STATE OF CALIFORNIA
STATE WATER RESOURCES CONTROL BOARD

In the Matter of Water Quality Certification for

MERCED IRRIGATION DISTRICT'S
MERCED RIVER HYDROELECTRIC PROJECT
AND
MERCED FALLS HYDROELECTRIC PROJECT

FEDERAL ENERGY REGULATORY COMMISSION
PROJECT NOS. 2179 AND 2467

Sources: **Merced River and tributaries**

Counties: **Merced and Mariposa**

WATER QUALITY CERTIFICATION FOR FEDERAL PERMIT OR LICENSE

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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*
CDFW	*California Department of Fish and Wildlife*
Central Valley Regional Water Board	*Central Valley Regional Water Quality Control Board*
CEQA	*California Environmental Quality Act*
CESA	*California Endangered Species Act*
certification	*water quality certification*
cfs	*cubic feet per second*
CRLF	*California red-legged frog*
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*
EA	*Environmental Assessment*
EC	*electrical conductivity*
EIR	*Environmental Impact Report*
EIS	*Environmental Impact Statement*
ERDC	*United States Army, Engineer Research and Development Center*
ESA	*Endangered Species Act*
Final EIS	*Final Environmental Impact Statement*
FERC	*Federal Energy Regulatory Commission*
FLA	*Final License Application*
FPA	*Federal Power Act*
FYLF	*foothill yellow-legged frog*
IS	*Initial Study*
LSJR	*Lower San Joaquin River*
LWM	*large woody material*
MID	*Merced Irrigation District*
MIF	*minimum instream flow(s)*
mmhos/cm	*milliMhos per centimeter*
NEPA	*National Environmental Policy Act*
NMFS	*National Marine Fisheries Service*
NPDES	*National Pollutant Discharge Elimination System*
REA	*Ready for Environmental Analysis*

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*
SR/SJR Basin Plan	*Water Quality Control Plan for the Sacramento River Basin and the San Joaquin River Basin*
State Water Board	*State Water Resources Control Board*
STM Working Group	*Stanislaus, Tuolumne, and Merced Working Group*
SWP	*State Water Project*
TAF	*thousand acre-feet*
USEPA	*United States Environmental Protection Agency*
USFWS	*United States Fish and Wildlife Service*
Vernalis	*San Joaquin River at Vernalis*
WQMP Plans	*Water Quality Monitoring and Protection Plans*
WRAMP	*California Wetland and Riparian Area Monitoring Plan*
WUA	*weighted usable area, instream physical rearing habitat*

1.0 Projects Background

The Merced River Hydroelectric Project and Merced Falls Hydroelectric Project (collectively Projects), Federal Energy Regulatory Commission (FERC) Project Nos. 2179 and 2467, respectively, are located in the Merced River watershed, in Merced and Mariposa counties, California (Figure 1). The Projects are owned and operated by Merced Irrigation District (MID or Licensee).

The FERC license for the Merced River Hydroelectric Project (Merced River Project) was initially issued on April 8, 1964 (1964 FERC license) and expired on February 28, 2014. On February 26, 2012, MID filed an Application for License[1] with FERC for the Merced River Project. The Merced River Project operates under an annual license until the relicensing process is complete.

The FERC license for the Merced Falls Hydroelectric Project (Merced Falls Project) was initially issued on July 28, 1969 and expired on February 28, 2014. The Merced Falls Project operates under an annual license until the relicensing process is complete. On February 8, 2012, Pacific Gas and Electric Company (PG&E) filed an application to relicense the Merced Falls Project with FERC. On May 20, 2014, PG&E filed an application for certification with the State Water Board for the Merced Falls Project. On July 6, 2015, FERC approved the transfer of the Merced Falls Project license and associated Merced Falls Project lands to MID. [2]

State Water Board staff provided public notice of the applications pursuant to California Code of Regulations, title 23, section 3858, by posting information describing the Projects on the State Water Board's website on June 24, 2014.

2.0 Projects Description

The majority of the Projects' facilities are located on federal land administered by the United States Department of Interior, Bureau of Land Management (BLM) as part of the Sierra Resource Management Area. The major components of the Projects include one reservoir, one impoundment, three powerhouses, and various access roads and other appurtenant facilities. The Merced River Project has an authorized installed capacity of 101.25 megawatts and the Merced Falls Project has an authorized installed capacity of 3.4 megawatts. A detailed description of the Projects' facilities can be found in Appendix A.

Water Rights

MID has riparian water rights claims for the natural flow of the Merced River at both the New Exchequer and McSwain powerhouses. These riparian claims are documented with the State Water Board through Statements of Water Diversion and Use numbers 15475 and 15476. MID also holds pre-1914 and adjudicated rights originally held by the Exchequer Gold Mine Company and the Crocker-Huffman Land Company, as well as

[1] An Amended Application was submitted on April 23, 2014.

[2] PG&E formally transferred ownership of the Merced Falls Hydroelectric Project to MID on March 2, 2017.

post-1914 appropriative water rights obtained directly by MID for the purpose of operating the Projects. In addition, MID holds water right licenses 2685, 6047, and 11395 (Applications 1224, 10572, and 16186, respectively) for irrigation, domestic use, recreational, and other purposes. In 2003, MID amended water right licenses 2685, 6047, and 11395 to: 1) release an additional 12,500 acre-feet (AF) of water annually in October; and 2) provide a volume of supplemental flow during a 31-day pulse flow period during April and May. The 12,500 AF are provided in addition to the FERC minimum instream flows. A list of water rights for the Projects is provided in Table A.

MID is the appropriative water right holder for nearly all water authorized for diversion in the Merced River watershed (approximately 98 percent of appropriative rights). In the Merced River watershed, there are 105 post-1914 appropriative water rights, with a combined face value of approximately 5.5 million acre-feet (MAF). Of these 105 water rights, 101 are non-power water rights with a face value of approximately 1.04 MAF. Of the 101 non-power rights, six are held by the MID. The face value of these six water rights totals approximately 1.02 MAF, accounting for approximately 98 percent of the water authorized for diversion (based on face value) under non-power water rights in the Merced River watershed.

Contractual Obligations

In addition to the 1964 FERC license requirements (see Appendix A), four agreements and contracts include various streamflow-related requirements. A summary of the agreements and contracts, and their associated terms and conditions, which are not part of the 1964 FERC license, are provided below.

California Department of Fish and Wildlife[3] Memorandum of Understanding

MID is required to supplement flows in the Merced River in October by providing 12,500 AF of water in addition to the Projects' existing FERC minimum flow requirement in that month. This 12,500 AF is reflected in the amended water right licenses discussed above.

Water Supply Deliveries in Lake McClure

MID makes three small diversions from Lake McClure for water supply: (1) Lake Don Pedro Community Service District withdraws up to about 5,000 AF of water annually from a location just north of Barrett Cove Marina; (2) the MID recreation facilities annually withdraw less than 1,000 AF of water at three locations along Lake McClure; and (3) the McClure Boat Club, a small development adjacent to the Merced River Project, diverts about 25 AF of water at a point near the development. The diversions are minor, and do not affect the Projects' operations. MID anticipates that these diversions will continue unchanged.

[3] Formerly the California Department of Fish and Game.

Table A. Water Rights Held by MID for the Projects

Application Number	Permit ID	License ID	Water Right Type	Status	Status Date	Face Value Amount[1]	Beneficial Use[2]	County
A008238	4893	6032	Appropriative	Licensed	2/11/1935	5,066	DOM, IRR	Merced
A006470	3456	1911	Appropriative	Licensed	10/31/1929	1,266,960.6	POW	Merced
A001221	912	990	Appropriative	Licensed	3/26/1919	868,773	POW	Mariposa
A016186	12825	11395	Appropriative	Licensed	8/15/1983	605,000	IRR, WILD, DOM, REC, AQUA	Mariposa
S010405	--	--	Statement of Div and Use	Claimed	6/29/1981	0	POW	Merced
S015475	--	--	Statement of Div and Use	Claimed	1/8/2004	0	POW	Mariposa
A033098	--	--	Appropriative	Pending	12/30/2019	400,000	WILD, WQ, AQUA, IND, MUN, STOCK, DOM, IRR, INPOW, FROST, REC	Merced
S004718	--	--	Statement of Div and Use	Claimed	1/1/1975	0	IRR	Merced
S004719	--	--	Statement of Div and Use	Claimed	1/1/1975	0	IRR	Merced
A010572	6808	6047	Appropriative	Licensed	6/20/2003	63,719.9	IRR	Merced
A001222	913	2684	Appropriative	Licensed	3/26/1919	491,080.2	POW	Mariposa
A001224	914	2685	Appropriative	Licensed	6/20/2003	345,440	DOM, IRR, MUN	Mariposa, Merced
A006807	5732	5227	Appropriative	Licensed	9/27/1930	1,251.2	DOM, IRR	Merced
A018774	13088	9429	Appropriative	Licensed	6/8/1959	5,000	DOM, IRR	Merced

Application Number	Permit ID	License ID	Water Right Type	Status	Status Date	Face Value Amount[1]	Beneficial Use[2]	County
S004705	--	--	Statement of Div and Use	Claimed	1/1/1975	0	POW, REC	Merced
A016187	12826	11396	Appropriative	Licensed	8/15/1983	1,861,824.9	POW	Mariposa
S015476	--	--	Statement of Div and Use	Claimed	1/8/2004	0	POW	Mariposa

1 Values shown in AF.

2 Domestic (DOM), Irrigation (IRR), Power (POW), Fish and Wildlife Preservation and Enhancement (WILD), Recreation (REC), Aquaculture (AQUA), Water Quality (WQ), Industrial (IND), Municipal (MUN), Stockwatering (STOCK), Incidental Power (INPOW), Frost Protection (FROST).

Cowell Adjudication Agreement

The Cowell Adjudication Agreement is a contractual obligation with MID to provide water to certain downstream users. In 1926, the Merced County Superior Court ruled that MID's upstream diversions bypassed senior riparian water rights holders. The Merced County Superior Court ordered MID to provide water downstream of Crocker-Huffman Dam for senior riparian water rights.

Under the Cowell Adjudication Agreement MID releases water from Crocker-Huffman diversion dam, of up to the following flows for use by the Cowell Adjudication Agreement diverters at 11 locations: 100 cubic feet per second (cfs) in March; 175 cfs in April; 225 cfs in May; 250 cfs from the first day in June until the natural flow of the Merced River falls below 1,200 cfs; 225 cfs flow for the next 31 days; 175 cfs flow for the next 31 days; 150 cfs for the next 30 days; and 50 cfs thereafter or the natural inflow into Lake McClure, whichever is less, through the last day of February.

Davis-Grunsky Act

In 1959, the California Legislature authorized bond sales for development of local water projects through the Davis-Grunsky Act. On October 31, 1967, the California Department of Water Resources (DWR) and MID entered into a contract for recreation and fish enhancement grants under the Davis-Grunsky Act (Davis-Grunsky contract). As part the Davis-Grunsky contract MID agreed to maintain continuous flows of 180 - 220 cfs in the Merced River spawning area (between Crocker-Huffman diversion dam and Shaffer Bridge) each year from November 1 to April 1. The Davis-Grunsky contract expired on December 31, 2017, since which time MID has ceased providing the flows.

3.0 Federal Energy Regulatory Commission Licensing Process

On February 8, 2012, PG&E filed with FERC its final relicensing application for the Merced Falls Project. Similarly, on February 26, 2012, MID filed with FERC its final relicensing application for Merced River Project. Both applications followed FERC's Integrated Licensing Process (ILP). FERC issued the *Projects Final Environmental Impact Statement for hydropower licenses Merced River Hydroelectric Project—FERC Project No. 2179-043 and Merced Falls Hydroelectric Project—FERC Project No. 2467-020* (Final EIS) on December 4, 2015, in compliance with National Environmental Policy Act (NEPA) requirements.

4.0 Regulatory Authority

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).) 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." (*Id*. § 1341(d).) Section 401 further provides that certification conditions shall become conditions of any federal license or permit for the project. *(Ibid.)* 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 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 2017).

MID filed an application for water quality certification (certification) with the State Water Board under section 401 of the Clean Water Act for the Merced River Project on May 21, 2014. MID filed an application for certification with the State Water Board for the Merced Falls Project on May 1, 2017. On April 22, 2019, the State Water Board denied MID's most recent applications for certification of the Projects without prejudice.

On June 17, 2020, the State Water Board released a draft certification for the Projects for public review and comment. In response to release of the draft certification, the State Water Board received comments from California Department of Fish and Wildlife (CDFW), United States Fish and Wildlife Service (USFWS), National Marine Fisheries Service (NMFS), Conservation Groups (comprised of Merced River Conservation Committee, California Sportfishing Protection Alliance, American Whitewater, Friends of the River, Golden West Women Flyfishers, Fly Fishers International, American Rivers, and Sierra Club), California Farm Bureau Federation, and Duane Morris, LLP on behalf of MID.

