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SECRETARY FOR
ENVIRONMENTAL PROTECTION
State Water Resources Control Board ENERGY
 REGULATORY COMMISSION

January 15, 2021

 Michael I. Cooke
 Turlock Irrigation District
 P.O. Box 949
 Turlock, CA 95381

 John B. Davids
 Modesto Irrigation District
 P.O. Box 4060
 Modesto, CA 95352

**Don Pedro Hydroelectric Project and La Grange Hydroelectric Project
 Federal Energy Regulatory Commission Project Nos. 2299 & 14581
 Tuolumne and Stanislaus Counties
 Tuolumne River**
**SUBJECT: ISSUANCE OF FINAL WATER QUALITY CERTIFICATION FOR THE
 DON PEDRO HYDROELECTRIC PROJECT AND LA GRANGE
 HYDROELECTRIC PROJECT**

Dear Mr. Cooke & Mr. Davids,

The State Water Resources Control Board (State Water Board) Executive Director issued a water quality certification (certification) pursuant to section 401 of the Clean Water Act for the Don Pedro Hydroelectric Project and La Grange Hydroelectric Project owned and operated by Turlock Irrigation District and Modesto Irrigation District on January 15, 2021. A copy of the certification is enclosed for your records. The certification and related documents are available on the State Water Board's webpages for the Don Pedro and La Grange Hydroelectric Projects:

Don Pedro Hydroelectric Project Webpage:

https://www.waterboards.ca.gov/waterrights/water_issues/programs/water_quality_cert/donpedro_ferc2299.html

La Grange Hydroelectric Project Webpage:

https://www.waterboards.ca.gov/waterrights/water_issues/programs/water_quality_cert/lagrangeferc14581.html

During the current Coronavirus 2019 emergency, most State Water Board staff are working from home. Accordingly, if you have questions regarding this letter, the best means of contact is by email. We kindly request that if you have any questions

E. JOAQUIN ESQUIVEL, CHAIR | EILEEN SOBECK, EXECUTIVE DIRECTOR

Mr. Cooke & Mr. Davids - 2 -
Water Quality Certification for Don Pedro Hydroelectric Project and La Grange
Hydroelectric Project

regarding this letter, please contact Chase Hildeburn at:
Wr401program@waterboards.ca.gov.

Written correspondence should be addressed as follows:

State Water Resources Control Board
Division of Water Rights
Attn: Chase Hildeburn
P.O. Box 2000
Sacramento, CA 95812-2000

Sincerely,

Chase Hildeburn

Chase Hildeburn
Water Resource Control Engineer
Water Quality Certifications Unit
Division of Water Rights

Enclosure: Water Quality Certification for the Don Pedro Hydroelectric Project and La
Grange Hydroelectric Project

cc (with enclosure):

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Region 9, Water Division
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Mr. Patrick Pulupa, Executive Officer
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Kimberly Ognisty, Partner
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1700 K Street N.W.
Washington, D.C. 20006

cc (without enclosures):

Interested Parties List

**STATE OF CALIFORNIA
STATE WATER RESOURCES CONTROL BOARD**

**In the Matter of Water Quality Certification for
TURLOCK IRRIGATION DISTRICT AND MODESTO IRRIGATION DISTRICT
DON PEDRO HYDROELECTRIC PROJECT
AND
LA GRANGE HYDROELECTRIC PROJECT
FEDERAL ENERGY REGULATORY COMMISSION
PROJECT NOS. 2299 AND 14581**

Sources: Tuolumne River and Tributaries

Counties: Stanislaus and Tuolumne

WATER QUALITY CERTIFICATION FOR FEDERAL PERMIT OR LICENSE

Don Pedro Hydroelectric Project and La Grange Hydroelectric Project January 2021
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Common Acronyms and Abbreviations

AF	acre-feet
Bay-Delta	San Francisco Bay/ Sacramento-San Joaquin Delta Estuary
Bay-Delta Plan	Water Quality Control Plan for the San Francisco Bay/ Sacramento-San Joaquin Delta Estuary
BLM	United States Department of Interior, Bureau of Land Management
BMI	benthic macroinvertebrates
Regional Water Board	Regional Water Quality Control Board
Caltrans	California Department of Transportation
CCSF	City and County of San Francisco
CDFW	California Department of Fish and Wildlife
Central Valley Regional Water Board	Central Valley Regional Water Quality Control Board
CEQA	California Environmental Quality Act
certification	water quality certification
cfs	cubic feet per second
CVP	Central Valley Project
CWA	Clean Water Act
Deputy Director	Deputy Director for the Division of Water Rights
dS/m	deciSiemens per meter
DWR	California Department of Water Resources
EC	electrical conductivity
EIS	Environmental Impact Statement
ERDC	United States Army, Engineer Research and Development Center
ESA	Endangered Species Act
FERC	Federal Energy Regulatory Commission
FLA	Final License Application
LSJR	Lower San Joaquin River
LWM	large woody material
MID	Modesto Irrigation District
mmhos/cm	milliMhos per centimeter
NEPA	National Environmental Policy Act
NMFS	National Marine Fisheries Service
NOAA	National Oceanic and Atmospheric Administration
NPDES	National Pollutant Discharge Elimination System
Reclamation	United States Bureau of Reclamation
RM	River Mile
SED	Substitute Environmental Document
SJR	San Joaquin River
SJRMEP	San Joaquin River Monitoring and Evaluation Program
SNYLF	Sierra Nevada yellow-legged frog

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SR/SJR Basin Plan

State Water Board
STM Working Group

SWP

TAF

TID

USEPA

USFWS

Vernalis

WQMP Plans

WRAMP

WUA

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

State Water Resources Control Board

Stanislaus, Tuolumne, and Merced Working Group

State Water Project

thousand acre-feet

Turlock Irrigation District

United States Environmental Protection Agency

United States Fish and Wildlife Service

San Joaquin River at Vernalis

Water Quality Monitoring and Protection Plans

California Wetland and Riparian Area Monitoring
Plan

Weighted Usable Area, instream physical rearing
habitat

**Don Pedro Hydroelectric Project and La Grange Hydroelectric Project January 2021
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1.0 Projects Background

The Don Pedro Hydroelectric Project and La Grange Hydroelectric Project (collectively, Projects), Federal Energy Regulatory Commission (FERC) Project Nos. 2299 and 14581, respectively, are located on the Tuolumne River in Tuolumne and Stanislaus Counties, California (Figures 1 and 2).

On April 28, 2014, Turlock Irrigation District (TID) and Modesto Irrigation District (MID) (collectively, Districts or Licensees) filed an application for a new license with FERC to continue to operate and maintain the Don Pedro Hydroelectric Project. Subsequently, the Districts filed an amended application for the Don Pedro Hydroelectric Project on October 11, 2017. In addition to providing hydroelectric power generation, Don Pedro Reservoir provides water supply for the irrigation of more than 200,000 acres of Central Valley farmland, municipal and industrial uses, flood control benefits along the Tuolumne and San Joaquin Rivers, and a water-banking arrangement for the benefit of the City and County of San Francisco (CCSF).

The existing, unlicensed La Grange Hydroelectric Project was determined to require licensing in an order issued by FERC on December 19, 2012. On October 11, 2017, the Districts filed an application for an original license with FERC, to continue to operate and maintain the La Grange Hydroelectric Project. FERC provided notice of the accepted applications on November 30, 2017.

The Districts filed applications requesting water quality certification (certification) with the State Water Resources Control Board (State Water Board) under section 401 of the Clean Water Act for the Projects on January 26, 2018, and April 22, 2019. Before one year had elapsed after receiving the applications, the State Water Board denied the applications without prejudice on January 24, 2019, and April 20, 2020, respectively. The Districts, as lead agencies under the California Environmental Quality Act (CEQA), had not begun the environmental analysis required under CEQA, FERC had not completed its National Environmental Policy Act (NEPA) analysis, and the State Water Board could not determine compliance with water quality standards at that time. On July 20, 2020, the Districts submitted applications requesting certification for the Projects. The applications have been publicly noticed. (Cal. Code Regs., tit.23, § 3858.)

On October 2, 2020, the Districts petitioned FERC to issue a declaratory order finding that the State Water Board waived certification based on *Hoopa Valley Tribe v. Federal Energy Regulatory Commission* (D.C. Cir. 2019) 913 F.3d 1099 and recent FERC precedent. The State Water Board opposes the Districts' petition. On November 19, 2020, the Districts withdrew their applications for certification, but their applications for FERC licenses and waiver request are still pending. In the circumstances presented here, when an application for a federal license has been filed and the project is still pending federal approval, nothing in the Clean Water Act, the Porter-Cologne Water Quality Control Act, or the State Water Board's regulations bars the State Water Board from issuing certification.

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The submission of the applications predates the effective date of the United States Environmental Protection Agency's (USEPA) new Clean Water Act Section 401 Certification Rule (40 C.F.R. part 121), which took effect on September 11, 2020. Thus, this certification is not subject to the requirements of the new regulations.

2.0 Projects Description

The 168-megawatt (MW) Don Pedro Hydroelectric Project is located at river mile (RM) 54.8 on the Tuolumne River in Tuolumne County, California. The Don Pedro Hydroelectric Project currently occupies 4,802 acres of federal land administered by the U.S. Department of the Interior, Bureau of Land Management (BLM). The major components of the Don Pedro Hydroelectric Project include New Don Pedro Reservoir, New Don Pedro Dam, Don Pedro Spillway, emergency spillway, power tunnel shaft and gate, Don Pedro Powerhouse, low-level outlet, and various access roads and other appurtenant facilities. The 4.7-MW La Grange Hydroelectric Project is located at RM 52.2 on the Tuolumne River in Stanislaus and Tuolumne Counties, California. The major components of the La Grange Hydroelectric Project include the La Grange Diversion Dam, storage reservoir, irrigation intakes and canals, powerhouse, access roads and other appurtenant facilities. The proposed area of the La Grange Hydroelectric Project is 14 acres of federal land administered by BLM. A detailed description of the Projects' facilities can be found in Attachment A.

3.0 Water Rights

The Districts share a number of appropriative water rights on the Tuolumne River for irrigation, power, recreation, and municipal use. New Don Pedro Reservoir provides 2,030,000 acre-feet (AF) of total water storage that serves irrigation, municipal and industrial water supply, and flood control purposes, which are described as critical functions of the Don Pedro Hydroelectric Project. The Don Pedro Hydroelectric Project provides water for irrigation of over 200,000 acres of farmland served by the Districts in the Central Valley. MID provides treated water to the City of Modesto and TID and MID jointly provide treated water to the community of La Grange. The Districts provide up to a maximum of 67,500 AF of water per year for municipal and industrial use. Immediately downstream of New Don Pedro Dam, the Districts generate 168 MW of electricity through the four turbines in the Don Pedro Powerhouse.

The La Grange Hydroelectric Project generates power using part of the flows released from the Don Pedro Hydroelectric Project. Downstream of La Grange Dam, TID diverts water from the TID Upper Main Canal to generate 4.7 MW of electricity through the La Grange Powerhouse.

Don Pedro Hydroelectric Project and La Grange Hydroelectric Project
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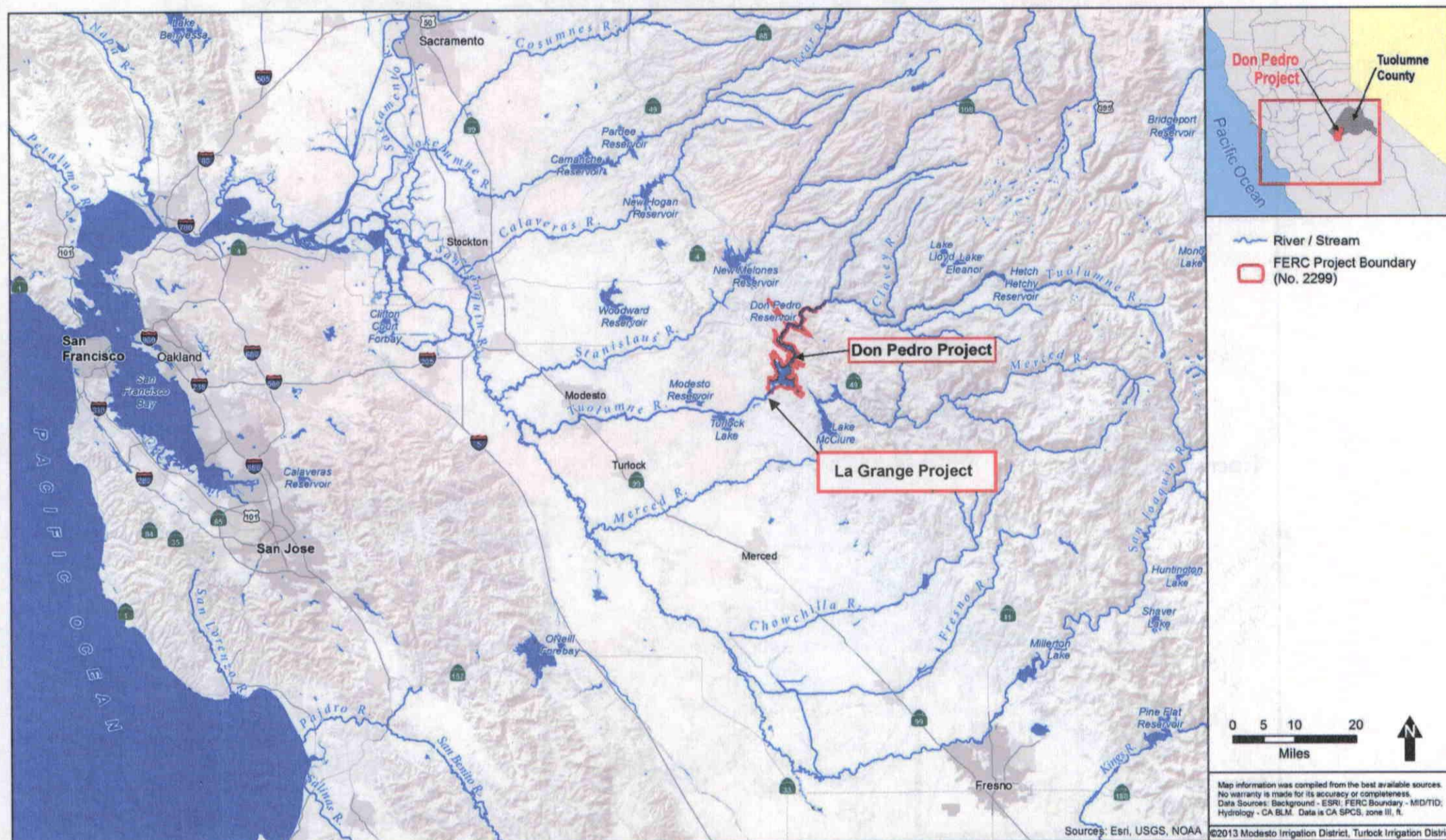


Figure 1. General Map of San Joaquin River Basin Showing Locations of Don Pedro and La Grange Hydroelectric Projects

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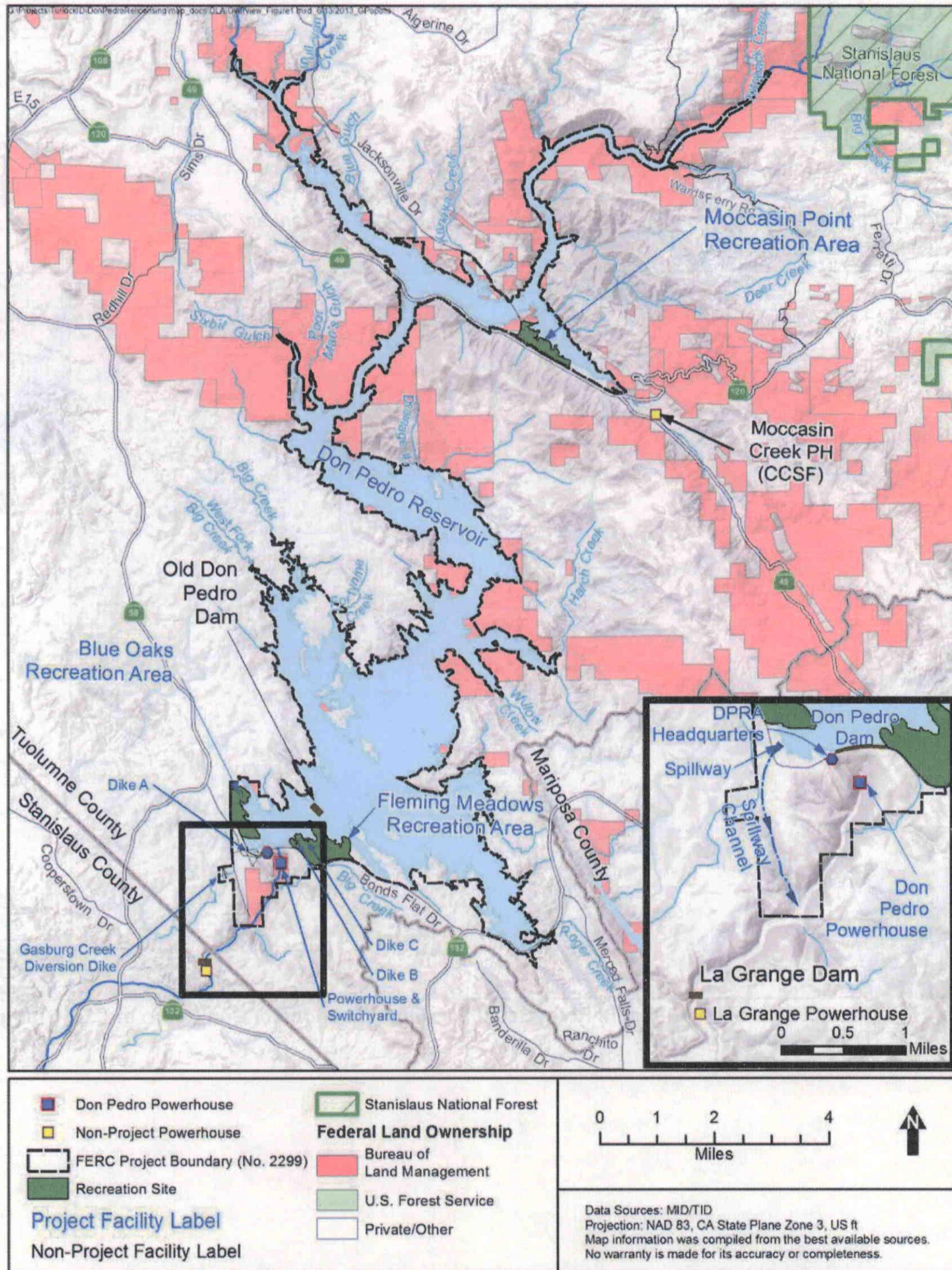


Figure 2. Don Pedro and La Grange Hydroelectric Projects Site Location Map

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The Projects receive inflow from the CCSF's upstream Hetch Hetchy Water and Power System, a series of reservoirs, diversion conduits, and powerhouses located on the upper Tuolumne River. Consistent with the requirements of the Raker Act¹ and agreements between the Districts and CCSF, the Projects provide a "water bank" of up to 570,000 AF of storage. The water bank allows CCSF to meet its requirement to satisfy the Districts' senior water rights by using the New Don Pedro Reservoir to store water released from its upstream facilities. By using the allotted reservoir storage, CCSF can then divert water at times when releases would have been required to satisfy the Districts' water rights. CCSF's water bank in New Don Pedro Reservoir provides water for its 2.4 million customers in the Bay Area.

In the Tuolumne River watershed, there are 165 post-1914 appropriative water rights with a combined face value of approximately 7.2 million AF (MAF). Of these 165 rights, 160 are non-power water rights with a face value of approximately 2.65 MAF. Of the 160 rights, five are non-power water rights held by TID and MID. The face value of these five water rights totals approximately 2.62 MAF, accounting for approximately 99 percent of the water authorized for diversion (based on face value) under non-power water rights in the Tuolumne River watershed (State Water Board, 2016).

In 2018, TID filed with the State Water Board a petition for long-term change to water right License 11058 (Application 14127), pursuant to Water Code section 1735 et seq. With the petition, TID seeks authorization to transfer up to 17,375 AF of water annually to the Stanislaus Regional Water Authority through July 28, 2065. The proposed transfer would include the following changes to License 11058: (1) add TID's infiltration gallery as a point of rediversion (with an average diversion rate for the maximum 30-day period of use of 24 cubic feet per second (cfs)); and (2) add municipal and industrial purposes of use within TID's existing place of use boundary for irrigation. In addition, FERC's *Final Environmental Impact Statement for Hydropower Licenses Don Pedro Hydroelectric Project—FERC Project No. 2299-082 and La Grange Hydroelectric Project—FERC Project No. 14581-002* (Final EIS), released on July 7, 2020, describes the Districts' proposed facility modification involving infiltration galleries. The Final EIS describes the Districts' proposal to install and operate two in-river infiltration galleries (one of which has been partially constructed) at approximately RM 25.9 on the lower Tuolumne River, which would have a combined capacity of 200 to 225 cfs.

¹ The Raker Act, passed by Congress in 1913, authorizes CCSF to build certain water and power facilities on federal lands and addresses the allocation of the waters of the Tuolumne River between the Districts and CCSF.

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Table A. Water Rights Held by TID and MID for the Projects¹.

Application Number	Permit ID	License ID	Water Right Type	Status	Status Date	Face Value Amount ²	Beneficial Use ³	County
A009996	005909	005418	Appropriative	Licensed	09/06/1940	868,773	POW	Stanislaus, Tuolumne
A003648	003026	002424	Appropriative	Licensed	09/24/1923	48,595.8	IRR	Stanislaus
S013848	--	--	Statement of Div and Use	Claimed	10/16/1992	0	POW, MUN, IRR, REC	Stanislaus
A003139	001699	002580	Appropriative	Licensed	04/02/1943	436,558.4	POW	Stanislaus
A001233	001165	005417	Appropriative	Licensed	04/08/1919	325,000	IRR	Stanislaus, Tuolumne
A001532	001168	005421	Appropriative	Licensed	11/21/1919	1,851,934.5	POW	Tuolumne
A001232	001164	005420	Appropriative	Licensed	04/08/1919	325,000	REC, POW	Tuolumne
A006711	004271	002425	Appropriative	Licensed	06/25/1930	480,800.4	IRR	Stanislaus
A014127	009320	011058	Appropriative	Licensed	01/16/1951	1,046,800	IRR, REC	Tuolumne
S013849	--	--	Statement of Div and Use	Claimed	10/16/1992	0	POW	Tuolumne
A009997	005910	005419	Appropriative	Licensed	09/06/1940	721,200.6	IRR	Stanislaus, Tuolumne
A014126	009319	011057	Appropriative	Licensed	01/16/1951	1,046,800	REC, POW	Tuolumne

¹ Water rights S013848, A003139, and S013849 are held solely by TID.

² Values shown in AF per year.

³ Irrigation (IRR), Power (POW), Recreation (REC), Municipal (MUN).

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4.0 Federal Energy Regulatory Commission Licensing Process

On April 28, 2014, the Districts filed an application for a new license with FERC to continue to operate and maintain the Don Pedro Hydroelectric Project. On October 11, 2017, the Districts filed an amended final license application for the Don Pedro Hydroelectric Project. On the same day, the Districts also filed an application for original license for the La Grange Hydroelectric Project. The applications followed FERC's Integrated Licensing Process (ILP). On November 30, 2017, FERC noticed the license applications and provided an opportunity for comment. On January 29, 2018, the State Water Board submitted certification preliminary terms and conditions to FERC. FERC issued a *Draft Environmental Impact Statement for Hydropower Licenses Don Pedro Hydroelectric Project—FERC Project No. 2299-082 and La Grange Hydroelectric Project—FERC Project No. 14581-002* (Draft EIS) in February 2019, pursuant to NEPA. On April 12, 2019, the State Water Board submitted timely comments on the Draft EIS. FERC issued the Final EIS on July 7, 2020.

5.0 Regulatory Authority

5.1 Water Quality Certification and Related Authorities

The federal Clean Water Act (33 U.S.C. §§ 1251 et seq.) was enacted "to restore and maintain the chemical, physical, and biological integrity of the Nation's waters." (33 U.S.C. § 1251(a).) The Clean Water Act relies significantly on state participation and support, in light of States' "primary responsibilities and rights" to "prevent, reduce, and eliminate pollution." (*Id.*, § 1251(b).) Federal agencies must "co-operate with the State and local agencies to develop comprehensive solutions to prevent, reduce and eliminate pollution in concert with programs for managing water resources." (*Id.*, § 1251(g).)

Section 401 of the Clean Water Act requires any applicant for a federal license or permit that may result in a discharge into navigable waters to provide the licensing or permitting federal agency with certification from the relevant state agency that the project will comply with state water quality laws. (*Id.*, § 1341(a)(1), (d).) Section 401 authorizes conditions "on the activity as a whole once the threshold condition, the existence of a discharge, is satisfied." (*PUD No. 1 of Jefferson County v. Washington Dept. of Ecology* (1994) 511 U.S. 700, 712 (*PUD No. 1*).) The state's certification may set conditions implementing Clean Water Act requirements, including the requirements of Section 303 of the Clean Water Act for water quality standards and implementation plans, or to implement "any other appropriate requirement of State law." (33 U.S.C. § 1341(d).) An activity must comply with designated uses of water to comply with applicable water quality standards and to ensure that each activity is consistent with specific uses and attributes of a particular body of water. (*PUD No. 1, supra*, at pp. 715-717.) Section 401 further provides that certification conditions shall become conditions of any federal license or permit for the project. (33 U.S.C. § 1341(d).) If the state agency denies certification, the federal agency cannot approve the project.

The State Water Board is the state agency responsible for Section 401 certification in California. (Wat. Code, § 13160.) The State Water Board has delegated authority to

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act on applications for certification to the Executive Director of the State Water Board. (Cal. Code Regs., tit. 23, § 3838, subd. (a).)

In addition, Water Code section 13383 provides the State Water Board with the authority to “establish monitoring, inspection, entry, reporting, and recordkeeping requirements... and [require] other information as may be reasonably required” for activities subject to certification under section 401 of the Clean Water Act that involve the diversion of water for beneficial use. The State Water Board delegated this authority to the Deputy Director of the Division of Water Rights (Deputy Director), as provided for in State Water Board Resolution No. 2012-0029 (State Water Board, 2012). In the *Redelegation of Authorities Pursuant to Resolution No. 2012-0029* memo issued by the Deputy Director on October 19, 2017, this authority is redelegated to the Assistant Deputy Directors of the Division of Water Rights (State Water Board, 2017A).

On November 30, 2020, the State Water Board released a draft certification for the Projects for public review and comment. In response to the draft certification, the State Water Board received comments from Bay Area Water Supply & Conservation Agency (BAWSCA), California Department of Fish and Wildlife (CDFW), California Farm Bureau Federation, Conservation Groups (comprised of Merced River Conservation Committee, California Sportfishing Protection Alliance, American Whitewater, Friends of the River, Golden West Women Flyfishers, Central Sierra Environmental Resources Center (CSERC), Sierra Club – Mother Lode Chapter, American Rivers, Tuolumne River Conservancy, Tuolumne River Trust, and Trout Unlimited), the Districts, Arthur E. Godwin of Robbins, Browning, Godwin & Marchini, LLP, National Marine Fisheries Service (NMFS), National Resources Defense Council (NRDC) and NRDC Action Fund, San Francisco Public Utilities Commission, and United States Army Corps of Engineers (USACE).

5.2 Water Quality Control Plans and Related Authorities

The State Water Board's certification for the Projects must ensure compliance with the water quality standards in the Central Valley Regional Water Quality Control Board's (Central Valley Regional Water Board) *Water Quality Control Plan for the Sacramento River Basin and the San Joaquin River Basin* (SR/SJR Basin Plan) (Central Valley Regional Water Board, 2018) and the *Water Quality Control Plan for the San Francisco Bay/Sacramento-San Joaquin Delta Estuary* (Bay-Delta Plan) (State Water Board, 2018B). Water quality control plans designate the beneficial uses of water that are to be protected (such as municipal and industrial, agricultural, and fish and wildlife beneficial uses), water quality objectives for the reasonable protection of the beneficial uses and the prevention of nuisance, and a program of implementation to achieve the water quality objectives. (Wat. Code, §§ 13241, 13050, subds. (h), (j).) The water quality control plans are consistent with state and federal antidegradation policies. The beneficial uses, together with the water quality objectives contained in the water quality control plans, and applicable federal anti-degradation requirements, constitute California's water quality standards for purposes of the Clean Water Act.

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The nine Regional Water Quality Control Boards (Regional Water Boards) have primary responsibility for the formulation and adoption of water quality control plans for their respective regions, subject to State Water Board and USEPA approval, as appropriate. (Wat. Code, § 13240 et seq.) The State Water Board may also adopt water quality control plans, which will supersede regional water quality control plans for the same waters to the extent of any conflict. (*Id.*, § 13170.)

In March 2019, the State Water Board submitted to FERC the plans and policies included in the State's comprehensive plan for orderly and coordinated control, protection, conservation, development and utilization of the water resources of the State. The submission includes the SR/SJR Basin Plan and the Bay-Delta Plan.

5.2.1 Sacramento and San Joaquin Rivers Basin Plan

The Central Valley Regional Water Board adopted, and the State Water Board and USEPA approved, the SR/SJR Basin Plan. The SR/SJR Basin Plan designates the beneficial uses of water to be protected along with the water quality objectives necessary to protect those uses. The existing beneficial uses for the Tuolumne River from New Don Pedro Reservoir to the San Joaquin River are: irrigation; stock watering; power; contact recreation; canoeing and rafting; other non-contact recreation; warm freshwater habitat; cold freshwater habitat; warm spawning; cold spawning; and wildlife habitat. Additionally, municipal and domestic supply is designated as a potential beneficial use.

5.2.2 Bay-Delta Plan

The Bay-Delta Plan establishes water quality objectives to protect beneficial uses of water in the San Francisco Bay/Sacramento-San Joaquin Delta Estuary (Bay-Delta) and tributary watersheds, including drinking water supply, irrigation supply, and fish and wildlife. The State Water Board adopts the Bay-Delta Plan pursuant to its authorities under the Porter-Cologne Water Quality Control Act (Wat. Code, § 13000 et seq.) and the federal Clean Water Act (33 U.S.C. § 1313).

