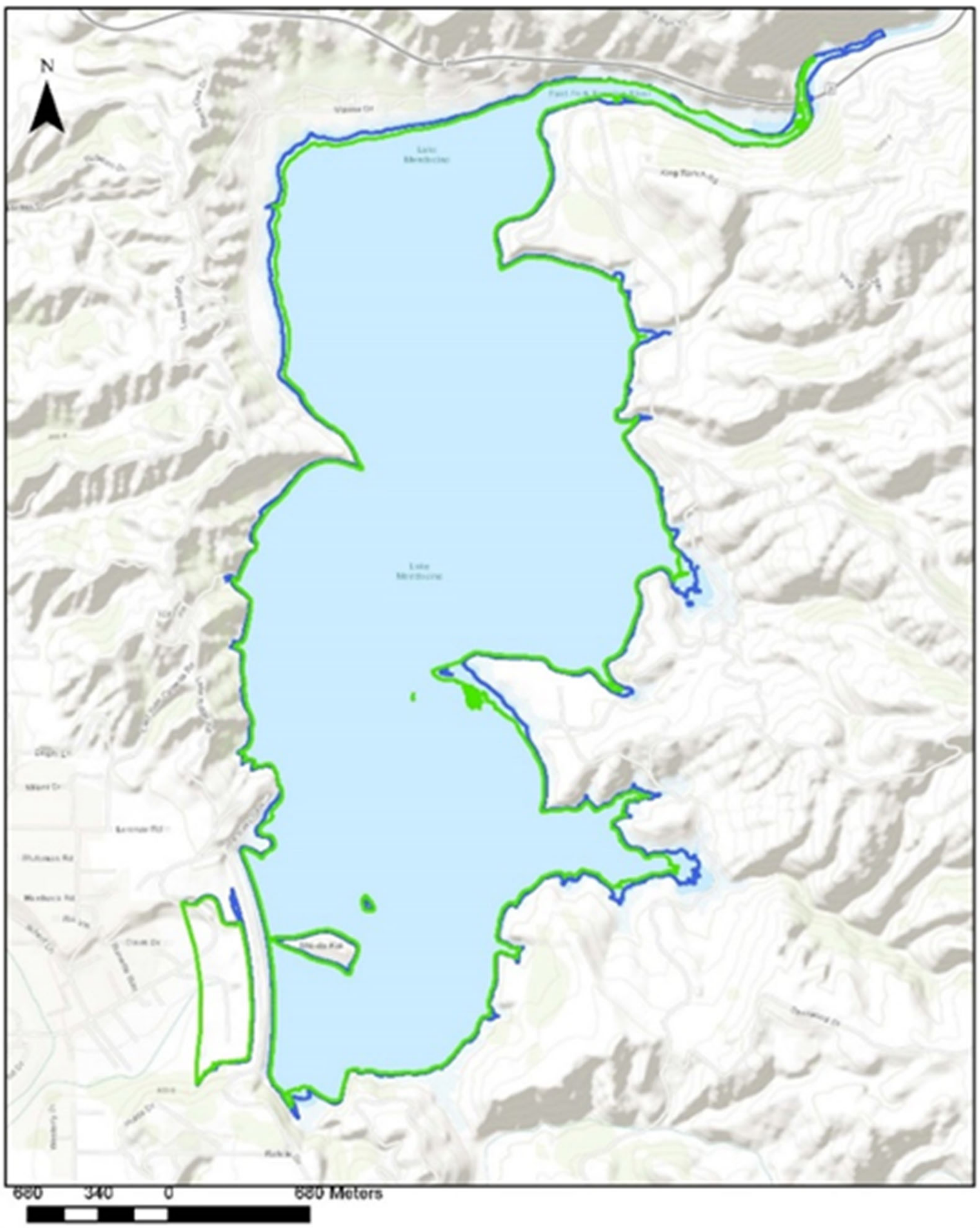


Figure 3-10. Area of Potential Effects for the Undertaking

The availability of natural resources in the Lake Mendocino area shaped the nature of human activities within the region. Before the mid-nineteenth century, the effects of Spanish and Russian activities in the San Francisco Bay region and along the Pacific coast slowly rippled inland to Native Americans living in the Russian River Valley. Changes to Native American's traditional lifeways, which were already extensive, increased rapidly with Mexican and American settlement. First, large Mexican ranchos and, later, smaller family-owned ranches transformed the region, including the project area, into an agricultural area. Viticulture, which made the Russian River Valley famous during the twentieth century, was late to arrive in Mendocino County.

Preconstruction studies focused on identifying cultural resources and archaeological sites of the Coyote Valley Dam and Lake Mendocino area were initially limited, comprising pedestrian inventories conducted in 1948 by Fenenga through the Smithsonian Institution's River Basin Surveys and further coordinated by the National Park Service in 1957 by Treganza, who identified 16 additional archaeological sites and conducted salvage archaeological excavations at CA-MEN-405 (Treganza 1958). These early cultural resource investigations were not comprehensive and were either underfunded or limited in scope. Subsequent archaeological and ethnographic investigations within the project area were undertaken through contracts by the USACE after the dam's completion and Lake Mendocino's filling to better understand the condition of these sites after inundation. Anuskiewicz (1974) conducted a shoreline survey of Lake Mendocino, followed by two comprehensive reports commissioned in 1976-1977 by the USACE to locate, identify, describe, and evaluate cultural resources from both precontact and historical time periods, fulfilling the requirements of Executive Order 11593 (Fredrickson and Origer 1977; Peri and Patterson 1977).

The project area has also been the subject of three studies examining the impact of freshwater immersion on cultural resources, authored by Bingham and Schultz (1977), Frederickson et al. (1977), and Stoddard and Frederickson (1978). Since the mid-1970s, no major archaeological programs have been initiated in Coyote Valley (Rockman 2010). By the early 1980s, Fredrickson (Moratto 1984) reported over 1,000 archaeological surveys and more than 100 tested sites within the broader Russian River Sub-Region, yet significant portions, including the CVD–Lake Mendocino area, remained largely unexplored. In 1997, concerns over vandalism and rising lake levels prompted minimal USACE-funded efforts to develop a historic context, recordation, and evaluation for the former Garzini Winery on Lake Mendocino's western edge. The Garzini Winery was evaluated for eligibility to be listed as a historic property on the National Register and potentially qualifies under Criterion B for its historical significance and under Criterion D for possible subsurface archaeological materials dating from 1911 to 1936.

Recent regional archaeological research relevant to understanding the cultural and chronological aspects of the study area includes studies by White et al. (2002) at Clear Lake to the southeast and at the Warm Springs Dam-Lake Sonoma project to the south (see Praetzellis et al. [1985] for a summary and references). Hildebrandt (2007) has provided an overview of archaeological research in northwestern California, focusing on Mendocino, Lake, and Sonoma Counties. Ongoing research in the area primarily serves compliance-related purposes, addressing state and federal mandates for cultural resource management in support of both private and public development initiatives.

3.7.2 Historic Properties

An archival search was conducted of records on file at the USACE San Francisco District offices. Within the APE there are 31 sites identified and 20 reports associated with the Lake Mendocino project over the past 6 decades. Within USACE lands at CVD-Lake Mendocino, 15 archaeological surveys, three historical overviews, three testing programs, two survey and testing investigations, two inundation studies, one ethnohistorical study, and one planning study have been conducted (Protas et al. 2001; Rockman 2010). Over the past 50-60 years, 31 sites have been identified, though the varying scope and intensity of these studies, compounded by fluctuations in lake levels since the reservoir's filling in 1957-1958, have led to some discrepancies in total resource counts.

Historic properties in the project area include several known ethnographic village locations and two twentieth-century Native American rancherías. A number of archaeological sites have been attributed by Fenenga (1948) and Treganza (1958) to specific villages identified by Barrett (1908) and Stewart (1943) within Coyote Valley. Various monographs on Pomo culture may provide important interpretative context for the identification and evaluation of archaeological sites (e.g., Barrett 1908, 1916, 1917; Gifford and Kroeber 1937; Kniffen 1939; Loeb 1926; Stewart 1943).

In 1974, Anuskiewicz completed a shoreline survey of Lake Mendocino for USACE, aiming to relocate sites documented by Fenenga and Treganza. Anuskiewicz identified nine sites that were inundated and successfully relocated four previously recorded sites, while also identifying four new sites along the eastern shore. Fredrickson and Origer (1977) subsequently conducted a follow-up survey, relocating two additional sites, identifying an archaeologically sensitive area, and documenting historical-period resources. Of the 16 prehistoric sites on USACE land, 14 were inundated, highlighting the impact of reservoir filling on archaeological resources.

3.7.3 Tribal Consultation and Traditional Cultural Properties

Historically, tribal consultation has been instrumental in identifying sites of religious and cultural significance to the Coyote Valley Band of Pomo Indians, now referred to as the Coyote Valley Tribe. Members of the Tribe are the descendants of the Chodakai Pomo, who have inhabited the region for over 11,800 years (USACE 2011). In 1909, the Bureau of Indian Affairs purchased land in Coyote Valley for the Native Americans of the Ukiah Valley. The land would be known as the Coyote Valley Rancheria, which was made up of 101-acres and consisted of three distinct sections: rivers bottom, sloping hillside, and a flat terrace land overlooking the river. According to residents of the Rancheria, there were live oaks and white oaks growing in isolated and dense groves on the bottomland. On July 10, 1957 Congress enacted HR 6692 which would terminate the Secretary of the Interior’s supervision over the Coyote Valley Indian Reservation and authorized USACE to construct the Coyote Valley Dam. This authorization resulted in the flooding of the area to create Lake Mendocino and ultimately displaced the Tribe and terminated their federal recognition status. The Tribe successfully regained federal recognition decades later.

Central to the Tribe's priorities are ensuring access to medicinal and beneficial plants, as well as the conservation and preservation of these significant resources. Moreover, the Tribe is committed to actively participating in the public interpretation of both the natural environment and the cultural heritage of their ancestral lands, as well as the identification and protection of any submerged cultural resources within Lake Mendocino.