On July 2, 2020, State Water Board staff requested comments from the Central Valley Regional Water Quality Control Board (Central Valley Regional Water Board) on the draft certification. (See Cal. Code Regs., tit. 23, § 53855, subd. (b)(2)(B).) No comments were received.

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 Board's *Water Quality Control Plan for the Sacramento River Basin and the San Joaquin River Basin* (SR/SJR Basin Plan) (Central Valley Regional Board, 2018) and the *Water Quality Control Plan for the San Francisco Bay/Sacramento-San Joaquin Delta Estuary* (Bay-Delta Plan) (State Water Board, 2018). 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 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.

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 United States Environmental Protection Agency (USEPA) approval, as appropriate. (Wat. Code, § 13240 et seq.) As noted above, 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.

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 Lake McClure and McSwain Reservoir are: irrigation; power; contact recreation; other non-contact recreation; warm and cold freshwater habitat; and wildlife habitat. Additionally, municipal and domestic supply is a potential beneficial use for Lake McClure and McSwain Reservoir. The existing beneficial uses from McSwain Reservoir to the San Joaquin River (SJR) are: municipal and domestic water supply; stock watering; process; service supply; power; contact recreation; canoeing and rafting; other non-

contact recreation; warm and cold freshwater habitat; warm and cold migration; warm and cold spawning; and wildlife habitat.

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 Estuary 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 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 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.

Clean Water Act Section 303(d) Listing

In 2010, the State Water Board listed the Merced River, from McSwain Reservoir to the SJR, and Lake McClure on the Clean Water Act Section 303(d) list of impaired water bodies. USEPA approved the 2010 303(d) list on October 11, 2011. The Merced River

is impaired for water temperature, mercury, chlorpyrifos, diazinon, Group A pesticides[4], and unknown toxicity. Lake McClure has been identified as being impaired by mercury. The listed sources for these pollutants are: agriculture (chlorpyrifos, diazinon, and Group A pesticides), resource extraction (mercury), and unknown source (water temperature and unknown toxicity). Section 303(d) of the Clean Water Act requires total maximum daily loads (TMDLs) to be developed for impaired water bodies. TMDLs are written plans that define the maximum amount of a pollutant that a water body can receive without exceeding water quality standards and establish load allocations for point and nonpoint sources of pollution.

Construction General Permit

MID may need to obtain coverage under the ***General Permit for Stormwater Discharges Associated with Construction and Land Disturbance Activities*** (Construction General Permit)[5] 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.

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. MID must comply with the Procedures when conducting dredge or fill activities that may impact waters of the state, including wetlands.

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***

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

[5] Water Quality Order No. 2009-0009-DWQ and 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. Accessed June 2, 2020.

and Aquatic Weed Control Applications (Aquatic Weed Control General Permit)[6] 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.

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***.[7] 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 the following three new beneficial use definitions (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 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 permits, water quality certifications, waste discharge requirements, and waivers of waste discharge requirements.

5.0 California Environmental Quality Act

MID is the lead agency for the purposes of California Environmental Quality Act (CEQA) compliance. (Pub. Resources Code, §§ 21000 – 21177.) The State Water Board is a responsible agency. As of the date of this certification, MID has not initiated the CEQA process by issuing a Notice of Preparation and has not certified an Environmental Impact Report or other environmental document in compliance with CEQA requirements. 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

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[6] 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. Accessed July 30, 2020.

[7] Available online at: https://www.waterboards.ca.gov/water_issues/programs/mercury/ Last accessed: July 30, 2020.

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.

Here, FERC issued an order on June 18, 2020, in response to MID's request, finding that the State Water Board waived certification, even though the State Water Board took steps to preserve its certification authority and could not have issued certification any sooner because the timing of CEQA review is under the control of MID and MID failed to prepare the necessary CEQA documents. The State Water Board disagrees with FERC's decision and has requested rehearing. The requirements of this certification shall not become effective as conditions required to be included in the FERC license unless and until the FERC order is overturned.

The issuance of this certification does not obviate MID's 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.

6.0 Rationale for Water Quality Certification Conditions

Water development projects in the LSJR watershed, including the Projects on the Merced 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 protecting 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 issued by FERC for the Projects.

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

- The final license applications submitted by MID (MID, 2012) and (PG&E, 2012) to FERC, MID's applications for certification, and any updates thereto;
- Comments submitted on the draft license applications;
- Comments submitted on the draft water quality certification;
- The draft (FERC, 2015) and Final EIS (FERC, 2015) prepared pursuant to NEPA, including comments submitted on the draft EIS;
- *BLM Final Section 4(e) Conditions, Final Recommendations, Terms and Conditions for the Merced River Hydroelectric Project 2179-043* (BLM, 2015);

- Existing and potential beneficial uses and associated water quality objectives in the SR/SJR Basin Plan and Bay-Delta Plan;
- Final 2014/2016 California Integrated Report (Clean Water Act Section 303(d) List/305(b) Report) (State Water Board, 2017);
- Projects-related controllable water quality factors; 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.

Rationale for Condition 1 – Minimum Instream Flow

Condition 1 is a suite of minimum instream flow requirements that includes FERC staff recommendations, flows to protect baseline conditions, and flow requirements to meet state water quality standards and other appropriate requirements of state law. The minimum instream flows outlined in Condition 1 maintain baseline flow conditions from November through January to support spawning and early rearing for native resident and migratory fish, require increased flows from February through June to support rearing and migration for native resident and migratory fish, and increased flows from July through October to support native fish species that remain in the Merced River over the summer and migrate upstream to spawn in the fall. Conditions 1.B, 1.C, and 1.D are based on information contained in FERC's 2015 Final EIS, 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, 2018),[8] and other scientific information that became available after the State Water Board adopted the 2018 SED.

The minimum instream flows in Condition 1.B are consistent with FERC recommended base flows from March 16 through October 31. Condition 1.C flows are generally consistent with FERC recommended pulse flows in the spring and fall. These flow schedules are a substantial increase from the flow requirements in the existing FERC licenses and are needed to improve instream conditions for native and migratory fish populations.

Condition 1.B required flows from November 1 – March 15 and 1.D flows are greater than the FERC recommended flow schedule because 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 Merced River, LSJR, and Bay-Delta, and that such flows have been impacted by the Projects. The November 1 through March 15 flows required in Condition 1.B were required in the Merced River for 50 years (1967 – 2017), under the Davis-Grunsky contract, to maintain a minimum level of suitable habitat for spawning

[8] 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: July 30, 2020.

and rearing Chinook salmon. Protecting baseline conditions is important to prevent degradation of habitat for native resident and migratory fish species. Condition 1.D applies a percent of unimpaired flow requirement at the confluence of the Merced River and LSJR to meet the Merced River portion of the LSJR flow objectives in the Bay-Delta Plan.

Generally, flow requirements in Condition 1.D are higher than flow requirements in Conditions 1.B and 1.C in the February through June time period. Condition 1.D 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 with State Water Board approved adaptive implementation of Condition 1.D flows or through a voluntary agreement consistent with the Bay-Delta Plan.

Rationale for Condition 1.A: Water Year Type

MID has established a five-level water year classification system for the Merced River. The 60-20-20 Index is based on the unregulated inflow to Lake McClure. The five-level water year classifications are: Wet, Above Normal, Below Normal, Dry, and Critically Dry. The index and water year classifications are calculated based on: 60 percent of the current year's April through July inflow, plus 20 percent of the current year's October through March inflow, plus 20 percent of the previous year's index. This certification uses MID's water year classifications to determine water year type.

Rationale for Condition 1.B: Minimum Instream Flows Below New Exchequer Dam and at Shaffer Bridge

McSwain Reservoir may back up to the base of New Exchequer Dam when McSwain Reservoir is at full pool; however, this is not likely when McSwain Reservoir is drawn down. Condition 1.B requires MID to provide a minimum discharge of 25 cfs at New Exchequer Dam to prevent dewatering the river reach between the dam and McSwain Reservoir.

Condition 1.B contains water year type specific minimum instream flow requirements on the Merced River at Shaffer Bridge. From March 16 through June 30, the proposed minimum instream flow schedule is consistent with the FERC staff recommendation, which is based on information in the 2015 Final EIS. The FERC staff flow schedule was developed with input from stakeholders and environmental agencies. The analysis considered tradeoffs between improving temperature conditions for fish life stages with the amount of cold water stored in Lake McClure, enhancing instream physical habitat (estimated by weighted-usable-area (WUA)) for native resident and migratory fish, providing flows that encourage juvenile outmigration prior to unfavorable temperature conditions, and conserving water for irrigation purposes. During the late spring and summer, the flows were designed to improve water temperatures for smoltification and provide reasonable instream physical habitat (estimated by WUA) for *Oncorhynchus mykiss* (O. mykiss) juveniles and adults, while at the same time conserving cold water reservoir storage for later in the year and making more water available for irrigation and other beneficial uses.

From March 16 to October 31, minimum flow values in Condition 1.B are primarily based on Table 5-1 (page 5-14) of the Final EIS. In response to comments on the draft certification, minimum instream flows from July – October of Dry and Critically Dry water years were increased from 100 cfs to 150 cfs to support the temperature criteria identified in Condition 8.A. Table 2. From November 1 to March 15, Condition 1.B incorporates minimum flows formerly required by the Davis-Grunsky contract to ensure protection of conditions that support salmon spawning, egg incubation, and recreation and more recent scientific information than the 2015 Final EIS. The flows are needed to prevent degradation of baseline instream habitat conditions and to avoid further reductions in persistently low survival of juvenile salmonids and returning adults to spawn in the Merced River. From November 1 through March 15, the minimum instream flow requirements are equivalent, at a minimum, to flow commitments that existed for 50 years (1967-2017) under the Davis-Grunsky contract. The November through mid-March flows range from 180 cfs to 220 cfs (based on dry and normal water year types defined in the Davis-Grunsky contract[9]) and are moderately higher than the FERC staff-recommended flow schedule, which ranges from 120 cfs to 175 cfs. The FERC flow schedule is lower in this time period based, in part, on analyses in the 2015 Final EIS that show greater amounts of "instream physical habitat" for spawning and rearing (WUA) at lower flow levels.

Notwithstanding the 2015 Final EIS, more recent information demonstrates that higher flows are needed. The 2018 SED shows that higher instream flows are associated with higher juvenile Chinook salmon survival and a recent (2019[10]) 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 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. It is anticipated that implementing

[9] The Davis-Grunsky contract flows are based on the Lake McClure water year type established in the existing FERC license. This method relies on the prior May 1st DWR Bulletin 120 forecast of unimpaired inflow to Lake McClure from April through July; if it was greater than 450 thousand acre-feet (TAF) then the November through March minimum flow was 220 cfs (normal), and if it was less than 450 TAF then the minimum flow was 180 cfs (dry). For incorporation into this certification, Davis-Grunsky contract flow requirements were converted to the Merced 60-20-20 water year types by reviewing historical Bulletin 120 documents from 1960 to 2015. The normal Davis-Grunsky contract flow of 220 cfs is applied in Wet, Above Normal, and Below Normal water years; and the dry Davis-Grunsky contract flow of 180 cfs is applied in Dry and Critically Dry water years.

[10] Independent Science Advisory Panel. 2019. Final Report. Developing Goals for the Bay-Delta Plan: Concepts and Ideas from an Independent Science Advisory Panel. April 2019.

Condition 1.D. flows will result in greater flow rates in the February through June months and could potentially increase flows from July – January if adaptive implementation methods are approved and applied during these months in a given year.

Rationale for Condition 1.C: Pulse Flows

Condition 1.C requires implementation of the pulse flows identified in the Final EIS with one modification made in response to comments on the draft certification. The FERC staff recommendation includes spring pulse flows from March – May. The pulse flow was modified to include the month of February to increase flexibility to use pulse flows when they may be most effective. It is anticipated that the flows required in Condition 1.D will provide greater volumes of water in the spring than the combination of Condition 1.B flows and Condition 1.C flows. Further, the fall pulse flows are consistent with MID's amended water rights licenses, discussed above. Pulse flows aim to mimic seasonal high flow events that provide important biological cues. For example, during the fall, specifically in October or November, a pulse flow would help to attract adult native migratory fish to the mouth of the Merced River and stimulate upstream migration to the primary spawning area between Crocker-Huffman diversion dam and Shaffer Bridge. In the spring, if timed appropriately, pulse flows stimulate native migratory fish outmigration prior to stressful summer flow and temperature conditions. In addition, pulse flows provide important geomorphic benefits, such as mobilizing spawning gravel and flushing sediment. Absent high flow events, especially in dry 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, which would 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 Merced River.

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, which are both narrative and numeric, to reasonably protect native fish and wildlife beneficial uses in the SJR watershed to the Sacramento – San Joaquin Delta (Delta). The narrative objectives require, in part, maintaining inflow conditions from the SJR watershed to the 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 are necessary to protect fish and wildlife beneficial uses in the LSJR watershed.