The State Water Board has historically developed the water quality control plan for the Bay-Delta for several reasons. The Bay-Delta is a critically important natural resource that is both the hub of California's water supply system and the most valuable estuary and wetlands system on the West Coast. Because diversions of water within and upstream of the Bay-Delta are a driver of water quality in the Bay-Delta watershed, much implementation of the Bay-Delta Plan relies on the combined water quality and water right authority of the State Water Board. In addition, the Bay-Delta falls within the boundaries of two Regional Water Boards. Having the State Water Board develop and adopt a water quality control plans that crosses Regional Water Board boundaries ensures a coordinated approach.

The beneficial uses in the Bay-Delta Plan are: municipal and domestic supply; industrial service supply; industrial process supply; agricultural supply; groundwater recharge; navigation; water contact recreation; non-contact water recreation; shellfish

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harvesting; commercial and sport fishing; warm freshwater habitat; cold freshwater habitat; migration of aquatic organisms; spawning, reproduction, and/or early development; estuarine habitat; wildlife habitat; and rare, threatened, or endangered species.

In 2018, the Bay-Delta Plan was updated to adopt new and revised Lower San Joaquin River (LSJR) flow objectives and revised southern Delta salinity objectives. The LSJR flow objectives apply from February – June to the Stanislaus, Tuolumne, and Merced Rivers and include a baseflow requirement that applies on the San Joaquin River (SJR) at Vernalis (Vernalis). In addition, the Bay-Delta Plan includes a revised southern Delta salinity objective of 1.0 deciSiemens/meter (dS/m) electrical conductivity (EC) at Vernalis and at the three interior southern Delta stations for the protection of agricultural beneficial uses.

5.3 Clean Water Act Section 303(d) Listing

On October 3, 2017, the State Water Board listed the Tuolumne River on the Clean Water Act Section 303(d) list of impaired waterbodies. USEPA approved the California 303(d) list on April 6, 2018. New Don Pedro Reservoir is impaired for mercury. The Tuolumne River, from New Don Pedro Reservoir to the San Joaquin River, has been identified as being impaired by chlorpyrifos, diazinon, Group A pesticides², mercury, temperature, and toxicity. Section 303(d) of the Clean Water Act requires total maximum daily loads (TMDLs) to be developed for impaired waterbodies. TMDLs are written plans that define the maximum amount of a pollutant that a waterbody can receive without exceeding water quality standards and establish load allocations for point and nonpoint sources of pollution.

5.4 Construction General Permit

The Districts may need to obtain coverage under the ***General Permit for Stormwater Discharges Associated with Construction and Land Disturbance Activities*** (Construction General Permit)³ for activities that disturb one or more acres of soil or activities that disturb less than one acre but are part of a larger common plan of development that in total disturbs one or more acres. Construction activities subject to the Construction General Permit include clearing, grading, and disturbances to the ground, such as stockpiling or excavation, but does not include regular maintenance activities performed to restore the original line, grade, or capacity of the facility.

² Group A pesticides consist of aldrin, dieldrin, chlordane, endrin, heptachlor, heptachlor epoxide, hexachlorocyclohexanes (including lindane), endosulfan, and toxaphene.

³ Water Quality Order No. 2009-0009-DWQ NPDES No. CAS000002, as amended by Order No. 2010-0014-DWQ and Order No. 2012-0006-DWQ. Available online at: https://www.waterboards.ca.gov/water_issues/programs/stormwater/construction.html Last accessed: November 5, 2020.

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5.5 State Wetland Definition and Procedures for Discharges of Dredged or Fill Material to Waters of the State

On April 2, 2019, the State Water Board adopted the *State Wetland Definition and Procedures for Discharges of Dredged or Fill Material to Waters of the State* (Procedures), which became effective on May 28, 2020. The Procedures provide California's definition of wetland, wetland delineation procedures, and procedures for submitting applications for activities that could result in discharges of dredged or fill material to waters of the state. The Procedures ensure that State Water Board regulatory activities will result in no net loss of wetland quantity, quality, or permanence, compliant with Executive Order W-59-93. The Districts must comply with the Procedures when conducting dredge or fill activities that may impact waters of the state, including wetlands.

5.6 Aquatic Weed Control General Permit

The *Statewide National Pollutant Discharge Elimination System Permit for Residual Aquatic Pesticide Discharges to Waters of the United States from Algae and Aquatic Weed Control Applications* (Aquatic Weed Control General Permit)⁴ applies to projects that require aquatic weed management activities. The Aquatic Weed Control General Permit sets forth detailed management practices to protect water quality from pesticide and herbicide use associated with aquatic weed control.

5.7 Statewide Mercury Provisions

On May 2, 2017, the State Water Board adopted Resolution No. 2017-0027, which approved *Part 2 of the Water Quality Control Plan for Inland Surface Waters, Enclosed Bays, and Estuaries of California—Tribal and Subsistence Fishing Beneficial Uses and Mercury Provisions*.⁵ Resolution No. 2017-0027 provides a consistent regulatory approach throughout the state by setting mercury limits to protect the beneficial uses associated with the consumption of fish by both people and wildlife. The State Water Board also established definitions for three new beneficial uses (tribal traditional culture, tribal subsistence fishing, and subsistence fishing) for use by the State Water Board and Regional Water Boards. The State Water Board also approved one narrative and four numeric mercury objectives to apply to inland surface waters, enclosed bays, and estuaries of the state that have any of the following beneficial use definitions: commercial and sport fishing, tribal traditional culture, tribal subsistence fishing, wildlife habitat, marine habitat, preservation of rare and endangered species, warm freshwater habitat, cold freshwater habitat, estuarine habitat, or inland saline

⁴ Water Quality Order No. 2013-0002-DWQ and NPDES No. CAG990005, as amended by Order No. 2014-0078-DWQ, Order No. 2015-0029-DWQ, Order No. 2016-0073-EXEC, and any amendments thereto. Available online at: https://www.waterboards.ca.gov/water_issues/programs/npdes/pesticides/weed_control.html. Last accessed: November 5, 2020.

⁵ Available online at: https://www.waterboards.ca.gov/water_issues/programs/mercury/ Last accessed: November 5, 2020.

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water habitat, with the exception of waterbodies or waterbody segments with site-specific mercury objectives. These provisions will be implemented through National Pollution Discharge Elimination System (NPDES) permits, certifications, waste discharge requirements, and waivers of waste discharge requirements.

6.0 California Environmental Quality Act

The Districts are the lead agencies for the purposes of CEQA compliance. (Pub. Resources Code, §§ 21000 – 21177.) The State Water Board is a responsible agency. As of the date of this certification, the Districts have not initiated the CEQA process. On June 29, 2020, Governor Newsom signed into law amendments to the Water Code that provide the State Water Board with the authority to issue certifications before completion of CEQA review, where waiting until completion of CEQA review presents a substantial risk of waiver of certification authority. (See Wat. Code, section 13160, subd. (b)(2), as amended by Stats. 2020, ch. 18, § 9.) On October 2, 2020, the Districts petitioned FERC to issue a declaratory order finding that the State Water Board waived certification. The State Water Board may now issue certification before CEQA review is complete.

The issuance of this certification does not obviate the Districts' or the State Water Board's obligations under CEQA, and the State Water Board, pursuant to Water Code section 13160, subdivision (b)(1), reserves authority to reopen and revise this certification "as appropriate to incorporate feasible measures to avoid or reduce significant environmental impacts or to make any necessary findings based on the information provided in the environmental document prepared for the project." If the State Water Board exercises this authority, it will file a Notice of Determination with the State Clearinghouse within five days of issuance of an amended certification.

7.0 Rationale for Water Quality Certification Conditions

Water development projects in the LSJR watershed, including the Projects on the Tuolumne River, have resulted in reductions in flows and alterations in the flow regime that adversely affect water quality. The Projects' impacts on water quality and beneficial uses are addressed in this certification. The certification conditions were developed to ensure that the Projects comply with water quality requirements and other appropriate requirements of state law, including the protection of beneficial uses of California's waters by complying with water quality objectives in water quality control plans and other applicable water quality requirements. Section 401 of the federal Clean Water Act (33 U.S.C. § 1341) provides that the conditions contained in this certification be incorporated as mandatory conditions of the new license(s) issued by FERC for the Projects.

When preparing the conditions in this certification, State Water Board staff reviewed and considered:

- The final license applications, including amendments and errata, submitted by the Districts to FERC (Districts 2017A);

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- The Districts' applications for certification;
- Comments submitted on the license applications;
- The Draft EIS (FERC 2019) and Final EIS (FERC, 2020) prepared pursuant to NEPA, including comments submitted on the Draft EIS;
- CDFW's 10(j) Recommendations (CDFW 2018);
- NMFS' 4(e) Conditions and 10(j) Recommendations;
- BLM's Comments, Recommendations, Preliminary Terms and Conditions, and Preliminary Fishway Prescriptions for the Don Pedro Hydroelectric Project (BLM, 2018A), Comments, Recommendations, Preliminary Terms and Conditions, and Preliminary Fishway Prescriptions for the La Grange Hydroelectric Project (BLM, 2018B), and Revised Conditions and Recommendations (BLM, 2018C);
- Existing and potential beneficial uses and associated water quality objectives in the SR/SJR Basin Plan and Bay-Delta Plan (State Water Board, 2018B);
- Final 2014/2016 California Integrated Report (Clean Water Act Section 303(d) List/305(b) Report) (State Water Board, 2017B);
- Projects-related controllable water quality factors;
- Comments submitted on the draft certification for the Projects; and
- Other information in the record.

The following describes the rationale used to develop the conditions in this certification that are needed to address water quality impacts of the Projects.

7.1 Rationale for Condition 1 –Instream Flows

Condition 1 is a suite of instream flow requirements that are based on FERC staff recommended minimum instream and spring pulse flows, CDFW fall pulse flow recommendations, and Bay-Delta Plan flow requirements, which are necessary to meet state water quality standards and other appropriate requirements of state law.

Conditions 1.B, 1.C, and 1.D are based on information contained in FERC's 2020 Final EIS, CDFW recommendations to FERC (CDFW, 2018), the 2018 *Final Substitute Environmental Document in Support of Potential Changes to the Water Quality Control Plan for the San Francisco Bay-Sacramento San Joaquin Delta Estuary* (2018 SED) (State Water Board, 2018A),⁶ and other scientific information that became available after the State Water Board adopted the 2018 SED.

Condition 1.B includes FERC staff recommendations for minimum instream flows year-round with modifications that: (i) prevent minimum instream flows from falling below 200 cfs; and (ii) require the 75 percent exceedance forecast in determining the water year type. Minimum instream flows apply at La Grange Dam and one or more new points of diversion or rediversion downstream. Pulse flows required by Condition 1.C

⁶ Available online at: https://www.waterboards.ca.gov/waterrights/water_issues/programs/bay_delta/bay_delta_plan/water_quality_control_planning/2018_sed/ Last Accessed: November 5, 2020.

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are based on FERC staff recommended spring floodplain and outmigration pulse flows ("spring pulse flows") and CDFW recommended fall pulse flows. The requirement for flows to be at least 200 cfs during the July through January period is based on maintaining recreational beneficial uses,⁷ supporting equitable access to water-based recreation for urban and rural communities, and minimizing poor water quality and habitat conditions that promote invasive plants and predatory fish. CDFW identified that the minimum instream flows proposed by the Districts in the amended final license application and, subsequently, in FERC's Final EIS are not sufficient to support salmonid holding, spawning, and rearing in the lower Tuolumne River (CDFW, 2018). Analyses in the 2018 SED and more recent scientific information show that flows greater than the FERC recommended flows are needed to provide reasonable protection of native resident and migratory fish species that use the Tuolumne River, LSJR, and Bay-Delta, and that such flows have been impacted by the Projects. Accordingly, Condition 1.D applies Bay-Delta Plan flows in the February through June time period, which consist of a narrative objective, a percent of unimpaired flow objective at the confluence of the Tuolumne River and the LSJR, and a base flow objective for the San Joaquin River at Vernalis.

Bay-Delta Plan flows can be used to meet the requirements of Conditions 1.B and 1.C in the February through June time period or contribute to flow requirements from July to January (e.g., fall pulse flows) with State Water Board approved adaptive implementation of Condition 1.D flows or through a voluntary agreement approved by the State Water Board.

The California Natural Resources Agency and the California Environmental Protection Agency are currently leading efforts to negotiate voluntary agreements to improve conditions for native fish throughout the Bay-Delta Watershed, including in the Tuolumne River. These agreements, if achieved, would help provide reasonable protection of the fish and wildlife beneficial uses by implementing a combination of flow and non-flow actions over a 15-year period. The Bay Delta Plan includes provisions for implementing plan requirements through voluntary agreements. Pursuant to the Bay-Delta Plan, at a minimum, voluntary agreements must include provisions for transparency and accountability, monitoring and reporting, and for planning, adaptive adjustments, and periodic evaluation, that are comparable to similar elements contained in the program of implementation for the LSJR flow objectives. The State Water Board may consider approval of voluntary agreements that do not meet the Bay Delta Plan's requirements after conducting any necessary technical and environmental analyses, and if necessary, complying with appropriate procedures to amend the Bay-Delta Plan. The State Water Board may also consider and accept voluntary agreements that include measures to comply with water quality requirements that are in addition to provisions included in applicable water quality control plans (e.g., gravel and large

⁷ Canoeing and rafting, contact recreation, and non-contact recreation are existing beneficial uses for the Tuolumne River from Don Pedro Reservoir to the confluence with the SJR (SJ/SJR Basin Plan, Central Valley Regional Water Board, 2018).

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woody material augmentation, floodplain restoration), and may amend this certification accordingly. As discussed below, the State Water Board may amend the certification to accommodate a voluntary agreement.

Future updates to the Bay-Delta Plan may be approved by the State Water Board to include specific provisions for voluntary agreements as a means of implementing the water quality objectives for the protection of fish and wildlife beneficial uses. As stated in Condition 27 (compliance with the Bay-Delta Plan and SR/SJR Basin Plan) and Condition 28 (compliance with other applicable standards and plans), the Projects must be operated in a manner consistent with all applicable water quality standards and implementation plans adopted or approved pursuant to the Porter-Cologne Water Quality Control Act or section 303 of the Clean Water Act. Moreover, as stated in Conditions 23 and 24 (reservations of authority), the State Water Board reserves the authority to add to or modify the conditions of the certification to implement any new or revised water quality standards and implementation plans, including revisions that provide for implementation through a voluntary agreement approved by the State Water Board.

7.1.1 Rationale for Condition 1.A: Water Year Type

This certification uses the San Joaquin Valley 60-20-20 Water Year Hydrological Classification Index (San Joaquin Valley 60-20-20 Index or SJV 60-20-20 Index) established in State Water Board Revised Water Right Decision 1641 (State Water Board, 2000) and the Bay-Delta Plan where flow requirements and other measures are based on water year type. The San Joaquin Valley 60-20-20 Index is calculated, in units of thousand acre-feet (TAF), using the monthly sum of unregulated runoff (i.e., unimpaired flow) into New Melones Reservoir (Stanislaus River), New Don Pedro Reservoir (Tuolumne River), Exchequer Reservoir (Merced River), and Millerton Lake (San Joaquin River) and the prior year's water year index volume as shown in the following equation.

$$\text{SJV 60-20-20 Index (TAF)} = 60\%(\text{sum current year April through July unimpaired runoff}) + 20\%(\text{sum current year March through October unimpaired runoff}) + 20\%(\text{the minimum between prior year index volume or 4,500 TAF}).$$

The San Joaquin Valley 60-20-20 Index includes five-water year classifications: Wet (W), Above Normal (AN), Below Normal (BN), Dry (D), and Critically Dry (C). The water year classification for the San Joaquin River flow objectives will be established using the best available estimate of the San Joaquin Valley 60-20-20 Index at the 75 percent exceedance level. FERC's Final EIS and the Districts' amended final license application also recommend use of the San Joaquin Valley 60-20-20 Index; however, the FERC staff recommendation uses the best available estimate of the San Joaquin Valley 60-20-20 Index at the 90 percent exceedance level in spring months. Use of the 90 percent exceedance forecast to determine flow requirements results in a shift to lower river flow requirements associated with drier water year types and would result in lower river flows in more months than would occur with the 75 percent exceedance

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forecast. The minimum instream flows and pulse flows in Condition 1.B and 1.C are based on the San Joaquin Valley 60-20-20 Index using the 75 percent exceedance to remain consistent with the definition in the Bay-Delta Plan and the intent of improving flows to protect fish and wildlife beneficial uses.

7.1.2 Rationale for Condition 1.B: Minimum Instream Flows Below La Grange Dam and Below a Potential New Point or Pointa of Diversion or Rediversion

Condition 1.B contains water year type-specific, minimum instream flow requirements on the Tuolumne River immediately downstream of La Grange Dam and downstream of the proposed addition of one or more points of diversion or rediversion associated with one or more infiltration galleries. The year-round minimum instream flows in Condition 1.B are based on FERC staff recommended minimum flows with modifications that do not allow flows to fall below 200 cfs from July through January. The FERC staff recommended minimum instream flows are based on San Joaquin Valley 60-20-20 Index water year type (see section 7.1.1 for the water year type rationale).

The requirement for flows to be at least 200 cfs in the July through January period is based on the need to maintain recreational beneficial uses⁸. The Districts' *Lower Tuolumne River Lowest Boatable Flow Study Report* (Districts, 2013A) shows 200 cfs as the boatable flow value identified by 90 percent of study participants. The Final EIS states that a flow of 200 cfs provides the lowest boatable flow for canoes and hardshell and inflatable kayaks based on the *Lower Tuolumne River Lowest Boatable Flow Study Report* (Districts, 2013A). The Final EIS includes an analysis of frequency of boatable conditions under multiple proposed flow schedules including the FERC staff recommended flows with and without operation of the proposed infiltration galleries.

The Final EIS boatable flows analysis shows that recreational boating is unavailable downstream of the infiltration galleries for the majority of the May through October time period in Dry and Critically Dry years under the FERC staff flow recommendation. Boatable flow conditions of 200 cfs or greater downstream of the infiltration galleries occur 39 percent of the time in Dry water years and 29 percent of the time in Critically Dry water years during the May through October recreational season under the FERC staff recommended flows. In July, August, and September months of Dry years boatable flows occur 16, 6, and 10 percent of the time, respectively, and zero percent of the time for all three months in Critically Dry years under FERC staff recommended flows. The Districts propose to modify operation of the infiltration galleries to provide flows of 200 cfs for 12 boatable recreational days in June through October 15; however, the record does not support the conclusion that 12 boatable days provides reasonable access to the urban and rural communities seeking boating recreation opportunities

⁸ Canoeing and rafting, contact recreation, and non-contact recreation are existing beneficial uses for the Tuolumne River from Don Pedro Reservoir to the confluence with the SJR (SJ/SJR Basin Plan, Central Valley Regional Water Board, 2018).

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downstream of the infiltration galleries and is protective of recreational uses generally. Instead, expected increased demand and the need to protect the water quality attributes of the water body that support recreational uses support the condition. The FERC Final EIS states that demand for recreational activities such as boating, wildlife viewing, and fishing are expected to increase with local population growth, which are expected to increase the demand for recreational experiences on the lower Tuolumne River. Additionally, as discussed below, there are water quality concerns associated with the FERC staff recommended flows during this period of time.

Flows of 200 cfs and lower in the lower Tuolumne River are also associated with warm water temperature, water hyacinth growth, poor water quality, stagnant conditions that support warm water predatory fish, poor aesthetic quality, and inequitably affect access to natural resources for urban and rural communities. The relationship between low flows and high temperatures is firmly established and summarized in the 2018 SED (State Water Board, 2018A). The *Lower Tuolumne River Lowest Boatable Flow Study Report* (Districts, 2013A) documents that water hyacinth mats completely spanned the river in 2012 at two locations between Riverdale Park and Shiloh Bridge and contributed to low boat-ability scores. Annual reports to FERC for the Don Pedro Hydroelectric Project also document water hyacinth, warm water temperatures, and presence of introduced predatory fish species (e.g., Districts 2015, 2016, and 2017B). Excessive plant growth, such as water hyacinth, and warm water are both associated with poor water quality such as low dissolved oxygen (State Water Board, 2018A) and can be harmful to salmon and other species as discussed in the rationale for Condition 3. Clear relationships have been demonstrated between reduced flow and depressed dissolved oxygen concentrations in other Central Valley waterbodies (Central Valley Regional Water Board, 2005).

FERC staff recommended minimum instream flows, floodplain pulse flows, and outmigration pulse flows are required at La Grange Dam in combination with Bay-Delta Plan flows, which are required at the flow gage nearest to the confluence with the LSJR⁹ (Condition 1.D), because river flows higher than FERC staff recommendations are needed to provide reasonable protection of fish and wildlife. The 2018 SED, which supports the Bay-Delta Plan LSJR flow objectives, and CDFW minimum instream flow rationale (CDFW, 2018) show that flows higher than the minimum instream flows required in the current FERC license and the FERC staff recommended minimum instream flows are associated with higher juvenile Chinook salmon survival.

CDFW minimum instream flow recommendations were developed to achieve the five functional flow components of the natural hydrograph in the eastern Central Valley:

⁹ The Bay-Delta Plan program of implementation for the LSJR flow objectives states that the Executive Director may approve changes to the compliance locations and gage station numbers if information shows that another location and gage station more accurately represent the flows of the LSJR tributary at its confluence with the LSJR.

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(1) fall or winter pulse flows (freshets/first inundation flows of the wet season); (2) winter base flows (storm and peak flows); (3) spring snowmelt flows; (4) snowmelt recession flows; and (5) base flows. CDFW developed minimum instream flow levels based on flows needed to: achieve instream physical habitat as estimated by weighted usable area (WUA); achieve USEPA temperature criteria the majority of the time; activate and sustain floodplain habitats prior to and through the spring recession for successful outmigration; and successfully attract adult spawning-aged fish in the fall (CDFW, 2018). A recent (ISAP, 2019) evaluation of juvenile Chinook salmon survival data on the Stanislaus River shows that measured juvenile survival decreased with increased instream physical rearing habitat (WUA). This occurs because WUA modeling estimates for juvenile Chinook physical rearing habitat are maximized at relatively low flows (e.g., 75 cfs). However, spawner and juvenile data show that higher juvenile survival occurs during times of higher flows rather than under model estimates of increased physical rearing habitat. The same analysis shows that higher instream flows have a stronger, positive relationship with spawning success than WUA.

Minimum instream flows in Condition 1.B, in combination with pulse flows in Condition 1.C and Bay-Delta Plan flows in Condition 1.D, are consistent with the CDFW approach to identifying functional flow components in support of fish and wildlife. Implementing Bay-Delta Plan flows will generally result in greater river flows in the February through June months than Condition 1.B and Condition 1.C flows alone. Bay-Delta Plan flows and pulse flows also include options for shaping and shifting flows to meet the needs of the five functional flow components.

7.1.3 Rationale for Condition 1.C: Pulse Flows

Condition 1.C requires implementation of a spring floodplain pulse flow and spring outmigration pulse flow consistent with the FERC Final EIS's staff recommendation (FERC, 2020), and a fall attraction pulse flow as recommended by CDFW (CDFW, 2018). The FERC staff recommendation includes a spring floodplain pulse flow of 2,750 cfs for 9 – 20 days depending on water year type and timed to support salmon springtime rearing and outmigration pulse flows to facilitate survival of migrating juvenile salmon. It is anticipated that the flows required in Condition 1.D (Bay-Delta LSJR flows) will generally provide greater volumes of water in the spring than the combination of Condition 1.B flows (minimum instream flows) and Condition 1.C flows (pulse flows) in the spring. In the spring, if timed appropriately, floodplain pulse flows will activate floodplain and increase the quality and quantity of rearing habitat for juvenile salmon and the outmigration pulse flows will stimulate native migratory fish migration to the ocean prior to stressful summer flow and temperature conditions. The combination of FERC staff recommended minimum instream and pulse flows at La Grange Dam, and LSJR Bay-Delta Plan flows at Modesto should result in benefits to fisheries consistent with CDFW and Bay-Delta Plan analyses while providing opportunities to maximize water supply reliability.

The CDFW fall pulse flows are based on providing fall freshet attraction flows for spawning adults (CDFW, 2018). For example, during the fall, specifically in October or

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November, a pulse flow would help to attract adult native migratory fish to the mouth of the Tuolumne River and stimulate upstream migration to the primary spawning area between La Grange Dam and Turlock State Park.

Pulse flows provide important geomorphic benefits, such as mobilizing spawning gravel and flushing sediment. Absent high flow events, especially in drier water years, river reaches can accumulate fine grained sediments, decreasing the amount of available spawning habitat. Furthermore, pulse flows and a more natural flow regime will better support aquatic life by maintaining or improving aquatic habitat. Pulse flows are needed to consistently inundate floodplains for a stretch of time, particularly during the spring, to provide rearing and foraging habitat for juvenile native resident and migratory fish in overbank areas. Pulse flows also stimulate development of floodplain vegetation that could provide protective cover for juvenile native resident and migratory fish and additional shade to the channel during warmer months when water temperature limits the suitability of native fish habitat in the lower Tuolumne River.

7.1.4 Rationale for Condition 1.D: Bay-Delta Plan Lower San Joaquin River Flows

Condition 1.D requires implementation of the Bay-Delta Plan's LSJR flow objectives (LSJR Bay-Delta flows), which are both narrative and numeric, to reasonably protect native fish and wildlife beneficial uses in the LSJR watershed to Bay-Delta. The narrative objectives require, in part, maintaining inflow conditions from the SJR watershed to the Bay-Delta at Vernalis that are sufficient to support and maintain the natural production of viable native SJR watershed fish populations migrating through the Delta. The numeric objective requires flows that more closely mimic natural hydrograph conditions. The program of implementation for the flow objectives provides flexibility for the flows to be adjusted, shaped, or shifted, if information supports that adaptively implementing the flows better achieves the narrative goal of supporting native SJR watershed fish populations.

The SJR watershed once supported large spring-run and fall-run (and possibly late fall-run) Chinook salmon populations; however, it is widely thought that the watershed now only supports fall-run Chinook salmon populations, and these populations are at risk. Reduced flow is recognized as a primary driver of the decline of riverine ecosystem conditions and fish species abundance and distribution. Nearly every feature of habitat that affects native fish and wildlife is, to some extent, determined by flow (e.g., temperature, water chemistry, and physical habitat complexity). The LSJR flow objectives in the Bay-Delta Plan protect fish and wildlife beneficial uses in the LSJR watershed.

The program of implementation for the flow objectives allows for adaptive implementation of the percent of unimpaired flow requirement. This adaptive implementation enables the magnitude and timing of flows to be adjusted, within the 30–50 percent of unimpaired flow range, when such adjustments result in better protection of fishery resources than rigidly following the unimpaired flow value on a

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seven-day running average. In addition, non-flow measures could improve habitat conditions for fish and wildlife, which may support a change in the required percent of unimpaired flow, within the prescribed range, or other adaptive adjustments that may collectively reduce the water supply and economic effects resulting from implementing the 2018 Bay-Delta Plan.

Adaptive implementation of flow is intended to accomplish the following goals:

- **Maximize fisheries benefits at potentially lower water cost.**
- **Respond to changing information and changing conditions, including changes in flow patterns from climate change.**
- **Minimize adverse water temperature effects.**
- **Support scientific efforts to assess the benefits of different flow regimes and other habitat improvements.**

Tuolumne River flows that meet the February – June LSJR flow objectives are generally greater than the baseflows and pulse flows identified in Conditions 1.B (minimum instream flows) and 1.C (pulse flows). The higher flows required by Condition 1.D (LSJR Bay-Delta flows) support achieving temperature criteria in Table 3 (Condition 3) during the February through June time period and may contribute to meeting temperature criteria from July through November upon State Water Board approval and application of adaptive implementation methods. The 2018 SED provides the scientific basis for requiring LSJR numeric flow objectives for the reasonable protection of native fish and wildlife beneficial uses. The 2018 SED shows that flows greater than baseline and the FERC staff recommendation are needed to provide reasonable protection for LSJR native resident and migratory fish species. Accordingly, Condition 1.D requires the Districts to meet the Tuolumne River portion of the LSJR flow objectives including the percent of unimpaired flow objective near the confluence of the Tuolumne River with the LSJR. Condition 1.D also acknowledges that the Bay-Delta Plan allows for the percent of unimpaired flow objective to be implemented as a total volume of water that can be applied adaptively within and outside the February through June time period to achieve the best biological outcome while reducing water supply impacts.

As described in the rationale for Condition 1.B, Bay-Delta Plan percent of unimpaired flow objectives are consistent with the CDFW approach to identifying functional flow components to protect ecological functions and support fish and wildlife. CDFW minimum instream flow recommendations are the base flows needed to achieve the five functional flow components of the natural hydrograph in the eastern Central Valley. Bay-Delta Plan flows are generally higher than recommended minimum instream flows and pulse flows and can be used as a block of water to achieve functional flow targets from February through June and supplement functional flow components (e.g., summer base flows, fall attraction flows) from July through January if approved as part of adaptive implementation.

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As discussed above, voluntary agreements may provide a means of implementing the Bay-Delta Plan's requirements. In addition, the State Water Board may modify the conditions of the certification to implement any new or revised water quality standards and related provisions, including revisions that provide for implementation through a voluntary agreement approved by the State Water Board.

7.1.5 Rationale for Condition 1.E: Compliance Methods

Compliance methods for minimum instream flows (Condition 1.B), pulse flows (Condition 1.C), and LSJR flow objectives (Condition 1.D) are needed to track and account for flows, including flows that are used as a volume or "block" of water to comply with the pulse flows and LSJR flow objectives. Implementing the LSJR percent of unimpaired flow objective requires development of methods to monitor and evaluate compliance. Flow objectives in water quality control plans and permits have traditionally been established as flow schedules by water year type with flows established at a fixed flow rate in cfs for a stated time period (e.g., monthly, 30-days, 14-days, or some other specific time increment). Similarly, compliance methods that track and account for flows that are established as a block or volume of water, such as pulse flows or LSJR flow objectives using adaptive methods, need to be established and approved by the State Water Board. On September 20, 2019, the State Water Board released a draft guidance document, *Initial Unimpaired Flow Compliance Measures*, (State Water Board, 2019B) which identifies basic steps for monitoring and assessing compliance with the LSJR unimpaired flow objectives and identifies issues to be resolved. State Water Board staff have been continuing to develop and refine compliance measures, including identifying options for voluntary agreements. Staff anticipate submitting an updated Unimpaired Flow Compliance Measures document to the State Water Board's Executive Director for consideration.

