WATER & POWER

# Local Hazard Mitigation Plan

2020

*Revised June 2022*

# The Turlock Irrigation District Local Hazard Mitigation Plan

# 2021

Revised June 2022

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Local Hazard Mitigation Plan 2021


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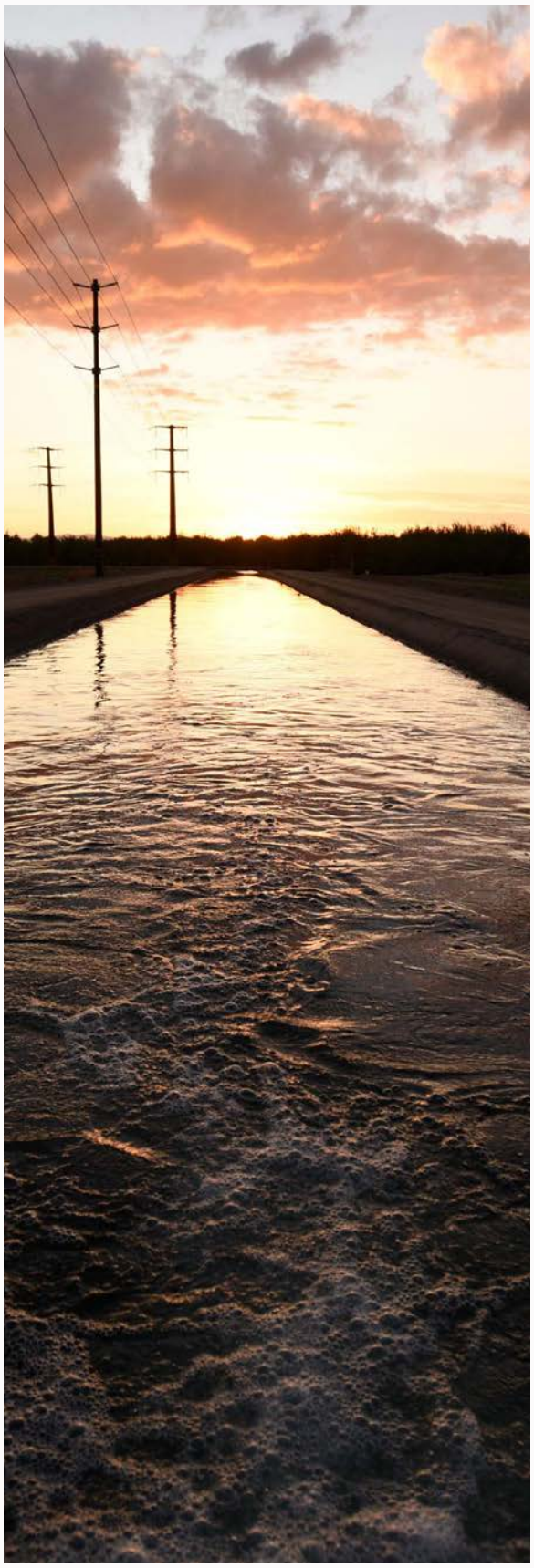


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Section

# 1

# Introduction

WATER & POWER

## Purpose

In the State of California and around the world, natural disasters occur frequently. The time and money needed to recover from these events can strain or deplete local resources. The purpose of hazard mitigation planning is to identify policies, actions, and strategies that will help to reduce risk and prevent future losses. Hazard mitigation is best realized when community leaders, businesses, citizens, and other stakeholders join together to undertake a process of learning about hazards that can affect their area and use this knowledge to prioritize needs and develop a strategy for reducing damage. Hazard mitigation is most effective when it is based on a comprehensive long-term plan that is developed prior to a disaster occurring.

In the course of developing this plan, seven naturally occurring hazards were identified by the Planning Team as being risks to TID: dam failure, earthquake, extreme weather, flooding, landslide, public health emergency and wildland fire. Each of these risks and their mitigation strategies are profiled in this plan.

## Hazard Mitigation Planning

The Federal Emergency Management Agency (FEMA) has determined that there is a critical link between Hazard Mitigation Planning and sustainability. This means if Turlock Irrigation District (TID) has the foresight to plan ahead to reduce the impacts of hazards, we will be better able to prevent injury, loss of life and damage to homes, businesses, and neighborhoods. Turlock Irrigation District can use the threat of disaster as a catalyst to act and develop a plan so we can recover more quickly following a disaster.

TID has committed itself to reducing long-term risk to our citizens and damage to property from the effects of natural hazards. By planning, preparing, and adopting a Hazard Mitigation Plan, TID is taking a proactive approach to reduce or eliminate the impacts of hazards before they occur.

FEMA defines Hazard Mitigation as any sustained action taken to reduce or eliminate the long-term risk to human life and property from hazards. TID's plan will serve as a tool for learning from disasters that have already occurred, so we can deal with them more effectively and efficiently with less expenditure than in the past.

### Direct benefits include:

- Reduced loss of life
- Reduced loss of property and essential services
- Reduced economic hardship
- Reduced reconstruction costs
- Increased cooperation and communication within the community through the planning process
- Expedited post-disaster funding

### Indirect benefits include:

- Disaster resilience
- Environmental quality
- Economic vitality
- Improved quality of life

## Planning Requirements

Section 322, Mitigation Planning, of the Robert T. Stafford Disaster Relief and Emergency Assistance Act ("the Stafford Act"), enacted by Section 104 of the Disaster Mitigation Act of 2000 ("DMA 2000"), provides revitalized approaches to mitigation planning. Section 322 continues the requirement for a State mitigation plan as a condition of disaster assistance, and establishes a new requirement for local mitigation plans.

As a Special District in the State of California, and to comply with DMA 2000 and its implementing regulations (44 CFR Part 201.6), TID is required to have an LHMP on file with the State of California and FEMA in order to apply for Federal aid for technical assistance and post-disaster funding.

Under the 2008 44 CFR update, requirements have changed governing mitigation planning provisions for local mitigation plans published under 44 CFR §201.6. Local mitigation plans now qualify local jurisdictions for the Federal mitigation grant programs including:

- Hazard Mitigation Grant Program (HMGP)
- Hazard Mitigation Assistance Grants (HMAG)
- Pre-Disaster Mitigation (PDM)
- Flood Mitigation Assistance (FMA)
- Severe Repetitive Loss (SRL)
- Repetitive Flood Claim (RFC)

## Local Hazard Mitigation Plan Creation

The TID Local Hazard Mitigation Plan (LHMP) identifies the risks posed by disasters, and ways to potentially minimize their damage. The plan is a comprehensive resource document that serves many purposes, including: enhancing public awareness and understanding, creating a decision tool for management, promoting compliance with State and Federal program requirements, enhancing local policies for hazard mitigation capability, and providing inter-jurisdictional coordination.

This is TID's first independent, stand-alone LHMP. Previously, the District provided information including damage estimates and impacts to District property to Stanislaus County as part of their county-wide LHMP, in 2005 and again in 2010. Each section this LHMP was reviewed and revised as appropriate to reflect TID's priorities, some of which are different from Stanislaus County's These revisions also reflect changes in development, updated property values, and progress in local mitigation efforts.

This Plan demonstrates TID's commitment to reducing risk and serves as a guide for decision makers as they commit resources to minimize the effects of natural hazards. By proactively mitigating the possible effects of a disaster or emergency, TID continues to work toward the goal of reducing risk to human life and property, and ensuring the priorities of providing safe and reliable water and power to its customers.

The Federal Emergency Management Agency (FEMA) provides disaster relief funds to local governments that have shown positive steps to prevent loss and damage from disasters by adopting a Hazard Mitigation Plan. By drafting this LHMP and implementing the mitigation measures included in it, increases the likelihood that TID will be covered later, in the event disaster strikes.

This plan will be resubmitted for approval to the California Governor's Office of Emergency Services (Cal OES) and FEMA for review. Once FEMA determines the plan is "approvable pending adoption," TID will then present it to its Board of Directors for their adoption, Adoption legitimizes the plan and authorizes administrations and departments to execute their responsibilities. The plan, upon adoption, shall include documentation in the form of a Board Resolution, Board Agenda item and minutes.

## Plan Components

The basic elements involved in this LHMP include:

- **Prerequisite -** This section addresses the formal adoption of the plan by TID's Board of Directors to demonstrate the District's commitment to our goal of becoming disaster-resistant.
- **District Profile -** This section provides the history and background of the District including an overview of TID's operations including; historical results of operations and historical operating statistics as well as maps of both our irrigation and electric service territories.
- **Planning Process -** This section identifies the planning process, the Planning Team members, the meetings held as

part of the planning process, documents the outreach efforts, and the review and incorporation of existing plans, reports, and other appropriate information.

- **Risk Assessment -** This section describes the process through which the Planning Team and our local partners identified, screened, and selected the hazards to be profiled. The hazard analysis includes the description, location, extent, and probability of future events for each hazard.
- **Mitigation Plan/Strategy -** The mitigation strategy section provides a plan for reducing the potential losses identified in the vulnerability analysis. Mitigation goals and potential actions to minimize the risks and losses associated with each hazard will be described along with a strategy for implementation.
- **Plan Maintenance -** This section describes the method and schedule for monitoring, evaluating and updating the plan to ensure that the LHMP remains an active and applicable document.

## Summary

This plan is designed to identify specific actions to reduce loss of life and property from the following seven hazards: dam failure, earthquake, extreme weather, flooding, landslide, public health emergency and wildland fire. It is not the intention for this plan to establish procedures in response to disasters or replace an existing Emergency Operations Plan (EOP) or any Incident Action Plan (IAP). The goal of this hazard mitigation plan is to decrease the need for response as opposed to outlining a plan for responding to a disaster. Recognizing that natural disasters cannot be prevented from occurring, it is the intent of this LHMP to steadily lessen the impacts associated with future hazard events.

Section

# 2

# Prerequisites

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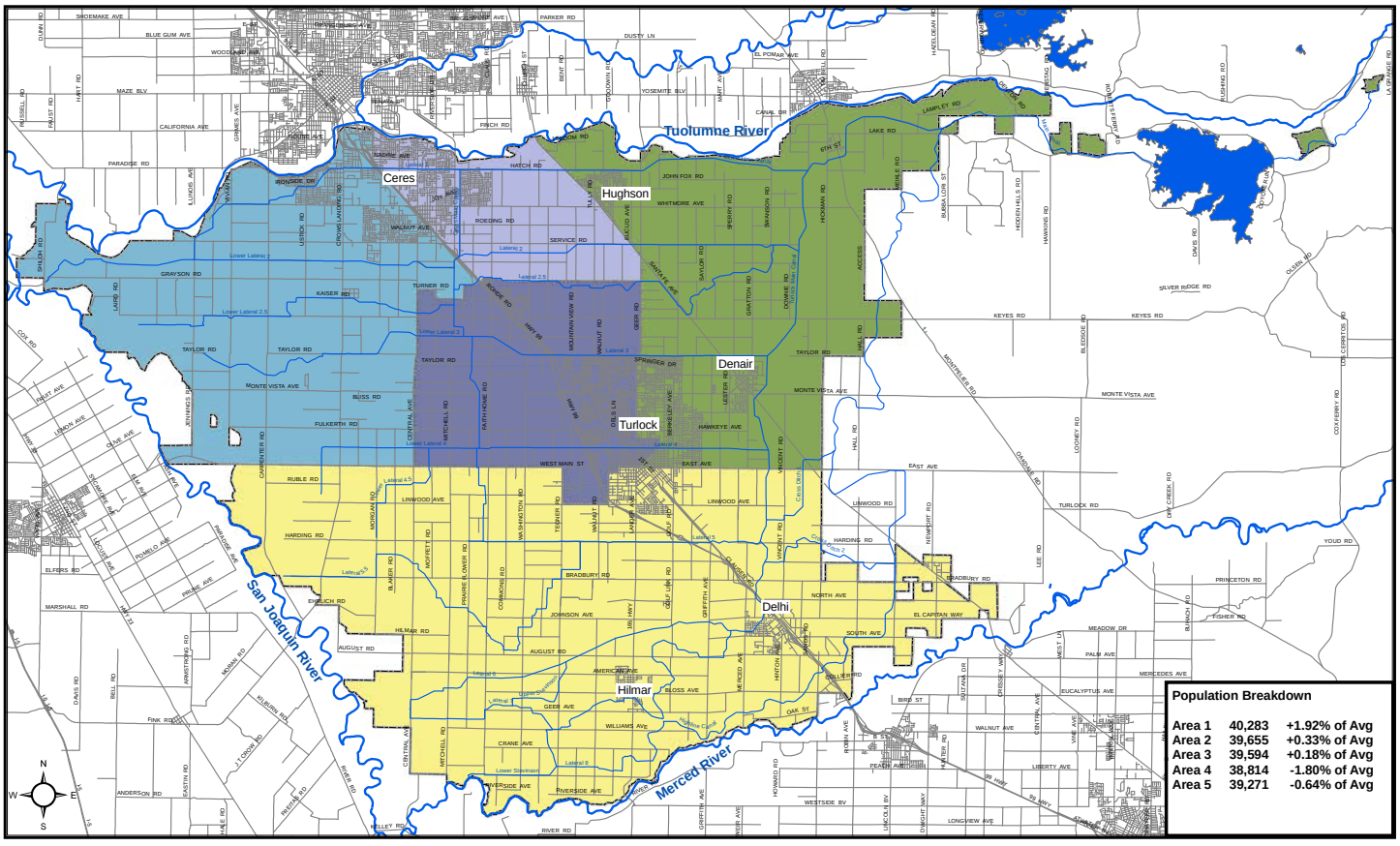
## Adoption by the TID Board of Directors

The Federal Emergency Management Agency's (FEMA) 44 Code of Regulations (CFR) Part 201.6(c) (5) requires that the Local Hazard Mitigation Plan is formally adopted by the governing body of the jurisdiction requesting approval of the plan. The Plan shall include documentation of plan adoption, usually in the form of a resolution.

"Approval Pending Adoption" is a recommended and potentially time-saving process by which TID submits the final draft of the LHMP to the California Governor's Office of Emergency Services (Cal OES), and the Federal Emergency Management Agency (FEMA) for a review prior to formal jurisdictional adoption. If the District's plan meets all the plan requirements, the plan will then be returned with an approvable pending adoption status. When the approval pending adoption plan is adopted by the jurisdiction, and FEMA has received the documentation of adoption, it will then be formally approved through a signed FEMA approval letter.

TID intends to follow this recommended process and, as such, will wait to receive an "Approval Pending Adoption" before taking the plan to the Board of Directors for adoption.

## TID Board of Directors Divisions




**Director Divisions - 2011**

If the plan is not adopted, TID is not eligible to apply for and/or receive project grants under the following hazard mitigation assistance programs:

- Hazard Mitigation Grant Program (HMGP)
- Hazard Mitigation Assistance Grants (HMAG)
- Pre-Disaster Mitigation (PDM)
- Flood Mitigation Assistance (FMA)
- Severe Repetitive Loss (SRL)
- Repetitive Flood Claim (RFC)

## Plan Update

TID is required to review and revise its plan, and resubmit it for approval within five (5) years from TID Board adoption in order to continue to be eligible for mitigation project grant funding. TID understands that a plan update is not an annex to the previously approved plan, but stands on its own as a complete and current plan, that has been reviewed and updated in all aspects.

## Plan Expiration Date Schedule

The plan will expire five years from the date of FEMA adoption of the plan.

## Plan Adoption

Once TID has received a Letter of Approval Pending Adoption from FEMA, TID's Board of Directors must pass a resolution adopting the LHMP and that resolution must be forwarded to FEMA in order to obtain final approval of the plan.

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Section

# 3

# District Profile

WATER & POWER

## General Information

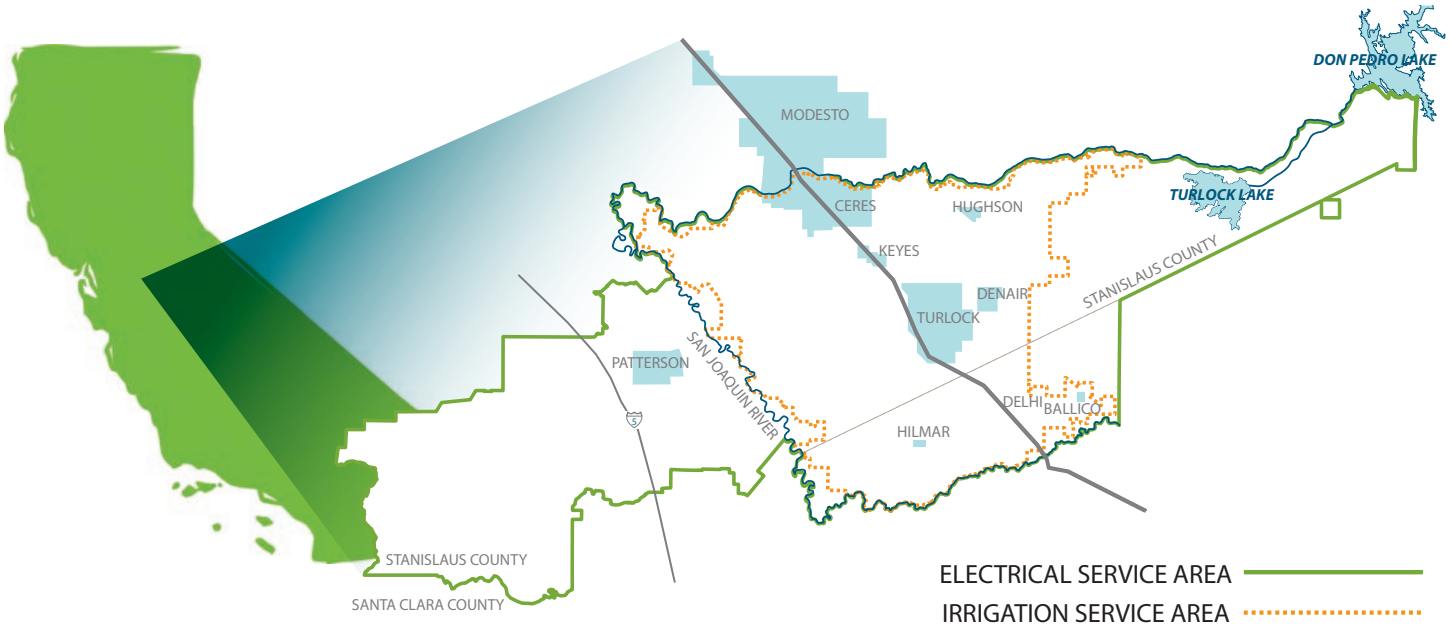
TID was formed on June 6, 1887, as the first irrigation district in the State of California. It is governed by a five-member Board of Directors elected from geographic divisions of the district on staggered four-year terms.

TID first began providing irrigation water from the Tuolumne River to farms in 1900 and eventually to 150,000 acres of some of the most productive agricultural land in the world. Crops grown in the District today include corn, grain, melons, peaches, apricots, tomatoes, vines, tree nuts, poultry, and dairy.

Since 1923, TID has provided electric service to a service territory stretching 425 square miles which include portions of Stanislaus, Merced and Tuolumne Counties. TID's service territory includes the cities of Turlock, Ceres, Hughson, parts of Modesto and the unincorporated communities of Ballico, Keyes, Denair, Hickman, Delhi, and Hilmar. TID supplies power to its customers in the same manner in which it provides irrigation water; on a not-for-profit basis.

Since 2003, TID has owned and operated the electric distribution facilities in a portion of the west side of Stanislaus County, including the City of Patterson, the community of Crows Landing and certain adjacent rural areas. This additional territory covers approximately 237 square miles.

Today, TID has approximately 102,000 electric customers and provides irrigation water to 5,800 parcels of land.




## Location

The Turlock Irrigation District operates mainly in Stanislaus County but, it does have irrigation and electric customers in a portion of Merced County. Additionally, Don Pedro Reservoir is located in Tuolumne County and a small portion of the District crosses into Mariposa County.

## Rivers

The TID irrigation service territory is bounded on three sides by the Tuolumne, Merced and San Joaquin rivers. The Tuolumne provides the source for TID's irrigation water supply and hydropower generation capabilities. TID has some of the most senior water rights on the Tuolumne, with some going back to the gold-rush era. As the operator of the Don Pedro Dam, TID bears the responsibility for maintaining appropriate environmental flows in the Tuolumne River for the benefit of fish and wildlife.

The Tuolumne on average, generates 1,850,000 acre-feet of runoff into Don Pedro Reservoir each year, mostly as a result of summer snowmelt. The river can produce extremely high flows and, floods can occur following heavy winter storms such as in 1997 and 2017.

## Reservoirs

### *Don Pedro Reservoir*

TID is the majority owner and operator of the Don Pedro Dam and Reservoir, located on the Tuolumne River about two miles upstream of the town of La Grange, CA. With a capacity of 2,030,000 acre-feet, Don Pedro is the sixth-largest reservoir in California and the dam, at 585 feet tall, is the tenth highest in the United States. It also provides flood control for residents and communities downstream.

Don Pedro Reservoir provides recreation opportunities for fishing, boating, house boating, water sports, camping, and other related outdoor recreation activities. Three areas of the reservoir have been developed with funds contributed by the State of California: Fleming Meadows, Blue Oaks, and Moccasin Point. Camping facilities, picnic areas, fish cleaning stations, boat ramps, a swimming lagoon, and marina are among some of the improvements offered at various sites.

### *Turlock Lake*

Turlock Lake, located between the towns of Hickman and La Grange, CA serves as a balancing reservoir storing water released from Don Pedro until it is released into the canal system to satisfy irrigation demand. Turlock Lake also gives the District the flexibility to operate the larger Don Pedro Dam independently from the irrigation system, maximizing the value of Don Pedro to the District's customers.

Open all year, the facility features camping, picnicking, fishing, swimming, boating, and water skiing. Recreation at Turlock Lake is managed by American Land and Leisure.

### *Lateral 8 Regulating Reservoir*

In 2016 TID completed the Lateral 8 Regulating Reservoir Project just outside the town of Hilmar by building an approximate 25-acre pond which enables the District to store 130-acre feet of irrigation water in order to improve efficiency and service to customers on the lower end of the system. The Project supports water conservation by stabilizing flow rates in the system downstream of the reservoir and capturing water that is normally spilled allowing that water to remain stored in upstream reservoirs for later use. The reservoir serves nearly 12,000 acres located downstream of the facility.

## Power Generation Facilities

### *Almond Power Plant*

Located in Turlock, Almond Power Plant is a natural gas-fired plant capable of generating 48 megawatts of electricity. This plant came on-line in 1995.

### *Almond 2 Power Plant (A2PP)*

The Almond 2 Power Plant is located between the cities of Ceres and Modesto, CA, and consists of three rapid start simple cycle gas turbine generators assisting us in meeting reliability obligations as a Balancing Authority and improving the economy, efficiency, and flexibility of the electrical system, including the integration of intermittent renewable resources.

### *Walnut Power Plant*
Walnut Power Plant, a gas-fired turbine is capable of producing 49.9 megawatts and came on-line in 1987. It's located in Turlock, CA.

### *Walnut Energy Center*
The Walnut Energy Center (WEC) is an efficient, environmentally responsible source of economical and reliable energy serving the growing energy demands within the TID electrical service area. Located in Turlock, the Walnut Energy Center uses recycled water from the City of Turlock for the project's generation-process water needs. Using natural gas for fuel, WEC is among the cleanest power generating facilities of comparable size in the nation. By utilizing the best available emissions control technology, its emissions are as much as 85 percent lower than those of older generating facilities currently operating in California.

### *Don Pedro Dam and Powerhouse*
At the base of Don Pedro Dam, Don Pedro's power plant occupies the entire width of the river channel at the toe of the dam. It's an outdoor structure, constructed of reinforced concrete and originally contained three 45,500 kilowatt generating units driven by three 70,000 horsepower turbines. In 1989 a fourth unit was added and today; the plant operates three 55,000 kW and one 38,000 kW generators each 85,000 horsepower bringing the total capacity of the plant to 203 megawatts with 139 MW going to TID and 64 MW to Modesto Irrigation District.

### *Small Scale Hydroelectric Facilities*
TID generates electricity on its irrigation canal system as well as surrounding irrigation district's canals through several small hydroelectric plants. Each of these renewable energy plants utilizes the power of irrigation water flowing through the gravity-fed system to create electricity.

### *The Tuolumne Wind Project*
The Tuolumne Wind Project began commercial operation on May 28, 2009. Located in Klickitat County, Washington and consisting of 62 turbines, the Tuolumne Wind Project has the total generating capacity of 136.6 megawatts. That is enough energy to supply approximately 44,000 households each year.

### *Rosamond Solar Facility*
In November 2015, TID entered into a 20-year agreement to purchase 54 megawatts of clean, renewable solar power from SunPower's newly constructed Rosamond Solar site located near Edwards Air Force Base in Kern County, CA. TID expects the plant to generate an equivalent amount of energy to power approximately 20,000 homes.

### *TID Parking Structure*
The District installed a 70.7-kilowatt array of photovoltaic panels atop the parking structure at its offices on Canal Drive in Turlock. The array generates up to 132,460 kilowatt-hours a year.

### *Biomass*
Currently, TID has a contract with ARP-Loyalton Cogen LLC to purchase biomass as mandated by Senate Bill 859, approved by the legislature and signed into law by Governor Brown on September 14, 2016.

### *Geothermal*
In 1984, TID acquired an interest in a geothermal power plant in the Geyers Steam Field, the world's largest geothermal field, located in California's Lake County approximately 70 miles north of San Francisco. The project has a capacity of generating 6.8 megawatts.

## 2018 TID Power Content Label

The Energy Commission's Power Source Disclosure program provides consumers a detailed view into the sources of energy purchased by their retail suppliers to power their homes and businesses. The result of this reporting is the Power Content Label, which resembles a nutrition label, with a breakdown of TID's energy sources. For comparison, the label includes a summary of California's energy mix, which is called total system power.

*Version: July 2019*

| **2018 POWER CONTENT LABEL** | | | |
|---|---|---|---|
| Turlock Irrigation District | | | |
| https://www.tid.org/power/power-content-label/ | | | |
| **ENERGY RESOURCES** | Retail Power Supply | BGreen | 2018 CA Power Mix** |
| **Eligible Renewable** | **32%** | **32%** | **31%** |
| Biomass & Biowaste | 0% | 0% | 2% |
| Geothermal | 2% | 2% | 5% |
| Eligible Hydroelectric | 3% | 3% | 2% |
| Solar | 8% | 8% | 11% |
| Wind | 19% | 19% | 11% |
| **Coal** | **5%** | **5%** | **3%** |
| **Large Hydroelectric** | **11%** | **11%** | **11%** |
| **Natural Gas** | **33%** | **33%** | **35%** |
| **Nuclear** | **0%** | **0%** | **9%** |
| **Other** | **0%** | **0%** | **<1%** |
| **Unspecified sources of power*** | **19%** | **19%** | **11%** |
| **TOTAL** | **100%** | **100%** | **100%** |
| * "Unspecified sources of power" means electricity from transactions that are not traceable to specific generation sources. | | | |
| ** Percentages are estimated annually by the California Energy Commission based on the electricity generated in California and net imports as reported to the Quarterly Fuel and Energy Report database and the Power Source Disclosure program. | | | |
| For specific information about this electricity product, contact: | **Turlock Irrigation District** | | |
| | **209-883-8362** | | |
| For general information about the Power Content Label, please visit: | http://www.energy.ca.gov/pcl/ | | |
| For additional questions, please contact the California Energy Commission at: | Toll-free in California: 844-454-2906<br>Outside California: 916-653-0237 | | |

## Climate

The climate in the TID service territory is typically described as "Mediterranean," with long, hot summers and mild winters. This climate makes the region one of the best agricultural areas in the world and positions it as a global center for agribusiness. The area averages approximately twelve inches of rain per year and experiences four distinct seasons. Temperatures range from an average low of 38° in the winter to an average high of 94° in July and August.

## Population

Demographic information is shown below for Stanislaus and Merced counties as those counties are where the vast majority of TID's operations exist. Information is not listed for Tuolumne County as TID has so few electric customers there that the information would not be relevant. No information is listed for Mariposa County because although TID's service territory crosses into Mariposa County, it has no retail electric or water customers located there.

### Stanislaus County Population Summary*

| Population Estimates | |
|---|---|
| Population (as of July 1, 2018) | 549,815 |
| Population change since 2010 census | +6.9% |
| Persons under 18 years | 27.1% |
| Persons 65 years or over | 13.2% |
| Foreign-born persons | 20.7% |
| **Race** | |
| White alone | 83.5% |
| White alone(not Hispanic or Latino) | 41% |
| Hispanic or Latino (b) | 47% |
| Black or African American alone (a) | 3.5% |
| American Indian or Alaska Native alone (a) | 2% |
| Asian alone (a) | 6.1% |
| Native Hawaiian and Other Pacific Islander alone (a) | 0.9% |
| Two or more races | 4.1% |
| **Housing** | |
| Housing units (as of July 1, 2018) | 182,290 |
| Owner-occupied housing rate, 2013-2017 | 57.1% |
| Median value of owner-occupied housing units, 2013-2017 | $ 244,100 |
| Median monthly owner costs - with a mortgage | $ 1,570 |
| Median monthly owner costs - without a mortgage | $ 464 |
| Median gross rent, 2013-2017 | $1 ,049 |
| Building permits ,2018 | 759 |
| **Education** | |
| High school graduate or higher, % of those 25+, 2013-2017 | 77.8% |
| Bachelors degree or higher, % of those 25+, 2013-2017 | 16.7% |
| **Income and Poverty** | |
| Median household income in 2017 dollars, 2013-2017 | $ 54,260 |
| Per capita income in the past 12 months in 2017 dollars, 2013-2017 | $ 24,007 |
| Persons in poverty, percent | 14% |
| **Employment* *** | |
| Unemployment Rate as of July 2019 - not seasonally adjusted | 6.60% |
| National Unemployment Rate as of July 2019 - non-farm related | 3.7% |

## Merced County Population Summary*

| Population Estimates | |
|---|---|
| Population (as of July 1, 2018) | 574,765 |
| Population change since 2010 census | +7.4% |
| Persons under 18 years | 29.3% |
| Persons 65 years or over | 11.2% |
| Foreign-born persons | 25.5% |
| **Race and Hispanic Origin** | |
| White alone | 82% |
| White alone(not Hispanic or Latino) | 27.1% |
| Hispanic or Latino (b) | 60.2% |
| Black or African American alone (a) | 4% |
| American Indian or Alaska Native alone (a) | 2.5% |
| Asian alone (a) | 7.9% |
| Native Hawaiian and Other Pacific Islander alone (a) | 0.4% |
| Two or more races | 3.2% |
| **Housing** | |
| Housing units (as of July 1, 2018) | 85,756 |
| Owner-occupied housing rate, 2013-2017 | 52% |
| Median value of owner-occupied housing units, 2013-2017 | $ 196,200 |
| Median monthly owner costs - with a mortgage | $ 1,385 |
| Median monthly owner costs - without a mortgage | $ 403 |
| Median gross rent, 2013-2017 | $ 934 |
| Building permits ,2018 | 630 |
| **Education** | |
| High school graduate or higher, % of those 25+, 2013-2017 | 68.9% |
| Bachelors degree or higher, % of those 25+, 2013-2017 | 13.8% |
| **Income and Poverty** | |
| Median household income in 2017 dollars, 2013-2017 | $ 46,338 |
| Per capita income in the past 12 months in 2017 dollars, 2013-2017 | $ 20,120 |
| Persons in poverty, percent | 23% |
| **Employment**** | |
| Unemployment Rate as of July 2019 - not seasonally adjusted | 8.40% |
| National Unemployment Rate as of July 2019 - nonfarm related | 3.7% |

**data are taken from U.S. Census Bureau, Quick Facts*
*(a)Includes persons reporting only one race*
*(b)Hispanics may be of any race, so also are included in applicable race categories*

*** data from the US Bureau of Labor Statistics*

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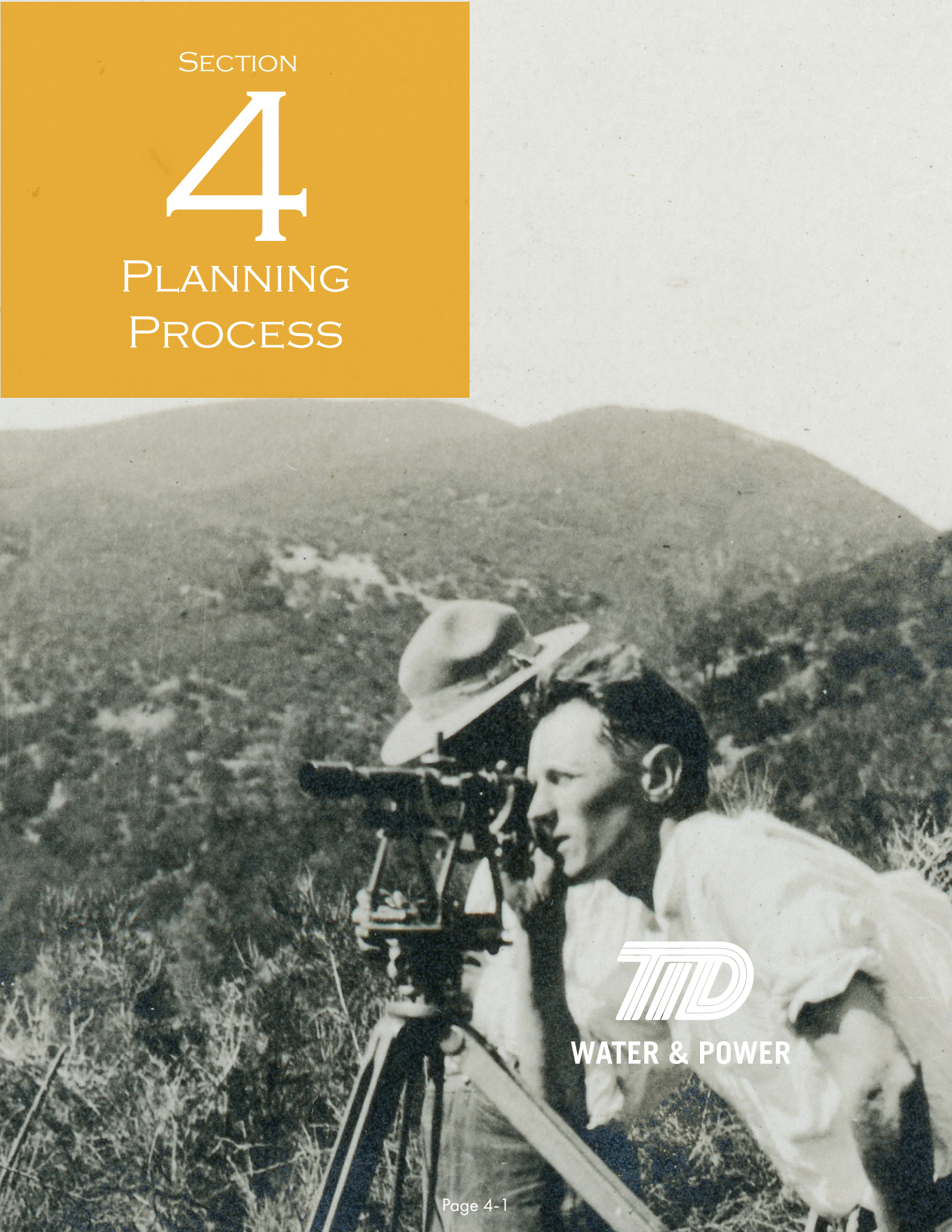
Section

# 4

# Planning Process



WATER & POWER

This section identifies the planning process, the Planning Team members, the meetings held as part of the creation of this plan as well as documents the meetings and public outreach efforts. Additionally, it captures the efforts to incorporate this plan into existing plans and other appropriate information.

A comprehensive description of the planning process in this document informs readers of the plan's development and serves as a record of the process for reaching the decisions included in the plan. A summary of the documentation used in building this plan is listed at the end of this section.

## Plan Kickoff Meeting

To begin the formal process of drafting this plan, a kickoff meeting was held in the Roy V. Meikle building at TID's Canal Campus on June 26, 2019. Attending this meeting were staff recognized as subject matter experts in the various departments that are directly involved in or responsible for the structures, facilities or job functions identified as exposed to risk in this plan. During this meeting, the initial risk assessment and hazard exposures were discussed and the various subject matter experts volunteered to serve on technical advisory committees to review each identified risk, propose mitigation strategies, and review and offer edits and feedback on the plan.

## Planning Team

The TID Emergency Management Planning Team (EMPT) is acting as the project lead for the creation of this Local Hazard Mitigation Plan.

The EMPT consists of:

- Jason Hicks - TID Manager of Security and Emergency Preparedness
- Calvin Curtin - TID Emergency Preparedness Coordinator
- Brannon Gomes - Don Pedro Recreation Agency, Recreation Division Manager
- Dave Funk - Emergency Management Consultant

The TID subject matter experts serving on the technical advisory committees are:

| Name | Job Title | Technical Advisory Committee(s) |
|---|---|---|
| Bill Baca | Trading and Scheduling Division Manager | • Extreme Weather |
| Bill Penney | Associate Civil Engineer | • Dam Failure<br>• Landslide |
| Bill Worsham | Information Technology Services Department Manager | • Earthquake |
| Carlos Agueda | Environmental Health and Safety Division Manager | • Earthquake<br>• Extreme Weather<br>• Public Health Emergency<br>• Wildland Fire |
| Chris Hardin | Construction and Maintenance Department Manager | • Dam Failure<br>• Earthquake<br>• Extreme Weather<br>• Flooding<br>• Landslide<br>• Wildland Fire |
| Chris Martin | Hydroelectric Department Manager | • Dam Failure<br>• Flooding<br>• Landslide |

| Name | Job Title | Technical Advisory Committee(s) |
|---|---|---|
| Constance Anderson | Communications Division Manager | • Dam Failure<br>• Earthquake<br>• Extreme Weather<br>• Flooding<br>• Landslide<br>• Public Health Emergency<br>• Wildland Fire |
| Dan Severson | Energy Markets Department Manager | • Earthquake<br>• Extreme Weather |
| Denver Hodges | Line Department Manager | • Dam Failure<br>• Extreme Weather<br>• Flooding<br>• Public Health Emergency<br>• Wildland Fire |
| Ed Jeffers | Electrical Engineering and Operations Department Manager | • Wildland Fire |
| James Ramos | Electrical Engineering and Operations Department Manager | • Dam Failure<br>• Extreme Weather<br>• Flooding<br>• Wildland Fire |
| Jason Carkeet | Utility Analyst II - Hydrology Department | • Dam Failure<br>• Extreme Weather<br>• Flooding |
| Jesse Kirschner | Finance Manager | • Dam Failure<br>• Wildland Fire |
| Jim McCoy | Interim Recreation Department Manager | • Dam Failure<br>• Flooding |
| Jorian Reed | Director of Human Resources | • Public Health Emergency |
| Lakmal Chandrasekara | Power Control Center Division Manager | • Extreme Weather |
| Manjot Gill | Assistant General Manager, Electrical Engineering and Operations | • Earthquake<br>• Flooding<br>• Landslide<br>• Wildland Fire |
| Mario Castrejon | Metering Division Manager | • Public Health Emergency |
| Matt Hazen | Associate Civil Engineer | • Landslide |
| Mike Kavarian | Water Distribution Department Manager | • Dam Failure<br>• Earthquake<br>• Flooding<br>• Landslide |
| Mike Tehada | Combustion Turbine Department Manager | • Earthquake<br>• Extreme Weather<br>• Flooding |
| Nancy Folly | Customer Service Department Manager | • Public Health Emergency |
| Pat Maloney | Aquatic Biologist II | • Extreme Weather |
| Phil Govea | Civil Engineering Department Manager | • Landslide |
| Tim Payne | Chief Dam Safety Engineer | • Dam Failure |

In addition to the Technical Advisory Committee members, the following TID employees have contributed their expertise to the plan:

- Michael Clipper - Risk and Investment Analyst
- Alex Buenrostro - Supervising Engineering Technician, Civil Engineering

## Planning Team Subject Matter Experts Kickoff Meeting Minutes

**Local Hazard Mitigation Plan**
**Internal Planning Meeting #1**

**Meeting Date, Time, Location**

June 26, 2019
1:30 – 3:30pm

Turlock Irrigation District
Meikle Building, Room 203
333 E Canal Drive
Turlock, CA 95380

**Attendees:**

| | |
|---|---|
| Amy Peterson | Bill Penney |
| Carlos Agueda | Lakmal Chandrasekara |
| Denver Hodges | Jorian Reed |
| Randy Erickson | Manjot Gill |
| Jason Carkeet | Ed Jeffers |
| Constance Anderson | Jason Hicks |
| Jesse Kirschner | Dave Funk |
| James Ramos | Calvin Curtin |
| Bill Worsham | Diane Rowley |

**Absent:**

| | |
|---|---|
| Brannon Gomes | Mike Kavarian |
| Phil Govea | Dan Severson |
| Jim McCoy | Chris Hardin |

Calvin Curtin presented a power point presentation on TID's Local Hazard Mitigation Plan SME Kickoff Meeting:

- Background - What is an LHMP and why do we need one?
- Plan Purpose – Research and data to justify District-wide threat analysis and mitigation strategy addressing climate change as part of the plan.
- Review the Current Plan – Local hazards listed in TID's 2011 LHMP Annex to Stanislaus County's MJHMP plus two newly identified hazards.
- New LHMP Scope and Schedule – Updating and re-writing TID's LHMP from an annex to a stand-alone plan with a completion date set for August 2020.
- How Can You Assist – the group will be divided into subcommittees to estimate losses and mitigation strategies for the seven identified local hazards to TID.
- Outreach Strategy – Public meetings, online surveys, stakeholder meetings
- Future Actions – subcommittee work to be completed by 8-30-19; next LHMP team meeting scheduled for 9-5-19 to review progress and get final thoughts & feedback.

**Question & Answer Session:**

Amy Peterson
- Q: Is this risk to TID or countywide?
- A: The focus is protecting our assets related to TID.

Jesse Kirschner
- Q: What about assets with TANK? Transmission lines that extend to the Oregon border.
- A: No.

Amy Peterson
- Q: What about the Tuolumne Wind Farm in Washington, i.e., ice storms?
- A: No.

Denver Hodges
- Q: What about indirect incidents, i.e., power shut-offs?
- A: Not in this case. That would be under Risk of Operation Strategy.

Jason Carkeet
- Q: TID right-of-ways on properties that have hazards.
- A: A cost analysis would need to be done. Possible grant money to put wires underground or developing an emergency road/exist.

Bill Penney
- Q: How does the hazard Extreme Weather differ from Flood?
- A: This would need to be discussed and flushed out as a group. Mitigations can overlap which increase the benefits and help to justify costs by providing benefits to multiple identified threats.

**Open Discussion:**

Dave Funk advised TID's old plan is good and it will not take much to update. We will need to be more specific on the "me too" sections in the annex plan.

Dave Funk asked the group for their opinions on the two newly added hazards: Extreme Weather and Public Health Outbreak or Epidemic. This would be ahead of the incident.

Jason Hicks explained a closed POD (Point of Distribution) and how it would benefit TID during a Public Health Outbreak or Epidemic.

Calvin Curtin stated a survey will be going out asking for details and any new thoughts the group might have.

Jesse Kirschner suggested Michael Clipper be included in the group due to some mitigation going through insurance. He should be involved at the end with the total asset values and to make sure we have enough insurance coverage.

Bill Penney suggested Tim Payne to be involved for dam failure and possibly use some of his previous plans to incorporate in this hazard.

**Meeting Wrap-Up:**

Jason Hicks reminded everyone to think outside the box for mitigation ways that are more affordable and realistic to obtain.

Meeting attendees turned in a sign-up sheet for participation on the hazard subcommittees.

## Risk Assessment and Mitigation Strategy Development

Following the Plan Kickoff Meeting, risk assessment and mitigation strategy development sessions were conducted with the Technical Advisory Committee members to analyze identified risks, discuss incorporating additional risks into the plan and discuss mitigation strategies and their impacts to TID. In order to make the most efficient use of time as most of the Planning Team members served on multiple technical advisory committees, most of the communications took place via email. Once all comments had been received from the Planning Team members, the revised plan was circulated among them for final review and comment.

## Internal Plan Review

During the development of the plan, various plan components were reviewed independently by the EMPT and the subject matter experts as part of their responsibilities on the Technical Advisory Committees. Comments received were logged and the edits recorded and, it was noted if the edits were made as received, changed upon editing or rejected and the rationale for accepting or rejecting the change.