The program of implementation for the flow objectives allows adaptive implementation of the percent of the unimpaired flow requirement. This adaptive implementation enables the magnitude and timing of flows to be adjusted, within 30–50 percent of the unimpaired flow range, when changes result in better protection of fishery resources than rigidly following the unimpaired flow value on a 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 experiments that assess the benefits of different flow regimes and other habitat improvements.

Merced River flows that meet the February – June LSJR flow objectives are greater than the baseflows and pulse flows identified in Conditions 1.B and 1.C. The higher flows required by Condition 1.D support achieving temperature criteria in Condition 8.A. Table 2 during the February through June time period and potentially contribute to meeting temperature criteria from July through November depending on 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, this certification includes Condition 1.D that requires MID to meet the Merced River portion of the LSJR flow objective near the confluence of the Merced River with the LSJR. Condition 1.D also acknowledges that the Bay-Delta Plan allows for the LSJR 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.

Voluntary agreements are being negotiated to implement the Bay-Delta Plan's water quality objectives related to the protection of native fish and wildlife. Robust voluntary agreements can help inform and facilitate implementation of the LSJR flow objectives and provide coordinated solutions in the Bay-Delta watershed while also providing reasonable protections for fish and wildlife. Incorporation of the terms of a voluntary agreement will be evaluated through the process(es) identified in the Bay-Delta Plan and the State Water Board will consider whether the agreement will help achieve the water quality objectives, help protect the beneficial uses, and be enforceable through State Water Board action. Depending on the scope of the voluntary agreement, amendments to the certification may be necessary.

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. A voluntary agreement may serve as an implementation mechanism for the LSJR tributaries as a whole, an individual tributary, or some combination thereof. Voluntary agreements may include commitments to meet the flow objectives and to undertake non-flow actions. At a minimum, to be considered by the State Water Board, 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.

Future updates to the Bay-Delta Plan may also 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 28 (compliance with the Bay-Delta Plan and SR/SJR Basin Plan) and Condition 29 (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 Condition 25 (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.

Rationale for Condition 1.E: Compliance Methods

Compliance methods for baseflows, pulse flows, and LSJR flow objectives are needed to track and account for flows, including flows that are used as a volume or "block" of water to comply with the LSJR flow objectives. Implementing the LSJR percent of unimpaired flow requirement 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. These actions are necessary to demonstrate compliance with flow requirements in Conditions 1.B, 1.C, and 1.D.

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, 1.C, and 1.D, 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 the best available information but may not accurately reflect actual precipitation and snowpack conditions that occur as the water year progresses. Accordingly, annual adaptive operations plans may need to be modified as the year progresses and information about available water supply improves. The process of developing an annual adaptive 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.

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

Developing and implementing a Dry Year Management 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 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.

Rationale for Condition 2 – Ramping Rates

Project operations can cause abrupt flow and stage fluctuations in the Projects-affected reaches. These fluctuations and the rate at which they occur (i.e., ramping rate) may strand or otherwise impact aquatic species. Condition 2 requires MID to develop and implement a Ramping Rate Plan, in consultation with the Merced River Watershed Group, to avoid rapid changes in river flow that may adversely impact aquatic life.

Rationale for Condition 3 – Carryover Storage Requirements

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). 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, prudent reservoir operations include consideration and planning to ensure some degree of protection of existing and future water supplies in the event of dry conditions. Where reservoir operations could result in impacts on fish and wildlife, maintaining reservoir storage of cold water is often referred to as cold-water pool.

The Bay-Delta Plan recognizes that implementing the LSJR flow objectives requires the development and implementation of minimum reservoir carryover storage levels. Maintaining adequate carryover storage helps to avoid significant adverse temperature or other impacts on fish and wildlife or, if feasible, on other beneficial uses. 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.

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 MID to submit and 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 emergency provision includes a requirement for the State Water Board to find that measures will be taken to reasonably protect fish and wildlife beneficial uses in light of the circumstances of the emergency.

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 Water Right Decision 1641 (2000), 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 San Joaquin River and its tributaries are lower than they were historically. Complex southern Delta circulation issues, shallow saline groundwater, the export pumps of the CVP and DWR's State Water Project (SWP), and hundreds of diversions further complicate the salinity issues. 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.

Rationale for Condition 6 – Merced River and Regional Watershed Groups

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 MID, water operators, stakeholders, and agencies with expertise on the Merced River and LSJR

watershed in fisheries management, hydrology, operations, monitoring, and assessment. Coordination is intended to maximize the beneficial uses of the state's 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.

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 benefits and impacts associated with the 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 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 MID 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.

Rationale for Condition 8 – Water Quality Monitoring and Management

The Merced River is listed on the Clean Water Act 303(d) list as impaired for elevated water temperatures, mercury, chlorpyrifos, diazinon, Group A pesticides, and unknown toxicity. Lake McClure is listed on the 303(d) list as being impaired by mercury. Dissolved oxygen monitoring results from the Projects' 2010/11 relicensing studies showed significant exceedances of the dissolved oxygen water quality objectives suggesting that section of the Merced River may be impaired by depressed dissolved oxygen levels. Elevated water temperatures and depressed dissolved oxygen levels significantly reduce habitat suitability for native resident and migratory fish downstream of Crocker-Huffman diversion dam. On the Merced River, water temperature is largely

controlled by flow releases from the reservoirs, and the Projects' operations can affect dissolved oxygen concentrations downstream.

Water temperature and dissolved oxygen are primary drivers of the productivity and survival of native resident and migratory salmonids. 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 and dissolved oxygen are intrinsically linked in the aquatic environment (i.e., as temperatures increase, biochemical demand for oxygen increases, and as temperatures increase the solubility of oxygen decreases).

As noted earlier in the certification, Lake McClure has 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 Merced River, Lake McClure, and McSwain 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. 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*. 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.

Condition 8 requires MID to meet temperature criteria in Table 2 (or as modified in an approved management plan) within its reasonable control and to develop and implement a Water Temperature Monitoring and Management Plan, a Dissolved Oxygen Monitoring and Management Plan, a Mercury Monitoring and Management Plan, and an Other Constituents Monitoring and Management Plan in consultation with the Merced River Anadromous Fish Committee, the Merced 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. Temperature criteria identified in Table 2 are based on USEPA recommended temperature criteria for protection of salmonids[11] and information provided and analyzed in the 2018 SED.[12] Information gathered from implementation of the plans required by Condition 8 will be

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

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

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.

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 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 Merced River downstream of Merced Falls 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 Merced Falls Dam and the Lower Merced River.

Condition 9 requires MID to develop and implement a Large Woody Material Management Plan (LWMMP) in consultation with BLM, USFWS, NMFS, CDFW, California Department of Transportation (Caltrans), and State Water Board staff. 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 Merced River below Merced Falls Dam.

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 Merced 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 MID 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.

Rationale for Condition 11 – Gravel Augmentation

Relicensing studies identified the need for gravel augmentation in the Merced River below Crocker-Huffman diversion dam. The Projects' reservoirs trap gravel originating from upstream sources. This limits available gravel that supports and enhances aquatic

habitat in the Merced River. The Merced River, downstream from Crocker-Huffman diversion 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 MID 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 addition of gravel to the Merced River below Crocker-Huffman diversion dam, as well as gravel mobilization monitoring. In response to comments received on the draft certification, the Gravel Augmentation Plan must consider the NMFS' gravel amounts and placement schedule NMFS recommended to FERC (NMFS, 2014) (NMFS, 2016). NMFS recommended sourcing aggregate material from areas along the banks of Merced 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.

Rationale for Condition 12 – Riparian and Floodplain Improvement Plan

The Projects have altered the hydrology and natural geomorphic processes along the Merced 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 Merced River corridor.

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 a migratory corridor and refuge from predatory species.

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 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 in Condition 1. Additionally, riparian and floodplain improvement efforts should be coordinated with related efforts, such as gravel augmentation (Condition 11).

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.

Rationale for Condition 14 – Aquatic Invasive Species Management

Recreational boating opportunities at Projects' reservoirs 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 MID 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.

Rationale for Condition 15 – Merced National Wildlife Refuge

The existing FERC license requires that MID provide the USFWS with up to 15,000 AF from Merced River Project water and return flow to the Merced National Wildlife Refuge (NWR). The refuge, located about 30 miles southeast of McSwain Dam, is part of the San Luis National Wildlife Refuge Complex. It encompasses 10,262 acres of wetlands, native grasslands, vernal pools, and riparian areas and was established in 1951 under the federal Lea Act (16 U.S.C. §695–695c; 62 Stat. 238) to attract wintering waterfowl from adjacent farmland where their foraging was causing crop damage.

Condition 15 requires MID to develop and implement a plan to continue water deliveries to the Merced NWR during times of the year when the 15,000 AF of water would provide the most benefit to wildlife.

Rationale for Condition 16 – 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, 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 16 requires MID to develop and implement a Recreation Facilities Management Plan in consultation with BLM, CDFW, USFWS, and State Water Board staff. The Recreation Facilities Management Plan will include: (1) measures that would be implemented to protect water quality; (2) monitoring; and (3) schedules to implement the proposed improvements and new recreation facilities.

Rationale for Condition 17 – 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 17 requires MID to develop and implement a Road Management Plan. Condition 17 will help ensure operation and maintenance of the Projects roads do not cause discharges to surface waters that violate water quality standards.

Rationale for Condition 18 – Biological Monitoring and 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 18 requires MID to develop and implement a Biological Monitoring and Management Plan in consultation with the Merced River Anadromous Fish Committee, Merced 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 Lower Merced River.

Rationale for Condition 19 – 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 and 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 Merced River Monitoring Plan may be used as the Merced River portion of the SJRMEP.

The monitoring and assessment required in Condition 19 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 the 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 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 MID. The Merced River is one tributary in the Bay-Delta Watershed that supports native

resident and migratory fish that migrate through the Sacramento-San Joaquin Delta. Accordingly, the Merced River Monitoring Plan should be integrated and coordinated with new and ongoing monitoring programs in the LSJR 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 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 receive and discuss the comprehensive report. 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.

Rationale for Condition 20 – 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 Merced 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 20 requires MID to comply with the terms of the Construction General Permit and to develop and implement appropriate Water Quality Monitoring and Protection Plans.

Rationale for Condition 21 – 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. Crocker-Huffman diversion dam (River Mile 52.0) represents the upstream barrier to native resident and migratory fish in the Lower Merced River. As outlined in the Final EIS, NMFS recommends that MID provide fish passage to cold-water habitat upstream of Crocker-Huffman diversion dam until a long-term water temperature improvement plan is developed. Fish passage above barriers can allow access to a larger abundance of improved habitat for native resident and migratory fish species.

Rationale for Conditions 22 through 45

In order to ensure that the Projects operate to meet water quality standards as anticipated, to ensure compliance with other relevant state and federal laws, and to 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.

7.0 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.

8.0 Water Quality Certification Conditions

ACCORDINGLY, BASED ON ITS INDEPENDENT REVIEW OF THE RECORD, THE STATE WATER RESOURCES CONTROL BOARD CERTIFIES THAT OPERATION OF THE MERCED RIVER HYDROELECTRIC PROJECT AND MERCED FALLS 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

1.A Water Year Types

The minimum flow requirements are dependent on a water year classification system for the Merced River, referred to as the Merced 60-20-20 Index (Index), which was established by the Merced Irrigation District (Licensee). The Licensee shall identify flow gages used to measure inflow values for the determination of the Merced River 60-20-20 Index and specify methods for calculating inflow to the State Water Resources Control Board's (State Water Board) Deputy Director for the Division of Water Rights (Deputy Director) as required in Condition 1.F. The Merced 60-20-20 Index is similar to the San Joaquin Valley Water Year Hydrologic Classification (San Joaquin Valley 60-20-20 Index) and shares the same five-water year classifications: Wet (W), Above Normal (AN), Below Normal (BN), Dry (D), and Critically Dry (C). The Merced 60-20-20 Index is calculated, in units of thousand acre-feet (TAF), as: 60 percent of the current year's April through July unregulated runoff (inflow) below Merced Falls (i.e., unimpaired inflow to Lake McClure), plus 20 percent of the current year's October through March unregulated runoff below Merced Falls, plus 20 percent of the minimum between: (1) the previous year's index; or (2) 675 TAF. The Merced 60-20-20 Index is used to determine the resulting water year based on the following numerical breakpoints:

- Wet: Index ≥ 650 TAF
- Above Normal: Index > 530 TAF and < 650 TAF
- Below Normal: Index > 420 TAF and ≤ 530 TAF
- Dry: Index > 360 TAF and ≤ 420 TAF
- Critically Dry: Index ≤ 360 TAF

Preliminary water year classifications will be determined in March and April and will apply from the 15th day of the month through the 14th day of the next month (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 the California Department of Water Resources' (DWR) Bulletin 120[13], shall be used for the

[13] 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.

