

# RECLAMATION

*Managing Water in the West*

## **Environmental Assessment**

## **Merced Irrigation District Drought Protection Water Management Model Project**

**October 2016**



**U.S. Department of the Interior  
Bureau of Reclamation  
Mid Pacific Region**

**October 2016**

## **Mission Statements**

The mission of the Department of the Interior is to protect and provide access to our Nation's natural and cultural heritage and honor our trust responsibilities to Indian Tribes and our commitment to island communities.

The mission of the Bureau of Reclamation is to manage, develop, and protect water and related resources in an environmentally and economically sound manner in the interest of the American public.

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# List of Acronyms and Abbreviations

AF	Acre Feet
CDFW	California Department of Fish and Wildlife
CDWR	California Department of Water Resources
CEQ	Council on Environmental Quality
CFR	Code of Federal Regulations
CFS	Cubic Feet per Second
DOI	Department of the Interior
EA	Environmental Assessment
FERC	Federal Energy Regulatory Commission
ITA	Indian Trust Assets
LiDAR	Light Detection and Ranging
MAGPI	Merced Area Groundwater Pool Interests
MID	Merced Irrigation District
NEPA	National Environmental Policy Act
NHPA	National Historic Preservation Act
NMFS	National Marine Fisheries Service
Reclamation	Bureau of Reclamation
RM	River Mile
Service	U.S. Fish and Wildlife Service
TAF	Thousand Acre Feet

# Section 1 Introduction

## 1.1 Background



**Figure 1. Merced Irrigation District location in Merced County, California** (Source: Merced Irrigation District, 2016)

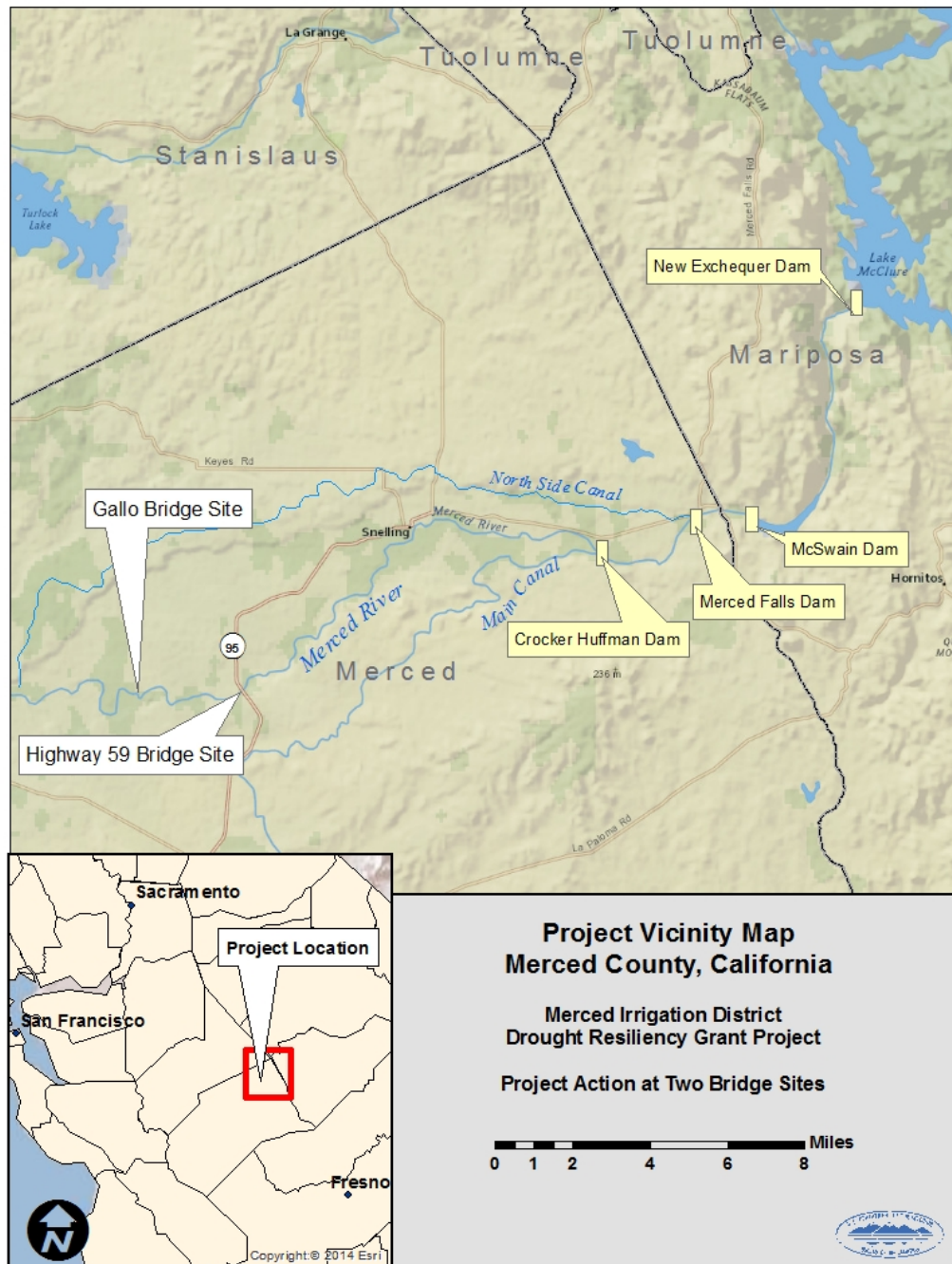
In conformance with the National Environmental Policy Act of 1969 (NEPA), as amended, the Bureau of Reclamation (Reclamation) has prepared this Environmental Assessment (EA) to evaluate and disclose any potential environmental impacts associated with implementation of the Merced Irrigation District's (MID) Drought Resiliency Grant Project (Proposed Action) (Figure 1). Reclamation proposes to provide a WaterSMART grant to the MID for the development and implementation of a drought protection water management model. As with the previous Water Marketing and Energy Efficiency Grants and prior DOI Challenge Grants, the aim of WaterSMART grant funding is to conserve and use water more efficiently, increase the use of renewable energy, protect endangered species, and facilitate water markets. In