Once complete, the entire document was reviewed by the EMPT for completeness and accuracy then submitted to TID's Senior Management Team for final internal review and approval. Once approved by the Senior Management Team, it was then made available for public and stakeholder input.

## Stakeholder Input

The plan was sent directly to the following stakeholders for comment:

| Entity | Entity |
|---|---|
| Stanislaus County Board of Supervisors | Emanuel Hospital |
| Merced County Board of Supervisors | Doctor's Hospital |
| Tuolumne County Board of Supervisors | Doctor's Hospital of Manteca |
| Mariposa County Board of Supervisors | Advancing Vibrant Communities |
| Santa Clara County Board of Supervisors | Cal OES |
| San Joaquin County Board of Supervisors | National Weather Service |
| City of Modesto | Delhi |

| Entity | Entity |
|---|---|
| City of Ceres | Hilmar |
| City of Turlock | Latino Emergency Council |
| City of Patterson | Stanislaus State University |
| City of Riverbank | University of California Merced |
| City of Oakdale | City and County of San Francisco/Hetch Hetchy |
| City of Hughson | Suntex (Don Pedro concessionaire) |
| City of Waterford | American Land and Leisure (Turlock Lake concessionaire) |
| City of Newman | California State Parks |
| Modesto Irrigation District | Merced Irrigation District |
| Stanislaus County Office of Education | Ceres Fire Protection District |
| Merced County Schools | Crowslanding Community Services District |
| Red Cross | Del Puerto Community Health Care District |
| Salvation Army | Del Puerto Water District |
| Lake Don Pedro Homeowners Association | Denair Community Services District |
| Stanislaus County Fairgrounds | Denair Fire Protection District |
| Stanislaus County Agricultural Advisory Board | Denair Municipal Advisory Council |
| Burbank Paradise Fire Protection District | East Side Mosquito Abatement District |
| Economic Development Action Committee | East Stanislaus Resource Conservation District |
| El Soyo Water District | East Side Water District |
| Empire Municipal Advisory Council | Newman Drainage District |
| Grayson Community Services District | Oakdale Irrigation District |
| Hickman Municipal Advisory Council | Patterson Cemetery District |
| In-Home Supportive Services Advisory Committee | Patterson Irrigation District |
| Keyes Community Services District | Reclamation District 2063 |
| Stanislaus Local Agency Formation Commission | Reclamation District 2091 |
| Monterey Park Tract Community Services District | Reclamation District 2092 |
| Mountain View Volunteer Fire Protection District | Riverdale Park Tract Community Services District |
| Stanislaus County Airport Land Use Commission | San Joaquin Valley Air Pollution Control District Citizens Advisory Council |
| Stanislaus County Equal Rights Commission | Sand Creek Flood Control District |
| Stanislaus County Free Library Board | Western Hills Water District |
| Stanislaus County Parks and Recreation Commission | Westley Community Services District |
| Stanislaus County Planning Commission | Westport Fire Protection District |
| Stanislaus County Workforce Development Board | Riverdale Park Tract Community Services District |
| Tuloumne River Regional Park Citizens Advisory Committee | Lake Don Pedro Community Services District |
| Turlock Mosquito Abatement District | Tuolumne County Board of Supervisors |
| Veterans Advisory Commission | District 1 Supervisor, Merced County |
| West Stanislaus Irrigation District | District 2 Supervisor, Merced County |

| Entity | Entity |
|---|---|
| Ca State University Stanislaus | District 3 Supervisor, Merced County |
| City of Ceres | District 4 Supervisor, Merced County |
| City of Modesto | District 5 Supervisor, Merced County |
| City of Patterson | Dairy Farmers of America |
| City of Turlock | Stanislaus County Office of Education |
| Turlock Unified School District | Hetch Hetchy Water and Power |
| Stanislaus County Operational Area Council | Approximately 50 of TID's large electrical customers |

## Plan Presentations

### Stanislaus County Operational Area Council

During the draft phase of the planning process, TID presented the LHMP to the Stanislaus County Operational Area Council (OAC) on October 17, 2019. The OAC consists of the Assistant Director of Emergency Services - County Fire Warden and a representative from each of the nine (9) cities within Stanislaus County including Modesto, Turlock, Ceres, Riverbank, Oakdale, Hughson,Patterson, Waterford, and Newman.

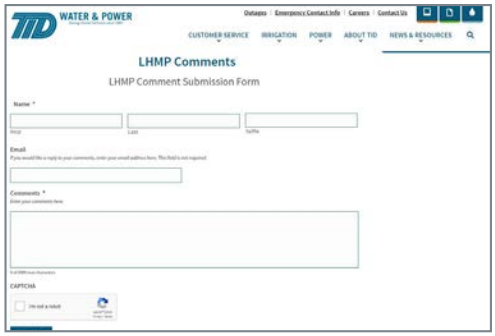
The OAC coordinates, reviews, and recommends for approval all emergency and disaster response policies, procedures, plans, and other influencing factors or events that would affect the Stanislaus Operational Area. The OAC provides technical review of all disaster plans by any agency or jurisdiction in the County for approval as to form and compliance with Incident Command System (ICS), Standardized Emergency Management System (SEMS), National Incident Management System (NIMS), and Homeland Security Presidential Directives (HSPD) 5 and 8.

### Latino Emergency Council

The Latino Emergency Council (LEC) is a nonprofit, community-based organization created to promote emergency preparedness in the Latino community and to facilitate emergency information when crisis strikes. TID presented the LHMP to the Latino Emergency Council and invited feedback from the council and their constituents on October 18, 2019.

## Involvement of Other Stakeholders in the Planning Process

The plan was also posted to TID's website where it is currently available for review and comment using a web-form which captures and preserves all comments and suggested edits. The plan and comment form will remain live in order to facilitate ongoing comments on updated versions of the plan as the process evolves.



Web-form for submitting comments at TID.org/LHMP

## Public Meetings

Two public meetings were held to present the plan and solicit comments. One was held on June 30, 2020 as part of a public workshop for the TID Board of Directors. This meeting was agendized as part of the regular TID Board Meeting held each Tuesday at 9 a.m. and was open to the public. Due to the current COVID-19 pandemic, this meeting was conducted via Zoom conference. The meeting was attended by TID staff representing the TID Management Team, the Water Resources Administration, the Electrical Engineering and Operations Administration and several members of the general public.

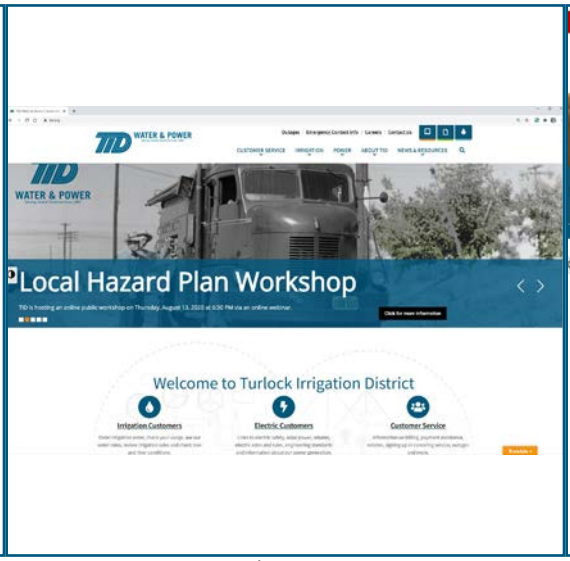
Only one question was asked at the end of the presentation by TID Board member Michael Frantz. He asked whether District staff who work at the Don Pedro Dam, La Grange Dam and Turlock Lake were consulted with and given the opportunity to provide input as they are most familiar with operations at those facilities. The response from the EMPT was that staff at those

facilities were included as Subject Matter Experts in the planning process and their input is included in the plan. They also were sent copies of the plan for their review prior to this public meeting.

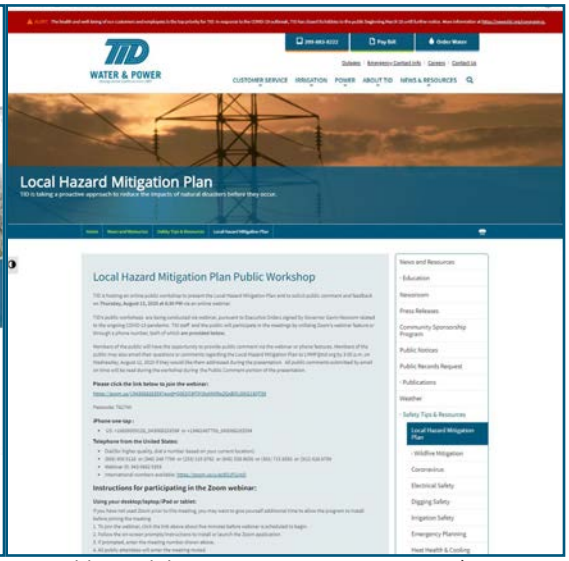
The second presentation of the plan was held via a Zoom conference on August 13, 2020, at 6:30 p.m. in order to accommodate members of the public that may have been unable to attend the previous 9 a.m. Board Workshop. The TID Assistant General Manager of the Financial Services Administration and one member of the public attended the meeting, no questions or comments were submitted.

Both meetings were recorded and are available on the TID website. To publicize the second meeting, TID posted graphics on the homepage of TID.org for two weeks prior to the event, listed it in the Public Notices section of the site, posted on District Social Media channels and ran public notices in the two largest newspapers in the region, the Modesto Bee and Turlock Journal.


*Social Media Posting*




*Homepage banner on TID.org*




*Public workshop announcement on TID.org/LHMP*

## Final Review

Once all comments from stakeholders, the public, and other relevant interests were received and logged, the suggested edits were evaluated by the EMPT and either accepted or rejected as occurred in the internal plan review. Any substantive changes were forwarded to the appropriate Technical Advisory Committee for their concurrence before being made to the plan.

Three hundred sixty-nine comments were received from internal stakeholders and SMEs during the review process including; edits to grammar, document structure, technical corrections, suggestions for clarification, and topics that the commenter felt were not correctly addressed or were left out. Also, 31 comments were received from the agencies and entities listed in the tables on pages 4-6 to 4-8. No comments from the general public were received.

To record, catalog, and track the disposition of all comments received by Technical Advisory Committee members, stakeholders, and the general public, a log was created to record the details of each comment made. The log includes the commenter's name, page, or section of the plan they are commenting on, the text of their comment or proposed change, and details regarding its disposition.

There were three possible outcomes for each comment received:

1. The comment was accepted in its entirety and the edit made as proposed
2. The comment was accepted with alterations or combined with another related comment and the change made
3. The comment was rejected

The table below contains the comments received (the commenter's name has been redacted for privacy):

| Commenter | Comment | Comment Accepted as Proposed? | Notes | Edit Made? | Notes | Page # |
|---|---|---|---|---|---|---|
| Stanislaus County OES - | The plan is well structured and visually appealing. My comment is specific to the Prerequisite section. In the past, the 5 year clock began not with Board adoption but with FEMA approval. Things may have changed since I was developing the County's 2017 LHMP. | Y | The 5 year review cycle does begin once FEMA issues an approval letter signifying the plan is adopted by the jurisdiction. | Y | Re-write to clarify | 2-3 |
| Stanislaus County OES - | I find the interesting the inclusion of Public Health in the LHMP. Is that a requirement now? If not, I think a biological emergency is better addressed in the COOP and EOP. With that said, I think your mitigation elements for a Public Health Emergency are well done. | N | The response to an emergency is addressed in the District's COD/COOP and EOP, however mitigation is not. This plan addresses the mitigation of the threat. | N | | |

| Commenter | Comment | Comment Accepted as Proposed? | Notes | Edit Made? | Notes | Page # |
|---|---|---|---|---|---|---|
| Stanislaus County OES - | Another thought, back in 2016 when OES submitted the LHMP one of the augmentations required by FEMA was highlighting the Vulnerability Impacts for each section. You may have already discussed this with OES. If you look at the County plan, you will see a box that summarizes the Vulnerability Impacts. This box was added to meet FEMA's approval. An example is in the earthquake section of the County LHMP on page 47. My work with the LHMP was several years ago, so this may no longer need to be emphasized. | Y | It is suggested by FEMA to use "Problem Statements" to summarize the impacts posed by each identified risk. | Y | Include short, bulleted statements of the impacts from each identified risk | |
| Stanislaus County OES - | Again, great job!!!! TID's LHMP is a solid, well thought out plan. | N | No edit suggested | N | | |
| Stanislaus County CEO's Office | Staff took a look and don't have any comments. Good resource document, thank you! | N | No edit suggested | N | | |
| Stanislaus County Fair | I started to ask for more pictures and less words in the official comment area, but figured I probably should not put that out there! It all looked pretty comprehensive and complete. | N | No edit suggested | N | | |

| Commenter | Comment | Comment Accepted as Proposed? | Notes | Edit Made? | Notes | Page # |
|---|---|---|---|---|---|---|
| Stanislaus County OES - | Hey guys, I have reviewed TID's Local Hazard Mitigation Plan and have no questions. The plan is well done and clearly outlines the risks, hazards and mitigation actions. County planning may have some feedback and I asked them to send it directly to you. Good work! | N | No edit suggested | N | No feedback ever received from County Planning Department or staff. | |
| Stanislaus County Fair | The plan looks pretty detailed and complete. I went through it and noticed that in the Extreme Weather, there is some talk about high winds, not to be confused with tornadoes, and that those winds are more commonly associated with winter storms. However, with the winds and PG&E's responses this year for turning off power in certain areas with high winds (during non-winter storms), does there need to be something about power line failure and mitigation of vegetation? | N | The plan does discuss the risk to our overhead lines from high wind events. Vegetation management is addressed in the Wildfire Mitigation Plan so was not included in the LHMP. | N | | |
| Stanislaus County Fair | Would a local hazard be defined as a neighboring power/water districts having a emergency and requesting help/resources from TID that may impact the TID district? | N | No, a mutual aid request is not considered a hazard for TID as we can simply decline to assist. | N | | |
| Stanislaus County Fair | Would a sink hole be considered a local Hazard? Otherwise, this was a very goo document. | N | A sinkhole could be considered a hazard however, sinkholes are extremely rare in the District so were not identified as a hazard. | N | | |

| Commenter | Comment | Comment Accepted as Proposed? | Notes | Edit Made? | Notes | Page # |
|---|---|---|---|---|---|---|
| Latino Emergency Council | Page 1-3 - Add BOS after Board of Supervisors and add BOS acronym in Glossary Page 8-2? | N | Board of Supervisors is a typo, changed to TID Board of Directors | Y | | |
| Latino Emergency Council | Page 2-2 and 2-3 - There is no mention of BOS adoption of LHMP | N | Since TID is a Special District under California statute, it's not necessary to have the County Board of Supervisors approve the LHMP. TID's Board of Directors has the authority to approve the plan. | N | | |
| Latino Emergency Council | Page 3-2 - In fourth paragraph, change "In 2003" to "Since 2003"? | Y | | Y | | |
| Latino Emergency Council | Page 3-3 - Indicate location of Lake Don Pedro, Lateral 8 Regulating Reservoir, Power Generation Facilities? | Y | | Y | | |
| Latino Emergency Council | Page 3-3 - Under Lake Don Pedro, mention "houseboating"? | Y | | Y | | |
| Latino Emergency Council | Page 3-3 - Under Turlock Lake, in second sentence delete first "from" | Y | | Y | | |
| Latino Emergency Council | Page 4-5 - There is no mention that BOS needs to adopt LHMP | N | It is not necessary for the Board of Supervisors to approve the plan as TID is a special district under California statutes. (see comment above) | N | | |
| Latino Emergency Council | Page 5-8 - Indicate location of Dawson Lake? | Y | Added location detail for Dawson | Y | | |

| Commenter | Comment | Comment Accepted as Proposed? | Notes | Edit Made? | Notes | Page # |
|---|---|---|---|---|---|---|
| Latino Emergency Council | Page 5-10 - Under Identifying Structures and Estimating Potential Losses, fifth paragraph – Include Spanish-speakers (or other groups who may be vulnerable due to language considerations) with the vulnerable groups mentioned in the LHMP. | Y | Added text to include those who are limited or non-English speakers | Y | | |
| Latino Emergency Council | Page 5-10 - Impact of Climate Change – Cite date of article? | Y | | Y | | |
| Latino Emergency Council | Page 5-33 - Change "LANDSLIDE" header to "LANDSLIDES"? | N | The threat is from Landslide as an overarching action, not individual events. | N | | |
| Latino Emergency Council | Page 5-43 -Under Wildland Fire, first paragraph, fifth sentence, change "and" to "an" | N | Unable to find the appropriate place to make the change. | N | | |
| Latino Emergency Council | Page 5-44 - Does"Dam Failure" belong under "Natural Hazard" heading? | Y | No, that was a typo and has been changed to Wildland Fire | Y | | |
| Latino Emergency Council | Page 5-45 - Under "Previous Fire Chart" list dates of fires in chronological order, from "earliest to latest"? | N | The chart is organized from most recent at the top to oldest at the bottom. | N | | |
| Latino Emergency Council | Page 6-32 - Wait 5 years to obtain breathing masks and air quality monitoring for employees? Do it sooner? | N | TID is not proposing waiting to provide worker protection and will do so when appropriate. There are some inconsistencies and controversy as to whether N95 masks are effective against PM2.5. We are continuing to investigate potential solutions. | N | | |

| Commenter | Comment | Comment Accepted as Proposed? | Notes | Edit Made? | Notes | Page # |
|---|---|---|---|---|---|---|
| Latino Emergency Council | 6-38 - Under 2020. LHMP.EW.19, 20 and 21 – Shouldn't priorities be higher? | N | These are not necessarily listed in order of importance, and we will implement these changes as the direction from regulators becomes clear. | N | | |
| Latino Emergency Council | 6-66 - 2020.LHMP.PHE.12 – Do it sooner? | N | We possibly could. We already have access to hand washing and hand sanitizing stations, this action is to increase them and provide better education to employees. This can happen at any time and the mitigations are not in chronological order. | | | |
| Latino Emergency Council | 6-73 - SCADA? Also, add SCADA to Glossary of Acronyms (page 8-6) | Y | Added to the Acronym list. | Y | | |
| Latino Emergency Council | 7-3 - Doesn't LHMP require BOS approval? (refer to page 1-3) | N | Ours does not require County BOS approval, just approval from TID's Board of Directors. | N | | |
| Latino Emergency Council | Change "was" to "were" under Mitigation Activity (NIMS, SEMS and ICS), Line 10 on pages 6-8, 6-11, 6-18, 6-22, 6-30, 6-35, 6-44, 6-48, 6-56, 6-60, 6-72 and 6-76 | Y | | Y | | |

| Commenter | Comment | Comment Accepted as Proposed? | Notes | Edit Made? | Notes | Page # |
|---|---|---|---|---|---|---|
| Modesto Irrigation District | " Excellent document. I have only two minor edits: 1. Page 1-3: Last paragraph under ""Local Hazard Mitigation Plan Creation"", the third sentence should read ""Board of Directors"" not ""Board of Supervisors"" 2. Page 5-7: Last paragraph under ""La Grange Dam and Powerhouse"", the crest elevation is 296.5 feet, not 269.5 feet. " | Y | | Y | | |

## Supplemental Review

Once all edits are made, and the Final Review process completed, the plan will be submitted to the State of California Office of Emergency Services. They will conduct their review process and make any suggestions to enhance the plan. If suggestions for enhancements are received by the EMPT from the state, they will be incorporated and if necessary, the Final Review process will be repeated.

Once the state has reviewed and approved the plan, they will forward it to the local FEMA office for their review and approval. FEMA will review the plan and offer any suggestions for improvement. Upon final approval by FEMA, TID will receive a letter of "Approval Pending Adoption." This letter states that the plan is approved by FEMA pending adoption by the TID Board. Once issued, TID has one year to adopt the plan.

## Review and Incorporation of Existing Plans

In the process of preparing this hazard plan, many other plans, reports, studies and technical information were evaluated or used as guidance. The Technical Advisory Committees consist of members of TID's staff that have direct knowledge or responsibility for the areas of the District's operations where the hazards were identified. Also, these employees are familiar with, or responsible to develop operational plans and provided their technical expertise in the development of this plan. The following plans were referenced when developing TID's Local Hazard Mitigation Plan.

### TID Plans

#### *Continuity of District/Continuity of Operations Plan (COD/COOP)*

TID must ensure its operations are performed efficiently with minimal disruption under all threats and conditions. This plan applies to the functions, operations, and resources necessary to ensure the continuation of TID's essential functions in the event its normal operations are disrupted or threatened with disruption. It identifies mission essential functions, alternate facilities, essential personnel, critical tools and documents, and outlines plans and processes to allow the District to function should a facility or facilities be unavailable or its workforce be significantly impacted and unable to report for work. The EMPT maintains this plan as well as the LHMP and will ensure that the appropriate mitigation priorities are incorporated into the COD/COOP.

This plan was used in developing the risk assessment and mitigation strategies for the Public Health Emergency portion of the LHMP specifically in the following areas:

- Vulnerability Impacts relating to employees being able to report for work
- Mitigation Strategies including potential alternate work locations, teleworking, and potential changes to District facilities

### *Emergency Operation Plan*

The Emergency Operations Plan is based on the National Incident Management System and its component parts, along with the California Standardized Emergency Management System (SEMS), including the use of the Incident Command System for field response. This plan addresses the District's emergency response policies and procedures for responding to and recovering from extraordinary emergency situations that could adversely affect business continuity and the capacity of the District to provide critical services.

This plan is updated every five years and utilizes SMEs from all departments and administrations at the District to provide technical direction and expertise. The LHMP's priorities will be incorporated into the Emergency Operations Plan at each re-write or edit moving forward as this plan is the responsibility of the EMPT to maintain.

### Wildfire Mitigation Plan

This plan is a required plan under SB901, now Public Utilities Code §8387, that was approved in 2018 and requires TID to have a mitigation plan that describes how electrical lines and equipment are constructed, maintained, and operated in a manner that minimizes the risk of wildfire. This plan was particularly useful when developing wildfire mitigation strategies as it outlines specific tasks that may be taken to lower risks. In particular, identifying areas of increased fire risk, weather threat monitoring, vegetation management, and lower-hazard equipment.

Some of the mitigation measures described under the Wildland Fire section of this plan incorporate projects originally identified in the Wildfire Mitigation Plan as described above. Part of the yearly reporting on the progress made under the Wildfire Mitigation Plan will reflect these and the other projects identified in the Wildland Fire Mitigation section of this LHMP.

### *Crisis Communication Plan*

The Crisis Communication Plan is the District's guide to communicating during an incident and contains messaging templates, process descriptions, and communication methods for use during an emergency. This plan guided the determination of mitigation strategies and methods of communication from the scene of an incident, and the potential for improving the District's communication capabilities during an emergency. This guidance was used across all identified risks and mitigation strategies.

This plan is updated annually by the EMPT and will continue to have the LHMP priorities incorporated into it.

### *Don Pedro, La Grange, and Turlock Lake (Drop 1) Emergency Action Plans*

These plans detail emergency actions and notification procedures in the event of an incident at each of these projects. This Don Pedro Emergency Action Plan also contains inundation mapping for the Don Pedro Dam should a catastrophic failure occur under full reservoir conditions and was used in determining the risk assessments and mitigation strategies for Dam Failure, Flooding, and Earthquakes. The priorities of all of these plans, protecting life and property are reflected in the LHMP.

The EMPT is involved in the update process and will ensure the LHMP priorities are incorporated into all three plans as they are updated.

### *Wildland Fire Incident Action Plan*

The purpose of the Wildland Fire Incident Action Plan is to describe the incident management, coordination of resources and required notifications in response to an active fire threatening or impacting District facilities.

Some of the mitigation actions outlined in this LHMP were identified through research conducted in preparation of this Incident Action Plan as well as the Wildfire Mitigation Plan. The priorities identified in the LHMP regarding wildland fire were, in part, originally described in this plan and then incorporated into the LHMP. This plan is regularly reviewed, updated and exercised and the LHMP priorities will be incorporated into those updates by the EMPT.

### *Increased Flows Incident Action Plan*

This is the District's plan to respond to high-flow conditions on the Tuolumne River resulting from flood or pre-flood releases from Don Pedro, emergency releases from the spillways, or certain other high-flow conditions involving District facilities. It contains plans for communication, coordination, incident management, and recovery operations relating to these high-flow conditions, as well as plans for de-energizing electrical customers along the Tuolumne, Merced, and San Joaquin Rivers during increased flow events whether related to TID facility operations or not. This plan was used in developing the risk assessments and mitigation strategies for Dam Failure, Extreme Weather, and Flooding.

This plan is reviewed and exercised on a regular basis with the appropriate SMEs and staff and the priorities of the LHMP will continue to be incorporated into the plan.

### *Emergency Management Strategic Plan*

This plan guides the strategy and planning of the Security and Emergency Preparedness Department at TID and it's principles of protecting life and property are included in the LHMP. The EMPT owns and updates this plan every five years and the LHMP priorities will continue to be incorporated into it.

### *Significant Storm Floatable Debris Incident Action Plan*

The Significant Storm Floatable Debris Incident Action Plan addresses the potential impacts of woody debris escaping containment in the back of the Don Pedro Reservoir which could lead to a safety hazard for boaters, and if it should travel to the dam, potentially interfere with spillway operations. This plan was used in developing the risk assessments and mitigation strategies for Dam Failure, Extreme Weather, Landslide, and Flooding in the context of the impacts of floatable debris on operations at Don Pedro.

Some of the mitigation actions involving Don Pedro Reservoir in the LHMP were taken directly from research and experience gained through exercises and activations of this plan. The priorities of the LHMP are incorporated into the existing plan and they will continue as this plan is exercised and updated by the EMPT.

### *Major Power Outage Incident Action Plan*

This is the District's plan for responding to the impacts of a large-scale power outage affecting a large number of customers and/or an outage lasting for a significant time. The communication and response tactics outlined in this plan were useful in the development of Earthquake, Extreme Weather, Flooding, Landslide, and Wildland Fire risk assessments and mitigations.

This plan is regularly exercised and reviewed with the SMEs having expertise and responsibility in this area and the EMPT will continue to incorporate the priorities of the LHMP into this plan.

The District will implement mitigation strategies outlined in the LHMP through existing capital improvement plans, After-action Report/Improvement Plans identified during exercises or incidents, and in the development of future Incident Action Plans,

Emergency Operations Plans and Emergency Action Plans as appropriate. The mitigation actions identified in this plan have been reviewed by SMEs who have direct knowledge and responsibility for the facilities identified and have given their concurrence that the projects described in this plan are realistic.

In order to ensure that strategies identified in this plan are integrated into future plans and projects, the District will provide a copy of the LHMP to the appropriate plan owner and conduct on-going monitoring with the SMEs having management responsibility for the mitigation actions identified in this plan to ensure they are prioritized. These project review meetings will be summarized into the annual report sent to CalOES and FEMA each year as required by the LHMP.

## Guidance Documents

The following guidance documents were used in the preparation of this plan.

### *Stanislaus County Plans*

- Stanislaus County Local Hazard Mitigation Plan
  Previously, TID provided information to Stanislaus County to aid in the development of the County's Local Hazard Mitigation Plan originally adopted in 2006 and updated in 2011. This information consisted of vulnerability assessments and the potential impacts of the identified risks in the plan. When drafting its stand-alone plan in 2019, the District used the county's 2016 plan as a sample document when building the community information portion of the District Profile and to ensure that all potential naturally occurring hazards were included in the plan. In addition to the five hazards identified in the county plan, TID chose to include two additional risks; Extreme Weather and Public Health Emergency.

- Stanislaus County General Plan
  The General Plan was used as a reference document when considering the impact of future development on all risk categories, except for Public Health Emergency.

### *Federal and State Guidance Documents*

- FEMA Local Mitigation Planing Handbook (FEMA March 2013)
- Mitigation Ideas, A Resource for Reducing Risk to Natural Hazards (FEMA January 2013)
- G393, Mitigation for Emergency Managers Student Manual (CalOES June 2014)

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# Section 5
# Risk Assessment

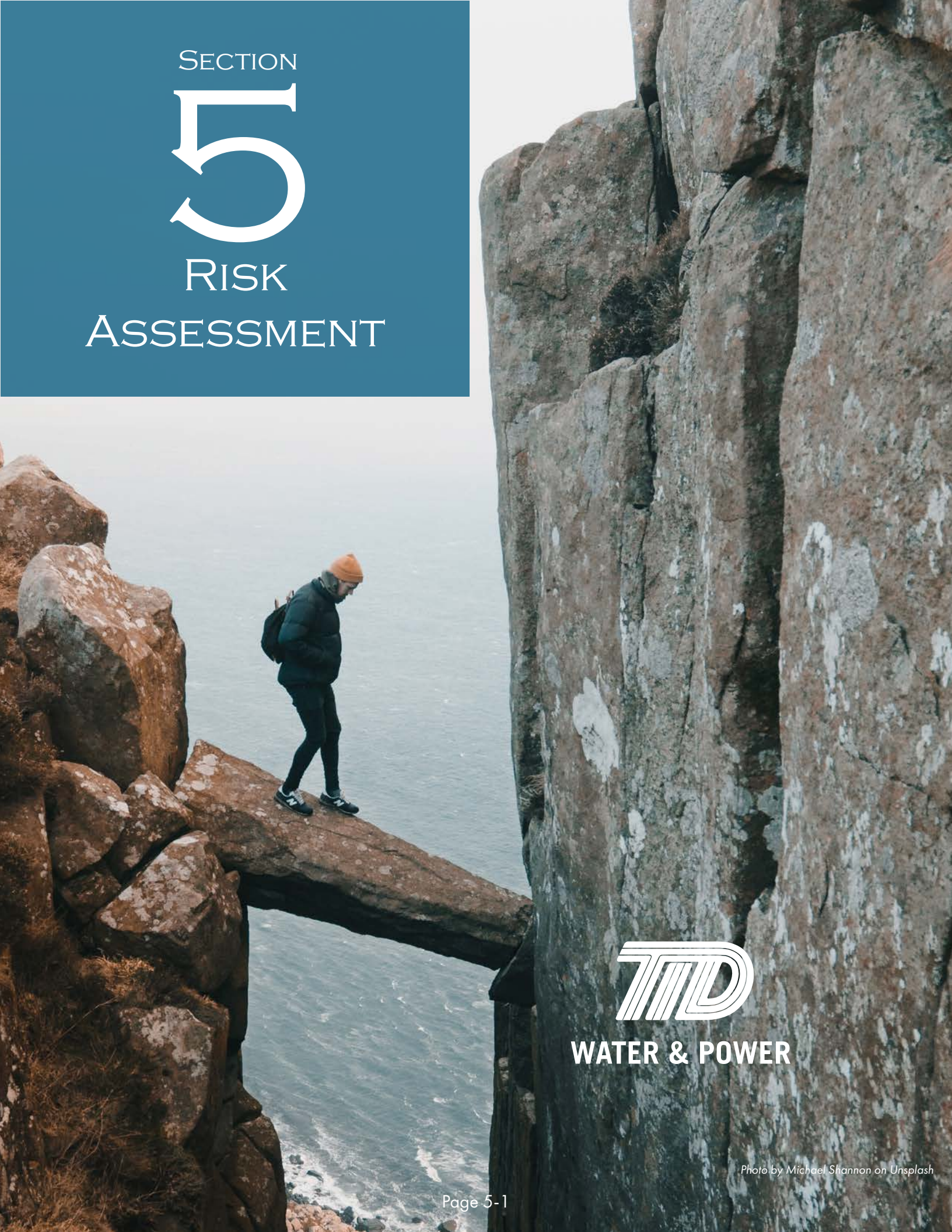

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*Photo by Michael Shannon on Unsplash*

The Turlock Irrigation District (TID or the "District") has identified several hazards, some of which were addressed in the Stanislaus County Local Hazard Mitigation Plan updated in 2011, where TID was included as an annex. Those hazards, along with two additional ones identified for this plan are included in the following risk assessment and each is profiled separately. Any hazard where no mitigation is possible, or where the potential damage is extremely low were not included in this risk assessment.

As discussed in the Planning Process Section of this plan, TID identified subject matter experts (SME) that would have a role in developing this plan, or in responding to an incident as described in it, and they attended a meeting on June 26, 2019. At this meeting, the risks initially identified by the TID Emergency Management Planning Team were discussed and the SMEs were asked to review the hazards and provide input and suggestions for threats not identified. After input from the SMEs, the following hazards were identified for inclusion in this Local Hazard Mitigation Plan:

- Earthquake
- Landslide
- Dam Failure
- Flood
- Wildfire
- Extreme Weather
- Public Health Outbreak

The Risk Assessment component includes the following subsections for each of the seven hazards:

**Identifying the Hazard -** includes a description of the types of all natural hazards;

**Profiling the Hazard -** identifies the location, extent, previous occurrences, new occurrences, and probability of future events;

**Assessing Vulnerability: Overview -** identifies an overall summary description of vulnerability to each hazard and the impact of each hazard on the jurisdiction. Plans approved after October 1, 2008, must also address the National Flood Insurance Program for insured structures that have been repetitively damaged by floods;

**Assessing Vulnerability: Identifying Structures/Estimating Potential Losses -** includes the types and numbers of existing and future buildings, infrastructure, and critical facilities located in the identified hazard areas, and includes estimates of potential dollar losses to vulnerable structures and describes the methodology used to prepare the estimate;

**Assessing Vulnerability: Analyzing Development Trends -** includes the land uses and development trends;

**Impact of Climate Change -** identifies the potential impacts to each hazard as discussed within the individual risk assessment;

**Probability Scale -** identifies the terms used to define the probability of future events for each hazard. The probablity is determined based on the likelihood of the hazard reoccurring within the identified time-frame as follows:

| Probability | Frequency |
|---|---|
| Highly Likely | Occurring every 1 to 10 years |
| Likely | Occurring every 10 to 50 years |
| Unlikely | Occurring less than once every 50 years |

## Risk Assessment

# Dam Failure

Dam failure is the breakdown, collapse or other failure of a dam structure resulting in the uncontrolled release of impounded water and has the potential to cause downstream flooding. A catastrophic dam failure is characterized by the sudden, rapid and uncontrolled release of impounded water or the likelihood of such an uncontrolled release. Dam failure can be caused by a number of factors but is often attributed to massive rainfall or snow-melt in the watershed exceeding the storage capacity of the reservoir.

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Dam failure is the breakdown, collapse or other failure of a dam structure resulting in the uncontrolled release of impounded water and has the potential to cause downstream flooding. A catastrophic dam failure is characterized by the sudden, rapid and uncontrolled release of impounded water or the likelihood of such an uncontrolled release. It is recognized that there are lesser degrees of failure and that any malfunction or abnormality outside the design assumptions and parameters that adversely affects a dam's primary function of impounding water is properly considered a failure. These lesser degrees of failure can progressively lead to or heighten the risk of catastrophic failure.

Dam failure can be caused by a number of factors but is often attributed to massive rainfall or snow melt in the watershed exceeding the storage capacity of the reservoir.

According to the Federal Emergency Management Agency (FEMA), a dam failure can usually be attributed to one or more of the following reasons:

- Over-topping caused by floods that exceed the capacity of the dam
- Deliberate acts of sabotage
- Structural failure of materials used in dam construction
- Movement and /or failure of the foundation supporting the dam
- Settlement and cracking of concrete or embankment material
- Piping and internal erosion of soil in embankment dams
- Inadequate maintenance

In addition to these failure causes, there are dams located upstream of Don Pedro on the Tuolumne River operated by the City and County of San Francisco. If one of those dams were to fail, the water released into the Tuolumne could cause the water level in Don Pedro to rise sufficiently and fast enough to exceed the design capacity of the project causing a potential uncontrolled release. The elevation of Don Pedro, the upstream dam that fails, the amount of water released, and the time it takes for the flows to reach the reservoir all factor into the impacts.

Dam failure presents a significant risk for disaster due to the potential for loss of life and property downstream. Recently, more attention has been paid to dams in California due to the incident involving the collapse of the spillway at Oroville Dam.

The Turlock Irrigation District (TID) owns or operates several dams including Don Pedro, La Grange, Dawson and Turlock Lake.

## Dam Failure Hazard Profile

| Natural Hazard | How Hazard was Identified | Why Hazard was Identified |
|---|---|---|
| Dam Failure | • Identified in the TID EOP<br>• Identified in EAPs for each facility<br>• TID's annex to the 2011 Stanislaus County LHMP | • The potential for damage and loss of life due to failure |

## Location

### Don Pedro Dam and Powerhouse

The Don Pedro Hydroelectric Project is identified as Federal Energy Regulatory Commission (FERC) Project Number 2299 and is owned by the Turlock Irrigation District (68.46%) and Modesto Irrigation District (31.54%) with TID acting as the operating agency. The water behind Don Pedro Dam is under the control of the two irrigation districts.

The Don Pedro Project is located about four miles upstream of the town of La Grange and 30 miles east of Modesto, California in the foothills of the Sierra Nevada.

The Don Pedro Dam and Reservoir are on the Tuolumne River, which originates near Mt. Lyell and Mt. Dana inside Yosemite National Park. The dam was built across a deep canyon of the Tuolumne and was completed in 1971.The Don Pedro Project consists of a main dam, powerhouse, three auxiliary dikes and one dike on the spillway channel as shown below.

The Don Pedro Reservoir and associated powerhouse comprise a multi-use hydroelectric facility providing flood control, irrigation water storage, fish and wildlife requirements, recreation and generation of electric power. The Don Pedro Reservoir is operated as a flood control facility in accordance with the U.S. Army Corps of Engineers (USACE) Reservoir Regulations for Flood Control Manual (1972).

Don Pedro Reservoir is one of several developments along the Tuolumne River and impounds a reservoir with an approximate surface area of 13,000 acres and a storage volume of 2,030,000 acre-feet (AF) at the maximum normal reservoir pool elevation of 830.0 feet above mean sea level. The reservoir is designed to reach elevation 852.0 feet under the probable maximum flood.

The total spillway capacity for the Don Pedro Project, which includes both a controlled and an uncontrolled spillway is 609,000 cubic feet per second (CFS) at a nominal top of dam elevation of 855.0 feet.

### *Main Dam and Spillway*

The main dam is 1,900 feet long and 585 feet high and constructed with earth and rock-fill. The controlled spillway includes three gates 45 feet wide by 30 feet high. The discharge capacity of the controlled spillway with all three gates fully open is 77,000 CFS with reservoir water surface elevation 830.0 feet.

### *Uncontrolled Spillway*

The uncontrolled spillway is located west of the main dam on the right abutment between the Tuolumne River and Gasburg Creek. The uncontrolled spillway is 995 feet long with a crest elevation of 830.0 feet. The Uncontrolled Spillway has a discharge capacity of 419,000 CFS at nominal top of the dam at elevation 855.0 feet.

### *Auxiliary Dikes*

The Don Pedro Reservoir includes three earth and rock-fill saddle dikes identified as Dike A, Dike B and Dike C. A fourth dike, the Gasburg Creek Dike, is located downstream of the main spillway, southwest of the main dam and is not an impounding structure unless water is being released from one or multiple spillways. The Gasburg Creek Dike is also composed of earth and rock-fill and was constructed to direct spillway flows toward the Tuolumne River and prevent flooding along Gasburg Creek.

*(ALL ELEVATIONS RELATING TO THE DON PEDRO PROJECT ARE IN FEET ABOVE MEAN SEA LEVEL (AMSL) IN NGVD29 DATUM)*

## La Grange Dam and Powerhouse

La Grange Dam was constructed in 1893 and is located approximately one mile downstream of Don Pedro Dam on the Tuolumne River. It is an overflow dam with the purpose of diverting water from the Tuolumne River into the canal systems of the Turlock and Modesto Irrigation Districts (MID).

La Grange is a stone masonry arch dam constructed of boulders set in concrete and is 131 feet high. The crest elevation is 296.5 feet with a crest width of approximately 20 feet and a base width of approximately 80 feet. The maximum pool behind the dam is less than 100 AF.

When water is released from either the Don Pedro Powerhouse or, the diversion tunnel, it flows through a steep canyon to the La Grange Dam. Once it reaches the dam it can flow three ways; into the diversion works for TID or MID or, into the river. On the occasions where there are sufficient releases from Don Pedro, water flows over the top of the dam and directly into the river.

In 1923, TID constructed the La Grange Powerhouse (FERC # 14581) on its side of the river immediately below La Grange Dam. This powerhouse is capable of generating 5 megawatts (MW) with a maximum flow of 550 CFS. The discharge from the powerhouse re-enters the Tuolumne River directly below the power plant.

*(ALL ELEVATIONS RELATING TO LA GRANGE DAM ARE IN FEET ABOVE MEAN SEA LEVEL (AMSL) IN NGVD29 DATUM)*

## Dawson Reservoir

Dawson Reservoir is in-line with the TID canal system and is not a part of the Tuolumne River. Three dams make up the Upper and Lower Dawson Reservoirs with the main dam being 22 feet high and 287 feet long. The reservoir has the capacity to store 960 AF and is located between the town of La Grange and Turlock Lake.

The powerhouse at Dawson Reservoir (FERC # 3136) was constructed in 1983 and is capable of generating 4.4 MW. This powerhouse is typically only operated during the irrigation season which is generally March through October.

## Turlock Lake

Turlock Lake is identified as FERC Project Number 2871 and is formed by a series of 18 earthen dams enclosing topographic saddles or low places around a perimeter. The dams are named Dam A through Dam S; there is no Dam I. Dam H is the highest of the earth structures at 32 feet. The concrete outlet structure at Dam A is 36 feet high. The dams are of hydraulic fill construction, with the exception of the powerhouse and outlet structure. Some of the embankments have upstream concrete faces including splash walls, most of which were later entombed in earth fill to address seepage concerns. The lowest crest elevation of the earthen dams is 243.6 feet.

Turlock Lake is an off-stream, in-line canal feature of TID's upper Main Canal system. Water releases entering TID's canal system at La Grange flow through the TID Upper Main Canal and into Turlock Lake and then back into the TID Main Canal downstream. As Turlock Lake is an in-line canal feature, inflows into the project are mostly controlled by the operators of the TID canal system, the exception being McDonald Creek. There is no spillway for Turlock Lake so all flood releases have to be made through the power plant and/or the canal outlet works. For this reason, winter storage is restricted to provide additional capacity to contain the design storm runoff.

The maximum authorized operating level in the Division of Safety of Dams (DSOD) issued Certificate of Operation is 240.6 feet. The project is normally operated between Elevation 234.6 and 236.1 feet during the irrigation season. In a dry year, operation will typically be lower during the irrigation season, typically between 233.3 and 234.6 feet. After the conclusion of irrigation season, the lake has historically been lowered to approximately 228 feet but, conditions and circumstances can vary the off-season elevation.

Turlock Lake is primarily used as a "balancing reservoir" and provides irrigation water storage, hydroelectric generation (during the irrigation season), recreation, and fish and wildlife benefits.

*(ALL ELEVATIONS RELATING TO TURLOCK LAKE ARE IN FEET ABOVE MEAN SEA LEVEL (AMSL) IN NGVD29 DATUM)*

## Extent

Severe storms, earthquakes and erosion of bank materials can all be causes for dam failure. In addition, there are scenarios that can cause inundation downstream of dams without causing their catastrophic failure. These include landslides flowing into lakes and the action of a seismically induced wave that over tops a dam without causing its complete failure. Additionally, debris interfering with the operation of the spillway structures can lead to downstream flooding if the debris prevents the structures from operating properly.

Dams are rated by the State of California's Division for the Safety of Dams (DSOD) on a four-tiered scale based solely on the potential for downstream impacts to life and property should the dam fail when operating with a full reservoir. The hazard classification is not related to the condition of the dam or its appurtenant structures. The definitions for downstream hazard are borrowed from Federal Guidelines for Inundation Mapping of Flood Risks Associated with Dam Incidents. FEMA categorizes the downstream hazard potential into three categories in increasing severity: Low, Significant and High. The DSOD adds a fourth category of "Extremely High."

The dams owned or managed by TID range in classification from "Low" to "Extremely High," again based on expected impacts downstream should they fail under full reservoir conditions.

For example; a failure of the dam at Dawson Reservoir is rated by the DSOD as "Low" because loss of life would not be expected, and property damage would be relatively minimal.

On the other hand, a catastrophic failure of the Don Pedro Dam would cause severe consequences downstream resulting in injuries, loss of life, severe property damage and economic devastation over a wide area for a significant period of time. This would include prolonged and severe economic impacts on the agricultural economy of the region once the water receded due to the lack of available surface water for irrigation. For these reasons, it is rated as "Extremely High."