An evaluation of compliance also includes measuring and monitoring flows at compliance points specified in Condition 1. Condition 1 requires installation and operation of a new gage downstream of infiltration galleries to be added as points of diversion or rediversion, including TID's proposed point of rediversion, before water is diverted at the new point or points of diversion or rediversion. The new gage is necessary to monitor minimum instream flows downstream of the diversion or rediversion and establish compliance with minimum flows and pulse flows.

7.1.6 Rationale for Condition 1.F: Annual Operations Plans

Condition 1.F requires the development of annual operations plans to promote comprehensive water resource management, including efficient and effective management of water resources for water supply and biological beneficial uses. The annual operations plans must address implementation of the flows identified in Conditions 1.B (minimum instream flows), 1.C (pulse flows), and 1.D (LSJR Bay-Delta Plan flows), ramping rates in Condition 2, and carryover storage requirements in Condition 3. Annual operations plans will be based on a forecast, or multiple forecasts, of predicted inflow to the watershed. Examples of available forecasts include the San Joaquin River water year forecast of monthly unimpaired flow produced by the

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California Department of Water Resources (DWR),¹⁰ released in December of the new water year and is updated monthly until May, and monthly inflow forecasts produced by the California Nevada River Forecast Center.¹¹ Best available information may not accurately reflect actual precipitation and snowpack conditions that occur as the water year progresses. Accordingly, it is expected that annual operations plans may need to be modified as the year progresses and information about available water supply improves. The process of developing an annual operations plan supports tracking operations decisions and identifying potential deviations from the approved plan as the water year progresses, such that proposed modifications can be submitted for approval, if necessary.

The Bay-Delta Plan requires annual adaptive operations plans to identify adaptive implementation actions for achieving the LSJR flow objectives. The annual operations plan required under Condition 1.F may be used to fulfill the Bay-Delta Plan's requirements for annual adaptive operations plans as long as the Bay-Delta Plan's requirements are met.

7.1.7 Rationale for Condition 1.G: Dry Year Management Operations Plan

Developing and implementing a Dry Year Management Operations Plan is important for successful management of water resources to protect all beneficial uses in California's extremely variable climate, which includes extended drought. Multiple, successive dry years present difficult choices between releasing reservoir water to meet immediate demands (deliveries and instream flow requirements) or storing reservoir water for a future year to address the risk of additional dry year(s). The Dry Year Management Operations Plan should identify available strategies for managing the need to release water from storage to fulfill seasonal water demand with the need to retain water in storage for future demand.

7.2 Rationale for Condition 2 – Ramping Rates

Projects' operations can cause abrupt flow and stage fluctuations in stream reaches. These fluctuations and the rate at which they occur (i.e., ramping rate) may strand or otherwise impact aquatic species. To avoid rapid changes in river flow that may adversely impact aquatic life and minimize risk of juvenile stranding or redd dewatering, Condition 2 requires the Districts to implement specific down-ramping rates of: (1) no more than two-inches per hour; and (2) a change in flow of less than or equal to 500 cfs in any 24-hour period. The down-ramping rates will be measured at the existing gage near La Grange Dam (USGS gage no. 11289650). Condition 2 provides an off-ramp for

¹⁰ Available at <https://cdec.water.ca.gov/snow/bulletin120/> by clicking on "San Joaquin River Water Year Forecast Breakdown: Latest." Last accessed: January 14, 2021.

¹¹ Available at <https://www.cnrfc.noaa.gov/ensembleProduct.php?id=NDPC1&prodID=8>. Last accessed: January 14, 2021.

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higher ramping rates required by USACE's flood control guidelines (USACE, 1972), and updates thereto, to ensure safety for people and property during high-flow events.

The FERC Final EIS states that numerous studies in California have shown that ramping rates in the one- to two- inches per hour range minimize adverse effects to aquatic biota. The FERC Final EIS cites a 2004 PacifiCorp (PacifiCorp, 2004) literature-based assessment of ramping profiles in river reaches impacted by the Klamath Hydroelectric Project and recommendations in Hunter (Hunter, 1992) that support limiting reductions in river stage to one- to two- inches per hour as generally protective of juvenile anadromous salmonids. The FERC Final EIS also contains an analysis of water years 1971 – 2012 that shows an hourly stage change downstream of La Grange Dam of one-inch per hour or less was met 97 percent of the time for all proposed and recommended flow regimes (see Table 3.3.2-41, page 3-179). Condition 2 allows for the modification of ramping rates with the support of the Tuolumne River Anadromous Fish Committee and supporting technical documentation.

7.3 Rationale for Condition 3 – Temperature Management and Monitoring Plan

The Tuolumne River, including La Grange Reservoir, is listed on the Clean Water Act 303(d) list as impaired for elevated water temperatures, which adversely affects cold water beneficial uses on the Tuolumne River (State Water Board, 2017B). The Bay-Delta Plan protects the beneficial uses of the Bay-Delta and tributary watersheds, including the SJR watershed and its tributaries. As described in Section 5.2 of the certification, the Bay-Delta Plan and the SR/SJR Basin Plan designate cold-water beneficial uses that apply to the lower Tuolumne River. The Central Valley Regional Water Board evaluated temperature monitoring data to determine whether the migration and spawning cold water beneficial uses were being attained by comparing the current temperatures to the temperature criteria of salmonid species identified in the USEPA *Region 10 Guidance for Pacific Northwest State and Tribal Temperature Water Quality Standards* (USEPA, 2003). Through this public process, the Central Valley Regional Water Board determined that these temperature criteria best represent "natural receiving water temperatures" and the benchmark conditions necessary to protect fish and wildlife beneficial uses (Central Valley Regional Water Board, 2009). Monitoring data show elevated temperature conditions on the lower Tuolumne River that exceed the USEPA Region 10 guidance, which lead to its inclusion on the State Water Board's 303(d) list of impaired waterbodies for temperature in 2011.

Although the temperature criteria were developed for fish populations located in states north of California, USEPA considers the Region 10 guidance and its associated Technical Issue Papers (USEPA, 2001A; USEPA 2001B; USEPA, 2001C; USEPA, 2001D; USEPA, 2001E) the most comprehensive compilation of research related to salmonid temperature criteria available. The studies compiled in the USEPA guidance and associated technical issue papers address the full geographic extent of salmonid populations, including California. The State Water Board considered additional scientific papers and studies that have been completed on the thermal tolerance of

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salmonids in California's Central Valley in the 2018 SED and as part of the rationale for Condition 3.

Elevated water temperatures can significantly reduce habitat suitability for native resident and migratory fish. On the Tuolumne River, water temperature is largely controlled by flow releases from the reservoirs, and the Districts' operations of the Projects can affect water temperatures downstream (State Water Board, 2018A).

Water temperature is a primary driver of the productivity and survival of native resident and migratory salmonids. The role of water temperature in determining suitable habitat for aquatic organisms and the drivers that determine water temperature in the Tuolumne River are extensively discussed and supported by scientific studies summarized in the 2018 SED (State Water Board, 2018A). Water temperature is crucial to aquatic organisms because it directly influences their metabolism, respiration, feeding, behavior, growth, and reproduction. Most aquatic species have an optimal temperature range for growth and reproduction, and they are also bound by upper and lower temperature limits in which they can no longer survive or successfully reproduce. Temperature interacts with other environmental conditions, for example, temperature and dissolved oxygen are intrinsically linked in the aquatic environment (i.e., as temperatures increase the biochemical demand for oxygen increases, and as temperatures increase the solubility of oxygen decreases). Elevated water temperature and depressed dissolved oxygen concentrations can significantly reduce habitat suitability for native resident and migratory fish.

Carryover storage requirements are needed to preserve cold water that can be used to provide suitable downstream temperatures for Chinook salmon and steelhead and other cold-water native fish species. Carryover storage refers to the quantity of water stored in a reservoir at the end of a season or water year (i.e., September 30). Establishing a carryover storage requirement is consistent with the Bay-Delta Plan Program of Implementation to support and protect aquatic-life beneficial uses. Where reservoir operations could result in impacts on fish and wildlife, maintaining or storing cold water in a reservoir is often referred to as a cold-water pool.

The State Water Board simulated monthly average Tuolumne River temperatures below La Grange Dam in September – December (1970 – 2003) as a function of reservoir storage (State Water Board, 2018A). This analysis is summarized in Figure 3, which shows simulated temperature in the Tuolumne River below La Grange Dam and associated storage volumes for the months of September through December. Figure 3 shows that a carryover storage target of 800,000 AF in New Don Pedro Reservoir would likely provide La Grange Dam release temperatures of less than 56°F in September through November of most years with December temperatures being lower (State Water Board, 2018A). These temperature values and time periods are consistent with providing suitable temperature conditions as defined by USEPA temperature criteria (55.4°F, 13°C) that protect returning adults during their upstream migration, holding, spawning, and egg incubation.

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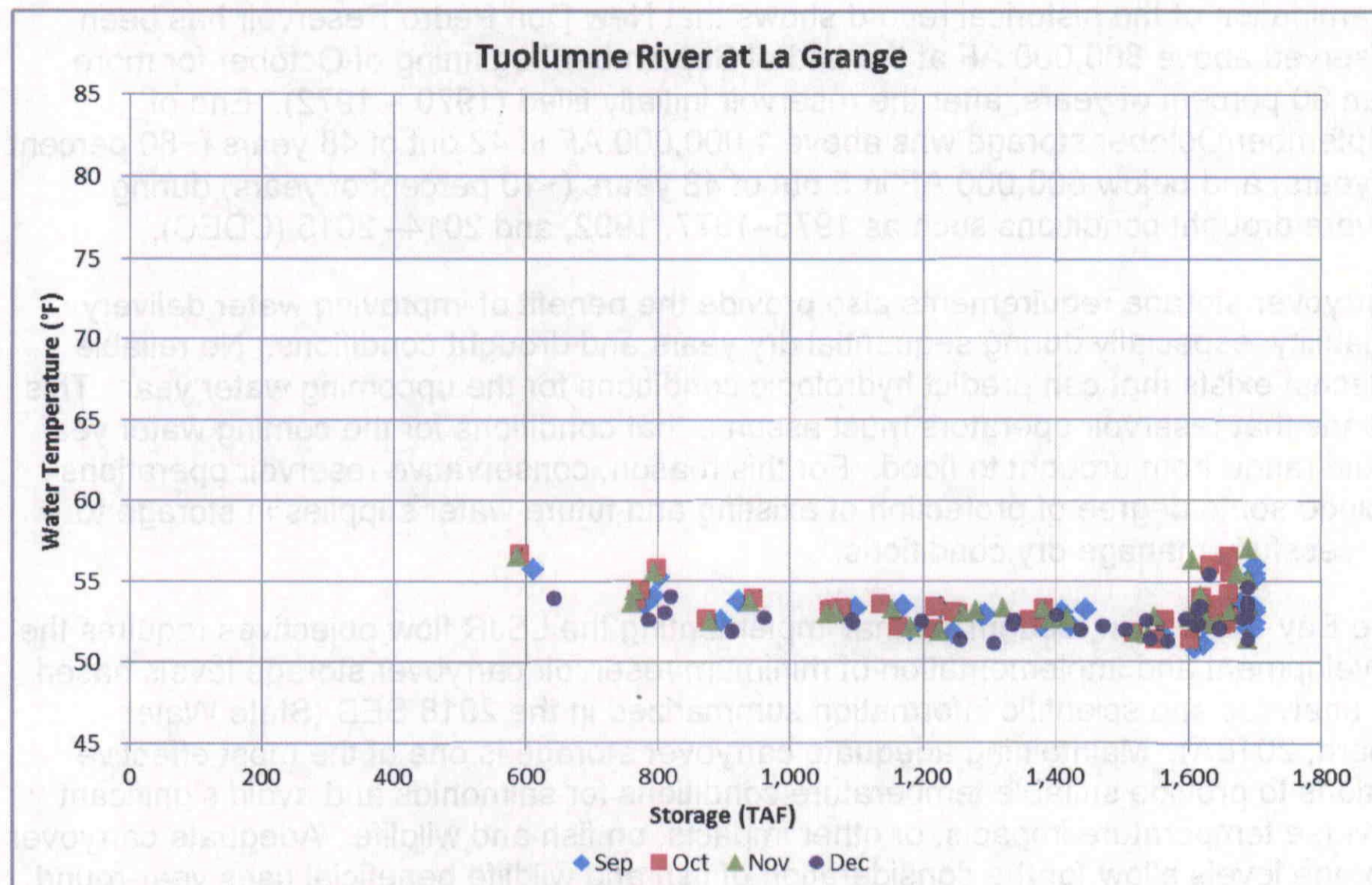


Figure 3. 2018 SED Appendix F.1, page F.1-210. "Figure F.1.6-6a Effects of New Don Pedro Storage on New Don Pedro and La Grange Simulated Water Temperatures September – December for Baseline Conditions 1970 – 2003."

Condition 3 requires the Districts to develop and implement a Temperature Management and Monitoring Plan that identifies carryover storage requirements and other actions needed to maintain suitable downstream temperature conditions and meet temperature targets within the Districts reasonable control. The Temperature Management and Monitoring Plan will be developed in consultation with the Tuolumne River Anadromous Fish Committee, the Tuolumne River Watershed Group, and appropriate state agencies, to ensure protection of water quality and the beneficial uses of water described in the Bay-Delta Plan and the SR/SJR Basin Plan.

Temperature targets identified in Table 3 are based on USEPA recommended temperature criteria for protection of salmonids¹² and information provided and analyzed in the 2018 SED (State Water Board, 2018A).¹³

¹² USEPA Region 10 Guidance for Pacific Northwest State and Tribal Temperature Water Quality Standards. April. USEPA 910-B-03-002. 49 pp.

¹³ Chapter 19 Analyses of Benefits to Native Fish Populations from Increased Flow between February 1 and June 30.

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Examination of the historical record shows that New Don Pedro Reservoir has been observed above 800,000 AF at the end of September/beginning of October for more than 90 percent of years, after the reservoir initially filled (1970 – 1972). End of September/October storage was above 1,000,000 AF in 42 out of 48 years (~80 percent of years) and below 800,000 AF in 5 out of 48 years (~10 percent of years) during severe drought conditions such as 1976–1977, 1992, and 2014–2015 (CDEC).

Carryover storage requirements also provide the benefit of improving water delivery reliability, especially during sequential dry years and drought conditions. No reliable forecast exists that can predict hydrologic conditions for the upcoming water year. This means that reservoir operators must assume that conditions for the coming water year could range from drought to flood. For this reason, conservative reservoir operations include some degree of protection of existing and future water supplies in storage to successfully manage dry conditions.

The Bay-Delta Plan recognizes that implementing the LSJR flow objectives requires the development and implementation of minimum reservoir carryover storage levels based on analyses and scientific information summarized in the 2018 SED (State Water Board, 2018A). Maintaining adequate carryover storage is one of the most effective actions to provide suitable temperature conditions for salmonids and avoid significant adverse temperature impacts, or other impacts, on fish and wildlife. Adequate carryover storage levels allow for the consideration of fish and wildlife beneficial uses year-round while focusing the LSJR flow objectives on the season that is most important to early life stages of several fish species (i.e., salmonid egg incubation, emergence, and juvenile rearing, migration, and smoltification).

Additional actions to control water temperature have been evaluated and implemented in California rivers and streams. For example, a temperature control device was necessary to improve the ability to control downstream water temperatures in the Sacramento River (State Water Board, 1990). The North Coast Regional Water Board has implemented temperature control programs that require riparian management or other restoration measures and coordinated efforts with local entities (North Coast Regional Water Board, 2018). Other possible actions to improve downstream water temperatures include, but are limited to, adaptive implementation of Bay-Delta Plan LSJR flows, modified or additional reservoir releases, cold water bypass, and modified power supply operations.

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Temperature target timing and locations are generally consistent with CDFW and NMFS 10(j) recommendations. In addition, the targets include protections for migrating salmonids to the confluence.

Condition 3 also allows the Deputy Director to set interim carryover storage requirements if the Districts fail to identify and implement carryover storage needed to maintain suitable downstream temperature conditions and meet temperature targets within the schedule identified in the condition.

7.4 Rationale for Condition 4 – Extremely Dry Conditions

California's history of drought illustrates the importance of planning for multiple dry years or drought. It is difficult to anticipate the specific impacts of consecutive dry years or a long-term drought and identify where limited water supplies may be best used during times of shortage. Condition 4 allows the Districts to request Deputy Director approval of a Revised Operations Plan to address water shortage issues during consecutive Dry or Critically Dry water year types or drought years. This condition provides flexibility for adaptive implementation during times of extreme water shortage.

The Bay-Delta Plan includes an emergency provision, which applies if the State Water Board determines the existence of an emergency as defined in CEQA or the Governor declares an emergency under the California Emergency Services Act and the LSJR flow requirements affect or are affected by the conditions of the emergency. The Governor's power to declare an emergency is not limited to statewide emergencies but encompasses emergencies that are regional or local in nature. Under the provision, the State Water Board may approve a temporary change in the implementation of the LSJR flow objectives in a water right proceeding. With respect to drought conditions, however, most are not declared emergencies and are accommodated through the adaptive implementation methods for the LSJR flow objectives. The emergency provision cannot be used to routinely relax implementation of flow requirements but is reserved for true emergencies. The Bay-Delta Plan emergency provision includes a requirement for the State Water Board, before authorizing any temporary change, to find that measures will be taken to reasonably protect fish and wildlife beneficial uses in light of the circumstances of the emergency.

7.5 Rationale for Condition 5 – Southern Delta Salinity

One of the primary water quality concerns in the southern Delta is salinity, particularly for agricultural water users. The Bay-Delta Plan establishes a year-round water quality objective of 1.0 dS/m EC at Vernalis and in the southern Delta for the protection of agricultural beneficial uses.

Before 2018, the Bay-Delta Plan set a water quality objective at the three interior southern Delta compliance stations and Vernalis of 0.7 millimhos per centimeter (mmhos/cm) (units of mmhos/cm are equal to units of dS/m) during the summer irrigation season and 1.0 mmhos/cm from September to March. Under their water right permits as amended by Revised Water Right Decision 1641 (State Water Board, 2000),

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DWR and the United States Bureau of Reclamation (Reclamation) are responsible for meeting this salinity requirement at the three interior southern Delta compliance stations and Reclamation is responsible for meeting the requirement at Vernalis. The 2018 Bay-Delta Plan set a year round objective of 1.0 dS/m, but as part of the amendments, the State Water Board determined that salinity at Vernalis during the summer irrigation season should remain 0.7 dS/m to provide assimilative capacity for salinity in the southern Delta and ensure attainment of the 1.0 dS/m water quality objective.

Salinity control in the southern Delta is complicated due to a variety of factors. The San Joaquin River, which flows into the southern Delta, carries a heavy salt load from upstream, primarily associated with discharges from agricultural lands on the west side of the river, served with Reclamation's Central Valley Project (CVP) water. In addition, due to upstream water infrastructure development, flows in the SJR and its tributaries are lower than they were historically. Complex southern Delta circulation issues, shallow saline groundwater, the export CVP facilities, including export of water and salts from the Sacramento River to the San Joaquin Valley through the CVP facilities, movement of CVP water through DWR's State Water Project (SWP) to the San Joaquin Valley, the CVP and SWP export pumps in the Delta, and hundreds of diversions further complicate the salinity issues. Revised Water Right Decision 1641 (State Water Board, 2000) identifies that upstream diversions of water from the Stanislaus, Tuolumne, Merced, and San Joaquin Rivers collectively significantly reduced flows in the SJR and result in a substantial reduction of the assimilative capacity of the San Joaquin River and southern Delta channels ability to absorb salt loads at concentrations that support agricultural beneficial use. It is reasonable to consider the responsibility of other entities besides Reclamation and DWR for implementing the southern Delta salinity objective as more information becomes available.

The Bay-Delta Plan's LSJR flow objectives and southern Delta salinity objective are complementary. The diversion of water and associated reduction in streamflow contributes to increased salinity. Increased flows under the LSJR flow objectives provide the incidental benefit of a lower salinity irrigation water supply to flush salts early in the irrigation season, and thus provide better salinity conditions during spring germination of crops, which is generally the most salt-sensitive time. The complementary nature of both objectives provides a comprehensive means to put the state's water resources to beneficial use to the fullest extent possible.

7.6 Rationale for Condition 6 – Tuolumne River and Regional Watershed Management Coordination

Optimizing the timing of flows to meet instream flow and other requirements, while also considering other beneficial uses as long as intended benefits to fish and wildlife are not reduced, requires coordination with many parties. Such parties include the Districts, water operators, stakeholders, and agencies with expertise on the Tuolumne River and LSJR watershed in fisheries management, hydrology, operations, monitoring, and assessment. Coordination is intended to maximize the beneficial uses of the state's

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waters and to assist with implementation, monitoring, and assessment of the certification conditions.

Participation in a LSJR watershed coordination group is necessary to assist with implementation of certification conditions, coordinate flows in the LSJR watershed to support native resident and migratory fish species, integrate monitoring efforts, and assess the effectiveness of certification conditions and water quality standards, including the February through June LSJR flow objectives. The Bay-Delta Plan identifies the formation of the Stanislaus, Tuolumne, and Merced Working Group (STM Working Group) as a watershed group to provide recommendations regarding multiple requirements of the Bay-Delta Plan such as: biological goals; procedures for implementing the adaptive methods described above; annual adaptive operations plans; and the San Joaquin River Monitoring and Evaluation Program, including special studies and reporting requirements. Recognizing that naming conventions may change over time, a watershed group identified by a name different than "STM Working Group" that performs the same functions and complies with the same requirements as the STM Working Group is considered functionally equivalent to the STM Working Group for the purposes of consistency with the Bay-Delta Plan's requirements and this condition.

7.7 Rationale for Condition 7 – Annual Review Meeting

Monitoring plans and studies required by this certification will help resource agencies and State Water Board staff evaluate the benefits and impacts associated with implementation of new license conditions on hydrological, biological, and geomorphological resources affected by the Projects throughout the term of the license(s) and any extensions. Annual consultation meetings bring the Districts, resource agencies, and interested stakeholders together to discuss monitoring results and resource trends, and develop adaptive management actions, if necessary, to protect water quality and beneficial uses. Condition 7 requires the Districts to conduct annual consultation meetings with resource agencies and other interested stakeholders to review monitoring reports and discuss ongoing and forecasted operations, including revisions or modifications to monitoring and/or operations that may be needed to protect water quality and beneficial uses.

7.8 Rationale for Condition 8 – Water Quality Monitoring and Management

The Tuolumne River, including La Grange Reservoir, is listed on the Clean Water Act 303(d) list as impaired for elevated water temperatures, mercury, chlorpyrifos, diazinon, Group A pesticides, and toxicity. New Don Pedro Reservoir is listed on the 303(d) list as being impaired for mercury. In addition, the FERC Final EIS identified periods and locations where dissolved oxygen concentrations may exceed the dissolved oxygen water quality objectives, and the FERC Final EIS identified that the use of pesticides for Projects' operations and maintenance has the potential to cause significant adverse effects on amphibians.

Dissolved oxygen, like water temperature, is a primary driver of the productivity and survival of native resident and migratory salmonids. As discussed in the rationale for

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Condition 3, elevated water temperature and depressed dissolved oxygen concentrations can significantly reduce habitat suitability for native resident and migratory fish. On the Tuolumne River, water temperature is largely controlled by flow releases from the reservoirs, which can also affect dissolved oxygen concentrations downstream. Clear relationships have been demonstrated between reduced flow and depressed dissolved oxygen concentrations in other Central Valley waterbodies (Central Valley Regional Water Board, 2005).

As noted earlier in the certification, New Don Pedro Reservoir and the lower Tuolumne River, including La Grange Reservoir, have been identified as being impaired by mercury. Mercury is a potent neurotoxicant that is toxic to humans, wildlife, and fish, and mercury pollution negatively impacts the beneficial uses of many waters of the state. Fish collected from the Tuolumne River and New Don Pedro Reservoir have fish tissue mercury concentrations that exceed safety thresholds to protect fish health, as well as exceed water quality objectives for the protection of human and wildlife consumers of fish. Although mercury occurs naturally in the environment, the Projects' operations exacerbate fish mercury concentrations. The proposed Statewide Mercury Control Program for Reservoirs has identified multiple mechanisms for how reservoir operations can adversely influence mercury bioaccumulation. For example, Projects' operations decrease flow and increase water temperatures which increase methylmercury production and support non-native warm water fish, reduce primary and secondary productivity, reduce inputs from ocean-derived nutrients, and change water chemistry (State Water Board, 2017C). On May 2, 2017, the State Water Board adopted Resolution No. 2017-0027, which approved *Part 2 of the Water Quality Control Plan for Inland Surface Waters, Enclosed Bays, and Estuaries of California—Tribal and Subsistence Fishing Beneficial Uses and Mercury Provisions* (Provisions). The Provisions provide a consistent regulatory approach throughout the state by setting mercury water quality objectives to protect the beneficial uses associated with the consumption of fish by both people and wildlife.

Condition 8 requires the Districts to develop and implement a Dissolved Oxygen Monitoring and Management Plan, Mercury Monitoring and Management Plan, and Other Constituents Monitoring and Management Plan in consultation with the Tuolumne River Anadromous Fish Committee, the Tuolumne River Watershed Group, and appropriate state agencies, to protect water quality and the beneficial uses of water described in the Bay-Delta Plan and the SR/SJR Basin Plan. Information gathered from implementation of the plans required by Condition 8 will be used to evaluate the effects of actions related to the Projects on water quality, and to identify, assess, and adaptively manage potential adverse water quality impacts.

7.9 Rationale for Condition 9 – Large Woody Material Management

Large woody material contributes to productive aquatic ecosystems and is an important component of stream channel maintenance and the formation of complex aquatic habitat both along stream margins and in active river channels. Large woody material provides cover and holding habitat for native resident and migratory fish and organic

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matter that supports the aquatic food web. Large woody material in tributaries of the upper watersheds is carried progressively downstream during high flow events. Prior to the construction of the Projects' dams, high flow events would distribute large woody material from the upper watersheds throughout downstream Projects' reaches. Presently, the Projects prevent most incoming large woody material from entering the Tuolumne River downstream of New Don Pedro Dam. The large woody material is instead impounded by the Projects' reservoirs. For this reason, large woody material of the size capable of influencing channel morphology is largely absent downstream of New Don Pedro Dam and the lower Tuolumne River.

Condition 9 requires the Districts to develop and implement a Large Woody Material Management Plan (LWMMP) in consultation with BLM, USFWS, NMFS, CDFW, and State Water Board staff. Condition 9 is based on recommendations made by CDFW (CDFW, 2018), NMFS (NMFS, 2018), and the FERC Final EIS regarding the need to develop a large woody material management plan. The condition does not specify the specific amounts of large woody material to be placed in the watershed but allows for development of that amount as part of the LWMMP development consultation process. The fisheries agencies and FERC identify varying amounts of large woody material and locations for installing large woody material suggesting the need for additional consultation or analysis to determine the appropriate amount of large woody material and identify specific locations for installation. Accordingly, Condition 9 requires development of a LWMMP that allows for consultation with resource agencies consistent with the FERC staff recommendation. The LWMMP will specify large woody material augmentation procedures and associated monitoring to assess the effectiveness of its implementation in transporting and distributing large woody material throughout the lower Tuolumne River below New Don Pedro Dam.

7.10 Rationale for Condition 10 – Erosion and Sediment Management

Surface erosion and increased overland flow associated with Projects-related construction and maintenance activities could release fine sediment into the Tuolumne River and tributaries. Additionally, the Projects reduce the frequency of seasonal high flow events in river reaches below the Projects' dams that facilitate the transport of fine sediment. Accumulation of fine sediment can degrade water quality and adversely affect fish spawning and incubation success.

To manage existing erosion and minimize future erosion and sediment delivery to Projects stream reaches and reservoirs, Condition 10 requires the Districts to develop and implement an Erosion and Sediment Management Plan (Erosion and Sediment Plan) in consultation with BLM, CDFW, USFWS, NMFS, and State Water Board staff. The Erosion and Sediment Plan will describe methods to inventory, assess, remediate, and monitor erosion sites, and outline site-specific temporary erosion control measures to be implemented during construction and maintenance activities.

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7.11 Rationale for Condition 11 – Gravel Augmentation

Relicensing studies identified the need for gravel augmentation in the Tuolumne River below La Grange Dam. The Projects' reservoirs trap gravel originating from upstream sources. This limits available gravel that supports and enhances aquatic habitat in the Tuolumne River. McBain and Trush (2004) estimates that annually 18,800 cubic yards of coarse sediment is trapped behind the Projects' reservoirs and unavailable to supply downstream habitats. This estimate is comparable to the Districts' estimates of annual total and coarse sediment yields to the New Don Pedro Reservoir of 288,000 cubic yards and 28,800 cubic yards, respectively, based on reservoir storage reductions from 1923 to 2011 (Districts, 2013B). The Tuolumne River, downstream of La Grange Dam, exhibits degraded habitat due to Projects' operations. This degraded habitat is characterized by a coarsening of the bed surface and reduction in the frequency and quantity of gravel deposits. This coarsening of the bed surface reduces the habitat suitability of spawning reaches, resulting in a reduction in the survival of fish eggs. Good quality coarse gravel provides substrate for growth of algae and invertebrates, which are important for the aquatic food web.