addition, WaterSMART funding can be used to address climate-related impacts on water and to help prevent any water-related crisis or conflict. As such, WaterSMART Grants provide cost-shared funding for projects that can increase water management flexibility and help prepare for the impacts of climate change. Reclamation plays a key role as the federal lead agency for the distribution and implementation of WaterSMART funded opportunities.

The Proposed Action consists of providing grant funds for a project in MID along the Merced River. The Proposed Action is designed to provide real-time climate and river flow data so that MID can balance water management objectives with existing conditions in a more timely and efficient manner.

Lake McClure behind the New Exchequer Dam, and Lake McSwain behind the McSwain Dam, are the primary water storage facilities operated by MID along the Merced River. These facilities are designed to provide water for household and irrigation purposes, flood control, hydroelectric power generation, recreation, and to meet environmental concerns. In addition, as a conjunctive-use district, MID historically has focused on the replenishment of

regional groundwater supplies, using water from Lake McClure to recharge the aquifer in eastern Merced County. Subject to the provisions of the U.S. Army Corps of Engineers Water Control Manual, New Exchequer Dam flood control operations are limited to a maximum of 350 thousand acre feet (TAF) of rain or forecasted snow melt flood space. Below the dam and reservoir facilities, water is diverted from the Merced River at two locations; the Northside Canal by the Merced Falls Dam and the Main Canal by the Crocker-Huffman Dam, about three miles downstream (Figure 2).



**Figure 2. Merced River Project Action Sites, Merced County, California.**

Water for irrigation purposes flows from the Main and North Side Canals to service MID lands which gross about 164,000 acres. Along its canals and channels, MID also maintains about 4,100 delivery gates and 1,500 check structures. Not only does the MID system provide water to customers, but it also serves flood protection needs by diverting water from crowded areas.

Along with providing water and flood control protection, the MID balances water conveyance along the Merced River to meet instream flow requirements mandated in MID's current Federal Energy Regulatory Commission (FERC) license. According to the license, MID must maintain minimum flows of 25 cubic feet per second (cfs) at the Shaffer Bridge downstream of the Proposed Action sites year round, with the exception that it must maintain flows at 15 cfs during drought years. Through its Davis Grunsky Agreement with the State of California, MID provides at least 180 cfs between the Crocker-Huffman Dam and Shaffer Bridge from November through March annually. Additionally, MID is required to release water from storage at Lake McClure to downstream water users to satisfy water supplies for riparian and pre-1914 claims of water rights as mandated by the Cowell Agreement. The Cowell Agreement was established on January 17, 1926 pursuant to a Merced Superior Court Order, and stipulates a scheduled quantity of flow rates, measured at Crocker-Huffman Dam, to be maintained by the District.

The MID annual water diversion from the Merced River varies from 479 TAF in wet years to 429 TAF in drought years. In drought years, MID relies on groundwater supplies to fulfill their water management responsibilities. However, groundwater sustainability has long been a concern, and in fact the Merced Basin was recently identified as "critically overdrafted" by the California Department of Water Resources (CDWR 2016). As required by the State Groundwater Management Act of 2014, Basins designated as critically overdrafted shall be managed under a groundwater sustainability plan by January 31, 2020.

To ease the burden on groundwater supplies and to reliably meet water management commitments during drought years, MID has proposed the implementation of the Drought Protection Water Management Model. With its implementation, MID expects increased efficiency in meeting management objectives and water operations. Applying a real-time model would allow a water savings of 25 to 65 TAF for the MID. With that savings, MID expects increased water supply reliability, improved power generation, and more timely reaction to extreme weather conditions. It would also allow a better understanding of the water resources diverted to the other users downstream of the Crocker-Huffman Dam. In all, the model will aid MID in real-time planning while increasing the ability to ensure compliance with all its water management directives.

Reclamation is proposing to provide MID with partial funding to install two weather stations to collect river flow and weather data along the lower Merced River, below the Crocker-Huffman Dam. The data will be used to tie hydrologic modelling, reservoir simulation modelling, and river systems analyses into a real-time simulation of the Merced River watershed.

This EA describes the existing environmental resources in the Proposed Action area, evaluates the effects of the No Action and Proposed Action alternatives on the resources, and proposes measures to avoid, minimize, or mitigate any adverse effects. This EA was prepared in accordance with NEPA, Council on Environmental Quality (CEQ) regulations (40 CFR 1500-1508), and DOI Regulations (43 CFR Part 46).