### Impacts

- Catastrophic failure of Don Pedro Dam could result in injuries or loss of life and would cause severe property damage and economic devastation over a wide area for a significant period of time.
- This economic devastation would include prolonged and severe impacts to the agricultural economy of the region once the water receded due to the lack of available surface water for irrigation.
- The majority of the population of Stanislaus, and San Joaquin counties would be affected as flooding would extend from Turlock all the way to the Tracy area.
- The impacts from a catastrophic failure of Dawson Reservoir or Turlock Lake are less severe as the water impounded by those structures is far less than Don Pedro. However, injuries or loss of life are still possible especially at Turlock Lake, and economic damage due to the potential disruption of surface water deliveries for agriculture is highly likely.

## Probability of Future Events

There has only been one instance of catastrophic failure of the dams discussed in this plan. On June 27, 1914, a section of concrete-covered fill at Turlock Lake about fifty feet south of the outlet gate suddenly gave way at approximately three o'clock a.m. The released water followed the main canal until it spilled over the sides and carved a channel to the Tuolumne, eventually rejoining the river near Roberts Ferry.

Much has changed since 1914 and today, dams are regulated and inspected by the DSOD and FERC. The TID participates in a robust dam safety program in addition to the regulatory agency inspections and conducts inspections of its dams along with engineering consultants regularly. Any deficiencies are noted and addressed and records are maintained of all repairs. TID considers all of its dams to be safe to operate.

For these reasons, the probability of dam failure is: **Unlikely**

## New Occurrences

There have been no new occurrences of dam failure since the 1914 event.

## Vulnerability Overview

As mentioned above, the catastrophic failure of Don Pedro Dam would have severe consequences resulting in loss of life, severe property damage, limited transportation routes and a decrease in vital utilities along with long-term economic devastation to the region.

The failure of Turlock Lake has the potential to cause significant downstream flooding, depending on the structure that failed however, not to the magnitude of a failure of Don Pedro. In addition to causing property damage along the route of the water flow, losing Turlock Lake would severely impact the delivery of surface water to growers and negatively impact the agricultural economy of Stanislaus County. Certain Turlock Lake Dams could potentially cause loss of life in the event of a failure, and are therefore considered High hazard.

La Grange Dam and the three Dawson dams are considered Low hazard.

If other structures in the system were to fail, the impacts would vary depending on their size, function and location as well as the time of year of the failure. All the structures in the irrigation system serve a purpose and the loss of any one of them would more than likely have some impact to TID's operations.

## Identifying Structures and Estimating Potential Losses

In the unlikely event of a complete failure of Don Pedro Dam, the entire irrigation service territory of TID is impacted. Likely most, if not all irrigation structures, electrical distribution equipment, power plants, Canal Campus and Broadway Yard would be damaged or destroyed. The complete failure of Don Pedro Dam is a low probability but high-risk hazard.

If Don Pedro were to fail, the impacts on the local economy and infrastructure would be severe. Impacts on the cities inundated would affect key infrastructure including hospitals, police and fire stations, clinics, and businesses. Economic impacts on unincorporated areas would include agriculture, food processing, and manufacturing industries. According to the 2017 Stanislaus County Agriculture Report (the last year data was available), the value of crops grown in Stanislaus County alone was $2,935,960,000. This figure does not include potential losses in the other counties impacted by the inundation.

The failure of the other dams as identified in the previous section would most likely not cause significant damage to property but, would affect TID's (and in the case of the La Grange Dam, both TID and MID's) ability to provide a reliable surface water supply for agriculture.

Although the failure of any of the structures identified in this plan would have severe impacts, the likelihood of such an occurrence is remote. The FERC requires dam operators to prepare and maintain extensive emergency action plans (EAPs) in case a failure or potential failure scenario develops. These EAPs include inundation maps and notification flow charts to be used in an emergency. These plans are regularly reviewed and exercised with plan-holders and first responders and the contacts are updated annually. Agencies with a response role have copies of the current plan on-hand. In partnership with the affected counties, TID has identified vulnerable areas specific to dam inundation.

There are vulnerable populations downstream of a potential dam failure. The populations most vulnerable are those that have the least amount of time to evacuate and need assistance. These populations that may need assistance include the elderly, disabled and young. The vulnerable population also includes those who may not have adequate warning to evacuate from emergency notification systems as well as those who are limited or non-english speakers.

If a catastrophic dam failure of Don Pedro were to occur, the value of TID's assets at risk totals in exceeds $2,000,000,000.

## Impact of Climate Change

An article published by D.E. Rheinheimer and J.H. Viers from the University of California at Davis discusses the effects of climate change on reservoir operations. The article is titled Combined Effects of Reservoir Operations and Climate Warming on the Flow Regime of Hydropower Bypass Reaches of California's Sierra Nevada*. This article, and others imply that climate change will impact the traditional operation measures and flow regimes used for dams as river conditions and water levels are fluctuating. This publication concludes that reservoir operators may need to adjust their operations to mitigate the impact of climate change on rivers and the ecosystem.

*Published February 2014 and available here - https://pdfs.semanticscholar.org/f808/d41853394ee38fbed0ecb53ae60bb35327fe.pdf

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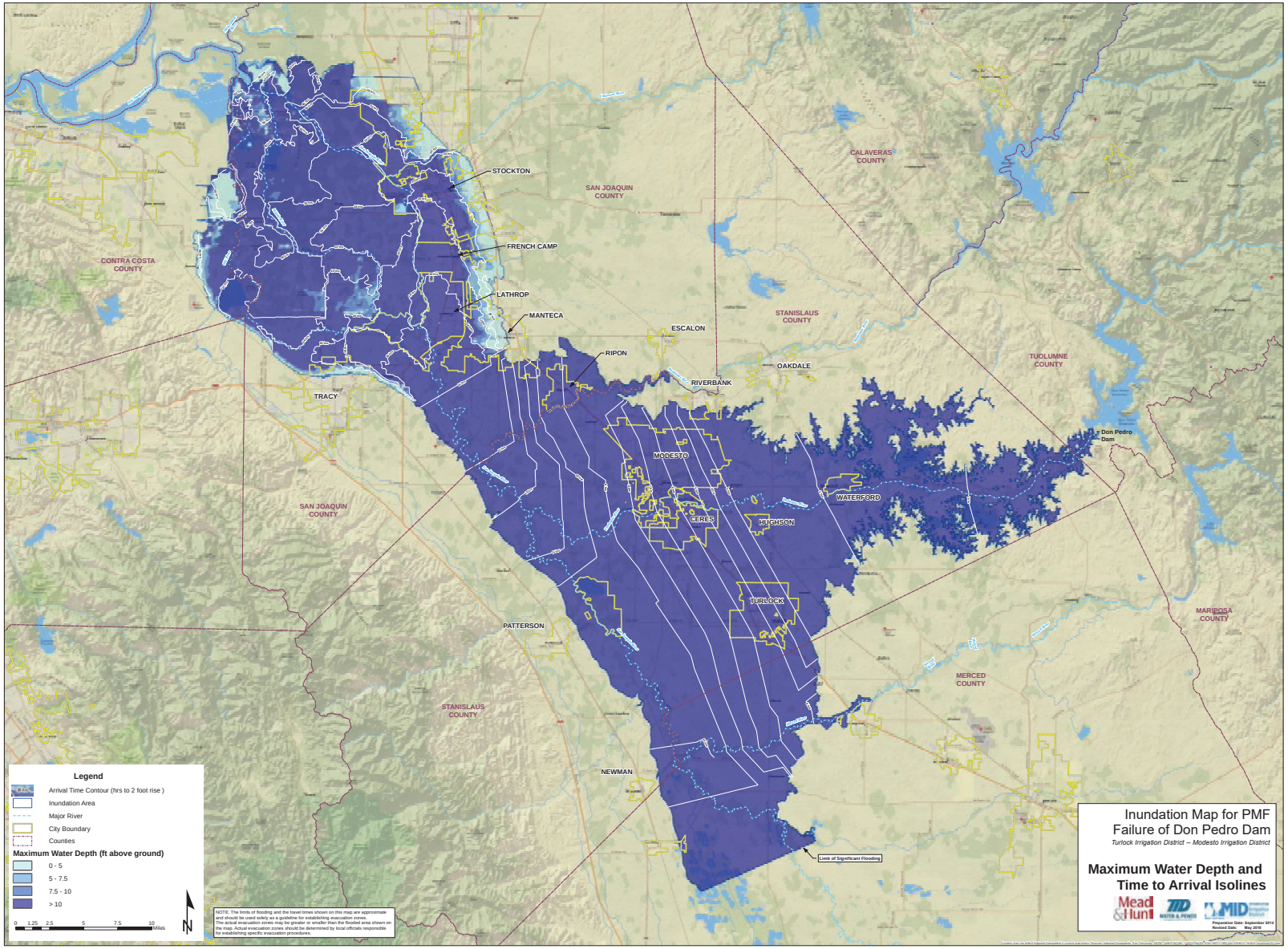
## Don Pedro Dam Inundation Map



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## Risk Assessment

# Earthquake

Earthquakes are caused by the movement of tectonic plates, located in the Earth's crust. The plates beneath California are moving in a sideways and downward direction resulting in what is known as subduction. When these plates become stuck at their edges due to friction, energy is stored in the rocks beneath the surface. When the stress on the edge overcomes the friction, there is an earthquake that releases the stored energy in waves that travel through the earth's crust and cause shaking. In a large earthquake, this shaking may be felt over vast distances.

California experiences thousands of earthquakes each year, many of them too small to feel. Only a few hundred are larger than magnitude 3.0 and only 15-20 are greater than 4.0.

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## Earthquake Hazard Profile

Earthquakes in California have been documented since the time of the Spanish missions with the earliest documented quake occurring in 1769 near present-day Los Angeles. During the years 1850–2004, potentially damaging earthquakes occurred about once per year on average in California. Fortunately, many of these did not cause serious consequences or loss of life.

California is particularly vulnerable to earthquakes because of its location along the Pacific Ring of Fire, a major area in the basin of the Pacific Ocean where many earthquakes and volcanic eruptions occur. About 90% of the world's total earthquakes and 81% of the largest earthquakes occur along its 25,000-mile perimeter.

California is also located over an area known as a Subduction Zone. Subduction is the sideways and downward movement of the edge of a plate of the earth's crust into the mantle beneath another plate. California is located at the junction of two tectonic plates, the North American Plate and the Pacific Plate which are moving in opposite directions.

Each year, southern California has about 10,000 earthquakes. Most of them are so small that they are not felt. Only several hundred are greater than magnitude 3.0, and only 15-20 are greater than magnitude 4.0.

## Profiling the Earthquake Hazard

| Natural Hazard | How Hazard was Identified | Why Hazard was Identified |
|---|---|---|
| Earthquake | • TID's annex to the 2011 Stanislaus County LHMP<br>• Stanislaus County's LHMP update in 2016<br>• Input from the LHMP Planning Team | • The potential for damage<br>• The propensity for earthquakes in California<br>• Previous occurrences |

## Location

There are several known faults in the area served by the TID but only the San Joaquin Fault Zone located in the hills west of Patterson has been active,. There are no known active faults in the valley floor covered by the TID service area and no active faults in the eastern part of the TID.

The closest active fault to District facilities is the Greenville Fault, located approximately 21 miles west of the city of Patterson. This fault has produced earthquakes in the past with the most recent being a magnitude 4.3 north of interstate 580, just east of Tassajara and a 5.5 magnitude near the town of Livermore in 1980. Faults in this general vicinity have experienced significant earthquakes in the past including a magnitude 6.0 in 1866 and a 6.3 in 1881.

The Hayward Fault located approximately 63 miles west of the City of Turlock, has the capacity for large, devastating earthquakes which could cause significant shaking and the potential for liquefaction of the soil on the west side of TID's service territory. According to the USGS "Haywired" scenario which models a 7.0 earthquake centered in Oakland along the Hayward Fault, significant shaking, strong enough to potentially cause damage to most structures, will be experienced in the western part of TID's service area.

If the Haywired scenario were to actually occur, the damage from the main shock could displace 411,000 people throughout the Bay Area and render residential buildings in downtown Oakland and San Francisco unusable for as long as 10 months. People impacted by this event likely would be relocated, at least temporarily, to Central Valley locations including Stanislaus County and the areas served by TID. Additionally, an earthquake of that magnitude has the potential to sever natural gas pipelines serving TID's power plants disrupting fuel deliveries for a significant period of time as well as fuel delivery trucks, impacting TID's ability to fuel vehicles and equipment.

Information furnished by the US Geological Survey (USGS) National Seismic Hazard Mapping Program indicates that the potential for damaging shaking exists within the TID service territory reaching varying intensities as rated on the Modified Mercalli Intensity (MMI) scale of 1931. Per the MMI scale, the eastern half of the District has the potential for shaking between five to seven Mercalli possibly resulting in varying degrees of building damage. The majority of the District, located on the valley floor, could experience shaking of seven to eight Mercalli, potentially causing significant damage to buildings and structures. The western half of the TID service area has the greatest exposure to severe shaking from an earthquake. According to the USGS the area west of I-5 could possibly see severe shaking up to nine Mercalli which is enough to cause building and structure collapse. Particularly, the area around Newman may have shaking intensity great enough to be judged a major hazard.

## Modified Mercalli Intensity Scale

There are several ways to measure the magnitude and expected impacts of an earthquake. The Richter and Moment Magnitude ($M_W$ )scales measure the overall energy released, while the somewhat subjective Modified Mercalli Index (MMI) describes shaking intensity at a particular location. Although not as scientifically accurate as the Richter or $M_W$ scales because it is based on an individual's observations, the MMI scale more effectively describes the shaking impacts in easy-to-understand terms.

The Modified Mercalli Scale and intensity descriptions:

| Intensity | Shaking | Description/Damage |
|---|---|---|
| I | Not Felt | Not felt except by a very few under especially favorable conditions. |
| II | Weak | Felt only by a few persons at rest, especially on upper floors of buildings. |
| III | Weak | Felt quite noticeably by persons indoors, especially on upper floors of buildings. Many people do not recognize it as an earthquake. Standing motor cars may rock slightly. Vibrations are similar to the passing of a truck. Duration estimated. |
| IV | Light | Felt indoors by many, outdoors by few during the day. At night, some awakened. Dishes, windows, doors disturbed; walls make cracking sound. Sensation like a heavy truck striking building. Standing motor cars rocked noticeably. |
| V | Moderate | Felt by nearly everyone; many awakened. Some dishes and windows broken. Unstable objects overturned. Pendulum clocks may stop. |
| VI | Strong | Felt by all, many frightened. Some heavy furniture moved; a few instances of fallen plaster. Damage slight. |
| VII | Very Strong | Damage negligible in buildings of good design; slight to moderate in well-built ordinary structures; considerable damage in poorly built or badly designed structures; some chimneys broken. |
| VIII | Severe | Damage slight in specially designed structures; considerable damage in ordinary substantial buildings with partial collapse. Damage great in poorly built structures. Fall of chimneys, factory stacks, columns, monuments, and walls. Heavy furniture overturned. |
| IX | Violent | Damage considerable in specially designed structures; well-designed frame structures thrown out of plumb. Damage great in substantial buildings, with partial collapse. Buildings shifted off foundations. |
| X | Extreme | Some well-built wooden structures destroyed; most masonry and frame structures destroyed including their foundations. Rail traffic disrupted due to bent rails. |
| XI | Extreme | Few, if any masonry structures remain standing. Bridges destroyed. Rails bent greatly. |
| XII | Extreme | Damage total. Lines of sight and level are distorted. Objects are thrown into the air. |

Because earthquakes have only one magnitude as expressed in the Richter or $M_W$ scales but can have vastly different intensity depending on the location and proximity to the epicenter, the District has incorporated the Mercalli Index into its replacement cost summary and expected impacts portions for this risk assessment.

## Extent

Numerous earthquakes occur each year along California's major faults. The active faults that may have the most potential impact on Stanislaus County and the TID service territory include the San Andreas, Calaveras, and Hayward. The western region of Stanislaus County experiences a higher level of earthquake hazard than the eastern portion due to its proximity to more active fault zones. Since 1950, Stanislaus County has had no declared disasters for earthquakes.

Structures, infrastructure and populations along the I-5 corridor in the western portion of TID's service territory and within the Diablo Range are most vulnerable to damage.

A secondary effect of an earthquake can include a Seiche. A Seiche is an earthquake-induced wave that impacts enclosed or partially enclosed bodies of water including reservoirs and swimming pools. The most severe hazard would exist if a Seiche occurred while many people were using a reservoir for recreation, especially if it resulted in over-topping of a dam or spillway structure. Fortunately, TID's reservoirs are located in the eastern portion of its service territory where the risk for large earthquakes is significantly lower than on the west side.

The impact of a Seiche on the canal system could occur if the earthquake were to happen during the irrigation season when the canals are full of water. The impacts from a Seiche to the canals would most likely be minimal.

Earthquakes can result in other secondary impacts that may include dam failure, landslides, and wildfires. These hazards are discussed in separate sections of this plan.

Since 1930, one earthquake epicenter of magnitude greater than 4.0 on the Richter Scale was recorded within Stanislaus County.

## Probability of Future Events

California has a high probability of a major earthquake occurring at any time. Fortunately for the TID, its service territory is not located in an area with significant earthquake risk. That being said, the state is very seismically active and major earthquakes can and do occur with some regularity. The greatest risk to the TID is from shaking and aftershocks resulting from earthquakes on more active faults in the San Francisco Bay Area or even Southern California. According to the California Earthquake Authority (CEA), there is a 76% probability of one or more $M_w$7.0+ striking Northern California in the 30 year period between beginning in 2014.

Due to the frequency of occurrence, the location of major, known faults, the geology of the soils and proximity to groundwater in portions of TID's service territory, and the potential for damage, the probability of an earthquake impacting TID is: ***Likely***.

## New Occurrences

There have been no new occurrences since the adoption of TID's annex to the Stanislaus County LHMP in 2011.

### Impacts

- Although not located in a seismically active area, TID's proximity to some of the most seismically active faults in California still makes it vulnerable to the effects of earthquakes.
- Fuel supplies for its power plants as well as its fleet of service vehicles is at risk to a catastrophic earthquake on any of the faults in the Bay Area.
- The Valley floor has the potential for liquefaction in a major earthquake, the extent of which is unknown. Liquefaction of the soil poses risk to the canal system as well as integrity of dams and water delivery systems. Damage or loss of the canal system could have devastating and long-lasting economic impact to the region due to the lack of surface water for agriculture.
- Below grade concrete pipelines are subject to damage in significant shaking events.
- Structures built prior to modern earthquake building standards could collapse or face structural damage during a moderate or severe earthquake potentially trapping or killing their occupants. Buildings most at risk include several of the structures at TID's Broadway Yard and North Annex properties and the CC Wright Hall at the Canal Campus.

## Vulnerability Overview

Although no known active faults are identified within the TID service territory, its proximity to active faults on the west side of the valley and especially in the Bay Area increases its vulnerability to earthquakes. The Earthquake Shaking Potential for California (2008) map developed by the California Geological Survey and the United States Geological Survey emphasizes the vulnerability of TID's service territory on the western side including the Interstate 5 (I-5) corridor. This information is reflected in the map included in this section of the LHMP. The cities of Patterson and Newman are nearest to major or active faults and will experience on average stronger earthquake shaking. Migrating east from the I-5 corridor the earthquake hazard level decreases. The map indicates the eastern portion of the District is distant from known, active faults and will experience lower levels of shaking less frequently.

## Identifying Structures and Estimating Potential Losses

The majority of the TID facilities are located on the floor of the Central Valley including power plants and substations and, irrigation canals. There are facilities in the western portion of the service territory for electrical distribution and transmission networks as well as similar facilities in the eastern portion of the District. The eastern portion of the TID also includes storage reservoirs, hydro-generation facilities at Turlock Lake and Don Pedro Reservoir, and the diversion dam and powerhouse at La Grange.

While there are no identified faults in the valley portion of the TID, and no active faults in the eastern section, there are active faults in the west, especially farther uphill in the Coast Range. Since TID's founding in 1887, there has been no recorded major damage caused by earthquakes. The TID did, however, experience a greater than normal incidence of crack repair in the District's concrete-lined irrigation canal system following the Loma Prieta earthquake in 1989, which was a magnitude 6.9 on the Richter Scale, centered in the Santa Cruz Mountains.

Because of the nature of TID's facilities and infrastructure such as, transmission and distribution power poles embedded in the ground, above-grade concrete-lined canals, the Lateral 8 regulating reservoir, and below-grade concrete pipelines, significant shaking of the ground or subsequent landslides present the potential for large-scale damage.
Newly constructed irrigation and electric facilities are appropriately designed and built to maintain serviceability for the determined risk.

Projects under FERC jurisdiction, such as Don Pedro Dam are likewise designed, constructed and maintained according to established criteria, regulations and directives to appropriately mitigate risk to acceptable levels.

This section is based on an inventory of existing and future buildings, infrastructure, and critical facilities that would most likely be impacted by an extreme weather-related event. Due to the unique nature of its facilities and assets, the TID has grouped them into the following categories:

- Water Storage
- Water Delivery
- Pumping and Drainage
- Generation
- Substations
- Transmission Lines
- Distribution Lines
- Other Buildings and Real Property
- Vehicles and Equipment

These groupings are consistent with TID's accounting structure and allow it to address portions of facilities which cross hazard boundaries. Within groupings, the value of the individual assets has been calculated using standard replacement cost methodologies.

All property within the TID is subject to seismic activity with those structures built before 1976 being the most vulnerable. For purposes of establishing a damage estimate, TID facilities are shown in the "Replacement Cost Summary" on page 5-18, grouped by their type and location within an established shaking intensity zone. These zones predict the probability of damaging shaking occurring over a period of 50 years.

Earthquake shaking generally occurs in three directions, up, down and side-to-side and is measured by its peak ground acceleration (PGA). Horizontal PGAs are generally larger than those in the vertical direction but this is not always true, especially close to large earthquakes. PGA is an important parameter (also known as an intensity measure) for earthquake engineering. Unlike the Richter and moment magnitude scales, PGA is not a measure of the total energy (magnitude, or size) of an earthquake, but rather of how hard the earth shakes at a given geographic point.

The peak horizontal acceleration (PHA) is the most commonly used type of ground acceleration in engineering applications and is often used within seismic building codes. In an earthquake, damage to buildings and infrastructure is related more closely to ground motion rather than the magnitude of the earthquake itself.

Peak horizontal acceleration is the approximate back and forth motion experienced by a structure during an earthquake and is used as a predictor of how it will respond. It's expressed as a percentage of the force of gravity or g-force. Areas with higher percentages of acceleration can expect more damage.

The map on  the following page shows the areas within TID and their exposure to shaking as a result of a seismic event. They are not predictions of earthquake occurrence nor are they fault maps. They are merely an estimate of the probability of exceeding a particular amount of ground motion in 50 years.

By comparing the location of TID's assets against the Seismic Hazard Map, the following replacement cost summary was devised. In order to quantify the effects of the various levels of anticipated spectral acceleration experienced by the structures inside a given zone, the approximate Modified Mercalli Index Shaking Intensity scale has been assigned to each zone. This has been done for illustrative purposes only and is not intended to be a predictor of specific damage.

The table below illustrates the values of District facilities located in the various shaking zones as shown on the Seismic Hazard Map located at the end of this section.

| Replacement Cost Summary | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Peak horizontal acceleration expressed as a percentage of the force of gravity (G) | Zone 1<br>16-18% G | Zone 2<br>18-20% G | Zone 3<br>20-30% G | Zone 4<br>30-40% G | Zone 5<br>40-50% G | Zone 6<br>50-60% G | Zone 7<br>60-80% G | Zone 8<br>80-120% G |
| Approximate Modified Mercalli Index Shaking Intensity | V<br>Moderate | VI-VII<br>Strong - Very Strong | VII<br>Very strong | VII-VIII<br>Very Strong -Severe | VIII<br>Severe | VIII<br>Severe | IX<br>Violent | IX<br>Violent |
| Water Delivery | $250,725,547 | $92,767,256 | $497,828,201 | $133,605,617 | $0 | $0 | $0 | $0 |
| Pumping & Drainage | $0 | $0 | $14,393,500 | $14,393,500 | $0 | $0 | $0 | $0 |
| Generation | $200,802,285 | $26,661,757 | $508,085,039 | $0 | $0 | $0 | $0 | $0 |
| Substations | $2,231,442 | $0 | $136,462,297 | $16,124,498 | $19,056,318 | $0 | $0 | $0 |
| Transmission | $2,625,000 | $2,625,000 | $98,250,000 | $20,000,000 | $1,500,000 | $0 | $0 | $0 |
| Distribution | $2,895,126 | $2,895,126 | $173,642,824 | $88,060,643 | $5,320,835 | $3,379,126 | $701,061 | $0 |
| Other Buildings and Real Property | $9,739,823 | $0 | $92,751,533 | $0 | $0 | $0 | $0 | $0 |
| Vehicles & Equipment | $5,123,973 | $0 | $32,010,471 | $0 | $0 | $0 | $0 | $0 |

## Analyzing Development Trends

There has been limited development in the Diablo Grande Community located seven miles west of Interstate 5 in the western portion of the TID. The development was approved by the Stanislaus County Board of Supervisors in 1993 for 5,000 residences, but as a result of the economic downturn in 2008 build-out of the residential area was stalled. Construction in the community has been slow to recover but building activity is projected to continue over the next few years.

Stanislaus County has initiated the development of the 1,528 acre former Crows Landing Airfield. The California Environmental Quality Act (CEQA) review is in process for the Crows Landing Industrial Business Park with an unknown time-line for construction of new buildings. It is possible that construction could begin within 5 years. All new buildings within Stanislaus County are constructed to current earthquake standards and any new construction will meet current building codes.

The General Plan provides for diverse land use needs by designating patterns that are responsive to the physical characteristics of the land. The County Planning and Community Development Department has a policy that urban development shall be prohibited in geological fault areas unless measures to mitigate the problem are included as part of the development application. The County enforces the provisions of the Alquist-Priolo Earthquake Fault Zoning Act that limits development in areas identified as having special seismic hazards prohibiting construction without a geologic study.

## Impact of Climate Change

The impact of climate change on earthquakes is unclear. Some articles claim climate change, and drought resulting from climate change, may increase the likelihood of earthquakes, but there seems to be no consensus within the scientific community.

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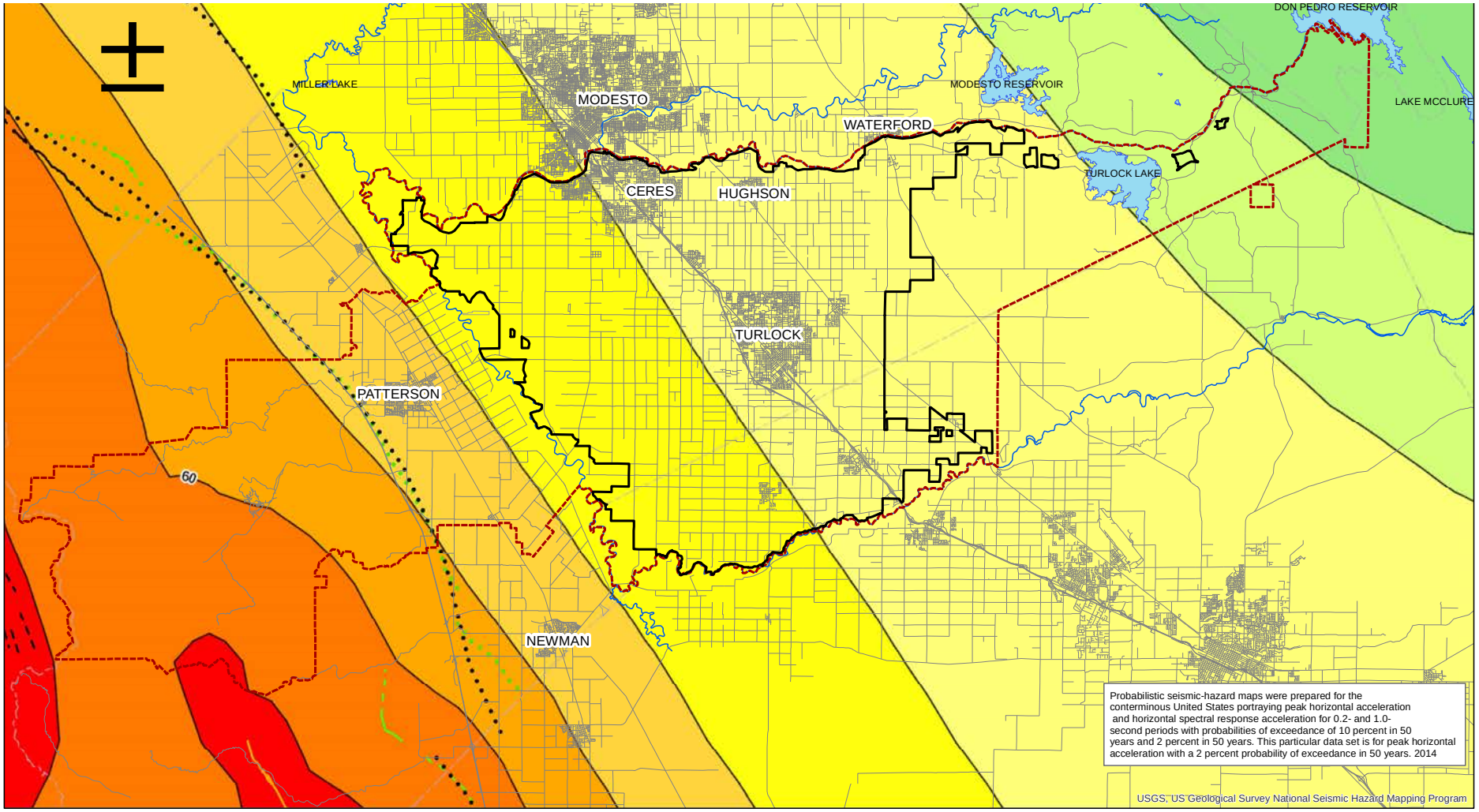
## Seismic Hazard Map




WATER & POWER

**Legend**

Electric Boundary

Irrigation Boundary

**Peak Horizontal Acceleration**

| | |
|---|---|
| Zone 1- .16-.18 G | Zone 5- .40-.50 G |
| Zone 2- .18-.20 G | Zone 6- .50-.60 G |
| Zone 3- .20-.30 G | Zone 7- .60-.80 G |
| Zone 4- .30-.40 G | Zone 8- .80-1.20 G |

0 5 10 20 Miles

**Seismic Hazard Map**
**2014 Peak Horizontal Acceleration**
**Electric and Irrigation Service Areas**

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## Risk Assessment

# Extreme Weather

Extreme weather is generally identified as any dangerous meteorological phenomenon that poses a risk to life or property, or requires the intervention of authorities.

The most common types of extreme weather that typically impact TID are damaging winds, extreme temperatures and localized extreme rainfall.

TID
WATER & POWER

## Identifying the Extreme Weather Hazard

Severe weather is generally identified as any dangerous meteorological phenomenon that poses a risk to life, property, or requires the intervention of authorities. Types of severe weather phenomena vary depending on location, altitude, topography, and conditions in the atmosphere.

Three types of severe weather typically impact the TID service territory: damaging winds, extreme temperatures, and hyper-localized extreme rainfall. Flooding can also be considered an extreme weather event and it is discussed separately in the Flood Risk Assessment section of this document.

An additional hazard that is not always considered as being weather-related is poor air quality, particularly air quality where the Air Quality Index (AQI) for airborne particulate matter (PM2.5) reaches high levels. This poor air quality can be attributable to many sources such as heavy truck traffic on I-5 and Highway 99, diesel-burning locomotives, tractors and irrigation pumps, wood-burning stoves and fireplaces, and wildfires. It's possible that smoke from wildfires burning many miles away from the TID service territory can be responsible for extremely hazardous air quality such as was experienced in this region in 2018. This is a result of the valley's topography – surrounding mountain ranges that trap air pollutants coupled with an inversion layer of warm air holding them near the ground.

The area served by the TID is mostly considered a "Mediterranean Climate" marked by hot, dry summers and mild winters. Generally, the extreme weather phenomena affecting this area most often is extreme heat in the summer and early fall. However, there have been instances of extreme cold, straight-line wind and tornadoes, and most recently, localized extreme rainfall causing flash flooding and dam failure to a facility owned by another entity upstream of Don Pedro Reservoir.

### Damaging Winds

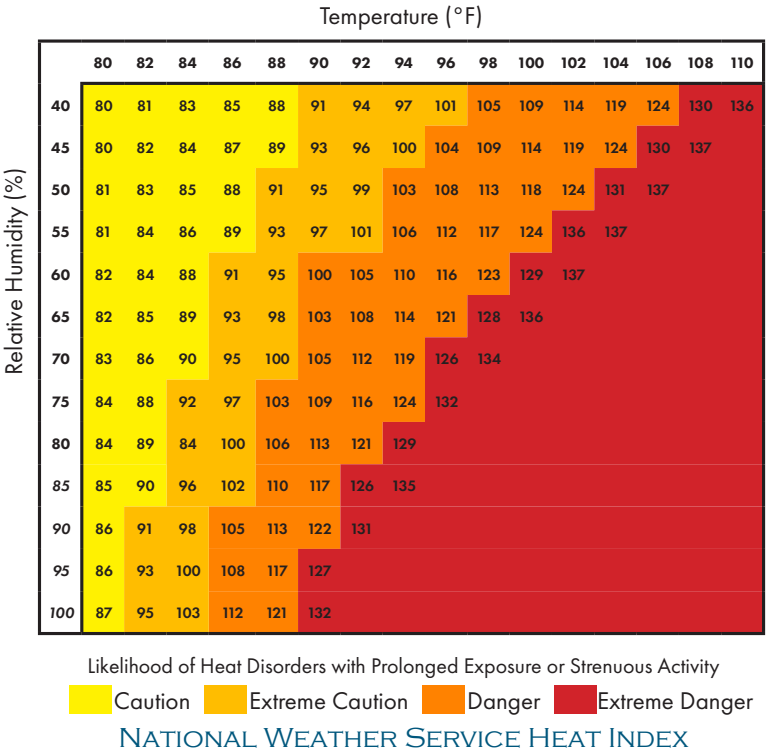
Damaging winds often called "straight-line" winds to differentiate the damage they cause from tornado damage, are classified by the National Severe Storms Laboratory as those exceeding 50-60 mph. Damage from severe thunderstorm winds account for half of all severe reports in the lower 48 states and is more common than damage from tornadoes. Damaging winds experienced in the TID service territory are most often related to winter storms.

### Tornadoes

A tornado is a narrow, violently rotating column of air that extends from the base of a thunderstorm to the ground. Because wind is invisible, it is hard to see a tornado unless it forms a condensation funnel made up of water droplets, dust, and debris. Tornadoes are the most violent of all atmospheric storms. The area served by the TID is considered at low risk for tornadoes however, they do exist here.

### Extreme Temperatures

Extreme temperatures include both heat and cold events, which can have a significant impact on human health and infrastructure. What constitutes "extreme heat" or "extreme cold" is somewhat subjective and can vary based on what the local population is accustomed to. Extreme temperatures can cause fatalities as they have the potential to push the human body beyond what it is capable of withstanding.



NATIONAL WEATHER SERVICE HEAT INDEX

### *Extreme Heat -*

The National Weather Service (NWS) describes extreme heat using a chart known as the Heat Index. The Heat Index is a measure of how hot it really feels when relative humidity is factored in with air temperature.

For example, if the air temperature is 90° F and the humidity is 75%, the heat index – how hot it actually feels – is 109° F. The NWS will issue a heat alert when the Heat index is expected to rise above 105°-110° Fahrenheit (depending on local climate) for at least two consecutive days.

### *Extreme Cold –*

Extremely cold air comes every winter in some parts of the country and is often made worse by wind-chill or, the combination of cold temperatures and wind speed. Fortunately for the TID, its service territory is located in a region known for mild winters and dangerous wind chill conditions are not common. However, temperatures low enough to cause damage to plants and agricultural crops as well as infrastructure do occur.

The NWS has a series of products to warn of potential cold weather conditions:

- Frost Advisory – areas of frost are expected or occurring posing a threat to sensitive vegetation
- Freeze Watch – the potential for significant, widespread freezing temperatures within the next 24-36 hours
- Freeze Warning – temperatures are forecasted to go below 32°F for a long period of time
- Hard Freeze Warning – temperatures are forecasted to go below 28°F for an extended period of time

## Localized Extreme Rainfall

While there is no single definition of extreme rainfall, per se, a good benchmark is a month's worth of rain for a given location falling in one day. Many events of extreme rainfall share characteristics, such as high moisture and an atmospheric disturbance. The longer these conditions persist in the same place, the more extreme rainfall is likely to exist.

Data from the recent U.S. climate assessment show that heavy rainfall is increasing in intensity and frequency. At the same time, vulnerability to extreme rainfall is increasing – and the effects of excessive rain are more impactful as more people live in low-lying areas and land development is changing drainage patterns. When extreme rainfall events occur and there is more rain than the soil can absorb, water will quickly run-off into rivers and creeks and can overwhelm culverts and drainage systems causing flash floods. This is dependent on several factors including rainfall rate, soil type, terrain and the amount of moisture in the soil.

## Poor Air Quality

The San Joaquin Valley has some of the nation's worst air quality, failing to meet federal health standards for both ozone (smog) and particulate pollution. Couple this with smoke from wildfires often burning many miles away drifting into the region and containing large amounts of fine particulates, known as PM2.5, and the problem is exacerbated. Particulates in PM2.5, including those smaller than 2.5 microns, can cause a wide range of health problems, from asthma to premature death. For

example, in November of 2018 the AQI for PM2.5 in Turlock exceeded 150 reaching the Unhealthy category for several days, a level at which everyone may begin to feel the effects with members of sensitive groups being more strongly affected.

## Extreme Weather Hazard Profile

| Natural Hazard | How Hazard was Identified | Why Hazard was Identified |
|---|---|---|
| Extreme Weather | • Input from the Planning Team<br>• Past instances of extreme weather in the TID Territory<br>• The Department of Industrial Relations Occupational Safety and Health Standards Board adoption of an emergency regulation regarding elevated AQI for PM2.5. | • Instances of extreme weather phenomenon have the potential to cause widespread power outages and damage to facilities and infrastructure.<br>• PM2.5 is associated with health problems from asthma to premature death. |

## Location

There is a lack of data separating damage caused by wind, extreme heat or cold and localized extreme rainfall which makes it difficult to assess exposure and vulnerability to these types of events. It can be assumed, however that the entire District is at some level of risk to all of these hazards.

Certain areas of the District may be more exposed to one type of risk or another due to their topography, geographic location and historical weather patterns. For example; District facilities located in the extreme eastern and western portions of TID's service territory could be at greater risk for wind damage due to their elevation and the impact of canyons on wind speeds. Conversely, overhead electrical facilities located in neighborhoods with large trees could be at greater risk due to falling branches or entire trees being blown over due to high winds and saturated soil. Likewise, the entire District is subject to extreme heat every summer and it is not uncommon for heat advisories and warnings to be issued for the entire District several times during the summer season.

The geography and topography of the region where TID is located contribute to increased levels of PM2.5 especially when a warm layer of air, known as an inversion layer traps fine particulate matter close to the ground. The absence of wind to mix the PM2.5 out of the air also contributes to poor air quality.

## Extent

### Damaging Winds

Since 1950, there have been 22 confirmed tornadoes within 30 miles of Turlock, the largest being an EF2 (wind speed 111-135 mph) in 1953 which caused no deaths or property damage. On November 15, 2015, an EF1 tornado (wind speed 86-110 mph) touched down in Denair causing property damage and downing power lines, knocking out power to most of the town.

During the winter it is not uncommon for storms with wind gusts of 50 mph or more to impact the District. In January of 2019, one such storm occurred causing power outages some of which lasted for more than 8 hours.

### Extreme Temperatures

Summers in the TID are very warm with average daytime high temperatures averaging 88° F to 94° F from June through September. The District typically experiences 10-20 days a year with daytime high temperatures of 100° F or higher. It is also common to have several consecutive days of 100° F temperatures and heat waves lasting a week or more.
When there are several consecutive days of extreme heat, it is not uncommon for nighttime lows to remain mild, often dropping only into the 60°'s or 70°'s overnight. This can pose particular problems for electrical equipment as the load from customers

using air conditioning remains high overnight as well as reduced recovery time for electrical equipment.

Employees working in extreme heat conditions can experience heat related health risks including heat stroke or heat exhaustion. This can include employees working in facilities where there is no air conditioning.

Although not as common as extreme heat and not as severe as what is experienced in other parts of the country, extreme cold does occasionally occur in the TID service territory. For example; in December 1990, temperatures in portions of Stanislaus County did not rise above 25° F for three consecutive days. Not only was the agriculture industry affected with acres of permanent crops destroyed but, facilities and infrastructure were damaged by broken water pipes. Thirty-three counties were included in a disaster declaration.

Again in December 1998, an arctic air mass moved over California leading to a devastating freeze to crops and affecting businesses, people and various public assistance agencies. The most recent extreme cold event occurred in January 2007 when Stanislaus County experienced $5.9 million in freeze-related agricultural losses.

**Impacts**

- Poor air quality can cause asthma, chronic obstructive pulmonary diseases and impaired lung function, lung cancer, heart attacks, and strokes for those working outside including TID Line Department, Customer Service, and Construction and Maintenance personnel.
- High winds can damage the overhead electrical system.
- Localized extreme rainfall events can adversely affect reservoir operations.
- Extreme heat can cause heat exhaustion or heat stroke to employees working outdoors or, in non-climate controlled facilities.
- Extreme heat with poor overnight temperature recovery can damage underground and overhead electrical facilities.

## Localized Extreme Rainfall

Recently, localized extreme rainfall events have occurred in the foothill regions east of the Don Pedro Reservoir and in the Dry Creek watershed just north of the TID.

On March 21-22, 2018, an atmospheric river moved into the State of California, coupled with convective showers that delivered 8-9 inches of rain in the higher elevations of the Sierra and 4-5 inches in the hills above Don Pedro Reservoir. The combination of these two events delivered extreme amounts of precipitation and runoff in a very short amount of time causing major flooding in the town of Groveland, as well as damage across Tuolumne County including soil erosion under roads and culverts, erosion of water conveyance and sewer systems that were inundated with excess water, debris and silt. Damage estimates topped $74 million.

On March 22, 2018, at approximately 2:45 p.m., the National Weather Service issued a Flash Flood Warning due to imminent dam failure of the Moccasin Reservoir Dam, owned and operated by the San Francisco Public Utilities Commission and located approximately one mile upstream of Don Pedro Reservoir. As a result, facilities downstream of the dam along Moccasin Creek were evacuated. A portion of the earthen spillway was eroded creating an uncontrolled release from the reservoir, inundating the Moccasin fish hatchery, washing mud and debris into Moccasin Bay and undercutting a portion of Highway 49 causing it to collapse.

The storm was also responsible for two deaths when drivers were swept off the roadway and their vehicles washed downstream.

## Poor Air Quality

The area where TID is located is home to some of the worst air quality in the nation with five of the ten worst cities for air pollution located in the San Joaquin Valley. When coupled with smoke from wildfires, levels of PM2.5 can make the already poor air quality reach unhealthy or extremely unhealthy levels as occurred in 2018.

## Probability of Future Events

Due to a history of wind events associated with winter storms occurring in the TID, the probability of future wind events is: **Highly Likely.**

The likelihood of localized extreme rainfall occurring is more difficult to predict. However, it is noteworthy that the area served by the TID has experienced both the driest period of annual precipitation in 1,500 years and, two of the wettest years on record within a five year time span. This could be an indication that weather patterns are becoming more volatile with greater extremes between wet and dry precipitation years. For this reason, the likelihood of more events involving localized extreme rainfall is: **Likely**.

Extreme heat affecting the TID service territory is nearly a given as it occurs at times during most summer months. For this reason, the likelihood of an extreme heat event occurring locally is: **Highly Likely**.

Extreme cold events are less common but, the impacts from them can be significant as structures and facilities are not built to withstand extremely cold temperatures. The likelihood of an extreme cold event is: **Likely**.

As noted above, poor air quality is nothing new in the region served by the TID. The bad air is made worse when an inversion layer forms trapping particulates close to the ground and there is little to no wind to mix them out. The likelihood of an AQI for PM2.5 of 151 or more is: **Likely**.