Condition 11 requires the Districts to develop and implement a Gravel Augmentation Plan in consultation with BLM, CDFW, USFWS, NMFS, and State Water Board staff. The Gravel Augmentation Plan will require the addition of gravel to the Tuolumne River below La Grange Dam, as well as gravel mobilization monitoring. Condition 11 also requires the Districts to annually augment gravel to restore and maintain adequate spawning gravels. The total volume of gravel material required to augment is equivalent to the estimated amount of coarse sediment trapped by the reservoirs over the anticipated life of the license(s) (i.e., 40 years). The development and implementation of the Gravel Augmentation Plan will help address the previous and ongoing trapping of sediment by strategically replacing coarse sediment in identified areas of Project-affected stream reaches. Such gravel augmentation will restore the downstream sediment transport process that has been inhibited since construction of Don Pedro Dam in 1923 and reduce habitat for non-native predators (i.e., filling special run pools). CDFW recommended sourcing aggregate material from areas along the banks of the Tuolumne River where future restoration projects (Condition 12) could be located. As aggregate material is harvested along the streambanks for gravel augmentation activities, new floodplain areas may be created.

7.12 Rationale for Condition 12 – Riparian, Spawning, and Floodplain Management

The Projects have altered the hydrology and natural geomorphic processes along the Tuolumne River corridor. The Projects' dams block sediment recruitment from the upstream basin and have changed the high flow frequencies, caused channel incision, altered peak flows, decreased winter flows, increased summer flows, and changed ramp down rates. The depletion of sediment loads reduces the formation of sediment benches, which affects riparian colonization and succession. Natural floodplain inundation has been greatly reduced in the Tuolumne River corridor.

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Floodplain habitats in the Central Valley have been found to have a positive effect on the growth of juvenile native resident and migratory fish, and larger and faster growth has been associated with increased survivorship in the river and to adulthood. The higher growth rates are largely attributed to greater productivity and availability of prey in the floodplains. Riparian habitats also provide allochthonous food sources and shading, which provides temperature benefits and cover to help protect juvenile native resident and migratory fish from predators. Floodplain habitats provide food and refuge from predatory species.

Condition 12 requires the development and implementation of a Riparian, Spawning, and Floodplain Restoration Plan, lowering of existing floodplain elevation to activate the floodplain at lower flow levels, and construction of a minimum of 150 acres of 100 percent suitable floodplain from Years 2 – 11 after license issuance and an additional 15 acres of 100 percent suitable floodplain in the years thereafter unless the Districts can demonstrate to the Deputy Director that habitat and flows are meeting the numeric and narrative goals and objectives for the LSJR.

Increased flows and habitat restoration are needed on the Tuolumne River and in the larger Bay-Delta watershed to achieve the Bay-Delta Plan LSJR narrative and salmon protection objectives. However, the exact combination of floodplain restoration and increased flow needed to achieve these goals is unknown. Accordingly, Condition 12 requires a lower minimum floodplain restoration amount than CDFW's recommendation of 810 acres of 100 percent suitable floodplain creation in the first 10 years of license issuance (CDFW, 2018). The CDFW recommendation for 810 acres of constructed floodplain is based on an Emigrating Salmonid Habitat Estimation (ESHE) analysis (Cain, 2019) and an evaluation of pre-Projects floodplain area, duration, and frequency on the Tuolumne River (USFWS, 2017 as summarized in CDFW, 2018). The analysis identifies that on average 77,640 acre-days of floodplain habitat would need to be produced to mitigate for the Projects' negative impacts to floodplain inundation. Scientific analyses relied on in the CDFW recommendation provide credible estimates of the amount of floodplain needed to rebuild the Tuolumne River salmonid population.

The lower minimum floodplain construction requirement in Condition 12 allows for adaptive management and increased knowledge from monitoring and assessment of the salmon population response to increased flows and habitat restoration to inform the need for additional floodplain restoration. Construction of 150 acres of 100 percent suitable floodplain habitat is a reasonable starting point that allows for evaluation of floodplain restoration projects (in progress and upon completion) combined with increased flows required by Condition 1 to determine if additional floodplain restoration is needed on the Tuolumne River to achieve the Bay-Delta Plan LSJR narrative objective, salmon protection objective, and approved biological goals for the Tuolumne River.

The need for the development and enhancement of riparian and floodplain habitats is consistent with the Bay-Delta Plan Program of Implementation to support and protect

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aquatic-life beneficial uses. The inclusion of the development and enhancement of riparian and floodplain habitats will maximize the benefits to native species from the instream flow requirements (Condition 1). Additionally, riparian and floodplain improvement efforts should be coordinated with related efforts, such as gravel augmentation (Condition 11) and large woody material placement (Condition 9).

7.13 Rationale for Condition 13 – Predator Suppression Plan

Predation has been identified as one of the multiple stressors that adversely impacts the survival of juvenile native resident and migratory salmonids. Projects' operations contribute to increased predation pressure on juvenile native resident and migratory fish. For example, increased water temperatures increase the presence of warm-water predatory species, and reduced water velocities increase the presence of submerged aquatic vegetation, which supports predatory species. In addition, other physical conditions in the river likely increase predation exposure to native resident and migratory fish (e.g., gravel pits, diversion dams, and lack of cover). There is large uncertainty in the magnitude of the impact of predation on native salmonid populations, especially the role of predation as a proximate or ultimate cause of mortality to native salmonids. The implementation of non-flow actions such as predator suppression to increase native salmonid survival is necessary to bolster native salmonid populations and is consistent with the Bay-Delta Plan.

7.14 Rationale for Condition 14 – Aquatic Invasive Species Management

Recreational boating opportunities at New Don Pedro Reservoir and along the Tuolumne River have the potential to cause the proliferation of aquatic invasive species. Visitors from different areas provide the potential for a large number of aquatic invasive species to colonize Projects-affected waters and potentially impact beneficial uses. If not properly managed, the use of contact recreational equipment can introduce aquatic invasive species that can deleteriously affect water quality, outcompete native fauna and flora, and degrade Projects' infrastructure.

Aquatic invasive species have the potential to cause adverse impacts to native species in the river. Floating and submerged aquatic vegetation can degrade water quality (e.g., depressed dissolved oxygen) and support non-native predators. In addition to the increase of predation pressure by non-native species, invasive species can compete against native species for limited resources.

Condition 14 requires the Districts to develop and implement a Projects-specific aquatic invasive species plan that includes a public education program for the Projects' recreation facilities. The plan also must include monitoring for early detection of aquatic invasive species vectors to minimize the risk of aquatic invasive species becoming established in Projects waters.

7.15 Rationale for Condition 15 – Recreation Facilities Management

Operations and maintenance activities associated with the Projects' recreation facilities have the potential to impact water quality. Construction of new recreation facilities,

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modification of existing recreation facilities, or other ground-disturbing activities could increase soil erosion and fine sediment delivery to Projects' waterways. Fine sediment can adversely affect water quality and associated aquatic habitat by increasing turbidity and total suspended solids. Accumulation of fine sediment in aquatic substrate can adversely affect fish spawning success and limit habitat suitability for many aquatic invertebrates.

Condition 15 requires the Districts to develop and implement a Recreation Facilities Management Plan in consultation with BLM and State Water Board staff. The Recreation Facilities Management Plan will include: (1) measures that would be implemented to protect water quality; (2) recreation activity surveys; and (3) schedules to implement the proposed improvements and new recreation facilities.

7.16 Rationale for Condition 16 – Road Management

Operations and maintenance of Projects' roads have the potential to impact water quality. The potential for water quality impacts depends on factors such as local topography, roadbed material, and drainage characteristics. To avoid and minimize these potential water quality impacts, Condition 16 requires the Districts to develop and implement a Road Management Plan. Condition 16 requirements will help ensure operation and maintenance of the Projects' roads do not cause discharges to surface waters that violate water quality standards.

7.17 Rationale for Condition 17 – Biological Resources Management

Continued operation of the Projects has the potential to impact fish populations, special-status amphibians, and benthic macroinvertebrate (BMI) assemblages in Projects-affected stream reaches. Biological measurements are the most direct indicator of the health and the well-being of fish and wildlife populations. Biological monitoring can detect changes, identify additional information needs, and guide adaptive management of Projects operations. Biological metrics can be used to assess the long-term impact from physical and chemical degradations (e.g., bioassessments). Corresponding biological data and environmental information (e.g., temperature, acres of floodplain inundation, flow pulse timing) can be used to evaluate the impact of management actions on fish and wildlife health. The Bay-Delta Plan Program of Implementation indicates that biological goals (e.g., abundance, spatial extent, survival, and temporal presence) will be used as part of adaptive management and as a way to measure the effectiveness of the program.

Condition 17 requires the Districts to develop and implement a Biological Monitoring and Management Plan in consultation with the Tuolumne River Anadromous Fish Committee, Tuolumne River Watershed Group, and the Lower San Joaquin River Watershed Group. The Biological Monitoring and Management Plan will outline monitoring and adaptive management for anadromous fish, BMI, and amphibians in the Tuolumne River.

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7.18 Rationale for Condition 18 – Comprehensive Monitoring, Assessment, Reporting, and Special Studies

A comprehensive monitoring, assessment, reporting, and special studies program is necessary to determine compliance with water quality standards, including the flow and water quality requirements contained in this certification. Monitoring and special studies are also needed: to assess the effectiveness of flow and water quality requirements in this certification; to inform adaptive implementation and adaptive management decisions such as annual operations plans and the timing of pulse flows; to investigate the technical factors involved in water quality control; and to inform future amendments to water quality control plans.

The Bay-Delta Plan Program of Implementation for the LSJR flow objectives requires formation of the San Joaquin River Monitoring and Evaluation Program (SJRMEP), which includes comprehensive monitoring, evaluation, special studies, and reporting associated with implementation of the Bay-Delta Plan flow and water quality objectives. Development and implementation of the Tuolumne River Monitoring Plan may be used as the Tuolumne River portion of the SJRMEP. Fisheries and water quality monitoring along the migratory pathway of Tuolumne River salmonids is reasonable because Projects reduce the volume and pattern of freshwater flows which adversely affects salmon survival along the entire saltwater-to-freshwater migratory pathway of Tuolumne River salmon (State Water Board, 2018A; State Water Board 2017E). The monitoring and assessment required in Condition 18 is consistent with multiple other statewide efforts to improve the quality of and access to monitoring data for the regular assessment of the status of natural resources. For example, the State Water Board maintains a public information webpage that includes information on water quality monitoring, assessment, research, standards, regulation, enforcement, and other pertinent matters. The California Water Quality Monitoring Council (Monitoring Council) develops specific recommendations to improve the coordination and cost-effectiveness of water quality and ecosystem monitoring and assessment, enhance the integration of monitoring data across departments and agencies, and increase public accessibility to monitoring data and assessment information. The 2016 Open and Transparent Water Data Act calls for DWR, in consultation with the Monitoring Council, State Water Board, and CDFW, to create, operate, and maintain a statewide integrated water data platform, develop protocols for data sharing, documentation, quality control, public access, and promotion of open-source platforms and decision support tools related to water data (e.g., groundwater, water quality, fisheries, water project operations).

Comprehensive monitoring is needed to address individual and cumulative impacts of the Projects to fish and wildlife and other beneficial uses. Development and implementation of the comprehensive monitoring, assessment, reporting, and special studies program should be a collaborative effort with the State Water Board and watershed partners, including the Districts. The Tuolumne River is one tributary in the Bay-Delta Watershed that supports native resident and migratory fish that migrate through the Bay-Delta. Accordingly, the Tuolumne River Monitoring Plan should be integrated and coordinated with new and ongoing monitoring programs in the LSJR

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watershed and Bay-Delta such as CDFW fish monitoring efforts, Interagency Ecological Program, FERC licensing proceedings, San Joaquin River Restoration Program, and regional water quality monitoring programs. This level of integration is necessary to coordinate flow actions among the salmon-bearing LSJR tributaries, evaluate progress toward achieving biological goals and protection of fish and wildlife beneficial uses, evaluate and prioritize aquatic habitat stressors, and assess the effectiveness of LSJR flow objectives on a regional scale.

The Bay-Delta Plan requires annual and comprehensive (multi-year) reporting of monitoring data. Annual reporting is required to inform the next year's operations and other activities to protect fish and wildlife. In addition to annual reporting, every three to five years, a comprehensive report is required to review the progress toward meeting the biological goals and identify any recommended changes to the implementation of the LSJR flow objectives. The State Water Board will hold public meetings to consider the comprehensive report, technical information, and conclusions or recommendations developed through a peer review process. This information will be used to inform potential adaptive changes to the implementation of the LSJR flow objectives and, as appropriate, future potential changes to the Bay-Delta Plan.

7.19 Rationale for Condition 19 – Construction and Maintenance

Protection of the beneficial uses identified in the SR/SJR Basin Plan requires effluent limitations and other limitations on pollutant discharges from point and nonpoint sources to the Tuolumne River and its tributaries. The Projects may replace or rehabilitate existing recreation facilities and conduct other activities that may require construction or maintenance through the term of the FERC license. Erosion from Projects-related construction and maintenance activities has the potential to result in discharges that violate water quality standards. Condition 19 requires the Districts to comply with the terms of the Construction General Permit, when applicable, and to develop and implement appropriate water quality monitoring and protection plans.

7.20 Rationale for Condition 20 – Reintroduction of Anadromous Fish

The Projects' facilities and other structures limit the upstream extent of habitat that anadromous fish can access. Water quality conditions (e.g., temperature and contaminant concentrations) are typically better in the river at upstream locations compared to downstream locations. La Grange Dam (RM 52.0) represents the upstream barrier to native resident and migratory fish in the lower Tuolumne River. As outlined in the FERC Final EIS, NMFS reserves its authority to prescribe the construction, operation, and maintenance of fishways at the Projects, including measures to determine, ensure, or improve the effectiveness of such prescribed fishways, pursuant to section 18 of the Federal Power Act. The FERC Final EIS estimated that fish passage above the La Grange and New Don Pedro dams may allow access to as much as 18.17 miles of accessible and 31.26 miles of potentially accessible anadromous fish habitat in the upper Tuolumne River Basin. Condition 20 reserves the State Water Board's authority to modify or add conditions to this certification if it is reasonably foreseeable that state- or federally-listed anadromous fish

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species will be reintroduced above the Projects' facilities, to ensure adequate protection of beneficial uses identified in the SR/SJR Basin Plan and Bay-Delta Plan and compliance with water quality standards and appropriate requirements of state law.

7.21 Rationale for Conditions 21 through 45

In order to ensure that the Projects operate to meet water quality standards as anticipated, ensure compliance with other relevant state and federal laws, and ensure that the Projects will continue to meet state water quality standards and other appropriate requirements of state law over their lifetime, this certification imposes conditions regarding monitoring, enforcement, and potential future revisions. Additionally, California Code of Regulations, title 23, section 3860 requires imposition of certain mandatory conditions for all certifications, which are included in this certification.

8.0 Conclusion

The State Water Board finds that, with the conditions and limitations imposed under this certification, the Projects will comply with applicable state water quality standards and other appropriate requirements of state law.

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9.0 Water Quality Certification Conditions

ACCORDINGLY, BASED ON ITS INDEPENDENT REVIEW OF THE RECORD, THE STATE WATER RESOURCES CONTROL BOARD CERTIFIES THAT OPERATION OF THE DON PEDRO HYDROELECTRIC PROJECT AND LA GRANGE HYDROELECTRIC PROJECT (collectively Projects) will comply with sections 301, 302, 303, 306, and 307 of the Clean Water Act, and with applicable provisions of State law under the following terms and conditions.

CONDITION 1. Instream Flows

Consistent with Condition 23, the State Water Resources Control Board (State Water Board) may re-evaluate and modify the requirements in Condition 1.A through 1.G to allow a voluntary agreement approved by the State Water Board to be used as an alternative means of meeting state water quality standards or other appropriate requirements of state law. An approved voluntary agreement may be used to meet flows in the *Water Quality Control Plan for the San Francisco Bay/Sacramento-San Joaquin Delta Estuary* (Bay-Delta Plan) and other requirements, and any amendments thereto. If the Bay-Delta Plan is amended in the future to allow flows other than the current Lower San Joaquin River (LSJR) flow objectives, or to allow implementation of a voluntary agreement approved by the State Water Board, the flows required pursuant to Condition 1.B through 1.D may be re-evaluated and updated, if appropriate, through an amendment to this certification. Requirements for coordination with watershed and technical groups such as the Tuolumne River Anadromous Fish Committee, Tuolumne River Watershed Group, and/or Lower San Joaquin River Watershed Group (Condition 6) may be modified consistent with the governance structure established by an approved voluntary agreement. Similarly, annual and dry year reporting requirements in Conditions 1.F and 1.G may be modified or met through submittal of plans or reports to the State Water Board pursuant to the terms of an approved voluntary agreement.

Condition 1 is a suite of instream flow-related requirements that includes Federal Energy Regulatory Commission (FERC) staff recommendations, flows to protect recreational use, and flow requirements to meet state water quality standards and other appropriate requirements of state law. As described in Conditions 1.B through 1.E, base flow, pulse flow, and Bay-Delta Plan flow requirements apply at different locations including River Mile (RM) 51.7 just below La Grange Dam, Gear Road near RM 25, Modesto at RM 16, and on the Lower San Joaquin River at Vernalis.

1.A Water Year Types

The minimum flow requirements that depend on water year type must use the water year classification system for the San Joaquin Basin, referred to as the San Joaquin Valley 60-20-20 Water Supply Index (Index) established in State Water Board Revised Water Right Decision 1641 (State Water Board, 2000) and the California Department of Water Resources (DWR) April 1 San Joaquin Valley unimpaired runoff forecast. Turlock Irrigation District (TID) and Modesto Irrigation District (MID) (collectively, Districts or Licensees) shall identify flow gages and equations used to estimate

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unimpaired inflow values for the determination of the Tuolumne River portion of the San Joaquin Valley 60-20-20 Index and specify methods for calculating inflow (i.e., daily and monthly unimpaired flow) to the State Water Board's Deputy Director for the Division of Water Rights (Deputy Director) as required in Condition 1.E and 1.F. The San Joaquin Valley 60-20-20 Index is calculated, in units of thousand acre-feet (TAF), using the monthly sum of unregulated runoff (i.e., unimpaired flow) into New Melones Reservoir (Stanislaus River), New Don Pedro Reservoir (Tuolumne River), Exchequer Reservoir (Merced River), and Millerton Lake (San Joaquin River) and the prior year's water year index volume as shown in the following equation.

$$\text{SJV 60-20-20 Index (TAF)} = 60\%(\text{sum current year April through July unimpaired runoff}) + 20\%(\text{sum current year March through October unimpaired runoff}) + 20\%(\text{the minimum between prior year index volume or 4,500 TAF}).$$

The San Joaquin Valley 60-20-20 Index includes five-water year classifications: Wet (W), Above Normal (AN), Below Normal (BN), Dry (D), and Critically Dry (C), which are defined by the following numeric breakpoints.

- Wet: Index \geq 3,800 TAF
- Above Normal: Index $>$ 3,100 TAF and $<$ 3,800 TAF
- Below Normal: Index $>$ 2,500 TAF and \leq 3,100 TAF
- Dry: Index $>$ 2,100 TAF and \leq 2,500 TAF
- Critically Dry: Index \leq 2,100 TAF

Preliminary water year classifications will be determined by DWR's Bulletin 120¹⁴, publications in February, March, and April and will apply from the 15th day of the month through the 14th day of the next month (i.e., February 15 – March 14, March 15 to April 14, and April 15 to May 14, respectively). For the preliminary Index calculations, the 75 percent exceedance forecast, from the corresponding monthly issue of DWR's Bulletin 120 shall be used for the current water year's April through July unregulated runoff and observed or expected values shall be used for the current water year's October through March unregulated runoff. The final water year classification shall be determined by DWR in May and shall apply from May 15 through February 14 of the following water year, unless the water year classification is updated in October with the DWR Bulletin 120 final water year classification. For the May Index calculation, a 75 percent exceedance forecast, from the May issue of DWR's Bulletin 120, shall be used for the current water year's April through July unregulated runoff and observed values shall be used for the current water year's October through March unregulated

¹⁴ Bulletin 120 is a publication issued four times a year, in the second week of February, March, April, and May by DWR. It contains forecasts of the volume of seasonal runoff from California's major watersheds, and summaries of precipitation, snowpack, reservoir storage, and runoff in various regions of California.

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runoff. Within five days of each water year type determination, the Licensees shall provide written notice of the determination to State Water Board staff.

1.B Minimum Instream Flows Below La Grange Dam and Below One or More Potential Points of Diversion or Rediversion

Below La Grange Dam

No later than three months following license issuance, the Licensees shall maintain minimum instream flows specified in Table 1 immediately below La Grange Dam (RM 51.7), as measured at United States Geological Survey (USGS) gage no. 11289650 for Tuolumne River below La Grange Dam near La Grange, California. Minimum flow requirements in Table 1 are defined based on water year types described in Condition 1.A.

Table 1. Minimum Instream Flow Requirements downstream of La Grange Dam, River Mile 51.7 (cubic feet per second)

Time Period	Wet	Above Normal	Below Normal	Dry	Critical
January 1 – 31	225	225	225	200	200
February 1 – 28/29	225	225	225	200	175
March 1 – April 15	250	250	250	225	200
April 16 – May 15	275	275	275	250	200
May 16 – 31	300	300	300	275	225
June 1 – 30	200	200	200	200	200
July 1 – October 15	350	350	350	300	300
October 16 – December 31	275	275	275	225	200

Below Potential New Point (or Points) of Diversion or Rediversion

If the Licensees install and operate one or more infiltration galleries as a new point or points of diversion or rediversion at or near RM 25.9 on the lower Tuolumne River, including through TID's change petition to add an infiltration gallery as a new point of rediversion near RM 25.9, the Licensees are required to operate the Projects to meet the minimum instream flows as described in Table 2 at a new stream gage to be located downstream of any new point or points of diversion or rediversion. Any necessary approvals, including any approvals by the State Water Board, must be obtained before the point or points of diversion or rediversion can be operated. The Licensees shall also operate the Projects to be consistent with the minimum instream flows in Table 1. The compliance point should directly measure streamflow in the Tuolumne River downstream of the new point or points of diversion or rediversion. Condition 1.E describes gage requirements.

Minimum flow requirements in Tables 1 and 2 are defined based on water year types described in Condition 1.A.

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Table 2. Minimum Instream Flow Requirements Downstream of Potential New Point or Points of Diversion or Rediversion near River Mile 25.9 (cubic feet per second)

Time Period	Wet	Above Normal	Below Normal	Dry	Critical
January 1 – 31	225	225	225	200	200
February 1 – 28/29	225	225	225	200	175
March 1 – April 15	250	250	250	225	200
April 16 – May 15	275	275	275	250	200
May 16 – 31	300	300	300	275	225
June 1 – 30	100	100	100	75	75
July 1 – October 15	200	200	200	200	200
October 16 – December 31	275	275	275	225	200

1.C Pulse Flows

No later than three months following license issuance, the Licensees shall release pulse flows as specified in this condition. Pulse flows will be measured at the two compliance points identified here and in Condition 1.E and subject to the requirements of this certification: 1) La Grange, near RM 51.7 (at USGS gage no. 11289650 for Tuolumne River below La Grange Dam near La Grange, California); and 2) a new gage downstream of the proposed point or points of diversion or rediversion at TID's infiltration gallery near RM 25.9, if the change is approved by the State Water Board's Division of Water Rights or otherwise installed and operated. Both fall and spring pulse flow volumes are expected to be measured at the same compliance point.

- **Fall Pulse Flow:** The Licensees shall provide a fall pulse flow during the October 1 through November 30 time period until a total volume of 20,000 acre-feet (AF) is released in Wet and Above Normal years, 15,000 AF in Below Normal and Dry years, and 10,000 AF in Critically Dry years. The fall pulse volume is in addition to the volume of flows set forth in Table 1 and Table 2 for the same period. The timing, magnitude, and duration of the fall pulse flow shall be determined in consultation with the Tuolumne River Anadromous Fish Committee and the Lower San Joaquin River Watershed Group (Condition 6).
- **Spring Pulse Flows:** If implementing the spring pulse flows at the applicable compliance location (Condition 1.E) would result in a volume of water greater than the volume of water needed to meet the Bay-Delta Plan flow requirements at the applicable compliance location (Condition 1.E), the Licensees may modify the applicable spring pulse flow volume of water to ensure the volume is no greater than that required under the 2018 Bay-Delta Plan, with approval of the Executive Director of the State Water Board following consultation with Tuolumne River Anadromous Fish Committee and the Lower San Joaquin River Watershed

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Group (Condition 6). In all instances the minimum instream flows identified in Tables 1 and 2 (Condition 1.B) shall be met.

Spring Floodplain Pulse Flow: During the time period of February 16 through May 31, the Licensees shall provide a floodplain pulse flow of 109,091 AF during Wet and Above Normal water years; 98,182 AF during Below Normal water years; 76,364 AF during Dry water years; and 49,091 AF during Critically Dry water years. Dry year off-ramps shall apply in Below Normal, Dry, or Critically Dry years that occur in a sequence that starts with a Dry or Critically Dry water year and contains no Wet or Above Normal water years. No floodplain pulse shall be required for Dry and Critical water years and the pulse flow shall be reduced to 76,364 AF for Below Normal water years. The floodplain pulse flow volumes shall be based on the preliminary water year type (Condition 1.A) in effect at the time the pulse flow is initiated. If the water year type as determined in the May issue of Bulletin 120 changes from the preliminary water year type initially used to define the pulse flow volume, the Licensees shall consult with the Tuolumne River Anadromous Fish Committee and the Lower San Joaquin River Watershed Group to determine how to adjust the pulse flow requirement. The floodplain pulse flow volume is inclusive of the volume of flows set forth in Table 1 and Table 2 for the same period. The timing, magnitude, and duration of the outmigration pulse flow releases shall be determined in consultation with the Tuolumne River Anadromous Fish Committee and the Lower San Joaquin River Watershed Group (Condition 6).

Spring Outmigration Pulse Flow: The Licensees shall provide an outmigration pulse flow of 150,000 AF during Wet and Above Normal water years; 100,000 AF during Below Normal water years; 75,000 AF during the first Dry water year in a sequence of Dry and Critically Dry water years; and 35,000 AF during the first Critically Dry water year in a sequence of Dry and Critically Dry water years, during the time period of February 16 through May 31. For the second or subsequent Dry and/or Critically Dry water years in a sequence of Dry and Critically Dry water years, dry year off-ramps will take effect requiring 45,000 AF during Dry water years and 11,000 AF during Critically Dry water years. The outmigration pulse flow volumes shall be based on the preliminary water year type (Condition 1.A) in effect at the time the pulse flow is initiated. If the water year type as determined in the May issue of Bulletin 120 changes from the preliminary water year type initially used to define the pulse flow volume, the Licensees shall consult with the Tuolumne River Anadromous Fish Committee to determine how to adjust the pulse flow requirement. The outmigration pulse flow volume is in addition to the volume of flows set forth in Table 1 and Table 2 for the same period. The timing, magnitude, and duration of the outmigration pulse flow releases shall be determined in consultation with the Tuolumne River Anadromous Fish Committee and the Lower San Joaquin River Watershed Group (Condition 6).

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1.D Bay-Delta Plan Flow Objectives

No later than six months following license issuance, the Licensees shall operate the Project in a manner consistent with the Bay-Delta Plan and any amendments thereto. This includes achieving the LSJR narrative and numeric water quality objectives established in the Bay-Delta Plan, Table 3, Water Quality Objectives for Fish and Wildlife Beneficial Uses, consistent with measures in the Bay-Delta Plan's program of implementation, including provisions for adaptive implementation. Implementation of the Bay-Delta Plan LSJR flow objectives, including through adaptive implementation, may result in flows that achieve minimum instream flows and pulse flows set forth in Conditions 1.B and 1.C subject to the criteria and approval process set forth in this certification and the Bay-Delta Plan's program of implementation. Adaptive implementation is encouraged as a feature of the program of implementation because it allows for adjustment of the required percentage of unimpaired flow in specified ways to improve the functions of those flows and better achieve the water quality objectives in response to changing information and conditions. In addition, subject to acceptance by the State Water Board, the Bay-Delta Plan expressly allows the use of a voluntary agreement as a means of implementing the LSJR flow objectives. If parties submit voluntary agreements that do not meet the Bay-Delta Plan's requirements, the State Water Board may consider approval of the agreements after conducting any necessary technical and environmental analyses and complying with applicable laws, including complying with appropriate procedures to amend the Bay-Delta Plan as necessary.

The Licensees shall ensure that flows from the Tuolumne River, including flows bypassed, released, or otherwise provided by the Licensees and any other available flows, meet the LSJR flow objectives for the Tuolumne River and contribute to the flow objective at Vernalis.

This condition is not intended to relieve any other water diverter of applicable requirements, or to preclude the State Water Board from setting additional requirements for other diversions to contribute to the achievement of the LSJR flow objectives. If the Licensees are aware of any water diverter with a junior priority diverting or threatening to divert significant quantities of water at a time when the Licensees are required to bypass or release water to meet the LSJR flow objectives, the Licensees shall report that diversion or threatened diversion to the State Water Board, which will consider appropriate action.

Flow requirements from Condition 1.B, 1.C, and 1.D are consolidated into Attachment B – Consolidated Instream Flow Requirements, for convenience and illustrative purposes.

1.E Compliance Methods

No later than one year after license issuance, the Licensees shall submit a compliance methods and monitoring plan for the flow requirements in Conditions 1.B, 1.C, and 1.D to the Deputy Director for consideration of approval. The Deputy Director may require modifications as part of any approval. Compliance methods for Conditions 1.B, 1.C,

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and 1.D shall be developed in consultation with the Tuolumne River Watershed Group and the Lower San Joaquin River Watershed Group (Condition 6).

Flows shall be measured in two ways: (1) as an instantaneous flow; and (2) as the 24-hour average of the flow (mean daily flow). The instantaneous flow is the value used to construct the mean daily flow value and shall be measured in 15-minute or more frequent increments. Each instantaneous flow measurement shall be equal to or greater than 90 percent of the flow value designated in Condition 1. The mean daily flow is the average of the incremental readings of instantaneous flow from midnight (12:00 AM) of one day to midnight (12:00 AM) of the next day. The mean daily flow shall be equal to or greater than the flow value designated in Condition 1. The Licensees shall record instantaneous (usually every 15-minutes) flow observations at all gages identified in this certification, consistent with USGS standards, and ensure the gages are calibrated for the full range of flows that are required, including pulse and unimpaired flows. The Licensees shall report any deviation from the required flows to the Deputy Director within 24 hours of the deviation.