## 1.2 Need for the Proposed Action

The DOI WaterSMART Initiative was established in 2010 to provide funding for projects that improve the conservation and sustainability of water supplies in the face of burgeoning demands. As the SMART acronym suggests (“Sustain and Manage America's Resources for Tomorrow”), the DOI WaterSMART Strategic Implementation Plan states that “Collaborative partnerships that go beyond political and institutional jurisdictions must be developed to ensure that the Nation’s limited water resources are used efficiently, sufficient amounts are retained to protect and restore the environment, and supplies are managed to reliably meet new demands (DOI 2011).” WaterSMART Grants are designed to coordinate conservation efforts between Reclamation and other Federal, state, tribal, and non-government agencies.

The purpose of providing grant funding for the Proposed Action is for Reclamation to further the goals and objectives of the WaterSMART Initiative as they apply to water supply reliability through management operations within the MID. Reclamation intends to do so by providing grant funding for the development and implementation of the Drought Protection Water Management Model. On-ground components of the model include two weather stations with flow-stage gauges to be installed along the Merced River.

This EA will analyze the affected environment of the Proposed Action and No Action Alternative in order to determine the potential impacts and cumulative effects to the following environmental resources:

- Air Quality
- Water Resources
- Groundwater Resources
- Biological Resources

## 1.3 Resources Not Analyzed in Detail

Department of the Interior Regulations, Executive Orders, and Reclamation guidelines require a discussion of the following items when preparing environmental documentation.

### 1.3.1 Cultural Resources

With supporting documentation prepared by Applied EarthWorks, Inc., Reclamation determined that no historic properties are present, pursuant to 36 CFR §800.3(a). No



further analysis is needed.

In the unlikely event that cultural resources or human remains are identified during the implementation of this project there may be additional considerations pursuant to Section 106 of the National Historic Preservation Act (NHPA). If inadvertent discoveries of cultural resources or human remains occur during project implementation, work shall temporarily stop and Reclamation cultural resources staff shall be contacted immediately.

### **1.3.2 Indian Trust Assets**

There are no Indian reservations, rancherias or allotments in the Proposed Action area. The Proposed Action does not have a potential to affect ITAs. The nearest ITA is a Public Domain Allotment approximately 31 miles northeast of the Proposed Action area (Appendix A).

### **1.3.3 Environmental Justice**

This action does not have the potential to affect any segment of the population, therefore, the Proposed Action could not have a significant or disproportionately negative impact on low-income or minority individuals within the project area.

### **1.3.4 Indian Sacred Sites**

Sacred sites are defined in Executive Order 13007 (May 24, 1996) as "any specific, discrete, narrowly delineated location on Federal land that is identified by an Indian tribe, or Indian individual determined to be an appropriately authoritative representative of an Indian religion, as sacred by virtue of its established religious significance to, or ceremonial use by, an Indian religion; provided that the tribe or appropriately authoritative representative of an Indian religion has informed the agency of the existence of such a site." The proposed Project is not on federal lands, and will not affect or prohibit access to and ceremonial use of Indian sacred sites.

## **Section 2 Alternatives Including Proposed Action**

### **2.1 No Action Alternative**

The No Action Alternative would consist of Reclamation not providing grant funding to facilitate development of a Drought Protection Water Management Model. Without grant funding from Reclamation, MID would not be able to install weather and flow-stage stations, and would not be able to develop a real-time Drought Protection Water Management Model. Under the No Action Alternative MID would continue to manage water resources based on data that reflects a combination of past conditions and projected forecasts. Beyond the surface water of the Merced River basin, groundwater supplies would continue to be used as necessary to meet demand.

## 2.2 Proposed Action Alternative

The Proposed Action Alternative consists of providing grant funds to support the development and implementation of a Drought Protection Water Management Model. The model would be based on computer software developed at the U.S. Army Corps of Engineers Hydrologic Engineering Center. Data from the California Department of Water Resources, the National Weather Service California Nevada River Forecast Center, and real time data would be used to inform an online decision support tool. LiDAR data would also be used to create accurate topography and capacity curves to better manage water supplies and routing along the Merced River. On-ground activities include the installation of the two weather and flow-stage stations along the Merced River to add real-time data related to river conditions. Model results will be published online at the California Data Exchange Center to allow coordinated, real-time management of all MID facilities.

The Proposed Action includes the installation of two flow stage measurement and weather stations, concrete bases, conduit for instrumentation wires, flow gauges, and vertical staffs below the Crocker-Huffman Dam. Weather stations include data collection devices, data loggers, and data transmitters. Data would be transmitted through the Geostationary Operational Environmental Satellite operated by the National Oceanic and Atmospheric Administration, National Environmental Satellite, Data, and Information Service.

### 2.2.1 Flow Stage and Weather Station Installation

Stations will be constructed on concrete 5x5 foot concrete pads within 20 feet of the bridge footings, above the ordinary high water mark. In both cases, the existing ground contains only herbaceous vegetation (i.e., no woody vegetation), and will be prepared using a skid steer track loader. The concrete footings will be precast offsite. Apart from flow gauge collection devices, conduits to them, and staff gauges, all station equipment will be contained in a walk-in structure and fenced on the concrete pad to prevent vandalism.

Weather information at each station will be tied to river flow measurements at each station. Two-inch diameter conduit will house the connections to bubbler gauges that will be placed instream to measure river flows. The conduit will be buried about 8 to 10 inches from the point it leaves the concrete base until it reaches the base of each bridge.