## New Occurrences

| | |
|---|---|
| Damaging Winds | Since the storms of January 2019, there have been no new occurrences of damaging winds in the TID |
| Localized Extreme Rainfall | Since the extreme rainfall event impacting Moccasin Dam and Don Pedro Reservoir in 2018, there have been no new occurrences |
| Extreme Temperatures | Extreme heat occurs nearly every summer. Since January 2007, there have been no new occurrences of extreme cold. |
| Poor Air Quality | Since November 2018, there have been no new occurrences of the AQI for PM2.5 meeting or exceeding 151 |

## Vulnerability Overview

Since extreme weather can strike any portion of TID's service territory at any time, the District remains vulnerable to its effects. All areas are subject to wind, extreme heat or cold and the portions of the District on the east and west sides are more vulnerable to localized extreme rainfall due to their topography and location in foothill regions.

Additionally, poor air quality due to wildfire smoke or other conditions occurring at some distance from TID can cause the AQI to rise to a level where steps to protect employees are mandated.

## Identifying Structures and Estimating Potential Losses

This section is based on an inventory of existing and future buildings, infrastructure, and critical facilities that would most likely be impacted by an extreme weather-related event. Due to the unique nature of its facilities and assets, the TID has grouped them into the following categories:

- Water Storage
- Water Delivery
- Pumping and Drainage
- Generation

- Substations
- Transmission Lines
- Distribution Lines
- Other Buildings and Real Property
- Vehicles and Equipment

These groupings are consistent with TID's accounting structure and allow it to address portions of facilities which crossed hazard boundaries. Within groupings, the value of the individual assets has been calculated using standard replacement cost methodologies.

For purposes of identifying structures and estimating potential losses in this risk assessment, each identified extreme weather phenomena has been listed separately with the associated structures and exposure levels.

When assessing the risk due to poor air quality, the assets at risk are District employees and their health. For this reason, the TID is not including a replacement cost summary valuing the assets at risk due to this identified threat. Costs associated with this risk are addressed in the mitigation section for this hazard.

## Damaging Winds Replacement Costs

| Damaging Winds Replacement Cost Summary | |
|---|---|
| Water Delivery | $0 |
| Pumping & Drainage | $0 |
| Generation | $0 |
| Substations | $0 |
| Transmission | $125,000,000 |
| Distribution | $149,300,379 |
| Other Buildings and Real Property | $47,089 |
| Vehicles & Equipment | $0 |

## Localized Extreme Rainfall Replacement Costs

| Localized Extreme Rainfall Replacement Cost Summary | |
|---|---|
| Water Delivery | $465,717,348 |
| Pumping & Drainage | $0 |
| Generation | $227,464,042 |
| Substations | $2,231,442 |
| Transmission | $0 |
| Distribution | $0 |
| Other Buildings and Real Property | $2,340,893 |
| Vehicles & Equipment | $0 |

### Extreme Temperatures Replacement Costs

| Extreme Temperatures Replacement Cost Summary | |
|---|---|
| Water Delivery | |
| Pumping & Drainage | $0 |
| Generation | $0 |
| Substations | $0 |
| Transmission | $0 |
| Distribution | $27,594,361 |
| Other Buildings and Real Property | $4,190,107 |
| Vehicles & Equipment | $0 |

## Analyzing Development Trends

There is no significant development in the unincorporated areas of TID's service territory that would be impacted more significantly than others by extreme weather events. Most urban development has been infill projects in cities within the District.

Stanislaus County discourages development in areas prone to flooding and does not allow development within identified floodways. The county requires that development within the 100-year flood boundary meets the requirements of Chapter 16.50 Flood Damage Protection of the County Code and within the designated floodway, Reclamation Board approval is needed.

## Impact of Climate Change

The impact of climate change may increase the volatility of weather patterns impacting the TID by producing unpredictable, strong or slow-moving storms which have the potential to produce large amounts of rain in a relatively small area. These storms are difficult to predict and their impacts are uncertain. This is evident in the event which caused the dam failure incident at the Moccasin Reservoir in 2018. This volatility may also affect winter storms by producing stronger winds with the potential to cause more widespread damage to overhead electrical facilities and equipment.

It can also be expected that increasingly warming temperatures could further exacerbate the occurrence of wildfires and potentially influence wind and weather patterns affecting air quality in the region served by the TID.

At this time, it's unclear what the specific impacts of climate change will be to the TID as it relates to its facilities, infrastructure, and the risks to its employees from poor air quality.


## Risk Assessment

# Flooding

Flooding is the temporary inundation of land that is normally dry and is the most common and destructive disaster that occurs in the U.S.

Flooding has been a major problem throughout the history of Stanislaus County especially prior to the construction of dams upstream along the Stanislaus, Tuolumne, Merced, and San Joaquin rivers.

The largest flood in the recorded history of the region occurred in 1862 and extended from portions of Washington and Idaho through Oregon, California, Nevada, Utah, Arizona, and western New Mexico.

The flood inundated or swept away entire towns, and damaged or ruined nearly everything in its path. It has been described as the worst disaster ever to strike California.

WATER & POWER

## Identifying the Flooding Hazard

A flood is the temporary inundation of land that is usually dry and may be caused by an overflow of water from a lake, river or the ocean in which water over-tops or breaks levees, or it may occur due to an accumulation of rainwater on saturated ground in an areal flood. Floods can also occur in rivers when the flow rate exceeds the capacity of the river channel, particularly at bends in the river or in meandering waterways.

Some floods develop slowly while others occur in just a few minutes and without visible signs of rain. These are known as "Flash Floods" and are often associated with desert areas such as Nevada, Arizona and New Mexico however, flash floods do occur in other types of environments and locations.

Urban flooding occurs in developed locations where the amount of rainfall received during a particular event exceeds the drainage capacity of the storm water system. Due to the amount of impervious surfaces in most developed areas, the rainfall is not absorbed into the ground and must be drained away by the storm water system and discharged into rivers, streams or storage ponds. When there is more rain than the system can accommodate, flood waters can rise rapidly. Additionally, storm drains are often clogged with debris limiting their ability to channel runoff to the storm drain system. During urban floods, streets can become inundated and water can back up into homes and businesses putting lives and property at risk.
The area served by the TID does have some risk of urban flooding but the largest risk is from the Tuolumne, Merced and San Joaquin Rivers overflowing their banks due to high flow conditions from runoff or flood control releases from upstream reservoirs such as Don Pedro.

## Flooding Hazard Profile

| Natural Hazard | How Hazard was Identified | Why Hazard was Identified |
|---|---|---|
| Flooding | • The TID annex to the 2011 Stanislaus County LHMP<br>• Input from the Planning Team<br>• Previous instances of flooding in the TID territory | • Flooding has the potential to cause loss of life and widespread property damage. |

## Location

Flooding along the Tuolumne River is limited due to operations at Don Pedro, but is not completely eliminated by them. The Tuolumne is capable of large flows during seasonal storms and the snow-melt season. It is not unusual to see flows on the Tuolumne into Don Pedro of 50,000 to 75,000 cfs in a typical winter storm event. Flows over 100,000 cfs have been recorded during large storms.

The TID monitors the USGS stream gauge (USGS 11290000) located near the Ninth Street Bridge on the Tuolumne River in Modesto and operates Don Pedro so as to keep the river below Flood Stage whenever possible. The Tuolumne is considered to be at Flood Stage when its elevation measures 55 feet ASL at the Ninth Street gauge.

Just upstream from this gauge, Dry Creek empties into the Tuolumne contributing to the flows measured at Ninth Street. When flows on Dry Creek are high, operations at Don Pedro factor in those flows when considering their releases.

The Tuolumne is a tributary of the San Joaquin River and joins the San Joaquin near Vernalis located west of Modesto. At times, operations on the tributaries to the San Joaquin must be modified to allow for flows from Friant, Exchequer and New Melones Dams.

## Extent

Flooding has been a major problem throughout the history of Stanislaus County, particularly with the encroachment of urban growth into flood plains. Major floods have occurred in 1861, 1938, 1950, 1955, 1969, 1983, 1995, 1997, and 1998. The latest flood event occurred in 2017 with impacts to low lying areas along the Tuolumne River and the confluence of the Tuolumne and San Joaquin. The State Reclamation Board has identified and adopted designated floodways, defined in feet per second of flow, along the San Joaquin River, Stanislaus River, Tuolumne River, and portions of Dry Creek. Seasonal flooding along Dry Creek and the San Joaquin River is common during very wet years or periods.

The Federal Emergency Management Agency Flood Insurance Rate Map (FIRM) provides information on flood risk in Stanislaus County using 100 and 500-year floodplain GIS mapping layers. Areas within the 100-year floodplain zone have a 1% annual exceedance probability of flood, meaning a flood has a 1% chance of being equaled or exceeded in any single year in those areas. Areas between the limits of the 100-year and 500-year floodplain zone have a 0.2% annual chance of flooding. The 100-year and 500-year floodplain zones are identified on the "FEMA Flood Hazard Map" on page 5-37.

According to the 2016 Stanislaus County Local Hazard Plan, over 3,000 people are living in the Tuolumne River 100-year flood plain with a total property value of $174M. The number climbs to more than 10,000 people and nearly $200M in property value for the 500-year flood plain.

It's difficult to determine precise impacts to agriculture production as a result of flooding in the TID irrigation service territory as making such estimates is highly variable depending on the level of flooding, the types of crops and properties damaged, the extent to which structures would fail, and the acreage of inundated land. In past floods including the flood of record for the Don Pedro Project which occurred in 1997, the majority of property damage locally occurred in and adjacent to the historic river channels of the Tuolumne, Merced, and San Joaquin.

In addition to the location of any flooding incident, timing must also be considered when assessing potential damage. If a flood were to occur just before the beginning of the irrigation season and the canal system sustained long-term damage rendering it unusable for a significant period, the economy of Stanislaus County could be severely impacted. Water from the Tuolumne River delivered to growers by the Turlock Irrigation District is critical to the production of all agricultural commodities produced in its irrigation service territory. This includes many high-value permanent crops and crops that support livestock herds. The water delivered by TID supports livestock production indirectly when crops produced with water from the District are consumed as feed at livestock operations in the region, regardless if they are located within or outside District boundaries.

### Impacts

- Flooding occurring along the Tuolumne and San Joaquin rivers as well as Dry Creek in Modesto can result in loss of life, property damage and damage to agricultural land and facilities.
- Dry Creek, an uncontrolled tributary of the Tuolumne River, can impede releases from Don Pedro when it is running high.
- Flooding can result in road and bridge closures restricting travel, increasing commute times, and lengthening critical emergency response potentially resulting in loss of life.
- Individuals experiencing homelessness and vulnerable populations living in mobile home parks located in low-lying areas along the Tuolumne and San Joaquin rivers are at greatest risk.
- 3,000 people live in the 100-year flood plain for the Tuolumne River and over 10,000 live in its 500-year flood plain and would be directly impacted by a flood.

According to the Socioeconomics Study Report prepared for the re-licensing of the Don Pedro Dam in April of 2014, the crop production value in the TID irrigation service territory averages $359 Million annually, not including livestock values. To support local crop production, a comprehensive infrastructure of agricultural-support businesses and service providers has developed in the region. Changes to agricultural production can have widespread ripple effects throughout the local economy. According to the report, based on baseline levels of crop production between 2007 and 2011, agricultural activity supported by the Don Pedro Project directly contributed $527.9 million in output, $171.7 million in annual labor income, and nearly 4,400 jobs at the farm level.

Accounting for the indirect and induced effects as money "ripples" through the regional economy, the total effects include $854.2 million in annual output, $278.1 million in annual labor income, and roughly 7,300 jobs (full and part-time) in Stanislaus, Merced, and Tuolumne counties.

## Probability of Future Events

The probability of flooding in Stanislaus County is likely. Historically, there have been clusters of flooding incidents within the County approximately every 14 years. Flooding risks are present among several creeks and rivers, including Del Puerto Canyon, Dry Creek, Orestimba Creek, Salado Creek, San Joaquin River, Stanislaus River, and the Tuolumne River. Stanislaus County is most regularly impacted by flooding along Dry Creek, the Tuolumne River and San Joaquin River.

The Dry Creek watershed is a major factor in flooding in eastern Stanislaus County and the east side of Modesto. The watershed was traditionally unmonitored and uncontrolled. To improve monitoring capabilities, in 2011 Stanislaus County purchased a Remote Automated Weather System (RAWS) to help monitor rainfall on the watershed near Crabtree Road. Turlock Irrigation District has installed another weather station on the upper Dry Creek watershed to give further capabilities for managing this flood hazard. Due to the history of flood events and the uncontrolled nature of Dry Creek and its impacts on the Tuolumne, the probability of flooding to occur is: **Likely**

## New Occurrences

Since Stanislaus County's LHMP update was released in 2016, there has been one new occurrence of flooding. In December of 2016 through February of 2017 a series of major winter storms impacted the Tuolumne River Watershed raising the level of Don Pedro to its maximum elevation of 830 feet ASL. In response, TID made pre-flood releases from Don Pedro, as provided in the Flood Control Manual, by operating one of the spillway gates creating flows of approximately 16,000 cfs in the Tuolumne River. These flows resulted in the river reaching 59 feet ASL at the Ninth Street Bridge in Modesto on February 22, 2017. Initial damage assessments from this event totaled approximately $5.2M in private and public property damage and agricultural crop losses. On March 7, 2017 Governor Brown requested a Presidential Major Disaster Declaration as a result of the February 2017 storms and their impacts to California.

## Vulnerability Overview

There is commonly seasonal flooding along the San Joaquin River and Dry Creek in wet years. Most flood conditions are from heavy, prolonged rain or rapid snow thaw. Flooding could involve extensive life and property loss, interruption of transportation and communications systems, loss and damage to agricultural land, and interruption of government infrastructure.

Most of the San Joaquin Regional Flood Management Working Group is focused on reducing the flood risk on the San Joaquin River. The working group includes local and state government, irrigation districts and levee districts. The group has proposed mitigation measures and has made available grants to help local government and districts implement recommendations. The working group has recommended increasing transitory storage on the San Joaquin River.

Stanislaus County and the Turlock Irrigation District have installed or is in the process of installing equipment to monitor the flow of Dry Creek and rain amounts within that watershed.

Historically, emergency officials have received notice of potential flooding before the incident giving first responders time to notify and evacuate residents. The more vulnerable populations are those who are not able to self-evacuate including the elderly, young and those with disabilities. The homeless population is vulnerable in a flood incident and may need expanded notification and relocation efforts. Law enforcement and fire departments have coordinated the notification of homeless in past incidents. Drivers who ignore warnings of flood are also a population of concern.

## Repetitive Loss Properties

The County Repetitive Loss Area maps do indicate areas within TID's boundaries that include repetitive loss properties. While TID does have irrigation and electrical facilities in and around these properties, the TID itself has not experienced a repetitive loss to those facilities. The TID therefore considers its facilities in those areas as low to moderate vulnerability to future loss.

## Identifying Structures and Estimating Potential Losses

This section is based on an inventory of existing and future buildings, infrastructure, and critical facilities that would most likely be impacted by an extreme weather-related event. Due to the unique nature of its facilities and assets, the TID has grouped them into the following categories:

- Water Storage
- Water Delivery
- Pumping and Drainage
- Generation
- Substations
- Transmission Lines
- Distribution Lines
- Other Buildings and Real Property
- Vehicles and Equipment

These groupings are consistent with TID's accounting structure and allow it to address portions of facilities which crossed hazard boundaries. Within groupings, the value of the individual assets has been calculated using standard replacement cost methodologies.

Using maps from the FEMA 100 and 500-year floodplain layers, the following table lists a summary of the properties and values at risk from 100-year and 500-year floods from various source rivers.

| Flooding Replacement Cost Summary | | |
|---|---|---|
| | 100 Year Flood | 500 Year Flood |
| Water Delivery | $15,364,914 | $15,364,914 |
| Pumping & Drainage | $0 | $0 |
| Generation | $0 | $0 |
| Substations | $23,043,034 | $35,180,816 |
| Transmission | $5,700,000 | $10,700,000 |
| Distribution | $27,689,474 | $27,689,474 |
| Other Buildings and Real Property | $0 | $0 |
| Vehicles & Equipment | $0 | $0 |

## Analyzing Development Trends

There is no significant development in the TID service area potentially impacted by flooding since the last update to Stanislaus County's LHMP in 2016. Most development has been infill in cities within the county.

Stanislaus County has several requirements pertaining to development in unincorporated areas of the county associated with increased risk of flooding including:

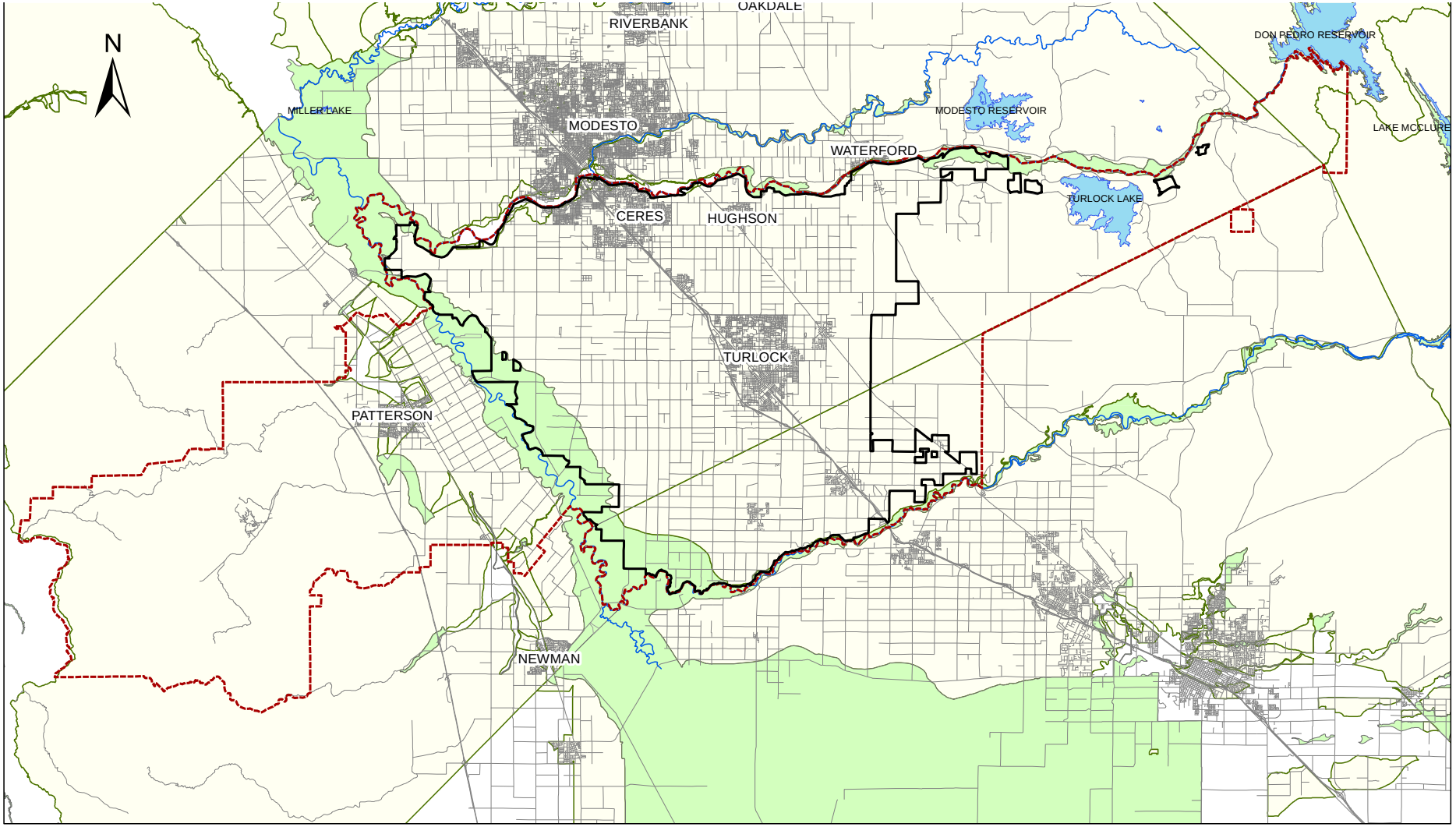
- Not allowing development in areas that are within the designated floodway. Development within the 100-year flood boundary shall meet the requirements of Chapter 16.50 Flood Damage Protection of the County Code and within the designated floodway shall obtain Reclamation Board approval.

- The County makes information available to landowners in areas subject to flooding and supports the formation of improvement districts including flood control districts to eliminate safety hazards.
- The County also utilizes the California Environmental Quality Act (CEQA) process to ensure that development does not occur that would be especially susceptible to flooding. Most discretionary projects require review for compliance with CEQA. As part of this review, potential impacts must be identified and mitigated.
- The County continues to support the Federal Emergency Management Agency (FEMA) Flood Insurance Program so that residents who qualify may purchase such protection.

## Impact of Climate Change

The area served by the TID has always been known to have periods of extreme dryness where there is virtually no risk of flooding followed by historically wet years with an associated increased risk of floods. It has been the observation of the TID that the climate is becoming more volatile with periods of historic drought followed immediately by some of the wettest years on record. What is unknown is how much of that volatility is attributable to climate change and to what extent future precipitation will be impacted by it.

## FEMA Flood Hazard Map




**Legend**

Irrigation Boundary

Electric Boundary

**FEMA 100 Year Flood Risk**

A-100 Year Zone

X-500 Year Zone

0 5 10 20 Miles

**Flood Hazard Map**
**F.E.M.A. 100 Year Flood Insurance Risk**
**Electric and Irrigation Service Areas**

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## Risk Assessment

# LANDSLIDE

Landslides can be caused by many factors including earthquakes, storms, volcanic eruptions, fire and human modification of land. The most deadly landslides are the ones that occur quickly, like debris flows, often with little notice.

In a landslide, masses of rock, earth or debris move down a slope and can develop during intense rainfall, runoff, or rapid snow-melt, changing the earth into a flowing river of mud or "slurry." They can flow rapidly, striking with little or no warning and can travel many miles from their source, growing in size as they pick up trees, boulders, cars and other materials. Debris flows don't always stay in stream channels and they can flow sideways as well as downhill.

LADWP
WATER & POWER

## Identifying the Landslide Hazard

A landslide is defined as the movement of a mass of rock, debris, or earth down a slope. Landslides are a type of "mass wasting," which denotes any down-slope movement of soil and rock under the direct influence of gravity. The term "landslide" encompasses five modes of slope movement: falls, topples, slides, spreads, and flows. These are further subdivided by the type of geologic material (bedrock, debris, or earth). Debris flows (commonly referred to as mud-flows or mudslides) and rockfalls are examples of common landslide types.

Almost every landslide has multiple causes. Slope movement occurs when forces acting down-slope (mainly due to gravity) exceed the strength of the earth materials that compose the slope. Causes include factors that increase the effects of down-slope forces and factors that contribute to low or reduced strength. Landslides can be initiated in slopes already on the verge of movement by rainfall, snow-melt, changes in water level, stream erosion, changes in groundwater, earthquakes, volcanic activity, disturbance by human activities, or any combination of these factors. Earthquake shaking and other factors can also induce landslides underwater. These landslides are called submarine landslides. Submarine landslides sometimes cause tsunamis that damage coastal areas.

Areas that have recently been burned in a wildland fire are especially susceptible to landslides. Post-fire landslide hazards include fast-moving, highly destructive debris flows that can occur in the years immediately after wildfires in response to high-intensity rainfall events, and those flows that are generated over longer time periods accompanied by root decay and loss of soil strength. Post-fire debris flows are particularly hazardous because they can occur with little warning, can exert great impulsive loads on objects in their paths, and can strip vegetation, block drainage ways, damage structures, and endanger human life.

## Landslide Hazard Profile

| Natural Hazard | How Hazard was Identified | Why Hazard was Identified |
|---|---|---|
| Landslide | • Identified in the TID Annex to Stanislaus County's LHMP update in 2010<br>• Previous occurrences in Stanislaus County | • Previous occurrences<br>• Potential for new occurrences |

## Location

Hazards due to landslide events are mostly limited to areas within the foothills at the western and eastern edges of the TID service territory. The western edge of the TID service territory is part of the Diablo Range which stretches almost 200 miles along the west side of the Central Valley, running parallel to the Pacific Ocean. Virtually the entire area located west of Interstate 5 is composed of geological formations that, due to structure, slope, runoff, lack of vegetation, and earthquake and human activity, are considered extremely susceptible to failure and sliding. The eastern portion of the TID service area is located in the western foothills of the Sierra Nevada in Tuolumne County. Areas of the District around Turlock Lake and towards La Grange contain geology and formations which could be susceptible to landslide and debris flows. This is especially true of the river canyon area in the upstream reaches of Don Pedro Reservoir. In 2013 the Rim Fire burned over 400 square miles of the forest and steep canyons of the Tuolumne River watershed. Some areas burned with such intensity that they are now hydrophobic, meaning the ground in those particular locations is no longer capable of absorbing water leading to the possibility of debris flows which eventually could wind up in the reservoir.

## Extent

Landslides are often triggered by other natural hazards such as earthquakes, heavy rain, flood or wildfires. Landslide frequency is often related to the frequency of these other hazards. In Stanislaus County, landslides typically occur during and after major storms so the potential for landslides largely coincides with the potential for sequential severe storms that saturate steep,

vulnerable soils. In the winter of 1982-1983, a saturation of the soil in the Diablo Range area resulted in a considerable amount of damage to Del Puerto Canyon Road. During the winter storms of 1997, Del Puerto Canyon Road experienced an approximately .10 mile landslide consisting of mud, rocks, and boulders. One lane was closed for repair for 2-3 months while the other lane stayed open to traffic. This caused minor traffic delays since the road is not a major thoroughfare. These types of landslides are typical for this area following storms due to vertical cuts for roadways without sufficient sloping for the run-off.

Sudden "mudslides" gushing down rain-sodden slopes and gullies are widely recognized by geologists as a hazard to human life and property. Most "mudslides" are localized in small gullies, threatening only those buildings in their direct path. They can burst out of the soil on almost any rain-saturated hill when rainfall is heavy enough and often they occur without warning in localities where they have never been seen before.

The ashy slopes left denuded by wildfires in California are especially susceptible to "mudslides" during and immediately after major rainstorms.

Debris avalanches and debris flows (both popularly called "mudslides") are shallow landslides, saturated with water, that travel rapidly downslope as muddy slurries. The flowing mud carries rocks, bushes, and other debris as it pours down the slopes. A debris avalanche (Figure 1) is a fast-moving debris flow that travels faster than about 10 mph or approximately 25 yards in about five seconds. Speeds in excess of 20 mph are not uncommon, and speeds in excess of 100 mph although rare, do occur locally.
Debris avalanches pose hazards that are often overlooked. Houses in the path of debris avalanches can be severely damaged or demolished. Persons in these structures can be severely injured or killed.

**Impacts**

- Roads in the Diablo Range west of Patterson are the most susceptible to landslide activity, with Del Puerto Canyon Road at the greatest risk. It experiences landslide or rockfall events several times each year. In the Eastern portion of the District, highway 132 experiences landslides fairly regularly after significant rain events. Long-term blockage of either of these two roads would effect our ability to reach facilities to make repairs.
- The power plant at Don Pedro is subject to rock-fall events.
- The Main Canal between La Grange Dam and Turlock Lake is also vulnerable. If that canal were lost to a landslide during the irrigation season for a significant period of time, the impacts to the local economy could be severe.

Most rainstorms are of such low intensity that they do not trigger debris avalanches. Some intense storms may trigger only a few debris avalanches. However, when the ground is already saturated from previous rain, even relatively short high-intensity rainstorms may trigger debris avalanches. The most common cause of debris avalanches and debris flows is the combination of heavy rainfall, steep slopes, and loose soil. Most fairly steep slopes have enough soil and loose rock for potential landslides. Although "stable" when dry, such slopes can produce local debris flows, often without warning.

Debris flows are known to start on slopes as low as 15 degrees, but the more dangerous, faster-moving flows (debris avalanches) are more likely to develop on steeper slopes. About two-thirds of all debris avalanches start in hollows or troughs at the heads of small drainage courses. Typically, a debris avalanche bursts out of a hillside and flows quickly downslope, inundating anything in its path. Because the path of a debris flow is controlled by the local topography just like flowing water, debris avalanches and debris flows generally follow stream courses.

## Probability of Future Events

It is evident that the steep slopes and undesirable geology of the area on the west side of the District, even without considering the possibility of an earthquake, present risks in certain conditions. It is common for minor

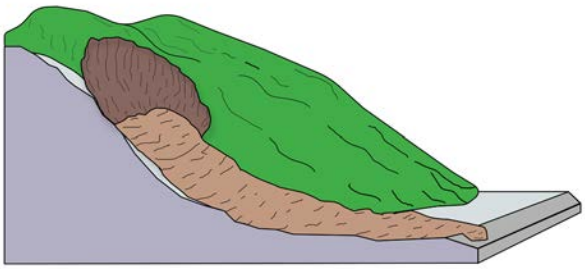

Figure 1 - Debris Avalanche

incidents requiring some debris clearing of Del Puerto Canyon Road to occur on average of 5-12 times a year. On the east side of the District, there are frequent landslides on Highway 132 along the river bluffs. These landslides are usually due to rain and occur during or within days after a storm.

It is also evident, based on the amount of debris and turbulence observed in the water entering Don Pedro Reservoir after a storm affecting the Tuolumne Watershed, that soils are slipping upstream of the reservoir and entering the river. This is most likely due to the Rim Fire and the effects are still being observed five years post-fire.

Based on these past events and observations the risk of landslides impacting the Diablo Range, areas along Hwy 132, and the Tuolumne River inflows to Don Pedro Reservoir is: **Highly Likely**

## New Occurrences

A significant rain event in January 2016 required one lane closure of Del Puerto Canyon Road which caused minimal impact to traffic. The more recent storms of January 2017 created landslides across Del Puerto Canyon Road ranging from 3 feet to 40 feet in size. These slides consisted of mud, rocks, and boulders that caused minor traffic delays. Clean up was completed within 1-2 hours and the road was fully open for traffic. Also during the January 2017 storms, two landslides occurred on Highway 132 approximately one mile from La Grange Road. The landslide consisted of rocks and boulders and closed one lane for about three hours while Caltrans removed the debris. The slides were 10 to 15 feet onto the roadway.

## Vulnerability Overview

Impacts from landslides in the TID service territory are limited to the areas of the extreme eastern and western portions of the District. In particular, the area of Del Puerto Canyon, especially Del Puerto Canyon Road sees the most landslides in a typical year. Landslides on Del Puerto Canyon Road requiring debris removal occurs 5 to 12 times per year on average. Lane closures are less frequent and Stanislaus County Public Works maintains the road and clears debris within 1-2 hours generally, depending on the severity and extent of the landslide.

The eastern edge of the District experiences landslides during, or closely following, rainstorms most often along Highway 132 between Lake Rd and the La Grange Road-J59 intersection. The area most susceptible is along the river bluffs on the south side of the highway. As with Del Puerto Canyon Rd., Stanislaus County maintains the road and clears debris when necessary; however landslides and rockfalls in this area often close the road which is the main route from Turlock and Modesto to Don Pedro Dam and Reservoir.

Additionally, the Don Pedro Power Plant is subject to rockfall due to its location at the bottom of the dam and the nearly sheer rock walls of the canyon. The same is true for the La Grange Power Plant although, not to the same extent as the Don Pedro Power Plant. Portions of the Upper Main Canal could also be impacted by landslides due to the hilly terrain at their location.

## Identifying Structures and Estimating Potential Losses

This section is based on an inventory of existing and future buildings, infrastructure, and critical facilities that would most likely be impacted by an extreme weather-related event. Due to the unique nature of its facilities and assets, the TID has grouped them into the following categories:

- Water Storage
- Water Delivery
- Pumping and Drainage

- Generation
- Substations
- Transmission Lines
- Distribution Lines
- Other Buildings and Real Property
- Vehicles and Equipment

These groupings are consistent with TID's accounting structure and allow it to address portions of facilities which crossed hazard boundaries. Within groupings, the value of the individual assets has been calculated using standard replacement cost methodologies.

The TID infrastructure at risk of damage from landslides or rockfall incidents include the power plants, transmission lines and switch yard at Don Pedro, the power plant and transmission lines at La Grange as well as portions of the Upper Main Canal above Turlock Lake. Of concern to the District are access roads, both public and private via easements, that if blocked could impede access to facilities in an emergency. The following table identifies roads in the TID service territory at risk of landslide exposure. These roads are included in the Stanislaus County LHMP Landslide Risk Assessment and were taken from there.

| Roads in the TID Service Area at Risk of Landslide | |
|---|---|
| Ingram Creek Rd | Geer Rd |
| Del Puerto Canyon Rd | Roberts Ferry Rd |
| Diablo Grande Parkway | Lake Rd |
| Crows Landing Rd at the San Joaquin River | La Grange Rd |
| Grayson Rd at the San Joaquin River | Cooperstown Rd |
| Paradise Rd at the San Joaquin River | Los Cerritos Rd |
| Shiloh Rd at the Tuolumne River | River Rd (Ceres area) |
| Santa Fe Ave | Mitchell Rd at the Tuolumne River |
| Highway. 132 between Lake Rd and La Grange Road-J59 near La Grange, CA | |

| Landslide Replacement Cost Summary | |
|---|---|
| Water Delivery | $125,363,273 |
| Pumping & Drainage | $0 |
| Generation | $256,358,622 |
| Substations | $2,231,442 |
| Transmission | $26,750,000 |
| Distribution | $89,309,269 |
| Other Buildings and Real Property | $10,167,977 |
| Vehicles & Equipment | $5,123,973 |

## Analyzing Development Trends

There has been limited development in the Diablo Grande Community located west of I-5. The development was approved by the Board of Supervisors in 1993 for 5,000 residences but build-out of the residential area has stalled. Construction in the community is projected to continue over the next few years.

Construction is possible west of I-5 but, any proposals for significant development beyond the currently permitted two dwellings per 160 acres should include a geological report, according to Stanislaus County's LHMP.

## Impact of Climate Change

Climate change may impact storm patterns in California, possibly increasing the probability of more frequent, intense storms with varying duration. Increase in global temperatures could impact the snow-pack in the Sierra and its ability to hold water and, the occurrence and duration of droughts which could increase the frequency and intensity of wildland fires creating more favorable conditions for landslides. The impacts from increased tree mortality due to drought and insect infestation can also increase wildland fire and the accompanying landslide risks.

## Risk Assessment

# Public Health Emergency

A public health emergency can take many forms ranging from widespread pandemic and regional outbreaks to purposefully targeted bioterrorism. Viruses, bacteria, and toxins all pose a threat to human health. The number of events that can be considered a public health emergency has taken a meteoric rise with the number of new diseases per decade nearly quadrupling over the past 60 years. Globalization, the advent of more efficient and economical means of travel and climate change are all factors contributing to a growing number of disease vectors carrying pathogens around the world with the potential to affect humans and other species.

WATER & POWER

## Identifying the Public Health Emergency Hazard

A public health emergency can take many forms ranging from widespread pandemic and regional outbreaks to purposefully targeted bio-terrorism. Viruses, bacteria, and toxins all pose a threat to human health. The number of events that can be considered a public health emergency has taken a meteoric rise with the number of new diseases per decade nearly quadrupling over the past 60 years. Globalization and the advent of more efficient and economical means of travel and climate change are all factors contributing to a growing number of disease vectors carrying pathogens around the world with the potential to affect humans and other species.

Infectious diseases remain a major cause of illness, disability, and death around the world with new infectious diseases being discovered regularly. Some diseases once considered under control are reemerging.

The World Health Organization (WHO) defines pandemic as the worldwide spread of a new disease. Misinformation about vaccines, the absence of a clear plan for coordination among agencies including the U.S. Agency for International Development and the Defense Department, and a need to improve public awareness about the threat posed by a biologic outbreak are among the factors that make the possibility of large and deadly pandemics increasingly likely. In addition, the risk of a pandemic continues to be pushed forward as the anti-vaccine movement encourages parents to refuse to vaccinate their children, resulting in higher risks of infection and dispersal of disease.

The District recognizes that the risk of a biological attack or outbreak of infectious disease is always present. Naturally occurring biological hazards of concern include; Bird Flu, H1N1 and other Influenza viruses, Ebola, Enterovirus, Measles, Middle East Respiratory Syndrome, Sudden Acute Respiratory Syndrome (SARS), West Nile Virus, and Zika Virus.

In late 2019 and early 2020 a novel Coronavirus disease (COVID-19), an infectious disease caused by the SARS-CoV-2 coronavirus, a respiratory pathogen, began to emerge in Wuhan China. As the virus eventually spread worldwide, it reached California where the impacts began to be felt in February 2020. The Governor of California eventually issued a "Stay at Home" order, prohibiting non-essential travel and requiring that all non-essential personnel telework if possible.

## Public Health Emergency Hazard Profile

| Natural Hazard | How Hazard was Identified | Why Hazard was Identified |
|---|---|---|
| Public Health Emergency | • Previous occurrences in California and other parts of the United States<br>• Information from the World Health Organization | • Potential for new occurrences<br>• The risk to TID employees working in direct contact with the public who may be infected |

## Location

Pandemic refers to an outbreak of a new disease worldwide. Although a pandemic outbreak is a cause for concern, the area served by the TID is vulnerable to outbreaks of known diseases such as SARS (including COVID), Bird Flu (Avian Influenza) and other types of Influenza, Middle East Respiratory Syndrome and West Nile Virus. A public health emergency is possible anywhere in TID's service territory.

## Extent

A disease outbreak can cause illness and result in significant casualties. Since 1900, there have been four influenza pandemics that killed approximately 600,000 people in the United States. In 2009, the H1N1 flu was first identified in Imperial and San Diego counties killing more than 550 Californians, sent thousands more to hospitals, caused widespread fear and anxiety and the declaration of a public health emergency. H1N1 in 2009 tested the State's medical infrastructure as never before.

H1N1 quickly spread nationwide and then around the globe, taking a heavy toll on people not usually susceptible to serious influenza.

The COVID-19 Pandemic of 2019-2020 demonstrated how an easily transmissible disease could affect the population and economy of the areas served by TID. As of the end of November, 2020 there were a combined total of 35,392 infected residents in Tuolumne, Merced and Stanislaus counties and 615 deaths. The economic damage from the virus and the related shut-downs is still being calculated but once known, it will be severe.

A serious threat faced in TID's service territory is from Avian Influenza due to the amount of poultry and other birds raised and processed locally. Birds can contract Avian Influenza and pass it along to humans. Some strains of the flu are more virulent than others and public health experts continue to be alert to the risk of a possible re-emergence of a 2003 epidemic among people primarily in Asia. In that event, people who had been in close contact with infected birds contracted a virulent form of Avian Influenza causing significant deaths.

**Impacts**

- TID's workforce is highly specialized and not easily replaced on short-notice.
- The risk is not only from naturally occurring organisms but from bio-terrorism related threats.
- There have been cases of West Nile virus as well as other virus outbreaks in the areas served by the District.
- Many of our employees work outside or in direct contact with members of the public, increasing the risk of exposure.
- There is a serious risk of Avian Influenza in the region served by TID due to the large amount of poultry and other birds raised and processed here.

To date, the Avian Influenza virus has not mutated and has not demonstrated easy transmission from person to person. However, were the virus to mutate to a highly virulent form capable of easy transmission between people, the public health community would be very concerned about the potential for a pandemic influenza outbreak. Such a pandemic could disrupt all aspects of society and severely affect the economy.

*Source: https://archive.cdph.ca.gov/HealthInfo/discond/Pages/Influenza(flu).aspx*

## Probability of Future Events

Based on past events and the prevalence of new diseases and outbreaks to occur, the likelihood that the area served by the TID will suffer some form of a disease outbreak is: **Highly Likely.**

## New Occurrences

There are new occurrences of flu outbreaks every year with some of them rising to wide-spread levels. Worldwide pandemics of influenza occur when a novel virus emerges to which the population has little immunity; the swine flu outbreak in 2009 and the COVID-19 Pandemic are examples. Recently, many states have experienced an increase in Hepatitis A, as well as mosquito-borne viruses such as Zika and West Nile. In 2019, the Measles was a concern in several states.

The COVID-19 Pandemic of 2019-2020 is the most recent large outbreak affecting TID to occur since the District was included in Stanislaus County's LHMP in 2011.

## Vulnerability Overview

Of all the threats TID faces from the viruses and bacteria identified, the greatest threat from year-to-year is from Influenza. Seasonal influenza is an annual occurrence that kills primarily persons aged 65 and older and those of any age with certain chronic health conditions. It causes significant economic impact due to loss of employee work time and costs of treating or preventing the spread of the flu and other illnesses. The COVID-19 Pandemic has also had significant impacts due to lost work time and productivity, costs to implement mitigation measures and impacts to revenues, particularly on the electric portion of

the business, as customers have been furloughed or let-go from their jobs impacting their ability to pay for electric service. The annual impacts from influenza have the same potential to negatively affect District revenue but, since the flu is not normally as widespread or contagious as COVID has proven to be, the impacts have not materialized to the same extent.

## Identifying Structures and Estimating Potential Losses

The risk of a public health emergency on structures is minimal other than the risk of a decreased number of workers able to work which can have impacts on maintenance and operations. The risk to people can be severe, including potential hospitalization and loss of life. Some estimates are that 40%-50% of a business's workforce may be impacted and unable to work during an outbreak.

The losses to agriculture can also be severe especially to livestock and poultry, depending on the disease. Although not a direct correlation to TID's business model, protecting the public, including those that may spread the infection to livestock and poultry is a consideration of this plan.

According to the Centers for Disease Control, the annual cost nationwide to businesses is $10.4 billion in hospitalization and outpatient visits for adults.

## Analyzing Development Trends

As mentioned above, the advent of globalization and the ease and economy of travel have increased the potential for the spread of disease among the world's population. Cases of flu are typically spread by droplets from coughing, sneezing or talking that come into contact with people within six feet of an infected person. But, the flu can also be contracted by touching a surface or object that has the virus on it and then touching the mouth or nose. This means that common areas which are not properly cleaned and maintained can be launching pads for viruses.

## Impact of Climate Change

According to the WHO, changes in infectious disease transmission patterns are a likely consequence of climate change. Some existing health threats will intensify and new health threats will emerge. Warmer average temperatures can mean longer warm seasons, earlier spring seasons, shorter and milder winters, and hotter summers. These conditions can be more hospitable to carriers of vector-borne diseases. Additionally, an unstable climate, more extreme heat days, and air pollution all increase health risks. WHO estimates an additional 250,000 deaths per year will be caused by climate change between 2030 and 2050.

## Risk Assessment

# Wildland Fire

Wildland fire is an uncontrolled fire in a area of combustible vegetation occurring in a rural area. Depending on the type of vegetation present, a wildfire can also be classified more specifically as a brush fire, grass fire vegetation fire, or forest fire. Wildfire is typically used to describe and unwanted and unplanned fire while wildland fire is a more broad term that includes both unplanned and prescribed burns.

The most common direct human-related causes of wildland fire include arson, discarded cigarettes, unattended campfires, and sparks from electric lines and equipment.

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## Identifying the Wildland Fire Hazard

A large portion of the inhabited land in the Turlock Irrigation District is made up of irrigated farmland or cities and towns. These are not the types of property historically associated with wildland fire, however, recent events have shown that wildfire is not just a phenomenon that occurs in the forest or uninhabited areas. Fires in Redding, Santa Rosa, and Ventura have proven that living in a city or on developed agricultural land does not make you immune from the threat of wildland fire.

Recognizing this, the District included the threat of a wildland fire damaging or destroying District property, infrastructure and facilities as part of its Local Hazard Mitigation Plan. With hundreds of miles of electric lines carried atop wooden poles meandering through rural areas throughout the District, the probability of damage from an uncontrolled wildland fire is high. As demonstrated in the asset evaluation, the TID has a significant amount of assets located in high fire-threat areas which could result in rather large losses in the event of a wildland fire.

## Wildland Fire Hazard Profile

| Natural Hazard | How Hazard was Identified | Why Hazard was Identified |
|---|---|---|
| Wildland Fire | • TID's annex to the 2011 Stanislaus County LHMP<br>• Input from the Planning Team<br>• Previous instances of wildland fire in the TID territory<br>• TID's Wildfire Mitigation Plan<br>• TID's Wildland Fire Incident Action Plan | • Wildland Fire has the potential to cause loss of life and widespread severe property damage and damage to District Facilities. |

## Location

Wildfire risk is widespread throughout California, but it varies dramatically according to location. In an attempt to improve fire preparedness, Cal Fire released a set of maps in 2007 that show where the hazard is highest. The maps show the probability of wildfire in a given area by taking a number of factors into account: vegetation, fire history, and topography (since steeper slopes have higher fire risk). The increased fire hazard zones are designated, Tier 2 or "Elevated Risk" and, Tier 3 or "Extreme Risk." New construction in these zones must meet tougher building standards for fire-resistance of roofs, windows, attic and foundation venting and decks.