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 in May and shall apply from May 15 through March 14 of the following water year. For the May Index calculation, a 50 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 runoff. Within 15 days of each water year type determination, the Licensee shall provide written notice of the determination to State Water Board staff.

1.B Minimum Instream Flows Below New Exchequer Dam and at Shaffer Bridge

Below New Exchequer Dam. The Licensee shall provide a minimum flow of 25 cubic feet per second (cfs), measured as reservoir outflow at the New Exchequer Dam station (California Data Exchange Center station ID EXC), at all times, to ensure the riverine section between the dam and McSwain Reservoir is not dewatered.

Shaffer Bridge. No later than three months following license issuance, the Licensee shall maintain minimum instream flows specified in Table 1 at Shaffer Bridge (River Mile 32.5), as measured at United States Geological Survey (USGS) gage no. 11271290.

The Licensee is required to operate the Projects to meet the minimum instream flows as described in Table 1 below. Minimum flow requirements in Table 1 are defined based on a water year types described in Condition 1.A above.

Table 1. Minimum Instream Flow Requirements at Shaffer Bridge (in cubic feet per second)

Time Period	Wet	Above Normal	Below Normal	Dry	Critically Dry
January	220	220	220	180	180
February	220	220	220	180	180
March 1 - 15	220	220	220	180	180
March 16 - 31	410	370	330	275	200
April 1 - 15	590	500	450	375	250
April 16 - 30	790	700	600	500	300
May	790	700	600	400	250
June	200	150	150	100	100
July	200	150	150	150	150
August	200	150	150	150	150
September	200	150	150	150	150
October 1 - 15	200	150	150	150	150
October 16 - 31	175	175	150	150	150
November	220	220	220	180	180
December	220	220	220	180	180

1.C Pulse Flows

No later than three months following license issuance, the Licensee shall release pulse flows as specified in this condition, as measured at Shaffer Bridge (River Mile 32.5).

- Fall: The Licensee shall provide a fall pulse flow measured at Shaffer Bridge (USGS gage no. 11271290), during October and/or November until a total volume of 12,500 acre-feet (AF) is released. This volume is in addition to the volume of flows set forth in Table 1 for the same period. The timing, magnitude, and duration, of the fall pulse flow shall be determined in consultation with the Merced River Anadromous Fish Committee and the Lower San Joaquin River Watershed Group (Condition 6).
- Spring: The Licensee shall provide a minimum spring pulse flow volume between February and May, as measured at Shaffer Bridge (USGS gage no. 11271290), of 30,000 AF during Wet water years, 20,000 AF during Above Normal water years, 15,000 AF during Below Normal water years, 10,000 AF during Dry water years, and 5,000 AF during Critically Dry water years. The spring pulse flow volume shall be based on the water year type (Condition 1.A) in effect at the time the pulse flow is initiated. If the May Bulletin 120 results in a change in water year type that requires a larger pulse flow volume, the Licensee shall consult with the Merced River Anadromous Fish Committee to determine how to best provide the additional volume of water. This volume is in addition to the volume of flows set forth in Table 1 for the same period. The timing, magnitude, and duration of the base and peak spring pulse flow releases shall be determined in consultation with the Merced River Anadromous Fish Committee and the Lower San Joaquin River Watershed Group (Condition 6).

1.D Bay-Delta Plan Flow Objectives

No later than three months following license issuance, the Licensee shall operate the Project in a manner consistent with the *Water Quality Control Plan for the San Francisco Bay/Sacramento-San Joaquin Delta Estuary* (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. Adaptive implementation of the LSJR flow objectives may result in flows that achieve base 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.

The Licensee shall ensure that flows from the Merced River, including flows bypassed, released, or otherwise provided by the Licensee and any other available flows, meet the LSJR flow objectives for the Merced 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 diverters to contribute to the achievement of the LSJR flow objectives. If the Licensee is aware of any water diverter with a junior priority diverting or threatening to divert significant quantities of water at a time when the Licensee is required to bypass or release water to meet the LSJR flow objectives, the Licensee 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 Appendix B – Consolidated Instream Flow Requirements, for convenience and illustrative purposes.

1.E Compliance Methods

No later than six months after license issuance, the Licensee shall submit compliance methods for the flow requirements in Conditions 1.B, 1.C, and 1.D to the Deputy Director for consideration of approval. Compliance methods for Conditions 1.C. and 1.D shall be developed in consultation with the Merced River Watershed Group and the Lower San Joaquin River Watershed Group (Condition 6). The Deputy Director may require modifications as part of any approval.

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 designated minimum flow value. 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 Licensee shall record instantaneous (usually every 15-minutes) flow readings at all gages, 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 Licensee shall report any deviation from the required flows to the State Water Board's Deputy Director within 24 hours of the deviation.

Flows shall be measured at the gage location referenced in this condition unless otherwise approved by the Deputy Director. The Licensee 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.[14] The Licensee shall post all flow and other data to the California Data Exchange Center website, within 24-hours of flow measurement, unless otherwise approved by the Deputy Director. The Licensee shall publicly notice at an easily accessible location on the internet all known events that will affect minimum flow releases (e.g., powerhouse outages, construction, etc.) in Projects' reaches a minimum of 30 days in advance.

1.E.1 Minimum Instream Flows

The point of measurement for compliance with minimum instream flows identified in Condition 1.B is at Shaffer Bridge (USGS gage no. 11271290). The flow schedule in Table 1 specifies minimum instream flows, by time period and water year type. Minimum instream flows are expressed in cfs as a mean daily average.

1.E.2 Pulse Flows

Fall Pulse Flow: Flows shall be measured and monitored using USGS gage no. 11271290 at Shaffer Bridge. The exact timing of the beginning of the pulse flow release shall be determined by the Merced River Anadromous Fish Committee and coordinated with the Lower San Joaquin River Watershed Group (Condition 6). The fall block pulse flow volume shall reach 12,500 AF while ensuring that spawning occurs in the baseflow channel rather than in overbank areas.

Spring Pulse Flow: Flows shall be measured and monitored using USGS gage no. 11271290 at Shaffer Bridge. The configuration of all releases (i.e., flows to be released on each day) and the exact timing of the beginning of the release shall be determined by the Merced River Anadromous Fish Committee and coordinated with the Lower San Joaquin River Watershed Group (Condition 6). Compliance with this measure shall be based on verification of the number of days flows exceed 1,000 cfs (e.g., no less than nine days in Wet years) and the total volume of the pulse flow release (e.g., no less than 30,000 acre-feet in Wet years). The releases during Wet, Above Normal, and Below Normal water years shall be configured to consist of flows equal to or greater than 1,000 cfs for up to a total of nine days in Wet water years, seven days in Above Normal water years, and six days in Below Normal water years. Additionally, the peak flow shall be held for two days, followed by a gradually descending hydrograph. The time needed to reach the 1,000 cfs threshold at the beginning of the pulse flow and to ramp down from 1,000 cfs to the required minimum flow shall not be included in the designated days over 1,000 cfs. 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 flow. The volume of water attributed to minimum flows shall not be included in the pulse flow volume.

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[14] 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 June 15, 2020)

1.E.3 LSJR Flow Objectives

The Licensee shall develop compliance methods for the LSJR flow objective specific to the Merced 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. On September 20, 2019, the State Water Board released a draft guidance document*, Initial Unimpaired Flow Compliance Measures*, that provides basic steps for monitoring and assessing compliance with the LSJR unimpaired flow objectives and identifies several issues that need to be resolved. State Water Board staff has been developing methods to address these issues and anticipates submitting updated Unimpaired Flow Compliance Methods, that include options for voluntary agreements, to the Executive Director for consideration. Compliance methods approved by the State Water Board or Executive Director in accordance with the Bay-Delta Plan shall be used to inform the Licensee's development of compliance methods specific to the Merced River as required by this condition.

1.E.4 Unplanned Temporary Flow Modifications

The flows specified in Condition 1 may be temporarily modified if required by equipment malfunction reasonably beyond the control of the Licensee, as directed by law enforcement authorities, or in emergencies. An emergency is defined as an unforeseen event that is reasonably out of the control of the Licensee and requires the Licensee to take immediate action, either unilaterally or under instruction by law 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 Project works; and recreation accidents. Drought is not considered an emergency for purposes of this condition.

When possible, the Licensee shall notify the Deputy Director prior to any unplanned temporary instream flow modification. In all instances, the Licensee 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 Licensee shall provide the Deputy Director with an update of the conditions associated with the modification and an estimated timeline for returning to the required instream flows.

Within 30 days of any unplanned temporary instream flow modification, the Licensee 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 instream flow modification; (3) a timeline for returning to the required instream flow or timeline when the instream 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 instream flows resulting from a similar emergency or event.

1.F Annual Operations Plan

The Licensee shall prepare an Annual Operations Plan that describes actions, operations, and methods for meeting instream flows identified in Condition 1, reservoir storage requirements in Condition 3, temperature and dissolved oxygen targets identified in Condition 8, and water deliveries to the Merced National Wildlife Refuge identified in Condition 15. 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 Bulletin 120. Equations and gage locations shall be provided as part of the description of flow calculations to meet requirements.

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 this condition may be used to fulfill the Bay-Delta Plan's requirements for annual adaptive operations plans provided that the requirements in the Bay-Delta Plan are met.

By November 1 of each year, the Licensee shall submit a draft Annual Operations Plan to the Deputy Director, the Merced River Watershed Group, and the Lower San Joaquin River Watershed Group (Condition 6), for review and recommendations. The draft annual operations plan shall cover the current water year (October 1 – September 30 of the following year). After considering recommendations, the Licensee 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 annual operations plans, the State Water Board or Executive Director will consider the recommendations of the Merced River Watershed Group and Lower San Joaquin River Watershed Group (if functionally equivalent to the STM Working Group), along with the requirements and procedures for adaptive implementation and other relevant information. The Executive Director may require modifications to the proposed Annual Operations Plan, based on advice from the watershed groups or other relevant information, as part of approval.

If hydrologic conditions change in the current water year such that revisions need to be made to an approved annual operations plan, the Licensee shall submit a Revised Operations Plan to the Executive Director for consideration of approval after

consultation with the Merced 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 adaptive Annual Operations Plan is based on a forecast from the best available information and may not accurately 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 adaptive 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 and any other required approvals. The Licensee shall file with FERC the Executive Director-approved annual operations plan, and any approved revisions thereto.

1.G Year Management Operations Plan

No later than one year following license issuance, the Licensee 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 identified in the approved plan 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 Plan shall be developed in consultation with the Merced 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).

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

CONDITION 2. Ramping Rates

No later than one year following license issuance, the Licensee shall submit a Ramping Rate Plan to the Deputy Director for consideration for approval. The Deputy Director may require modifications as part of any approval. The Licensee shall develop the Ramping Rate Plan for changes in flows, including pulse flows, in consultation with the agencies in the Merced River Watershed Group (Condition 6). The Ramping Rate Plan shall be developed and implemented to protect aquatic life health (e.g., prevent dewatering and stranding, promote natural fish behaviors) and provide adequate conditions to stimulate growth of riparian trees and shrubs. At a minimum, the Ramping Rate Plan shall include:

- Purpose of the plan;
- Aquatic species for which ramping rates were developed to protect;
- An assessment of which flows (if any), in addition to those required in Condition 1, require ramping rates;
- Methods or information used to determine ramping rates (e.g., studies, tests, monitoring, etc.), as well as identification of what additional studies or information are needed if interim ramping rates are proposed;
- A monitoring plan to verify adequate protections for aquatic life health (e.g., stranding, dewatering, fish behaviors, and mortality), and adequate stimulation of growth of riparian trees and shrubs. The plan may point to other monitoring required by this certification;
- Criteria for evaluating the effectiveness of the ramping rates;
- Schedule for reporting study and monitoring results to the agencies in the Merced River Watershed Group;
- Proposed interim ramping rates, if applicable;
- How modifications to the Ramping Rates Plan will be implemented to address the need for updates to ramping rates throughout the term of the FERC license(s) and any extensions. After considering monitoring results from other conditions of this certification, or following recommendation(s) by one or more agency in the Merced River Watershed Group (Condition 6) , the Deputy Director may require the Licensee to initiate consultation with the agencies of the Merced River Watershed Group (Condition 6) to determine if the required ramping rates are protecting water quality and beneficial uses, and determine what, if any, adjustments are necessary; and
- Documentation of consultation with agencies in the Merced River Watershed Group (Condition 6), comments and recommendations made in connection with the development of the Ramping Rates Plan, and a description of how the Ramping Rates Plan incorporates or addresses the comments and recommendations.

A temporary variance from ramping rates may be granted if required by equipment malfunction beyond the reasonable control of the Licensee, as directed by law

enforcement authorities or in emergencies[15]. Within 96 hours of the beginning of any unplanned temporary modification from ramping rates, the Licensee shall provide written notification to the Deputy Director including: a description of the event that necessitated the temporary modification, an update of the conditions associated with the modification, an estimated timeline for returning to compliance with certification requirements, and future actions the Licensee proposes to implement to avoid the need for a variance resulting from a similar event in the future, if appropriate.