At the Gallo Bridge, conduit will run along the left upstream edge of the bridge deck bracing to the first pylon, and will then angle down the pylon to the instrumentation in the water. The conduit will be anchored to the base of the bridge and the first pylon. In addition, a staff gauge will be attached to the first pylon to provide stream flow data. The streambed will not be disturbed.

Similar to the Gallo Bridge site, the conduit will angle downward into the ground from the weather station to a junction box on the first left upstream pylon. Because the first pylon at the Highway 59 Bridge is above the low water mark, the conduit will then run for about 12 feet until it emerges at a point that is instream during low flows. A staff gauge will be bolted to an anchor instream and a bubbler flow gauge will be attached to it. Additionally, a one-inch conduit will run parallel to the two-inch conduit from the junction box to an instream staff gauge anchor plate for a temperature sensor. A second staff for higher flows

will be anchored directly to the pylon.

### **2.2.2 Work Scheduling**

The Proposed Action is anticipated to take a crew of 2-3 people a total of five 10-hour workdays to complete. Work will only occur in periods of no rain following dry periods of at least 24 hours. Work below the high water mark will be completed between June 1 and September 30; open trenches will be backfilled immediately after conduit has been placed.

### **2.2.3 Conservation Measures**

As part of the Proposed Project, Reclamation includes the following conservation measures to avoid and minimize project effects to the steelhead and steelhead critical habitat:

1. Staging and storage areas will be located at least 500 feet from the ordinary high water mark of the river, and will be limited to existing roads and disturbed areas. Containments will be installed at the staging area for fueling and maintenance of stationary equipment to ensure any spill will not enter the water, contaminate sediments that may come in contact with the water, or damage wetland or riparian vegetation.
2. Except for the bucket of the mini-excavator under the Highway 59 Bridge, heavy machinery or construction equipment will not enter the waterway. All excavation work will be done from dry land.
3. A turbidity curtain will be installed in the in-channel work area to isolate turbidity from moving across or downstream of the action area.
4. Best management practices (BMPs) will be implemented (such as fiber rolls and silt fence) to minimize sediment and erosion as a result of the construction activities from entering the water ways.
5. Construction will follow typical spill prevention and control plan measures implemented to minimize effects from spills of hazardous, toxic, or petroleum substances used in project related construction activities.
6. No standing woody vegetation will be trimmed or removed during Proposed Project actions.
7. Upon completion of project activities, all construction debris will be removed and trenches will be backfilled and levelled with the spoils that were removed. All disturbed areas above the ordinary high water mark will be reseeded with a native seed mix.

## **Section 3      Affected Environment and Environmental Consequences**

This section analyzes potentially affected environmental resources and the environmental

consequences that could result from the Proposed Action and the No Action Alternative.

### 3.1 Air Quality

Section 176 (c) of the Clean Air Act (CAA) (42 U.S.C. 7506 (c)) requires that any entity of the federal government that engages in, supports, or in any way provided financial support for, licenses or permits, or approves any activity to demonstrate that the action conforms to the applicable State Implementation Plan (SIP) required under Section 110 (a) of the CAA (42 U.S.C. 7401 (a)) before the action is otherwise approved. In this context, conformity means that such federal actions must be consistent with a SIP's purpose of eliminating or reducing the severity and number of violations of the National Ambient Air Quality Standards (NAAQS) and achieving expeditious attainment of those standards. Each federal agency must determine that any action that is proposed by the agency and that is subject to the regulations implementing the conformity requirements will, in fact conform to the applicable SIP before the action is taken.

On November 30, 1993, the U.S. Environmental Protection Agency (EPA) promulgated final general conformity regulations at 40 CFR 93 Subpart B for all federal activities except those covered under transportation conformity. The general conformity regulations apply to a proposed federal action in a non-attainment or maintenance area if the total direct and indirect emissions of the relevant criteria pollutant(s) and precursor pollutant(s) caused by the Proposed Action equal or exceed certain threshold amounts, thus requiring the federal agency to make a determination of general conformity.

#### 3.1.1 Affected Environment

The San Joaquin Valley Air Basin (SJVAB) is within the management area of the San Joaquin Valley Air Pollution Control District (SJVAPCD). The SJVAB experiences episodes of poor atmospheric mixing caused by inversion layers formed when temperature increases with elevation above ground, or when a mass of warm, dry air settles over a mass of cooler air near the ground. NAAQS and California Ambient Air Quality Standards (CAAQS) have been established for the following criteria pollutants: carbon monoxide (CO), ozone (O<sub>3</sub>), sulfur dioxide (SO<sub>2</sub>), nitrogen dioxide (NO<sub>2</sub>), inhalable particulate matter between 2.5 and 10 microns in diameter (PM<sub>10</sub>), particulate matter less than 2.5 microns in diameter (PM<sub>2.5</sub>), and lead. The CAAQS also set standards for sulfates, hydrogen sulfide, and visibility.

The SJVAB has reached NAAQS and CAAQS attainment status for all criteria pollutants except for O<sub>3</sub>, PM<sub>10</sub> (CAAQS only), and PM<sub>2.5</sub>. As a result, the emissions of most concern are O<sub>3</sub> (which includes precursors such as volatile organic compounds [VOC] and nitrogen oxides [NO<sub>x</sub>]), PM<sub>10</sub>, and PM<sub>2.5</sub>. Table 1 shows the attainment status and *de minimis* threshold for general conformity for the criteria pollutants of most concern.

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<sup>1</sup> The term "volatile organic compounds" are synonymous with "reactive organic gases" for the purposes of this document since both terms refer to hydrocarbon compounds that contribute to ozone formation.