An uncontrolled fire can occur at any time or location in the Turlock Irrigation District. However, TID has particular concerns when it comes to areas in the extreme eastern and western portions of its electric service territory. These concerns are related to terrain, fuel types, access, fire behavior and the probability of flames and embers threatening structures as well as District facilities and infrastructure.

These two areas of concern consist of all the land in TID's electric service territory west of Interstate 5 in Patterson and a section of the District near La Grange and Don Pedro Reservoir identified as a Tier 2 Fire Hazard Severity Zone (FHSZ) by Cal Fire. At this time, the TID has 1,047 meters in the West Side Fire Zone and 946 meters in the East Side Fire Zone.

## Extent

Wildland fires of 100-500 acres happen occasionally in the eastern and western portions of TID's service territory usually burning anywhere from a few acres to several hundred. Large wildland fires are less common but do happen from time to time. Below is a list of the significant fires (greater than 1,000 acres) that have burned in or near TID territory and facilities between 2003 and 2018.

## Previous Fires

| Fire Name | Date | Approximate Start Location | Acres |
|---|---|---|---|
| SCU Lightning Complex Fire | 8-18-2020 | Multiple start locations in the mountains above Patterson due to lightning. The fire burned 396,624 acres across 6 counties | 396,624 (175,804 in Stanislaus County) |
| Rock Fire | 6-26-19 | Del Puerto Canyon Road | 2,422 |
| Marshes Fire | 10-4-16 | Hwy. 49 and Marshes Flat Road north of Don Pedro Reservoir | 1,080 |
| Canyon Fire | 7-9-06 | Del Puerto Canyon – west of Patterson | 34,217 |
| Pedro Fire | 7-3-06 | Don Pedro Reservoir & Hwy 49, near Moccasin Power House | 1,998 |
| Del Puerto Fire II | 6-30-06 | Del Puerto Canyon Road, near Frank Raines Park, west of Patterson, off I-5 | 2,593 |
| Del Puerto Fire | 7-20-03 | Del Puerto Canyon Road/Mile Post 16 | 5,909 |

People are moving farther into "natural" areas to take advantage of the privacy, natural beauty, recreational opportunities, affordable living, and developers are building neighborhoods to accommodate the influx. As a result, fire departments are fighting fires along the Wildland-Urban Interface (WUI), defined as areas where homes are built near or among lands prone to wildland fire.

The WUI is not a place, per se, but rather a set of conditions that can exist in nearly every community. It can be a major subdivision or it can be four homes on an open range. According to the National Fire Protection Association, conditions include (but are not limited to): the amount, type, and distribution of vegetation; the flammability of the structures (homes, businesses, outbuildings, decks, fences) in the area and their proximity to fire-prone vegetation and to other combustible structures; weather patterns and general climate conditions; topography; hydrology; average lot size; and road construction.

**Impacts**

- Power lines falling across Diablo Grande Parkway, the only access road into and out of the subdivision could block evacuation and emergency response routes endangering lives and property.
- Wildland fires damaging or destroying electrical and irrigation infrastructure disrupting service.
- District electrical infrastructure failing and potentially causing a wildfire.
- Debris-flows and landslides caused by rainfall on recently burned hillsides, especially in Del Puerto Canyon.
- Damage to permanent crops from fires burning in the WUI.

In TID's electric service territory, an area of concern regarding fire and the WUI is centered in a development west of Patterson, known as Diablo Grande. This development is located in a moderately steep canyon with one access road and surrounded on all sides by grass and low brush with dispersed oak trees. The development itself consists of primarily single-family homes on residential-sized lots built among two golf courses, only one of which is actively maintained. TID power lines cross the one access road into and out of the development in several places.

One of the chief concerns with Diablo Grande relates to evacuations should power lines fall, or be knocked over across the road blocking the only evacuation route out of the development.

## Probability of Future Events

Historically, there have been significant fires that have occurred in the eastern and western portions of the District approximately every five years. A prolonged period of dry weather or drought can increase the likelihood that a large fire may start at any time.

For these reasons, the probability of a wildland fire event occurring in the TID is: **Highly Likely**.

## New Occurrences

In June of 2019, the Rock Fire in the hills near Patterson burned more than 2,400 acres. No District facilities were immediately threatened by the blaze. As of the writing of this document the cause of the fire is unknown.

The August 2020 California lightning wildfires are a series of 650 wildfires that ignited across Northern California in mid-August 2020, due to a siege of dry lightning from rare, massive summer thunderstorms, which were caused by an unusual combination of very hot, dry air at the surface, dry fuels, and advection of moisture from the remains of Tropical Storm Fausto northward into the Bay Area. These fires burned approximately 2,100,000 acres within a 2–3 week period. The August 2020 lightning fires included three enormous widlfires: the SCU Lightning Complex, the August Complex, and the LNU Lightning Complex. The three major Bay Area fires, the SCU, LNU, and the CZU Lightning Complex, collectively burned about 846,000 acres by mid-September 2020, destroyed 2,723 structures, and took 6 lives.

## Vulnerability Overview

Although wildland fires have generally occurred in the eastern and western portions of the District, recent fires in other parts of the state, particularly in Ventura and Santa Rosa have shown that no matter where you live in California, wildland fire is a risk. Fires that burn in cities and towns damage and destroy homes, buildings and infrastructure but fires that occur in the WUI and other more rural settings can destroy crops, create a heightened vulnerability to flood and landslide due to the loss of vegetation, and cause erosion of the soil followed by intrusion of the eroded soil into low lying areas where it may be deposited by subsequent rains.

In order to reduce the fire risk, the individual counties in the TID service territory and Cal Fire enforce local and state codes requiring the removal of debris which constitutes a fire menace and, in the high fire threat zones, require the clearing and maintenance of defensible space around buildings and homes. This work can be done by the county or Cal Fire if not performed by the property owner in a timely manner with the cost charged back against the property in the form of a lien.

## Identifying Structures and Estimating Potential Losses

This section is based on an inventory of existing and future buildings, infrastructure, and critical facilities that would most likely be impacted by an extreme weather-related event. Due to the unique nature of its facilities and assets, the TID has grouped them into the following categories:

- Water Storage
- Water Delivery
- Pumping and Drainage
- Generation
- Substations
- Transmission Lines
- Distribution Lines
- Other Buildings and Real Property
- Vehicles and Equipment

These groupings are consistent with TID's accounting structure and allow it to address portions of facilities which crossed hazard boundaries. Within groupings, the value of the individual assets has been calculated using standard replacement cost methodologies.

| Replacement Cost Summary | |
|---|---|
| Water Delivery | $250,726,547 |
| Pumping & Drainage | $0 |
| Generation | $256,358,622 |
| Substations | $2,231,442 |
| Transmission | $26,750,000 |
| Distribution | $89,309,269 |
| Other Buildings and Real Property | $10,167,977 |
| Vehicles & Equipment | $5,123,973 |

## Analyzing Development Trends

The areas most vulnerable to wildland fire exist on the eastern and western portions of the TID territory. Development in the Diablo Grande project has been limited and is still far below the original 5,000 residences approved by Stanislaus County in 1993. Currently, TID has 608 meters in the Diablo Grande Subdivision.

## Impact of Climate Change

Climate change producing drier and/or hotter conditions in the future may increase fire risk.

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Section

# 6

# Mitigation Strategy

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*Photo by Mat Reding on Unsplash*

## Introduction

This section outlines the process for preparing a mitigation strategy including; developing mitigation goals and identifying, evaluating and implementing mitigation actions.

The Planning Team developed the mitigation goals, reviewed potential actions, and developed the action plan. The action plan was also reviewed and shared with TID's local partners to receive feedback and help to prioritize goals and objectives.

## Purpose of a Mitigation Strategy

- To help the District make decisions that will reduce its vulnerability to hazards
- To reduce costs by addressing the impacts of a disaster before it occurs
- To offset the gap in funding from State and Federal aid which is usually insufficient to cover the extent of physical and economic damages resulting from disasters
- To prevent damage from hazards by anticipating where and how disasters will occur, and then taking appropriate action to minimize damages
- To lessen the impact of disasters and speed the response and recovery process
- To fulfill TID's responsibility to be good stewards of the resources entrusted to it
- To aid the community in becoming more sustainable and disaster-resistant

## Developing Mitigation Goals

Mitigation goals are defined as general guidelines that explain what the District wants to achieve in terms of hazard and loss prevention. Goals are typically long-range statements representing District-wide visions. The Planning Team developed the goals for this plan which focus on protecting life and property and minimizing both the short and long-term impacts and vulnerabilities resulting from the identified hazards. The goals were developed to be compatible with the goals of the District as expressed in the District Strategic Plan and the Emergency Operations Plan. The District's mitigation strategy is guided by its vision of building on the present culture of safety and its heritage of over 130 years being a good steward of the resources entrusted to it.

TID routinely performs activities such as repairing damaged irrigation and power facilities and structures, expanding service to residents and businesses in its service territory, and continually evaluating and implementing new technologies to improve its level of service. The District is conscious that these activities should reflect the vision and goals of its strategic plan by using the most current materials and techniques, incorporating efficient and innovative design and utilizing the safest products and processes in order to reduce and prevent injury and damage from naturally occurring hazards.

## Identifying Mitigation Actions

For this plan, TID evaluated potential mitigation actions after reviewing its mitigation goals. Mitigation actions are activities, measures, or projects that help achieve the goals of a mitigation plan. Particular effort was made to identify at least one new mitigation action for each identified risk that is not already a part of ongoing operations and to define whether the existing actions were completed, deleted, deferred, or ongoing. Mitigation efforts should occur both before and after emergencies or disasters. This includes eliminating or reducing the impact of hazards that exist within the Turlock Irrigation District.

### Mitigation efforts include:

- Integrating mitigation efforts into other District Plans
- Improving the understanding of the vulnerability of District structures and infrastructure
- Ensuring plans address high-risk areas and include mitigation measures that provide for safety
- Emphasize the importance of coordination, communication, and cooperation with outside agencies and responders
- Reinforce relationships between all administrations within the TID
- Stress the importance of relationships with our customers and the communities we serve

## Changes to Mitigation Priorities and Objectives

This is Turlock Irrigation District's first stand-alone Local Hazard Plan representing its priorities and objectives for hazard mitigation. Previously, TID supplied information to Stanislaus County's LHMP to be used in a functional annex, most recently in the 2011 version. Although the 2011 county plan identified some of the same hazards this plan includes, the District chose to add two additional threats; Extreme Weather and Public Health Emergency.

The latest county plan includes a focus on increased planning and mitigation efforts for dam and flood along with increased preparedness in participating in the Great Shake-Out for earthquakes. The County's Mitigation Strategy is guided by the vision of a safe and resilient County. The District's mitigation goals center around protection of its assets and maintaining its ability to provide the critical services of electric power and irrigation water to its customers.

Since the publication of the county's LHMP in 2011 when TID was included as an annex, the region has experienced extreme weather events, large wildfires and, along with the entire world, the COVID-19 pandemic. These experiences are the drivers for the District's change in mitigation priorities and objectives.

## National Flood Insurance Program (NFIP) Compliance

The TID is not required to participate in the NFIP program.

## Evaluating and Prioritizing Mitigation Activities

The Planning Team reviewed the initial mitigation activities identified in this plan. The mitigation strategies for each risk were reviewed and then validated or more clearly defined. The various administrations and departments at the District with a role in helping to mitigate the effects of naturally occurring disasters reviewed the mitigation strategies and activities as outlined in this plan. All of them have key roles in preventing future losses. The TID General Manager, Management Team and the Manager of Security and Emergency Preparedness ensure that emergency plans are developed and implemented and that personnel is trained to an appropriate level in disaster response including the National Incident Management System. Additionally, comments from the public and stakeholders are evaluated, considered and when appropriate, included in the Mitigation Action Plan. Mitigation is an ongoing activity that is incorporated into the day-to-day workflow for the many District departments involved. The work can be funded through capital improvement budget funds, operations budget funds or federal and state grants.

## Mitigation Capabilities

Mitigation capabilities describes the District's existing authorities, policies, programs and resources that can be used for mitigation activities. These capabilities are divided into four basic capability types; Planning and Regulatory, Administrative and Technical, Financial, and Education and Outreach. The following table details TID's mitigation capabilities.

| Planning and Regulatory Capabilities | | |
|---|---|---|
| Plans | Yes/No<br>Year | • Does the plan address hazards?<br>• Does the plan identify projects to include in the mitigation strategy?<br>• Can the plan be used to implement mitigation actions? |
| Comprehensive/Master Plan | Yes<br>2020 | • TID has a Strategic Plan updated in 2020. This plan does not identify hazards specifically but can be used as authority to conduct mitigation activities that align with the strategic goals of the plan. Safety, Security, and Emergency Preparedness are identified in the plan as important goals for TID. |
| Capital Improvements Plan | Yes<br>Annually | • No<br>• No<br>• Yes, can be used to implement mitigation actions |

| | | |
|---|---|---|
| Economic Development Plan | No | • This is not applicable to TID. |
| District Emergency Operations Plan | Yes 2018 | • Yes, the plan addresses both natural and man-made hazards for both the electric and irrigation water provided to customers by TID.<br>• The Emergency Operations plan does not address specific projects to include in the mitigation strategy.<br>• No, the EOP is the overarching plan addressing emergency responses in the District, not mitigation." |
| Continuity of District/ Continuity of Operations Plan | Yes 2019 | • Yes, the COD/COOP addresses the effect on operations at TID when either a facility or facilities are damaged rendering them unusable or staff cannot report for work due to damaged facilities, widespread health emergency, or other reasons. The COD/COOP contains alternate work facilities and staffing plans, outlines for recovery operations, orders of succession, delegation of authority, devolution of authority, identifies Continuity Records and Mission Essential Functions of the District.<br>• This plan does not identify specific projects to include in the mitigation strategy but does give some direction that helps in developing mitigation measures, such as the need for a mobile command post and alternate communication methods and equipment.<br>• Not directly however, since it has already been approved by the TID Management Team, it could be used internally as justification for implementing mitigation measures that improve the District's ability to function when facilities or personnel are unavailable. |
| Transportation Plan | No | • This is not applicable to TID. |
| Stormwater Management Plan | No | • This is not applicable to TID. |
| Don Pedro Woody Debris Management Plan | Yes 2017 | • The Don Pedro Woody Debris Management Plan is a requirement under Article 52 of the project's Federal Energy Regulatory Commission hydropower license.<br>• This plan describes the requirements and process that the District must undertake to manage the woody debris in the reservoir that pose a public safety risk to recreational users of Don Pedro.<br>• Yes, appropriate mitigation actions involving floatable debris at Don Pedro can be implemented under this plan. |

| | | |
|---|---|---|
| Wildfire Mitigation Plan | Yes<br>2019 | • Yes, this plan specifically addresses steps the District is taking to reduce the likelihood that its facilities will start or contribute to the growth of a wildfire inside its boundaries.<br>• Yes, in addition to hardening its equipment in elevated fire zone areas, the plan calls for implementing new technologies when they become available.<br>• Yes, mitigation actions can be implemented as described in the Wildfire Mitigation Plan as required under its adoption required under the Public Utilities Code section 8387 (b). |
| Don Pedro Emergency Action Plan | Yes<br>2017 | • Yes, this plan addresses specific hazards relating to emergency conditions at the Don Pedro Dam and Spillway.<br>• No, this is an emergency response plan and not a mitigation plan.<br>• No, this is an emergency response plan and not a mitigation plan. |
| Turlock Lake Emergency Action Plan | Yes<br>2017 | • Yes, this plan addresses specific hazards relating to emergency conditions at the dams at Turlock Lake.<br>• No, this is an emergency response plan and not a mitigation plan.<br>• No, this is an emergency response plan and not a mitigation plan. |
| Don Pedro Vulnerability-Risk Assessment | Yes<br>2019 | • Yes, this plan addresses specific hazards relating to security related issues at the Don Pedro Dam.<br>• Yes, this plan details projects that could help to mitigate risks identified in the LHMP involving the dam or appurtenant structures.<br>• Yes, appropriate mitigation actions could be implemented under the LHMP as described in this plan. |
| | | |
| **Building Code, Permitting and Inspections** | **Yes/No** | **Are codes adequately enforced?** |
| Building Code | No | • This is not applicable to TID. |
| Building Code Effectiveness Grading Schedule (BCEGS) Score | No | • This is not applicable to TID. |
| Fire department ISO rating | No | • This is not applicable to TID. |
| Site Plan Review Requirements | No | • This is not applicable to TID. |
| Electrical Facilities Inspection | Yes | • Yes, inspection from TID is required prior to energizing new services or any time a generator is installed by the customer. |
| | | |
| **Land Use Planning and Ordinances** | **Yes/No** | **"Is the ordinance an effective measure for reducing hazard impacts?<br>Is the ordinance adequately administered and enforced?"** |
| Zoning ordinance | No | • This is not applicable to TID. |

| | | |
|---|---|---|
| Subdivision ordinance | No | • This is not applicable to TID. |
| Floodplain ordinance | No | • This is not applicable to TID. |
| Natural hazard specific ordinance (stormwater, steep slope, wildfire) | No | • This is not applicable to TID. |
| Flood insurance rate maps | No | • This is not applicable to TID. |
| Acquisition of land for open space and public recreation uses | No | • This is not applicable to TID. |

How can these capabilities be expanded and improved to reduce risk?

These plans can be utilized to facilitate hazard mitigation as part of normal plan implementation. Each time mitigation efforts are undertaken under one of these plans, consideration should be given as to how work could potentially be completed in conjunction with projects outlined in the LHMP.

## Administrative and Technical Capabilities

| Administration | Yes/No | • Describe capability<br>• Is coordination effective? |
|---|---|---|
| Planning Commission | No | This is not applicable to TID. |
| Mitigation Planning Committee | Yes | • The TID Emergency Management Planning Team, in conjunction with subject matter experts meet and confer to identify risks and mitigation strategies for the LHMP. Due to the complexity and highly technical nature of the structures and facilities in the District, this team approach is critical in identifying these risks and mitigations.<br>• Coordination between the EMPT and the SMEs has proven to be highly effective in developing incident action plans and responding to actual emergencies and activations in the past. |
| Maintenance programs to reduce risk (e.g., tree trimming, clearing drainage systems) | Yes | • TID has a vegetation management program which includes tree trimming to reduce outages caused by vegetation contacting power lines. The requirements of the Wildfire Mitigation Program detail specific requirements for vegetation management in high fire-threat areas. |
| Mutual aid agreements | Yes | • The District has mutual aid agreements with neighboring utilities and the California Municipal Utilities Agency to provide and receive mutual aid during an emergency. Coordination between TID, neighboring utilities, and the CMUA has been effective in the past when mutual aid has been requested. |
| | | |
| Staff | Yes/No<br>FT/PT | • Is staffing adequate to enforce regulations?<br>• Is staff trained on hazards and mitigation?<br>• Is coordination between agencies and staff effective? |
| Chief Building Official | No | • This is not applicable to TID. |

| | | |
|---|---|---|
| Floodplain Administrator | No | This is not applicable to TID. |
| Emergency Manager | Yes<br>FT | • TID has a full-time Security and Emergency Preparedness Department including a Manager, Emergency Preparedness Coordinator, Environmental Health and Safety Division with two full-time staff and a Security Specialist.<br>• The staff is trained on emergency management procedures and the Environmental Health and Safety staff have training and licenses including Hazardous Materials training and licensing.<br>• The Security and Emergency Preparedness staff are in regular communication with the various county offices of emergency services in the areas where the District operates as well as with CalOES through our area representative. Environmental Health and Safety regularly works with the various regulating agencies including OSHA, Cal OSHA and others as part of their regular job duties. |
| Community Planner | No | This is not applicable to TID. |
| Civil Engineers | Yes<br>FT | • TID has both Civil and Electrical Engineers on staff which contribute to hazard planning and mitigation for the District and serve as SMEs on various incident planning teams including the LHMP.<br>• Both departments conduct effective coordination and communication with various state and federal agencies that provide oversight on projects. |
| GIS Coordinator | Yes<br>FT | • TID has engineering staff that use GIS on a regular basis and can create maps and other information used in hazard mitigation planning, including inundation maps, flood mapping and earthquake shaking intensity maps using ARC GIS.<br>• Internal coordination between TID Security and Emergency Preparedness and the engineering staff with GIS capabilities has been very effective in the past and they have contributed several maps used in this LHMP. |
| Dam Safety Engineer | Yes<br>FT | • The District employs both a Chief and Deputy Chief Dam Safety Engineer who's responsibility it is to ensure the integrity and safe operation of the dams owned and operated by TID.<br>• These engineers are in close contact with Federal and State agencies including the Federal Energy Regulatory Commission and the State Division for the Safety of Dams as well as others as part of their normal responsibilities. |
| | | |
| Technical | Yes/No | • Describe capability<br>• Has capability been used to assess/mitigate risk in the past? |
| Warning systems/ services (Reverse 911, outdoor warning signals) | Yes | • The District uses Everbridge, branded as TIDAlert, to conduct outgoing communication with those potentially impacted by a Public Safety Power Shut-off or other emergency situation where lives or property could be in danger. This system is based on the users ""opting in"" to receive notifications and providing their contact and location information. It has been used to communicate during emergencies and PSPS events.<br>• TID also installed and maintains a siren in the town of La Grange to serve as an early warning should there be a potential or imminent dam failure event involving the Don Pedro Dam. Although TID installed and maintains the physical condition of the siren, it is operated by Stanislaus County during an emergency. |

| | | |
|---|---|---|
| Hazard data and information | Yes | • As dam owners and operators, TID has inundation maps for each of the dams it owns. Additionally, the District has maps indicating the extent of flooding along the rivers and creeks that are impacted by releases from Don Pedro and other reservoirs owned or operated by outside agencies in the region. |
| Grant writing | No | |
| Hazus analysis | No | |

How can these capabilities be expanded and improved to reduce risk?

The Emergency Management Planning Team and Subject Matter Experts should consider actions outlined in the LHMP when drafting After Action Reports and Improvement Plans for specific IAPs or exercises so as to incorporate improvements already identified. The District could also consider outsourcing some of the GIS and HAZUS capabilities needed to build more robust response plans and technical documents as needed in future plans. It should also consider hiring a grant writer on a contract or other basis in order to secure funding for projects identified as part of the LHMP.

## Financial Capabilities

| Funding Resources | Access/ Eligibility (Yes/No) | • Has the funding resource been used in past and for what type of activities?<br>• Could the resource be used to fund future mitigation actions? |
|---|---|---|
| Capital improvements project funding | Yes | • Combination of bond debt, cash funding, and grant funding when available has been used in the past to fund capital projects<br>• The Capital Budget can be used to fund projects identified in the LHMP |
| Authority to levy taxes for specific purposes | No | • Not applicable to TID |
| Fees for water, sewer, gas, or electric services | Yes | • As the governing body, TID can set rates at appropriate levels to cover costs<br>• This is one of the sources for the Capital Budget which can be used to fund improvement projects identified in the LHMP |
| Impact fees for new development | No | • Not applicable to TID |
| Storm water utility fee | No | • Not applicable to TID |
| Incur debt through general obligation bonds and/or special tax bonds | Yes | • Special bonds, tax exempt debt<br>• The District has used this resource to fund improvement projects |
| Incur debt through private activities | No | • Not applicable to TID |
| Community Development Block Grant | No | • Not applicable to TID |

| | | |
|---|---|---|
| Other federal funding programs | | FEMA Grants including:<br>• Hazard Mitigation Grant Program (HMGP)<br>• HMPG Post-Fire Grant (when applicable)<br>• Flood Mitigation Assistance Program (FMAP)<br>• Emergency Management Performance Grant (EMPG) |
| State funding programs | | • Building Resilient Infrastructure and Communities (BRIC)<br>• 404 Hazard Mitigation and Grant Program (when applicable after a Presidential Disaster Declaration) |

| How can these capabilities be expanded and improved to reduce risk? |
|---|
| The District intends to pursue grant funding when available to implement some of the mitigation projects identified in the LHMP which have proven to be viable and cost-effective. It is also possible that projects deemed to be a high-priority based on the cost-benefit analysis could be funded through the capital improvement plan. |

## Education and Outreach Capabilities

| Program/Organization | Yes/No | • Describe program/organization and how it relates to disaster resilience and mitigation.<br>• Could the program/organization help implement future mitigation activities? |
|---|---|---|
| Local citizen groups or non-profit organizations focused on environmental protection, emergency preparedness, access and functional needs populations, etc. | Yes | • Latino Emergency Council (LEC) is a group formed in early 2006 in Stanislaus County to set up an emergency response network linked to the Latino community.<br>• The LEC engages Stanislaus County's large Spanish-speaking population on a continuous basis to prepare for emergencies and respond when they occur.<br>• TID regularly attends LEC meetings and participates with them in community outreach efforts in an effort to increase it's communication capabilities with the Spanish speaking community. |

| | | |
|---|---|---|
| Ongoing public education or information program (e.g., responsible water use, fire safety, household preparedness, environmental education) | Yes | • TID participates in career fairs and agricultural awareness days at local elementary and secondary schools throughout the District. At these events, District representatives present information on the water cycle, energy related topics including renewable and Greenhouse Gas-free generation, water and power efficiency as well as safety involving electricity and water. Also, TID sponsors swim days at local pools by paying for admission so that the community can have a safe place to swim during hot weather.<br>• TID also employs a full-time aquatic biologist which, among other duties, conducts school programs in local elementary schools to educate students about the Salmon life-cycle. This program includes students raising salmon from eggs to fry in aquariums in their classrooms and then releasing them back into the river where they originated. For older students, it includes harvesting and fertilization of eggs from the adult salmon. |
| Natural disaster or safety related school programs | Yes | • As mentioned in the previous section, school programs put on by the District promote safety by instructing students to only swim in safe places and to stay away from canals.<br>• Additional messaging regarding electrical safety is presented including avoiding playing beneath power lines, especially with kites, balloons or other toys that may touch them. |
| StormReady certification | No | • This is not applicable to TID. |
| Firewise Communities certification | No | • This is not applicable to TID. |
| Public-private partnership initiatives addressing disaster-related issues | Yes | • The Stanislaus County EOC Management Team consists of personnel from both public and private entities trained to respond to events and incidents that would require EOC activation. The team may also be made available to other EOCs in the local Operational Area (county) for deployment, if requested. The EOC Management Team should not be confused with an Incident Management Team, which responds to field incidents. The EOC Management Team responds primarily to EOC activations.<br>• The Turlock Emergency Preparedness Group- similar to the Stanislaus County EOC Management Team is made up of local public and private emergency management personnel and offers networking and training opportunities to foster cooperation and support for those who may be working on an emergency in the Turlock area.<br>• Stanislaus County Haz-Mat Group- a local group of hazardous materials trained staff from public and private entities with expertise in the handling and response to emergencies involving a haz-mat situation. The group shares information, provides networking and shares contact information for those who could assist during a large-scale emergency response. |

| How can these capabilities be expanded and improved to reduce risk? |
|---|
| • School programs promoting safety and environmental stewardship could be improved with increased outreach to school districts in the region and increasing the number of safety-related presentations offered. In order to accomplish this, additional staffing may be required as well supplies or lesson plans for teachers.<br>• Community outreach could be increased by providing safety related presentations to local first responders, CERT Teams or other community emergency response groups.<br>• Providing tours for the purpose of acquainting local emergency managers with the facilities at Don Pedro and other District owned locations to gain a common operating picture in the event of an actual emergency could help to reduce the risks associated with miscommunication and the dangers posed by energized facilities to first responders. Accomplishing this would require additional staff time and resources to conduct outreach and training. |

## Implementing a Mitigation Action Plan

The Mitigation Action Plan table for each hazard identifies the action, associated objectives, progress/status, responsible personnel or department and time frame. Many of these actions are considered ongoing or continuous District initiatives. The progress/status section of the table indicates the status of the activity if it was already underway before the creation of this plan or if it is a newly identified activity.

## Cost-Benefit Review

A cost-benefit review was applied in order to prioritize the mitigation recommendations for implementation. The priority for implementing mitigation recommendations depends upon the overall feasibility of the recommendation when taking into account monetary and non-monetary costs and benefits associated with each action. The cost-benefit table for each hazard provides an analysis of the benefit, cost and a relative priority rank (High, Medium and Low) for each mitigation activity. The general guidelines are listed below.

- **High** – Benefits are perceived to exceed costs without further study or evaluation.
- **Medium** – Benefits are perceived to exceed costs, but may require further study or evaluation prior to implementation.
- **Low** – Benefits and the associated costs require additional evaluation prior to implementation.

Projects identified in this LHMP receiving funding, either from District resources or grant opportunities, shall be cost-effective and assist in efforts to help the District recover from disasters. Some of the projects identified are already funded through existing mechanisms while others await evaluation and identification of potential funding sources. The majority of the projects are ongoing to ensure mitigation measures are implemented within the District. It is not anticipated that all future projects will be identified in this LHMP. The LHMP will help guide the District to prioritize, be flexible, and identify critical mitigation strategy needs that may arise from a disaster when there is no time to update the local plan.

It is also important for the District to protect critical facilities and infrastructure. The TID has a Capital Improvement Plan in place and is actively working to protect facilities and infrastructure important to the District.

## Mitigation Funding Strategy

It is the District's intention to fund mitigation activities that are deemed to be feasible to accomplish with a combination of TID (or DPRA where applicable) budget funds and Federal and/or state grant funds when available. These funds could be from a variety of sources including FEMA Hazard Mitigation Grant Program (HMGP) funding, HMPG Post-Fire Grants (when applicable), Flood Mitigation Assistance Program (FMAP) grants, Emergency Management Performance Grant (EMPG) program funds and Building Resilient Infrastructure and Communities (BRIC) funding.

These grants will be investigated and the District will apply for funding once a project has been identified as viable or, during the investigative phase if funding is available to assist with those associated costs. The TID EMPT will facilitate and monitor grant funding opportunities as they arise and will report on the outcome of grant applications as part of the annual reporting required under the LHMP.

## Mitigation Strategy

# Dam Failure

TID's Dam Failure objectives include protecting life and property and reducing the likelihood of a failure incident at any of the District's Dams.

Each identified mitigation action inlcudes clear objectives, actionable mitigation measures, identifies responsible parties and examines the costs versus benefits which will form the basis for implementing them.

WATER & POWER

## Dam Failure Mitigation Goals

- Protect life and property
- Reduce the impact of dam failure to the TID, its customers and the general public
- Reduce the impacts to the economy resulting from dam failure
- Promote coordination and cooperation between the TID and regional partner agencies

## Dam Failure Mitigation Objectives

| Objective No. | Objective Activity |
|---|---|
| **DF1** | Protect life and property |
| **DF2** | Reduce the likelihood of a failure incident and the resulting impacts on TID and its property |
| **DF3** | Reduce the likelihood of a failure incident impacting TID's customer's property and businesses |
| **DF4** | Continue TID's critical business functions in the event of a failure incident |
| **DF5** | Integrate the LHMP with other TID plans |
| **DF6** | Integrate the LHMP with partner agency plans |
| **DF7** | Coordinate and communicate with partner and responding agencies |
| **DF8** | Improve coordination and communication during a dam failure incident |
| **DF9** | Recover from the effects of a dam failure incident as quickly as possible |
| **DF10** | Provide critical support to residents in areas impacted by a dam failure incident |
| **DF11** | Lessen the impact of a dam failure incident on the general public |

## Dam Failure Mitigation Action Plan

The following table describes the mitigation activities identified by the LHMP Planning Team, the objective the activity achieves, party or parties responsible for carrying it out and the time-frame for accomplishing it.

| Mitigation Activity | Objective | Progress/Status | Responsible | Time-frame |
|---|---|---|---|---|
| 2020.LHMP.DF.01 Integrate the LHMP priorities into other TID plans including the Emergency Operations Plan, Continuity of District/ Continuity of Operations Plan, Capital Improvement Plans and other District plans. | DF1, DF5, DF7 | This is a new activity. | Security and Emergency Preparedness, TID Management Team | Ongoing |

| Mitigation Activity | Objective | Progress/Status | Responsible | Time-frame |
|---|---|---|---|---|
| 2020.LHMP.DF.02 Improve cell phone coverage at Don Pedro Reservoir for internal communications capabilities and to allow for alerting and warning of watercraft via cell phones if it is necessary to evacuate the lake due to spillway operations, potential failure scenarios or unsafe conditions. | DF1, DF4, DF7 | Evaluate current radio system and configuration, identify repeated and non-repeated channels, and explore options to tie TID and DPRA radios together to allow for better communications. Investigate mobile communications signal boosting equipment. Some of the work around improving internal communications capabilities at Don Pedro has begun. Investigation of methods for improving the alerting and warning of watercraft on the lake has not yet commenced. | Security and Emergency Preparedness, Station Engineering, Electronics | Begin exploring solutions for alerting and warning of watercraft in Q1 of 2021 and complete by Q4 of 2025 |
| 2020.LHMP.DF.03 Improve radio and cell phone coverage at locations where signal strength is weak or radio communication is difficult. | DF1, DF8, DF4, DF7 | Investigate mobile communications signal boosting equipment. This is a new activity and work has not yet begun. | Security and Emergency Preparedness, Station Engineering, Electronics | In progress. Tested using Starlink as an option. Other platforms need evaluation. |
| 2020.LHMP.DF.04 Improve radio communication capabilities and interoperability between TID, Don Pedro Recreation Agency (DPRA), and outside agencies. | DF1, DF8, DF4, DF7 | Investigate potential solutions for improving the capability of TID's radio system to communicate between District frequencies and DPRA as well as outside agencies in an emergency. This activity is new to TID's emergency planning and work has not yet begun. | Security and Emergency Preparedness, Station Engineering, Electronics | Begin in Q3 of 2021 and complete by 2023 |
| 2020.LHMP.DF.05 Re-configure and expand TID's District Operations Center to include dedicated meeting space, JIC, and breakout rooms for Management/ Command and General Staff and a separate area for meals/ breaks. | DF1, DF8, DF7, DF9 | Remodel of current DOC to provide reconfigurable space for meetings/ breakout rooms at CC Wright Hall or, other locations in close proximity. Some of this work has already been completed with the addition of a conference room but, a dedicated JIC and other improvements have not been started. | Security and Emergency Preparedness, Facilities | Partially completed, still needs to be re-stocked. |
| 2020.LHMP.DF.06 Mobile command post for locating District response personnel in close proximity to damaged facilities during recovery. | DF1, DF8, DF9 | Investigate solutions for a mobile office trailer or vehicle specifically designed to be used as a mobile Incident Command Post. This is a new activity and work has not yet begun. | Security and Emergency Preparedness | Begin investigating solutions in Q2 of 2021 and present options to the TID Management Team by Q1 2023 |

| Mitigation Activity | Objective | Progress/Status | Responsible | Time-frame |
|---|---|---|---|---|
| 2020.LHMP.DF.07 Provide NIMS, SEMS and ICS training to TID employees with a role in an emergency response. The National Incident Management System (NIMS), Standardized Emergency Management System (SEMS), and the Incident Command System (ICS) were developed so that responders from different jurisdictions and disciplines can work together to provide a unified approach to incident management using a common set of operating principles, organizational structure, and terminology. | DF1, DF8, DF7 | Develop an appropriate training program to introduce TID staff to the principles of incident command. This is a new activity for TID. The development of course presentations has begun and the initial round of training based on ICS-100 and 700 will be complete by the end of 2020. Training of staff will commence as conditions permit in-person training to resume. | Security and Emergency Preparedness | Course development already underway, in-person training to begin by Q3 2021 (if conditions permit) all existing staff trained in basic ICS by Q4 2026. New staff training will be ongoing. |
| 2020.LHMP.DF.08 Provide portable power stations to communities without electricity for charging of cell phones. | DF1, DF11, DF10 | Investigate solutions for providing remote cell phone charging stations or portable generators/power units to provide this ability. This is a new activity and work has not yet begun. | Security and Emergency Preparedness | Begin in Q3 of 2021 and present a proposal to TID Management Team by Q4 2022 |
| 2020.LHMP.DF.09 Dispose of floatable debris in the upper reaches of the reservoir that has washed downstream from the Tuolumne River. | DF1, DF8, DF11 | Investigate disposal techniques including burning of debris in place. Preliminary work has begun to determine options that may be suitable for disposing of the debris. More work is needed to determine the best method and identify alternatives. | DPRA | Began in Spring 2023. |
| 2020.LHMP.DF.10 Provide a second method of egress from the Turlock Lake Campgrounds to be used in the event of an emergency at the facility necessitating the rapid evacuation of the campground. | DF1 | Investigate the feasibility of providing another access route into or out of the campgrounds at Turlock Lake. This is a new activity and work has not yet begun. | Security and Emergency Preparedness, Chief Dam Safety Engineer, Civil Engineering | On-hold due to the status of Turlock Lake |

| Mitigation Activity | Objective | Progress/Status | Responsible | Time-frame |
|---|---|---|---|---|
| 2020.LHMP.DF.11 Continue to review, update and exercise all dam related EAPs per the requirements of each plan. Continue to include outside agencies with a role in an activation of the plan to participate in the plan review and exercise. | DF1, DF6, DF7 | As the operator of Don Pedro and the owners of Turlock Lake, TID annually hosts a review of the EAPs for each facility and exercises the Notification Flow Charts by making the required calls. | Chief Dam Safety Engineer | Ongoing/ Annual |
| 2020.LHMP.DF.12 Continue to participate in Emergency Action Plan training and exercises by attending presentations of other local jurisdiction's plans. | DF1, DF6, DF7 | Attend the Stanislaus and San Joaquin Operational Area Council meetings regularly and attend other meetings. | Various TID Departments | Ongoing |
| 2020.LHMP.DF.13 Continue to work with Stanislaus County on the Tuolumne River /TID Flood Working Group to develop and approve plans specific to public notification and evacuation. | DF1, DF5, DF6, DF7 | This has been an ongoing activity since 2014 but is new to the LHMP. | Security and Emergency Preparedness, Chief Dam Safety Engineer | Ongoing |
| 2020.LHMP.DF.14 Provide a way to back-feed the DPRA warehouse and Don Pedro 2 Substation | DF1, DF4 | Investigate the feasibility of adding an over-head line and fiber optic cable across the canyon downstream of the Don Pedro Power Plant in order to back-feed the DPRA warehouse and Don Pedro 2 Substation. This is a new activity and work has not yet begun. | Electrical Engineering and Operations, Line Department | Begin in Q4 2024 and determine the feasibility of the project by Q4 2025 |
| 2020.LHMP.DF.15 Incorporate the Everbridge Alert System (TIDAlert) into the procedures for making notifications to entities identified on the Notification Flowcharts for all dam EAPs and other EAP/IAP activations. | DF1, DF3, DF7, DF8, DF11 | Capacity on the Everbridge System has been acquired and installed. Contacts, Scripts, Notification Protocols established. Only testing and implementation remains. | Security and Emergency Preparedness | Complete and tested by the end of 2022 |

Project Complete

## Dam Failure Mitigation Cost-Benefit Review

This table analyzes the costs and benefits for the identified mitigation activities, assigns it a priority level as well as a proposed funding source. For definitions of the priority levels, see "Cost-Benefit Review" on page 6-11.

| Mitigation Activity | Benefit | Costs | Priority | Funding Source |
|---|---|---|---|---|
| 2020.LHMP.DF.01 Integrate the LHMP priorities into other TID plans including the Emergency Operations Plan, Continuity of District/ Continuity of Operations Plan, Capital Improvement Plans and other District plans. | Avoids emergency management costs. | Staff time for development and coordination | HIGH | • TID Budget |
| 2020.LHMP.DF.02 Improve cell phone coverage at Don Pedro Reservoir for internal communications capabilities and to allow for alerting and warning of watercraft via cell phones if it is necessary to evacuate the lake due to spillway operations, potential failure scenarios or unsafe conditions. | Improves internal communications within TID. Enables emergency managers and responding agencies to more quickly and efficiently evacuate the lake when necessary. | Equipment costs and staff time to position it in the event of an emergency, ongoing training and maintenance costs | LOW | • DPRA Budget<br>• FEMA EMPG funding<br>• BRIC funding |
| 2020.LHMP.DF.03 Improve radio and cell phone coverage at locations where signal strength is weak or radio communication is difficult. | Improves communication capabilities when operating in remote areas or in areas without cell phone coverage. | Staff time for research and bid process, equipment costs, ongoing maintenance costs | LOW | • TID Budget<br>• FEMA EMPG funding<br>• BRIC funding |
| 2020.LHMP.DF.04 Improve radio communication capabilities and interoperability between TID, Don Pedro Recreation Agency (DPRA), and outside agencies. | Improves communication between DPRA and Don Pedro Power Plant, Construction and Maintenance staff and outside agencies responding to an emergency. | Equipment costs and staff time to train on the new system | MEDIUM | • TID and/or DPRA Budget<br>• FEMA EMPG funding |
| 2020.LHMP.DF.05 Re-configure and expand TID's District Operations Center to include dedicated meeting space, JIC, and breakout rooms for Management/ Command and General Staff and a separate area for meals/ breaks. | Avoids Emergency Management Costs. Improves DOC operations. | Staff time for remodel design work, permitting (if necessary) and construction | MEDIUM | • TID Budget<br>• FEMA EMPG funding |

| Mitigation Activity | Benefit | Costs | Priority | Funding Source |
|---|---|---|---|---|
| 2020.LHMP.DF.06<br>Mobile command post for locating District response personnel in close proximity to damaged facilities during recovery. | Provides command, communication and coordination support near the incident for District personnel assigned to critical incident response during a disaster. Provides a portable office space for an Incident Command Post near the disaster location. | Equipment costs, ongoing maintenance, set-up and transportation costs when deployed | MEDIUM | • TID Budget<br>• FEMA EMPG funding |
| 2020.LHMP.DF.07<br>Provide NIMS, SEMS and ICS training to TID employees with a role in an emergency response. The National Incident Management System (NIMS), Standardized Emergency Management System (SEMS), and the Incident Command System (ICS) were developed so that responders from different jurisdictions and disciplines can work together to provide a unified approach to incident management using a common set of operating principles, organizational structure, and terminology. | Avoids emergency management costs and facilitates communication and coordination in the event of an incident involving outside agencies. | Staff time for coordination and training, developing materials for in-house training, and hiring outside instructors for advanced topics. | HIGH | • TID Budget<br>• FEMA EMPG funding |
| 2020.LHMP.DF.08<br>Provide portable power stations to communities without electricity for charging of cell phones. | Allows the public to maintain communications with family members for reunification, reporting their status to officials thereby reducing costs for response, and communicating and coordinating their personal recovery efforts with local, state and regional disaster assistance organizations and NGOs. | Equipment costs, ongoing maintenance, set-up, and transportation costs when deployed | LOW | • TID Budget<br>• BRIC funding |

| Mitigation Activity | Benefit | Costs | Priority | Funding Source |
|---|---|---|---|---|
| 2020.LHMP.DF.09 Dispose of floatable debris in the upper reaches of the reservoir that has washed downstream from the Tuolumne River. | Removing floatable debris prevents it from escaping the containment booms where it is currently being held and creating a safety hazard for boaters on the lake. It also prevents the debris from migrating through the reservoir and becoming lodged in the outlet works or spillway structures preventing their use. Disposing of the woody debris reduces wildland fire risk. | Investigate disposal techniques including burning of debris in place. | MEDIUM | • DPRA Budget<br>• FEMA HMGP funding |
| 2020.LHMP.DF.10 Provide a second method of egress from the Turlock Lake Campgrounds to be used in the event of an emergency at the facility necessitating the rapid evacuation of the campground. | Protects life and property and avoids emergency management costs. | Staff time for investigation of possible alternative routes and acquisition of property or easements | LOW | • TID Budget<br>• BRIC funding |
| 2020.LHMP.DF.11 Continue to review, update and exercise all dam related EAPs per the requirements of each plan. Continue to include outside agencies with a role in an activation of the plan to participate in the plan review and exercise. | Promotes better communication and cooperation between TID and outside agencies. Assures that the contact phone numbers in the EAPs are correct and current. Reduces response time by outside agencies in the event of an incident. Avoids unnecessary emergency management costs. Ensures that TID staff and outside agencies are familiar with their roles and responsibilities as described in the EAPs. | Staff time for preparation, coordination and exercises. Costs related to hosting the EAP presentations | HIGH | • Dam Safety Budget<br>• FEMA EMPG funding |
| 2020.LHMP.DF.12 Continue to participate in Emergency Action Plan training and exercises by attending presentations of other local jurisdiction's plans. | Promotes the sharing of information with outside agencies and personal relationships with other emergency managers that would have a role in an activation of an EAP. | Staff time to attend meetings | HIGH | • TID Budget |

| Mitigation Activity | Benefit | Costs | Priority | Funding Source |
|---|---|---|---|---|
| 2020.LHMP.DF.13 Continue to work with Stanislaus County on the Tuolumne River /TID Flood Working Group to develop and approve plans specific to public notification and evacuation. | Avoids casualties, emergency management costs and property damage. Promotes cooperation and coordination with TID and outside agencies. | Staff time for development and coordination | HIGH | • TID Budget |
| 2020.LHMP.DF.14 Provide a way to back-feed the DPRA warehouse and Don Pedro 2 Substation | Provides another means of supplying power and communications to Don Pedro 2 Substation and the DPRA Warehouse facility. | Staff time, equipment costs, ongoing maintenance costs | LOW | • TID Budget<br>• FEMA EMPG funding |
| 2020.LHMP.DF.15 Incorporate the Everbridge Alert System (TIDAlert) into the procedures for making notifications to entities identified on the Notification Flowcharts for all dam EAPs and other EAP/IAP activations. | Improves speed of notifications to both internal and external stakeholders in the event of an emergency at one of the District's dams. | Additional message capacity on the Everbridge system. Staff time for deployment and ongoing maintenance. | HIGH | TID Budget |

Project Complete

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## Mitigation Strategy

# EARTHQUAKE

Earthquakes can strike anytime, anywhere and their effects can be catastrophic. Fortunately for TID, it is not located in a part of California known to have damaging earthquakes. However, earthquakes do occur here and damage resulting from them is always possible. TID is evaluating steps it can take to minimize the risks from earthquake damage including impacts to its operations resulting from a distant seismic event.