The Ramping Rate Plan shall be implemented upon approval of the Deputy Director and any other required approvals. The Licensee shall file with FERC the Deputy Director-approved Ramping Rate Plan, and any approved amendments thereto.

CONDITION 3. Carryover Storage Requirements

No later than three months following license issuance, the Licensee shall initiate a collaborative effort through the Merced River Watershed Group (Condition 6) to develop proposed reservoir carryover storage and other reservoir requirements as needed (collectively referred to Carryover Storage Requirements) for Lake McClure. No later than 18 months following license issuance, the Licensee shall submit proposed Carryover Storage Requirements to the Deputy Director for review and consideration for approval. The Deputy Director may require modifications as part of any approval.

In developing the Carryover Storage Requirements, the Licensee 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 Licensee shall target suitable temperature conditions for freshwater life stages of Chinook salmon and Central Valley steelhead, which are identified in Table 2 in Condition 8. 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 Carryover Storage Requirements shall be implemented upon approval of the Deputy Director and any other required approvals. The Licensee shall file with FERC the Deputy Director-approved Carryover Storage Requirements, and any approved amendments thereto.

Prior to Deputy Director approval of Carryover Storage Requirements, the Licensee shall monitor and report temperature conditions and manage diversions, releases, and operations to achieve temperature targets (Table 2, Condition 8) in combination with approved biological goals (currently under consideration by the State Water Board pursuant to the Bay-Delta Plan).

[15] Refer to definition of emergencies presented in Condition 1.E.4 of this certification.

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 Merced and/or Mariposa counties, or multiple consecutive Dry or Critically Dry water years, the Licensee may request modification of the flow and related requirements, including carryover storage requirements, of this certification. If the Licensee anticipates that it may request modification pursuant to this condition, the Licensee shall notify the agencies in the Merced River Watershed Group (Condition 6), the Bureau of Land Management (BLM), and Deputy Director of the Licensee's 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 Licensee requests modification pursuant to this condition, the Licensee shall develop a Revised Operations Plan in consultation with the agencies in the Merced River Watershed Group (Condition 6) and BLM for flows during the extremely dry conditions.

The Licensee 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 Licensee 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 Licensee's 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 Licensee shall describe the circumstances and justification for not implementing water conservation measures.

The Licensee shall submit the proposed Revised Operations Plan to the Deputy Director for review and consideration for approval. The Licensee 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 Licensee may implement the Revised Operations Plan upon receipt of Deputy Director and other required approvals, in accordance with the schedule and requirements specified therein. The Licensee shall file with FERC the Deputy Director-approved Revised Operations Plan, and any approved amendments thereto.

CONDITION 5. Southern Delta Salinity Objective

The Licensee 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 Licensee 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 Licensee's diversion, hydraulic continuity would not exist between the Licensee's 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 Licensee.

This condition is not intended to relieve any other diverter of responsibility to contribute to achievement of the southern Delta salinity objective. If the Licensee is aware of any person or entity with a junior priority diverting or threatening to divert significant quantities of water at a time when the Licensee is required to bypass or release water under this condition, the Licensee should report that diversion or threatened diversion to the Deputy Director, who may initiate appropriate proceedings 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. Merced River and Regional Watershed Management Coordination

6A. Merced River Watershed Group

No later than three months following license issuance, the Licensee shall establish and convene a Merced River Watershed Group for the purpose of consultation on ecological topics related to the development and review of plans and to provide recommendations to the Licensee as expressly provided for under the conditions of this certification. Examples of topics the Merced 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 and the coordination of Merced River flows with flows from the other salmon-bearing tributaries to the LSJR, specifically the Stanislaus and Tuolumne Rivers. In order to ensure adequate coordination, and unless they decline to participate, the Merced River Watershed Group shall include, at a minimum, and in addition to the Licensee's 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), 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 or implementation of provisions of this certification. Depending on the topic, it is also highly recommended, and the Deputy Director may direct, that the Merced River Watershed Group include water diverters and users on the Merced River and nongovernmental organizations with appropriate expertise.

The Merced River Watershed Group may convene individual committees, as needed, to address topic specific issues or to include 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 Licensee is required to convene a Merced River Anadromous Fish Committee, a subgroup of the Merced River Watershed Group. The Licensee shall host the first meeting of the Merced River Anadromous Fish Committee no later than three months following license issuance. The Licensee shall organize and host all future meetings of the Merced River Anadromous Fish Committee. Meetings shall be held at least monthly unless otherwise agreed to by the committee. The Merced River Anadromous Fish Committee shall be comprised of one representative each from MID, CDFW, NMFS, USFWS, the State Water Board, and a nongovernmental organization with anadromous fisheries expertise. Merced River Anadromous Fish Committee members shall be selected by each respective organization.

6.B Lower San Joaquin River Watershed Group

The Licensee 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 STM Working Group as described in the Bay-Delta Plan. The State Water Board will seek recommendations from the regional watershed group (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 Licensee 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 Licensee shall invite the Merced River Watershed Group (Condition 6), BLM, and other interested stakeholder to participate in the annual review meeting. The annual review meeting shall be noticed at least 30 days in advance on the Licensee's Projects webpage(s). The Merced 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 Licensee shall:

- Review the status of implementing the FERC license(s) and certification conditions;
- Review monitoring data from all monitoring conducted the previous year;
- Review elements of current year maintenance plans and any non-routine maintenance;
- Discuss foreseeable changes to 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 Merced River Watershed Group (Condition 6), BLM, and other interested stakeholders at least 30 days prior to the annual meeting. The Licensee 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 Temperature Monitoring and Management Plan

The Licensee shall take actions within its reasonable control to achieve the water temperatures outlined in Table 2 and any amendments to the temperature requirements as approved in the Licensee's Annual Operations Plan (Condition 1). No later than six months following license issuance, the Licensee shall submit a Water Temperature Monitoring and Management Plan to the Deputy Director for review and approval. The Deputy Director may require modifications as part of any approval. The Licensee shall

develop the Water Temperature Monitoring and Management Plan in consultation with the Merced River Anadromous Fish Committee (Condition 6). The Licensee shall install and operate 4 to 8 water temperature monitoring devices no later than 18 months following license issuance. At a minimum, the Water Temperature Management 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 requirements, 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, and modified power supply operations. The plan shall also identify the actions the Licensee proposes to implement initially and the schedule for implementation;
- A detailed reporting schedule, that includes:
  - Summarizing, evaluating, and reporting the data; 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 effecting 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 requirements in Table 2 within the reasonable control of the Licensee;
- Any requests for modifications to the monitoring locations identified in Table 2, including supporting information for any proposed modifications. Proposed 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.

Table 2. Merced River Temperature Requirements

Time Period	Water-Year Type (Condition 1)	Maximum Daily Temperature	Location[1]
January 1 – February 14	Wet Above Normal Below Normal Dry Critically Dry	13°C (55.4°F)	Shaffer Bridge (RM 32.5) Shaffer Bridge (RM 32.5) River Mile 38 River Mile 45 Snelling – G St (RM 46.5)
February 15 – April 30 February 15 – March 31 February 15 – March 15 February 15 – March 15 February 15 – 28/29	Wet Above Normal Below Normal Dry Critically Dry	16°C (60.8°F)	Confluence RM 2.5
April 1 – April 30 March 16 - April 30 March 16 - April 30 March 1 – April 30	Above Normal Below Normal Dry Critically Dry	18°C (64.4°F)	RM 14 RM 27 RM 27 RM 38
May 1 – June 30 May 1 – June 30 May 1 – June 30 May 1 – June 30 May 1 – May 31	Wet Above Normal Below Normal Dry Critically Dry	18°C (64.4°F)	RM 27 RM 27 RM 38 RM 38 RM 38
July 1 – November 30 July 1 – November 30 July 1 – November 30 July 1 – November 30 June 1 – November 30	Wet Above Normal Below Normal Dry Critically Dry	18°C (64.4°F)	RM 49
December	All water years	13°C (55.4°F)	Shaffer Bridge (RM 32.5)

Abbreviation: RM – River Mile
[1] Alternative locations may be approved by the Deputy Director as part of approval of the Water Temperature Management Plan.

Inability to Meet Temperature Requirements Due to Uncontrollable Factors. If the Licensee is unable to meet the temperature requirements of this certification due to an event or circumstance beyond its reasonable control, the Licensee 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 requirement. Such notice shall include a statement of specific actions that the Licensee has or will take to address the event or circumstance and how it will manage the cold-water pool or river flow to minimize exceedances of Table 2. If the Deputy Director finds that there is a pattern of exceedances within the Licensee's 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 Licensee to file a plan identifying any

feasible measures that the Licensee may undertake, requiring the Licensee 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.

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

8.B Dissolved Oxygen Monitoring and Management Plan

The Licensee shall take all actions within its reasonable control to meet the dissolved oxygen water quality objectives outlined in Table 3 below and any amendments thereto as approved in the Licensee's Annual Operations Plan (Condition 1). No later than six months following license issuance, the Licensee shall submit a Dissolved Oxygen Management Plan to the Deputy Director for review and approval. The Deputy Director may require modifications as part of any approval. The Licensee shall develop the Dissolved Oxygen Monitoring and Management Plan in consultation with the Merced 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 Licensee shall operate a minimum of two continuous real-time dissolved oxygen monitoring stations to measure compliance with the two dissolved oxygen water quality objectives for the Merced River (Table 3). At a minimum, the Dissolved Oxygen 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 (i.e., continuous), equipment to be used, and the quality assurance project plan;
- A comprehensive description of the Projects' impact on dissolved oxygen concentrations in the Lower Merced River. This description shall also identify the magnitude of the Projects' impact in relationship to other environmental factors influencing dissolved oxygen in the Merced River;
- A minimum of two continuous real-time dissolved oxygen monitoring stations to measure compliance with the two dissolved oxygen water quality objectives in the Merced River, and evaluation of the need for additional dissolved oxygen monitoring stations to inform habitat suitability;
- 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 3; and
- A summary of any comments received in development of the plan and how the comments were addressed.

Table 3. Merced River Dissolved Oxygen Water Quality Objectives[1]

River Section	Water Quality Objective (mg/l)[1]	Time Period
Merced River from Cressy to New Exchequer Dam	8.0	All Year
Merced River from Cressy to the confluence with San Joaquin River	7.0	All Year

[1]SR/SJR Basin Plan. Dissolved oxygen concentrations below the levels presented in this table are prohibited at all times.

Inability to Meet Dissolved Oxygen Requirements Due to Uncontrollable Factors. If the Licensee is unable to meet the dissolved oxygen requirements of this certification due to an event or circumstance beyond its reasonable control, the Licensee 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 requirement. Such notice shall include a statement of specific actions that the Licensee has or will take to address the event or circumstance and how it 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 Licensee's 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 Licensee to file a plan identifying any feasible measures that the Licensee may undertake, require the Licensee to file modifications to license(s) requirements, etc.).

The Licensee 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 Licensee shall file with FERC the Deputy Director-approved Dissolved Oxygen Management Plan, and any approved amendments thereto.

8.C Mercury Monitoring and Management Plan

No later than one year following license issuance, the Licensee 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 Licensee 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 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 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 reporting schedule;
- 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 Licensee 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 Licensee shall file with FERC the Deputy Director-approved Mercury Monitoring and Management Plan, and any approved amendments thereto.

8.D Other Constituents Monitoring and Management Plan

No later than one year following license issuance, the Licensee 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 Merced 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 Lake McClure, McSwain Reservoir, and the Lower Merced River. This description shall also identify the magnitude of the Projects' impact in relationship to other factors influencing the constituents in the Merced 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 8.A), mercury (covered in Condition 8.C), chlorpyrifos, diazinon, Group A pesticides (aldrin, dieldrin, chlordane, endrin, heptachlor, heptachlor epoxide, hexachlorocyclohexanes [including lindane], endosulfan, and toxaphene), and unknown toxicity;
- A description of water quality parameters to be monitored in the Merced 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-Party Group (Central Valley Regional Water Board Order R5-2012-0116-08);
- 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 Licensee 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. The Licensee 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 Plan

No later than one year following license issuance, the Licensee 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 Merced 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, California Department of Transportation (Caltrans), and State Water Board staff. 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 Lake McClure and McSwain Reservoir, including options for moving the large woody material collected in Lake McClure and McSwain Reservoir and depositing it downstream of Crocker-Huffman diversion dam;
- Identification of suitable locations in the Merced River downstream of Crocker-Huffman diversion 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 Licensee will evaluate and report on the performance of large woody material management efforts. The program shall include the criteria that will be used to evaluate the performance of large woody material management measures. The Licensee shall propose any updates to the LWMMP based on the monitoring results. Reports shall be submitted to the Deputy Director, BLM, Caltrans, CDFW, NMFS, and USFWS;
- An adaptive management program that describes how the Licensee plans 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, Caltrans, 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.