3.8 Aesthetics and Recreation

3.8.1 Aesthetics

Lake Mendocino is located on the East Fork Russian River near Ukiah. Water-based boating, swimming, fishing, and camping are popular at Lake Mendocino. The reservoir is surrounded by views of oak woodland hills. A 15-mile network of trails can be used to hike, bike, or horse ride, and provides access to a 689-acre wildlife management area where native wildlife can be viewed on the east side of the reservoir. The wildlife management area is also accessible by boat or by driving or walking down Inlet Road. Fishing is popular at Lake Mendocino (USACE 2015). The public can view the reservoir from multiple view points along the trail network near the reservoir, as well as from boats on the reservoir. Under the reservoir operations according to the existing WCM, the conservation space elevation fluctuates seasonally, with corresponding change in the viewshed at the reservoir.

3.8.2 Recreation

USACE operates Lake Mendocino recreational facilities, which offer a variety of recreational activities, including boating, water skiing, swimming, camping, fishing, hunting, picnicking, mountain biking, horseback riding, and sightseeing. Lake Mendocino recreation facilities are open year-round; however, the summer months from June through August are the most popular time for boating activities on the reservoir. Fishing for Striped Bass, sunfishes such as Largemouth Bass, Smallmouth Bass, Crappie, and Bluegill, and catfish is popular at Lake Mendocino.

Lake Mendocino offers four large day-use areas with covered picnic shelters and barbeques (Figure 3-11). Camping at Lake Mendocino is available at Kyen Campground, Bushay Recreation Area, Chekaka Recreation Area. Kyen Campground offers 102 campsites, Bushay Recreation Area offers over 100 campsites, and Chekaka Recreation Area offers 17 campsites. There are approximately 15 miles of trails around Lake Mendocino that are accessible to mountain bikers and hikers. Horseback riders are allowed on designated trails. Lake Mendocino provides 1,750 surface acres of water that are accessible by canoe, sailboat, motorboats, or other water vessels. Boat launching is provided at public boat ramps located at the northern end of Lake Mendocino off of Marina Drive (North Boat Ramp) and at the southern end of Lake Mendocino near Coyote Valley Dam (South Boat Ramp).

Many of the recreation facilities were built at or slightly above 748 feet mean sea level (msl). Inlet Road was built at approximately 750 feet msl. Under the existing conditions, approximately 30% of the time, during winter months, Inlet Road floods and Bushay Recreation Area is closed due to inaccessibility. High lake levels can continue into late spring and early summer, prolonging inaccessibility to these areas.

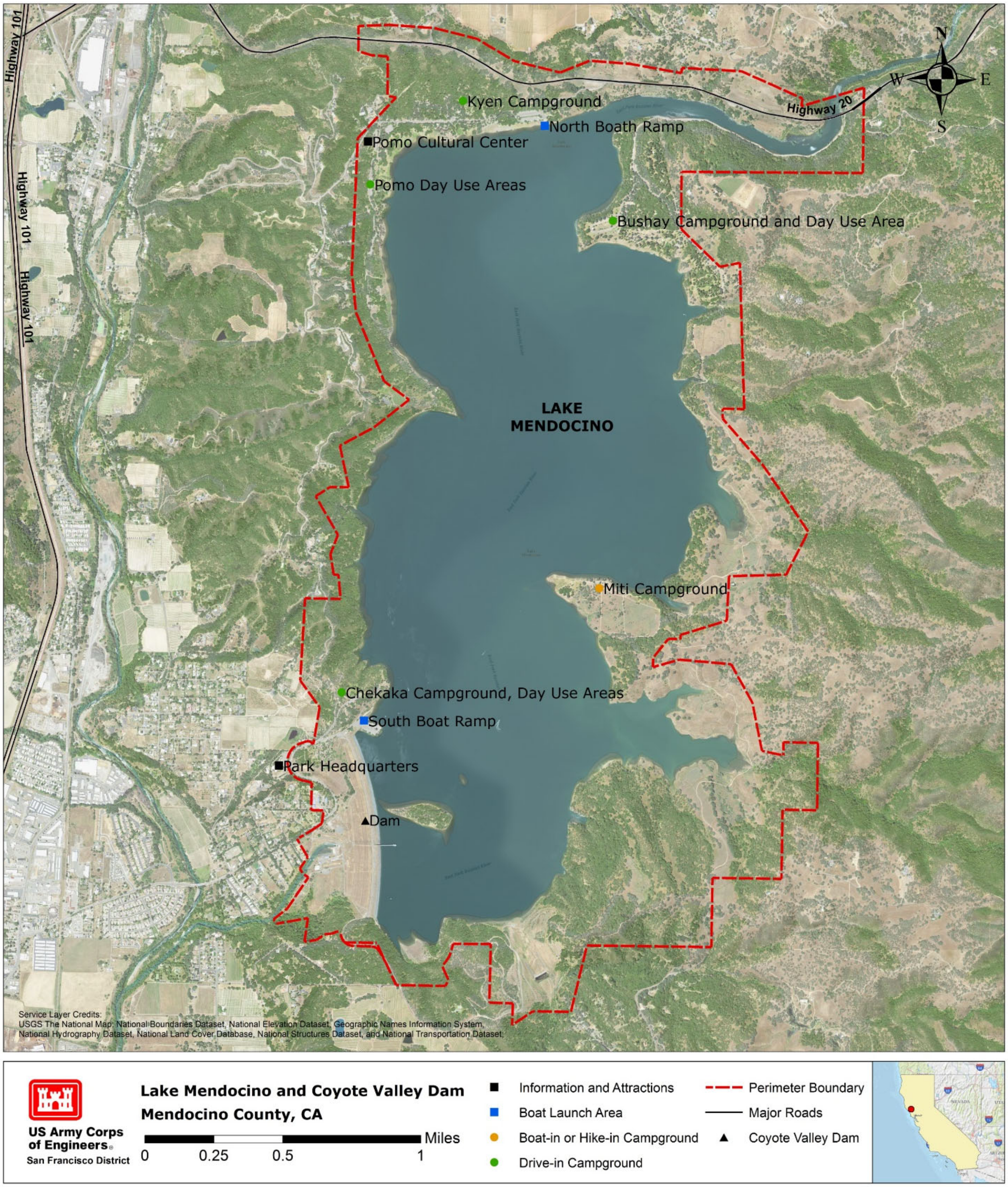


Figure 3-11. Recreation Areas at Lake Mendocino

3.9 Public Services and Utilities

3.9.1 Water Supply and Deliveries

Lake Mendocino is a crucial drinking water source for several cities, including Ukiah, Healdsburg, Cloverdale, and Hopland. Additionally, it supplies water to Sonoma Water’s Russian River water supply system which has two major reservoir projects: Lake Mendocino on the East Fork of the Russian River and Lake Sonoma on Dry Creek. Sonoma Water controls and coordinates water supply releases from Lake Mendocino and Lake Sonoma in accordance with its water rights permits and the requirements of SWRCB’s Decision 1610. Decision 1610 establishes minimum instream flow requirements for the mainstem Russian River and Dry Creek. Sonoma Water makes releases to meet downstream demands from agricultural, commercial, and residential individual water uses and other public water systems and to maintain minimum instream flow requirements for beneficial uses, including recreation and fish habitat.

Sonoma Water has constructed six collector wells adjacent to the Russian River. Collectors 1 and 2 were constructed in the late 1950s and are located near the Wohler Bridge. Collectors 3, 4 and 5 were constructed between 1975 and 1985, and are located near Mirabel Park. Construction of Sonoma Water's newest collector well, Collector 6, was completed in the spring of 2006. Groundwater is extracted by each collector well from the alluvial aquifer adjacent to and beneath the Russian River. A typical collector well has a 13-foot to 18-foot diameter concrete caisson (pipe) extending approximately 80 feet below the surface of the natural streambed. Six to 12 horizontal intake laterals (perforated pipes) ranging from 8-inch to 18-inch in diameter extend radially from the bottom of each caisson into the aquifer. Each collector well houses two large vertical turbine pumps equipped with electric motors that range from 1,000 to 2,000 horsepower.

Sonoma Water operates an inflatable dam on the Russian River in the Mirabel area to increase production capacity during peak demand months. Operation of the inflatable dam increases production capacity in two important ways. First, surface water immediately behind the dam can be diverted to a series of infiltration ponds that are constructed adjacent to the three Mirabel collector wells. Fish screening facilities ensure the safety of the fish in the river. Second, infiltration to the underlying aquifer behind the dam is significantly improved by increasing the recharge area from the river. Permanent fish ladders provide fish passage when the dam is raised. As a stand-by water source, seven vertical wells were constructed in the late 1990s near the Mirabel collectors, providing 7 to 10 million gallons per day (mgd) of back up capacity (Sonoma Water 2024a).

The aqueduct system consists of storage tanks, pipelines and booster (pump) stations and is designed to carry the anticipated (average) daily demand during peak demand. Maximum demand usually occurs during July or August.

3.9.2 Hydropower Generation

Mendocino County primarily relies on imported electricity and natural gas for most of its energy needs. However, there are two sources of locally produced electricity in the county (Mendocino County General Plan 2020):

- PG&E's PVP on the Eel River
- LMHPP on the East Fork Russian River

The LMHPP is located within the study area, and owned and operated by City of Ukiah. Neither Sonoma Water nor USACE participates in the operation of the LMHPP. The LMHPP was added as an external facility to the downstream base of CVD which was not originally designed to supply a hydroelectric plant, and was completed in May 1986. The LMHPP has a total generation capacity of 3.5 MW through two generators rated at 1 MW and 2.5 MW. City of Ukiah is a member of the Northern California Power Authority (NCPA) and operates the project under a 50-year FERC license issued April 1, 1982 (Project No. 2481-001). The LMHPP supplements other sources within Ukiah's power system and has no contractual minimum output requirements to maintain. The average annual energy Ukiah can expect from the LMHPP is estimated to be 17.66 GWh with an estimated annual plant utilization factor of 0.58.