Each identified mitigation action includes clear objectives, actionable mitigation measures, identifies responsible parties and examines the costs versus benefits which will form the basis for implementing them.

TID
WATER & POWER

## Earthquake Mitigation Goals

- Protect life and property
- Reduce the impact of an earthquake on TID, its customers, and the general public
- Reduce the impacts to the economy resulting from earthquakes
- Promote coordination and cooperation between the TID and regional partner agencies

## Earthquake Mitigation Objectives

| Objective No. | Objective Activity |
|---|---|
| **EQ1** | Protect life and property |
| **EQ2** | Protect District infrastructure from earthquake damage |
| **EQ3** | Recover from earthquake-related damage as quickly as possible |
| **EQ4** | Continue to provide critical services |
| **EQ5** | Train First Responders |
| **EQ6** | Provide support to critical facilities where power is lost due to earthquakes |
| **EQ7** | Integrate the LHMP with other TID plans |
| **EQ8** | Integrate the LHMP with other outside agency plans |
| **EQ9** | Coordinate and communicate with partner and responding agencies |
| **EQ10** | Improve coordination and communication between TID departments |

## Earthquake Mitigation Action Plan

The following table describes the mitigation activities identified by the LHMP Planning Team, the objective the activity achieves, party or parties responsible for carrying it out and the time-frame for accomplishing it.

| Mitigation Activity | Objective | Progress/Status | Responsible | Time-frame |
|---|---|---|---|---|
| 2020.LHMP.EQ.01 Integrate the LHMP priorities into other TID plans including the Emergency Operations Plan, Continuity of District/ Continuity of Operations Plan, Capital Improvement Plans and other District plans. | EQ1, EQ7, EQ9 | This is a new activity. | Security and Emergency Preparedness, TID Management Team | Ongoing |

| Mitigation Activity | Objective | Progress/Status | Responsible | Time-frame |
|---|---|---|---|---|
| 2020.LHMP.EQ.02 Improve cell phone coverage at Don Pedro Reservoir for internal communications capabilities and to allow for alerting and warning of watercraft via cell phones if it is necessary to evacuate the lake due to spillway operations, potential failure scenarios or unsafe conditions. | EQ1, EQ4, EQ9 | Evaluate current radio system and configuration, identify repeated and non-repeated channels, and explore options to tie TID and DPRA radios together to allow for better communications. Investigate mobile communications signal boosting equipment. Some of the work around improving internal communications capabilities at Don Pedro has begun. Investigation of methods for improving the alerting and warning of watercraft on the lake has not yet commenced. | Security and Emergency Preparedness, Station Engineering, Electronics | Begin exploring solutions for alerting and warning of watercraft in Q1 of 2021 and complete by Q4 of 2025 |
| 2020.LHMP.EQ.03 Improve radio and cell phone coverage at locations where signal strength is weak or radio communication is difficult. | EQ1, EQ10, EQ4, EQ9 | Investigate mobile communications signal boosting equipment. This is a new activity and work has not yet begun. | Security and Emergency Preparedness, Station Engineering, Electronics | In progress. Tested using Starlink as an option. Other platforms need evaluation. |
| 2020.LHMP.EQ.04 Improve radio communication capabilities and interoperability between TID, Don Pedro Recreation Agency (DPRA), and outside agencies. | EQ1, EQ10, EQ4, EQ9 | Investigate potential solutions for improving the capability of TID's radio system to communicate between District frequencies and DPRA as well as outside agencies in an emergency. This activity is new to TID's emergency planning and work has not yet begun. | Security and Emergency Preparedness, Station Engineering, Electronics | Begin in Q3 of 2021 and complete by 2023 |
| 2020.LHMP.EQ.05 Re-configure and expand TID's District Operations Center to include dedicated meeting space, JIC, and breakout rooms for Management/ Command and General Staff and a separate area for meals/ breaks. | EQ1, EQ10, EQ9, EQ3 | Remodel of current DOC to provide reconfigurable space for meetings/ breakout rooms at CC Wright Hall or, other locations in close proximity. Some of this work has already been completed with the addition of a conference room but, a dedicated JIC and other improvements have not been started. | Security and Emergency Preparedness - Facilities | Partially complete, still needs to be re-stocked |
| 2020.LHMP.EQ.06 Mobile command post for locating District response personnel in close proximity to damaged facilities during recovery. | EQ1, EQ10, EQ3 | Investigate solutions for a mobile office trailer or vehicle specifically designed to be used as a mobile Incident Command Post. This is a new activity and work has not yet begun. | Security and Emergency Preparedness | Begin investigating solutions in Q2 of 2021 and present options to the TID Management Team by Q1 2023 |

| Mitigation Activity | Objective | Progress/Status | Responsible | Time-frame |
|---|---|---|---|---|
| 2020.LHMP.EQ.07 Provide NIMS, SEMS and ICS training to TID employees with a role in an emergency response. The National Incident Management System (NIMS), Standardized Emergency Management System (SEMS), and the Incident Command System (ICS) were developed so that responders from different jurisdictions and disciplines can work together to provide a unified approach to incident management using a common set of operating principles, organizational structure, and terminology. | EQ1, EQ10, EQ9 | Develop an appropriate training program to introduce TID staff to the principles of incident command. This is a new activity for TID. The development of course presentations has begun and the initial round of training based on ICS-100 and 700 will be complete by the end of 2020. Training of staff will commence as conditions permit in-person training to resume. | Security and Emergency Preparedness | Course development already underway, in-person training to begin by Q3 2021 (if conditions permit) all existing staff trained in basic ICS by Q4 2026. New staff training will be ongoing. |
| 2020.LHMP.EQ.08 Provide portable power stations to communities without electricity for charging of cell phones. | EQ1, EQ4, EQ6 | Investigate solutions for providing remote cell phone charging stations or portable generators/power units to provide this ability. This is a new activity and work has not yet begun. | Security and Emergency Preparedness | Begin in Q3 of 2021 and present a proposal to the TID Management Team by Q4 2022 |
| 2020.LHMP.EQ.09 Dispose of floatable debris in the upper reaches of the reservoir that has washed downstream from the Tuolumne River. | EQ1, EQ10, EQ3 | Investigate disposal techniques including burning of debris in place. Preliminary work has begun to determine options that may be suitable for disposing of the debris. More work is needed to determine the best method and identify alternatives. | DPRA | Began in Spring 2023 |
| 2020.LHMP.EQ.10 Provide a second method of egress from the Turlock Lake Campgrounds to be used in the event of an emergency at the facility necessitating the rapid evacuation of the campground. | EQ1 | Investigate the feasibility of providing another access route into or out of the campgrounds at Turlock Lake. This is a new activity and work has not yet begun. | Security and Emergency Preparedness, Chief Dam Safety Engineer, Civil Engineering | On-hold due to the status of Turlock Lake |

| Mitigation Activity | Objective | Progress/Status | Responsible | Time-frame |
|---|---|---|---|---|
| 2020.LHMP.EQ.12 Develop alternate fuel sources should natural gas delivery be disrupted due to a major earthquake damaging supply pipelines. | EQ2, EQ3, EQ4, EQ6 | Investigate potential for alternate fuel sources if gas availability from the Bay Area or Southern California is disrupted. If no alternates available, investigate means of importing power through the transmission system. Determine the amount of load the District could potentially serve based on limited supply scenarios. This work has already begun and is part of the District's overall enterprise risk management strategy. | Security and Emergency Preparedness, Power Supply Administration | Ongoing |
| 2020.LHMP.EQ.14 Route power to critical facilities during power outages. | EQ1, EQ4, EQ6 | Investigate the development of plans to strategically route power to critical care facilities during times of limited power availability due to fuel disruptions or issues affecting TID's ability to generate power at full capacity. This is a current project but new to the LHMP. | Security and Emergency Preparedness, Engineering and Operations Administration, Line Department | Ongoing |
| 2020.LHMP.EQ.15 Participate in the Great California Shakeout exercise conducted annually by CAL OES. | EQ1, EQ2, EQ8 | Develop a company-wide outreach program to encourage participation in the Great California Shakeout and promoting preparedness at work and home for employees. | Security and Emergency Preparedness, Communications Division | Ongoing |
| 2020.LHMP.EQ.16 Improve earthquake resistance at District facilities. | EQ2, EQ4 | Evaluate all District facilities for earthquake resistance and investigate improvements. This is a new project. | Security and Emergency Preparedness, Civil Engineering | Begin in Q3 2021 and continue as an ongoing project. |
| 2020.LHMP.EQ.17 Provide training to first responders about the hazards of electrical equipment during earthquake events. | EQ1, EQ5 | Incorporate information about damaged electrical facilities into existing First Responder Step Potential Training. This project has begun and is continuing. | Line Division | Ongoing |
| 2020.LHMP.EQ.18 Continue to participate in Emergency Action Plan training and exercises by attending presentations of other local jurisdiction's plans. | EQ8 | TID attends the Stanislaus and San Joaquin Operational Area Council meetings regularly and attend other meetings as made aware of them. | Security and Emergency Preparedness | Ongoing |

| Mitigation Activity | Objective | Progress/Status | Responsible | Time-frame |
|---|---|---|---|---|
| 2020.LHMP.EQ.19 Provide alternative fuel source for District vehicles and equipment. | EQ1, EQ3, EQ4, EQ6 | Investigate new sources of fuel available in an emergency not located in the Bay Area or subject to supply disruptions from ruptured supply lines. This is a new project. | Security and Emergency Preparedness, Fleet, Materials Management | Begin in Q3 2021 and report findings to the TID Management Team by Q4 2023 |
| 2020.LHMP.EQ.20 Rehabilitate or rebuild the Upper Main Canal to make it more resilient and resistant to seismic events or other potential impacts. | EQ1, EQ2, EQ3, EQ4 | Develop a more robust hydraulic model to simulate operational and capacity conditions needed to serve all of the District's interests. Upon completion of this task, evaluate replacement alternatives, update cost estimate and construct the replacement facility. | Water Resources Administration | Currently developing a new hydraulic model. Once complete, further evaluation of alternatives can begin. |
| 2020.LHMP.EQ.21 Rehabilitate and rebuild selected dams at Turlock Lake to make them more resilient and resistant to seismic events or other potential impacts. | | This is a new activity and is currently in the design and environmental clearance process. TID has applied for a grant to complete this project. | CDSE, TID Civil Engineering | Construction could commence once design and environmental work are complete. |

## Earthquake Mitigation Cost-Benefit Review

This table analyzes the costs and benefits for the identified mitigation activities, assigns it a priority level as well as a proposed funding source. For definitions of the priority levels, see "Cost-Benefit Review" on page 6-11.

| Mitigation Activity | Benefit | Costs | Priority | Funding Source |
|---|---|---|---|---|
| 2020.LHMP.EQ.01 Integrate the LHMP priorities into other TID plans including the Emergency Operations Plan, Continuity of District/ Continuity of Operations Plan, Capital Improvement Plans and other District plans. | Avoids emergency management costs. | Staff time for development and coordination | HIGH | • TID Budget |
| 2020.LHMP.EQ.02 Improve cell phone coverage at Don Pedro Reservoir for internal communications capabilities and to allow for alerting and warning of watercraft via cell phones if it is necessary to evacuate the lake due to spillway operations, potential failure scenarios or unsafe conditions. | Improves internal communications within TID and DPRA. Enables emergency managers and responding agencies to more quickly and efficiently evacuate the reservoir of boat and watercraft should it be necessary as a result of damage to the dam or spillways or, the threat of a Seiche. | Equipment costs and staff time to position it in the event of an emergency, ongoing training and maintenance costs | LOW | • DPRA Budget<br>• FEMA EMPG funding<br>• BRIC funding |
| 2020.LHMP.EQ.03 Improve radio and cell phone coverage at locations where signal strength is weak or radio communication is difficult. | Improves communication capabilities when operating in remote areas or in areas without cell phone coverage. | Staff time for research and bid process, equipment costs, ongoing maintenance costs | LOW | • TID Budget<br>• FEMA EMPG funding<br>• BRIC funding |
| 2020.LHMP.EQ.04 Improve radio communication capabilities and interoperability between TID, Don Pedro Recreation Agency (DPRA), and outside agencies. | Improves communication between DPRA and Don Pedro Power Plant, Construction and Maintenance staff and outside agencies responding to an emergency. | Equipment costs and staff time to train on the new system | MEDIUM | • TID and/or DPRA Budget<br>• FEMA EMPG funding |
| 2020.LHMP.EQ.05 Re-configure and expand TID's District Operations Center to include dedicated meeting space, JIC, and breakout rooms for Management/ Command and General Staff and a separate area for meals/ breaks. | Avoids Emergency Management Costs. Improves DOC operations. | Staff time for remodel design work, permitting (if necessary) and construction | MEDIUM | • TID Budget<br>• FEMA EMPG funding |

| Mitigation Activity | Benefit | Costs | Priority | Funding Source |
|---|---|---|---|---|
| 2020.LHMP.EQ.06<br>Mobile command post for locating District response personnel in close proximity to damaged facilities during recovery. | Provides command, communication and coordination support near the incident for District personnel assigned to critical incident response during a disaster. Provides a portable office space for an Incident Command Post near the disaster location. | Equipment costs, ongoing maintenance, set-up and transportation costs when deployed | MEDIUM | • TID Budget<br>• FEMA EMPG funding |
| 2020.LHMP.EQ.07<br>Provide NIMS, SEMS and ICS training to TID employees with a role in an emergency response. The National Incident Management System (NIMS), Standardized Emergency Management System (SEMS), and the Incident Command System (ICS) were developed so that responders from different jurisdictions and disciplines can work together to provide a unified approach to incident management using a common set of operating principles, organizational structure, and terminology. | Avoids emergency management costs and facilitates communication and coordination in the event of an incident involving outside agencies. | Staff time for coordination and training, developing materials for in-house training, and hiring outside instructors for advanced topics. | HIGH | • TID Budget<br>• FEMA EMPG funding |
| 2020.LHMP.EQ.08<br>Provide portable power stations to communities without electricity for charging of cell phones. | Allows the public to maintain communications with family members for reunification, reporting their status to officials thereby reducing costs for response, and communicating and coordinating their personal recovery efforts with local, state and regional disaster assistance organizations and NGOs. | Equipment costs, ongoing maintenance, set-up, and transportation costs when deployed | LOW | • TID Budget<br>• BRIC funding |

| Mitigation Activity | Benefit | Costs | Priority | Funding Source |
|---|---|---|---|---|
| 2020.LHMP.EQ.09<br>Dispose of floatable debris in the upper reaches of the reservoir that has washed downstream from the Tuolumne River. | Removing floatable debris prevents it from escaping the containment booms where it is currently being held and creating a safety hazard for boaters on the lake. It also prevents the debris from migrating through the reservoir and becoming lodged in the outlet works or spillway structures preventing their use. Disposing of the woody debris reduces wildland fire risk. | Investigate disposal techniques including burning of debris in place. | MEDIUM | • DPRA Budget<br>• FEMA HMGP funding |
| 2020.LHMP.EQ.10<br>Provide a second method of egress from the Turlock Lake Campgrounds to be used in the event of an emergency at the facility necessitating the rapid evacuation of the campground. | Protects life and property and avoids emergency management costs. | Staff time for investigation of possible alternative routes and acquisition of property or easements | LOW | • TID Budget<br>• BRIC funding |
| 2020.LHMP.EQ.12<br>Develop alternate fuel sources should natural gas delivery be disrupted due to a major earthquake damaging supply pipelines. | Allows the District to continue to provide critical services to customers during the emergency. | Staff time to conduct an investigation. | LOW | • TID Budget<br>• BRIC funding |
| 2020.LHMP.EQ.14<br>Route power to critical facilities during power outages. | Allows faster restoration of critical services to the community during an earthquake event. | Staff time to investigate a solution to provide power to critical facilities | MEDIUM | • TID Budget<br>• FEMA EMPG funding |
| 2020.LHMP.EQ.15<br>Participate in the Great California Shakeout exercise conducted annually by CAL OES. | Heightens awareness of the need to prepare both at work and at home in case of a large scale natural disaster. Provides resiliency to the District in case of an emergency through a prepared and trained staff. | Staff time to develop and execute an employee awareness and participation campaign | HIGH | • TID Budget |
| 2020.LHMP.EQ.16<br>Improve earthquake resistance at District facilities. | Prevents or lessens potential damage to TID facilities. Prevents emergency management costs. | Staff time to investigate facilities and potential mitigations. Capital costs to implement any approved improvements to facilities. | MEDIUM | • TID Budget<br>• BRIC funding<br>• FEMA HMGP funding |

| Mitigation Activity | Benefit | Costs | Priority | Funding Source |
|---|---|---|---|---|
| 2020.LHMP.EQ.17<br>Provide training to first responders about the hazards of electrical equipment during earthquake events. | During existing First Responder training on Step Potential, remind responders of the dangers of water and electricity and the need for caution and coordination with TID to ensure everyone's safety. | Staff time during already scheduled presentations | HIGH | • TID Budget<br>• FEMA EMPG funding |
| 2020.LHMP.EQ.18<br>Continue to participate in Emergency Action Plan training and exercises by attending presentations of other local jurisdiction's plans. | Avoids casualties, emergency management costs and property damage. Promotes cooperation and coordination with TID and outside agencies. | Staff time for development and coordination | HIGH | • TID Budget |
| 2020.LHMP.EQ.19<br>Provide alternative fuel source for District vehicles and equipment. | Provides certainty of fuel supply and the District's ability to continue critical business functions. | Staff time to develop bid specs, bid and establish emergency fuel agreements | MEDIUM | • TID Budget<br>• FEMA EMPG funding |
| 2020.LHMP.EQ.20<br>Rehabilitate or rebuild the Upper Main Canal to make it more resilient and resistant to seismic events or other potential impacts. | Improves the reliability of water supplies, adds additional operational flexibility for greater efficiency, and improves overall system management of the high capacity conveyance facility between La Grange Dam and Turlock Lake. | Staff time, property acquisition, design, permitting, construction costs and ongoing maintenance | HIGH | • TID Budget<br>• BRIC funding<br>• Other grants |
| 2020.LHMP.EQ.21<br>Rehabilitate and rebuild selected dams at Turlock Lake to make them more resilient and resistant to seismic events or other potential impacts. | Improves resiliency and resistance to seismic and other events and lessens the possibility of a failure protecting lives, property, the environment downstream. Additionally, it prevents significant damage to the local economy resulting from a loss of surface water irrigation capability while protecting groundwater resources. | Staff time.<br>If grant funds are used, staff time to administer the grant. | HIGH | • BRIC funding<br>• FEMA EMPG funding<br>• TID Budget |

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## Mitigation Strategy

# Extreme Weather

Extreme weather is generally identified as any dangerous meteorological phenomenon that poses a risk to life or property, or requires the intervention of authorities. The strategies for mitigating the District's risk from extreme weather center around the need for real-time information allowing the District to make more informed operating decisions.

The most common types of extreme weather that typically impact TID are damaging winds, extreme temperatures and localized extreme rainfall.

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## Extreme Weather Mitigation Goals

- Protect life and property
- Reduce the impact of extreme weather events on the TID, its customers, and the general public
- Reduce the impacts on the economy resulting from extreme weather events impacting TID facilities
- Promote coordination and cooperation between the TID and its regional partner agencies

## Extreme Weather Mitigation Objectives

| Objective No. | Objective Activity |
|---|---|
| **EW1** | Protect life and property |
| **EW2** | Improve coordination and communication during extreme weather events |
| **EW3** | Improve the ability of the TID to predict the occurrence of extreme weather events with the potential to impact District infrastructure |
| **EW4** | Continue the TID's critical business functions in the event of an extreme weather event |
| **EW5** | Integrate the LHMP with other TID plans |
| **EW6** | Integrate the LHMP with partner agency plans |
| **EW7** | Coordinate and communicate with partner and responding agencies |
| **EW8** | Recover from the effects of an extreme weather incident |
| **EW9** | Provide critical support to residents in areas impacted by an extreme weather event |

## Extreme Weather Mitigation Action Plan

The following table describes the mitigation activities identified by the LHMP Planning Team, the objective the activity achieves, party or parties responsible for carrying it out and the time-frame for accomplishing it.

| Mitigation Activity | Objective | Progress/Status | Responsible | Time-frame |
|---|---|---|---|---|
| 2020.LHMP.EW.01 Integrate the LHMP priorities into other TID plans including the Emergency Operations Plan, Continuity of District/ Continuity of Operations Plan, Capital Improvement Plans and other District plans. | EW1, EW5, EW7 | This is a new activity. | Security and Emergency Preparedness, TID Management Team | Ongoing |

| Mitigation Activity | Objective | Progress/Status | Responsible | Time-frame |
|---|---|---|---|---|
| 2020.LHMP.EW.02 Improve cell phone coverage at Don Pedro Reservoir for internal communications capabilities and to allow for alerting and warning of watercraft via cell phones if it is necessary to evacuate the lake due to spillway operations, potential failure scenarios or unsafe conditions. | EW1, EW4, EW7 | Evaluate current radio system and configuration, identify repeated and non-repeated channels, and explore options to tie TID and DPRA radios together to allow for better communications. Investigate mobile communications signal boosting equipment. Some of the work around improving internal communications capabilities at Don Pedro has begun. Investigation of methods for improving the alerting and warning of watercraft on the lake has not yet commenced. | Security and Emergency Preparedness, Station Engineering, Electronics | Begin exploring solutions for alerting and warning of watercraft in Q1 of 2021 and complete by Q4 of 2025 |
| 2020.LHMP.EW.03 Improve radio and cell phone coverage at locations where signal strength is weak or radio communication is difficult. | EW1, EW2, EW4, EW7 | Investigate mobile communications signal boosting equipment. This is a new activity and work has not yet begun. | Security and Emergency Preparedness, Station Engineering, Electronics | In progress. Tested using Starlink as an option. Other platforms need evaluation. |
| 2020.LHMP.EW.04 Improve radio communication capabilities and interoperability between TID, Don Pedro Recreation Agency (DPRA), and outside agencies. | EW1, EW2, EW4, EW7 | Investigate potential solutions for improving the capability of TID's radio system to communicate between District frequencies and DPRA as well as outside agencies in an emergency. This activity is new to TID's emergency planning and work has not yet begun. | Security and Emergency Preparedness, Station Engineering, Electronics | Begin in Q3 of 2021 and complete by 2023 |
| 2020.LHMP.EW.05 Re-configure and expand TID's District Operations Center to include dedicated meeting space, JIC, and breakout rooms for Management/ Command and General Staff and a separate area for meals/ breaks. | EW1, EW2, EW7, EW8 | Remodel of current DOC to provide reconfigurable space for meetings/ breakout rooms at CC Wright Hall or, other locations in close proximity. Some of this work has already been completed with the addition of a conference room but, a dedicated JIC and other improvements have not been started. | Security and Emergency Preparedness, Facilities | Began, needs to be re-stocked |

| Mitigation Activity | Objective | Progress/Status | Responsible | Time-frame |
|---|---|---|---|---|
| 2020.LHMP.EW.06 Mobile command post for locating District response personnel in close proximity to damaged facilities during recovery. | EW1, EW2, EW8 | Investigate solutions for a mobile office trailer or vehicle specifically designed to be used as a mobile Incident Command Post. This is a new activity and work has not yet begun. | Security and Emergency Preparedness | Begin investigating solutions in Q2 of 2021 and present options to the TID Management Team by Q1 2023 |
| 2020.LHMP.EW.07 Provide NIMS, SEMS and ICS training to TID employees with a role in an emergency response. The National Incident Management System (NIMS), Standardized Emergency Management System (SEMS), and the Incident Command System (ICS) were developed so that responders from different jurisdictions and disciplines can work together to provide a unified approach to incident management using a common set of operating principles, organizational structure, and terminology. | EW1, EW2, EW7 | Develop an appropriate training program to introduce TID staff to the principles of incident command. This is a new activity for TID. The development of course presentations has begun and the initial round of training based on ICS-100 and 700 will be complete by the end of 2020. Training of staff will commence as conditions permit in-person training to resume. | Security and Emergency Preparedness | Course development already underway, in-person training to begin by Q3 2021 (if conditions permit) all existing staff trained in basic ICS by Q4 2026. New staff training will be ongoing. |
| 2020.LHMP.EW.08 Provide portable power stations to communities without electricity for charging of cell phones. | EW1, EW3 | Investigate solutions for providing remote cell phone charging stations or portable generators/power units to provide this ability. This is a new activity and work has not yet begun. | Security and Emergency Preparedness | Begin in Q3 of 2021 and present a proposal to the TID Management Team by Q4 2022 |
| 2020.LHMP.EW.09 Dispose of floatable debris in the upper reaches of the reservoir that has washed downstream from the Tuolumne River. | EW1, EW2, EW3 | Investigate disposal techniques including burning of debris in place. Preliminary work has begun to determine options that may be suitable for disposing of the debris. More work is needed to determine the best method and identify alternatives. | DPRA | Began Spring 2023 |

| Mitigation Activity | Objective | Progress/Status | Responsible | Time-frame |
|---|---|---|---|---|
| 2020.LHMP.EW.10 Provide a second method of egress from the Turlock Lake Campgrounds to be used in the event of an emergency at the facility necessitating the rapid evacuation of the campground. | EW1 | Investigate the feasibility of providing another access route into or out of the campgrounds at Turlock Lake. This is a new activity and work has not yet begun. | Security and Emergency Preparedness/ Chief Dam Safety Engineer/ Civil Engineering | On hold due to status of Turlock Lake |
| 2020.LHMP.EW.12 Continue to participate in Emergency Action Plan training and exercises by attending presentations of other local jurisdiction's plans. | EW1, EW6, EW7 | Attend the Stanislaus and San Joaquin Operational Area Council meetings regularly and attend other meetings. TID currently participates in these meetings and will continue to do so. | Various TID representatives | Ongoing |
| 2020.LHMP.EW.13 Provision for continuous operations at the DOC in the event of a power outage. | EW1, EW2, EW4 | Install a permanent generator at the DOC. This is a new activity and work has not yet begun. | Security and Emergency Preparedness and Facilities | Begin in Q3 2021 and present options to the TID Management Team by Q4 2024 |
| 2020.LHMP.EW.14 Notification system to primary personnel activated to the DOC | EW1, EW3, EW7 | Use of TIDAlert to notify personnel. TID has been using Everbridge, branded as TIDAlert for the past five years. This activity will continue for the foreseeable future. | Security and Emergency Preparedness | Ongoing |
| 2020.LHMP.EW.16 Increase the ability of TID to monitor local weather and streamflow conditions in order to more accurately forecast impacts of hyper-local weather events. | EW1, EW2, EW3, EW4, EW7 | Investigate the feasibility of installing additional meteorological stations, streamflow gages and vertical radar stations in areas where they can increase TID's ability to monitor local weather, water quality and flow conditions. | Hydrology Department | Begin in Q2 of 2021 and present findings to the TID Management Team by Q4 of 2025 |
| 2020.LHMP.EW.17 Reduce outages during high wind events by improving the ability of transmission and distribution lines to withstand high winds. | EW1, EW4 | Investigate the feasibility of installing conductors and poles that are better able to withstand high wind events. The District currently does this with locations where high winds have resulted in large or frequent outages in the past. This project will take a more proactive look at possible pre-storm mitigation and assess the feasibility of hardening the system in the appropriate areas. | Electrical Engineering and Operations Department | Begin in Q3 of 2021 and report results to the TID Management Team by Q4 2025 |

Project Complete

| Mitigation Activity | Objective | Progress/Status | Responsible | Time-frame |
|---|---|---|---|---|
| 2020.LHMP.EW.18 Reduce the number of outages due to high overnight temperatures during a high heat event. | EW1, EW4 | Investigate the feasibility of replacing equipment in areas that typically experience outages due to the poor overnight temperature recovery that occurs during high heat events. This project could be accomplished in conjunction with 2020.LHMP.EW.17. | Electrical Engineering and Operations Department | In Progress. Begin in Q2 of 2023 |
| 2020.LHMP.EW.20 Utilize mobile air quality monitors on job sites when the AQI for PM2.5 is forecasted to be at a level determined by the DIR as a health risk to those working outside. | EW1, EW4 | Investigate the feasibility of purchasing and using mobile air quality monitors. This is a new project. | Environmental Health Division/ Security & Emergency Preparedness | Begin in Q1 of 2021 and report results to the TID Management Team by Q4 2025 |
| 2020.LHMP.EW.21 Mitigate the effects of extreme heat on employees working in older, existing buildings at the District which currently do not have air conditioning. | EW1, EW4 | Investigate the feasibility of remodeling existing buildings that currently do not have air conditioning in order to include it. This is a new project. | Environmental Health Division/ Facilities/ Construction & Maintenance/ Civil Engineering | Begin in Q3 of 2021 and report results to the TID Management Team by Q4 2025 |
| 2020.LHMP.EW.22 Increase the ability of TID to monitor water temperature and quality in Don Pedro Reservoir negatively impacted by runoff and debris flows resulting from storm events occurring in the Tuolumne River watershed and adjust operations in order to mitigate them. | EW1, EW2, EW3, EW4, EW7 | Investigate the feasibility of purchasing, installing and operating equipment located at the reservoir which will provide real-time data on temperature and water quality so that TID can make informed decisions on reservoir operations during and after storm events. This is a new project. | Hydrology Department | In progress. Some research into the viability of the project and equipment that could be used has been completed. More is necessary to proceed. |

| Mitigation Activity | Objective | Progress/Status | Responsible | Time-frame |
|---|---|---|---|---|
| 2020.LHMP.EW.23 Purchase and implement an outage management system. | EW1, EW2, EW4, EW5 | Investigate the feasibility of implementing the use of an outage management system in the Power Control Center. This is a new project, however some of the preliminary work has already been completed. | Electrical Engineering and Operations Administration | Currently working on design documents with OSI. OMS projects is scheduled to be complete by the end of 2023 |
| 2020.LHMP.EW.24 Reduce the occurrence of tree limbs falling or being blown into power lines during storm events. | EW1, EW4 | Investigate the feasibility of adopting longer tree trimming distances for electrical distribution lines. This is a new project. Most of this work has been completed in the high fire-threat Tier 2 zones within the District as per the Wildfire Mitigation Plan. This activity addresses vegetation management in non fire-threat zones. This project could be a part of the 2020.LHMP.EW.17 mitigation activity. | Electrical Engineering and Operations Administration | Ongoing |
| 2020.LHMP.EW.25 Upgrade the building heaters in the water treatment facilities at DPRA in order to protect equipment in the event of extreme cold temperatures. | EW1, EW4 | Investigate the feasibility of replacing the current heaters inside the water treatment facility buildings at DPRA. This is a new project. | DPRA | Begin in Q1 of 2021 and report results to the TID Management Team by Q4 2025 |
| 2020.LHMP.EW.26 Prepare for changes in water availability in the canal system due to the impacts of climate change. | EW1, EW2, EW3, EW7, EW8, EW9 | Continue to make improvements to the canal system, consider opportunities to install drought mitigation measures, and evaluate potential water storage projects as they are identified. This is an ongoing project. | Water Distribution, Hydrology, Civil Engineering, Construction & Maintenance | Ongoing |

| Mitigation Activity | Objective | Progress/Status | Responsible | Time-frame |
|---|---|---|---|---|
| 2020.LHMP.EW.27 Investigate the feasibility and effectiveness of reducing evaporation in the canal system. | EW1, EW9 | TID is partnering with UC Merced, the State of California and private companies on a pilot program to install solar panels over a portion of the canal system to test their effectiveness in reducing water loss through evaporation and limiting the growth of aquatic weeds which can lead to overtopping and a potential canal failure. This project has been awarded grant funding. | Water Resources Administration, Power Supply Administration | The first pilot project is underway. |
| 2020.LHMP.EW.28 Improve irrigation system efficiency by constructing regulating reservoirs on the lower end of the canal system. | EW1, EW9 | Design has been completed and CEQA clearance obtained for the Ceres Main Regulating Reservoir. Construction is expected to begin in late Summer of 2022 and be completed in early 2023. Design and CEQA clearance are currently underway for the Lateral 5.5 Regulating Reservoir. More projects like these are being considered and will move forward with construction once they are deemed viable. | Water Distribution, Civil Engineering, & Construction & Maintenance | The first project is expected to be complete and operational by Q2 of 2023 |
| 2020.LHMP.EW.29 Improve TID's capability to forecast water content in the Tuolumne River Watershed. | EW1, EW2, EW3, EW4, EW7, EW8, EW9 | TID is currently utilizing the Airborne Snow Observatory and the Hydrocomp Forecast and Analysis Modeling, to improve the District's ability to analyze the water content of the snowpack and determine runoff potential in the Tuolumne River. | Water Resources Administration | This project is ongoing. |
| 2020.LHMP.EW.30 Modernize water control structures on the lower canal system. | EW1 | The District modernizes several water control structures in its lower canal system annually. | Water Resources Administration | This project is ongoing. |
| 2020.LHMP.EW.31 Prepare for changes in water availability in the canal system due to the impacts of extreme weather by augmenting surface water supplies. | EW1, EW8, EW9 | Currently investigating the feasibility and viability of various flood flow storage and conveyance projects. | Water Resources Administration | This project is ongoing. |

| Mitigation Activity | Objective | Progress/Status | Responsible | Time-frame |
|---|---|---|---|---|
| 2020.LHMP.EW.34 Acquire new technology including computer hardware, software, data management systems, and an expansion of the HFAM model to include Mustang and Sand Creek improving the ability to predict and respond to hyper-local weather events which are increasing in frequency and intensity due to the effects of climate change. Incorporate this new data into future modeling of watershed behavior. | EW1, EW2, EW3, EW4, EW7, EW8, EW9 | This is a new project in 2023, not yet begun. TID intends to pursue grant funding in order to complete this project | Hydrology Department | Not yet implemented. |
| 2020.LHMP.EW.35 Improve communication with assisting and cooperating agencies during an emergency condition at Don Pedro or other District owned or operated dam. Establish a method for sharing real-time information, video feeds and data. | EW1, EW2, EW6, EW7, EW9 | This is a new project in 2023, not yet begun. TID intends to pursue grant funding in order to complete this project | Hydrology Department, Security and Emergency Preparedness | Not yet implemented. |
| 2020.LHMP.EW.36 Improve interoperability between TID and response agencies during a High Flow Condition or other emergency condition at any District owned or operated dam. | EW1, EW2, EW7, EW9 | This is a new project in 2023, not yet begun. TID intends to pursue grant funding in order to complete this project | Hydrology Department, Security and Emergency Preparedness | Not yet implemented. |
| 2020.LHMP.EW.37 Add additional infiltration galleries in the Tuolumne River at Fox Grove. | EW4, EW8, EW9 | This is a new project in 2023, not yet begun. TID intends to pursue grant funding in order to complete this project | Hydrology Department | Not yet implemented. |

## Extreme Weather Mitigation Cost-Benefit Review

This table analyzes the costs and benefits for the identified mitigation activities, assigns it a priority level as well as a proposed funding source. For definitions of the priority levels, see "Cost-Benefit Review" on page 6-11.

| Mitigation Activity | Benefit | Costs | Priority | Funding Source |
|---|---|---|---|---|
| 2020.LHMP.EW.01 Integrate the LHMP priorities into other TID plans including the Emergency Operations Plan, Continuity of District/ Continuity of Operations Plan, Capital Improvement Plans and other District plans. | Avoids emergency management costs. | Staff time for development and coordination | HIGH | • TID Budget |
| 2020.LHMP.EW.02 Improve cell phone coverage at Don Pedro Reservoir for internal communications capabilities and to allow for alerting and warning of watercraft via cell phones if it is necessary to evacuate the lake due to spillway operations, potential failure scenarios or unsafe conditions. | Improves internal communications within TID. Enables emergency managers and responding agencies to more quickly and efficiently evacuate the lake when necessary. | Equipment costs and staff time to position it in the event of an emergency, ongoing training and maintenance costs | LOW | • DPRA Budget<br>• FEMA EMPG funding<br>• BRIC funding |
| 2020.LHMP.EW.03 Improve radio and cell phone coverage at locations where signal strength is weak or radio communication is difficult. | Improves communication capabilities when operating in remote areas or in areas without cell phone coverage. | Staff time for research and bid process, equipment costs, ongoing maintenance costs | LOW | • TID Budget<br>• FEMA EMPG funding<br>• BRIC funding |
| 2020.LHMP.EW.04 Improve radio communication capabilities and interoperability between TID, Don Pedro Recreation Agency (DPRA), and outside agencies. | Improves communication between DPRA and Don Pedro Power Plant, Construction and Maintenance staff and outside agencies responding to an emergency. | Equipment costs and staff time to train on the new system | MEDIUM | • TID and/or DPRA Budget<br>• FEMA EMPG funding |
| 2020.LHMP.EW.05 Re-configure and expand TID's District Operations Center to include dedicated meeting space, JIC, and breakout rooms for Management/ Command and General Staff and a separate area for meals/ breaks. | Avoids Emergency Management Costs. Improves DOC operations. | Staff time for remodel design work, permitting (if necessary) and construction | MEDIUM | • TID Budget<br>• FEMA EMPG funding |

| Mitigation Activity | Benefit | Costs | Priority | Funding Source |
|---|---|---|---|---|
| 2020.LHMP.EW.06<br>Mobile command post for locating District response personnel in close proximity to damaged facilities during recovery. | Provides command, communication and coordination support near the incident for District personnel assigned to critical incident response during a disaster. Provides a portable office space for an Incident Command Post near the disaster location. | Equipment costs, ongoing maintenance, set-up and transportation costs when deployed | MEDIUM | • TID Budget<br>• FEMA EMPG funding |
| 2020.LHMP.EW.07<br>Provide NIMS, SEMS and ICS training to TID employees with a role in an emergency response. The National Incident Management System (NIMS), Standardized Emergency Management System (SEMS), and the Incident Command System (ICS) were developed so that responders from different jurisdictions and disciplines can work together to provide a unified approach to incident management using a common set of operating principles, organizational structure, and terminology. | Avoids emergency management costs and facilitates communication and coordination in the event of an incident involving outside agencies. | Staff time for coordination and training, developing materials for in-house training, and hiring outside instructors for advanced topics. | HIGH | • TID Budget<br>• FEMA EMPG funding |
| 2020.LHMP.EW.08<br>Provide portable power stations to communities without electricity for charging of cell phones. | Allows the public to maintain communications with family members for reunification, reporting their status to officials thereby reducing costs for response, and communicating and coordinating their personal recovery efforts with local, state and regional disaster assistance organizations and NGOs. | Equipment costs, ongoing maintenance, set-up, and transportation costs when deployed | LOW | • TID Budget<br>• BRIC funding |

| Mitigation Activity | Benefit | Costs | Priority | Funding Source |
|---|---|---|---|---|
| 2020.LHMP.EW.09 Dispose of floatable debris in the upper reaches of the reservoir that has washed downstream from the Tuolumne River. | Removing floatable debris prevents it from escaping the containment booms where it is currently being held and creating a safety hazard for boaters on the lake. It also prevents the debris from migrating through the reservoir and becoming lodged in the outlet works or spillway structures preventing their use. Disposing of the woody debris reduces wildland fire risk. | Investigate disposal techniques including burning of debris in place. | MEDIUM | • DPRA Budget<br>• FEMA HMGP funding |
| 2020.LHMP.EW.10 Provide a second method of egress from the Turlock Lake Campgrounds to be used in the event of an emergency at the facility necessitating the rapid evacuation of the campground. | Protects life and property and avoids emergency management costs. | Staff time for investigation of possible alternative routes and acquisition of property or easements | LOW | • TID Budget<br>• BRIC funding |
| 2020.LHMP.EW.12 Continue to participate in Emergency Action Plan training and exercises by attending presentations of other local jurisdiction's plans. | Promotes the sharing of information with outside agencies and personal relationships with other emergency managers that would have a role in the activation of an EAP. | Staff time to attend meetings | HIGH | • TID Budget |
| 2020.LHMP.EW.13 Provision for continuous operations at the DOC in the event of a power outage. | Ensures continuous operations at the DOC. Avoids emergency management costs, loss of communication, situational awareness, and control of the response. | Equipment and ongoing maintenance | LOW | • TID Budget<br>• BRIC funding |
| 2020.LHMP.EW.14 Notification system to primary personnel activated to the DOC | Improves communication and response time of activated DOC incident staff. | Ongoing maintenance of a database of contact numbers and testing of the system | HIGH | • TID Budget |
| 2020.LHMP.EW.16 Increase the ability of TID to monitor local weather and stream-flow conditions in order to more accurately forecast impacts of hyper-local weather events. | Provides better and timelier information on conditions that could potentially impact Don Pedro Reservoir allowing TID to make more accurate predictions and better operational decisions. | Equipment costs, staff time and maintenance costs | MEDIUM | • TID Budget<br>• FEMA HMGP funding |

| Mitigation Activity | Benefit | Costs | Priority | Funding Source |
|---|---|---|---|---|
| 2020.LHMP.EW.17<br>Reduce outages during high wind events by improving the ability of transmission and distribution lines to withstand high winds. | Reduces the number of electrical outages to customers during storm and wind events. Reduces overtime costs from crews that are needed in order to restore power during these outages. Protects vulnerable or medically fragile customers from losing power in a storm. | Equipment costs, staff time and maintenance costs | LOW | TID Budget<br>BRIC funding |
| 2020.LHMP.EW.18<br>Reduce the number of outages due to high overnight temperatures during a high heat event. | Reduces the number of electrical outages to TID customers during high heat events. Reduces overtime costs from crews that are needed in order to restore power during these outages. Protects vulnerable or medically fragile customers from losing power in a high heat event. | Equipment costs, staff time and maintenance costs | HIGH | • TID Budget<br>• BRIC funding |
| 2020.LHMP.EW.20<br>Utilize mobile air quality monitors on job sites when the AQI for PM2.5 is forecasted to be at a level determined by the DIR as a health risk to those working outside. | Provides real-time monitoring of conditions at the job site, reducing the necessity for breathing masks when the regional forecast of an AQI for PM2.5 is above acceptable levels as defined by the DIR but the AQI at the job site is lower. | Equipment costs, staff time and maintenance costs | LOW | • TID Budget<br>• FEMA HMGP funding |
| 2020.LHMP.EW.21<br>Mitigate the effects of extreme heat on employees working in older, existing buildings at the District which currently do not have air conditioning. | Provides protection of employees from exposure to the risks of extreme heat while working in buildings without air conditioning. Complies with directives from the DIR. | Equipment costs, staff time and maintenance costs | LOW | • TID Budget<br>• BRIC funding |
| 2020.LHMP.EW.22<br>Increase the ability of TID to monitor water temperature and quality in Don Pedro Reservoir negatively impacted by runoff and debris flows resulting from storm events occurring in the Tuolumne River watershed and adjust operations in order to mitigate them. | Provides better and timelier information on conditions that could potentially impact Don Pedro Reservoir allowing TID to make more accurate predictions and better operational decisions. | Equipment costs, staff time and maintenance costs | MEDIUM | • TID Budget<br>• FEMA HMGP funding |

Project Complete

| Mitigation Activity | Benefit | Costs | Priority | Funding Source |
|---|---|---|---|---|
| 2020.LHMP.EW.23 Purchase and implement an outage management system. | Provides better information in real-time when outages occur and improves the District's formation of a restoration strategy. | Equipment costs, staff time and maintenance costs | HIGH | • TID Budget<br>• BRIC funding |
| 2020.LHMP.EW.24 Reduce the occurrence of tree limbs falling or being blown into power lines during storm events. | Allows tree trimming crews to increase the distance from electric distribution lines that vegetation can be removed, lowering the risk that branches or larger limbs will fall into lines causing an outage during a storm. | Contract tree trimming crew costs, equipment costs, staff time and maintenance costs | HIGH | • TID Budget<br>• BRIC funding |
| 2020.LHMP.EW.25 Upgrade the building heaters in the water treatment facilities at DPRA in order to protect equipment in the event of extreme cold temperatures. | Protects water treatment capabilities for the recreation facilities during extreme cold events. | Equipment costs, staff time and maintenance costs | LOW | • DPRA Budget<br>• BRIC funding |

| Mitigation Activity | Benefit | Costs | Priority | Funding Source |
|---|---|---|---|---|
| 2020.LHMP.EW.26<br>Prepare for changes in water availability in the canal system due to the impacts of climate change. | Canal system improvements increase efficiency and help to avoid a major canal system failure which could result in property damage, loss of water, and depending upon location and conditions, loss of life. Some projects can improve water conservation by providing enhanced measurement and system management capability through telemetry and the use of new technology. Other projects may remove capacity restrictions resulting from previous design and construction practices or impediments to flow hampered by the growth of aquatic weeds. These system improvements could also provide in-lieu groundwater recharge benefits if they can improve the flow of surface water, reducing or negating the need for TID or its customers to pump groundwater into the system to compensate for reduced canal capacity. | Staff time, construction and maintenance costs. | MEDIUM | • TID Budget<br>• Grant funding |
| 2020.LHMP.EW.27<br>Investigate the feasibility and effectiveness of reducing evaporation in the canal system. | Increases the amount of available water without diverting more water from the river. The water that is then prevented from being lost to evaporation can be conserved for future use. The renewable energy produced by the solar panels is GHG and carbon-free. | Staff time, construction and maintenance costs. | HIGH | • TID Budget<br>• Grant funding |

| Mitigation Activity | Benefit | Costs | Priority | Funding Source |
|---|---|---|---|---|
| 2020.LHMP.EW.28 Improve irrigation system efficiency by constructing regulating reservoirs on the lower end of the canal system. | Regulating reservoirs can improve water quality and provide in-lieu groundwater recharge by reducing the need for groundwater pumping, increase conservation by reducing operational spills, and improve service to growers by staging water closer to them in the lower end of the system. | Staff time, property acquisition, design, permitting, construction costs and ongoing maintenance | HIGH | • TID Budget<br>• BRIC funding |
| 2020.LHMP.EW.29 Improve TID's capability to forecast water content in the Tuolumne River Watershed. | Allows the District to better plan for the management of water resources for growers as well as the environment. Knowing more precisely the water content of the snowpack throughout the watershed, the projected rate of evapotranspiration, and the timing and duration of runoff into the reservoir gives TID the ability to more accurately predict inflows and reservoir levels as well as plan water availability during the Irrigation Season. This capability also allows TID to more accurately predict the impacts of storm events year-around. | Staff time, investments in new or emerging technology | HIGH | • TID Budget<br>• EMPG Funding |
| 2020.LHMP.EW.30 Modernize water control structures on the lower canal system. | Modernization of water control structures improves overall water management through remote control and monitoring via the District's Supervisory Control and Data Acquisition (SCADA) control network, which allows water managers to quickly respond to changing conditions in the canal system. Faster system response times also increases water conservation by reducing operational spills. | Staff time, property acquisition, design, permitting, construction costs and ongoing maintenance | HIGH | • TID Budget |

| Mitigation Activity | Benefit | Costs | Priority | Funding Source |
|---|---|---|---|---|
| 2020.LHMP.EW.31 Prepare for changes in water availability in the canal system due to the impacts of extreme weather by augmenting surface water supplies. | Improve the availability and reliability of water in the sub-basin through large-scale flood flow storage projects, interties between large-scale storage projects, capture and reuse of local storm water runoff, and recycled water reuse projects. | Staff time, property acquisition, design, permitting, construction costs and ongoing maintenance | MEDIUM | • TID Budget<br>• BRIC Grants<br>• Other Grants |
| 2020.LHMP.EW.34 Acquire new technology including computer hardware, software, data management systems, and an expansion of the HFAM model to include Mustang and Sand Creek improving the ability to predict and respond to hyper-local weather events which are increasing in frequency and intensity due to the effects of climate change. Incorporate this new data into future modeling of watershed behavior. | Improve the District's ability to predict and respond to extremely localized weather events which have historically been difficult or impossible for the National Weather Service to forecast due to its localized nature. Improves the modeling used by TID to forecast watershed conditions and inflow amounts into Don Pedro and the TID irrigation system. | Staff time, equipment costs, software costs, maintenance costs, and consultant costs to implement the system and develop necessary modeling. | MEDIUM | • TID Budget<br>• BRIC Grants<br>• Other Grants |
| 2020.LHMP.EW.35 Improve communication with assisting and cooperating agencies during an emergency condition at Don Pedro or other District owned or operated dam. Establish a method for sharing real-time information, video feeds and data. | Provides better intelligence to first responders and other assisting and cooperating agencies during an emergency condition involving one or more of the District's dams. Such conditions could be Imminent or Potential Failure or a High Flow Condition. | Staff time, equipment and maintenance costs | LOW | • TID Budget<br>• BRIC Grants<br>• Other Grants |
| 2020.LHMP.EW.36 Improve interoperability between TID and response agencies during a High Flow Condition or other emergency condition at any District owned or operated dam. | Improves communication between TID and first responders both in the field and at the DOC and county EOCs, thereby making the response efforts safer and more efficient. | Staff time, equipment and maintenance costs | LOW | • TID Budget<br>• BRIC Grants<br>• Other Grants |
| 2020.LHMP.EW.37 Add additional infiltration galleries in the Tuolumne River at Fox Grove. | Increases the ability for the District to release larger flows into the Tuolumne at Don Pedro, and then pump those larger flows into the canal system at Fox Grove. | Staff time, equipment, construction costs, permitting and environmental compliance costs, changes to water rights | MEDIUM | • TID Budget<br>• BRIC Grants<br>• Other Grants |

## Mitigation Strategy

# Flooding

Flooding is one of the most destructive natural hazards a community can face. More damage is done by flooding every year than any other naturally occuring hazard phenomenon.