Instream flows shall be measured at the compliance points referenced in Condition 1.B, 1.C, and 1.D. unless otherwise approved by the Deputy Director. The existing and potential compliance points are as follows:

- Immediately below La Grange Dam (RM 51.7), as measured at USGS gage no. 11289650 for Tuolumne River below La Grange Dam near La Grange, California (Condition 1.B, 1.C);
- A compliance point will be required if the Licensees install and operate infiltration galleries as a point or points of diversion or rediversion near RM 25.9, including through TID's petition to add an infiltration gallery as new point of rediversion. The second compliance point must be located in the Tuolumne River within 1,500 feet downstream of any new point or points of diversion or rediversion and must directly measure streamflow in the Tuolumne River downstream of the new point or points of diversion or rediversion. Water shall not be diverted at the new point or points of diversion or rediversion until the compliance point is installed and operational (Condition 1.B, 1.C);
- USGS gage no. 1129000 at Modesto (Condition 1.D); and
- San Joaquin River near Vernalis, DWR gage VNS (Condition 1.D).

The Licensees shall comply with applicable California laws and regulations regarding measuring and monitoring water diversions, including California Code of Regulations, title 23, section 933, and amendments thereto, and State Water Board requirements to provide telemetered diversion data on a public website.¹⁵ The Licensees shall post all

¹⁵ Information regarding telemetered requirements are available at the State Water Board's **Telemetry Requirements webpage**, which is available online at: https://www.waterboards.ca.gov/waterrights/water_issues/programs/measurement_regulation/telemetry_requirements.html. (Last Accessed November 23, 2020)

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flow and other data to the California Data Exchange Center or successor website, within 24-hours of flow measurement, unless otherwise approved by the Deputy Director. The Licensees shall publicly notice at an easily accessible location on the internet all known events that will affect flow releases (e.g., powerhouse outages, construction, etc.) on the lower Tuolumne River below New Don Pedro Dam a minimum of 30 days in advance, or as soon as known if events are identified less than 30 days in advance.

At minimum, the compliance methods and monitoring plan shall include the following:

1. Locations where the Licensees will monitor compliance with the requirements in the license related to streamflows and reservoir levels.
2. Equipment used by the Licensees to monitor compliance with the requirements in the license related to streamflows and reservoir levels.
3. How the equipment used by the Licensees to monitor compliance with the requirements in the license related to streamflows and reservoir levels is deployed, set (e.g., frequency of data collection), operated and maintained, and calibrated.
4. How data are retrieved from the equipment used by the Licensees to monitor compliance with the requirements in the license related to streamflows and reservoir levels, including frequency of data downloads, quality assurance/quality control procedures, and data storage.
5. How the Licensees make streamflow and reservoir level data available to FERC, resource agencies, and the public.
6. High resolution description of the calculation of monthly and daily unimpaired flow including equations, equation terms, locations of gages, and methods for estimating specific terms that include field measurements and quantitative methods for transforming field measurements into estimates for specific equation terms (e.g., reservoir storage and diversions).
7. How the Licensees will update the plan during the term of the FERC license, including provisions for consultation.
8. An evaluation of public safety risk to recreational or other river users caused by rapid flow or river stage fluctuations and measures to reduce any public safety risk potentially caused by such fluctuations. At a minimum, if the evaluation demonstrates potential risk, the Licensees shall publicly notice such fluctuations at an easily accessible location on the internet in addition to implementing measures identified in the evaluation.

1.E.1 Minimum Instream Flows

The flow schedules in Table 1 and Table 2 specify minimum instream flows, by time period and water year type, to be met at the compliance points required by Condition 1. Minimum instream flows are expressed in cubic feet per second (cfs) as a mean daily average.

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1.E.2 Pulse Flows

Fall Pulse Flow: Flows shall be measured and monitored at the compliance points required by Condition 1. The exact timing of the beginning of the pulse flow release shall be determined by the Tuolumne River Anadromous Fish Committee and coordinated with the Lower San Joaquin River Watershed Group (Condition 6). The Licensees shall implement the fall block pulse flow volumes identified in Section 1.C. The volume of water attributed to minimum instream flows shall not be included in the pulse flow volume. The total volume attributed to the pulse flow includes flows from the onset of the ramp up to the pulse flow to the return to the designated minimum instream flow.

Spring Pulse Flows: Flows shall be measured and monitored at the compliance points required by Condition 1. The configuration of all releases, including flows to be released on each day, and the exact timing of the beginning of the releases shall be determined by the Tuolumne River Anadromous Fish Committee and coordinated with the Lower San Joaquin River Watershed Group (Condition 6). The Licensees shall implement the spring pulse flow volumes identified in Section 1.C. The total volume attributed to the pulse flow includes flows from the onset of the ramp up to the pulse flow to the return to the designated minimum instream flow. The volume of water attributed to minimum instream flows shall not be included in the pulse flow volume.

1.E.3 LSJR Flow Objectives

The Licensees shall develop compliance methods for the LSJR flow objectives specific to the Tuolumne River that are consistent with the Bay-Delta Plan and submit the methods to the State Water Board's Executive Director (Executive Director) for consideration of approval. The Executive Director may require modifications as part of any approval. For the Tuolumne River, the Bay-Delta Plan-required compliance points for the LSJR flow objectives are on the Tuolumne River at Modesto USGS gage no. 1129000 and on the San Joaquin River near Vernalis at DWR gage code VNS. The Licensees must provide a high-resolution description of the calculation of monthly and daily unimpaired flow, including equations, equation terms, locations of gages, and methods for estimating specific equation terms (e.g., reservoir storage). Field measurement data and equations used to calculate daily and monthly unimpaired flow should be easily accessible by the public and State Water Board.

Compliance methods approved by the State Water Board or Executive Director in accordance with the Bay-Delta Plan shall be used to inform the Licensees' development of compliance methods specific to the Tuolumne River as required by this condition.

1.E.4 Unplanned Temporary Flow Modifications

The flows specified in Condition 1 may be temporarily modified in the event of equipment malfunction reasonably beyond the control of the Licensees, as directed by law enforcement authorities, or in an emergency. An emergency is defined as an unforeseen event that is reasonably out of the control of the Licensees and requires the Licensees to take immediate action, either unilaterally or under instruction by law

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enforcement or other regulatory agency staff, to prevent imminent loss of human life or substantial property damage. An emergency may include, but is not limited to, natural events such as: landslides, storms, or wildfires; malfunction or failure of Projects works; and recreation accidents. Drought is not considered an emergency for purposes of this condition.

When possible, the Licensees shall notify the Deputy Director prior to any unplanned temporary instream flow modification. In all instances, the Licensees shall notify the Deputy Director within 24 hours of the beginning of any unplanned temporary streamflow modification. Within 96 hours of the beginning of any unplanned temporary stream flow modification, the Licensees shall provide the Deputy Director with an update of the conditions associated with the modification, an estimated timeline for returning to the required flows, and any measures taken to reasonably protect fish and wildlife beneficial uses in light of the circumstances.

Within 30 days of any unplanned temporary instream flow modification, the Licensees shall provide the Deputy Director with: (1) a written description of the modification and reason(s) for its necessity; (2) photo documentation of the emergency or reason for the flow modification; (3) a timeline for returning to the required flow or timeline when the required flow resumed; (4) a description of corrective actions taken in response to any unplanned under-release of flow; and (5) a plan to prevent the need for modification of flows resulting from a similar emergency or event.

1.F Annual Operations Plan

The Licensees shall prepare an Annual Operations Plan that describes actions, operations, and methods for meeting instream flows identified in Condition 1, temperature and carryover storage requirements in Condition 3, and dissolved oxygen targets identified in Condition 8. The Annual Operations Plan shall cover the current water year. The Annual Operations Plan shall identify how instream flow requirements, carryover storage requirements, dissolved oxygen objectives, and temperature targets will be achieved under a reasonable range of hydrological conditions, including hydrological conditions that are reasonably expected in the year for which the plan is prepared. The Annual Operations Plan shall identify appropriate strategies for meeting flow, dissolved oxygen, temperature, and carryover storage requirements and identify relevant parameters such as precipitation volume, monthly reservoir storage, as well as precipitation, inflow, storage patterns, and resulting streamflow. The Annual Operations Plan shall identify how Bay-Delta Plan flows and other flow requirements are calculated or measured, identify compliance methods for minimum, pulse, and Bay-Delta Plan flows, and how adjustments will be made as updated information regarding the present year's hydrology becomes available, such as DWR's San Joaquin River water year forecast and inflow volume forecasts from California Nevada River Forecast Center. Equations and gage locations shall be provided as part of the description of flow calculations that will be used to meet requirements.

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By November 1 of each year, the Licensees shall submit a preliminary Annual Operations Plan to the Deputy Director, the Tuolumne River Watershed Group, and the Lower San Joaquin River Watershed Group (Condition 6), for review and recommendations. This preliminary plan must provide information about preliminary operational strategies for meeting instream flow requirements, water delivery demand, and reservoir storage targets given available information about existing conditions (e.g., end of September reservoir storage) and precipitation projections (e.g., inflow forecasts from California Nevada River Forecast Center and San Joaquin River water year forecast). The preliminary annual operations plan shall cover the current water year (October 1 – September 30 of the following year). After considering recommendations and projections for the water year, the Licensees shall submit a proposed Annual Operations Plan to the Executive Director by January 10 of the current water year for consideration of approval. When acting on requests for approval of an Annual Operations Plan, the State Water Board or Executive Director will consider the recommendations of the Tuolumne River Watershed Group and Lower San Joaquin River Watershed Group (if functionally equivalent to the Stanislaus, Tuolumne, Merced [STM] Working Group), along with the requirements and procedures for adaptive implementation and other relevant information. The Executive Director or State Water Board may require modifications to the proposed Annual Operations Plan, based on advice from the watershed groups or other relevant information, as part of approval.

As hydrologic conditions change in the current water year such that revisions need to be made to an approved Annual Operations Plan, the Licensees shall submit a Revised Operations Plan to the Executive Director for consideration of approval after consultation with the Tuolumne River Watershed Group and the Lower San Joaquin River Watershed Group (if functionally equivalent to the STM Working Group). The State Water Board recognizes that an annual operations plan is based on a forecast from the best available information and may not reflect actual conditions that occur during the February through June period. Accordingly, the State Water Board will consider this factor and whether the hydrologic condition could have been planned for in evaluating deviations from approved annual operations plans. The Executive Director may require modifications to the Revised Operations Plan as part of any approval.

The annual operations plans and revisions thereto shall be implemented upon approval of the Executive Director or State Water Board and any other required approvals. The Licensees shall file with FERC the approved Annual Operations Plan, and any approved revisions thereto.

The Bay-Delta Plan requires annual adaptive operations plans for adaptive implementation actions that achieve the LSJR flow objectives. The annual operations plan required under this condition may be used to fulfill the Bay-Delta Plan requirements for annual adaptive operations plans provided that the requirements for annual adaptive operations plans and related requirements in the Bay-Delta Plan are met.

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1.G Dry Year Management Operations Plan

No later than one year following license issuance, the Licensees shall submit a Dry Year Management Operations Plan to the Deputy Director for consideration of approval. The Deputy Director may require modifications as part of any approval. The Dry Year Management Operations Plan should outline operations strategies for optimizing water supply reliability for instream flows and water deliveries during Dry years in anticipation of multiple, sequential dry years. Dry-year water management strategies should be designed to minimize the frequency of requesting modification of the flow requirements of this certification as described in Condition 4 (Extremely Dry Conditions).

The Dry Year Management Operations Plan shall be developed in consultation with the Tuolumne River Watershed Group (Condition 6), and include, at minimum, a description of the process for allocating water to users during years with and without water shortages, a description of options for reservoir storage targets that address water deliveries and the need for instream flows and downstream temperature management in anticipation of multiple, sequential dry year conditions, and management strategies to guide operations in multiple, sequential, dry years. Management strategies should include water allocation approaches that assess risks and costs of meeting immediate and future water supply needs and instream flow requirements, considering the uncertainty of future inflows and the risk of drought. This effort should be coordinated with development of carryover storage requirements required in Condition 3. Implementing dry-year operations strategies should be exhausted prior to using the process outlined in Condition 4 (Extremely Dry Conditions).

To avoid duplication of dry year planning measures, the Licensees may incorporate the elements of FERC's Dry Year Management Operations Plan into any other drought management plan required by the license(s); doing so, however, does not relieve the Licensees of any obligation to comply with this condition.

The Dry Year Management Operations Plan shall be implemented upon approval of the Deputy Director and any other required approvals. The Licensees shall file with FERC the Deputy Director-approved Dry Year Management Operations Plan, and any approved amendments thereto.

CONDITION 2. Ramping Rates

The Licensees shall, upon issuance of the license, implement the down-ramping rates identified below for all controllable flow rate changes greater than 200 cfs.

- The decreasing rate of change shall be no more than two-inches per hour as measured at the existing gage near La Grange Dam (USGS gage no. 11289650) and change shall be less than or equal to 500 cfs in any one 24-hour period, unless a higher rate of change is required by USACE's *Don Pedro Lake Reservoir Regulation for Flood Control (USACE, 1972)*, and amendments thereto, to avoid interference with flood control operations necessary to ensure safety of people and property.

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The Licensees may request Deputy Director approval to modify the ramping rates required by this condition for purposes of avoiding adverse impacts to aquatic species. The Deputy Director may require modifications as part of any approval. Any such request shall be supported by the Tuolumne River Anadromous Fish Committee based on supporting technical information. The Licensees shall provide documentation of Tuolumne River Anadromous Fish Committee support for the modification and supporting information as part of any request.

No later than one month following license issuance, the Licensees shall notify the Deputy Director whether facility modifications are needed to meet the specified ramping rates, and specifically identify what modifications are needed to meet the ramping rates associated with specific ranges of flows required per the certification. If facility modifications are necessary to achieve the specified ramping rates, the modifications shall be completed no later than three years after license issuance. The Licensees are required to make a good faith effort to provide the specified ramping rates until such facility modifications are completed.

CONDITION 3. Temperature Management and Monitoring Plan

No later than six months following license issuance, the Licensees shall initiate a collaborative effort through the Tuolumne River Watershed Group (Condition 6) to identify comprehensive reservoir operation requirements, including carryover storage, needed to maintain suitable downstream temperature targets identified in Table 3. Table 3 temperature targets may be updated with new requirements, including biological and environmental targets for temperature, if incorporated into a voluntary agreement approved by the State Water Board, or alternate temperature targets approved by the Executive Director that are developed by the Licensees based on scientific information demonstrating reasonable protection of native fish.

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Table 3. Tuolumne River Temperature Targets

Time Period ¹	Water-Year Type (Condition 1)	Temperature (7DADM)	Location ¹
January 1 – May 31	Wet Above Normal Below Normal	14°C (57.2°F)	Hickman Bridge (RM 31.8)
	Dry Critically Dry		Robert's Ferry Bridge (RM 39.5)
February 15 – May 31 February 15 – May 31 February 15 – May 31 February 15 – May 31 February 15 – April 30	Wet Above Normal Below Normal Dry Critically Dry	18°C (64.4°F)	Shiloh Bridge (RM 3.4)
June 1 – September 30	Wet Above Normal Below Normal	18°C (64.4°F)	Robert's Ferry Bridge (RM 39.5)
	Dry Critically Dry		Turlock State Park (RM 42.8)
October 1 – October 31	Wet Above Normal Below Normal	18°C (64.4°F)	Shiloh Bridge (RM 3.4)
October 1 – October 15	Dry Critically Dry	20°C (68.0°F)	
October 15 – October 31		18°C (64.4°F)	
October 16 – December 31	Wet Above Normal Below Normal	13°C (55.4°F)	Robert's Ferry Bridge (RM 39.5)
	Dry Critically Dry		Basso Bridge (RM 47.4)

Abbreviations: 7DADM – 7-day average of the daily maximum; RM – River Mile

¹ Alternative locations and temperatures may be approved by the Deputy Director as part of approval of the Water Temperature Management Plan or amendments thereto. If temperature targets cannot be met for the entire time periods identified, then the plan should identify the frequency or percentage of time that it is anticipated that the temperature targets will be attainable for the range of water years, time frames, and locations. Requests for modifications to Table 3 temperature targets shall be developed in consultation with the Tuolumne River Anadromous Fish Committee (Condition 6) and supported with scientific information.

The Licensees shall take actions within their reasonable control to achieve the water temperatures outlined in Table 3 and any amendments to the temperature targets as

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approved in the Licensees' Annual Operations Plan (Condition 1) or amendments to the *Water Temperature Management and Monitoring Plan*. No later than one year following license issuance, the Licensees shall submit a *Water Temperature Monitoring and Management Plan* to the Deputy Director for review and consideration of approval. The Deputy Director may require modifications as part of any approval. The Licensees shall develop the *Water Temperature Monitoring and Management Plan* in consultation with the Tuolumne River Anadromous Fish Committee (Condition 6). The Licensees shall install and operate four to eight water temperature monitoring devices no later than two years following license issuance. At a minimum, the *Water Temperature Management and Monitoring Plan* shall include:

- A statement of the goals and objectives of the plan;
- A description of proposed monitoring and associated protocols, including monitoring locations, schedule/frequency, equipment to be used, and the quality assurance project plan;
- A comprehensive description of factors that may affect water temperature. This description shall also identify whether the factors are associated with the Projects' operations;
- A comprehensive description of reasonable actions to achieve the temperature targets, which may include temperature control structures, riparian shade and other restoration measures, adaptive implementation of Bay-Delta Plan LSJR flows, modified or additional reservoir releases, cold water bypass, reduced delivery for consumptive use, and modified power supply operations. The plan shall also identify the actions the Licensees proposes to implement and the schedule for implementation;
- Proposed carryover (end of September) storage requirements that can meet and maintain temperature targets in Table 3 in most years (see more in Carryover Storage section below);
- Other reservoir requirements may include refill requirements after dry year sequences, minimum allocations, and options for relaxing the carryover storage requirements to meet the minimum allocation during times of extreme drought;
- A detailed reporting schedule, that includes:
 - Reporting on inability to meet water temperature targets; and
 - Posting monitoring data to a publicly available website in real-time (see Condition 1.E);
- A plan for corrective measures and a timetable for implementation, if data indicate that the Projects may be increasing water temperature and/or adversely affecting water quality, including adjustments to Projects' operations or physical solutions;
- A description of the modeling and assumptions that will be used to develop annual operations plans (Condition 1) so that the Projects can achieve the temperature targets in Table 3 within the reasonable control of the Licensees;
- Any requests for modifications to the monitoring locations identified in Table 3, including supporting information for any proposed modifications. Proposed

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locations shall be selected with consideration for site accessibility, equivalency to existing location, and species presence and management; and

- A summary of any comments received in development of the plan and how the comments were addressed.

Inability to Meet Temperature Targets Due to Uncontrollable Factors. If the Licensees are unable to meet the temperature targets of this certification due to an event or circumstance beyond their reasonable control, the Licensees shall file a notice with the Deputy Director within 10 days of such event or circumstance. The notice shall describe the event or circumstance causing the inability to meet the target. Such notice shall include a statement of specific actions that the Licensees have or will take to address the event or circumstance and how they will manage the cold-water pool or river flow to minimize exceedances of Table 3. If the Deputy Director finds that there is a pattern of exceedances within the Licensees' reasonable control that could result in adverse impacts to fishery resources, the Deputy Director may take remedial action to address the exceedances (e.g., requiring the Licensees to file a plan identifying any feasible measures that the Licensees may undertake, requiring the Licensees to file modifications to license(s) requirements, directing implementation of corrective actions in the Water Temperature Monitoring and Management Plan, etc.) in addition to other actions within the State Water Board's authority.

Carryover Storage. In developing the carryover storage requirements, the Licensees shall consider and incorporate site-specific information, local conditions, and knowledge from local experts. The feasibility of carryover storage options shall be evaluated and considered as part of developing the carryover storage requirements. The carryover storage requirements shall be designed to provide suitable stream temperatures, avoid significant adverse temperature or other impacts on fish and wildlife and, if feasible, on other beneficial uses. The Licensees shall target suitable temperature conditions for freshwater life stages of Chinook salmon and Central Valley steelhead, which are identified in Table 3. The carryover storage requirements shall include any monitoring and reporting that will be implemented (may include reference to monitoring conducted under other certification conditions), as well as updates to the requirements, if needed, during the term of the FERC license(s).

The Licensees shall implement the Temperature Management and Monitoring Plan upon receipt of Deputy Director and any other required approvals in accordance with the schedule specified therein. The Licensees shall file with FERC the Deputy Director-approved Temperature Management and Monitoring Plan, and any approved amendments thereto.

Prior to Deputy Director approval of the Temperature Management and Monitoring Plan, the Licensees shall monitor and report temperature conditions and manage diversions, releases, and operations to achieve temperature targets (Table 3) in combination with approved biological goals (currently under consideration by the State Water Board pursuant to the Bay-Delta Plan).

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If the Licensees do not have approved carryover storage requirements one year after license issuance, the Deputy Director reserves the authority to require interim carryover storage to achieve temperature requirements following notice and an opportunity for comment. The Licensees shall file with FERC the Deputy Director's interim carryover storage requirements, and any approved amendments thereto. The Licensees shall implement the Deputy Director's interim carryover storage requirements upon receipt, in accordance with the schedule and requirements specified therein.

CONDITION 4. Extremely Dry Conditions

In the event of extremely dry conditions, which may include a year in which the Governor of the State of California declares a drought emergency for Tuolumne County or Stanislaus County, or both, or multiple consecutive Dry or Critically Dry water years, the Licensees may request modification of the flow and flow-related requirements, including carryover storage requirements, of this certification. If the Licensees anticipate that they may request modification pursuant to this condition, the Licensees shall notify the agencies in the Tuolumne River Watershed Group (Condition 6), the Bureau of Land Management (BLM), and Deputy Director of the Licensees' concerns related to flows and related requirements as early as possible, and no later than March 15 of the year in which a request may be submitted. If the Licensees request modification pursuant to this condition, the Licensees shall develop a Revised Operations Plan in consultation with the agencies in the Tuolumne River Watershed Group (Condition 6) and BLM for flows during the extremely dry conditions.

The Licensees shall provide interested parties with notice of the proposed Revised Operations Plan at least seven days prior to submittal to the Deputy Director. Whenever possible, the Licensees shall provide an opportunity for interested parties to comment on the proposed Revised Operations Plan prior to submittal to the Deputy Director and provide such comments to the Deputy Director as part of submittal of the Revised Operations Plan. The Licensees' request shall include: an estimate of water to be saved and the alternative beneficial uses for which the water is being conserved; a timeline for the return to regular operations; proposed monitoring for the revised operations, including an estimation of any impacts the revised operations may have on any beneficial uses of water; identification of measures to reasonably protect beneficial uses under the circumstances; and proposed water conservation measures that will be implemented. If conservation measures are not applicable, the Licensees shall describe the circumstances and justification for not implementing water conservation measures. Any information that is required by FERC's Drought Management Plan (or equivalent document in the final Projects' license(s)) may be integrated into the Revised Operations Plan so as not to duplicate efforts.

The Licensees shall submit the proposed Revised Operations Plan to the Deputy Director for review and consideration for approval. The Licensees shall also provide a summary of any comments received and how the comments were addressed. The Deputy Director may require modifications to the Revised Operations Plan as part of any approval. The Licensees may implement the Revised Operations Plan upon receipt

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of Deputy Director and other required approvals, in accordance with the schedule and requirements specified therein. The Licensees shall file with FERC the Deputy Director-approved Revised Operations Plan, and any approved amendments thereto.

CONDITION 5. Southern Delta Salinity Objective

The Licensees shall not divert water when, in order to meet the southern Delta salinity objective established in the Bay-Delta Plan, the United States Bureau of Reclamation (Reclamation) is releasing stored water from New Melones Reservoir to avoid exceedance of 0.7 deciSiemens/meter (dS/m) electrical conductivity (EC) at Vernalis (April – August) and 1.0 dS/m EC at Vernalis (September – March). In water years when Reclamation may release stored water from New Melones to achieve the Vernalis salinity objective, the Licensees shall consult with Reclamation and State Water Board staff on at least a monthly basis, and more often as needed, to determine whether this condition applies. The Deputy Director may modify or provide additional direction regarding the required consultation process.

This restriction shall not apply when, in the judgment of the Deputy Director, curtailment of diversion will not be effective in lowering the salinity concentration at Vernalis, or when in the absence of the Licensees' diversion, hydraulic continuity would not exist between the Licensees' point of diversion and Vernalis. This restriction shall also not apply when, in the judgment of the Deputy Director, releases of stored water from New Melones to achieve salinity requirements would be unnecessary if Reclamation curtailed diversion of natural flow being diverted at other Reclamation facilities in the San Joaquin River watershed under water rights that are junior in priority to the Licensees.

This condition is not intended to relieve any other diverter of responsibility to contribute to achievement of the southern Delta salinity objective. If the Licensees are aware of any person or entity with a junior priority diverting or threatening to divert significant quantities of water at a time when the Licensees are required to bypass or release water under this condition, the Licensees should report that diversion or threatened diversion to the Deputy Director, who may initiate appropriate actions to address that diverter's responsibility to contribute to achievement of the southern Delta salinity objective, as appropriate.

This condition shall apply unless and until modified through a proceeding by the State Water Board to allocate responsibility for meeting the southern Delta salinity objective in the Bay-Delta Plan.

**CONDITION 6. Tuolumne River and Regional Watershed Management
Coordination**

The Licensees shall form and participate in a Tuolumne River Watershed Group. The Licensee shall participate in the Lower San Joaquin River Watershed Group, as described below, or participate in an alternative governance entity established pursuant to a voluntary agreement approved by the State Water Board that performs similar functions.

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No later than three months following license issuance, the Licensees shall establish and convene a Tuolumne River Watershed Group, or functionally equivalent group, for the purpose of consultation on ecological topics related to the development and review of plans required by this certification and to provide recommendations to the Licensees as expressly provided in this certification. Examples of topics the Tuolumne River Watershed Group shall consult on include, but are not limited to, the implementation, monitoring, and effectiveness assessment of the flow requirements identified in this certification. The Tuolumne River Watershed Group may also develop materials and information to inform coordination of Tuolumne River flows with flows from the other salmon-bearing tributaries to the LSJR, specifically the Stanislaus and Merced Rivers. In order to ensure adequate coordination, and unless persons or entities decline to participate, the Tuolumne River Watershed Group shall include, at a minimum, and in addition to the Licensees' representative or representatives, representatives from the following entities who have expertise in San Joaquin River fisheries management, hydrology, operations, land management, and monitoring and assessment needs: State Water Board, California Department of Fish and Wildlife (CDFW), National Marine Fisheries Service (NMFS), United States Fish and Wildlife Service (USFWS), BLM, and other members identified by the Deputy Director. The State Water Board staff overseeing implementation of this water quality certification shall also be included in all meetings related to development of information related to, or implementation of, provisions of this certification. Depending on the topic, it is also highly recommended, and the Deputy Director may direct, that the Tuolumne River Watershed Group include water diverters and users on the Tuolumne River and nongovernmental organizations with appropriate expertise.

The Tuolumne River Watershed Group may convene individual committees, as needed, to address specific topics or issues or to invite additional expertise. The committees may include representatives from all or a subset of the entities of the watershed group as well as representatives from other sectors with appropriate expertise.

The Licensees are required to convene a Tuolumne River Anadromous Fish Committee, a subgroup of the Tuolumne River Watershed Group. The Licensees shall host the first meeting of the Tuolumne River Anadromous Fish Committee no later than three months following license issuance. The Licensees shall organize and host all future meetings of the Tuolumne River Anadromous Fish Committee. Meetings shall be held at least monthly unless otherwise agreed to by the committee. The Tuolumne River Anadromous Fish Committee shall be comprised of one representative each from TID, Modesto Irrigation District, CDFW, NMFS, USFWS, the State Water Board, and at least one nongovernmental organization with anadromous fisheries expertise. Tuolumne River Anadromous Fish Committee members shall be selected by each respective organization.

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Lower San Joaquin River Watershed Group

The Licensees shall participate in a Lower San Joaquin River Watershed Group convened by the State Water Board or other appropriate regional watershed group established to assist with the implementation, monitoring, and assessment of the Bay-Delta Plan. This regional group will serve the purposes and functions of the Stanislaus, Tuolumne, and Merced (STM) Working Group as described in the Bay-Delta Plan. The State Water Board will seek recommendations from the regional watershed group (i.e., STM Working Group) regarding: biological goals; procedures for implementing the adaptive methods; annual adaptive operations plan; and the San Joaquin River Monitoring and Evaluation Program, including special studies and reporting requirements.

The Lower San Joaquin River Watershed Group shall include, at a minimum, representatives from the following entities who have expertise in LSJR, Stanislaus, Tuolumne, and Merced rivers fisheries management, hydrology, operations, and monitoring and assessment needs: CDFW; NMFS; USFWS; and water diverters and users on the Stanislaus, Tuolumne, and Merced rivers. The Lower San Joaquin River Watershed Group shall also include State Water Board staff and may include any other persons or entities the Executive Director determines to have appropriate expertise, including nongovernmental organizations. To the extent practicable, the membership of the Lower San Joaquin Watershed Group should achieve a balance of interests such that no one interest constitutes a majority of the group.

CONDITION 7. Annual Review Meeting

No later than one year following license issuance, the Licensees shall establish an annual meeting that is open to the public to review and discuss implementation of the Projects' license(s). At a minimum and at least 30 days prior to the meeting, the Licensees shall invite the Tuolumne River Watershed Group (Condition 6), BLM, and other interested stakeholders to participate in the annual review meeting. The Licensees shall notice the annual review meeting at least 30 days in advance on the Tuolumne River Technical Advisory Committee webpage¹⁶ or successor website or forum. The Tuolumne River Watershed Group shall establish communication protocols to facilitate interactions between group members that allow for open participation and communication between all parties.