Large woody material shall not be stockpiled on BLM land, especially in the Piney Creek Red-legged Frog Core Area. The Licensee 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). The Licensee shall report on large woody material management for the previous year at the Annual Review Meeting (Condition 7).

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

CONDITION 10. Erosion and Sediment Management Plan

No later than one year following license issuance, the Licensee shall submit an Erosion and Sediment Control Management Plan (Erosion and Sediment Plan) to the Deputy Director for review and approval. The Licensee may require modifications as part of any approval. The Erosion and Sediment Plan shall be developed in consultation with BLM, CDFW, USFWS, NMFS, Caltrans, 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:

- 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 Licensee shall prepare an amendment to the plan for Deputy Director review and approval. The plan amendment shall be prepared in consultation with BLM, CDFW, USFWS, NMFS, Caltrans, 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;
- A monitoring and reporting program that describes how the Licensee 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, USFWS, NMFS, Caltrans, 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 Licensee shall file with FERC the Deputy Director-approved Erosion and Sediment Plan, and any approved amendments thereto. The Licensee 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 Plan

No later than one year following license issuance, the Licensee 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 Merced River, including the addition of coarse gravel to fill bedload traps and provide spawning gravel downstream of Crocker-Huffman diversion 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;
- 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 biproducts associated with the process;
- Identification of locations and methods for gravel introduction/placement, and any facilities or improvements necessary to access the Merced River and place gravel;
- Coordination with activities under the Riparian and Floodplain Improvement Plan (Condition 12);
- A schedule for gravel placement with provisions for an initial placement of 50,000 cubic yards of coarse gravel at suitable augmentation sites downstream of Crocker-Huffman diversion dam to fill bedload traps and for annual placement of 2,600 cubic yards of spawning gravel in the Lower Merced River;
- Gravel placement methods;
- Schedule and methods for monitoring mobilization of gravel dispersal;

- Measures that Licensee 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 Licensee 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. 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 Licensee 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 Licensee plans to adjust gravel placement and monitoring methods based on evaluation of information and monitoring resulting from implementation of the plan. The adaptive management shall include evaluation of the initial fill volumes and propose additional annual placement of coarse and spawning gravels, as needed, based on NMFS' submittals to FERC related to successful infill of bedload traps and suitable spawning gravels in the Lower Merced River (NMFS, 2014) (NMFS, 2016); 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 Deputy Director may require additional gravel augmentation based on monitoring results, as part of adaptive management implementation of the Gravel Augmentation Plan. The Licensee shall file with FERC the Deputy Director-approved Gravel Augmentation Plan, and any approved amendments thereto. The Licensee 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 and Floodplain Improvement Plan

No later than one year following license issuance, the Licensee shall submit a Riparian and Floodplain Improvement Plan to the Deputy Director for review and consideration for approval. The Deputy Director may require modifications as part of any approval. The Riparian and Floodplain Improvement Plan shall be developed in consultation with the agencies in the Merced River Anadromous Fish Committee (Condition 6). The Riparian and Floodplain Improvement Plan shall describe the phased program (phases described below) the Licensee will implement to restore, enhance, and protect riparian and other floodplain habitats to support fish and wildlife beneficial uses. The Riparian and Floodplain Improvement Plan shall incorporate expected flow volumes associated with implementation of the Bay-Delta Plan LSJR flow objectives in its design and include a definition of high flow events. The Licensee 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 Licensee shall file with FERC the Deputy Director-approved Riparian and Floodplain Improvement Plan, and any approved amendments thereto. The Licensee shall implement the Riparian and Floodplain Improvement Plan upon receipt of Deputy Director and any other required approvals, in accordance with the schedule and requirements specified therein.

The program set forth in the Riparian and Floodplain Improvement Plan shall be implemented in the following three phases:

- *Phase 1*. No later than one year following license issuance (as part of submittal of the Riparian and Floodplain Improvement Plan) and in consultation with the Merced River Anadromous Fish Committee (Condition 6) the Licensee shall provide a screening level analysis of proposed riparian/floodplain improvement projects, including an evaluation of the feasibility and benefits of constructing 40 – 125 acres of floodplain habitat near spawning habitats throughout the lower Merced River, with some portion of constructed acres designed to activate at flows lower than existing bank full flow values (e.g., between 500 and 700 cfs), 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. This phase shall include the identification of a Phase 1 recommended alternative, and relevant information from the Gravel Augmentation Plan (Condition 11) and coordination with Gravel Augmentation Plan activities, as it applies to any proposed restoration activities.

- *Phase 2*. No later than two years following license issuance and in consultation with the agencies in the Merced River Anadromous Fish Committee (Condition 6), the Licensee shall initiate Phase 2 of the program. Phase 2 shall begin with an evaluation of the full scope and feasibility of the Phase 1 recommended alternative and development of an implementation schedule for the alternative, as approved by the Deputy Director as part of review and approval of the Riparian and Floodplain Improvement Plan. Within four years of license issuance, the Licensee shall submit the Phase 1 recommended alternative and implementation schedule to the Deputy Director for review and consideration for approval. The Deputy Director may require modifications as part of the approval. The Licensee shall file with FERC the Deputy Director's approval of the Phase 1 recommended alternative and implementation schedule and any approved amendments thereto. The Licensee shall implement the Phase 1 recommended alternative upon receipt of Deputy Director and any other required approvals, in accordance with the schedule and requirements specified therein. In no case shall the following timelines be exceeded:
  - No later than eight years following license issuance, the Licensee 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 alternative.

  - No later than 10 years following license issuance the Licensee shall fully implement the approved alternative.

- *Phase 3*. Following full implementation of the approved alternative (i.e., completion of Phase 2), the Licensee shall annually collect data appropriate for evaluating the effectiveness of the riparian and floodplain improvement program and the achievement of the program objectives. The Licensee shall use monitoring results to develop a BACI analysis. The License shall implement an adaptive management process to employ additional measures needed to achieve program objectives. The Licensee shall prepare an annual summary report describing monitoring and implementation activities completed pursuant to this condition and submit the report to the agencies of the Merced River Anadromous Fish Committee (Condition 6), for review on an annual basis.

The Licensee, in consultation with the agencies of the Merced River Anadromous Fish Committee (Condition 6), shall reevaluate the Riparian and Floodplain Improvement Plan every five years after initial implementation of Phase 3 and provide a comprehensive report that evaluates the effectiveness of the program. If any changes are recommended beyond the objectives, activities, or schedules approved by the Deputy Director, the Licensee shall submit recommendations in a revised plan to the Deputy Director for review and consideration for approval. The Licensee shall include with the revised plan, copies of the comments, including recommendations, made in the course of consultation with the agencies, and an explanation as to how the plan incorporates or addresses the comments and recommendations.

CONDITION 13. Predator Suppression Plan

No later than one year following license issuance, the Licensee 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 Licensee shall create the Predator Suppression Plan in consultation with the agencies of the Merced 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 Merced 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 Licensee will implement to reduce predation and non-native fish effects and to improve native resident and migratory fish success. Action may

include modification of priority 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, and temperature management) to maximize predator suppression and native resident and migratory fish survival;
- A monitoring and reporting program that describes how the Licensee will evaluate and report on the performance of plan implementation. The program shall include the criteria that will be used to evaluate the 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 Licensee shall file with FERC the Deputy Director-approved Predator Suppression Plan, and any approved amendments thereto. The Licensee 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 Licensee 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 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;

- 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 Licensee 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 Deputy Director may direct the Licensee to implement additional measures to address aquatic invasive species in Projects-affected waters. The Licensee shall propose any updates to the plan based on the monitoring results or other available information. Reports shall be submitted to BLM, CDFW, USFWS, and the Deputy Director;
- An adaptive management program that describes how the Licensee 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, 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 Licensee shall file with FERC the Deputy Director-approved Invasive Species Plan, and any approved amendments thereto. The Licensee 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.

CONDITION 15. Merced National Wildlife Refuge Water Delivery Plan

No later than two years following license issuance, the Licensee shall submit a Merced National Wildlife Refuge Plan (NWR Plan) to the Deputy Director for review and consideration for approval. The Deputy Director may require modifications as part of any approval. The NWR Plan shall be developed in consultation with BLM, CDFW, USFWS, and State Water Board staff. The purpose of the NWR Plan is to support the habitat needs of wintering waterfowl and other waterbirds, particularly between September and January when the water provides the most benefit. The Licensee shall ensure the year-round delivery of 15,000 AF of water to the Merced National Wildlife Refuge. The NWR Plan shall include the water delivery schedule in Table 4, unless otherwise approved by the Deputy Director.

Table 4. Merced National Wildlife Refuge Water Delivery Schedule

Month	Delivery in AF
September	2,700
October	2,700
November	1,900
December	1,100
January	1,100
February	600
March	600
April	600
May	900
June	900
July	1,100
August	800

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

CONDITION 16. Recreation Facilities Monitoring and Management

No later than two years following license issuance, the Licensee 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, CDFW, USFWS, and State Water Board staff. At a minimum, the Recreation Plan shall include:

- A description of operations and maintenance activities associated with the Project 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 Project and submittal of the associated results to State Water Board staff. If results of the survey indicate an increase in recreation use, the Licensee shall evaluate the potential effects to determine whether modifications to Project facilities are needed to protect water quality and beneficial uses and provide the Deputy Director with the analysis and any associated recommendations for review and approval;
- A list, description, and schedule for modifications to existing and construction of new recreation facilities associated with the Project. For each facility modification or construction, the Licensee shall prepare and implement, once approved by the Deputy Director, a Water Quality Monitoring and Protection Plan (Condition 20) that outlines measures and monitoring the Licensee 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, CDFW, USFWS, 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 Licensee shall file the Deputy Director-approved Recreation Plan, and any required modifications or amendments thereto, with FERC. The Licensee 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 17. Road Management

No later than two years following license issuance, the Licensee 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;
- Proposed measures designed to improve drainage that are consistent with the most current BLM or Caltrans guidance;
- A process for the Licensee 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 Licensee shall file with FERC the Deputy Director-approved Road Management Plan, and any approved amendments thereto. The Licensee 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 18. Biological Monitoring and Management Plan

No later than one year following license issuance, the Licensee shall submit a Biological 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 Licensee shall develop the Biological Monitoring and Management Plan in consultation with the Merced River Anadromous Fish Committee, Merced River Watershed Group, and the Lower San Joaquin River Watershed Group (Condition 6). At a minimum, the Biological Monitoring and Management Plan shall include:

- Monitoring for native resident and migratory fish monitoring, benthic macroinvertebrates (BMI), and amphibians in the Lower Merced River (Crocker-Huffman Dam to the confluence with the LSJR) over the term of the license(s) and any extensions;
- Specific years that monitoring will occur throughout the term of the license(s) and any extensions;
- Standardized sampling and data protocols with consideration given to methods used for downstream monitoring associated with the Sacramento-San Joaquin Delta;
- Fish data monitoring protocols and frequency 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); Additionally, fish community composition monitoring and assessment in coordination with habitat improvement actions such as 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 Merced River. Specifics related to this item include:
    - Determine presence or absence of introduced predators, spatial and temporal distribution, diversity, and habitat use;
    - Otolith and scale analysis, spawner surveys, and/or counting weirs to provide data for brood tables, stock-recruitment modeling, pulse flow effectiveness, and track life-history diversity properties of brood years;
    - Snorkel surveys for Central Valley steelhead and scale preservation for Chinook and *O. mykiss*;
    - Development and implementation of an acoustic tagging protocol and monitoring design for native migratory fish species and other fish species;
    - Installation and operation of two rotary screw traps in the Merced River: one upstream of the Cressy gage station (CRS) and one downstream of Hagaman State Park, to evaluate juvenile survival of Chinook salmon and Central Valley steelhead and identify other fish species that are sampled for information regarding fish community composition; and
    - Identification of habitat protection measures for native fisheries;

- BMI monitoring using the Surface Water Ambient Monitoring Program Protocols[16] or its successor program, or an alternative methodology approved by the Deputy Director. The protocols shall include population heterogeneity, composition, and trends;
- Monitoring and habitat protection measures for fish, amphibian, and reptile species that are listed as threatened or endangered under the California 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.);
- 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;
- Monitoring and habitat protection measures for Vernal Pool Fairy Shrimp and Vernal Pool Tadpole Shrimp;
- Adaptive management that describes how the Licensee plans to adjust monitoring methods based on evaluation of information and monitoring resulting from implementation of the plan;
- Consideration of Projects' impacts on species and their habitats; and
- 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.