### 3.1.2 Environmental Consequences

#### No Action

There would be no change in air quality within the SJVAB.

**Table 1. SJVAB attainment status and *de minimus* thresholds for federal conformity determinations.**

Pollutant	Attainment Status <sup>a</sup>	(tons/year)
VOC (as ozone precursor)	Nonattainment <sup>d</sup>	10 <sup>b</sup>
NO <sub>x</sub> (as an ozone precursor)	Nonattainment <sup>d</sup>	10 <sup>b</sup>
PM <sub>10</sub>	Nonattainment (CAAQS) Attainment (NAAQS)	15 <sup>c</sup> 100
PM <sub>2.5</sub>	Nonattainment	15 <sup>c</sup>

<sup>a</sup> Source: <http://www.arb.ca.gov/desig/adm/adm.htm>

<sup>b</sup> 40 CFR 93.153

<sup>c</sup> SJVAPCD Threshold

<sup>d</sup> The SJVAB is designated as Extreme for O<sub>3</sub> NAAQS

#### Proposed Action

Construction emissions would vary from day to day and by activity, depending on the timing and intensity of construction, and wind speed and direction. Generally, air quality impacts from the Proposed Action would be localized in nature and decrease with distance. Ground disturbing activities would result in the temporary emissions of fugitive dust and vehicle combustion pollutants during the following activities:

- earthwork (site preparation, concrete placement, trenching for conduit placement)
- construction equipment and haul truck engine emissions

In 2012, Reclamation published a Finding of No Significant Impact for the Merced Irrigation District Arena Canal and Howard Lateral Conservation Project (2012 Project; Reclamation 2012). Calculated emissions from the 2012 Project were estimated using the 2007 URBEMIS software (version 9.2.4), which incorporates emission factors from both the EMFAC2007 and OFFROAD2007 models for reactive organic gases (ROG)<sup>1</sup>, NO<sub>x</sub>, PM<sub>10</sub>, and PM<sub>2.5</sub>. As shown in Table 2, the 2012 Project action was estimated to emit less than the *de minimis* threshold for NO<sub>x</sub> and ROG/VOC as O<sub>3</sub> precursors and PM<sub>2.5</sub>; therefore, a federal general conformity analysis report was not required. In addition, PM<sub>10</sub>

**Table 2. Estimated Project Emissions, Merced Irrigation District Arena Canal and Howard Lateral Conservation Project (2012 Project) <sup>a</sup>**

Pollutant	Construction
ROG/VOC	1.58
NO <sub>x</sub>	5.87
PM <sub>10</sub>	1.18
PM <sub>2.5</sub>	0.7

<sup>a</sup> Source: URBEMIS version 9.2.4

emissions from the 2012 Project action were estimated to be well below the SJVAPCD threshold of 15 tons/year.

Because the 2012 Project action had much more extensive ground-disturbing activities, it can be deduced that the current Proposed Action is also below *de minimus* thresholds for the common pollutants listed, and a conformity analysis is not required.

## 3.2 Water Resources

### 3.2.1 Affected Environment

The MID chiefly relies upon Lake McClure above New Exchequer Dam for water supply in the Merced River Basin. Generally, the management objective is to maximize surface water in Lake McClure to preserve groundwater resources in the region. However, MID manages Lake McClure levels in compliance with year-round maximum limits established by the U.S. Army Corps of Engineers for rain and snowmelt (Corps 1981). In contrast, FERC licensing requires Lake McClure to be maintained as high as possible, with a minimum pool of not less than 111,500 acre-feet. Lake McClure capacity is 1,024,600 acre-feet. In all, MID manages Lake McClure to remain compliant with flood control, recreation, power supply, water supply, and environmental purposes.

MID releases water through New Exchequer Dam downstream to Lake McSwain above the McSwain Dam. Lake McSwain provides further recreational opportunities, while the McSwain Dam, along with the New Exchequer Dam, generates 103.5 megawatts combined annually. Water released from the McSwain Dam flows directly into Merced Falls Reservoir, behind the Merced Falls Dam. The Merced Falls Dam is owned and operated by Pacific Gas and Electric Company for hydroelectric purposes.

The Northside Canal diverts water at the Merced Falls Dam to about 10,000 acres of agricultural lands north of the Merced River. The Merced River flows below Merced Falls at RM 55 to the Crocker-Huffman Diversion Dam at RM 52.0, where the Main Canal diverts water to the south. In all, total irrigable lands in the MID are about 138,000 acres. Water is also diverted from above the Crocker-Huffman Diversion Dam to the Chinook salmon hatchery on the Merced River.

The Proposed Action area is along the Merced River at two bridges, about RM 42.1 and RM

39.4 downstream of the Crocker-Huffman Diversion Dam. Further downstream at about RM 35.0, North Side Canal water is returned to the Merced River. Also, pursuant to the Cowell Agreement, other users throughout the lower Merced River exercise riparian rights to the river water. Water flow is measured at the Crocker-Huffman Dam to ensure that flows are compliant with mandated responsibilities. At about RM 32.1, the Shaffer Bridge is used as a site to verify lower Merced River Flows.

In addition to providing water, MID also uses its existing water distribution system for local flood control. Generally, water is routed away from residential, commercial, and industrial areas as foothill runoff begins to fill floodplain areas.