The power output of the LMHPP is determined by the amount of water released from CVD for water supply, minimum instream flow requirements, and flood control, rather than power generation needs. The LMHPP became dormant in 1998 due to various design and operational restrictions but was subsequently upgraded with more modern equipment. During 2005, the City of Ukiah worked with NMFS to develop an operations plan to minimize impacts to salmonids in the Russian River during hydroelectric operations. NMFS technical assistance focused on potential effects to salmonids during the transitions between flood and power operations. The City of Ukiah, NCPA, and NMFS established the operations plan that included operation criteria to reduce potential effects to listed salmonids. Structural modifications to the Tainter gate at Lake Mendocino by the City of Ukiah briefly suspended the operation of the plant before resuming operations in January 2007, but the LMHPP has been operating without any interruption since then.

3.10 Climate and Weather

Climate in the Russian River watershed is influenced by the watershed's proximity to the Pacific Ocean. Precipitation patterns within the watershed reflect a Mediterranean climate, with hot, dry summers and cool, wet winters. Climatic conditions vary across different portions of the watershed. Mean daily summer temperatures range from 72 to 75°F inland (with maximum temperatures in excess of 90°F) to 61 to 64°F near the coast, while precipitation normally falls during the wet season (October to May) with a large percentage of the rainfall typically occurring during three or four major winter storms. These major storms often come in the form of an AR, which is the horizontal transport of large amounts of water vapor through the atmosphere along a narrow corridor. Although brief, ARs can produce 30 to 50% of the Russian River watershed's annual precipitation during a few days (Flint et el. 2015). Rainfall tends to be heaviest at higher elevations near the coast, with average annual rainfall of 80 inches per year near Cazadero at the western edge of the watershed. In lower elevation valley areas, annual precipitation ranges from 22 inches per year near Santa Rosa to 41 inches per year at the City of Healdsburg. A significant part of the region is subject to marine influence and fog intrusion. Prevailing winds are from the west and southwest.

The Climate Assessment for WCM Updates for CVD and Warm Springs Dam (WSD) was conducted to satisfy Section 4-05 of Engineering Regulation (ER) 1110-2-8156, *Preparation of Water Control Manuals.* The Climate Assessment identified potential climate and weather vulnerabilities for water management activities and dam/reservoir operations at the CVD and Lake Mendocino Project on the Russian River, and the WSD and Lake Sonoma Project on Dry Creek (USACE 2024b).

Based on the Climate Assessment, projections of future climate show strong consensus on increases in future temperature, and moderate consensus on increases in future precipitation. There is little to no consensus related to trends in future streamflow. While the total amount of annual precipitation is not necessarily projected to increase, the proportion of that annual precipitation that comes from ARs is projected to increase. Also, the intensity of individual AR events is projected to increase in the study area. Projections of future stream flows are mixed and depend on the climate model and its assumptions. Observed trends in streamflow vary by season, but some evidence exists of increasing flows on average (USACE 2024b).

3.11 Communities in the Study Area

The City of Ukiah is the largest city in proximity to the study area, and most of population who can regularly visit the recreation facilities in Lake Mendocino may live in and around the City of Ukiah. As of the 2020 Decennial Census, the City of Ukiah had a total population of 16,607 people. In 2020 the median age in Ukiah was 38.9 years while the median age in California was 37.9 years. The estimated median household income in Ukiah in 2022 was $62,934 while the median household income in California was $91,551 (U.S. Census Bureau 2020). According to the 2022 American Community Survey, the 5 largest ethnic groups in Ukiah are White (Non-Hispanic; 55.3%), White (Hispanic; 15.5%), Other (Hispanic; 11.6%), Multiracial (Hispanic; 8.2%), and Asian (Non-Hispanic; 3.16%).

According to the 2022 American Community Survey, the economy of Ukiah employs 7,260 people. The largest industries in Ukiah are Health Care & Social Assistance (1,374 people), Retail Trade (1,053 people), and Accommodation & Food Services (786 people), and the highest paying industries are Transportation & Warehousing ($79,191), Public Administration ($73,750), and Transportation & Warehousing, & Utilities ($72,297). From 2021 to 2022, employment in Ukiah declined at a rate of −2.19% from 7.43k employees to 7.26k employees (U.S. Census Bureau 2020).

4 ENVIRONMENTAL CONSEQUENCES

This section describes the potential effects (both positive and negative) on human environment with and without implementing the Proposed Action. An impact is considered significant if it has an adverse and unmitigable effect to any resource relative to the existing conditions described in Section 3. Analysis of No Action alternative is required under NEPA to provide a comparative baseline for effects against the Proposed Action. Under the No Action alternative, the existing WCM would not be altered. Under the Proposed Action, the CVD-Lake Mendocino WCM would be updated with the implementation of Lake Mendocino FIRO procedures in making decisions whether to retain or release water to allow discretionary encroachment into flood control space.

4.1 Environment Not Considered in Detail

As mentioned in Section 3.1, the initial evaluation of No Action and Proposed Action alternatives indicated little to no effect on several resources for the following reasons:

- **Geomorphology, Seismicity and Soils:** No impact in the study area is expected under No Action and Proposed Action alternatives because there is no ground-disturbing activity involved such as excavation. The channel maintenance work activities prescribed in the existing WCM such as sediment removal and debris clearing, vegetation management, and streambank stabilization would remain unchanged; therefore, there is no incremental adverse impact for the No Action and Proposed Action alternatives compared to the existing conditions.
- **Air Quality:** Neither of the two alternatives would result in emissions of criteria pollutants or greenhouse gases from equipment, processes, or vehicles either on- or off-site. Therefore, no National ambient air quality standards and emission limits would be violated and the No Action and Proposed Action alternatives would not alter the attainment status of MCAQMD.
- **Land Use:** Neither of the two alternatives would propose any conversion of land use type or creation of incompatible land use types; therefore, there is no effect on land use under the No Action and Proposed Action alternatives.
- **Noise:** Neither of the two alternatives would expose persons to or generate noise levels in excess of standards established in county or city plans, ordinances, or applicable standards of other agencies. In addition, they would not expose persons to or generate ground-borne vibration or ground noise levels, or substantially increase ambient noise levels. The implementation of the Lake Mendocino FIRO Procedures would not affect noise levels in the Lake Mendocino recreation areas. Therefore, there is no effect on noise under the No Action and Proposed Action alternatives.
- **Transportation:** Neither of the two alternatives would involve any new construction and result in an increase in traffic over the existing traffic load or exceedance in existing road capacity. Therefore, there is no effect on traffic or transportation under the No Action and Proposed Action alternatives.
- **Greenhouse Gas Emission:** Neither of the two alternatives would increase GHG emissions.

4.2 Hydrology and Hydraulics

For the purposes of this analysis, an effect on hydrology and hydraulics may be considered significant if an alternative would result in:

- Increased effects on the community from flooding; or
- Violation of laws or regulations adopted to protect or manage the water resource system in the study area.

4.2.1 No Action

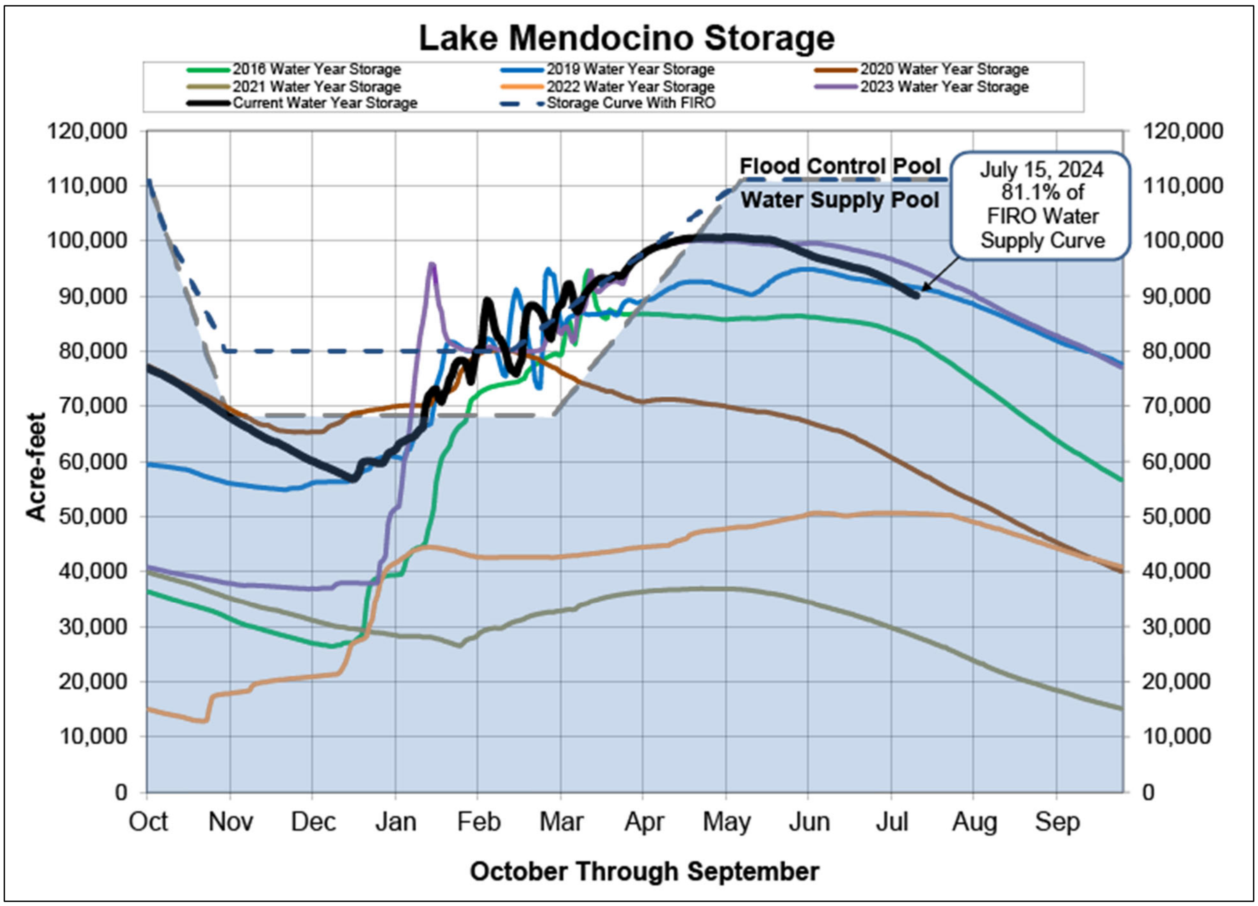
Under the No Action alternative, USACE would not approve the proposed WCM update. As a result, the flood control releases from Lake Mendocino would continue to be made in accordance with the operating rules and instructions contained in the existing WCM. As prescribed in the existing WCM, the volume of water stored in the reservoir could range up to 68,400 acre-feet between November 1 and March 1. Storage above the Winter TOC (i.e., 68,400 acre-feet) would always be evacuated as quickly as feasible. Issues related to the reduction in PVP water diversion from the Eel River to Russian River, and resultant low reservoir storage levels would remain unaddressed.