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

CONDITION 19. Monitoring, Assessment, Reporting, and Special Studies

19.A Monitoring, Assessment, and Special Studies Program

No later than two years following license issuance, the Licensee shall submit a comprehensive Merced River monitoring, assessment, reporting, and special studies plan (Merced River Monitoring Plan) to the Deputy Director for review and consideration

[16] State Water Board. 2017. *Surface Water Ambient Monitoring Program: Quality Assurance Program Plan.* May 2017, and any amendments thereto.

for approval. The Deputy Director may require modifications as part of any approval. The Deputy Director also may direct the Licensee to implement measures to address impacts to biological resources associated with the Projects. The Merced River Monitoring Plan and performance of the required monitoring may serve as the Merced River portion of the San Joaquin River Monitoring and Evaluation Program (SJRMEP).

Development of the Merced River Monitoring Plan shall build on the monitoring and assessment framework and principles outlined in the California Wetland and Riparian Area Monitoring Plan[17] (WRAMP) and the United States Environmental Protection Agency (USEPA) tiered monitoring approach.[18] The Merced River Monitoring Plan shall describe 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.[19] The Merced River Monitoring Plan shall be developed in consultation with the agencies in the Merced Watershed Group and the Lower San Joaquin River Watershed Group (Condition 6).

Development and implementation of the Merced River Monitoring Plan shall be integrated and 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.

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[17] 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: June 14, 2020)

[18] https://www.epa.gov/wetlands/wetlands-monitoring-and-assessment (Last accessed: June 15, 2020)

[19] 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 June 15, 2020).

At a minimum, the Merced River Monitoring Plan shall include[20]:

- The purpose of the plan and specific management questions the monitoring program is designed to address;
- Compliance 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 8.A for temperature monitoring, Condition 8.B for dissolved oxygen monitoring, Condition 8.C for mercury monitoring, and Condition 8.D for other constituents monitoring;
- Biological (Effectiveness) Monitoring. Identify fish, BMI, and amphibian monitoring the Licensee will conduct in Projects-affected reaches over the term of the license(s) and any extensions (See additional details in Condition 18);
- Other Constituents Monitoring. Identify water quality parameters and associated monitoring the Licensee 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), channel margin restoration, 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 Merced River Watershed Group to inform real-time adaptive management decisions and to complete reporting requirements in Condition 19.B and Condition 19.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;
- Special Studies. Identify scientific investigations that need to be completed to achieve more effective and efficient attainment of flow and water quality requirements and biological goals; and
- Governance and Administration. The Merced River Monitoring Plan shall also include:

[20] To the extent information is provided in another plan required by this certification that has been approved by the Deputy Director, the Licensee shall integrate the plan into the Merced River Monitoring Plan. References to certification conditions have been provided to assist the Licensee in determining when such instances may occur.

- A governance charter for decision making processes in consultation with the Merced River Watershed Group (Condition 6);
- Identification of organizations involved in collecting, assessing, and reporting monitoring data and their roles. The Licensee shall document consultation with entities identified in monitoring, such as the Merced 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 Merced 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 Merced River Monitoring 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 Merced River Monitoring 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 Merced River Watershed Group (Condition 6). The Licensee shall submit any proposed modifications to the Merced River Monitoring Plan to the Deputy Director for review and consideration for approval.

The Licensee shall file with FERC the Deputy Director-approved Merced River Monitoring Plan, and any approved amendments thereto. The Licensee shall implement the Merced River Monitoring 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.

19.B Annual Summary Reports

By December 31 of each year, the Licensee shall submit an annual summary report to the Deputy Director that summarizes the Licensee's 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 Licensee shall ensure that the annual report is available for review and discussion at the Annual Review Meeting (Condition 7).

19.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 Licensee 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 Licensee is encouraged to work collaboratively in one or more groups and in consultation with the Merced River Watershed Group and the Lower San Joaquin River Watershed Group (Condition 6).

CONDITION 20. Construction and Maintenance

When applicable, the Licensee 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 Licensee shall prepare and implement site specific Water Quality Monitoring and Protection Plans (WQMP Plans) for Deputy Director approval. WQMP Plans must demonstrate compliance with sediment and turbidity water quality objectives in the SR/SJR Basin Plan and the Bay-Delta Plan.

The Licensee 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 Deputy Director may require modifications as part of any approval. The Licensee shall file with FERC the Deputy Director approved WQMP Plans, and any approved amendments thereto. The Licensee 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 21. Reintroduction of Anadromous Fish

The State Water Board reserves the authority 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 objectives and beneficial uses. For this condition, “reasonably foreseeable” includes, but is not limited to, a comprehensive reintroduction effort or plan that has a reasonable likelihood of implementation within the following 18 months.

The State Water Board also reserves the authority to require the Licensee to develop and conduct studies if it is reasonably foreseeable that listed anadromous fish species will be reintroduced into Projects-affected areas. Such 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, tribal cultural resources, and access to Projects-affected tributaries.

CONDITIONS 22 – 46

CONDITION 22. The requirements of this certification shall not become effective as conditions required to be included in the FERC license unless and until FERC sets aside the determination of waiver made in its June 18, 2020 order or is required to do so by court order, or there is another judicial or administrative action finding that FERC improperly found waiver of the State Water Board's certification authority. The requirements of this order are not binding on or enforceable against the Licensee

except to the extent they are incorporated into a FERC license or FERC license amendment, or are incorporated into another regulatory decision or order by the State Water Board or a Regional Water Board. This condition does not affect the time for filing a petition for reconsideration under section 3867 of title 23 of the California Code of Regulations, provided that the failure to seek reconsideration of this certification is not a limitation on the ability to seek reconsideration of a later issued decision or order for which reconsideration is authorized under State Water Board regulations or the Water Code.

CONDITION 23. The Licensee 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 2019) and the *California Wetlands Conservation Policy* (Governor's Executive Order W-59-93).

CONDITION 24. 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 may take action, including enforcement action, if the Licensee fails 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 Licensee 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 Licensee shall file with FERC any Deputy Director- or Executive Director-approved time extensions. The Licensee shall not implement any plans or reports until after receiving Deputy Director and Executive Director approval and any other necessary regulatory approvals.

CONDITION 25. 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 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 Lake McClure, McSwain Reservoir, and the Merced River.

CONDITION 26. 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 27. 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 28. 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 29. 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 30. 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 31. 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 Licensee, the Licensee 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 Licensee is responsible for meeting all requirements of the applicable ESAs for the Projects authorized under this certification.

CONDITION 32. The Licensee 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 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 33. 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 34. 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 35. This certification shall not be construed as replacement or substitution for any necessary federal, state, and local approvals. The Licensee is 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 36. 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 37. Upon request, a construction schedule shall be provided to the Deputy Director. The Licensee shall provide State Water Board and Central Valley Regional Water Board staff access to Projects sites to document compliance with this certification.

CONDITION 38. 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 Licensee shall be responsible for work conducted by its contractor, subcontractors, or other persons conducting work related to the Projects.

CONDITION 39. 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 40. 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 41. The Licensee 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 42. 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 43. 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 44. 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 45. 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.

CONDITION 46. This certification is conditioned upon total payment of any fee required under California Code of Regulations, title 23, division 3, chapter 28.

July 31, 2020

Eileen Sobeck
Executive Director

Date

Enclosures: Appendix A: Projects Description
Appendix B: Consolidated Instream Flow Requirements

9.0 References

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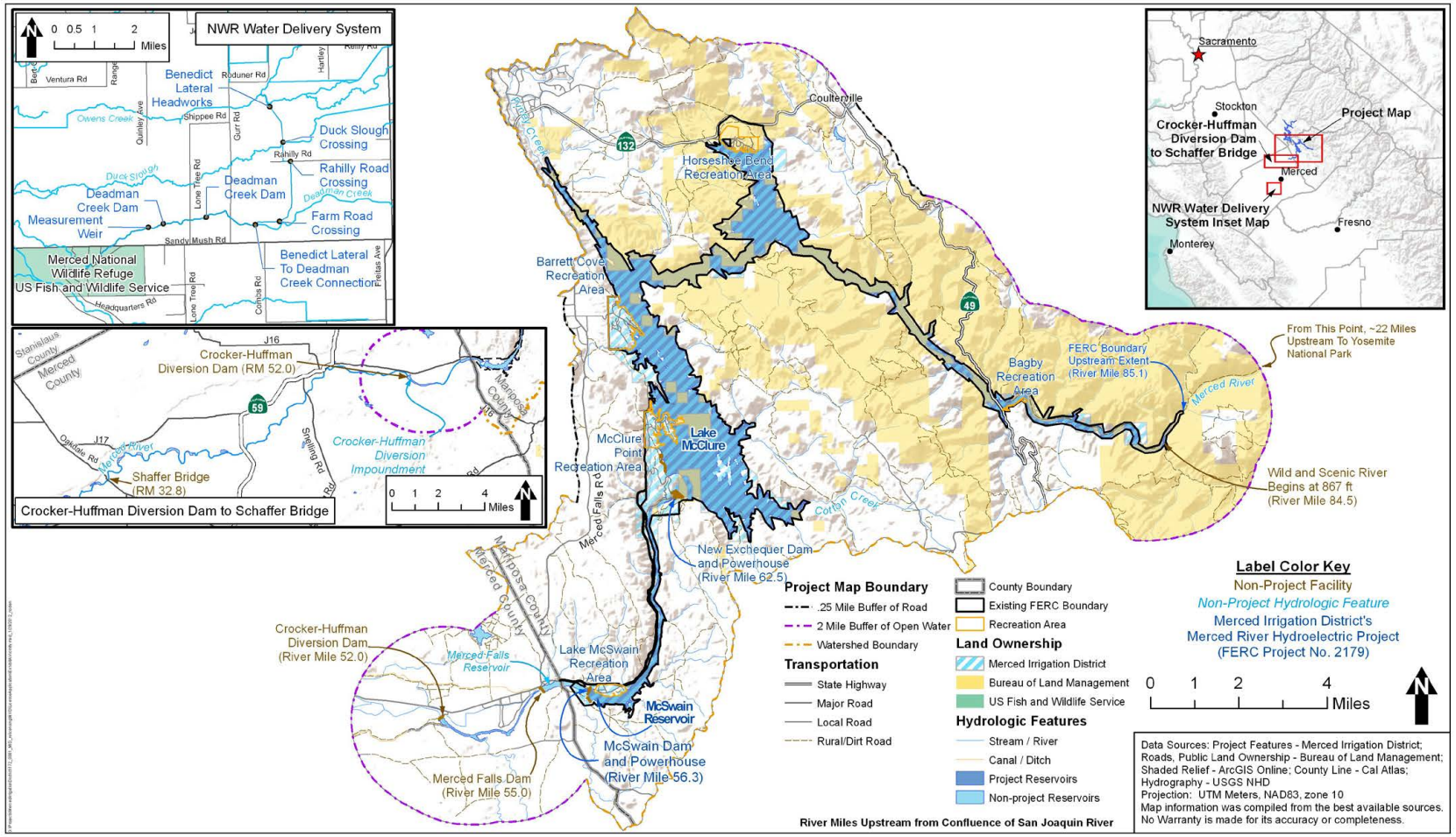

Figure 1. Merced River and Merced Falls Hydroelectric Projects Location Map (source FLA 2012)

APPENDIX A: PROJECTS DESCRIPTION

WATER QUALITY CERTIFICATION
FOR
MERCED RIVER HYDROELECTRIC PROJECT
AND
MERCED FALLS HYDROELCTRIC PROJECT

JULY 2020

1.0 Description of Projects

The Merced River Hydroelectric Project and Merced Falls Hydroelectric Project (collectively Projects), Federal Energy Regulatory Commission (FERC) Project Nos. 2179 and 2467, respectively, are located in the Merced River watershed, in Merced and Mariposa counties, California (see draft water quality certification Figure 1). The Projects are owned and operated by Merced Irrigation District (MID).

The majority of the Projects' facilities are located on federal land administered by the United States Department of Interior, Bureau of Land Management (BLM) as part of the Sierra Resource Management Area. The major components of the Projects include one reservoir, one impoundment, three powerhouses, and various access roads and other appurtenant facilities. The Merced River Hydroelectric Project (Merced River Project) has an authorized installed capacity of 101.25 megawatts and the Merced Falls Hydroelectric Project (Merced Falls Project) has an authorized installed capacity of 3.4 megawatts.

1.1 Facilities

1.1.1 Merced River Project

The Merced River Project includes two main developments: New Exchequer and McSwain.

1.1.1.1 New Exchequer Development

The New Exchequer development is the upstream facility and consists of: (1) New Exchequer dam—a rock structure with a reinforced concrete upstream face, 490 feet high and 1,220 feet long that impounds Lake McClure; (2) an ogee-type, concrete spillway with a 1,080-foot-long, ungated section and a 240-foot-long, gated section with six radial gates that are 40 feet wide and 30 feet high; (3) an earth-and-rock dike that is 62-feet-high and 1,500-feet-long; (4) an intake structure located upstream of the dam in Lake McClure; (5) a concrete-lined power tunnel that is 383-feet-long and 18 feet in diameter; (6) a concrete-encased, steel penstock that is 982-feet-long and 16 feet in diameter; (7) a above-ground concrete powerhouse that is 75 feet by 91 feet and discharges directly to the Merced River; (8) a low-level outlet, consisting of a 945.5-foot long, 108-inch-diameter powerhouse bypass (a steel pipe) that runs from the New Exchequer power tunnel to McSwain reservoir north of the New Exchequer powerhouse with a 108-inch-diameter Howell-Bunger valve; and (9) an interconnection to the grid at the step-up transformer in the powerhouse switchyard. The development is located on MID (7,577.5 acres), BLM (3,134.7 acres), and private (13.2 acres) land.