### **3.2.2 Environmental Consequences**

#### No Action

Under the No Action Alternative, no changes would occur to the existing operations or the MID's water resources.

#### Proposed Action

The Proposed Action would not alter the current hydroelectric power production operations at the New Exchequer and McSwain Dam facilities. Also, it would not alter the amount of water provided along the North Side and Main Canals to meet water use demands. Furthermore, MID will continue to ensure that water flows in the Lower Merced River below the Crocker-Huffman Dam are adequate to remain compliant with Cowell Agreement and FERC license responsibilities.

The Proposed Action would allow MID to regulate Lower Merced River flows in real time. Because real-time data would be used to guide management and operations of MID facilities, less water would be directed downstream from Lake McClure and Lake McSwain. MID would continue to meet mandated regulations; with the Proposed Action actual water flows would align more accurately and precisely with required conditions in the Lower Merced River. MID anticipates that surplus flows due to river releases could be reduced by over 25 TAF per year (MID 2015). In addition, the reduction in surplus flows would result in about 40 TAF of additional stored water prior to the irrigation season annually (MID 2015).

## **3.3 Groundwater Resources**

### **3.3.1 Affected Environment**

Most of the MID overlies the Merced Sub-basin of the San Joaquin Groundwater Basin. Generally, the Merced sub-basin is bounded by the Chowchilla River to the south, the San Joaquin River to the west, the Merced River to the north, and the crystalline basement rock of the Sierra Nevada foothills that runs along the Mariposa County line to the east. The total storage capacity of the Merced sub-basin is estimated to be 21.1 million AF to a depth of 300 feet, and 47.6 million AF to the base of fresh groundwater (CDWR 2003). On average, the Merced sub-basin water level declined nearly 30 feet from 1970 through 2000 (CDWR 2003). From 2000 to 2014, the groundwater level has decreased about another 30

feet (MAGPI 2016). Within the past year CDWR has classified the Merced sub-basin as critically overdrawn (CDWR 2016).

The trend of decreasing groundwater resources has been a concern in the MID for many years. The City of Merced and MID, along with several other water agencies, formed in 1997 the Merced Area Groundwater Pool Interests to promote conjunctive groundwater management throughout the Merced sub-basin (MAGPI 2016). In 2013 an integrated water resources management plan was developed and adopted by MID, the City of Merced, and Merced County (MIWRMP 2016).

To meet conjunctive-use goals MID completed the construction of the Cressey Recharge Basin near Winton, in 2011 (MAGPI 2016). The Cressey Recharge Basin is designed to return water from Lake McClure to the groundwater supply in an area of MID with groundwater at depths more than 100 feet from ground surface (MAGPI 2016). In winter months of 2011, about 1,300 AF were replenished through the Cressey Recharge Basin, yet due to drought no water was available for recharge in 2012 (Sweigard 2013). Lake McClure reached its lowest level on record in February 2015, and MID subsequently relied upon groundwater resources to provide minimal irrigation water. Groundwater recharge and use continues to be dependent on available surface water resources.

### **3.3.2 Environmental Consequences**

#### No Action

The current condition of the groundwater resources within the MID would continue under the No Action Alternative.

#### Proposed Action

The Proposed Action would employ the use of a comprehensive Drought Protection Water Management Model. Using weather and stage data from the stations to be installed under the Proposed Action, MID would be able to minimize the release of lower Merced River flows below the Crocker-Huffman Dam in excess of that required by FERC licensing and Cowell Agreement regulations, allowing more water to remain in storage facilities upstream. The increases in water held in Lake McClure and Lake McSwain from reduced releases could make more water available for users during times of below average precipitation. Furthermore, because less water would be released from storage facilities during the fall months, the potential to reach maximum allowable pool levels during winter months would increase. Thus, more water may be available for groundwater recharge purposes during winter months.

## **3.4 Biological Resources**

### **3.4.1 Affected Environment**

For the purpose of this EA, biological resources include vegetation, wildlife, and waters of the United States. The MID comprises about 164,000 acres with about 138,000 acres of irrigable land on the Central Valley floor. Primary crops include alfalfa, almonds, corn, cotton, sweet potatoes, and tomatoes. Water is also provided to livestock. About 75% of MID lands are used for agricultural and livestock purposes (Homer et al. 2015). It is estimated that another 17% of the MID land cover exists in a developed setting, primarily



around the areas of Merced and Atwater, and continuing along the State Highway 99 corridor in the west (Homer et al. 2015).

Historically, lands on the valley floor in the vicinity of the MID likely included annual grasslands and oak woodlands to the east. In the grasslands by the Sierra Nevada foothills, numerous vernal pools still exist. The Proposed Action area exists in a wooded riparian corridor along the south bank of the Merced River. However, the installation of weather stations will not entail the removal or trimming of any woody vegetation.

CDFW operates the Merced River Hatchery for fall-run Chinook salmon (*Oncorhynchus tshawytscha*) adjacent to the Crocker-Huffman Facility. The fall Chinook salmon program is considered experimental, juveniles are marked to test survival rates to adulthood at different release sites in the Merced River and San Joaquin Basin (HSRG 2012). Since the opening of the hatchery in 1970, numerous floodplain restoration and gravel enhancement projects have contributed to improving the habitat suitability of the lower Merced River for Chinook salmon and Central Valley steelhead (*O. mykiss*). The Merced River below the Crocker-Huffman Dam has historically served as a migration corridor and spawning ground for Chinook salmon and Central Valley steelhead. The lower Merced River has been designated as critical habitat for the steelhead.