The Russian River basin frequently experiences both extremes of flood and drought because of the presence and absence of ARs originating in the Pacific Ocean. While floods are often caused by rainfalls resulting from high intensity or frequent ARs, droughts are caused by the absence of ARs. Therefore, there are high variations of unimpaired inflows to Lake Mendocino due to the natural cycles of periodic droughts and floods. Consequently, the reservoir water storage varies widely according to the inflows. The negative effects of the No Action alternative on hydrology and hydraulics would be associated with water scarcity during droughts. During droughts, flood control is not expected to be a principal factor in the operation of Lake Mendocino so that the water storage in the conservation space is managed by Sonoma Water in accordance with existing contracts. It is anticipated that the already compromised water supply would further diminish during drought years over time as climate and weather tend to cause more extreme droughts.

4.2.2 Proposed Action

Under the Proposed Action, operation decisions would be based on 5-day deterministic cumulative inflow volume forecasts provided by the CNRFC. In the absence of a large inflow forecast, the flood control pool could potentially be encroached by 11,650 acre-feet to a maximum allowable volume of 80,050 acre-feet at an approximate elevation of 744.0 feet NGVD29. This allowance for encroachment could begin on October 23 and end on February 15. After that, the spring refill of the reservoir would begin. The modification of reservoir operations under this alternative is only allowed within Flood Control Schedule 1 (as shown in Figure 1-1 in Section 1.2) for the purpose of enhancing water supply reliability during upcoming summer months. The decision to encroach into the Flood Control Schedule 1 space would be at the discretion of USACE's flood managers given that there is no large inflow forecast in the next 5 days as prescribed in the FIRO implementation flowchart (Figure 2-2 in Section 2.3).

Using historical hydrologic conditions and actual reservoir operations during major deviations in WY 2019, 2020, and 2021-2026, we can gain insights on the effects of the Proposed Action on the reservoir storage. Figure 4-1 presents Lake Mendocino storage data for WY 2016 (which is an assumed baseline based on the average hydrologic condition) and WY 2019 through WY 2023 (years of major deviation using FIRO). As indicated by water storage curves during drought years in WY 2021-2022, flood control was not a principal factor in the operation of Lake Mendocino, so that the major deviation using FIRO was not implemented since the reservoir storage curves were well below the Winter TOC. However, during non-drought years (WY 2019, 2020, and 2023) major deviation using FIRO was implemented and the reservoir storage was encroached into the flood control space. Because the major deviation allowed to retain more water during the wet winter season, the water supply pool was higher going into the dry summer season.



Source: Sonoma Water 2024b

Figure 4-1. Lake Mendocino Storage with Major Deviation using FIRO

The analyses conducted for the Lake Mendocino FIRO Final Viability Assessment and the WCM update both showed the FIRO based alternatives would either maintain or decrease the duration and magnitude of potential emergency spillway flow when compared to the baseline conditions (i.e., No Action alternative). Additionally, the FIRO based alternatives allow for USACE to partner with the local sponsor (Sonoma Water) to potentially release water from the conservation space (i.e., water supply space) of the reservoir in advance of forecasted significant storms, which is an action currently not allowed or contemplated as part of the baseline.

Similar to the major deviations, it is anticipated that the Proposed Action would have beneficial effects on reservoir storage by retaining more water when it is allowable and having better control of potential emergency spillway flow because of the Lake Mendocino FIRO decision-making tools and procedures.

4.3 Water Quality

For the purposes of this analysis, an effect on water quality would be considered significant if an alternative would result in:

- Substantial degradation of groundwater resources or long-term management or maintenance of the groundwater basin.
- Degradation of water quality potentially affecting beneficial uses, including degradation that would result in violation of any applicable water quality standard or waste discharge requirements.

4.3.1 No Action

Under the No Action alternative, the USACE would not approve the WCM update. As a result, the flood control releases from Lake Mendocino would continue to be made in accordance with the operating rules and instructions contained in the existing WCM. Issues of the reduction of annual water transfer from the Eel River to Lake Mendocino via PVP would remain unaddressed, and the large fluctuation of water surface elevation between floods and droughts would be compounded as effects of climate and weather progress over time. As a result, it is anticipated large swings of water temperatures and DO concentrations.

During prolonged, multi-year droughts such as 1976-1977, 2011-2017 and 2020-2022, there would be a higher risk of draining the reservoir and experiencing warmer water temperature and lower DO levels in the reservoir as well as the water released from the reservoir under this alternative, although it is anticipated that the elevated turbidity and mercury levels would remain similar to the existing conditions. Therefore, potential negative impacts to water quality under No Action alternative would be a high probability of exacerbating the temperature impairments of Lake Mendocino and the East Fork Russian River below CVD.

4.3.2 Proposed Action

Under the Proposed Action, the reservoir storage could potentially increase up to the maximum allowable volume of 80,050 acre-feet at 744.0 feet NGVD29 from October 23 to February 15. Also, the spring refill of the reservoir could begin on February 15 instead of March 1. Although the range of water surface elevations in Lake Mendocino would remain within the reservoir's existing operational levels, the Proposed Action would provide benefits to water quality by providing greater spring reservoir storage volumes and improving the ability to maintain a cold-water pool in the reservoir. In turn, cooler water release from CVD in late summer into the East Fork Russian River would have a beneficial effect on water temperature because it would reduce the probability of temperature limit exceedances and better support the designated beneficial use of cold freshwater habitat (COLD) and Rare, Threatened, or Endangered Species (RARE) for Lake

Mendocino, the East Fork below CVD and the Russian River mainstem. It is anticipated that the turbidity, DO and mercury levels would remain similar to the existing conditions.

Therefore, it is anticipated that there would be a beneficial effect to water temperature under the Proposed Action.

4.4 Fisheries

For the purposes of this analysis, an effect on fisheries may be considered significant if an alternative would result in:

- Substantial long-term direct and indirect adverse effects to native and resident species, or through habitat modification of those species.

4.4.1 No Action

Under the No Action alternative, USACE would not approve the proposed WCM update. As a result, the flood control releases from Lake Mendocino would continue to be made in accordance with the operating rules and instructions contained in the existing WCM. As the reduction of annual water transfer from the Eel River to Lake Mendocino via PVP and effects of climate and weather progress over time, the large fluctuation of water surface elevation between floods and droughts is anticipated; therefore, the fish communities in Lake Mendocino would be stressed by large swings of water temperatures and DO. During prolonged multi-year droughts, there would be a higher risk of draining the reservoir under the No Action alternative. With the lower water storage in the reservoir compared to the conditions that would be anticipated under the Proposed Action, water temperature would be warmer, and resident aquatic species, such as sunfish, would slowly be acclimated and have to adapt to higher water temperature to the extent tolerable. If the water temperature reaches beyond the threshold of species' tolerance level, the reservoir may become inhabitable to those warm water species.

4.4.2 Proposed Action

The Proposed Action would not alter the East Fork Russian River upstream or minimum instream flows downstream of Lake Mendocino, and would not impound additional reaches of the East Fork. Also, the Proposed Action is not associated with river flows on the West Fork of the Russian River. There are no anadromous fish species in the East Fork Russian River upstream of Lake Mendocino. However, the East Fork Russian River downstream of Lake Mendocino and the mainstem Russian River support listed anadromous salmon that rely on releases from the reservoir. These species are discussed further in Section 4.6 – Special-status Species.

The Proposed Action could potentially increase the size of the reservoir pool on a temporary basis (mainly in November-May) each year compared to the existing conditions (i.e., baseline) and No Action alternative. Resident, warm water species such as sunfish typically spawn in Lake Mendocino during spring months (typically beginning in late March) in relatively shallow water (approximately 0.5 to 6 feet depending on species). However, the reservoir storage and releases during the spring spawning season are not anticipated to fluctuate more than the range of existing operating conditions. The early beginning of the spring refill from February 15 as described in the

Proposed Action in Section 2.3 would precede the spawning season for sunfish and operations during non-spawning season would also be similar to the existing range of conditions in the reservoir. Therefore, the Proposed Action would not result in adverse impacts to fisheries resources.

4.5 Vegetation and Wildlife

For the purposes of this analysis, an effect on vegetation and wildlife may be considered significant if an alternative would result in:

- Significantly degrade established native vegetation.
- Significantly degrade native wildlife habitats or migratory wildlife corridors.

4.5.1 No Action

Under the No Action alternative, the USACE would not approve the requested WCM update. As a result, the flood control releases from Lake Mendocino would continue to be made in accordance with the operating rules and instructions contained in the existing WCM. There would be no effect on vegetation and wildlife species existing in the area of potential effect because current conditions would remain unaltered.