The first annual review meeting shall be held no later than the first full calendar year after license issuance. At the annual review meetings, the Licensees shall:

- Review the status of implementing the FERC license(s) and certification conditions;
- Review monitoring data from all monitoring conducted the previous year;

¹⁶ Available at: <http://tuolumnerivertac.com/>

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- Review elements of current year maintenance plans and any non-routine maintenance;
- Discuss foreseeable changes to the Projects' facilities or features;
- Discuss the status of salmonid reintroduction plans;
- Discuss necessary revisions or modifications to plans approved as part of this certification; and
- Discuss species listing implications, including:
 - Needed protection measures for species newly listed as threatened, endangered, candidate, or sensitive;
 - Changes to existing plans for actions that may no longer be necessary due to delisting of a species; and
 - Changes to existing plans to incorporate new information about species requiring protection.

Materials shall be provided to the Tuolumne River Watershed Group (Condition 6), BLM, and other interested stakeholders at least 30 days prior to the annual meeting. The Licensees shall submit a report to the State Water Board that summarizes the annual review meeting no later than 60 days following each meeting.

CONDITION 8. Water Quality Monitoring and Management

8.A Dissolved Oxygen Monitoring and Management Plan

The Licensees shall take all actions within their reasonable control to meet the dissolved oxygen water quality objectives outlined in Table 4 below and any amendments thereto as approved in the Licensees' Annual Operations Plan (Condition 1). No later than six months following license issuance, the Licensees shall submit a Dissolved Oxygen Management Plan to the Deputy Director for review and consideration for approval. The Deputy Director may require modifications as part of any approval. The Licensees shall develop the Dissolved Oxygen Monitoring and Management Plan in consultation with the Tuolumne River Anadromous Fish Committee (Condition 6) and Central Valley Regional Water Quality Control Board (Central Valley Regional Water Board) staff. No later than 18 months following license issuance, the Licensees shall operate a minimum of two continuous real-time dissolved oxygen monitoring stations to measure compliance with the applicable dissolved oxygen water quality objectives for the lower Tuolumne River (Table 4). At a minimum, the Dissolved Oxygen Management Plan shall include:

- A statement of the goals and objectives for the plan;
- A description of proposed monitoring and associated protocols, including monitoring locations, frequency (i.e., continuous), equipment to be used, and the quality assurance project plan. The description shall include a minimum of two continuous real-time dissolved oxygen monitoring stations that will be operated to measure compliance with the dissolved oxygen water quality objectives in the Tuolumne River, rationale for the compliance locations, and evaluation of the

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need for additional dissolved oxygen monitoring stations to inform habitat suitability;

- A comprehensive description of the Projects' impact on dissolved oxygen concentrations in the lower Tuolumne River. This description shall also identify the magnitude of the Projects' impact in relationship to other environmental factors influencing dissolved oxygen in the Tuolumne River;
- A detailed reporting schedule that includes:
 - Summarizing, evaluating, and reporting on the data; and
 - Posting monitoring station data to a publicly available website in real-time (see Condition 1.E);
- A plan for corrective measures and a timetable for implementation if data indicate that the Projects may be decreasing dissolved oxygen concentrations and/or adversely affecting water quality;
- A description of the modeling and assumptions or data that will be used to develop annual operation plans (Condition 1) to meet the dissolved oxygen requirements in Table 4 at the compliance points identified in the plan; and
- A summary of any comments received in development of the plan and how the comments were addressed.

Table 4. Tuolumne River Dissolved Oxygen Water Quality Objectives¹

River Section	Water Quality Objective (mg/l)¹	Time Period
Tuolumne River from Waterford to La Grange	8.0	October 15 – June 15
	7.0	June 16 – October 14
Tuolumne River from Waterford to the confluence with San Joaquin River	7.0	All Year
Sources to New Don Pedro Reservoir and New Don Pedro and La Grange Reservoirs		

¹ SR/SJR Basin Plan. Dissolved oxygen concentrations below the levels presented in this table are prohibited at all times. Subject to the Deputy Director's approval, the requirements in this table may be superseded by appropriate dissolved oxygen requirements adopted in an amended SR/SJR Basin Plan.

Inability to Meet Dissolved Oxygen Requirements Due to Uncontrollable Factors. If the Licensees are unable to meet the dissolved oxygen requirements of this certification due to an event or circumstance beyond its reasonable control, the Licensees shall file a notice with the Deputy Director within 10 days of such event or circumstance. The

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notice shall describe the event or circumstance causing the inability to meet the requirement. Such notice shall include a statement of specific actions that the Licensees have or will take to address the event or circumstance and how they will manage the cold-water pool or river flow to minimize exceedances of Table 4. If the Deputy Director finds that there is a pattern of exceedances within the Licensees' reasonable control that could result in adverse impacts to fishery resources or other beneficial uses, the Deputy Director may take remedial action to address the exceedances (e.g., requiring the Licensees to file a plan identifying any feasible measures that the Licensees may undertake, require the Licensees to file modifications to license(s) requirements, etc.).

The Licensees shall implement the Dissolved Oxygen Management Plan upon receipt of Deputy Director and other required approvals, in accordance with the schedule and requirements specified therein. The Licensees shall file with FERC the Deputy Director-approved Dissolved Oxygen Management Plan, and any approved amendments thereto.

8.B Mercury Monitoring and Management Plan

No later than one year following license issuance, the Licensees shall submit a Mercury Monitoring and Management Plan to the Deputy Director for review and consideration for approval. The Deputy Director may require modifications as part of any approval. The Licensees shall develop the Mercury Monitoring and Management Plan consistent with the State Water Board's May 2, 2012 *Part 2 Of The Water Quality Control Plan For Inland Surface Waters, Enclosed Bays, And Estuaries Of California—Tribal And Subsistence Fishing Beneficial Uses And Mercury Provisions* and any amendments thereto, and in consultation with the California Department of Public Health, Office of Environmental Health Hazard Assessment, State Water Board, and Central Valley Regional Water Board staff. At a minimum, the Mercury Monitoring and Management Plan shall include:

- A statement of the goals and objectives for the plan;
- A description of proposed monitoring protocols and locations (within the reservoirs and river), including aqueous methylmercury and inorganic mercury, fish tissue mercury, sediment mercury, and other ancillary parameters that affect mercury cycling (e.g., chlorophyll-a, dissolved organic carbon, and redox-potential);
- A comprehensive description of procedures, including coordination with the California Department of Public Health and Office of Environmental Health Hazard Assessment to develop notification procedures that will be implemented to inform the public if hazardous levels of mercury are found in fish tissue;
- An evaluation of risks to piscivorous wildlife;
- A detailed description of reporting that will be implemented, including schedule;

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- **Proposed reservoir operations and fisheries adaptive management to reduce methylmercury pollution (e.g., bioaccumulation, methylation, and risks to piscivorous wildlife and human fish consumers);**
- **A plan for corrective measures and a timetable for implementation, if data indicate that the Projects may be increasing bioavailable mercury concentrations and/or adversely affecting water quality; and**
- **A summary of any comments received in development of the plan and how the comments were addressed.**

The Licensees shall implement the Mercury Monitoring and Management Plan upon receipt of Deputy Director and other required approvals, in accordance with the schedule and requirements specified therein. The Licensees shall file with FERC the Deputy Director-approved Mercury Monitoring and Management Plan, and any approved amendments thereto.

8.C Other Constituents Monitoring and Management Plan

No later than one year following license issuance, the Licensees shall submit an Other Constituents Monitoring and Management Plan to the Deputy Director for review and consideration for approval. The Deputy Director may require modifications as part of any approval. The Other Constituents Monitoring and Management Plan shall be developed in coordination with the Tuolumne River Watershed Group (Condition 6) and the Central Valley Regional Water Board. At a minimum, the Other Constituents Monitoring and Management Plan shall include:

- **A statement of goals and objectives for the plan;**
- **A description of proposed monitoring and associated protocols, including monitoring locations, frequency (e.g., continuous), equipment to be used, and the quality assurance project plan;**
- **A comprehensive description of the Projects' impact on concentrations of constituents that will be monitored per the plan (see next bullet) in New Don Pedro Reservoir, La Grange Reservoir, and the lower Tuolumne River. This description shall also identify the magnitude of the Projects' impact in relationship to other factors influencing the constituents in the Tuolumne River;**
- **A description of water quality parameters to be monitored that include, but are not limited to those identified in the 303(d) listing: water temperature (covered in Condition 3), mercury (covered in Condition 8.B), chlorpyrifos, diazinon, Group A pesticides (aldrin, dieldrin, chlordane, endrin, heptachlor, heptachlor epoxide, hexachlorocyclohexanes [including lindane], endosulfan, and toxaphene), and toxicity;**
- **Pesticides used for Projects' operations and maintenance;**
- **A description of water quality parameters to be monitored in the Tuolumne River as part of the *Waste Discharge Requirements General Order For Growers Within The Eastern San Joaquin River Watershed That Are Members Of The Third-***

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Party Group (Central Valley Regional Water Board Order R5-2012-0116-09), including any amendments or successor orders;

- Current water quality objectives for the parameters and monitoring requirements provided in the SR/SJR Basin Plan, Bay-Delta Plan, or amendments thereto;
- Description of options to reduce 303(d) listed pollutant levels, and a plan for corrective measures and a timetable for implementation, if data indicate that the Projects may be adversely affecting water quality;
- A summary of any comments received in development of the plan and how the comments were addressed; and
- A detailed reporting schedule that includes summarizing, evaluating, and reporting on the data.

The Licensees shall implement the Other Constituents Monitoring and Management Plan upon receipt of Deputy Director and other required approvals, in accordance with the schedule and requirements specified therein. If the water quality monitoring assessment determines that the Projects' operations have de minimis impacts to the constituents described above, then the Licensees may propose reduced monitoring for review and approval by the Deputy Director. The Licensees shall file with FERC the Deputy Director-approved Other Constituents Monitoring and Management Plan, and any approved amendments thereto.

CONDITION 9. Large Woody Material Management

No later than one year following license issuance, the Licensees shall submit a Large Woody Material Management Plan (LWMMP) to the Deputy Director for review and consideration for approval. The Deputy Director may require modifications as part of any approval. The LWMMP shall be designed to provide additional native resident and migratory fish rearing habitat in the Tuolumne River by creating additional cover, edge, and channel complexity through the addition of structural habitat, including large woody debris, boulders, and other objects. The LWMMP shall be developed in consultation with BLM, USFWS, NMFS, CDFW, and State Water Board staff. The Licensees shall consider guidance from the *National Large Wood Manual* (Reclamation and ERDC, 2016) and *Integrating Recreational Boating Considerations into Stream Channel Modification & Design Projects* (Colburn, 2012) in developing the LWMMP.

At a minimum, the LWMMP shall include:

- Specific objectives, including a description of: (a) what constitutes large woody material (i.e., size criteria) that will be captured, removed, stored, and placed as part of this condition; (b) how other woody material will be handled or disposed of as part of the Projects' operations; (c) what other materials (e.g., boulders) will be used;
- Proposed monitoring to assess the effectiveness of the plan (e.g., mobilization and distribution of large woody material and other approved materials);
- Detailed description of the methods, locations, volume, and frequency of large woody material capture, removal, storage, and placement for large woody

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material in New Don Pedro Reservoir, including options for moving the large woody material collected in New Don Pedro Reservoir and depositing it downstream of La Grange Dam;

- Identification of suitable locations in the Tuolumne River downstream of La Grange Dam where large woody material can be placed and be passively mobilized by two to five-year high flow events, or where it would be appropriate to anchor large woody material;
- A monitoring and reporting program that describes how the Licensees will evaluate and report on the performance of management efforts related to large woody material and other approved materials. The monitoring and reporting program shall include the criteria that will be used to evaluate the performance of the management measures. The Licensees shall propose updates to the LWMMP based on the monitoring results. Reports shall be submitted to the Deputy Director, BLM, CDFW, NMFS, and USFWS;
- An adaptive management program that describes how the Licensees plan to adjust large woody material management and monitoring methods based on evaluation of information and monitoring resulting from implementation of the LWMPP; and
- Documentation of consultation with BLM, USFWS, NMFS, CDFW, and State Water Board staff, including comments and recommendations made in connection with the LWMMP, and a description of how the LWMMP incorporates or addresses the comments and recommendations.

In addition to the general minimum requirements above, the Licensees shall, in consultation with the agencies listed above, evaluate the following elements for inclusion in the LWMMP:

- A strategy for safe and expeditious wood removal from New Don Pedro Reservoir when the volume exceeds 5,000 cubic yards of woody material entering New Don Pedro in any one year;
- The amount and location of large woody material placement and a schedule for placement in consultation with BLM, USFWS, NMFS, CDFW, and State Water Board staff. Identification of the amount, location, and timing of large woody material; and
- CDFW and NMFS recommendations (CDFW, 2018; NMFS, 2018) and information provided in the Final EIS, and other available, relevant scientific and technical information. CDFW and NMFS recommendations (CDFW, 2018; NMFS, 2018) and information provided in the FERC Final EIS, and other available, relevant scientific and technical information.

The Licensees shall report on large woody material management for the previous year at the Annual Review Meeting (Condition 7).

The Licensees shall file with FERC the Deputy Director-approved LWMMP, and any approved amendments thereto. The Licensees shall implement the LWMMP upon

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receipt of Deputy Director and any other required approvals, in accordance with the schedule and requirements specified therein.

CONDITION 10. Erosion and Sediment Management

No later than one year following license issuance, the Licensees shall submit an Erosion and Sediment Control Management Plan (Erosion and Sediment Plan) to the Deputy Director for review and consideration for approval. The Licensees may require modifications as part of any approval. The Erosion and Sediment Plan shall be developed in consultation with BLM, CDFW, Central Valley Regional Water Board, and State Water Board staff. The primary goal of the Erosion and Sediment Plan shall be to address and control Projects-related erosion and sedimentation during the term of the new license(s) and any extensions.

At a minimum, the Erosion and Sediment Plan shall include recommendations (referred to as Measure Number 4, items 1 and 2) provided by CDFW (CDFW, 2018) and the following items:

- The goal, purpose, and scope of the plan;
- Periodic inventories of the entire Projects area to identify and assess sites with erosion and sedimentation issues. The plan shall identify a timeline for the inventories;
- Criteria for ranking and treating erosion sites identified as part of the inventories, including a risk rating and hazard assessment for scheduling erosion treatment measures and monitoring at each erosion site;
- Protocols for monitoring completed erosion control treatment measures for a period of up to three years after treatment to determine the effectiveness of erosion control measures and whether further erosion control measures are necessary;
- Process and timeline for submittal of the periodic inventories, including associated information and monitoring of existing sites, to the Deputy Director. If the inventory indicates existing or new sites with Project-related erosion and sedimentation issues, the Licensees shall prepare an amendment to the plan for Deputy Director review and consideration for approval. The plan amendment shall be prepared in consultation with BLM, CDFW, Central Valley Regional Water Board, and State Water Board staff and submitted to the Deputy Director within six months of submitting the periodic inventory to the Deputy Director. The plan amendment shall include: (a) a ranking of the sites based on the criteria used for ranking and treating erosion sites; (b) a timeline for addressing sites with erosion and sedimentation issues; (c) measures/treatments that will be implemented to address erosion and sedimentation issues at each site; (d) measures that will be implemented to protect water quality and beneficial uses; (e) monitoring of sites to evaluate effectiveness of implemented measures/treatments; and (f) reporting;
- Site-specific temporary erosion control measures that will be implemented during construction-related activities;

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- A monitoring and reporting program that describes how the Licensees will evaluate and report on the performance of erosion and sedimentation control efforts. The program shall include the criteria that will be used to evaluate the performance of erosion and sedimentation control management measures and propose changes to the measures/treatments;
- Protocols for emergency erosion and sediment control that will be implemented upon notice to the Deputy Director, outside of the timeline and process outlined above; and
- Documentation of consultation with BLM, CDFW, Central Valley Regional Water Board, and State Water Board staff, comments and recommendations made in connection with the plan, and a description of how the plan incorporates or addresses the comments and recommendations.

The Licensees shall file with FERC the Deputy Director-approved Erosion and Sediment Plan, and any approved amendments thereto. The Licensees shall implement the Erosion and Sediment Plan upon receipt of Deputy Director and any other required approvals, in accordance with the schedule and requirements specified therein.

CONDITION 11. Gravel Augmentation and Management

No later than one year following license issuance, the Licensees shall submit a Gravel Augmentation Plan to the Deputy Director for review and consideration for approval. The Deputy Director may require modifications as part of any approval. The Gravel Augmentation Plan shall be developed in consultation with BLM, CDFW, USFWS, NMFS, and State Water Board staff. A primary goal of the Gravel Augmentation Plan shall be to develop specifications for gravel augmentation in the lower Tuolumne River, including the addition of coarse gravel to fill bedload traps/special run pools and provide spawning gravel downstream of La Grange Dam. The Gravel Augmentation Plan should be designed with consideration of sediment budgets that exceed the river's ability to transport, so that over time the system becomes less incised.

At a minimum, the Gravel Augmentation Plan shall include:

- The purpose, goals, and scope of the plan, including the provisions noted in the Additional Gravel Augmentation Details section below;
- Identification of coarse gravel and spawning gravel sizes to be used for gravel augmentation;
- Identification of gravel harvesting sources and storage sites;
- Method for removal, sorting, and cleaning the source gravel, as well as disposal of any byproducts associated with the process;
- Identification of locations and methods for gravel introduction/placement, and any facilities or improvements necessary to access the Tuolumne River and place gravel;
- Coordination with activities under the Riparian, Spawning, and Floodplain Restoration Plan (Condition 12);

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- **The priorities for short-term gravel transfusions of coarse gravel (to fill sediment traps/special run pools) and long-term annual spawning gravel augmentations as found in the Tuolumne River Coarse Sediment Management Plan (McBain and Trush 2004);**
- **Measures that Licensees will take to reasonably protect water quality, including fish and wildlife beneficial uses, during gravel augmentation;**
- **A monitoring and reporting program that describes how the Licensees will evaluate and report on the performance of gravel augmentation efforts. The program shall include the criteria that will be used to evaluate the performance of gravel augmentation management measures, including a schedule and methods for monitoring mobilization of gravel dispersal. Monitoring shall include an evaluation of the effectiveness of gravel augmentation activities at providing spawning substrate, including identification of whether the gravels are being used, the quality of spawning habitat being created, and success in meeting the plan's goals. The Licensees shall propose any updates to the plan based on the monitoring results. Reports shall be submitted to the Deputy Director, BLM, CDFW, NMFS, and USFWS;**
- **An adaptive management program that describes how the Licensees plan to adjust gravel placement and monitoring methods based on evaluation of information and monitoring resulting from plan implementation; and**
- **Documentation of consultation with BLM, CDFW, USFWS, NMFS, and State Water Board staff, including comments and recommendations made in connection with the plan, and a description of how the plan incorporates or addresses the comments and recommendations.**

Additional Gravel Augmentation Details. The Licensees shall implement coarse gravel (non-spawning and spawning) enhancement in the following reaches:

- **Spawning Reach (RM 53.0 – RM 47.5) La Grange Dam to Basso Bridge;**
- **Dredger Reach (RM 47.5 – RM 39.5) Basso Bridge to Roberts Ferry;**
- **Mining Reach (RM 39.5 – RM 36.3) Roberts Ferry to Santa Fe Bridge; and**
- **Lower Tuolumne (RM 36.3 – RM 0).**

The Licensees shall place coarse gravel in the four reaches of the lower Tuolumne River identified above. The exact size distribution of gravels and location of gravel placement in the four reaches identified above shall be determined in the Gravel Augmentation Plan and through annual consultation with the BLM, CDFW, USFWS, NMFS, and State Water Board staff. The Gravel Augmentation Plan shall include the gravel augmentation as follows:

- **564,000 cubic yards of coarse gravels within the first 15 years (approximately 37,600 cubic yards per year) following license(s) issuance to fill the bedload traps/special run pools; and**

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- 5,400 cubic yards per year of cleaned spawning sized gravel to create or restore spawning riffles and restore fluvial geomorphic processes starting five years after license(s) issuance.

The Deputy Director may require additional gravel augmentation based on monitoring results, as part of adaptive management implementation of the Gravel Augmentation Plan. The Licensees shall file with FERC the Deputy Director-approved Gravel Augmentation Plan, and any approved amendments thereto. The Licensees shall implement the Gravel Augmentation Plan upon receipt of Deputy Director and any other required approvals, in accordance with the schedule and requirements specified therein.

CONDITION 12. Riparian, Spawning, and Floodplain Management

12.A Riparian, Spawning, and Floodplain Restoration Plan

No later than two years following license issuance, the Licensees shall submit a Riparian, Spawning, and Floodplain Restoration Plan to the Deputy Director for review and consideration for approval. The Deputy Director may require modifications as part of any approval. The Riparian, Spawning, and Floodplain Restoration Plan shall be developed in consultation with the agencies in the Tuolumne River Anadromous Fish Committee (Condition 6), shall: (i) include habitat and biological goals for the restoration plan; (ii) be based on the expected water budget resulting from Conditions 1.B, 1.C, 1.D, and 3; and (iii) include a definition of high flow events.

The Riparian, Spawning, and Floodplain Restoration Plan shall identify the river reaches with the greatest need for riparian, spawning, and floodplain rearing habitat. Spawning restoration sites identified in the Gravel Augmentation Plan (Condition 11) shall be incorporated into the Riparian, Spawning, and Floodplain Restoration Plan if approved by the Tuolumne River Anadromous Fish Committee. Riparian habitat restoration sites may be identified in specific locations for temperature management or combined with floodplain restoration sites if approved by the Tuolumne River Anadromous Fish Committee. The Riparian, Spawning, and Floodplain Restoration Plan shall identify the target amount of floodplain rearing habitat to be developed for each reach, and potential locations for floodplain restoration projects, including locations for lowering existing floodplain elevations to activate at flow rates in the range of 700 to 1,300 cfs and in the range from 1,300 to 3,000 cfs. The Riparian, Spawning, and Floodplain Restoration Plan shall evaluate floodplain restoration locations for a minimum of 200 acres of constructed, restored floodplain rearing habitat and shall include a floodplain inundation analysis to identify locations for restoration projects that reduce elevations for flooding to flow rates of 700 to 3,000 cfs, a revegetation plan, and other relevant details.

The Licensees shall prioritize project sites that have the potential to produce the highest quality habitat at the optimal frequency and duration for supporting native fish species. Restoration project site selection shall prioritize floodplain areas with a higher river frontage to acreage ratio and projects that lower the existing floodplain elevation to

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activate at lower flow levels. The Licensees shall also work in coordination with the Tuolumne River Anadromous Fish Committee to develop restoration project-specific plans including performance criteria. The Licensees may develop specific projects in conjunction with projects developed as part of the Gravel Augmentation Plan (Condition 11). Floodplain restoration sites may be used as sources of material for gravel augmentation and new floodplains may be created during the filling of special-run pools as recommended by CDFW in Measure 5 (CDFW, 2018).

No later than one year following license issuance, the Licensees shall, as part of submittal of the Riparian, Spawning, and Floodplain Restoration Plan, submit a screening level analysis of proposed locations for a minimum of 200 acres of constructed, restored, floodplain habitat throughout the lower Tuolumne River in reaches with the greatest needs and designed to activate at flows lower than existing overbank flow values (e.g., between 700 and 1,300). The screening level analysis shall include a determination of floodplain activation flows for each project and an evaluation of how flood/pulse flows may contribute to floodplain values and benefit fish and wildlife species. Restored habitats that activate at lower flows may be restored side channels with a mix of floodplain and instream habitat characteristics determined by flow rate. The screening level analysis shall be developed in consultation with the Tuolumne River Anadromous Fish Committee (Condition 6).

The Riparian, Spawning, and Floodplain Restoration Plan shall identify recommended restoration projects, implementation schedule for the restoration, identification of performance criteria for restored habitats, and implementation and effectiveness monitoring that will be performed for each individual restoration project. The recommended restoration projects shall incorporate relevant information from the Gravel Augmentation Plan (Condition 11) and restoration screening-level analysis.

The Licensees shall include with the plan copies of the comments, including recommendations, made in the course of consultation, and an explanation as to how the plan incorporates or addresses the comments and recommendations. The Licensees shall file with FERC the Deputy Director-approved Riparian, Spawning, and Floodplain Restoration Plan, and any approved amendments thereto.

12.B Floodplain Habitat Restoration

The Licensees shall implement the Riparian, Spawning, and Floodplain Restoration Plan upon receipt of Deputy Director and any other required approvals, in accordance with the schedule and requirements specified therein.

The Licensees shall construct a minimum of 150 acres of 100 percent suitable floodplain rearing habitat that is designed to lower existing floodplain surface elevation in the first 10 years following Deputy Director approval of the Riparian, Spawning, and

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Floodplain Restoration Plan (an average of 15 acres per year¹⁷). The Licensees shall construct an average of 15 acres of 100 percent suitable floodplain habitat every year thereafter unless the Licensees, in consultation with the Tuolumne River Anadromous Fish Committee, can demonstrate to the Deputy Director that available habitat and flows are meeting the narrative and numeric objectives and goals for the LSJR and Tuolumne River. Floodplain construction and restoration shall implement the Riparian, Spawning, and Floodplain Restoration Plan and primarily include floodplain restoration that activates at flows in the range of 700 – 1,300 cfs and 1,300 – 3,000 cfs. Additional floodplain restoration is required if monitoring and assessment show that floodplain restoration projects are not 100 percent suitable, are not meeting performance criteria, or if biological targets for salmon are not met (e.g., juvenile survival targets, Central Valley Protection Improvement Act doubling escapement, State Water Board approved biological goals for the Tuolumne River) due to lack of adequate rearing habitat quality or quantity.

No later than two years following license issuance, the Licensees shall complete the final design, perform pre-construction monitoring to support development of a Before-After-Control-Impact (BACI) analysis, and commence construction of the approved Riparian, Spawning, and Floodplain Restoration Plan.

The Licensees shall develop restoration project-level designs in consultation with the Tuolumne River Anadromous Fish Committee and identify performance metrics for habitat quantity and quality and biological targets (e.g., salmonid use, salmonid survival, presence/absence of warm water predator fish) for each restoration project.

12.C Riparian, Spawning, and Floodplain Restoration Monitoring and Assessment

***Restoration Site-specific Monitoring.* The Licensees shall develop a monitoring plan for each restoration site and shall be responsible for implementing the plan at each site. Monitoring designs for implementation and effectiveness assessment shall be identified in collaboration with the Tuolumne River Anadromous Fish Committee for each restoration project. Monitoring can be carried out by other organizations and/or member organizations of the Tuolumne River Anadromous Fish Committee and Tuolumne River Watershed Group. The Licensees shall be financially responsible for fulfillment of this requirement. As multiple restoration projects are completed, their individual monitoring plans shall be integrated so that monitoring activities, analysis, and synthesis are facilitated and to further the understanding of river wide recovery efforts. Such integration shall be reflected in the annual, five-year, and comprehensive reports described below. The Licensees shall include the following parameters in their**

¹⁷ An averaging period of no greater than five years may be applied to the annual requirement for 15 acres of 100 percent suitable floodplain rearing habitat.

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monitoring plans for immediate implementation following the completion of any individual floodplain restoration project:

- **Floodplain Inundation:** The Licensees shall monitor pre- and post-project floodplain inundation frequency, duration, depth, timing, velocity, and temperature;
- **Fish Use:** The Licensees shall monitor the pre- and post-project use of the restored project sites by fish, particularly juvenile salmonids; and
- **Vegetation Survival:** The Licensees shall monitor survival of planted riparian species at newly constructed restoration sites.

Implementation Monitoring. The Licensees shall summarize and provide the results of implementation monitoring in a report to the Deputy Director, CDFW, USFWS, and NMFS within 60 days of completion of the site-specific restoration implementation monitoring.

Effectiveness Monitoring. The Licensees shall conduct effectiveness monitoring to assess:

- **Floodplain inundation and geomorphic processes at the restored/enhanced floodplain sites;**
- **Survivorship of planted riparian species, riparian canopy cover, and riparian species recruitment at the restored/enhanced floodplain sites;**
- **Presence and function of large woody material in the restored/enhanced floodplain sites;**
- **Terrestrial subsidies inputs from the restored/enhanced floodplain sites; and**
- **Juvenile salmonid use of restored/enhanced floodplain habitats and large woody material placement sites.**

Post-construction effectiveness monitoring of restoration and enhancement sites shall commence no later than one year following full implementation at a given restoration site for a period of 10 years or until performance metrics have been achieved. If the effectiveness monitoring shows less effectiveness than the design values and performance metrics, the Licensees shall only be credited with the amount of restoration shown to be suitable habitat. The Licensees shall implement an adaptive management process to employ additional measures needed to achieve restoration objectives. The Licensees shall summarize and provide the results of effectiveness monitoring in a report to the Deputy Director, CDFW, USFWS, and NMFS within 60 days of completion of the site-specific restoration effectiveness monitoring.

Annual Monitoring. The Licensees shall annually collect data appropriate for evaluating the implementation and effectiveness of the Riparian, Spawning, and Floodplain Restoration Plan and the achievement of the plan objectives. The Licensees shall prepare an annual summary report describing monitoring and implementation activities completed pursuant to this condition, including floodplain reconnection and riparian planting that were completed during the previous year, and submit the report to the

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agencies of the Tuolumne River Anadromous Fish Committee (Condition 6) for review and comment. The Licensees shall present the results of monitoring completed pursuant to this condition at the annual meeting (Condition 7).

Five-Year Evaluation. The Licensees, in consultation with the agencies of the Tuolumne River Anadromous Fish Committee (Condition 6), shall evaluate the Riparian, Spawning, and Floodplain Restoration Plan every five years after initial implementation and provide a comprehensive report that evaluates the effectiveness of the program over the previous five years and other efforts conducted under this condition. If any changes are recommended beyond the objectives approved by the Deputy Director, the Licensees shall submit recommendations in a revised plan to the Deputy Director for review and consideration for approval. The Licensees shall include with the revised plan, copies of the comments, including recommendations, made in the course of consultation with the agencies, and an explanation of how the plan incorporates or addresses the comments and recommendations.

Comprehensive Evaluation. The Licensees shall evaluate the need for additional habitat restoration to meet performance metrics and biological goals in consultation with the Tuolumne River Anadromous Fish Committee no later than 25 years following license issuance or completion of floodplain restoration projects if completed prior to 25 years after license issuance. The evaluation shall be submitted to the Deputy Director upon completion, no later than 26 years after license issuance. The Deputy Director may require additional floodplain restoration projects if needed to achieve biological goals or habitat goals.