Because of its destructive nature, TID takes the risk of flooding seriously, and as part of its commitment to providing water and electric power safely, is continually evaluating its operations and striving to improve them. This Flooding Mitigation plan outlines steps the District can take to reduce the risk posed by a flood.

Each identified mitigation action inlcudes clear objectives, actionable mitigation measures, identifies responsible parties and examines the costs versus benefits which will form the basis for implementing them.

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## Flooding Mitigation Goals

- Protect life and property
- Reduce the impact of flooding to TID, its customers and the general public
- Reduce the impacts to the economy resulting from flooding
- Promote coordination and cooperation between the TID and regional partner agencies

## Flooding Mitigation Objectives

| Objective No. | Objective Activity |
|---|---|
| **FL1** | Protect Life and Property |
| **FL2** | Improve Coordination and Communication during flooding |
| **FL3** | Lessen the impact of flooding on the general public |
| **FL4** | Continue TID's critical business functions in the event of flooding |
| **FL5** | Integrate the LHMP with other TID plans |
| **FL6** | Integrate the LHMP with partner agency plans |
| **FL7** | Coordinate and communicate with partner and responding agencies |
| **FL9** | Recover from the effects of a flooding incident as quickly as possible |

## Flooding Mitigation Action Plan

The following table describes the mitigation activities identified by the LHMP Planning Team, the objective the activity achieves, party or parties responsible for carrying it out and the time-frame for accomplishing it.

| Mitigation Activity | Objective | Progress/Status | Responsible | Time-frame |
|---|---|---|---|---|
| 2020.LHMP.FL.01 Integrate the LHMP priorities into other TID plans including the Emergency Operations Plan, Continuity of District/ Continuity of Operations Plan, Capital Improvement Plans and other District plans. | FL1, FL6, FL7 | This is a new activity. | Security and Emergency Preparedness, TID Management Team | Ongoing |
| 2020.LHMP.FL.02 Improve cell phone coverage at Don Pedro Reservoir for internal communications capabilities and to allow for alerting and warning of watercraft via cell phones if it is necessary to evacuate the lake due to spillway operations, potential failure scenarios or unsafe conditions. | FL1, FL4, FL7 | Evaluate current radio system and configuration, identify repeated and non-repeated channels, and explore options to tie TID and DPRA radios together to allow for better communications. Investigate mobile communications signal boosting equipment. Some of the work around improving internal communications capabilities at Don Pedro has begun. Investigation of methods for improving the alerting and warning of watercraft on the lake has not yet commenced. | Security and Emergency Preparedness, Station Engineering, Electronics | Begin exploring solutions for alerting and warning of watercraft in Q1 of 2021 and complete by Q4 of 2025 |

| Mitigation Activity | Objective | Progress/Status | Responsible | Time-frame |
|---|---|---|---|---|
| 2020.LHMP.FL.03 Improve radio and cell phone coverage at locations where signal strength is weak or radio communication is difficult. | FL1, FL2, FL4, FL7 | Investigate mobile communications signal boosting equipment. This is a new activity and work has not yet begun. | Security and Emergency Preparedness, Station Engineering, Electronics | In progress. Tested using Starlink as an option. Other platforms need evaluation. |
| 2020.LHMP.FL.04 Improve radio communication capabilities and interoperability between TID, Don Pedro Recreation Agency (DPRA), and outside agencies. | FL1, FL2, FL4, FL7 | Investigate potential solutions for improving the capability of TID's radio system to communicate between District frequencies and DPRA as well as outside agencies in an emergency. This activity is new to TID's emergency planning and work has not yet begun. | Security and Emergency Preparedness, Station Engineering, Electronics | Begin in Q3 of 2021 and complete by 2023 |
| 2020.LHMP.FL.05 Re-configure and expand TID's District Operations Center to include dedicated meeting space, JIC, and breakout rooms for Management/ Command and General Staff and a separate area for meals/ breaks. | FL1, FL2, FL7, FL9 | Remodel of current DOC to provide reconfigurable space for meetings/ breakout rooms at CC Wright Hall or, other locations in close proximity. Some of this work has already been completed with the addition of a conference room but, a dedicated JIC and other improvements have not been started. | Security and Emergency Preparedness, Facilities | Began but needs to be re-stocked. |
| 2020.LHMP.FL.06 Mobile command post for locating District response personnel in close proximity to damaged facilities during recovery. | FL1, FL2, FL9 | Investigate solutions for a mobile office trailer or vehicle specifically designed to be used as a mobile Incident Command Post. This is a new activity and work has not yet begun. | Security and Emergency Preparedness | Begin investigating solutions in Q2 of 2021 and present options to the TID Management Team by Q1 2023 |

| Mitigation Activity | Objective | Progress/Status | Responsible | Time-frame |
|---|---|---|---|---|
| 2020.LHMP.FL.07 Provide NIMS, SEMS and ICS training to TID employees with a role in an emergency response. The National Incident Management System (NIMS), Standardized Emergency Management System (SEMS), and the Incident Command System (ICS) were developed so that responders from different jurisdictions and disciplines can work together to provide a unified approach to incident management using a common set of operating principles, organizational structure, and terminology. | FL1, FL2, FL7 | Develop an appropriate training program to introduce TID staff to the principles of incident command. This is a new activity for TID. The development of course presentations has begun and the initial round of training based on ICS-100 and 700 will be complete by the end of 2020. Training of staff will commence as conditions permit in-person training to resume. | Security and Emergency Preparedness | Course development already underway, in-person training to begin by Q3 2021 (if conditions permit) all existing staff trained in basic ICS by Q4 2026. New staff training will be ongoing. |
| 2020.LHMP.FL.08 Provide portable power stations to communities without electricity for charging of cell phones. | FL1, FL10, FL11 | Investigate solutions for providing remote cell phone charging stations or portable generators/power units to provide this ability. This is a new activity and work has not yet begun. | Security and Emergency Preparedness | Begin in Q3 of 2021 and present a proposal to the TID Management Team by Q4 2022 |
| 2020.LHMP.FL.09 Dispose of floatable debris in the upper reaches of the reservoir that has washed downstream from the Tuolumne River. | FL1, FL2, FL11 | Investigate disposal techniques including burning of debris in place. Preliminary work has begun to determine options that may be suitable for disposing of the debris. More work is needed to determine the best method and identify alternatives. | DPRA | Began Spring 2023 |
| 2020.LHMP.FL.10 Provide a second method of egress from the Turlock Lake Campgrounds to be used in the event of an emergency at the facility necessitating the rapid evacuation of the campground. | FL1 | Investigate the feasibility of providing another access route into or out of the campgrounds at Turlock Lake. This is a new activity and work has not yet begun. | Security and Emergency Preparedness, Chief Dam Safety Engineer, Civil Engineering | On-hold due to the status of Turlock Lake |

| Mitigation Activity | Objective | Progress/Status | Responsible | Time-frame |
|---|---|---|---|---|
| 2020.LHMP.FL.13 Construction of a bridge or other means of passing water from the spillway without removing Bonds Flat Rd at the spillway. | FL1, FL3 | Investigate the feasibility of building a bridge or other structure so that Bonds Flat Rd can remain open during spillway operations. Preliminary work on this project was done after the 2017 flood event but there was no funding source identified. This is a new project. | TID, DPRA and Tuolumne County | Begin in Q3 of 2021 and present findings to the TID Management Team by Q4 2025 |
| 2020.LHMP.FL.14 Continue to participate in Emergency Action Plan training and exercises by attending presentations of other local jurisdiction's plans. | FL1, FL6, FL7 | TID attends the Stanislaus and San Joaquin Operational Area Council meetings regularly and attend other meetings as made aware of them. | Security and Emergency Preparedness | Ongoing |
| 2020.LHMP.FL.15 Continue to work with Stanislaus County on the Tuolumne River /TID Flood Working Group to develop and approve plans specific to public notification and evacuation. | FL1, FL6, FL7 | This has been an ongoing activity since 2014 but is new to the LHMP. | Security and Emergency Preparedness, Hydrology Department | Ongoing |
| 2020.LHMP.FL.16 Provide a video feed of spillway operations to the DOC and Power Control Center. | FL1, FL2 | Partnership with ARES or similar organization to provide live feed from spillway - alternatively a permanently mounted security camera(s) feed to DOC during spillway ops. This project is currently underway. | Security and Emergency Preparedness | Complete by Q4 of 2023 |
| 2020.LHMP.FL.17 Provision for continuous operations at the DOC in the event of a power outage. | FL1, FL2, FL4 | Install a permanent generator at the DOC. This is a new project. | Facilities | Begin in Q2 of 2022 and present findings to the TID Management Team by Q4 2024 |
| 2020.LHMP.FL.18 Notification system to primary personnel activated to the DOC. | FL1, FL3, FL7 | Use of TIDAlert to notify personnel. TID has been using Everbridge, branded as TIDAlert for the past five years. This activity will continue for the foreseeable future. | Security and Emergency Preparedness | Ongoing |
| 2020.LHMP.FL.21 Provide education to local First Responders on the dangers posed by electrical equipment during flood events. | FL1, FL6, FL7 | Incorporate information about damaged electrical facilities into existing First Responder Step Potential Training. This project has begun and is continuing. | Line Division | Ongoing |

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## Flooding Mitigation Cost-Benefit Review

This table analyzes the costs and benefits for the identified mitigation activities, assigns it a priority level as well as a proposed funding source. For definitions of the priority levels, see "Cost-Benefit Review" on page 6-11.

| Mitigation Activity | Benefit | Costs | Priority | Funding Source |
|---|---|---|---|---|
| 2020.LHMP.FL.01 Integrate the LHMP priorities into other TID plans including the Emergency Operations Plan, Continuity of District/ Continuity of Operations Plan, Capital Improvement Plans and other District plans. | Avoids emergency management costs. | Staff time for development and coordination | HIGH | • TID Budget |
| 2020.LHMP.FL.02 Improve cell phone coverage at Don Pedro Reservoir for internal communications capabilities and to allow for alerting and warning of watercraft via cell phones if it is necessary to evacuate the lake due to spillway operations, potential failure scenarios or unsafe conditions. | Improves internal communications within TID. Enables emergency managers and responding agencies to more quickly and efficiently evacuate the lake when necessary. | Equipment costs and staff time to position it in the event of an emergency, ongoing training and maintenance costs | LOW | • DPRA Budget<br>• FEMA EMPG funding<br>• BRIC funding |
| 2020.LHMP.FL.03 Improve radio and cell phone coverage at locations where signal strength is weak or radio communication is difficult. | Improves communication capabilities when operating in remote areas or in areas without cell phone coverage. | Staff time for research and bid process, equipment costs, ongoing maintenance costs | LOW | • TID Budget<br>• FEMA EMPG funding<br>• BRIC funding |
| 2020.LHMP.FL.04 Improve radio communication capabilities and interoperability between TID, Don Pedro Recreation Agency (DPRA), and outside agencies. | Improves communication between DPRA and Don Pedro Power Plant, Construction and Maintenance staff and outside agencies responding to an emergency. | Equipment costs and staff time to train on the new system | MEDIUM | • TID and/or DPRA Budget<br>• FEMA EMPG funding |
| 2020.LHMP.FL.05 Re-configure and expand TID's District Operations Center to include dedicated meeting space, JIC, and breakout rooms for Management/ Command and General Staff and a separate area for meals/ breaks. | Avoids Emergency Management Costs. Improves DOC operations. | Staff time for remodel design work, permitting (if necessary) and construction | MEDIUM | • TID Budget<br>• FEMA EMPG funding |

| Mitigation Activity | Benefit | Costs | Priority | Funding Source |
|---|---|---|---|---|
| 2020.LHMP.FL.06<br>Mobile command post for locating District response personnel in close proximity to damaged facilities during recovery. | Provides command, communication and coordination support near the incident for District personnel assigned to critical incident response during a disaster. Provides a portable office space for an Incident Command Post near the disaster location. | Equipment costs, ongoing maintenance, set-up and transportation costs when deployed | MEDIUM | • TID Budget<br>• FEMA EMPG funding |
| 2020.LHMP.FL.07<br>Provide NIMS, SEMS and ICS training to TID employees with a role in an emergency response. The National Incident Management System (NIMS), Standardized Emergency Management System (SEMS), and the Incident Command System (ICS) were developed so that responders from different jurisdictions and disciplines can work together to provide a unified approach to incident management using a common set of operating principles, organizational structure, and terminology. | Avoids emergency management costs and facilitates communication and coordination in the event of an incident involving outside agencies. | Staff time for coordination and training, developing materials for in-house training, and hiring outside instructors for advanced topics. | HIGH | • TID Budget<br>• FEMA EMPG funding |
| 2020.LHMP.FL.08<br>Provide portable power stations to communities without electricity for charging of cell phones. | Allows the public to maintain communications with family members for reunification, reporting their status to officials thereby reducing costs for response, and communicating and coordinating their personal recovery efforts with local, state and regional disaster assistance organizations and NGOs. | Equipment costs, ongoing maintenance, set-up, and transportation costs when deployed | LOW | • TID Budget<br>• BRIC funding |

| Mitigation Activity | Benefit | Costs | Priority | Funding Source |
|---|---|---|---|---|
| 2020.LHMP.FL.09 Dispose of floatable debris in the upper reaches of the reservoir that has washed downstream from the Tuolumne River. | Removing floatable debris prevents it from escaping the containment booms where it is currently being held and creating a safety hazard for boaters on the lake. It also prevents the debris from migrating through the reservoir and becoming lodged in the outlet works or spillway structures preventing their use. Disposing of the woody debris reduces wildland fire risk. | Investigate disposal techniques including burning of debris in place. | MEDIUM | • DPRA Budget<br>• FEMA HMGP funding |
| 2020.LHMP.FL.10 Provide a second method of egress from the Turlock Lake Campgrounds to be used in the event of an emergency at the facility necessitating the rapid evacuation of the campground. | Protects life and property and avoids emergency management costs. | Staff time for investigation of possible alternative routes and acquisition of property or easements | LOW | • TID Budget<br>• BRIC funding |
| 2020.LHMP.FL.13 Construction of a bridge or other means of passing water from the spillway without removing Bonds Flat Rd at the spillway. | Improves transportation routes for residents, tourists and first responders by keeping Bonds Flat Road open during spill events. Eliminates the need to remove Bonds Flat Rd during spill operations. | Estimate for construction of a bridge over the spillway from 2017 flood event was $6M. Ongoing costs include maintenance and repair of the roadway and bridge structure. | LOW | • TID/DPRA Tuolumne County Budgets<br>• Potentially Cal Trans funds<br>• BRIC funding |
| 2020.LHMP.FL.14 Continue to participate in Emergency Action Plan training and exercises by attending presentations of other local jurisdiction's plans. | Promotes the sharing of information with outside agencies and personal relationships with other emergency managers that would have a role in an activation of an EAP. | Staff time to attend meetings | HIGH | • TID Budget |
| 2020.LHMP.FL.15 Continue to work with Stanislaus County on the Tuolumne River /TID Flood Working Group to develop and approve plans specific to public notification and evacuation. | Avoids casualties, emergency management costs and property damage. Promotes cooperation and coordination with the TID and outside agencies. | Staff time for development and coordination | HIGH | • TID Budget |

| Mitigation Activity | Benefit | Costs | Priority | Funding Source |
|---|---|---|---|---|
| 2020.LHMP.FL.16 Provide a video feed of spillway operations to the DOC and Power Control Center. | Improves communication and situational awareness of staff working in the DOC and PCC as well as a common operating picture among the departments and outside agencies assisting TID. | Equipment and ongoing maintenance | HIGH | • TID/DPRA Budget |
| 2020.LHMP.FL.17 Provision for continuous operations at the DOC in the event of a power outage. | Ensures continuous operations at the DOC. Avoids emergency management costs, loss of communication, situational awareness and control of the response. | Equipment and ongoing maintenance | MEDIUM | • TID Budget<br>• BRIC funding<br>• FEMA EMPG funding |
| 2020.LHMP.FL.18 Notification system to primary personnel activated to the DOC. | Improves communication and response time of activated DOC incident staff. | Ongoing maintenance of database of contact numbers and testing of the system | HIGH | • TID Budget |
| 2020.LHMP.FL.21 Provide education to local First Responders on the dangers posed by electrical equipment during flood events. | During existing First Responder training on Step Potential, remind responders of the dangers of water and electricity and the need for caution and coordination with TID to ensure everyone's safety. | Staff time during already scheduled presentations | HIGH | • TID Budget<br>• FEMA EMPG funding |

## Mitigation Strategy

# LANDSLIDE

Most of the land irrigated with water from TID is not susceptible to landslides as it is mostly flat farmland located on the valley floor in Stanislaus and Merced Counties. The District does face some exposure to landslide risk in the eastern and western portions of its territory where the terrain is more conducive to landslide activity. These areas are where the bulk of the landslide mitigation activities occur.

Each identified mitigation action includes clear objectives, actionable mitigation measures, identifies responsible parties and examines the costs versus benefits which will form the basis for implementing them.

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## Landslide Mitigation Goals

- Protect life and property
- Reduce the impact of landslides to TID, its customers, and the general public
- Reduce the impacts to the economy resulting from a landslide impacting our ability to deliver water or power
- Promote coordination and cooperation between the TID and regional partner agencies

## Landslide Mitigation Objectives

| Objective No. | Objective Activity |
|---|---|
| L1 | Protect life and property |
| L2 | Reduce the likelihood of a landslide occurring which disrupts TID's ability to serve water and/or electricity to its customers |
| L3 | Continue TID's critical business functions in the event of a landslide affecting its infrastructure |
| L4 | Integrate the LHMP with other TID plans |
| L5 | Integrate the LHMP with partner agency plans |
| L6 | Coordinate and communicate with partner and responding agencies |
| L7 | Recover from the effects of a landslide incident as quickly as possible |
| L8 | Improve coordination and communication between internal TID departments during an incident |

## Landslide Mitigation Action Plan

The following table describes the mitigation activities identified by the LHMP Planning Team, the objective the activity achieves, party or parties responsible for carrying it out and the time-frame for accomplishing it.

| Mitigation Activity | Objective | Progress/Status | Responsible | Time-frame |
|---|---|---|---|---|
| 2020.LHMP.L.01 Integrate the LHMP priorities into other TID plans including the Emergency Operations Plan, Continuity of District/ Continuity of Operations Plan, Capital Improvement Plans and other District plans. | L1, L5, L6 | This is a new activity. | Security and Emergency Preparedness/ TID Management Team | Ongoing |
| 2020.LHMP.L.02 Improve cell phone coverage at Don Pedro Reservoir for internal communications capabilities and to allow for alerting and warning of watercraft via cell phones if it is necessary to evacuate the lake due to spillway operations, potential failure scenarios or unsafe conditions. | L1, L3, L6 | Evaluate current radio system and configuration, identify repeated and non-repeated channels, and explore options to tie TID and DPRA radios together to allow for better communications. Investigate mobile communications signal boosting equipment. Some of the work around improving internal communications capabilities at Don Pedro has begun. Investigation of methods for improving the alerting and warning of watercraft on the lake has not yet commenced. | Security and Emergency Preparedness, Station Engineering, Electronics | Begin exploring solutions for alerting and warning of watercraft in Q1 of 2021 and complete by Q4 of 2025 |

| Mitigation Activity | Objective | Progress/Status | Responsible | Time-frame |
|---|---|---|---|---|
| 2020.LHMP.L.03 Improve radio and cell phone coverage at locations where signal strength is weak or radio communication is difficult. | L1, L3, L6, L8 | Investigate mobile communications signal boosting equipment. This is a new activity and work has not yet begun. | Security and Emergency Preparedness, Station Engineering, Electronics | In progress. Tested using Starlink as an option. Other platforms need evaluation. |
| 2020.LHMP.L.04 Improve radio communication capabilities and interoperability between TID, Don Pedro Recreation Agency (DPRA), and outside agencies. | L1, L3, L6, L8 | Investigate potential solutions for improving the capability of TID's radio system to communicate between District frequencies and DPRA as well as outside agencies in an emergency. This activity is new to TID's emergency planning and work has not yet begun. | Security and Emergency Preparedness, Station Engineering, Electronics | Begin in Q3 of 2021 and complete by 2023 |
| 2020.LHMP.L.05 Re-configure and expand TID's District Operations Center to include dedicated meeting space, JIC, and breakout rooms for Management/ Command and General Staff and a separate area for meals/ breaks. | L1, L6, L7, L8 | Remodel of current DOC to provide reconfigurable space for meetings/ breakout rooms at CC Wright Hall or, other locations in close proximity. Some of this work has already been completed with the addition of a conference room but, a dedicated JIC and other improvements have not been started. | Security and Emergency Preparedness, Facilities | Began still needs to be re-stocked |
| 2020.LHMP.L.06 Mobile command post for locating District response personnel in close proximity to damaged facilities during recovery. | L1, L7, L8 | Investigate solutions for a mobile office trailer or vehicle specifically designed to be used as a mobile Incident Command Post. This is a new activity and work has not yet begun. | Security and Emergency Preparedness | Begin investigating solutions in Q2 of 2021 and present options to TID Management Team by Q1 2023 |

| Mitigation Activity | Objective | Progress/Status | Responsible | Time-frame |
|---|---|---|---|---|
| 2020.LHMP.L.07 Provide NIMS, SEMS and ICS training to TID employees with a role in an emergency response. The National Incident Management System (NIMS), Standardized Emergency Management System (SEMS), and the Incident Command System (ICS) were developed so that responders from different jurisdictions and disciplines can work together to provide a unified approach to incident management using a common set of operating principles, organizational structure, and terminology. | L1, L6, L8 | Develop an appropriate training program to introduce TID staff to the principles of incident command. This is a new activity for TID. The development of course presentations has begun and the initial round of training based on ICS-100 and 700 will be complete by the end of 2020. Training of staff will commence as conditions permit in-person training to resume. | Security and Emergency Preparedness | Course development already underway, in-person training to begin by Q3 2021 (if conditions permit) all existing staff trained in basic ICS by Q4 2026. New staff training will be ongoing. |
| 2020.LHMP.L.08 Provide portable power stations to communities without electricity for charging of cell phones. | L1, L10, L11 | Investigate solutions for providing remote cell phone charging stations or portable generators/power units to provide this ability. This is a new activity and work has not yet begun. | Security and Emergency Preparedness | Begin in Q3 of 2021 and present a proposal to TID Management Team by Q4 2022 |
| 2020.LHMP.L.09 Dispose of floatable debris in the upper reaches of the reservoir that has washed downstream from the Tuolumne River. | L1, L8, L11 | Investigate disposal techniques including burning of debris in place. Preliminary work has begun to determine options that may be suitable for disposing of the debris. More work is needed to determine the best method and identify alternatives. | DPRA | Began Spring 2023 |
| 2020.LHMP.L.10 Provide a second method of egress from the Turlock Lake Campgrounds to be used in the event of an emergency at the facility necessitating the rapid evacuation of the campground. | L1 | Investigate the feasibility of providing another access route into or out of the campgrounds at Turlock Lake. This is a new activity and work has not yet begun. | Security and Emergency Preparedness, Chief Dam Safety Engineer, Civil Engineering | On-hold due to the status of Turlock Lake |
| 2020.LHMP.L.12 Prevent debris flow or rockfall from impacting the canal system in areas prone to landslide. | L2 | Evaluate the need for hillside stabilization in areas where landslides may impact the canal system and prevent water delivery to growers. This is a current and ongoing project. | Civil Engineering | Ongoing |

| Mitigation Activity | Objective | Progress/Status | Responsible | Time-frame |
|---|---|---|---|---|
| 2020.LHMP.L.13 Prevent rocks or debris from falling onto the La Grange Power Plant and infrastructure. | L2 | Evaluate the need for additional rockfall prevention measures on the canyon walls La Grange Power Plant. This is a current and ongoing project. | Civil Engineering, Hydroelectric Department, CDSE | Ongoing |
| 2020.LHMP.L.15 Access Road improvements or alternate routes to critical facilities. | L1, L3 | Evaluate routes to District facilities for landslide potential and investigate improvements. This is a current and ongoing project. | Security and Emergency Preparedness, Civil Engineering | Ongoing |
| 2020.LHMP.L.17 Mitigate landslide risk on all new access roads to TID infrastructure. | L1, L2 | To the extent feasible, any new roads or access routes to TID infrastructure in areas subject to landslides shall be designed, engineered and constructed in order to minimize the risk of a landslide occurring. | Civil Engineering | Ongoing |
| 2020.LHMP.L.18 Evaluate areas of the District for landslide risk and correct issues prior to the winter storm season. | L1, L2, L7 | Periodically patrol areas known to have elevated risk of landslides and correct any potential issues prior to the winter storm season. This is a current and ongoing project. | Water Distribution, Civil Engineering, Construction and Maintenance, Line Department | Ongoing Annually |

## Landslide Mitigation Cost-Benefit Review

This table analyzes the costs and benefits for the identified mitigation activities, assigns it a priority level as well as a proposed funding source. For definitions of the priority levels, see "Cost-Benefit Review" on page 6-11.

| Mitigation Activity | Benefit | Costs | Priority | Funding Source |
|---|---|---|---|---|
| 2020.LHMP.L.01 Integrate the LHMP priorities into other TID plans including the Emergency Operations Plan, Continuity of District/ Continuity of Operations Plan, Capital Improvement Plans and other District plans. | Avoids emergency management costs. | Staff time for development and coordination | HIGH | • TID Budget |
| 2020.LHMP.L.02 Improve cell phone coverage at Don Pedro Reservoir for internal communications capabilities and to allow for alerting and warning of watercraft via cell phones if it is necessary to evacuate the lake due to spillway operations, potential failure scenarios or unsafe conditions. | Improves internal communications within TID. Enables emergency managers and responding agencies to more quickly and efficiently evacuate the lake when necessary. | Equipment costs and staff time to position it in the event of an emergency, ongoing training and maintenance costs | LOW | • DPRA Budget<br>• FEMA EMPG funding<br>• BRIC funding |
| 2020.LHMP.L.03 Improve radio and cell phone coverage at locations where signal strength is weak or radio communication is difficult. | Improves communication capabilities when operating in remote areas or in areas without cell phone coverage. | Staff time for research and bid process, equipment costs, ongoing maintenance costs | LOW | • TID Budget<br>• FEMA EMPG funding<br>• BRIC funding |
| 2020.LHMP.L.04 Improve radio communication capabilities and interoperability between TID, Don Pedro Recreation Agency (DPRA), and outside agencies. | Improves communication between DPRA and Don Pedro Power Plant, Construction and Maintenance staff and outside agencies responding to an emergency. | Equipment costs and staff time to train on the new system | MEDIUM | • TID and/or DPRA Budget<br>• FEMA EMPG funding |
| 2020.LHMP.L.05 Re-configure and expand TID's District Operations Center to include dedicated meeting space, JIC, and breakout rooms for Management/ Command and General Staff and a separate area for meals/ breaks. | Avoids Emergency Management Costs. Improves DOC operations. | Staff time for remodel design work, permitting (if necessary) and construction | MEDIUM | • TID Budget<br>• FEMA EMPG funding |

| Mitigation Activity | Benefit | Costs | Priority | Funding Source |
|---|---|---|---|---|
| 2020.LHMP.L.06<br>Mobile command post for locating District response personnel in close proximity to damaged facilities during recovery. | Provides command, communication and coordination support near the incident for District personnel assigned to critical incident response during a disaster. Provides a portable office space for an Incident Command Post near the disaster location. | Equipment costs, ongoing maintenance, set-up and transportation costs when deployed | MEDIUM | • TID Budget<br>• FEMA EMPG funding |
| 2020.LHMP.L.07<br>Provide NIMS, SEMS and ICS training to TID employees with a role in an emergency response. The National Incident Management System (NIMS), Standardized Emergency Management System (SEMS), and the Incident Command System (ICS) were developed so that responders from different jurisdictions and disciplines can work together to provide a unified approach to incident management using a common set of operating principles, organizational structure, and terminology. | Avoids emergency management costs and facilitates communication and coordination in the event of an incident involving outside agencies. | Staff time for coordination and training, developing materials for in-house training, and hiring outside instructors for advanced topics. | HIGH | • TID Budget<br>• FEMA EMPG funding |
| 2020.LHMP.L.08<br>Provide portable power stations to communities without electricity for charging of cell phones. | Allows the public to maintain communications with family members for reunification, reporting their status to officials thereby reducing costs for response, and communicating and coordinating their personal recovery efforts with local, state and regional disaster assistance organizations and NGOs. | Equipment costs, ongoing maintenance, set-up, and transportation costs when deployed | LOW | • TID Budget<br>• BRIC funding |

| Mitigation Activity | Benefit | Costs | Priority | Funding Source |
|---|---|---|---|---|
| 2020.LHMP.L.09 Dispose of floatable debris in the upper reaches of the reservoir that has washed downstream from the Tuolumne River. | Removing floatable debris prevents it from escaping the containment booms where it is currently being held and creating a safety hazard for boaters on the lake. It also prevents the debris from migrating through the reservoir and becoming lodged in the outlet works or spillway structures preventing their use. Disposing of the woody debris reduces wildland fire risk. | Investigate disposal techniques including burning of debris in place. | MEDIUM | • DPRA Budget<br>• FEMA HMGP funding |
| 2020.LHMP.L.10 Provide a second method of egress from the Turlock Lake Campgrounds to be used in the event of an emergency at the facility necessitating the rapid evacuation of the campground. | Protects life and property and avoids emergency management costs. | Staff time for investigation of possible alternative routes and acquisition of property or easements | LOW | • TID Budget<br>• BRIC funding |
| 2020.LHMP.L.12 Prevent debris flow or rockfall from impacting the canal system in areas prone to landslide. | Protects the ability of TID to supply water to its customers. Avoids Emergency management costs. | Staff time for evaluation and mitigation research. Construction costs for projects identified as viable in the evaluation phase. | HIGH | • TID Budget<br>• BRIC funding |
| 2020.LHMP.L.13 Prevent rocks or debris from falling onto the La Grange Power Plant and infrastructure. | Protects District infrastructure. Avoids Emergency management costs. | Staff time for evaluation and mitigation research. Construction costs for projects identified as viable in the evaluation phase. | MEDIUM | • TID Budget<br>• BRIC funding |
| 2020.LHMP.L.15 Access Road improvements or alternate routes to critical facilities. | Protects District infrastructure and improves response time in an emergency. Avoids Emergency management costs. | Staff time for evaluation and mitigation research. Construction costs for projects identified as viable in the evaluation phase. | HIGH | • TID Budget<br>• BRIC funding |

| Mitigation Activity | Benefit | Costs | Priority | Funding Source |
|---|---|---|---|---|
| 2020.LHMP.L.17 Mitigate landslide risk on all new access roads to TID infrastructure. | Improves response time should an incident occur. Avoids Emergency management costs. | Staff time for evaluation and mitigation research. Construction costs for projects identified as viable in the evaluation phase. | HIGH | • TID Budget<br>• BRIC funding |
| 2020.LHMP.L.18 Evaluate areas of the District for landslide risk and correct issues prior to the winter storm season. | Prevents landslides from occurring that could prevent or impede the ability to provide critical services. Avoids Emergency management costs. | Staff time for evaluation and mitigation research. Construction costs for projects identified as viable in the evaluation phase. | HIGH | • TID Budget<br>• BRIC funding |

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## Mitigation Strategy

# Public Health Emergency

The mitigation strategy for addressing the threat of a public health emergency impacting TID focuses on the health and safety of its employees. It is crucial to the community that the District continue to provide critical services to the region during a public health crisis. To accomplish this mission, TID must have a workforce physically capable of responding.

The following plan contains strategies to improve TID's response capability during a public health emergency.

Each identified mitigation action inlcudes clear objectives, actionable mitigation measures, identifies responsible parties and examines the costs versus benefits which will form the basis for implementing them.

TID
WATER & POWER

## Public Health Emergency Mitigation Goals

- Protect the lives and health of TID's employees and customers
- Reduce the impact of a public health emergency on TID's ability to deliver water, power and service to its customers
- Promote coordination and cooperation between the TID and regional partner agencies

## Public Health Emergency Mitigation Objectives

| Objective No. | Objective Activity |
|---|---|
| **PHE1** | Protect the lives and health of employees, customers, and the public |
| **PHE2** | Continue critical business functions |
| **PHE3** | Reduce the health risk to employees from infected persons |
| **PHE4** | Integrate the LHMP with other TID plans |
| **PHE5** | Integrate the LHMP with partner agency plans |
| **PHE6** | Coordinate and communicate with partner and responding agencies |
| **PHE7** | Improve coordination and communication between internal TID departments during an incident |
| **PHE8** | Recover from the effects of a public health emergency as quickly as possible |

## Public Health Emergency Mitigation Action Plan

The following table describes the mitigation activities identified by the LHMP Planning Team, the objective the activity achieves, party or parties responsible for carrying it out and the time-frame for accomplishing it.

| Mitigation Activity | Objective | Progress/Status | Responsible | Time-frame |
|---|---|---|---|---|
| 2020.LHMP.PHE.01 Integrate the LHMP priorities into other TID plans including the Emergency Operations Plan, Continuity of District/ Continuity of Operations Plan, Capital Improvement Plans and other District plans. | PHE1, PHE4, PHE6 | This is a new activity. | Security and Emergency Preparedness, TID Management Team | Ongoing |
| 2020.LHMP.PHE.05 Re-configure and expand TID's District Operations Center to include dedicated meeting space, JIC, and breakout rooms for Management/ Command and General Staff and a separate area for meals/ breaks. | PH1, PHE6, PHE7, PHE8 | Remodel of current DOC to provide reconfigurable space for meetings/ breakout rooms at CC Wright Hall or, other locations in close proximity. Some of this work has already been completed with the addition of a conference room but, a dedicated JIC and other improvements have not been started. | Security and Emergency Preparedness - Facilities | Began, needs to be re-stocked |

| Mitigation Activity | Objective | Progress/Status | Responsible | Time-frame |
|---|---|---|---|---|
| 2020.LHMP.PHE.06 Mobile command post for locating District response personnel in close proximity to damaged facilities during recovery. | PHE1, PHE7, PHE8 | Investigate solutions for a mobile office trailer or vehicle specifically designed to be used as a mobile Incident Command Post. This is a new activity and work has not yet begun. | Security and Emergency Preparedness | Begin investigating solutions in Q2 of 2021 and present options to the TID Management Team by Q1 2023 |
| 2020.LHMP.PHE.09 Provide better access to flu vaccines for all employees and other vaccines for those working outside District offices. | PHE1, PHE3 | Investigate making flu shots available at work during work hours and other vaccines as appropriate specifically; Hepatitis. This is a new activity and work has not yet begun. | Security and Emergency Preparedness, Human Resources | Begin in Q2 2022 and present options to the TID Management Team by Q4 2023 |
| 2020.LHMP.PHE.11 Continue to participate in Emergency Action Plan training and exercises by attending presentations of other local jurisdiction's plans. | PHE6 | The TID attends the Stanislaus and San Joaquin Operational Area Council meetings regularly and other meetings as appropriate. | Security and Emergency Preparedness | Ongoing |

## Public Health Emergency Mitigation Cost-Benefit Review

This table analyzes the costs and benefits for the identified mitigation activities, assigns it a priority level as well as a proposed funding source. For definitions of the priority levels, see "Cost-Benefit Review" on page 6-11.

| Mitigation Activity | Benefit | Costs | Priority | Funding Source |
|---|---|---|---|---|
| 2020.LHMP.PHE.01 Integrate the LHMP priorities into other TID plans including the Emergency Operations Plan, Continuity of District/ Continuity of Operations Plan, Capital Improvement Plans and other District plans. | Avoids emergency management costs. | Staff time for development and coordination | HIGH | • TID Budget |
| 2020.LHMP.PHE.05 Re-configure and expand TID's District Operations Center to include dedicated meeting space, JIC, and breakout rooms for Management/Command and General Staff and a separate area for meals/ breaks. | Avoids Emergency Management Costs. Improves DOC operations. | Staff time for remodel design work, permitting (if necessary) and construction | MEDIUM | • TID Budget<br>• FEMA EMPG funding |
| 2020.LHMP.PHE.06 Mobile command post for locating District response personnel in close proximity to damaged facilities during recovery. | Provides command, communication and coordination support near the incident for District personnel assigned to critical incident response during a disaster. Provides a portable office space for an Incident Command Post near the disaster location. | Equipment costs, ongoing maintenance, set-up and transportation costs when deployed | MEDIUM | • TID Budget<br>• FEMA EMPG funding |
| 2020.LHMP.PHE.09 Provide better access to flu vaccines for all employees and other vaccines for those working outside District offices. | Increases the likelihood staff will get annual flu shots which offer at least some level of protection from the flu. | Staff time and costs to administer the clinics. | MEDIUM | • TID Budget<br>• FEMA HMGP funding |
| 2020.LHMP.PHE.11 Continue to participate in Emergency Action Plan training and exercises by attending presentations of other local jurisdiction's plans. | Avoids casualties and emergency management costs. Promotes cooperation and coordination with TID and outside agencies. | Staff time for development and coordination. | HIGH | • TID Budget |

## Mitigation Strategy

# Wildland Fire

TID's ability to mitigate wildland fire risk is primarily addressed in the Wild Fire Mitigation Plan prepared and overseen by the Electrical Engineering and Operations Administration. Some of the strategies contained in that plan have been repeated here and some additional measures have been added.

The most common direct human related causes of wildland fire include arson, discarded cigarettes, unattended campfires, and sparks from electric lines and equipment.