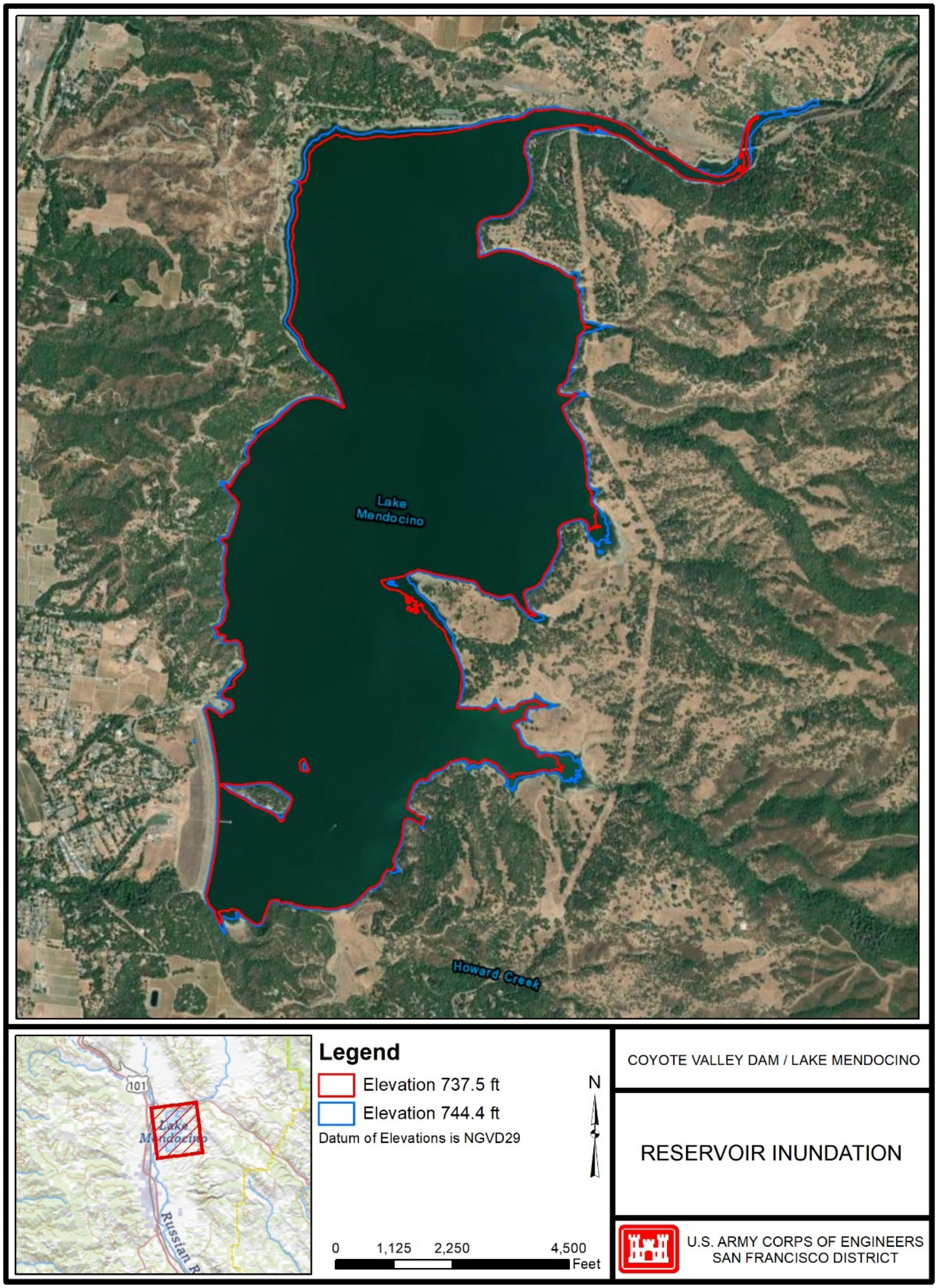
4.5.2 Proposed Action

As mentioned in Section 3.5, riparian and marsh habitat at Lake Mendocino is generally absent from the shoreline due to managed, fluctuating water levels. The shoreline is typically barren with an upland plant community at the high-water line. Changes in water releases from CVD would affect water levels in Lake Mendocino, however they are within the operational range of the existing WCM and the maximum water level would remain unchanged. This maximum water level determines the transition of the upper shoreline to upland vegetation. Because this maximum water level would remain the same as currently exists under existing conditions, the Proposed Action would not permanently remove or disturb sensitive native communities, nor would it significantly reduce the amount of native vegetation and wildlife habitat in the area.

Figure 4-2 presents the areas inundated by the existing Winter TOC at 737.5 feet at NGVD29 (a red polygon) and the maximum water level of discretionary encroachment into flood control space (744.4 feet at NGVD29; a blue polygon) allowed by the Proposed Action. The difference of these two polygon areas would be the additional area that would be inundated by the Proposed Action. Based on the Lake Mendocino Area and Capacity Curve, the area inundated by the 737.5 feet at NGVD29 (Winter TOC) is 1665 acres, and the area at 744.4 feet at NGVD29 is 1724 acres. The maximum additional area that would be inundated by the Proposed Action compared to that of the existing TOC is estimated to be 3.5%.

Downstream of Lake Mendocino, flows in the East Fork Russian River and mainstem Russian River would remain within the range of existing levels with extreme high winter flows and low summer flows potentially slightly moderated. Because the range of flows downstream of the reservoir would remain the same as existing conditions, the Proposed Action would not permanently remove or disturb sensitive native communities, nor would it significantly reduce the amount of native vegetation and wildlife habitat in downstream areas.

Based on the analysis above, the potential impact to vegetation and wildlife resulting from the additional inundation under the Proposed Action is considered less than significant; therefore, no mitigation is needed or proposed.



M:\GIS\PROJECTS\OPERATIONS\Lake_Mendocino\MXD\Water_Control_Manual_Update\Reservoir_Inundation.mxd

Figure 4-2. Comparisons of Reservoir Inundation at Maximum Allowable Conservation Elevation for No Action vs. Proposed Action

4.6 Special-status Species

For the purposes of this analysis, an effect on special-status species may be considered significant if an alternative would result in:

- Direct or indirect reduction in the growth, survival, or reproductive success of species listed or proposed for listing as threatened or endangered under the ESA; or
- Substantial long-term direct and indirect adverse effects through habitat modification of special status species and designated critical habitat

4.6.1 No Action

Under the No Action alternative, USACE would not approve the proposed WCM update. As a result, the flood control releases from Lake Mendocino would continue to be made in accordance with the operating rules and instructions contained in the existing WCM. As the reduction of annual water transfer from the Eel River to Lake Mendocino via PVP and effects of climate and weather progress over time, a large fluctuation of water surface elevation between floods and droughts is anticipated. As a result, large swings of water temperatures and DO concentrations are anticipated. During prolonged multi-year droughts, there would be a higher risk of draining the reservoir and warmer water temperature and lower DO levels occurring in the water released from the reservoir under the No Action alternative. Therefore, the potential negative impacts to Federally-listed salmonids under this alternative may be a short- or long-term habitat loss, and reductions in survival or reproductive success of those species due to high probability of exceeding lethal limits of water temperature and DO levels for listed salmonids in the upper Russian River.

Under the No Action alternative, turbidity issues would remain similar to the existing conditions described in Section 3.3.3. Turbidity releases in the spring and summer would be most likely to adversely affect rearing juvenile steelhead in the Russian River mainstem. Elevated turbidity levels could reduce visibility and impair feeding or the ability to detect predators. Increased energy expenditures would be required if it is necessary to clear sediment from the gills through flaring, etc. Juveniles that are present closer to CVD would be expected to experience the greatest impacts because the turbidity dissipates moving downstream. The USACE has formed a turbidity TAC to determine a path forward for addressing elevated turbidity levels in the Russian River, is conducting turbidity monitoring, and is planning a modeling effort to identify potential operational and structural (e.g., turbidity curtains, etc.) changes that could be implemented to reduce turbidity in CVD releases. Consultation with NMFS has been reinitiated on the larger Russian River Water Supply, Flood Control, and Channel Maintenance project (Russian River Project), and a new BO is expected in January 2025 which will include these and likely other turbidity-related reasonable and prudent measures.

4.6.2 Proposed Action

The Proposed Action is expected to result in conservation of the cold-water pool in Lake Mendocino, and would improve water temperatures in the upper Russian River for summer rearing of juvenile steelhead and the migration of fall-run adult Chinook Salmon compared to existing conditions. Juvenile steelhead rear year-round in freshwater streams, and the amount of cold-water summer rearing habitat is an important limiting factor affecting the recovery of Russian River steelhead. It is anticipated that the elevated turbidity and DO levels would remain similar to existing conditions (baseline).

As stated above in Sections 3.3.3 and 4.6.1, USACE has formed a turbidity TAC to determine a path forward for addressing elevated turbidity levels in the Russian River, is conducting turbidity monitoring, and will implement modeling to identify operational or structural changes that could be implemented to reduce turbidity in CVD releases. A new Russian River Project BO is expected in January 2025 which will include these and likely other turbidity-related reasonable and prudent measures. The BA supporting the new BO anticipates that the proposed WCM update will occur (see Appendix C of this document for more detail) and states the following:

> *USACE is proposing ongoing (modified) flood control operations associated with Planned Major Deviation to the 1986 Lake Mendocino Water Control Manual for WY 2021 through WY 2026[6], pending updates to the WCM, and application of forecast-informed reservoir operations (FIRO) procedures. Application of FIRO procedures will continue after the WCM has been updated.*

The proposed WCM update is a small part of the of the larger Russian River Project and as discussed in the BA is considered to be necessary and beneficial in light of the anticipated changes due to PVP. However, implementing the WCM update is considered a non-discretionary action in the BA, and although it is discussed, is not considered part of the consultation with NMFS. The USACE considers the impacts implementing the Proposed Action on ESA-listed salmon and steelhead or their designated critical habitat as less than significant.