CONDITION 13. Predator Suppression Plan

No later than one year following license issuance, the Licensees shall submit a Predator Suppression Plan to the Deputy Director for review and consideration for approval. The Deputy Director may require modifications as part of any approval. The Licensees shall develop the Predator Suppression Plan in consultation with the agencies of the Tuolumne River Anadromous Fish Committee (Condition 6).

At a minimum, the Predator Suppression Plan shall include:

- The goals and objectives of the plan;
- An evaluation of the effects that predators have on native resident and migratory fish, including predator density in the Tuolumne River, alternative prey, juvenile residence time, refuge habitat availability, and impacts of predation on native resident and migratory fish survival rates;
- Identification of gravel pits, scour pools, ponds, weirs, diversion dams, submerged aquatic vegetation, and other structures or areas, that support significant number of non-native fish and predators that may currently reduce native resident and migratory fish survival;
- Actions the Licensees will implement to reduce predation and non-native fish effects and to improve native resident and migratory fish success. Action may

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include modification of structures and areas or other appropriate actions (e.g., predator removal);

- Coordination with actions required by other conditions of this certification (e.g., large woody material placement, floodplain habitat refuge for juvenile native resident and migratory fish, gravel augmentation, and temperature management) to maximize predator suppression and native resident and migratory fish survival;
- A monitoring and reporting program that describes how the Licensees will evaluate and report on the performance of plan implementation. The program shall include the criteria that will be used to evaluate plan implementation and propose changes; and
- Documentation of consultation with agencies, including comments and recommendations made in connection with the plan, and a description of how the plan incorporates or addresses the comments and recommendations.

The Licensees shall file with FERC the Deputy Director-approved Predator Suppression Plan, and any approved amendments thereto. The Licensees shall implement the Predator Suppression Plan upon receipt of Deputy Director and any other required approvals, in accordance with the schedule and requirements specified therein.

CONDITION 14. Aquatic Invasive Species Management Plan

No later than two years following license issuance, the Licensees shall submit an Aquatic Invasive Species Management Plan (Invasive Species Plan) to the Deputy Director for review and consideration for approval. The Deputy Director may require modifications as part of any approval. The Invasive Species Plan shall be developed in consultation with BLM, CDFW, USFWS, NMFS, and State Water Board staff. The Invasive Species Plan shall provide guidance to manage aquatic invasive species that occur or have the potential to occur in Projects-affected waters. The goals of the Invasive Species Plan are to: (1) identify and implement best management practices (BMPs) to minimize and prevent the introduction and spread of aquatic invasive species into and throughout Projects-affected waters; (2) provide education and outreach to ensure public awareness of the potential effects of aquatic invasive species throughout Projects-affected waters and actions needed to avoid or address them; (3) develop and implement monitoring programs to ensure early detection of aquatic invasive species; and (4) monitor the spread of established aquatic invasive species. At a minimum, the Invasive Species Plan shall include:

- The purpose of the plan;
- Identification of aquatic invasive species that occur or have the potential to occur in Projects-affected waters. For those that occur, include information on where the aquatic invasive species occur and its density;
- BMPs that will be implemented to manage aquatic invasive species;
- An education and outreach program that will be implemented to ensure public awareness and actions to avoid the introduction and spread of aquatic invasive species;

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- **A monitoring and reporting program that will be implemented to ensure early detection of new aquatic invasive species and monitor the spread or reduction of established aquatic invasive species. The monitoring program shall include the species that will be monitored for, monitoring protocols, frequency, and locations. The program shall describe how the Licensees will evaluate and report on the performance of aquatic invasive species management efforts. The program shall include the criteria that will be used to evaluate the performance of aquatic invasive species management measures. The reports shall include identification of changes associated with the presence of aquatic invasive species in Projects-affected waters and recommendations to address the presence. The Licensees shall propose any updates to the plan based on the monitoring results or other available information. Reports shall be submitted to BLM, CDFW, USFWS, NMFS, and the Deputy Director;**
- **An adaptive management program that describes how the Licensees plans to adjust aquatic invasive species monitoring methods based on evaluation of information and monitoring resulting from implementation of the plan; and**
- **Documentation of consultation with BLM, CDFW, USFWS, NMFS, and State Water Board staff, including comments and recommendations made in connection with the plan, and a description of how the plan incorporates or addresses the comments and recommendations.**

The Licensees shall file with FERC the Deputy Director-approved Invasive Species Plan, and any approved amendments thereto. The Licensees shall implement the Invasive Species Plan upon receipt of Deputy Director approval and any other required approvals, in accordance with the schedule and requirements specified therein. The Deputy Director may direct the Licensees to implement additional measures to address aquatic invasive species in Projects-affected waters.

CONDITION 15. Recreation Facilities Management

No later than two years following license issuance, the Licensees shall submit a Recreation Facilities Management Plan (Recreation Plan) to the Deputy Director for review and consideration for approval. The Deputy Director may require modifications as part of any approval. The Recreation Plan shall be developed in consultation with BLM and State Water Board staff.

At a minimum, the Recreation Plan shall include:

- **A description of operations and maintenance activities associated with the Projects' recreation facilities that have the potential to impact water quality, and measures that will be implemented to address any impacts;**
- **Identification of recreation use surveys that will be conducted as part of the Projects and submittal of the associated results to State Water Board staff. If results of the surveys indicate an increase in recreation use, the Licensees shall evaluate the potential effects to determine whether modifications to Projects' facilities are needed to protect water quality and beneficial uses and provide the**

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Deputy Director with the analysis and any associated recommendations for review and consideration of approval;

- A list, description, and schedule for modifications to existing and construction of new recreation facilities associated with the Projects. For each facility modification or construction, the Licensees shall prepare and implement, once approved by the Deputy Director, a Water Quality Monitoring and Protection Plan (Condition 19) that outlines measures and monitoring the Licensees will implement to protect water quality, beneficial uses, and aquatic biological resources;
- A reporting program to document, summarize, and analyze completion of recreation facility construction or modification and associated monitoring results; and
- Documentation of consultation with BLM and State Water Board staff, comments and recommendations made in connection with the plan, and a description of how the plan incorporates or addresses the comments and recommendations.

The Licensees shall file the Deputy Director-approved Recreation Plan, and any required modifications or amendments thereto, with FERC. The Licensees shall implement the Recreation Plan upon receipt of Deputy Director and any other required approvals, in accordance with the schedule and requirements specified therein.

CONDITION 18. Road Management

No later than two years following license issuance, the Licensees shall file a Road Management Plan with the Deputy Director for review and consideration for approval. The Deputy Director may require modifications as part of any approval. The Road Management Plan shall be developed in consultation with Central Valley Regional Water Board and State Water Board staff. The Road Management Plan shall describe the maintenance and construction of Projects' roads in a manner that is protective of water quality.

At a minimum, the Road Management Plan shall include:

- An inventory and map of all roads associated with the Projects, including locations of drainage structures, streams, and surface waterbodies;
- An assessment of Projects' roads to determine if any drainage structures or road segments are impacting or have the potential to impact water quality;
- Proposed measures and an implementation schedule to rehabilitate existing damage and minimize erosion from Projects' roads;

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- Proposed measures designed to improve drainage that are consistent with the most current BLM construction and maintenance guidance¹⁸ or Caltrans' Highway Design Manual¹⁹
- A process for the Licensees to propose updates or modifications to the plan for activities unknown at the time of plan approval, such as new road construction or decommissioning;
- A schedule and plan for inspection and maintenance of Projects' roads throughout the term of the license(s) and any extensions; and
- Documentation of consultation with Central Valley Regional Water Board and State Water Board staff, including comments and recommendations made in connection with the plan, and a description of how the plan incorporates or addresses the comments and recommendations.

The Licensees shall file with FERC the Deputy Director-approved Road Management Plan, and any approved amendments thereto. The Licensees shall implement the Road Management Plan upon receipt of Deputy Director and any other required approvals, in accordance with the schedule and requirements specified therein.

CONDITION 17. Biological Resources Management

No later than one year following license issuance, the Licensees shall submit a Biological Monitoring, Management, and Science Plan to the Deputy Director for review and consideration for approval. The Deputy Director may require modifications as part of any approval. The Licensees shall develop the Biological Monitoring, Management, and Science Plan in consultation with the Tuolumne River Anadromous Fish Committee, Tuolumne River Watershed Group, and the Lower San Joaquin River Watershed Group (Condition 6).

As part of implementing the Biological Monitoring, Management, and Science Plan, the Licensees shall monitor salmonids, fish communities, and aquatic ecology in the lower Tuolumne River, lower San Joaquin River, and at the mouth of the Sacramento-San Joaquin Delta in order to quantify the effects of the Projects on fish and wildlife in the watershed. Monitoring salmonid populations will assist in developing data for improving life-cycle models and scientific tools to better manage Tuolumne River salmonid populations. In consultation with the Tuolumne River Anadromous Fish Committee and the Tuolumne River Watershed Group, and with the Deputy Director's approval, the Licensees may participate in a regional monitoring program or other collective monitoring effort in lieu of some or all of the individual monitoring or data collection

¹⁸ BLM's construction and maintenance for roads can be found at: <https://www.blm.gov/sites/blm.gov/files/Chapter%204%20-%20Construction%20and%20Maintenance.pdf>. Last accessed: November 23, 2020.

¹⁹ Caltrans Highway Design Manual – Hydraulics and Stormwater Related Chapters. <https://dot.ca.gov/programs/design/manual-highway-design-manual-hdm>. Last accessed: November 23, 2020.

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provisions required by this condition. Such programs and efforts may include partnerships with the Interagency Ecological Program Bay-Delta water quality and biological monitoring efforts. Participation in a regional monitoring program or other collective monitoring effort shall consist of providing funds or in-kind services to the existing program or effort equivalent to the cost of conducting separate monitoring or data collection and assessment efforts.

At a minimum, the Biological Monitoring, Management, and Science Plan shall include:

1. Specific management questions that each biological monitoring effort is designed to answer;
2. Identification of biological and ecological performance targets to assess progress towards improving and sustaining healthier salmon populations, including biological goals adopted by the State Water Board, and other ecological metrics;
3. Science Program. Identify scientific investigations and/or special studies that need to be completed to achieve more effective and efficient attainment of biological goals and/or performance targets;
4. Adaptive management that describes how the Licensees plan to adjust management actions based on evaluation of information and monitoring resulting from implementation of the plan;
5. Specific years that monitoring will occur throughout the term of the license(s) and any extensions;
6. Standardized sampling and data protocols with consideration given to methods used for downstream monitoring associated with the Sacramento-San Joaquin Delta;
7. Salmon Monitoring Plan – see details below;
8. Ecological Stream Monitoring Plan – native resident and migratory fish, benthic macroinvertebrates (BMI), and amphibians in the lower Tuolumne River (La Grange Dam to the confluence with the LSJR) over the term of the license(s) and any extensions;
 - Fish community composition monitoring and assessment in coordination with habitat improvement actions such as large woody debris (Condition 9), gravel augmentation (Condition 11), riparian and floodplain improvement (Condition 12), and predator suppression (Condition 13) to identify fish species in multiple locations spanning the lower Tuolumne River;
 - BMI monitoring using the Surface Water Ambient Monitoring Program Protocols²⁰ or its successor program, or an alternative methodology approved by the Deputy Director. The protocols shall include population heterogeneity, composition, and trends;
9. Monitoring and habitat protection measures for fish, amphibian, and reptile species that are listed as threatened or endangered under the California

²⁰ State Water Board. 2017D. Surface Water Ambient Monitoring Program: Quality Assurance Program Plan.

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Endangered Species Act (ESA) and/or federal ESA, or Species of Special Concern designated by CDFW. These species include, but are not limited to: Central Valley steelhead, Central Valley spring-run Chinook salmon, Central Valley fall and late fall-run Chinook salmon, North American green sturgeon, Western Pond Turtle, Limestone Salamander, California red-legged Frog, Foothill yellow-legged Frog, and California Tiger Salamander. (Note monitoring for fish may be covered by other portions of the plan.);

- 10. Monitoring and habitat protection measures for bald eagle, including focused surveys to identify eagle nests within one mile of disturbance areas related to the Projects. The early nesting season survey shall occur at a time when eagles are most likely to be found at the nest sites, and the second survey shall occur later in the season and prior to the fledglings leaving the nest to confirm nesting activity. All observations shall be reported to CDFW using the California Bald Eagle Nesting Territory Survey Form;**
- 11. Monitoring and habitat protection measures for Vernal Pool Fairy Shrimp and Vernal Pool Tadpole Shrimp;**
- 12. Consideration of Projects' impacts on species and their habitats;**
- 13. Documentation of consultation, including comments and recommendations made in connection with the plan, and a description of how the plan incorporates or addresses the comments and recommendations; and**
- 14. Funding strategy, budget, and funding reporting process.**

Salmon Monitoring Plan. A Salmon Monitoring Plan shall be included in the Biological Monitoring, Management, and Science Plan consistent with CDFW recommendations (CDFW, 2018). At a minimum, the Salmon Monitoring Plan shall include the following:

- 1. Measurement of fall-run Chinook salmon spawning and escapement surveys:**
 - Annual carcass surveys to estimate spawning and escapement from October 1 through December 1, and continuing until two weeks after surveyors find less than five new fish-carcasses in a week. The stream-reach locations for each carcass shall be recorded;**
 - Consistent with the modified Cormack-Jolly-Seber (CJS) methodology described in the CDFW 2012 *Central Valley Chinook Salmon In-River Escapement Monitoring Plan* (Bergman et al. 2012);**
 - Annual snorkel surveys to estimate adult distribution, abundance, and age; and**
 - Annual pre-spawning mortality survey.**
- 2. Morphometric measurements of returning salmon adults shall include:**
 - 100 percent of the Chinook salmon carcasses downstream of the Fish Counting Weir at RM 24.5, surveying to at least RM 23.5;**
 - The first 500 Chinook salmon carcasses found upstream of the Fish Counting Weir; and**
 - An additional five percent (5%) of the Chinook salmon carcasses beyond the first 500 Chinook salmon carcasses upstream of the fishing weir, but not more than 1,000 in given year:**

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- Scale and otolith collection, length, sex, coded-wire-tag, and fecundity data (for estimating pre-spawn mortality).
3. Measure and estimate juvenile production by operating two rotary screw traps: one at RM 5.3 (Grayson RST); and one at RM 29.8 (Waterford RST). For fall-run Chinook salmon, operation of the traps shall occur annually from January 1 through June 15. The Licensees shall ensure:
 - The rotary screw traps are maintained in working order and positioned to provide adequate trap capture efficiencies at all flows;
 - Sufficient capture efficiency tests are conducted at all flows with all fish sizes;
 - Measurement of fork length of juveniles to track life-history diversity properties of brood years;
 - Development of methods to estimate expanded passage value for juvenile production estimates; and
 - Identification of all fish species that are sampled for information regarding fish community composition.
 4. Operation and maintenance of a seasonal counting weir at RM 24.5 to estimate CV Chinook salmon and CCV steelhead escapement and provide data on the percentage of females and migration timing.
 5. Snorkel surveys, using standard survey protocols, prior to each large woody material placement action, within the area of large woody material placement at the 10 meters upstream and downstream of the placement. Two snorkel surveys should occur in the placement area following large woody placement: the first during the second week following placement; and the second prior to spring flows returning to minimum instream flows in the calendar year following large woody material placement.
 6. Monitoring that will support assessment of the fisheries with respect to State Water Board approved biological goals for the LSJR and fishery performance metrics (e.g., total abundance, density, age composition, spatial distribution, and seasonal survival).

The Licensees shall file with FERC the Deputy Director-approved Biological Monitoring, Management, and Science Plan, and any approved amendments thereto. The Licensees shall implement the Biological Monitoring, Management, and Science Plan upon receipt of Deputy Director and any other required approvals, in accordance with the schedule and requirements specified therein.

CONDITION 18. Monitoring, Assessment, Reporting, and Special Studies

18.A Monitoring, Assessment, and Science Program

No later than two years following license issuance, the Licensees shall submit a comprehensive Tuolumne River monitoring, assessment, reporting, and special studies plan (Tuolumne River Monitoring, Assessment, and Science Plan) to the Deputy Director for review and consideration for approval. The Deputy Director may require

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modifications as part of any approval. The Deputy Director also may direct the Licensees to implement measures to address impacts associated with the Projects. The Tuolumne River Monitoring, Assessment, and Science Plan and performance of the required monitoring may serve as the Tuolumne River portion of the San Joaquin River Monitoring and Evaluation Program (SJRMEP).

Development of the Tuolumne River Monitoring, Assessment, and Science Plan shall build on the monitoring and assessment framework and principles outlined in the California Wetland and Riparian Area Monitoring Plan²¹ (WRAMP) and the USEPA tiered monitoring approach.²² The Tuolumne River Monitoring, Assessment, and Science Plan shall consolidate all monitoring actions required in the conditions of this certification that include monitoring necessary to assess compliance with the flow and water quality requirements in this certification, inform adaptive management decisions, and assess progress toward meeting biological goals.²³ The Tuolumne River Monitoring, Assessment, and Science Plan shall be developed in consultation with the agencies in the Tuolumne River Watershed Group and the Lower San Joaquin River Watershed Group (Condition 6).

Development and implementation of the Tuolumne River Monitoring, Assessment, and Science Plan shall be coordinated with monitoring programs in the LSJR watershed and Bay-Delta including, but not limited to: CDFW fish monitoring efforts; the Interagency Ecological Program; Reclamation monitoring for the CVP; DWR monitoring for the SWP; USFWS Anadromous Fish Restoration Program; FERC licensing proceedings for the Tuolumne River; San Joaquin River Restoration Program; and regional monitoring programs, such as the Irrigated Lands Regulatory Program East San Joaquin Water Quality Coalition, Delta Regional Monitoring Program, and San Francisco Bay Regional Monitoring Program.

²¹ WRAMP is designed to support monitoring and assessment of wetlands and streams, including projects, in a watershed or landscape context. Additional information is available on the Elements of WRAMP webpage, which is available online at https://mywaterquality.ca.gov/monitoring_council/wetland_workgroup/wramp/ (Last accessed: November 23, 2020)

²² <https://www.epa.gov/wetlands/wetlands-monitoring-and-assessment> (Last accessed: November 23, 2020)

²³ The Bay-Delta Plan requires development biological goals for the LSJR tributaries to assess progress towards achieving the narrative LSJR flow objective. **Draft Biological Goals** were released in 2019 for public comment and currently under consideration by the State Water Board pursuant to the Bay-Delta Plan. https://www.waterboards.ca.gov/waterrights/water_issues/programs/bay_delta/docs/biological_goals/draft_biological_goals.pdf (Last accessed November 23, 2020).

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At a minimum, the Tuolumne River Monitoring, Assessment, and Science Plan shall include²⁴:

- **The purpose of the plan and specific management questions the monitoring program is designed to address;**
- **Compliance and Implementation Monitoring. Identify the locations and instruments to measure flow and water quality properties (e.g., dissolved oxygen and temperature) needed to demonstrate compliance with flow and water quality requirements in this certification. Identify all monitoring requirements in the conditions of this certification and include them in the plan. See additional details in Condition 1.E for flow compliance monitoring, Condition 3 for temperature monitoring, Condition 8.A for dissolved oxygen monitoring, Condition 8.B for mercury monitoring, and Condition 8.C for other constituents monitoring;**
- **Biological (Effectiveness) Monitoring. Identify fish, BMI, and amphibian monitoring the Licensees will conduct in Projects-affected reaches over the term of the license(s) and any extensions (see additional details in Condition 17);**
- **Other Constituents Monitoring. Identify water quality parameters and associated monitoring the Licensees will conduct in Projects-affected reaches over the term of the license(s) and any extensions. See additional details in Condition 8;**
- **Non-Flow Actions. Incorporate compliance and adaptive management monitoring associated with non-flow restoration actions such as gravel augmentation (Condition 11), floodplain restoration (Condition 12), large-woody material management (Condition 9), predator suppression (Condition 13) and other non-flow restoration actions as they are implemented. Monitoring designs for non-flow actions should be based on principles outlined in the WRAMP and the USEPA tiered monitoring approach, or updated approaches approved by the Deputy Director;**
- **Assessment. Identify a schedule for assessing monitoring data and providing data and assessments to the Tuolumne River Watershed Group to inform real-time adaptive management decisions and to complete reporting requirements in Condition 18.B and Condition 18.C. Assessment of monitoring data shall provide: the compliance status for flow and water quality objectives required in this certification; evaluation of biological and ecological monitoring data, and tracking progress toward achieving biological goals; and updated responses to management questions. Assessments shall include identification of any impacts to biological resources and recommendations to address such impacts;**

²⁴ To the extent information is provided in another monitoring plan required by this certification that has been approved by the Deputy Director, the Licensees shall integrate the approved monitoring plan (e.g., temperature monitoring, biological monitoring) into the Tuolumne River Monitoring, Assessment, and Science Plan. References to certification conditions have been provided to assist the Licensees in determining when such instances may occur.

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- **Science Program.** Identify scientific investigations that need to be completed to achieve more effective and efficient attainment of flow and water quality requirements and biological goals (Condition 17); and
- **Governance and Administration.** The Tuolumne River Monitoring, Assessment, and Science Plan shall also include:
 - **A governance charter** for decision making processes in consultation with the Tuolumne River Watershed Group (Condition 6);
 - **Identification of organizations** involved in collecting, assessing, and reporting monitoring data and their roles. The Licensees shall document consultation with entities identified in monitoring, such as the Tuolumne River Watershed Group (Condition 6);
 - **Data Management.** Identify protocols for collecting, storing, assessing, summarizing, and making monitoring data and assessments and results from special studies available to the public;
 - **Annual Review.** Identify an annual review cycle to determine the need for modifications and a process for proposing modifications to the plan once approved;
 - **External Review.** Identify and implement a schedule for regularly occurring external reviews (e.g., every five years) of the plan and its implementation; and
 - **Long-term funding strategy.** Identify funding sources and allocate resources to monitoring, data management, assessment, reporting, special studies, and external reviews.

Documentation of consultation with the Tuolumne River Watershed Group and Lower San Joaquin River Watershed Group (Condition 6) and existing monitoring programs shall be provided to the Deputy Director as part of the request for review and consideration for approval of the Tuolumne River Monitoring, Assessment, and Science Plan. Documentation shall include any comments and recommendations made in connection with the plan, and a description of how the plan incorporates or addresses the comments and recommendations.

There may be a need to modify the approved Tuolumne River Monitoring, Assessment, and Science Plan to accommodate changing circumstances such as technological improvements in monitoring equipment and the initiation and completion of non-flow restoration actions or special studies. Proposed modifications shall be based on knowledge gained through monitoring data, assessment results, or results of special studies. Proposed modifications shall be developed through the annual review process in consultation with the Tuolumne River Watershed Group (Condition 6). The Licensees shall submit any proposed modifications to the Tuolumne River Monitoring, Assessment, and Science Plan to the Deputy Director for review and consideration for approval.

The Licensees shall file with FERC the Deputy Director-approved Tuolumne River Monitoring, Assessment, and Science Plan, and any approved amendments thereto.

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The Licensees shall implement the Tuolumne River Monitoring, Assessment, and Science Plan and any required measures upon receipt of approval of the Deputy Director and any other required approvals, in accordance with the schedule and requirements specified therein.

18. B Annual Summary Reports

By December 31 of each year, the Licensees shall submit an annual summary report to the Deputy Director that summarizes the Licensees' operations and other activities for the prior water year. The annual summary report shall be used to inform future years' operations and other activities. The annual summary report shall describe implementation of flows, including any flow shifting done pursuant to the annual adaptive operations plan or a voluntary agreement, monitoring and special studies activities, and implementation of other measures to protect fish and wildlife during the previous water year, including actions performed by other entities identified in the Bay-Delta Plan's program of implementation. The annual summary report shall also identify any deviations from the annual adaptive operations plan and describe future special studies planned for the water year. The Licensees shall ensure that the annual report is available for review and discussion at the Annual Review Meeting (Condition 7).

18.C Comprehensive Reports

Every three to five years following implementation of this certification (i.e., beginning no sooner than three years, and no later than five years following issuance of the license(s)), the Licensees shall prepare and submit a comprehensive report to the State Water Board. The comprehensive report shall be prepared to review progress toward meeting the biological goals and identify any recommended changes to the implementation of the LSJR flow objectives.

The comprehensive report and any recommendations shall be peer-reviewed by an appropriate independent science panel, which will make its own conclusions and recommendations. In order to leverage expertise and limited resources (financial and otherwise), the Licensees are encouraged to work collaboratively in one or more groups and in consultation with the Tuolumne River Watershed Group and the Lower San Joaquin River Watershed Group (Condition 6).

CONDITION 19. Construction and Maintenance

When applicable and for activities not covered by other conditions of this certification, the Licensees shall comply with the State Water Board's *General Permit for Stormwater Discharges Associated with Construction and Land Disturbance Activities* (Construction General Permit), and amendments thereto. For any construction and maintenance activities with the potential to impact water quality or beneficial uses that are not subject to the Construction General Permit, the Licensees shall prepare and implement site-specific Water Quality Monitoring and Protection Plans (WQMP Plans) for Deputy

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Director approval. WQMP Plans must demonstrate compliance with sediment and turbidity water quality objectives in the SR/SJR Basin Plan.

The Licensees shall submit the WQMP Plans to the Deputy Director for review and consideration for approval at least 60 days prior to the desired start date of the applicable construction or maintenance activity. The Deputy Director may require modifications as part of any approval. The objective of the WQMP Plans shall be to identify and implement control measures for construction, maintenance, or other activities with the potential to cause erosion, stream sedimentation, fugitive dust, soil mass movement, release of hazardous materials, or other water quality impairment.

The WQMP Plans shall be based on actual site geologic, soil, and groundwater conditions, and at a minimum shall include:

- **Description of site conditions and the proposed activity;**
- **Detailed descriptions, design drawings, and specific topographic locations of all control measures in relation to the proposed activity, which may include:**
 - **Measures to divert runoff away from disturbed land surfaces;**
 - **Measures to collect and filter runoff from disturbed land surfaces; and**
 - **Measures to dissipate energy and prevent erosion;**
- **Revegetation measures for disturbed areas, which shall include use of native plants and locally sourced plants and seeds; and**
- **A monitoring, maintenance, and reporting schedule.**

The Licensees shall file with FERC the Deputy Director approved WQMP Plans, and any approved amendments thereto. The Licensees shall implement the WQMP Plans upon receipt of Deputy Director and any other required approvals, in accordance with the schedule and requirements specified therein.

CONDITION 20. Reintroduction of Anadromous Fish

The State Water Board reserves authority for the Executive Director to modify or add conditions to this certification if State Water Board staff determine that it is reasonably foreseeable that state or federally listed anadromous fish species will be reintroduced into Projects-affected streams to ensure adequate protection of SR/SJR Basin Plan and Bay-Delta Plan objectives and beneficial uses. The State Water Board also reserves the authority for the Executive Director to require the Licensees to develop plans and conduct studies if it is reasonably foreseeable that listed anadromous fish species will be reintroduced into Projects-affected areas. Such plans and studies shall be designed in consultation with USFWS, NMFS, CDFW, and State Water Board staff, to develop fish passage, flows, or other measures, as well as determine appropriate modifications to the certification to minimize potential impacts and protect water quality and beneficial uses. Introduction of anadromous fish may require reevaluation of the Projects' facilities, flow regimes, fish stocking plans, availability of large woody material, gravel augmentation, and access to Projects-affected tributaries.

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CONDITIONS 21 – 45

CONDITION 21. The Licensees shall ensure no net loss of wetland or riparian habitat functions and is responsible for its own compliance with the *State Wetland Definition and Procedures for Discharges of Dredged or Fill Material to Waters of the State* (State Water Board, 2019A) and the *California Wetlands Conservation Policy* (Governor's Executive Order W-59-93). Proposed wetland mitigation ratios shall be submitted to the Deputy Director for approval.

CONDITION 22. Any plan developed as a condition of this certification will require review and consideration for approval by the Deputy Director, unless otherwise specified. The State Water Board's approval authority, including authority delegated to the Deputy Director or others, includes, but is not limited to, the authority to withhold approval or modify a proposal, plan, or report prior to approval. The State Water Board, or delegatee with approval authority for a plan, may require consultation with persons or entities with appropriate expertise, including nongovernmental organizations, prior to considering the plan. If the Licensees fail to timely submit an adequate plan, the Deputy Director may prescribe interim requirements or measures in furtherance of the condition that is the subject of the plan. The State Water Board may take action, including enforcement action, if the Licensees fail to provide or implement a required item in a timely manner. If a time extension is needed to submit an item for Deputy Director or Executive Director approval, the Licensees shall submit a written request for the extension, with justification, to the Deputy Director or Executive Director no later than 60 days prior to the deadline. The Licensees shall file with FERC any Deputy Director- or Executive Director-approved time extensions. The Licensees shall not implement any plans or reports until after receiving Deputy Director and Executive Director approval and any other necessary regulatory approvals.

CONDITION 23. The State Water Board reserves the authority to add to or modify the conditions of this certification to incorporate terms of a State Water Board-approved voluntary agreement that helps to meet water quality standards and other appropriate requirements of state law, and that may include, but is not limited to, coordination requirements with watershed groups, modifications to requirements for instream flows, temperature targets, annual plans and reporting requirements, non-flow restoration actions (e.g. gravel augmentation, habitat restoration, large woody material management), and monitoring, assessment, and science requirements.

CONDITION 24. The State Water Board reserves the authority to add to or modify the conditions of this certification: (1) to incorporate changes in technology, sampling, or methodologies; (2) if monitoring results indicate that continued operation of the Projects could violate water quality objectives or impair beneficial uses; (3) to implement any new or revised water quality standards and implementation plans adopted or approved pursuant to the Porter-Cologne Water Quality Control Act or section 303 of the Clean Water Act; (4) to coordinate the operations of these Projects and other hydrologically connected water development projects, where coordination of operations is reasonably

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necessary to meet water quality objectives and protect beneficial uses of water; and (5) to require additional monitoring and/or other measures, as needed, to ensure that continued operation of the Projects meet water quality objectives and protect the beneficial uses of New Don Pedro Reservoir, the Tuolumne River, and the Bay-Delta.