MID maintains four recreation areas at Lake McClure: (1) McClure Point, which includes a campground, picnic area, swim beach, marina, and boat ramp; (2) Barrett Cove, which includes a campground, swim beach, marina with two boat ramps, and overflow parking; (3) Horseshoe Bend, which includes a campground, swim beach, and boat ramp; and (4) Bagby, which includes a campground, boat ramp, and Shepherd's Point primitive area (considered part of the Bagby recreation area).

1.1.1.2 McSwain Development

The McSwain development is the downstream facility, consisting of: (1) McSwain dam—an embankment structure with a central impervious core of rolled fill between shoulders of cobbles or crushed rock—that is 80-feet-high and 1,620-feet-long and impounds McSwain reservoir; (2) an ungated concrete overflow spillway that is 802-feet- long; (3) an intake structure that is integral with the dam; (4) a concrete-lined power tunnel that is 160-feet-long and 15 feet in diameter that leads to a steel penstock that is 160-feet-long and 15 feet in diameter; (5) an above-ground, concrete powerhouse that is 72 feet by 72 feet and discharges directly into the Merced River; and (6) a low-level outlet, consisting of a 360-foot-long, 9-foot diameter powerhouse bypass pipe that runs from the McSwain power tunnel to Merced Falls reservoir with a fixed wheel gate at the upstream end of the bypass and an 8-foot-diameter Howell-Bunger valve on its downstream end. There is no transmission line associated with the powerhouse. The development connects to Pacific Gas and Electric Company's (PG&E) interconnected system at the step-up transformer in the powerhouse switchyard. The development is located on MID (907.5 acres) and BLM (20.2 acres) land.

MID maintains the McSwain recreation area at this development, which includes a campground, picnic area, group picnic area, informal day use area, swim beach, marina, and boat ramp.

1.1.1.3 Crocker-Huffman Diversion Dam

Crocker-Huffman diversion dam is located 4.3 miles downstream of MID's McSwain dam and 3.0 miles downstream of Merced Falls dam. MID owns Crocker-Huffman diversion dam and operates it as part of MID's water delivery system, but the dam is not included as part of the Merced River Project. The concrete gravity dam is approximately 725-feet-long and 22-feet-high, and diverts approximately 2,000 cubic feet per second (cfs) of water into MID's Main Canal (irrigation canal).

1.1.1.4 Merced National Wildlife Refuge Water Delivery Facilities

FERC's license requires that MID provide to the United States Fish and Wildlife Service up to 15,000 acre-feet of water and return flow to the Merced National Wildlife Refuge (Merced NWR). The Merced NWR, located about 30 miles southeast of McSwain dam, is part of the San Luis National Wildlife Refuge Complex (see draft water quality certification Figure 1). It encompasses 10,262 acres of wetlands, native grasslands, vernal pools, and riparian areas. The Merced NWR was established in 1951 under the federal Lea Act (16 U.S.C. §695–695c; 62 Stat. 238) to attract wintering waterfowl from adjacent farmland where their foraging was causing crop damage.

To provide this water, in the early 1990s, MID made eight modifications to its existing Benedict lateral canal, which is part of MID's water supply delivery system and composed of non-Merced River Project facilities. These modifications were incorporated into the Merced River Project license (but not included in the project boundary). The eight modifications, from upstream to downstream, include:

- Benedict-lateral headworks;

- Benedict lateral duck slough crossing;
- Benedict lateral Rahilly Road crossing;
- Benedict lateral Farm Road crossing;
- Benedict lateral to Deadman Creek connection;
- Deadman Creek dam and flashboard risers (Station 77+73);
- Deadman Creek dam and flashboard risers (Station 142+00); and
- a measurement weir.

Currently, MID uses various combinations of channels in its irrigation system to deliver water to Merced NWR. The summary of facilities used to deliver water to the Merced NWR is based on MID's September 5, 2014, filing with FERC. MID delivers water to the Merced NWR from Lake Yosemite, an instream regulating reservoir located at the end of MID's Main Canal. The lake receives input from other sources as well. MID has several facilities that divert water from Lake Yosemite for water supply purposes, including the Fairfield Canal and the Le Grand Canal, as well the Tower Lateral, a small lateral canal. Water from Lake Yosemite is conveyed primarily through the Le Grand and Fairfield canal systems to about 70,000 acres of irrigated land, including the Dean and El Capitan canal systems, through MID's vast, interconnected water conveyance system. The Fairfield, Le Grand, Dean, and El Capitan canal systems are the MID conveyance systems that, in addition to providing water supply to MID growers, are also used to convey water to Merced NWR. The Dean and El Capitan canal systems are supplied from the Fairfield and Le Grand canal systems via Bear Creek. Crocker dam, which is unrelated to Crocker-Huffman diversion dam, is a manually operated dam in Bear Creek that functions as a diversion dam during the irrigation season. When raised, Crocker dam serves to back up water into the Dean and El Capitan canal systems. The delivery to Merced NWR is located on Deadman Creek, in the northeast quarter of the southeast quarter of Section 36, Township 8S, Range E, the most southerly, downstream stretch of MID's conveyance network. Water can take a variety of different paths through different canals before reaching Merced NWR.

1.1.2 Merced Falls Project

The existing Merced Falls Project consists of: (1) a concrete gravity dam with a structural height of 34 feet and a crest length of 575 feet; (2) three radial gates, each 20-feet-long and 13.5-feet-high; (3) a one-mile-long impoundment with approximately 900 acre-feet of storage capacity, a useable storage capacity of approximately 579 acre-feet, a total surface area of approximately 65 acres, and a normal impoundment elevation of 344 feet above mean sea level (msl); (4) powerhouse facilities consisting of a steel building housing a 3.4-megawatt turbine/generator unit and a vertical Kaplan-type four-blade turbine; (5) a 1,000-foot-long earthen levee with a crest width of 8 feet; (6) an adjacent intake structure with a debris rack; and (7) a non-operable fish ladder.

The Merced Falls Project has a dependable capacity of 1.7 megawatts and an annual average generation of approximately 14.4 gigawatt hours.

1.2 Current Operations

The Merced River Project and the Merced Falls Project currently operate under annual licenses since their FERC licenses (issued on April 8, 1964 and on July 28, 1969, respectively) expired in 2014.

1.2.1 Merced River Project

MID operates Lake McClure to retain snowmelt from springtime runoff for flood control, water supply, recreation, hydropower, and environmental purposes. During winter storms, the Merced River Project attenuates high flows (i.e., those in excess of about 3,200 cfs that would otherwise pass downstream of the project) and stores this water in Lake McClure. During the drier months of July through November, the Merced River Project augments flows in the Lower Merced River compared to those that would occur without the project. In spring and summer, water levels are maintained relatively high for recreation at Lake McClure. From March through October, MID releases water primarily for downstream water supply. These releases are also used for hydropower generation at New Exchequer and McSwain powerhouses. The normal maximum and minimum reservoir elevations for Lake McClure are 867 feet and 630 feet, but, typically, the reservoir is operated within a range of 842 feet to 780 feet.

In September and October, MID releases water from storage when necessary to achieve a level of storage that allows for the required flood space, and storage is maintained at or below this level through mid-March. In the spring, depending on the snowpack and runoff forecasts, MID begins to refill Lake McClure with the snowmelt runoff. During drier years and drier periods, water levels may consistently stay below the required flood-space level because water supply and recreation needs drive reservoir storage more than flood control requirements.

McSwain reservoir is typically operated as a re-regulating afterbay for flows released from Lake McClure. This operation allows the New Exchequer powerhouse to be used to meet peak power demands or perform load-following functions while still maintaining a steady flow release to the Lower Merced River. The normal maximum and minimum reservoir elevations for McSwain reservoir are 399.0 feet and 391.5 feet. Water surface elevations below the normal minimum reservoir elevation do occur, but they are generally due to atypical operating conditions, such as unplanned outages, inspections, or work on the dam.

MID operates New Exchequer and McSwain powerhouses as base-load plants with seasonal peaking capabilities; these peaking capabilities were primarily exercised at New Exchequer powerhouse. McSwain powerhouse is operated to re-regulate flows released by New Exchequer powerhouse by providing flows that are more indicative of inflows to Lake McClure with releases dependent on the requirements for downstream water supply at, and downstream of, Crocker-Huffman diversion dam. Both powerhouses are operated on-site by MID from a centralized control center at New Exchequer dam and powerhouse and have automatic generation control capability. The New Exchequer development diverts all flows from Lake McClure through the intake, power tunnel, penstock, and powerhouse and then directly releases the flows to

McSwain reservoir. The McSwain development diverts all flows from McSwain reservoir through the intake, power tunnel, penstock, and powerhouse and then directly to Merced Falls reservoir on the Merced River.

1.2.2 Merced Falls

The Merced Falls Project is operated in a run-of-river mode dependent on water outflow from MID's upstream Merced River Project. Inflow to the Merced Falls Project passes through the impoundment, which is kept at a constant water elevation and then flows either through the powerhouse or the dam's radial gates. Flows of up to approximately 1,750 cfs are diverted through the powerhouse, and then discharged to the Merced River via the tailrace. When water inflows exceed 2,200 cfs, the Merced Falls Project spills water through the radial gates. The main section of the dam, approximately 535.5 feet long, is topped with needle beams. During flood events with flows greater than 12,250 cfs, the needle beams can be dropped, allowing the 575-foot-long concrete section of the dam to act as a spillway.

APPENDIX B: CONSOLIDATED INSTREAM FLOW REQUIREMENTS

WATER QUALITY CERTIFICATION
FOR
MERCED RIVER HYDROELECTRIC PROJECT
AND
MERCED FALLS HYDROELCTRIC PROJECT

JULY 2020

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

Month	Water Year Type	Minimum Instream Base Flows (cfs)	Spring Pulse Flow (TAF)	Fall Pulse Flow (TAF)	Bay-Delta Plan LSJR Flows
January	Wet	220			Period during which adaptive methods allow flow shifting, if approved
	Above Normal	220			
	Below Normal	220			
	Dry	180			
	Critical	180			
February	Wet	220	Wet – 30 TAF Above Normal = 20 TAF Below Normal = 15 TAF Dry = 10 TAF Critical = 5 TAF Pulse flows are in addition to base flows The timing, magnitude, and duration of the spring pulse flow releases shall be determined in consultation with the Merced River Watershed Group, Anadromous Fish Committee, and the Lower San Joaquin River Watershed Group.		LSJR Feb – June flow objectives 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
	Above Normal	220			
	Below Normal	220			
	Dry	180			
	Critical	180			
March 1-15	Wet	220			
	Above Normal	220			
	Below Normal	220			
	Dry	180			
	Critical	180			
March 16-31	Wet	410			
	Above Normal	370			
	Below Normal	330			
	Dry	275			
	Critical	200			
April 1-15	Wet	590			
	Above Normal	500			
	Below Normal	450			
	Dry	375			
	Critical	250			
April 16 - 30	Wet	790			
	Above Normal	700			
	Below Normal	600			
	Dry	500			
	Critical	300			
May	Wet	790			
	Above Normal	700			
	Below Normal	600			
	Dry	400			
	Critical	250			
June	Wet	200			
	Above Normal	150			
	Below Normal	150			
	Dry	100			
	Critical	100			
July	Wet	200			Period during which adaptive methods allow flow shifting, if approved
	Above Normal	150			
	Below Normal	150			
	Dry	150			
	Critical	150			
August	Wet	200			
	Above Normal	150			
	Below Normal	150			
	Dry	150			
	Critical	150			
September	Wet	200			
	Above Normal	150			
	Below Normal	150			
	Dry	150			
	Critical	150			
October 1 – 15	Wet	200		12.5 TAF Pulse flows are in addition to base flows The timing, duration, and rate of the fall pulse flow shall be determined in consultation with the Merced River Anadromous Fish Committee.	
	Above Normal	150			
	Below Normal	150			
	Dry	150			
	Critical	150			
October 16 –31	Wet	175			
	Above Normal	175			
	Below Normal	150			
	Dry	150			
	Critical	150			
November	Wet	220			
	Above Normal	220			
	Below Normal	220			
	Dry	180			
	Critical	180			
December	Wet	220			
	Above Normal	220			
	Below Normal	180			
	Dry	180			
	Critical	180			

Abbreviations: cfs – cubic feet per second; LSJR – Lower San Joaquin River; TAF – thousand acre-feet.