4.7 Cultural Resources

Section 106 outlines the process in which Federal agencies are required to determine the effects of their undertakings on historic properties. Analysis of the potential impacts was based on evaluation of the changes to the existing historic properties that would result from implementation of the project. In deciding the effects to historic properties, consideration was given to:

- Specific changes in the characteristics of historic properties in the APE;
- The temporary or permanent nature of changes to historic properties;
- The introduction of visual, atmospheric, or audible elements that diminish the integrity of the property's historical features; and

[6] Please note that the Modified Hybrid EFO was used for the recent WY 2021-2026 major deviation; however, the proposed action for the WCM update uses a 5-day Deterministic Forecast method because it can be more seamlessly integrated into the USACE standard decision tools while providing similar water conservation and flood risk management benefits to the Modified Hybrid EFO.

- The existing integrity considerations of historic properties in the APE and how the integrity was related to the specific criterion that makes a historic property eligible for listing in the National Register.

The threshold also applies to any cultural resource that has not yet been evaluated for its eligibility to the National Register or if the Proposed Action disturbs a traditional cultural property. Analysis of potential impacts to cultural resources may be the result of physically altering, damaging, or destroying all or part of a resource, altering characteristics of the surrounding environment by introducing visual or audible elements that are out of character for the period the resource represents, or neglecting the resource to the extent that it deteriorates or is destroyed.

Analysis considers both direct and indirect impacts. Direct impacts refer to the causality of the effect to historic properties. This means that if the effect comes from the undertaking at the same time and place with no intervening cause, it is considered “direct” regardless of its specific type (e.g., whether it is visual, physical, auditory, etc.). Indirect impacts to historic properties are those caused by the undertaking that are later in time or farther removed in distance but are still reasonably foreseeable. Any adverse effects on historic properties are significant under Section 106 of the NHPA. Effects are adverse if they alter, directly or indirectly, any of the characteristics of a cultural resource that qualify that resource for the National Register so that the integrity of the resource's location, design, setting, materials, workmanship, feeling, or association is diminished.

4.7.1 No Action

Under the No Action alternative, USACE would not approve the proposed WCM update. As a result, the flood control releases from Lake Mendocino would continue to be made in accordance with the operating rules and instructions contained in the existing WCM. The No Action alternative would result in drawdown to the winter TOC, beginning on October 1 and completed by November 1. The increase in spring storage would begin on March 1 and be completed by May 10. No forecasts would be utilized. Storage above the rule curve would always be evacuated as quickly as feasible. FIRO’s goal to help restore some of the diminished water supply reliability without reducing the existing flood protection capacity of Lake Mendocino would not be met, and a maximum additional storage of 11,650 acre-feet between November 1 and February 28 would not be achieved. Because there would be no change to the current use of the flood control pool, there would be no effect on historic properties.

4.7.2 Proposed Action

The Proposed Action would use forecasting to provide water storage of up to 11,650 acre-feet into the flood control space, and USACE reservoir operators retain full operational control and authority. There would be a 5-day cumulative inflow volume threshold of 15,000 acre-feet. Remainder of flood control space above the encroachment curve only allows for temporary storage, consistent with the existing operation rules. This would bring the retention of storage up to 80,050 acre-feet at mid-winter. Above this storage level, excess water would be released according to the release constraints defined in the WCM. The Proposed Action again includes the option to conditionally draft into the water conservation space in advance of significant storm events. All water levels would be maintained within the storage space allowed by this deviation, and the USACE would have the discretion to utilize the additional information provided to inform reservoir operations. Under the Proposed Action, there would be no effect on historic properties since this flood pool has been utilized historically. No new analysis is required for this finding of effect.

4.8 Aesthetics and Recreation

For the purposes of this analysis, an effect on aesthetics and recreation may be considered significant if an alternative would:

- Substantially reduce or increase access and use of existing recreational facilities or their availability.
- Substantial degradation of visual character of the site.
- Result in physical deterioration of existing recreational facilities.
- Substantial damage to scenic resources.
- Creation of a new light or glare affecting daytime or nighttime views of the area.

4.8.1 No Action

Under the No Action alternative, the USACE would not approve the WCM update. As a result, the flood control releases from Lake Mendocino would continue to be made in accordance with the operating rules and instructions contained in the existing WCM. For some time of the year, temporary closures would occur to Inlet Road and Bushay/Kyen Recreation Areas when reservoir levels reach above 750 feet at NGVD29 under No Action alternative. These occurrences are in compliance with the existing WCM and would be considered part of the standard reservoir operations. The associated impacts would not be subject to any mitigation, as a result, these impacts would be considered less than significant.

4.8.2 Proposed Action

Lake Mendocino provide water-based recreational opportunities such as boating, swimming, fishing, and camping. The reservoir is surrounded by views of oak woodland hills. A 15-mile network of trails can be used to hike, bike, or horse ride, and provides access to a 689-acre Wildlife Management Area. The public can view the reservoir from multiple view points from the trail network near the reservoir, as well as from boats on the reservoir.

By allowing discretionary encroachment into flood control space from November 1 through February 15 each year, the Proposed Action could potentially increase the water level prior to a high demand recreational season so corresponding water level changes would affect the viewshed at the lake. However, it would be a temporary effect on visual resources compared to the baseline and the range of water level changes at Lake Mendocino would remain within the reservoir's existing range of operational water levels.

Because the Proposed Action could potentially allow more water storage in the reservoir, it would provide additional recreational opportunities with increased water elevations throughout the year. Higher reservoir water levels would increase visitors and provide picnic areas and campgrounds with enhanced access to the reservoir. Figure 3-1 in Section 3.1.3 presents the extent of the lake perimeter at high-water pool levels (i.e., blue dashed line). Under the Proposed Action, the frequency of higher water elevations that would extend longer into the recreational season could increase to approximately 50% of the time (Lake Mendocino Steering Committee 2020).

The quality of the recreational experience would be slightly diminished by the Proposed Action due to the inaccessibility of Inlet Road and Bushay/Kyen Recreation Areas due to temporary inundation of the access road. Based on the Final Viability Assessment of Lake Mendocino FIRO, the estimated average number of days per recreation season (101 days from Memorial Day to Labor Day) during which access to Bushay Campground is limited (i.e., pool elevation of 750 feet at NGVD29 is exceeded) would increase by approximately 58% to 38 days compared to 24 days under No Action alternative. In other words, the estimated average number of days recreation season when Bushay Campground is accessible would decrease by 18% to 63 days from 77 days under No Action alternative. Even though the closure of the Bushay/Kyen Recreation Areas may cause a short-term disturbance to a limited number of recreationists, the additional storage of water would ensure a longer recreation season with more water in the reservoir for the 4th of July and Labor Day holidays, providing enhanced recreational opportunities for more people. As a result, the temporary effects to recreation would be considered less than significant. No recreational facilities would be permanently lost as a result of the Proposed Action.

Since the potential disruption in access to the Bushay/Kyen Recreation Areas is temporary (Memorial Day to Labor Day) in nature mostly during wet years, and other recreation areas around the reservoir would be accessible and available to recreationists, providing similar recreational opportunities; therefore, the effect on recreation is considered less than significant, and no mitigation is proposed.

4.9 Public Services and Utilities

For the purposes of this analysis, effects on public services and utilities would be considered significant if an alternative:

- Interfere with emergency response plans or emergency evacuation plans;
- Result in inadequate emergency access or impediments to emergency services;
- Result in the net reduction in utility services provided; or
- Result in the net increase in public services required.

4.9.1 No Action

Under the No Action alternative, USACE would not approve the proposed WCM update. As a result, the flood control releases from Lake Mendocino would continue to be made in accordance with the operating rules and instructions contained in the existing WCM. The issues with compromised water supply due to the changes to the PVP water diversion from the Eel River would also unaddressed. Coupled with climate and weather effects such as prolonged droughts, Sonoma Water's water supply reliability and LMHPP's power production rates would be further diminished. Therefore, this alternative would have a negative effect to power generation at the

LMHPP and water supply reliability while it would have little to no effect to other public services such as emergency services and evacuation plans.

4.9.2 Proposed Action

The LMHPP at CVD is operated and maintained by the City of Ukiah Electric Utility Department. Under the Proposed Action, improved forecasting would allow dam operators to make moderate, sustained releases for longer time periods ahead of incoming storms rather than large releases immediately ahead of incoming storms. This may increase the length of time in which power is produced through sustained releases although it may reduce the peak power production rate. However, the total amount of power produced by those releases would increase with a prolonged release. Also, by allowing discretionary encroachment into flood control space from November 1 through February 15 each year, the Proposed Action could potentially increase the water level. However, the range of water level changes at Lake Mendocino would remain within the reservoir's existing range of operational water levels, so the Proposed Action would not impede emergency access, response plans or evacuation plans.

When no precipitation is forecasted, releases may be reduced during the winter but water held in the reservoir would be released in the following summer and fall when the power demand is high; therefore, the timing of power production would be shifted. The shift in the timing of power production would be a beneficial effect as a result of the Proposed Action because it would help moderate the peak demand in the summer. Also, the total amount of power produced annually is anticipated to increase slightly (around 4%) over the baseline (Lake Mendocino Steering Committee 2020). In addition, the Proposed Action would help customers in Sonoma Water's service area with water supply reliability that has been compromised by the changes to the PVP water diversion from the Eel River and/or prolonged droughts.

Therefore, the Proposed Action would have a beneficial effect to power generation at the LMHPP and water supply reliability while it would have little to no effect to other public services such as emergency services and evacuation plans.

4.10 Climate and Weather

For the purposes of this analysis, an effect on climate and weather may be considered significant if an alternative would result in:

- Generate a substantial adverse effect on levels of GHG emissions during construction or operation of the proposed project would have a substantial adverse effect on levels of; or
- Conflict with an applicable plan, policy, or regulation adopted for the purpose of reducing the emissions of GHGs.

4.10.1 No Action

Under the No Action alternative, USACE would not approve the proposed WCM update. As a result, the flood control releases from Lake Mendocino would continue to be made in accordance with the operating rules and instructions contained in the existing WCM. Under this alternative, the existing level of GHG emissions would remain unchanged, and no effects would result in the study area or airshed.