CONDITION 25. Future changes in climate projected to occur during the FERC license(s) term may significantly alter the baseline assumptions used to develop the conditions of this certification. The State Water Board reserves authority to add to or modify the conditions of this certification, to require additional monitoring and/or other measures, as needed, to verify that Projects' operations meet water quality objectives and protect the beneficial uses assigned to Projects-affected stream reaches.

CONDITION 26. The State Water Board shall provide notice and an opportunity to be heard in exercising its authority to add to or modify the conditions of this certification.

CONDITION 27. In addition to the specific conditions in this certification, the Projects shall be operated in a manner consistent with all applicable requirements of the Bay-Delta Plan and SR/SJR Basin Plan.

CONDITION 28. In addition to the specific conditions in this certification, the Projects shall be operated in a manner consistent with all water quality standards and implementation plans adopted or approved pursuant to the Porter-Cologne Water Quality Control Act or section 303 of the Clean Water Act.

CONDITION 29. Unless otherwise specified in this certification or at the request of the Deputy Director, data and/or reports shall be submitted electronically in a format accepted by the State Water Board to facilitate the incorporation of this information into public reports and the State Water Board's water quality database systems in compliance with California Water Code section 13167.

CONDITION 30. This certification does not authorize any act which results in the taking of a threatened, endangered, or candidate species or any act which is now prohibited, or becomes prohibited in the future, under either the California ESA (Fish & Game Code §§ 2050 – 2097) or the federal ESA (16 U.S.C. §§ 1531 – 1544). If a "take" will result from any act authorized under this certification or water rights held by the Licensees, the Licensees must obtain authorization for the take prior to any construction or operation of the portion of the Projects that may result in a take. The Licensees are responsible for meeting all requirements of the applicable ESAs for the Projects authorized under this certification.

CONDITION 31. The Licensees shall submit any change to the Projects, including operations, facilities, technology changes or upgrades, or methodology, which may have a significant or material effect on the findings, conclusions, or conditions of this certification, to the State Water Board for prior review and written approval. The State Water Board shall determine significance and may require consultation with state and/or federal agencies. If the State Water Board is not notified of a change to the Projects, it

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will be considered a violation of this certification. If such a change would also require submission to FERC, the change must first be submitted and approved by the Executive Director of the State Water Board unless otherwise delegated in this certification or other State Water Board approval.

CONDITION 32. In the event of any violation or threatened violation of the conditions of this certification, the violation or threatened violation is subject to any remedies, penalties, process, or sanctions as provided for under applicable state or federal law. For the purposes of section 401(d) of the Clean Water Act, the applicability of any state law authorizing remedies, penalties, process, or sanctions for the violation or threatened violation constitutes a limitation necessary to ensure compliance with the water quality standards and other pertinent requirements incorporated into this certification. In response to any violation of the conditions of this certification, the State Water Board may add to or modify the conditions of this certification as appropriate to ensure compliance.

CONDITION 33. In response to a suspected violation of any condition of this certification, the State Water Board or Central Valley Regional Water Board may require the holder of any federal permit or license subject to this certification to furnish, under penalty of perjury, any technical or monitoring reports the State Water Board deems appropriate, provided that the burden, including costs, of the reports shall bear a reasonable relationship to the need for the reports and the benefits to be obtained from the reports. (Wat. Code, §§ 1051, 13165, 13267, and 13383.)

CONDITION 34. This certification shall not be construed as replacement or substitution for any necessary federal, state, and local approvals. The Licensees are responsible for compliance with all applicable federal, state, or local laws or ordinances and shall obtain authorization from applicable regulatory agencies prior to the commencement of Projects' activities.

CONDITION 35. Any requirement in this certification that refers to an agency whose authorities and responsibilities are transferred to or subsumed by another state or federal agency, will apply equally to the successor agency.

CONDITION 36. Upon request, a construction schedule shall be provided to the Deputy Director. The Licensees shall provide State Water Board and Central Valley Regional Water Board staff access to Projects sites to document compliance with this certification.

CONDITION 37. A copy of this certification shall be provided to any contractor and all subcontractors conducting Projects-related work, and copies shall remain in their possession at the Projects site(s). The Licensees shall be responsible for work conducted by its contractor, subcontractors, or other persons conducting work related to the Projects.

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CONDITION 38. Onsite containment for storage of chemicals classified as hazardous shall be away from watercourses and include secondary containment and appropriate management as specified in California Code of Regulations, title 27, section 20320.

CONDITION 39. Activities associated with operation and maintenance of the Projects that threaten or potentially threaten water quality shall be subject to further review by the Deputy Director and Executive Officer of the Central Valley Regional Water Board. Any proposal for Projects maintenance or repair work involving Projects-affected water bodies, including desilting of dam impoundments, impoundment drawdowns to facilitate repair or maintenance work, and tailrace dredging, shall be filed with the Deputy Director for prior review and consideration for approval.

CONDITION 40. The Licensees shall comply with the terms and conditions in the State Water Board's *National Pollutant Discharge Elimination System (NPDES) General Permit for Storm Water Discharges Associated with Construction and Land Disturbance Activities* (Construction General Permit; State Water Board Order 2009-0009-DWQ, as amended by State Water Board Orders 2010-0014-DWQ and 2012-0006-DWQ), and ongoing amendments during the life of the Projects.

CONDITION 41. Nothing in this certification shall be construed as State Water Board approval of the validity of any water rights, including pre-1914 claims. The State Water Board has separate authority under the Water Code to investigate and take enforcement action, if necessary, to prevent any unauthorized or threatened unauthorized diversions of water.

CONDITION 42. This certification is subject to modification or revocation upon administrative or judicial review, including but not limited to review and amendment pursuant to California Water Code section 13330 and California Code of Regulations, title 23, division 3, chapter 28, article 6 (commencing with section 3867).

CONDITION 43. This certification is subject to modification to incorporate feasible measures to avoid or reduce significant environmental impacts or to make any necessary findings based on any environmental documents certified by the California Environmental Quality Act (CEQA) lead agency after this certification is issued, including any revisions to those environmental documents made as a result of judicial review of the CEQA lead agency's approval of the Projects.

CONDITION 44. This certification is not intended and shall not be construed to apply to any activity involving a hydroelectric facility and requiring a FERC license or an amendment to a FERC license unless the pertinent application for certification was filed pursuant to California Code of Regulations, title 23, section 3855, subdivision (b) and that application for certification specifically identified that a FERC license or amendment to a FERC license for a hydroelectric facility was being sought.

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CONDITION 45. This certification is conditioned upon total payment of any fee required under California Code of Regulations, title 23, division 3, chapter 28.



Eileen Sobek
Executive Director

January 15, 2021
Date

Enclosures: Attachment A: Detailed Projects Description
Attachment B: Consolidated Instream Flow Requirements

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ATTACHMENT A: DETAILED PROJECTS DESCRIPTION

**FINAL WATER QUALITY CERTIFICATION
FOR
DON PEDRO HYDROELECTRIC PROJECT
AND
LA GRANGE HYDROELECTRIC PROJECT**

JANUARY 2021

**Don Pedro and La Grange Hydroelectric Projects
Final Water Quality Certification****Attachment A
January 2021****1.0 Introduction**

The Don Pedro Hydroelectric Project (Don Pedro Project) and La Grange Hydroelectric Project (La Grange Project) (collectively, Projects), Federal Energy Regulatory Commission (FERC) Project Nos. 2299 and 14581, respectively, are located on the Tuolumne River. The Projects are jointly owned by Turlock Irrigation District (TID) and Modesto Irrigation District (MID) (collectively, Districts). The Don Pedro Project is located in Tuolumne County and has an authorized installed generation capacity of 168 megawatts (MW). The La Grange Project is located immediately downstream of the Don Pedro Project in Stanislaus and Tuolumne Counties and has an authorized installed capacity of 4.7 MW.

The Don Pedro Project consists of New Don Pedro Dam and Don Pedro Reservoir, gated and uncontrolled spillways on the west abutment of the main dam, low-level outlet works located in the diversion tunnel in the east abutment of the main dam, the power intake and tunnel (also in the left abutment), Don Pedro powerhouse, the Project switchyard located at the powerhouse, and four dikes. The La Grange Project consists of La Grange Diversion Dam and Reservoir, La Grange spillway, sluice gates and sluice channel, two penstocks and their intakes, La Grange Powerhouse, an excavated tailrace, and a substation. These Projects facilities are described in further detail below. The descriptions provided in this attachment are for informational purposes only.

2.0 Don Pedro Hydroelectric Project**2.1 New Don Pedro Dam**

New Don Pedro Dam is a 1,900-foot-(ft)-long by 580-ft-high earth and rockfill structure. The top of the dam is at an elevation of 855 ft. The dam has a top depth (i.e., thickness) of 40 ft and a bottom depth of approximately 3,000 ft. The downstream slope is grass-covered and the upstream slope has riprap protection extending to an elevation of 585 ft.

2.2 Don Pedro Reservoir

The Don Pedro Reservoir extends for approximately 24 miles at the normal maximum water surface elevation of 830 ft and 26 miles at the upstream Project Boundary water at an elevation of 845 ft. The surface area of the reservoir at an elevation of 830 ft is approximately 12,960 acres (ac) with a gross storage capacity of 2,030,000 acre-feet (AF). The Don Pedro Reservoir shoreline, including the numerous islands within the lake (at the normal maximum water surface elevation), is approximately 160 miles long. The current minimum operating pool elevation is at 600 ft. Water storage below this elevation is approximately 309,000 AF. The old Don Pedro Dam, which was displaced by the construction of New Don Pedro Dam, is located approximately 1.5 miles upstream of New Don Pedro Dam at approximately River Mile 56.4. The old Don Pedro Dam remains in place with its 12 original irrigation outlets in the open position. The permanent concrete spillway crest of old Don Pedro Dam is at an approximate elevation of 597 ft and was topped by nine-foot-high gates, which were removed when New Don Pedro Dam was constructed.

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2.3 Don Pedro Spillway

The Don Pedro spillway includes gated and ungated sections, located adjacent to one another in a saddle area west of, and separated from, the main dam. The gated spillway section is 135-ft-long, with a permanent crest elevation of 800 ft, and includes three radial gates each 45-ft-wide by 30-ft-high. The radial gates are operated by motor-driven steel cables. A travel way is provided over the gated spillway along a top deck at elevation 855 ft. Gate trunnions are located at an elevation of 810 ft. The ungated spillway is an ogee crest section 995-ft-long with a permanent crest elevation of 830 ft and a top abutment elevation of 855 ft. The total spillway capacity at a reservoir water level of 850 ft is 472,500 cubic feet per second (cfs). Flow over the ungated ogee crest section of the spillway has occurred only twice since Don Pedro Project construction, during the New Year's 1997 flood and more recently in February 2017. Flows over the spillway are released into a normally dry gulch named Twin Gulch, which discharges into the Tuolumne River approximately 1.5 miles downstream of the main dam. The spillway sections are founded on bedrock. The Twin Gulch spillway channel primarily consists of bedrock and boulders.

2.4 Outlet Works

Low level outlet works are located at the left (east) abutment of the main dam. The outlet works consist of three individual service gate housings, each containing 4-ft-wide by 5-ft-high slide gates. The outlet works are situated in a 3,500-ft-long concrete lined tunnel, a portion of which originally served as the water diversion tunnel during construction. The original water diversion tunnel had an inlet elevation centerline of 315 ft. At the completion of construction, the original inlet for the diversion tunnel was fitted with a concrete plug and a new 12-ft-diameter inlet was constructed with an inlet invert of 342 ft. The diversion tunnel downstream of the new inlet was fitted with three bonneted slide gates. The invert of the three slide gates is at an approximate elevation of 310 ft. A maintenance gate, which travels on an inclined gate track, serves as the inlet to the outlet works. The outlet works tunnel daylight back to the Tuolumne River approximately 400 ft downstream of the powerhouse. The invert of the outlet works at the river discharge is at an approximate elevation of 300 ft. At a reservoir water surface elevation of 830 ft, the hydraulic capacity of the three gates constituting the outlet works is 7,500 cfs. The three gates were refurbished in 2016.

2.5 Power Intake and Tunnel

Flows are delivered from the reservoir to the powerhouse via a 2,960-ft-long power tunnel located in the left (east) abutment of the dam. The tunnel transitions from an 18.5-ft-diameter concrete lined section to a 16-ft-diameter steel lined section. Emergency closure can be provided by a 21-ft-high by 12-ft-wide fixed-wheel gate that is operated from a chamber at the top of the gate shaft located at the left dam abutment. Flows from the power tunnel are delivered to the four unit powerhouse and a hollow jet bypass control valve in the powerhouse. The inlet to the power tunnel is fitted with trash racks and a hydraulically operated bulkhead gate for tunnel dewatering or emergency closure. The power tunnel centerline at the intake is at an elevation of 534 ft, 66 ft below the minimum power pool elevation of 600 ft.

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2.6 Don Pedro Powerhouse, Turbines, and Generators

Located immediately downstream of the dam, the reinforced concrete powerhouse contains four turbine generator units and a 72-in hollow jet valve. The powerhouse is 171-ft-long and 148-ft-wide. The powerhouse contains four Francis-type turbines that are direct connected to electrical generators. The current FERC-authorized capacity is 168 MW. Combined hydraulic capacity of the four units under the maximum gross operating head of 530 ft is approximately 5,500 cfs. Each of the three original turbines and generators have a rotational speed of 277 revolutions per minute (rpm) and are rated at 77,700 horsepower (hp) and 48 megavolt-amperes (MVA), respectively, at 450 ft of net head. Turbine 4 was installed in 1989 after FERC approved the Districts' amendment to add the fourth turbine in February 1987. At maximum head (i.e., at full gate flow supplied to each of the four units), the powerhouse has an output capability of 203 MW.

The powerhouse also contains a 72-in hollow jet valve located in the east end of the powerhouse with a centerline elevation, at discharge, of 305 ft. The maximum hydraulic capacity of the hollow jet valve is 3,000 cfs. While Turbines 1, 2, and 3 discharge directly to the river channel, Turbine 4 discharges to the outlet works tunnel approximately 250 ft upstream of the tunnel outlet. Water to Turbine 4 is delivered through a bifurcation from the hollow jet valve piping, such that when Turbine 4 is in operation, the hollow jet valve capacity is reduced from 3,000 cfs to 800 cfs.

Access to the powerhouse is via a secured gate located off the former Visitor Center parking area. The road provides access directly onto the top deck of the powerhouse at an elevation of 340 ft. A 4-ft-high wall surrounds the top deck. A two-hook gantry crane sits atop the deck to provide for equipment and materials delivery to the powerhouse and maintenance services. The generator floor in the powerhouse is at an elevation of 323 ft and the turbine floor is at an elevation of 308 ft.

2.7 Tailrace

The powerhouse and hollow jet valve discharge directly to the Tuolumne River at about River Mile 54. Tailwater elevation during turbine operation varies from a low of about 300 ft to a high of about 304 ft under normal operating conditions. The tailwater elevation at the outlet works tunnel is at approximately 300 ft under low flow conditions.

2.8 Switchyard

The Don Pedro Project switchyard is located atop the powerhouse at an elevation of 340 ft. The switchyard provides power delivery and electrical protection to the Districts transmission systems. The switchyard includes isolated phase buses, circuit breakers, and four transformers that raise the 13.8-kilovolt (kV) generator voltage to 69-kV transmission voltage. Transformers 1, 2, and 3 are rated at 55-MVA and Transformer 4 is rated at 44-MVA. While Transformers 1, 2, and 4 are directly connected to TID's system and Transformer 3 to the MID system, the switchyard has been configured to allow for interconnection across the systems when needed. This system, when

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operating in an interconnected fashion, acts as a pathway for electricity to flow across the two systems, providing system benefits to both districts.

2.9 Gasburg Creek Dike

The spillway structures for New Don Pedro Dam discharge into Twin Gulch, a small intermittent drainage, which discharges back into the Tuolumne River 1.5 miles downstream of the dam. To prevent spillway discharges into Twin Gulch from entering the adjacent Gasburg Creek drainage, the Districts constructed the Gasburg Creek Dike. The dike is located in a low saddle that separates Twin Gulch drainage from Gasburg Creek drainage, approximately midway down the Twin Gulch waterway. The 75-ft-high Gasburg Creek Dike consists of an earth and rock fill dam with an impervious core. The dike is equipped with a slide-gate controlled by an 18-in-diameter outlet conduit. The top of Gasburg Creek Dike is at an elevation of 725 ft.

2.10 Dikes A, B, and C

There are three small reservoir rim embankments along the reservoir, which are referred to as Dikes A, B, and C. These embankments are constructed in low saddles on the reservoir rim with top elevations of 855 ft. Dike A is located between the dam and the spillway. Dikes B and C are located east of the dam.

2.11 Station Service

Station service power¹ is provided by primary and secondary station service power transformers. The primary unit is a 69-kV/12-kV step-down transformer that feeds a 12-kV line. The 12-kV line feeds three secondary 12-kV/480-kV step-down transformers. The first two secondary transformers service the spillway motor control centers. The third services the powerhouse. There is a 45-kVA diesel generator that serves as an emergency backup for station service power. There is also a portable propane power unit that can power the gate hoists for the radial gates in an emergency.

3.0 La Grange Hydroelectric Project

3.1 La Grange Dam and Headpond

The La Grange Diversion Dam (LGDD) was constructed for the purpose of raising the level of the Tuolumne River to a height that enabled gravity flow of diverted water into the Districts' irrigation systems. When not in spill mode, the water level above the diversion dam is between 294 ft and 296 ft approximately 90 percent of the time. The headpond formed by LGDD is narrow and steep-sided and flow conditions along the headpond reflect a more riverine than lacustrine environment.

Based on FERC's assessment of hydraulic modeling performed by the Districts, the upper end of the headpond formed by LGDD under non-spill conditions terminates

¹ Station service power refers to the electric energy produced by a project that is used in the project to power lights, motors, control systems, and other auxiliary electrical loads that are necessary to operate the project.

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approximately two miles above the diversion dam. This creates a shoreline length of approximately four miles and a surface area of approximately 35 acres. The headpond has a maximum depth of 35 ft, a mean depth of approximately 11 ft, a gross storage capacity of approximately 400 AF, and a usable storage capacity of less than 100 AF.

3.2 Intakes and Tunnels

Water released from Don Pedro Reservoir is either diverted by TID or MID at LGDD for irrigation or municipal water supply purposes at LGDD or passes to the lower Tuolumne River through one of the flow passageways available at the diversion dam. MID's diversion tunnel intake is located on the west (looking downstream, river right) end of the diversion dam, and TID's diversion tunnel intake is located on the east (river left) end of the diversion dam. Consistent with each irrigation districts' acreage served, the irrigation canals were constructed such that approximately 68 percent of diverted flow is routed to the TID system and 32 percent to the MID system.

3.3 MID's Intake and Diversion Tunnel

MID's diversion tunnel and intake are non-Project facilities, as they are not used in conjunction with TID's hydropower facility.

Due to maintenance and repair issues experienced along its Upper Main Canal, in 1987/1988 MID constructed the current diversion tunnel and tunnel intake to bypass the upper section of the Main Canal. The intake to the MID diversion tunnel is located in the face of a cliff on the west (river right) bank about 100 ft upstream of LGDD. The invert of the MID tunnel is at an elevation of 277.4 ft. Flow is conveyed through the 15.5-foot-diameter tunnel for 895 ft to a control structure. Flow is then conveyed through a 5,300-foot-long tunnel to an outlet structure which controls flow to the MID non-Project Main Canal. The canal provides water to MID's irrigation and municipal water systems. The design maximum flow rate for this tunnel is approximately 2,000 cfs.

3.4 TID's Intake and Diversion Tunnel

TID's diversion tunnel and intake are non-Project facilities, the primary purpose of which are to divert Tuolumne River flows to TID's main irrigation canal. The TID intake is located on the east (left) bank just upstream of the diversion dam and consists of two separate structures. The south intake structure contains two 8-ft-wide by 11.8-ft-high control gates driven by electric motor hoists. The north intake structure contains a single 8-ft-wide by 12-ft-high control gate.

The north intake structure was added in 1980 to increase the delivery capability of TID's irrigation canal system by reducing head losses through a single intake and lowering the tunnel invert. Flows from the intake are conveyed to a 600-foot-long tunnel and thence the 110-ft-long forebay of the TID non-Project Main Canal. The forebay was modified in the 1980's to reinforce the structure. Flows to TID's irrigation system are regulated at the non-Project Main Canal Headworks, which consists of six slide gates, each of which is 5-ft-wide by 8.3-ft-high.

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3.5 Powerhouse Intake and Main Canal Headworks

Flows from the TID tunnel discharge nearly 600 ft downstream from the intake into a concrete channel that contains the penstock intake structure and TID's non-Project Upper Main Canal Headworks. At the tunnel outlet portal, the channel invert is approximately 18 ft wide and gradually expands to 39 ft wide at the face of the Upper Main Canal Headworks. The channel runs 118 ft along the centerline of flow and is constructed with a gradual bend to the south as it enters the TID non-Project Upper Main Canal.

The original invert of the channel was constructed at an elevation of approximately 281.2 ft but was excavated and rebuilt at a lower elevation of nearly 278 ft in 1980 to improve the irrigation flow delivery capacity to the TID Upper Main Canal. TID currently maintains an 18-in pipe in an open position, which continuously delivers flow to the sluice gate channel downstream of the sluice gates. This water flows into the tailrace just upstream of the powerhouse. The flow quantity is not measured but is estimated to be approximately 5 to 10 cfs.

Located at the west side of the concrete channel, the penstock intake structure contains a trashrack structure and three 7.5-ft-wide by 14-ft-high concrete intake bays that deliver water to the two penstocks. Manually-operated steel gates are used to shut off flows through these intakes. Immediately upstream and adjacent to the penstock intakes are two automated 5-ft-high by 4-ft-wide sluice gates that discharge water over a steep rock outcrop and sluice gate channel to the tailrace just upstream of the powerhouse.

The non-Project TID irrigation canal headworks structure was originally constructed with five 5-ft-wide by 8.3-ft-high outlets controlled by fabricated steel gates. In 1980, a sixth gate was added as part of the rehabilitation of the forebay. The sixth gate is the same dimensions of the original five gates. All the 1980 modifications were performed to improve the control of flows as part of improvements to the TID irrigation system.

3.6 La Grange Powerhouse

The La Grange powerhouse is located approximately 0.2 miles downstream of LGDD on the south (left) bank of the Tuolumne River. The power plant is owned and operated by TID. Water diverted through the TID intake and tunnel can enter the two penstocks that deliver flow to the powerhouse. The two-unit powerhouse was built in 1924. The powerhouse is a 72-ft by 29-ft structure with a reinforced concrete substructure and steel superstructure. The intakes for the two penstocks are located in the west (right) side of the forebay. The penstock for Unit 1 is a 235-ft-long, 5-ft-diameter steel pipe. The penstock for Unit 2 is a 212-ft-long, 7-ft-diameter steel pipe.

There have been no modifications to the powerhouse since its original construction in 1924, except for routine maintenance and repairs.

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3.7 Turbines, Generators, and Accessory Equipment

The La Grange powerhouse contains two turbine-generator units originally installed circa 1924/1925. The turbine of the smaller unit (Unit 1) contains a Voith runner rated, at its cavitation limit, at 1,650 horsepower at 140 cfs and 115 ft of net head. The larger unit (Unit 2) also contains a Voith runner rated, at its cavitation limit, at 4,950 horsepower at 440 cfs and 115 ft of net head. The actual net head at the plant varies with flow, which affects flow capacity and unit output. The runners of the original turbine-generator units were replaced with the current Voith runners in 1989.

Historically, the flow capacity of the original 1924 units exceeded 600 cfs. The units with the Voith replacement runners have a combined capacity of about 580 cfs at the guaranteed maximum capacity (i.e., their cavitation limit). The original Unit 1 design was an unconventional configuration, even for the 1910/1920s, consisting of a single horizontal Francis turbine coupled to two 500-kilowatt generators, one on each side of the turbine. The powerhouse has a minimum hydraulic capacity of roughly 100 cfs.

This two-generator configuration was replaced with an industry-standard single-generator configuration as part of the 1989/1990 rehabilitation work. The original Unit 2 design was a conventional configuration consisting of a single vertical Francis turbine coupled to a single 3,750-kilowatt generator. At the turbines' guaranteed maximum capacity, the combined generator output is approximately 4.7 MW.

3.8 Substation and Transmission Line

There are no FERC-jurisdictional transmission lines associated with the La Grange Project. The transmission line connecting the La Grange Powerhouse to the grid originates at the 4.16-/69-kV transformer in the substation located on the east side of the powerhouse. This transmission line connects to both TID's Tuolumne Line No. 1 and its Hawkins Line. In the event that the La Grange Project powerhouse is decommissioned in the future, this transmission line would need to be retained to provide power needed to operate the Main Canal Headworks associated with the irrigation canal systems and the sluice gates. Therefore, under FERC's transmission line jurisdictional criteria, the transmission line currently serves as part of the existing distribution/transmission grid and, therefore, would not fall under FERC jurisdiction.

**ATTACHMENT B: CONSOLIDATED INSTREAM FLOW
REQUIREMENTS**

**FINAL WATER QUALITY CERTIFICATION
FOR
DON PEDRO HYDROELECTRIC PROJECT
AND
LA GRANGE HYDROELECTRIC PROJECT**

JANUARY 2021

**Consolidated Instream Flow Requirements in
Conditions 1.B, 1.C, and 1.D (provided for illustrative purposes)**

Attachment B, Table 1 Consolidated Instream Flow Requirements Downstream of La Grange Dam, River Mile 51.7

Time Period	W (cfs)	AN (cfs)	BN (cfs)	D (cfs)	C (cfs)	Pulse Flows (TAF)	Function	Bay-Delta Plan Flows ¹
January 1 – 31	225	225	225	200	200		Wet season base flow	LSJR Feb – June flow objectives
February 1 – 15	225	225	225	200	175			
February 16 – 28/29	225	225	225	200	175	109,091 AF in W & AN; 98,182 AF in BN; 76,364 AF in D; 49,091 AF in C ²	Floodplain activation pulse & wet season base	
March 1 – April 15	250	250	250	225	200	----- Plus	-----	
April 16 - 30	275	275	275	250	200	150 TAF in W & AN; 100 TAF in BN; 75 TAF in D; 35 TAF in C ³	Outmigration pulse & wet season base	
May 1 – 15	275	275	275	250	200			
May 16 – 31	300	300	300	275	225			
June 1 – 30	200	200	200	200	200			
July 1 – September 30	350	350	350	300	300		Dry season base flow	July – January adaptive methods allow flow shifting, if approved
October 1 – 15	350	350	350	300	300	Plus	Fall pulse flow window & dry season base flow	
October 16 – November 30	275	275	275	225	200	20 TAF in W, AN; 15 TAF in BN & D; 10 TAF in C		
December 1 – 31	275	275	275	225	200		Dry season base flow	

- 1) When LSJR flow requirements exceed minimum instream base flows, LSJR requirements control and can also be used to meet Conditions 1.B and 1.C.
- 2) For BN, D, or C years that occur in a sequence that starts with a D or C year and contains no W or AN years then dry year off-ramps will apply, in which case no floodplain pulse will be required for D and C years and the pulse will be reduced to 76,364 AF for BN years.
- 3) In a sequence of C and D years, off ramps are applied to the spring pulse flow volume. When these off ramps are applied, the D year spring pulse flow volume is reduced to 45 TAF, and the C year spring pulse flow volume is reduced to 11 TAF.

Abbreviations: cfs – cubic feet per second; LSJR – Lower San Joaquin River; AF – acre-feet; TAF – thousand acre-feet; W – Wet, AN – Above Normal, BN – Below Normal, D – Dry, C – Critical.

Attachment B, Table 2 Consolidated Instream Flow Requirements Downstream of Potential New Point or Points of Diversion or Rediversion, River Mile 25.9

Time Period	W (cfs)	AN (cfs)	BN (cfs)	D (cfs)	C (cfs)	Pulse Flows (TAF)	Function	Bay-Delta Plan Flows ²
January 1 – 31	225	225	225	200	200		Wet season base	LSJR Feb – June flow objectives
February 1 – 15	225	225	225	200	175			
February 16 – 28/29	225	225	225	200	175	109,091 AF in W & AN; 98,182 AF in BN; 76,364 AF in D; 49,091 AF in C ²	Floodplain activation pulse & wet season base	
March 1 – April 15	250	250	250	225	200	-----	-----	
April 16 – 30	275	275	275	250	209	Plus 150 TAF in W & AN; 100 TAF in BN; 75 TAF in D; 35 TAF in C ³	Outmigration pulse & wet season base	
May 1 – 15	275	275	275	250	200			
May 16 – 31	300	300	300	275	225			
June 1 – 30	100	100	100	75	75			
July 1 – September 30	200	200	200	200	200		Dry season base flow	
October 1 – 15	209	200	200	200	209	Plus 20 TAF in W, AN; 15 TAF in BN & D; 10 TAF in C	Fall pulse flow window & dry season base flow	
October 16 – November 30	275	275	275	225	200			
December 1 – 31	275	275	275	225	200		Dry season base flow	

- 1) When LSJR flow requirements exceed minimum instream base flows, LSJR requirements control and can also be used to meet Conditions 1.B and 1.C.
- 2) For BN, D, or C years that occur in a sequence that starts with a D or C year and contains no W or AN years then dry year off-ramps will apply, in which case no floodplain pulse will be required for D and C years and the pulse will be reduced to 76,364 AF for BN years.
- 3) In a sequence of C and D years, off ramps are applied to the spring pulse flow volume. When these off ramps are applied, the D year spring pulse flow volume is reduced to 45 TAF, and the C spring pulse flow volume is reduced to 11 TAF.

Abbreviations: cfs – cubic feet per second; LSJR – Lower San Joaquin River; AF – acre-feet; TAF – thousand acre-feet; W – Wet, AN – Above Normal, BN – Below Normal, D – Dry, C – Critical.

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