#### Potential Federally Listed Species in the Proposed Action area

On February 11, 2016, a species list of federally listed, proposed and candidate species potentially occurring within the Proposed Action area and surrounding areas was obtained from the U.S. Fish and Wildlife's (Service) website. Table 3 includes federally listed species potentially affected by the Proposed Action, and a summary of the rationale supporting the determination.

### **3.4.2 Environmental Consequences**

#### No Action

Under the No Action Alternative, current biological resources conditions along the Merced River and in MID would continue. The MID management and operations of water resources in the Merced River watershed would not change.

#### Proposed Action

The installation of the weather stations under the Proposed Action would remove about 50 square feet of herbaceous vegetation within the riparian corridor. The proposed locations for the weather station are above the ordinary high water mark of the Merced River, and no woody vegetation will be trimmed or removed. Below the high water mark, temporary disturbance would be necessary to bury a conduit line and anchor a staff with a bubbler flow gauge under the Highway 59 Bridge. The flow gauges would remain permanent, as would the similar gauges attached to pilings at the Gallo Bridge.

The weather station and flow gauge data would be used to inform the Drought Protection Water Management Model. With the implementation of real-time data into a comprehensive water management scheme, water flows released into the lower Merced River would be more closely aligned with amounts required by the various regulations. It's likely that on an annual basis, water released into the lower Merced River would

decrease in volume.

### Central Valley Steelhead

On January 5, 2006, NMFS listed the Central Valley steelhead (*Oncorhynchus mykiss*) as a threatened species under the Endangered Species Act (NMFS 2006). Unlike conspecific rainbow trout that are not listed as threatened, the Central Valley steelhead represents an anadromous distinct population segment that migrates to the Pacific Ocean for several years before returning to rivers of the Central Valley to spawn. Although overlap occurs between the two forms of *O. mykiss* (Zimmerman *et al.* 2008), steelhead mainly remain separate from resident, non-anadromous rainbow trout of Central Valley rivers as a consequence of physical, ecological, and behavioral factors (NMFS 2014).

**Table 3. Federally endangered and threatened species with potential to occur within the vicinity of the Proposed Action (USFWS 2016).**

Scientific Name	Common Name	Federal Status	Effects	Potential habitat utilized by species in Proposed Action Area
<b>INVERTEBRATES</b>				
<i>Lepidurus packardii</i>	Vernal pool tadpool shrimp	E	NE	<b>Absent.</b> No vernal pool habitat in the Proposed Action area. No vernal pool habitat would be disturbed. Water quality of vernal pools would not be affected.
<i>Branchinecta lynchi</i>	Vernal pool fairy shrimp	T	NE	<b>Absent.</b> No vernal pool habitat in the Proposed Action area. No vernal pool habitat would be disturbed. Water quality of vernal pools would not be affected.
<i>Branchinecta conservation</i>	Conservancy fairy shrimp	T	NE	<b>Absent.</b> No vernal pool habitat in the Proposed Action area. No vernal pool habitat would be disturbed. Water quality of vernal pools would not be affected.
<i>Desmocerus californicus dimorphus</i>	Valley elderberry longhorn beetle	T	NE	<b>Absent.</b> No suitable habitat in the Proposed Action area. No elderberry shrubs would be disturbed.
<b>FISHES</b>				
<i>Hypomesus transpacificus</i>	Delta smelt	T	NE	<b>Absent.</b> Not present in the Merced River. Proposed Project actions are not expected to negatively affect the delta smelt or delta smelt critical habitat, which exists downstream.
<i>Oncorhynchus mykiss</i>	Central Valley steelhead	T	NLAA	<b>Potential.</b> Species is known to exist in the Merced River. Conspecific rainbow trout are released from hatcheries on the Merced River, and are indistinguishable from steelhead. The Proposed Action area is designated critical habitat.
<b>AMPHIBIANS</b>				

<i>Ambystoma californiense</i>	California tiger salamander, Central Valley population	T	NE	<b>Absent.</b> The closest occurrence is over 2.5 miles to the southeast of the Proposed Action area, and on the opposite side of the Main Canal (CNDDDB 2016). The Proposed Action area does not provide suitable breeding or migratory habitat.
<i>Rana draytonii</i>	California red-legged frog	T	NE	<b>Absent.</b> Species absent from San Joaquin Valley floor and from vicinity of the Proposed Action area. No suitable habitat in the Proposed Action area. No change to wetland or riparian habitat.
<b>REPTILES</b>				
<i>Gambelia sila</i>	Blunt-nosed leopard lizard	E	NE	<b>Absent.</b> No suitable habitat in the Proposed Action area. No suitable habitat would be disturbed.
<i>Thamnophis gigas</i>	Giant garter snake	T	NE	<b>Absent.</b> There are no records of giant garter snake within the Proposed Action area, and it is extremely unlikely that GGS would use the Merced River as a migratory corridor due to the lack of aquatic vegetation in the Proposed Action area. There is no suitable upland habitat for hibernation, and the action would occur during the inactive period for GGS.
<b>MAMMALS</b>				
<i>Vulpes macrotis mutica</i>	San Joaquin kit fox	E	NE	<b>Absent.</b> The closest occurrence record is about 9.5 miles from the Proposed Action area (CNDDDB 2016). The Proposed Action is not expected to affect movements of San Joaquin kit foxes.