4.10.2 Proposed Action

While the timing of power production could shift as a result of the Proposed Action, the total amount of power produced annually is anticipated to increase slightly over existing conditions. Improved forecasting would allow dam operators to make moderate, sustained releases for longer time periods ahead of incoming storms rather than large releases immediately ahead of incoming storms. This may increase the length of time that the releases produce power and reduce the peak power production rate, but would slightly increase the total amount of power produced by those releases. When no precipitation is forecasted, releases may be reduced during the winter but water held in the reservoir would be released the following summer and fall, thus shifting the timing of power production. These changes in timing would not impact the City of Ukiah's ability to meet their Climate Action Plan. Therefore, no adverse effect to climate and weather is anticipated and the Proposed Action would not hinder the attainment of climate and weather objectives in the North Coast Air Basin.

In addition, the Proposed Action could enable operators to adapt dam operations to an increasingly variable climate. By making improved forecasting data available to dam operators, the Lake Mendocino FIRO effort would allow operators to prepare for large precipitation events by releasing water to prevent downstream flooding, or to retain water longer when no precipitation is forecasted. Therefore, the Proposed Action would have a beneficial effect to climate and weather adaptation, resulting in the reduction of GHG emissions.

4.11 Cumulative Effects

NEPA requires the consideration of cumulative effects of the Proposed Action combined with the effects of other projects in the study area. NEPA defines a cumulative effect as the effect on the environment that results from the incremental effect of an action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (Federal or non-Federal) or person undertakes such other actions (40 C.F.R. pt. 1508.7). NEPA requires a discussion of cumulative impacts when they are significant. The discussion should reflect the severity of impacts and their likelihood of occurrence and should be guided by the standards of practicability and reasonableness.

Sections 4.1 through 4.10 identified incremental, potential direct and indirect environmental effects of the Proposed Action, including hydrology and hydraulics, cultural resources, recreation, special-status species, vegetation and wildlife, and water quality. The geographic and temporal scope that could be affected by the Proposed Action would vary depending on the type of environmental resource being considered. For most resources, effects would generally be confined in geographic scope of the Lake Mendocino at the gross pool. The temporal scope would be the estimated duration of remaining service life of the Coyote Valley Dam-Lake Mendocino Project after the approval of the WCM update. Potentially affected water quality and special-status species resources extend beyond the confines of the Lake Mendocino due to the effects of the release from CVD. Table 4-1 presents the general geographic areas and temporal scope associated with the different resources addressed in this cumulative effects analysis.

Table 4-1. Geographic and Temporal Scope of Cumulative Effects Analysis by Resource

<table>
<tr><th>Resource</th><th>Geographic Scope</th><th>Temporal Scope</th></tr>
<tr><td>Hydrology and Hydraulics</td><td>Lake Mendocino at the gross pool</td><td rowspan="9">From the beginning of Coyote Valley Dam-Lake Mendocino Project operation (January 1959) to the end of its service life</td></tr>
<tr><td>Water Quality</td><td>Lake Mendocino at the gross pool, downstream reach of the East Fork Russian River below CVD</td></tr>
<tr><td>Fisheries</td><td>Lake Mendocino at the gross pool</td></tr>
<tr><td>Vegetation and Wildlife</td><td>Lake Mendocino at the gross pool</td></tr>
<tr><td>Special-status Species</td><td>Lake Mendocino at the gross pool, downstream reach of the East Fork Russian River below CVD, and upper Russian River below the confluence of the East Fork Russian River and Russian River mainstem</td></tr>
<tr><td>Cultural Resources</td><td>Lake Mendocino at the gross pool</td></tr>
<tr><td>Aesthetics and Recreation</td><td>Lake Mendocino at the gross pool</td></tr>
<tr><td>Public Services and Utilities</td><td>Sonoma Water Service Area including cities of Ukiah, Healdsburg, Cloverdale, and Hopland</td></tr>
<tr><td>Climate and weather</td><td>Mendocino County Air Quality Management District (MCAQMD)</td></tr>
</table>

In determining the past, present, and reasonably foreseeable actions with potential to contribute to cumulative effects when combined with effects of the Proposed Action, USACE considered other planning efforts that would likely result in effects that could interact cumulatively with the Proposed Action. The other projects assessed under this cumulative effects analysis are established in Sections 4.11.1 and 4.11.2.

4.11.1 Past and Present Projects

Section 1.2 provides the description of Coyote Valley Dam and Lake Mendocino project development and Section 1.4 describes the history of reservoir operations, reduction in water transfer from the Eel River by PG&E's PVP, studies conducted by Lake Mendocino FIRO Steering Committee, and subsequent major deviations in an effort for Sonoma Water to improve water supply reliability.

4.11.2 Reasonably Foreseeable Future Projects

Eel Russian Project Authority

As mentioned in Section 1.4, FERC approved PG&E's plan and schedule and noted the surrender application was filed with FERC on July 24, 2025. Consequently, the continued transfer of water from the Eel River through the PVP is highly uncertain.

On June 28, 2019, a partnership of Mendocino Inland Water and Power Commission, Sonoma Water, California Trout, the Round Valley Indian Tribes, and the County of Humboldt filed a joint Notice of Intent with FERC to investigate the feasibility of relicensing the project. The partnership subsequently withdrew the notice of intent in April 2023. Even if they had been successful and FERC issued a new operating license for the project, it would likely contain terms and conditions that may be similar to the current order or further reduce the water transfer of the Eel River to the Russian River Watershed, resulting in no improvement of water supply reliability of Lake Mendocino for the region.

The partnership along with California Department of Fish and Wildlife has continued to work together with the goals of (i) improving fish migration and habitat on the Eel River with the objective of achieving naturally reproducing, self-sustaining, and harvestable native anadromous fish populations, and (ii) maintaining continued water diversion from the Eel River through the existing tunnel to the Russian River to support water supply reliability, fisheries, and water quality in the Russian River Basin. In December 2023, Sonoma Water, Sonoma County, and Mendocino County IWPC formed the Eel Russian Project Authority (ERPA) as a joint powers authority. Round Valley Indian Tribes has a seat on ERPA's Board of Directors. ERPA proposes to construct, operate, and maintain a New Eel-Russian Facility to divert water from the Eel River, at the site of and following the decommissioning and removal of Cape Horn Dam, on terms consistent with restoration of the anadromous fisheries of the Eel River.

Fish Habitat Flows and Water Rights Project

Sonoma Water is the local sponsor for CVD-Lake Mendocino and manages water supply releases from the conservation pool. Sonoma Water is proposing the Fish Habitat Flows and Water Rights Project (Fish Flow Project). A California Environmental Quality Act Draft Environmental Impact Report was released by Sonoma Water for public review on August 19, 2016. The public review period concluded on March 10, 2017. The objectives of the Fish Flow Project are to manage Lake Mendocino and Lake Sonoma water supply releases to provide instream flows that will improve habitat for threatened and endangered fish species, and to update Sonoma Water's existing water rights to reflect current conditions.

Because late spring storm events do not occur predictably, there have been a number of years since 2006 that Lake Mendocino has not had sufficient storage to meet water supply needs without risking draining the reservoir. Therefore, Sonoma Water had to file Temporary Urgency Change Petitions with the State Water Resources Control Board (SWRCB) in 2007, 2009, 2013, 2014, 2015, 2020, 2021, and 2022 to reduce minimum instream flow requirements in order to prevent draining of Lake Mendocino.

The Fish Flow Project proposes to change minimum instream flow requirements in the Russian River downstream of Lake Mendocino and in Dry Creek (a tributary to the Russian River and downstream of Lake Sonoma); to change the hydrologic index that determines the minimum instream flow schedules; to extend the time to 2040 to fully utilize existing water rights; and to add existing points of diversion for the Occidental Community Service District and the Town of Windsor as authorized points of diversion in the Water Agency's water right permits. The proposed changes to minimum instream flow requirements are in response to the 2008 Russian River BO's RPMs to avoid jeopardizing listed salmonids and are in accordance with the new BO issued in April 2025. Sonoma Water would implement the proposed Fish Flow Project if the water-right modifications are made by the SWRCB.

4.11.3 Scope of Cumulative Effects by Resource

With the reduction in PVP annual water transfers, Lake Mendocino has become dependent on late spring storm events to adequately fill in order to meet water demands. However, late spring storm events do not reliably occur which creates a vulnerability in Lake Mendocino's water supply. The Proposed Action would allow the USACE to have a discretion to utilize the additional FIRO tool for (but not control) reservoir operations. The Proposed Action would also help reservoir operators adapt to an increasingly variable environment. Long-term effects of the Proposed Action would be beneficial in terms of improving water supply reliability, adapting to increasingly variable environmental conditions, and maintaining a cold-water pool in the reservoir for the fall Chinook Salmon migration for a longer duration.

The primary effect of proposed Fish Flow Project in the Russian River would be to improve steelhead summer rearing habitat by reducing summer flows relative to Decision 1610 in the long term. This is especially true in the area between Cloverdale and the Forks, which provides the best steelhead rearing habitat in the mainstem. In general, the improved rearing flows throughout the Russian River basin could result in an increase in juvenile survival, which would translate into future increases in adult abundance and a reduced risk of population decline. The proposed WCM update and Fish Flows Project at CVD are expected to result in conservation of cold-water pool in Lake Mendocino, which would improve water temperatures in the upper Russian River relative to existing conditions and No Action alternative.

Table 4-2 presents the presents combined effects of the Proposed Action with incremental effects of other past, present, and reasonably foreseeable future actions in the general geographic areas on different resources addressed in Section 4.