Key:

(E) Endangered– Listed in the Federal Register as being in danger of extinction

(T) Threatened – Listed as likely to become endangered within the foreseeable future

Historically, the Merced River upstream of New Exchequer Dam contained a population of Central Valley steelhead, while the lower Merced River in the vicinity of the Proposed Action was used primarily as a migration corridor (NMFS 2014). Currently, the Merced River by the Proposed Action area may be used for spawning of migrating Central Valley steelhead and resident rainbow trout (NMFS 2014). In 2005, the lower Merced River below the Crocker Huffman Dam, including the Proposed Action area, was designated as critical habitat for the Central Valley steelhead under the Endangered Species Act (NMFS 2005).

In determining what areas constitute critical habitat, NMFS considers physical or biological features that are essential to the conservation of the species. These features are known as primary constituent elements. Table 4 lists the primary constituent elements of steelhead critical habitat. Of the 6 elements, 3 are concerned with the freshwater, riverine habitat. As part of the Proposed Action, the installation of staff and stage gauge equipment will not affect the ability of the lower Merced River to support spawning, incubation and larval development of Central Valley Steelhead. Also, the growth and development of juvenile Central Valley steelhead will not be affected by the Proposed Action. Furthermore, the Proposed Action will not affect the capability of the lower Merced River to act as a migration corridor with suitable instream cover for the Central

Valley steelhead.

The Proposed Action would provide better control of lower Merced River flows below the Crocker Huffman Dam. The Proposed Action would ensure that actual flows in the lower Merced River meet federal mandates designed to maintain suitable salmonid habitat. The Proposed Action would not result in a significant change in the riparian environment and would not affect the amount of shaded riverine habitat. The weather stations would be constructed adjacent to bridges in areas that do not contain any trees or shrubs.

**Table 4. Primary constituent elements of steelhead critical habitat (NMFS 2005).**

Primary Constituent Element
1. Freshwater spawning sites with water quantity and quality conditions and substrate supporting spawning, incubation and larval development. These features are essential to conservation because without them the species cannot successfully spawn and produce offspring.
2. Freshwater rearing sites with water quantity and floodplain connectivity to form and maintain physical habitat conditions and support juvenile growth and mobility; water quality and forage supporting juvenile development; and natural cover such as shade, submerged and overhanging large wood, log jams and beaver dams, aquatic vegetation, large rocks and boulders, side channels, and undercut banks. These features are essential to conservation because without them juveniles cannot access and use the areas needed to forage, grow, and develop behaviors (e.g., predator avoidance, competition) that help ensure their survival.
3. Freshwater migration corridors free of obstruction with water quantity and quality conditions and natural cover such as submerged and overhanging large wood, aquatic vegetation, large rocks and boulders, side channels, and undercut banks supporting juvenile and adult mobility and survival. These features are essential to conservation because without them juveniles cannot use the variety of habitats that allow them to avoid high flows, avoid predators, successfully compete, begin the behavioral and physiological changes needed for life in the ocean, and reach the ocean in a timely manner. Similarly, these features are essential for adults because they allow fish in a nonfeeding condition to successfully swim upstream, avoid predators, and reach spawning areas on limited energy stores.
4. Estuarine areas free of obstruction with water quality, water quantity, and salinity conditions supporting juvenile and adult physiological transitions between fresh- and saltwater; natural cover such as submerged and overhanging large wood, aquatic vegetation, large rocks and boulders, and side channels; and juvenile and adult forage, including aquatic invertebrates and fishes, supporting growth and maturation.
5. Nearshore marine areas free of obstruction with water quality and quantity conditions and forage, including aquatic invertebrates and fishes, supporting growth and maturation; and natural cover such as submerged and overhanging large wood, aquatic vegetation, large rocks and boulders, and side channels.
6. Offshore marine areas with water quality conditions and forage, including aquatic invertebrates and fishes, supporting growth and maturation. These features are essential for conservation because without them juveniles cannot forage and grow to adulthood.

### 3.5 Cumulative Effects

According to the CEQ regulations for implementing the procedural provisions of NEPA, a cumulative impact is defined as *the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (Federal or non-Federal) or person undertakes such other actions*. Cumulative effects can result from individually minor but collectively significant actions taking place over a period of time.

There are no adverse impacts associated with implementing the Proposed Action, and therefore there are no cumulative effects to consider.

## **Section 4      Consultation and Coordination**

### **4.1              Agencies and Persons Consulted**

Reclamation consulted and coordinated with the following agencies and groups in preparation of the EA:

- National Marine Fisheries Service, Central California Valley Office
- California Office of Historic Preservation
- Merced Irrigation District

### **4.2              Public Review Period**

Reclamation posted for public review and comment a draft of this EA, available from June 3 to July 5, 2016. No comments were received.

### **4.3              Endangered Species Act (16 USC § 1531 et seq.)**

Section 7 of the Endangered Species Act requires Federal agencies to ensure that discretionary federal actions do not jeopardize the continued existence of threatened or endangered species or result in the destruction or adverse modification of the critical habitat of these species. Reclamation has determined that proposed Project actions may affect, but is not likely to adversely affect Central Valley Steelhead, and may affect, but is not likely to destroy or adversely modify designated steelhead critical habitat. Reclamation has completed a section 7 consultation and in a letter dated July 7, 2016, NMFS has concurred with these determinations (NMFS # WCR-2016-5156).

## Section 5      References

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