Table 4-2. Scope of Cumulative Effects by Resource Category

Resource Category	Cumulative Effects
Hydrology and Hydraulics	Implementation of Proposed Action would have beneficial effects on reservoir storage by retaining more water when it is allowable and having better control of potential emergency spillway flow because of the Lake Mendocino FIRO decision-making tools and procedures. Two-Basin Solution may further reduce the transfer of Eel River water to the Russian River Watershed, which would affect further loss of reservoir storage; Fish Flow Project would reduce minimum flows in the Russian River between late spring and early fall, resulting in preserving reservoir storage. The Proposed Action and Fish Flow Project would offset the loss of reservoir storage from the Two-Basin Solution and result in beneficial cumulative effects to water resources.
Water Quality	Proposed Action would provide benefits to water quality by providing greater spring reservoir storage volumes and improving the ability to maintain a cold-water pool in the reservoir. In turn, cooler water release from CVD in late summer into the East Fork Russian River would have a beneficial effect on water temperature. Two-Basin Solution may further reduce the transfer of Eel River water to the Russian River Watershed, which would result in higher water temperature due to loss of reservoir storage while turbidity in the Lake Mendocino may improve; Fish Flow Project would also have a beneficial effect on temperature of water released from CVD because of increased reservoir storage. The Proposed Action and Fish Flow Project would offset the loss of reservoir storage from the Two-Basin Solution and result in beneficial cumulative effects to water quality.
Fisheries	The proposed Action would begin the spring refill earlier (i.e., starting February 15), and would precede the spawning season during spring months for warm water species such as sunfish. Operations during non-spawning season would be similar to the existing range of conditions in the reservoir. Two-Basin Solution may further reduce the transfer from Eel River water, further reducing reservoir storage; Fish Flow Project would reduce minimum flows in the Russian River between late spring and early fall, resulting in higher reservoir storage. Therefore, overall combined effects on warm water species would be insignificant.
Vegetation and Wildlife	Because the maximum water level resulting from Proposed Action, Two-Basin Solution and Fish Flow Project would remain the same as currently exists under existing conditions, these projects would not permanently remove or disturb sensitive native communities, nor would it significantly reduce the amount of native vegetation and wildlife habitat in the area. Therefore, overall cumulative effects would be less than significant.

Resource Category	Cumulative Effects
Special-status Species	The Proposed Action is expected to result in conservation of the cold-water pool in Lake Mendocino, and would improve water temperatures in the upper Russian River for summer rearing juvenile steelhead and the migration of fall-run adult Chinook Salmon. Fish Flow Project would reduce water velocities during summer months so that the quality and quantity of rearing habitat for steelhead would be improved. Overall, the cumulative effects on the special-status species would be beneficial.
Cultural Resources	Because the maximum water level resulting from Proposed Action, Two-Basin Solution and Fish Flow Project would remain the same as currently exists under existing conditions, these projects would have no effect on historic properties since this flood pool has been utilized historically.
Aesthetics and Recreation	While Two-Basin Solution would reduce reservoir storage, Proposed Action and Fish Habitat Project could potentially increase the water level prior to a high demand recreational season so corresponding water level changes would affect the viewshed at the lake. However, it would be a temporary effect on visual resources compared to the baseline and the range of water level changes at Lake Mendocino would remain within the reservoir's existing range of operational water levels. Because the inlet Road to Bushay/Kyen Recreation Areas was built at approximately 750 feet msl, access to the Bushay/Kyen Recreation Areas may potentially inaccessible temporarily (Memorial Day to Labor Day) mostly during wet years. However, other recreation areas around the reservoir would be accessible and available to recreationists, providing similar recreational opportunities. Overall, the cumulative effects on the aesthetics and recreation would be less than significant.
Public Services and Utilities	Proposed Action would help customers in Sonoma Water's service area with water supply reliability that has been compromised by the changes to the PVP water diversion from the Eel River and/or prolonged droughts. While Two-Basin Solution would potentially further reduce reservoir storage, Fish Flow Project would retain more water by reducing minimum flows in the Russian River between late spring and early fall. Therefore, overall cumulative effects on public services and utilities would beneficial.
Climate and weather	By making improved forecasting data available to dam operators, the Lake Mendocino FIRO effort would allow operators to prepare for large precipitation events by releasing water to prevent downstream flooding, or to retain water longer when no precipitation is forecasted. Therefore, the Proposed Action would have a beneficial effect to climate and weather adaptation, resulting in the reduction of GHG emissions. Two-Basin Solution and Fish Flow Project would have no effect on climate and weather. Overall, the cumulative effects on climate and weather would be beneficial.

4.12 Avoidance, Minimization and Mitigation Measures

No avoidance, minimization and mitigation measures are identified as no significant impact on any of resource categories is anticipated.

5 ENVIRONMENTAL COMPLIANCE

The USACE will ensure that the proposed action complies with all relevant environmental laws, regulations, and executive orders (EOs), and will be obtained in implementing the proposed action. Major environmental compliance regulations and status of compliance with a brief statement summarizing how the proposed action will comply with the requirements are summarized in Table 5-1.

Table 5-1. Summary of Environmental Compliance

Statute or Executive Order	Status of Compliance
Clean Air Act of 1972, as amended, 42 U.S.C. § 7401, et seq.	In compliance – The Proposed Action is not expected to violate any Federal air quality standards, exceed the EPA's general conformity de minimis threshold, or hinder the attainment of air quality objectives in the local air basin. USACE has determined the Proposed Action would have no significant effects on the future air quality of the study area.
Clean Water Act of 1972, as amended, 33 U.S.C. § 1251, et seq.	Not applicable – Because the WCM update does not propose to change the water conservation pool or how the State Water Board would meet minimum instream flow requirements, consultation with the State is not needed; therefore, CWA 401 water quality certification is not required for the proposed action.
Endangered Species Act of 1973, as amended, 16 U.S.C. § 1531, et seq.	In compliance – USACE obtained a list from USFWS and NMFS for Federally listed and proposed species likely to occur in the action area. After reviewing the species list and conducting a desktop survey of the potential action area, the USACE determined that steelhead and Chinook Salmon have the potential to be affected by the Proposed Action. The USACE, as the action agency, has made the determination that there would be potential beneficial effects on those listed salmonids under the Proposed Action because it would result in conservation of cold-water pool in Lake Mendocino, which would improve water temperatures in the upper Russian River for juvenile steelhead during summer and fall compared to the existing conditions. Given the overlap of critical habitat with the action area and potential for presence of listed salmonids downstream of Lake Mendocino, coordination with NMFS was conducted. A summary of the coordination is provided in Appendix D.

Statute or Executive Order	Status of Compliance
Executive Order 11988, Floodplain Management	In compliance – This Executive Order 11988 was signed into law on May 24, 1977, requiring that Federal agencies provide leadership and take action to restore and preserve the natural and beneficial values served by floodplains. Before proposing, conducting, supporting, or allowing an action in the floodplain, each Federal agency must determine if planned activities would affect the floodplain and evaluate the potential effects of the intended action on the floodplain's functions.
Executive Order 13751, Safeguarding the Nation from the Impacts from Invasive Species	In compliance – Executive Order 13751 was signed into law on December 5, 2016, to refrain from authorizing, funding, or implementing actions that are likely to cause or promote the introduction, establishment, or spread of invasive species in the United States unless, pursuant to guidelines that it has prescribed, the agency has determined and made public its determination that the benefits of such actions clearly outweigh the potential harm caused by invasive species; and that all feasible and prudent measures to minimize risk of harm will be taken in conjunction with the actions. The Proposed Action is not expected to cause or promote the introduction, establishment, or spread of invasive species. Vegetation along the shore of Lake Mendocino has been determined by seasonal fluctuations in reservoir elevation that occur under existing operations. The maximum water surface elevation at the reservoir would remain the same as existing operations under the Proposed Action. The maximum water surface elevation determines the transition location from upper shoreline to upland vegetation. Annual plant species may seasonally colonize exposed shoreline areas. Because there would be no change in maximum water surface elevation, upland vegetation beyond the shoreline is not anticipated to change and there would be no potential for the Proposed Action to cause or promote the introduction, establishment, or spread of invasive species. Upstream of Lake Mendocino, flows are regulated by a license issued to PG&E by FERC. The Proposed Action would not change flows in the East Fork Russian River and would remain within the range of existing baseline levels. The Proposed Action would not cause or promote the introduction, establishment, or spread of invasive species upstream of Lake Mendocino. Downstream of Lake Mendocino, flows in the East Fork Russian River and mainstem Russian River would remain within the range of existing baseline levels with extreme high winter flows and low summer flows potentially slightly moderated. Because the range of flows downstream of the reservoir would remain the same as under baseline conditions, the Proposed Action would

Statute or Executive Order	Status of Compliance
	not cause or promote the introduction, establishment, or spread of invasive species.
Fish and Wildlife Coordination Act (16 U.S.C. §§ 661 666c)	Not applicable - Lake Mendocino WCM update is part of USACE operation activities; therefore, it is exempt from FWCA.
Migratory Bird Treaty Act (15 U.S.C § 701-18h)	In compliance – There would be no construction activities or vegetation removal as part of the Proposed Action and therefore, no impacts to nesting migratory birds are anticipated.
National Environmental Policy Act of 1969, as amended, 42 U.S.C. § 4321, et seq.	In compliance – A 30-day public review period was completed. Comments received during the public review period have been incorporated into the Final EA[7], as appropriate, and a comments and responses appendix. The Final EA is accompanied by a signed FONSI.
National Historic Preservation Act of 1966, as amended, 16 U.S.C. § 470 et seq.	In compliance – The project is in compliance with Section 106 of the National Historic Preservation Act (36 C.F.R. pt. 800). There are no resources found in the APE and therefore no impacts to cultural resources.

[7] In compliance with Interim Final Rule (90 Fed. Reg. 29461-29465) "Procedures for Implementing NEPA; Removal", the page limit is not exceeded because tables and charts do not count towards the page limit.

6 PUBLIC INVOLVEMENT

Lake Mendocino FIRO Steering Committee has collaborated over 6 years and their coordination culminated in the Final Viability Assessment in 2020. The Final Viability Assessment established the basis and pathway for updating the WCM to explicitly incorporate forecasts in order to improve water supply reliability and environmental conditions in the upper Russian River watershed. Appendix D of this document summaries historical interagency and public engagement efforts made by the Lake Mendocino FIRO Steering Committee.

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