TID
WATER & POWER

## Wildland Fire Mitigation Goals

- Protect life and property
- Reduce the impact of wildland fire on TID, its customers, and the general public
- Reduce the impacts to the economy resulting from wildland fire
- Promote coordination and cooperation between the TID and regional partner agencies

## Wildland Fire Mitigation Objectives

| Objective No. | Objective Activity |
|---|---|
| **WF1** | Protect Life and Property |
| **WF2** | Improve Coordination and Communication during wildland fire events |
| **WF3** | Lessen the impact of wildland fire on the general public |
| **WF4** | Continue TID's critical business functions in the event of wildland fire |
| **WF5** | Integrate the LHMP with other TID plans |
| **WF6** | Integrate the LHMP with partner agency plans |
| **WF7** | Coordinate and communicate with partner and responding agencies |
| **WF8** | Recover from the effects of a wildland fire incident as quickly as possible |
| **WF9** | Provide critical support to residents in areas impacted by wildland fire |

## Wildland Fire Mitigation Action Plan

The following table describes the mitigation activities identified by the LHMP Planning Team, the objective the activity achieves, party or parties responsible for carrying it out and the time-frame for accomplishing it.

| Mitigation Activity | Objective | Progress/Status | Responsible | Time-frame |
|---|---|---|---|---|
| 2020.LHMP.WF.01 Integrate the LHMP priorities into other TID plans including the Emergency Operations Plan, Continuity of District/ Continuity of Operations Plan, Capital Improvement Plans and other District plans. | WF1, WF5, WF7 | This is a new activity. | Security and Emergency Preparedness/ TID Management Team | Ongoing |
| 2020.LHMP.WF.02 Improve cell phone coverage at Don Pedro Reservoir for internal communications capabilities and to allow for alerting and warning of watercraft via cell phones if it is necessary to evacuate the lake due to spillway operations, potential failure scenarios or unsafe conditions. | WF1, WF4, WF7 | Evaluate current radio system and configuration, identify repeated and non-repeated channels, and explore options to tie TID and DPRA radios together to allow for better communications. Investigate mobile communications signal boosting equipment. Some of the work around improving internal communications capabilities at Don Pedro has begun. Investigation of methods for improving the alerting and warning of watercraft on the lake has not yet commenced. | Security and Emergency Preparedness, Station Engineering, Electronics | Begin exploring solutions for alerting and warning of watercraft in Q1 of 2021 and complete by Q4 of 2025 |

| Mitigation Activity | Objective | Progress/Status | Responsible | Time-frame |
|---|---|---|---|---|
| 2020.LHMP.WF.03 Improve radio and cell phone coverage at locations where signal strength is weak or radio communication is difficult. | WF1, WF2, WF4, WF7 | Investigate mobile communications signal boosting equipment. This is a new activity and work has not yet begun. | Security and Emergency Preparedness, Station Engineering, Electronics | In progress. Tested using Starlink as an option. Other platforms need evaluation. |
| 2020.LHMP.WF.04 Improve radio communication capabilities and interoperability between TID, Don Pedro Recreation Agency (DPRA), and outside agencies. | WF1, WF2, WF4, WF7 | Investigate potential solutions for improving the capability of TID's radio system to communicate between District frequencies and DPRA as well as outside agencies in an emergency. This activity is new to TID's emergency planning and work has not yet begun. | Security and Emergency Preparedness, Station Engineering, Electronics | Begin in Q3 of 2021 and complete by 2023 |
| 2020.LHMP.WF.05 Re-configure and expand TID's District Operations Center to include dedicated meeting space, JIC, and breakout rooms for Management/Command and General Staff and a separate area for meals/breaks. | WF1, WF2, WF7, WF8 | Remodel of current DOC to provide reconfigurable space for meetings/ breakout rooms at CC Wright Hall or, other locations in close proximity. Some of this work has already been completed with the addition of a conference room but, a dedicated JIC and other improvements have not been started. | Security and Emergency Preparedness, Facilities | Began, needs to be re-stocked |
| 2020.LHMP.WF.06 Mobile command post for locating District response personnel in close proximity to damaged facilities during recovery. | WF1, WF2, WF8 | Investigate solutions for a mobile office trailer or vehicle specifically designed to be used as a mobile Incident Command Post. This is a new activity and work has not yet begun. | Security and Emergency Preparedness | Begin investigating solutions in Q2 of 2021 and present options to the TID Management Team by Q1 2023 |

| Mitigation Activity | Objective | Progress/Status | Responsible | Time-frame |
|---|---|---|---|---|
| 2020.LHMP.WF.07 Provide NIMS, SEMS and ICS training to TID employees with a role in an emergency response. The National Incident Management System (NIMS), Standardized Emergency Management System (SEMS), and the Incident Command System (ICS) were developed so that responders from different jurisdictions and disciplines can work together to provide a unified approach to incident management using a common set of operating principles, organizational structure, and terminology. | WF1, WF2, WF7 | Develop an appropriate training program to introduce TID staff to the principles of incident command. This is a new activity for TID. The development of course presentations has begun and the initial round of training based on ICS-100 and 700 will be complete by the end of 2020. Training of staff will commence as conditions permit in-person training to resume. | Security and Emergency Preparedness | Course development already underway, in-person training to begin by Q3 2021 (if conditions permit) all existing staff trained in basic ICS by Q4 2026. New staff training will be ongoing. |
| 2020.LHMP.WF.08 Provide portable power stations to communities without electricity for charging of cell phones. | WF1, WF3, WF9 | Investigate solutions for providing remote cell phone charging stations or portable generators/power units to provide this ability. This is a new activity and work has not yet begun. | Security and Emergency Preparedness | Begin in Q3 of 2021 and present a proposal to the TID Management Team by Q4 2022 |
| 2020.LHMP.WF.09 Dispose of floatable debris in the upper reaches of the reservoir that has washed downstream from the Tuolumne River. | WF1, WF2, WF3 | Investigate disposal techniques including burning of debris in place. Preliminary work has begun to determine options that may be suitable for disposing of the debris. More work is needed to determine the best method and identify alternatives. | DPRA | Began Spring 2023 |
| 2020.LHMP.WF.10 Provide a second method of egress from the Turlock Lake Campgrounds to be used in the event of an emergency at the facility necessitating the rapid evacuation of the campground. | WF1 | Investigate the feasibility of providing another access route into or out of the campgrounds at Turlock Lake. This is a new activity and work has not yet begun. | Security and Emergency Preparedness, Chief Dam Safety Engineer, Civil Engineering | On hold due to status of Turlock Lake |

| Mitigation Activity | Objective | Progress/Status | Responsible | Time-frame |
|---|---|---|---|---|
| 2020.LHMP.WF.12 Continue to participate in Emergency Action Plan training and exercises by attending presentations of other local jurisdiction's plans. | WF1, WF6, WF 7 | TID attends the Stanislaus and San Joaquin Operational Area Council meetings regularly and attend other meetings as made aware of them. | Security and Emergency Preparedness | Ongoing |
| 2020.LHMP.WF.15 Use FR3 overhead transformers in high fire-threat areas. | WF1, WF3, WF4 | Transformers are replaced as needed using FR3 transformers in high fire-threat areas. This is an ongoing project as part of the District's Wildfire Mitigation Plan. | Electrical Engineering and Operations, Line Department | Ongoing |
| 2020.LHMP. WF.16 Construct a communication system in order to facilitate the use of SCADA in high fire-threat areas. | WF1, WF2, WF3, WF4 | Investigate the feasibility of installing a fiber system that allows the use of SCADA controlled pulse re-closers in high fire-threat areas. | Electrical Engineering and Operations, Line Department | In progress. Staff is working on easements for communication sites. |
| 2020.LHMP.WF.17 Where possible, underground electric distribution facilities and equipment. | WF1, WF3, WF4 | Investigate the feasibility of moving existing overhead electrical distribution lines and equipment underground in high fire-threat areas. | Electrical Engineering and Operations, Line Department | Begin Q1 2021 and present results to TID Management Team by Q4 2025 |
| 2020.LHMP.WF.19 Install falling wire sensors to alert TID Power Control Center to downed lines. | WF1, WF2, WF3, WF4 | Investigate the feasibility of installing and using falling wire sensors in high fire-threat areas. This is an ongoing project as part of the District's Wildfire Mitigation Plan. | Electrical Engineering and Operations/ Line Department | Ongoing |

## Wildland Fire Mitigation Cost-Benefit Review

This table analyzes the costs and benefits for the identified mitigation activities, assigns it a priority level as well as a proposed funding source. For definitions of the priority levels, see "Cost-Benefit Review" on page 6-11.

| Mitigation Activity | Benefit | Costs | Priority | Funding Source |
|---|---|---|---|---|
| 2020.LHMP.WF.01 Integrate the LHMP priorities into other TID plans including the Emergency Operations Plan, Continuity of District/ Continuity of Operations Plan, Capital Improvement Plans and other District plans. | Avoids emergency management costs. | Staff time for development and coordination | HIGH | • TID Budget |
| 2020.LHMP.WF.02 Improve cell phone coverage at Don Pedro Reservoir for internal communications capabilities and to allow for alerting and warning of watercraft via cell phones if it is necessary to evacuate the lake due to spillway operations, potential failure scenarios or unsafe conditions. | Improves internal communications within TID. Enables emergency managers and responding agencies to more quickly and efficiently evacuate the lake when necessary. | Equipment costs and staff time to position it in the event of an emergency, ongoing training and maintenance costs | LOW | • DPRA Budget<br>• FEMA EMPG funding<br>• BRIC funding |
| 2020.LHMP.WF.03 Improve radio and cell phone coverage at locations where signal strength is weak or radio communication is difficult. | Improves communication capabilities when operating in remote areas or in areas without cell phone coverage. | Staff time for research and bid process, equipment costs, ongoing maintenance costs | LOW | • TID Budget<br>• FEMA EMPG funding<br>• BRIC funding |
| 2020.LHMP.WF.04 Improve radio communication capabilities and interoperability between TID, Don Pedro Recreation Agency (DPRA), and outside agencies. | Improves communication between DPRA and Don Pedro Power Plant, Construction and Maintenance staff and outside agencies responding to an emergency. | Equipment costs and staff time to train on the new system | MEDIUM | • TID and/or DPRA Budget<br>• FEMA EMPG funding |

| Mitigation Activity | Benefit | Costs | Priority | Funding Source |
|---|---|---|---|---|
| 2020.LHMP.WF.05 Re-configure and expand TID's District Operations Center to include dedicated meeting space, JIC, and breakout rooms for Management/Command and General Staff and a separate area for meals/ breaks. | Avoids Emergency Management Costs. Improves DOC operations. | Staff time for remodel design work, permitting (if necessary) and construction | MEDIUM | • TID Budget<br>• FEMA EMPG funding |
| 2020.LHMP.WF.06 Mobile command post for locating District response personnel in close proximity to damaged facilities during recovery. | Provides command, communication and coordination support near the incident for District personnel assigned to critical incident response during a disaster. Provides a portable office space for an Incident Command Post near the disaster location. | Equipment costs, ongoing maintenance, set-up and transportation costs when deployed | MEDIUM | • TID Budget<br>• FEMA EMPG funding |
| 2020.LHMP.WF.07 Provide NIMS, SEMS and ICS training to TID employees with a role in an emergency response. The National Incident Management System (NIMS), Standardized Emergency Management System (SEMS), and the Incident Command System (ICS) were developed so that responders from different jurisdictions and disciplines can work together to provide a unified approach to incident management using a common set of operating principles, organizational structure, and terminology. | Avoids emergency management costs and facilitates communication and coordination in the event of an incident involving outside agencies. | Staff time for coordination and training, developing materials for in-house training, and hiring outside instructors for advanced topics. | HIGH | • TID Budget<br>• FEMA EMPG funding |

| Mitigation Activity | Benefit | Costs | Priority | Funding Source |
|---|---|---|---|---|
| 2020.LHMP.WF.08 Provide portable power stations to communities without electricity for charging of cell phones. | Allows the public to maintain communications with family members for reunification, reporting their status to officials thereby reducing costs for response, and communicating and coordinating their personal recovery efforts with local, state and regional disaster assistance organizations and NGOs. | Equipment costs, ongoing maintenance, set-up, and transportation costs when deployed | LOW | • TID Budget<br>• BRIC funding |
| 2020.LHMP.WF.09 Dispose of floatable debris in the upper reaches of the reservoir that has washed downstream from the Tuolumne River. | Removing floatable debris prevents it from escaping the containment booms where it is currently being held and creating a safety hazard for boaters on the lake. It also prevents the debris from migrating through the reservoir and becoming lodged in the outlet works or spillway structures preventing their use. Disposing of the woody debris reduces wildland fire risk. | Investigate disposal techniques including burning of debris in place. | MEDIUM | • DPRA Budget<br>• FEMA HMGP funding |
| 2020.LHMP.WF.10 Provide a second method of egress from the Turlock Lake Campgrounds to be used in the event of an emergency at the facility necessitating the rapid evacuation of the campground. | Protects life and property and avoids emergency management costs. | Staff time for investigation of possible alternative routes and acquisition of property or easements | LOW | • TID Budget<br>• BRIC funding |
| 2020.LHMP.WF.12 Continue to participate in Emergency Action Plan training and exercises by attending presentations of other local jurisdiction's plans. | Promotes the sharing of information with outside agencies and personal relationships with other emergency managers that would have a role in the activation of an EAP. | Staff time to attend meetings | HIGH | • TID Budget |

| Mitigation Activity | Benefit | Costs | Priority | Funding Source |
|---|---|---|---|---|
| 2020.LHMP.WF.15 Use FR3 overhead transformers in high fire-threat areas. | Reduces the risk of fire by using FR3 transformers which use vegetable-based oil for coolant instead of petroleum-based oil. | Equipment costs, staff time and maintenance costs | HIGH | • TID Budget<br>• BRIC funding |
| 2020.LHMP. WF.16 Construct a communication system in order to facilitate the use of SCADA in high fire-threat areas. | Allows the installation of remotely controlled disconnection points along the electric system. | Equipment costs, staff time and maintenance costs | HIGH | • TID Budget<br>• BRIC funding |
| 2020.LHMP.WF.17 Where possible, underground electric distribution facilities and equipment. | Removes the threat of overhead equipment falling and starting a fire. | Equipment costs, staff time and maintenance costs | MEDIUM | • TID Budget<br>• BRIC funding |
| 2020.LHMP.WF.19 Install falling wire sensors to alert TID Power Control Center to downed lines. | Alerts system operators to wires that have fallen allowing a faster response from line workers or remote disconnection (if available). | Equipment costs, staff time and maintenance costs | MEDIUM | • TID Budget<br>• BRIC funding |

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Section

# 7

# Plan Maintenance


TID
WATER & POWER

This section describes a formal plan maintenance process to ensure that the LHMP remains an active and applicable document. It includes an explanation of how the TID Security and Emergency Preparedness Department (S&EP) intends to organize its efforts to ensure that improvements and revisions to the LHMP occur in a well-managed, efficient, and coordinated manner.

The following three process steps are addressed in detail below:

- Monitoring, evaluating, and updating the LHMP
- Implementation through existing planning mechanisms
- Continued public involvement

## Monitoring, Evaluating, and Updating the LHMP

The LHMP was prepared as a collaborative effort among many departments at TID, outside agencies and the public. To maintain momentum and build upon the hazard mitigation planning efforts and successes, the TID will use the Planning Team Members expertise to monitor, evaluate, and update the LHMP. The Emergency Management Coordinator will serve as the primary point of contact and will coordinate all local efforts to monitor, evaluate, and revise the LHMP. The Planning Team Members will monitor integration between the LHMP and other plans for which they are responsible. Proposed projects that are included in the LHMP must be individually reviewed in terms of conceptual plan, project schedule and funding by the administrations responsible to carry the projects out. The responsible administration reviews the concept, scope and cost of the project and appropriate environmental reviews are completed before a project is initiated.

The Emergency Preparedness Coordinator will communicate on behalf of the S&EP with the appropriate departments periodically throughout the year and conduct an annual review to monitor the progress in implementing the LHMP. The LHMP Progress Report Form has been developed for this purpose and will be utilized during the annual review process beginning one year from the date of FEMA's approval of the final LHMP.

The LHMP Progress Report Form will provide the basis for possible changes to the overall LHMP and the District will have an opportunity to refocus on any new or more threatening hazards. This will allow the District to make any necessary adjustments to, or changes in resource allocations, and engage additional support for the LHMP implementation, if warranted. The findings will be reviewed by the Emergency Preparedness Coordinator and a report created and sent to the Manager of Security and Emergency Preparedness for presentation to TID Senior Management annually.

.

LHMP Progress Report Form will be used to evaluate the plan for the following:

- Have any new hazard/disaster events occurred during the reporting period?
- Did anyone from the public comment on the plan during this reporting period?
- Do the goals and objectives address current and expected conditions?
- Were any mitigation projects identified in the LHMP implemented during this reporting period?
- What obstacles, problems, or delays did any current or ongoing mitigation projects encounter, if any?
- Are the current resources appropriate for implementing the plan?
- Have the outcomes occurred as expected?
- Where shortcomings are identified, what can the District do to bring things back on track?
- Have there been changes in development trends that could create additional risks?

In addition to the annual review, the District will update the LHMP every five (5) years to maintain FEMA mitigation funding eligibility. The Plan Update will include the following activities:

- Review FEMA LHMP update requirements for the new planning cycle
- Thoroughly analyze and update the risk of natural hazards District-wide
- Coordinate with participating jurisdictions to review and update the LHMP
- Complete a comprehensive detailed risk assessment updating costs and facilities

- Complete a comprehensive detailed mitigation strategy review and revision
- Update the Mitigation Action Plan identifying the status of the currently identified actions and adding newly considered, prioritized, and assigned actions
- Present LHMP to Cal OES and FEMA for review and approval
- Present LHMP to TID's Board of Directors for adoption
- Return a copy of the finalized LHMP with the adoption resolution from the TID Board of Directors to FEMA to finalize FEMA's approval

## Criteria for Revisions to the LHMP

- New technology
- If changing situations have modified goals/objectives/actions and/or hazards
- New information to update vulnerability assessments
- Shifts in development
- Areas affected by recent disasters
- Significant changes in Federal, State or County regulations, codes, ordinances or policies

## Continued Public Involvement

Turlock Irrigation District remains dedicated to involving the public in the continual reshaping and updating of the LHMP. The web-page designed for the LHMP will remain live with a link to the most current version of the plan and the updated plan will be posted when available. This will provide an opportunity for the public to comment on the plan at any time. In addition to the plan being down-loadable from the District website, the site also contains contact information with an e-mail address and phone number to which people can direct their comments or concerns.

The Emergency Preparedness Coordinator also has the opportunity to raise awareness of the LHMP by attending and participating in other meetings such as: the Operational Area Council, the Turlock Emergency Preparedness Group and others. The Operational Area Council meetings are attended by all nine cities as well as participating agencies such as the American Red Cross, United Way, Latino Emergency Council, private industry, schools, California Emergency Management Agency, CERT, Mountain Valley EMSA, utilities, Faith Based Organizations, and other Stanislaus County departments. Any public comments received regarding the LHMP will be collected by the S&EP and included in the annual report, and considered during future plan updates.

## LHMP Progress Report Form

As part of the Plan Maintenance Process for the LHMP, the S&EP will convene the LHMP Planning Team and conduct an annual review to monitor the progress in implementing the LHMP. The LHMP Progress Report Form has been developed for this purpose and will be completed annually.

The LHMP Progress Report Form will provide the basis for possible changes to the overall LHMP and the County and/or jurisdiction will have an opportunity to refocus on any new or more threatening hazards. This will allow the County to make any necessary adjustments to, or changes in resource allocations, and engage additional support for the LHMP implementation, if warranted. The findings will be reviewed by the Assistant Director of Emergency Services and used for the next plan update.

A sample of the LHMP Annual Report Form is located on the next page.

## LHMP Annual Progress Report Form

Date:

Department:

Name of Person Completing the Report:

### Summary of Progress

Have any new hazard/disaster events occurred during the reporting period? If so, list the event(s).

To your knowledge, did anyone from the public comment on the plan during the reporting period? If so, list the comments.

Do the goals and objectives of the plan address current and expected conditions? If not, please explain further:

Were any mitigation projects identified in the LHMP implemented during the reporting period? If so, list the projects.

What obstacles, problems, or delays did any current or ongoing mitigation projects encounter, if any? How were the problems solved?

| | | |
|---|---|---|
| Are current resources appropriate for implementing the plan? | Y | N |
| Have the outcomes occurred as expected? | Y | N |
| Have outside agencies participated as proposed? | Y | N |

Were shortcomings have been identified, what can the District do to get things back on track?

Have there been changes in development trends that could create additional risks? If so, please explain.

### LHMP Progress Report Verification

Signature Date

Section

# 8

# Glossary of Acronyms

| | |
|---|---|
| 211 Center | Community / Public Information and Services Telephone Answering Point |
| **A** | |
| A2PP | Almond Power Plant 2 |
| AAC | After Action Conference |
| AAR | After-Action Report |
| AAR/IP | After-Action Report/Improvement Plan |
| AC | Area Command |
| ADA | Americans with Disabilities Act |
| AF | Acre Feet |
| ALS | Advanced Life Support |
| AQI | Air Quality Index |
| ARC | American Red Cross |
| ARES | Amateur Radio Emergency Services |
| ASL | Above Mean-Sea-Level |
| | |
| **B** | |
| BIA | Bureau of Indian Affairs |
| BLM | Bureau of Land Management |
| BLS | Basic Life Support |
| BRIC | Building Resilient Infrastructure and Communities |
| | |
| **C** | |
| C/E | Controller / Evaluator |
| C&O | Concept and Objectives |
| CalEMA | California Emergency Management Agency |
| Cal Fire | California Department of Forestry and Fire Protection |
| Cal OES | California Office of Emergency Services |
| Cal OSHA | California Occupational Safety and Health Administration |
| CCSF | City and County of San Francisco |
| CDC | Centers for Disease Control |
| CDEC | California Data Exchange Center |
| CDFW | California Department of Fish and Wildlife |
| CDPH | California Department of Public Health |
| CDSE | Chief Dam Safety Engineer |
| CERT | Community Emergency Response Team |
| CEQA | California Environmental Quality Act |
| CFR | Code of Federal Regulations |
| CFS | Cubic Feet per Second |

| | |
|---|---|
| CHP | California Highway Patrol |
| CMUA | California Municipal Utilities Association |
| COD/COOP | Continuity of District/Continuity of Operations Plan |
| COG | Continuity of Government |
| COOP | Continuity of Operation Plan |
| COP | Common Operating Picture |
| CPG | Comprehensive Planning Guide |
| CRT | Crisis Response Team |
| CSUS | California State University Stanislaus |
| CVP | Central Valley Project |
| CVRWQCB | Central Valley Water Quality Control Board |
| | |
| **D** | |
| DCF | Disaster Control Facility |
| DHS | United States Department of Homeland Security |
| DMA 2000 | Disaster Mitigation Act of 2000 |
| DMC | Doctors Medical Center |
| DMP | Debris Management Plan |
| DOC | District (or Department) Operations Center |
| DOD | United States Department of Defense |
| DOJ | United States Department of Justice |
| DPPP | Don Pedro Power Plant |
| DPRA | Don Pedro Recreation Agency |
| DSOD | Division of Safety Of Dams |
| DWR | Department of Water Resources |
| | |
| **E** | |
| EAP | Emergency Action Plan |
| EEG | Exercise Evaluation Guide |
| EF(#) | Enhanced Fujita Scale (followed by a #) |
| EHPSM | Environmental and Historic Preservation Screening Memo |
| EMA | Emergency Management Agency |
| EMC | Emanuel Medical Center |
| EMMA | Emergency Management Mutual Aid |
| EMPG | Emergency Management Performance Grant |
| EMPT | Emergency Management Planning Team |
| EMS | Emergency Medical Services |
| EMSystem | Computerized Emergency Medical Service Tracking System |

| | |
|---|---|
| EMT | Emergency Medical Technician |
| EndEx | End Exercise |
| ENS | Emergency Notification System (Hiplink) |
| EOC | Emergency Operations Center |
| EOP | Emergency Operations Plan |
| EPA | United States Environmental Protection Agency |
| EVC | Emergency Volunteer Center |
| EXPLAN | Exercise Plan |
| | |
| **F** | |
| FBI | Federal Bureau of Investigation |
| FE | Functional Exercise |
| FEMA | Federal Emergency Management Agency |
| FERC | Federal Energy Regulatory Commission |
| FIRESCOPE | Firefighting Resources of California Organized for Potential Emergencies |
| FIRM | Flood Insurance Rate Map |
| FMA | Flood Mitigation Assistance |
| FMAG | Fire Mutual Aid Grant |
| FOUO | For Official Use Only |
| FPC | Final Planning Conference |
| FPPC | Fair Political Practices Commission |
| FSE | Full-Scale Exercise |
| | |
| **G** | |
| G&T | Preparedness Directorate's Office of Grants and Training |
| GG | Golden Guardian |
| GIS | Graphical Information System |
| | |
| **H** | |
| HCC | Hospital Command Center |
| HMAG | Hazard Mitigation Assistance Grant |
| HazMat | Hazardous Materials |
| HMGP | Hazard Mitigation Grant Program |
| Hiplink | Computerized / Telephone Notification System |
| Hotwash | Debriefing of Personnel Immediately at the Conclusion of an Exercise |
| HSC | Homeland Security Council |
| HSEEP | Homeland Security Exercise and Evaluation Program |
| HSPD | Homeland Security Presidential Directive |

| | |
|---|---|
| | |
| **I** | |
| I-5 | Interstate 5 |
| IAP | Incident Action Plan |
| IC | Incident Commander |
| ICS | Incident Command System |
| IDE | Initial Damage Estimate |
| IP | Improvement Plan |
| IPAWS | Integrated Public Alert and Warning System |
| IPC | Initial Planning Conference |
| | |
| **J** | |
| JIC | Joint Information Center |
| JIS | Joint Information System |
| | |
| **K** | |
| | |
| **L** | |
| LDRM | Local Disaster Recovery Manager |
| LEC | Latino Emergency Council |
| LEPC | Local Emergency Planning Committee |
| LHMP | Local Hazard Mitigation Plan |
| LifeCom | Ambulance Dispatch Center |
| LLIS | Lessons Learned Information Sharing |
| LOTO | Lock-out/Tag-out |
| | |
| **M** | |
| MA | Mutual Aid |
| MAC | Multi Agency Coordination |
| MACS | Multi Agency Coordination System |
| MeID | Merced Irrigation District |
| MCI | Mass Casualty Incident |
| MH | Medical Health |
| MHOAC | Medical Health Operational Area Coordinator |
| MID | Modesto Irrigation District |
| MMC | Memorial Medical Center |
| MMI | Modified Mercalli Index |
| MMRS | Metropolitan Medical Response System |

| | |
|---|---|
| MOU | Memorandum of Understanding |
| MPC | Midterm Planning Conference |
| MPH | Miles Per Hour |
| MS | Medical Surge |
| MSEL | Master Scenario Events List |
| MVEMSA | Mountain Valley Emergency Medical Service Agency |
| MW | Megawatt(s) |
| $M_W$ | Moment Magnitude |
| | |
| **N** | |
| NDRF | National Disaster Recovery Framework |
| NEP | National Exercise Program |
| NEXS | National Exercise Schedule |
| NFIP | National Flood Insurance Program |
| NIC | National Incident Management System (NIMS) Integration Center |
| NIMS | National Incident Management System |
| NGO | Non-Governmental Organization |
| NOAA | National Oceanic and Atmospheric Administration |
| NPREP | National Preparedness for Response Exercise Program |
| NPS | National Preparedness System |
| NRF | National Response Framework |
| NWS | National Weather Service |
| | |
| **O** | |
| OA | Operational Area |
| OES | Office of Emergency Services |
| OID | Oakdale Irrigation District |
| OIS | Other Internal Surge |
| OSHA | Occupational Health and Safety Administration |
| OVH | Oak Valley Hospital |
| OVHD | Oak Valley Hospital District |
| | |
| **P** | |
| PCC | (TID'S) Power Control Center |
| PM2.5 | Particulate Matter (2.5 microns or smaller) |
| P/O | Player / Observer |
| PDM | Pre-Disaster Mitigation |
| PDRP | Post-Disaster Recovery Plan |

| | |
|---|---|
| PG&E | Pacific Gas and Electric |
| PGA | Peak Ground Acceleration |
| PHA | Peak Horizontal Acceleration |
| PIO | Public Information Officer |
| PMF | Probable Maximum Flood |
| POC | Point of Contact |
| PPD | Presidential Policy Directive |
| PPE | Personal Protective Equipment |
| | |
| **Q** | |
| QPF | Quantitative Predictive Forecast |
| | |
| **R** | |
| RAWS | Remote Automated Weather Station |
| REOC | Regional Emergency Operations Center |
| RFC | Repetitive Flood Claim |
| RIMS | Response Information Management System |
| RMDHS | Region Disaster Medical Health Specialist |
| RSF | Recovery Support Function |
| RSP | Render-Safe Procedures |
| | |
| **S** | |
| SCADA | Supervisory Control And Data Acquisition |
| SCOE | Stanislaus County Office of Education |
| SEMS | Standardized Emergency Management System |
| SFHA | Special Flood Hazard Area |
| SIMCELL | Simulation Cell |
| SITMAN | Situation Manual |
| SMART | Simple, Measurable, Achievable, Realistic, Task-oriented |
| SME | Subject Matter Expert |
| SOC | State Operations Center |
| SOP | Standard Operating Procedure |
| SRL | Severe Repetitive Loss |
| StanMAC | Stanislaus Multi Agency Coordination |
| StartEx | Start Exercise |
| SWP | State Water Project |
| SWRCB | State Water Resources Control Board |
| | |

| T | |
|---|---|
| TA | Homeland Security Preparedness Technical Assistance Program |
| T&EPW | Training and Exercise Plan Workshop |
| TAG | Threat Assessment Group |
| TCL | Target Capabilities List |
| TCSD | Tuolumne County Sheriff's Department |
| Tech Spec | Technical Specialist |
| TFL | Task Force Leader |
| THIRA | Threat and Hazard Identification and Risk Assessment |
| TID | Turlock Irrigation District |
| TriPHT | Triage and Pre Hospital Treatment |
| TRT | Tuolumne River Trust |
| TTX | Tabletop Exercise |
| TWP | Tuolumne Wind Project |
| | |
| **U** | |
| UC | Unified Command |
| UAC | Unified Area Command |
| USACE | United States Army Corps of Engineers |
| USAR | Urban Search and Rescue |
| USBR | United States Bureau of Reclamation |
| USFS | United States Forest Service (Dept. of Agriculture) |
| USFWS | United States Fish and Wildlife Service |
| USGS | United States Geological Survey |
| USNPS | United States National Park Service |
| UTL | Universal Task List |
| UW | United Way |
| | |
| **V** | |
| VIP | Very Important Person |
| VOAD | Volunteer Organizations Active in Disasters |
| VSJAS | Volunteer Staff Job Action Sheet |
| | |
| **W** | |
| WEC | Walnut Energy Center |
| WDMP | Woody Debris Management Plan |
| WHO | World Health Organization |
| WUI | Wildland-Urban Interface |

| | |
|---|---|
| **X** | |
| | |
| **Z** | |
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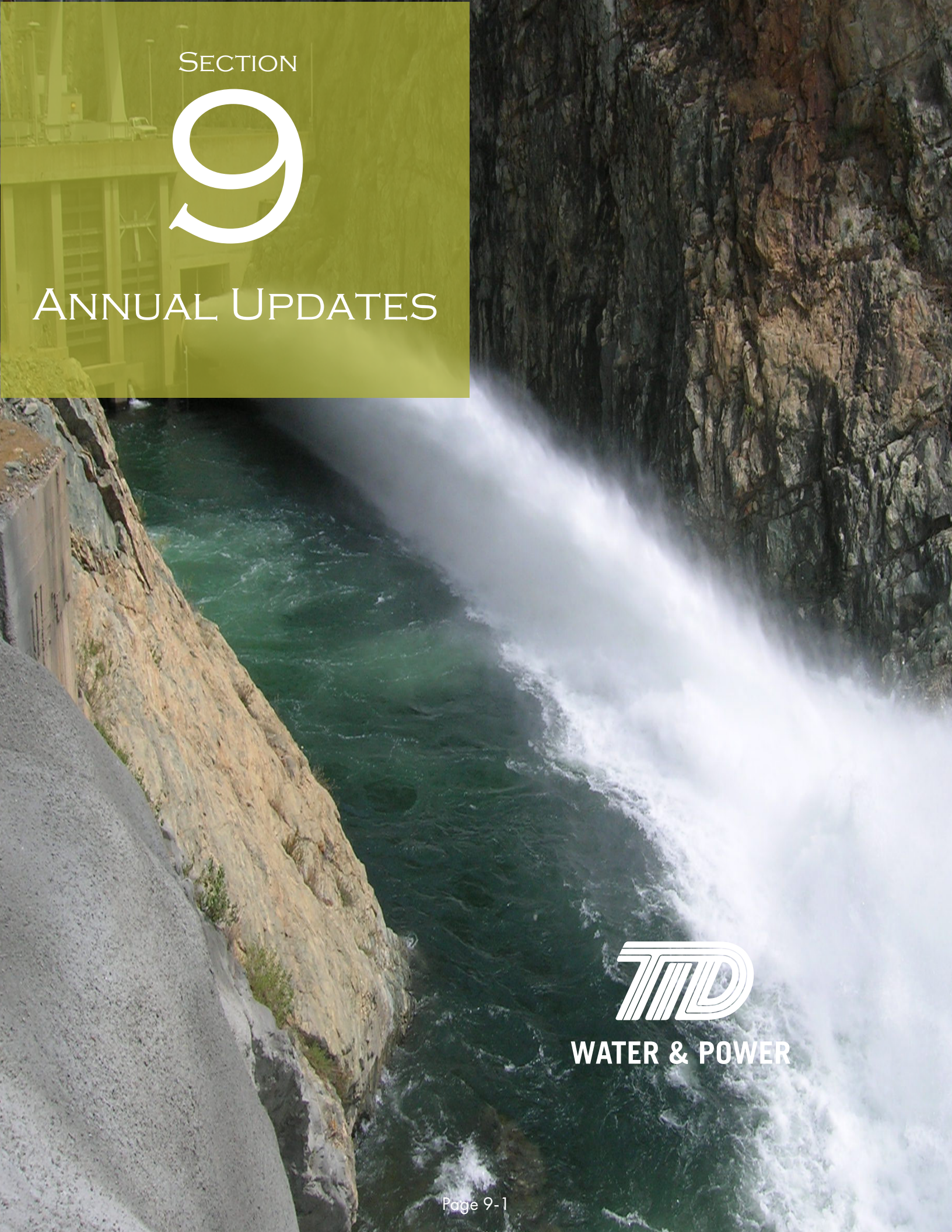

Section

# 9

# Annual Updates

WATER & POWER

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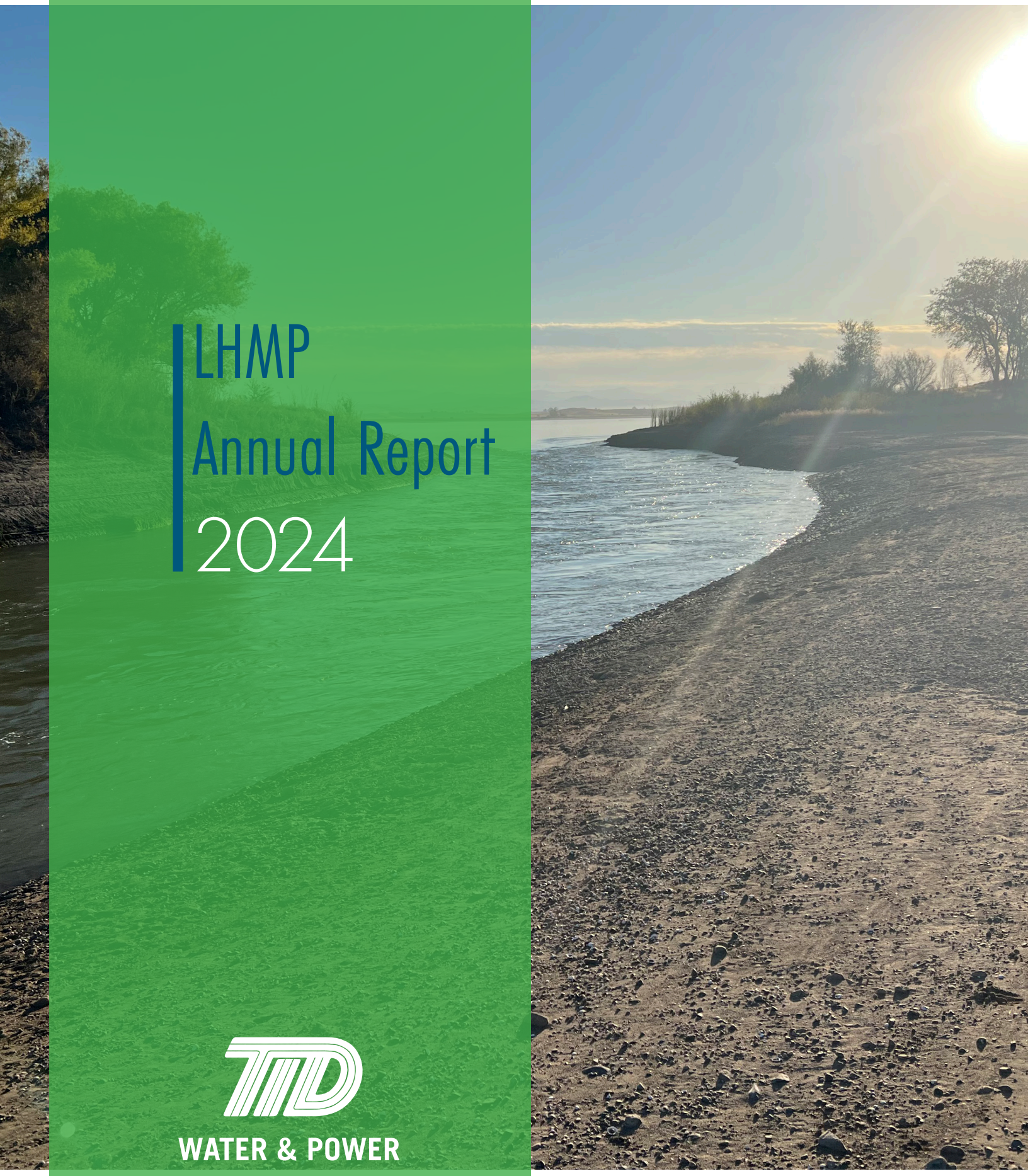

# LHMP Annual Report 2024

WATER & POWER

Created: July, 29, 2024

# The Turlock Irrigation District
# Local Hazard Mitigation Plan Annual Report

July 2024

## Mitigation Action Plan Update

The following table provides a status update to the mitigation activities identified in the TID Local Hazard Mitigation Plan.

| Mitigation Activity | Mitigation Strategy | Responsible | Costs | Priority | Progress/Status |
|---|---|---|---|---|---|
| Integrate the LHMP priorities into other TID plans including the Emergency Operations Plan, Continuity of District/ Continuity of Operations Plan, Capital Improvement Plans and other District plans. | Dam Failure 2020.LHMP.DF.01<br>Earthquake 2020.LHMP.EQ.01<br>Extreme Weather 2020.LHMP. EW.01<br>Flooding 2020.LHMP.FL.01<br>Landslide 2020.LHMP.L.01<br>Public Health Emergency 2020. LHMP.PHE.01<br>Wildland Fire 2020.LHMP.WF.01 | Security and Emergency Preparedness, TID Management Team | Staff time for development and coordination | HIGH | **Ongoing.** The priorities of the LHMP have begun to be implemented into other District plans such as the District's Strategic Plan, Emergency Operations Plan, Continuity of District/Continuity of Operations Plan, and Capital Improvement Plans for specific projects. |
| Improve cell phone coverage at Don Pedro Reservoir for internal communications capabilities and to allow for alerting and warning of watercraft via cell phones if it is necessary to evacuate the lake due to spillway operations, potential failure scenarios or unsafe conditions. | Dam Failure 2020.LHMP.DF.02<br>Earthquake 2020.LHMP.EQ.02<br>Extreme Weather 2020.LHMP. EW.02<br>Flooding 2020.LHMP.FL.02<br>Landslide 2020.LHMP.L.02<br>Wildland Fire 2020.LHMP.WF.02 | Security and Emergency Preparedness, Station Engineering, Electronics | Equipment costs and staff time to position it in the event of an emergency, ongoing training and maintenance costs | LOW | **Not yet implemented.** Investigation of methods for improving the alerting and warning of watercraft on the Lake has not yet commenced due to the demands of other projects on staff. We have learned that cell coverage is out of scope of Electronics Department's abilities. One possible solution would be a dedicated Marine Radio Frequency to contact boaters in an emergency event or a portable mobile cell tower. |

| Mitigation Activity | Mitigation Strategy | Responsible | Costs | Priority | Progress/Status |
|---|---|---|---|---|---|
| Improve radio and cell phone coverage at locations where signal strength is weak or radio communication is difficult. | Dam Failure 2020.LHMP.DF.03<br>Earthquake 2020.LHMP.EQ.03<br>Extreme Weather 2020.LHMP.EW.03<br>Flooding 2020.LHMP.FL.03<br>Landslide 2020.LHMP.L.03<br>Wildland Fire 2020.LHMP.WF.03 | Security and Emergency Preparedness, Station Engineering, Electronics | Staff time for research and bid process, equipment costs, ongoing maintenance costs | LOW | **Not yet implemented.**<br>Investigation into the equipment required to improve cell service have not yet begun.<br><br>Added Civil Engineering as a responsible entity since irrigation SCADA communications uses the District's and radio network. Civil Engineering will contribute ideas to improvements that could serve both emergency response and routine SCADA communications.<br><br>Electronics is unaware of radio dead spots and is in need of more information. Voter receiver system has been validated. |
| Improve radio communication capabilities and interoperability between TID, Don Pedro Recreation Agency (DPRA), and outside agencies. | Dam Failure 2020.LHMP.DF.04<br>Earthquake 2020.LHMP.EQ.04<br>Extreme Weather 2020.LHMP.EW.04<br>Flooding 2020.LHMP.FL.04<br>Landslide 2020.LHMP.L.04<br>Wildland Fire 2020.LHMP.WF.04 | Security and Emergency Preparedness, Station Engineering, Electronics | Equipment costs and staff time to train on the new system | MEDIUM | **Completed.**<br>Completed June 2024 by internal staff. |

Project Complete

| Mitigation Activity | Mitigation Strategy | Responsible | Costs | Priority | Progress/Status |
|---|---|---|---|---|---|
| Re-configure and expand TID's District Operations Center to include dedicated meeting space, JIC, and breakout rooms for Management/Command and General Staff and a separate area for meals/ breaks. | Dam Failure 2020.LHMP.DF.05<br>Earthquake 2020.LHMP.EQ.05<br>Extreme Weather 2020.LHMP. EW.05<br>Flooding 2020.LHMP.FL.05<br>Landslide 2020.LHMP.L.05<br>Public Health Emergency 2020. LHMP.PHE.05<br>Wildland Fire 2020.LHMP.WF.05 | Security and Emergency Preparedness, Facilities | Staff time for remodel design work, permitting (if necessary) and construction | MEDIUM | **In-progress.** A partial remodel of the DOC has been completed. A space that can be dedicated to a Joint Information Center needs to be identified and properly equipped. The facility has not been used as a DOC in several years and needs to be upgraded, supplies replenished and signs and placards reinstalled that are used in a DOC activation. This space is currently being used for a major IT project team, making upgrades difficult to complete. |
| Mobile command post for locating District response personnel in close proximity to damaged facilities during recovery. | Dam Failure 2020.LHMP.DF.06<br>Earthquake 2020.LHMP.EQ.06<br>Extreme Weather 2020.LHMP. EW.06<br>Flooding 2020.LHMP.FL.06<br>Landslide 2020.LHMP.L.06<br>Public Health Emergency 2020. LHMP.PHE.06<br>Wildland Fire 2020.LHMP.WF.06 | Security and Emergency Preparedness | Equipment costs, ongoing maintenance, set-up and transportation costs when deployed | MEDIUM | **Not yet implemented.** Initial investigations into available equipment have begun and, once a solution is identified, it will be evaluated and a budget proposal developed. Staff expects to explore state and federal grant opportunities for this project in before the close of 2024. |

| Mitigation Activity | Mitigation Strategy | Responsible | Costs | Priority | Progress/Status |
|---|---|---|---|---|---|
| Provide NIMS, SEMS and ICS training to TID employees with a role in an emergency response. The National Incident Management System (NIMS), Standardized Emergency Management System (SEMS), and the Incident Command System (ICS) were developed so that responders from different jurisdictions and disciplines can work together to provide a unified approach to incident management using a common set of operating principles, organizational structure, and terminology. | Dam Failure 2020.LHMP.DF.07<br>Earthquake 2020.LHMP.EQ.07<br>Extreme Weather 2020.LHMP.EW.07<br>Flooding 2020.LHMP.FL.07<br>Landslide 2020.LHMP.L.07<br>Wildland Fire 2020.LHMP.WF.07 | Security and Emergency Preparedness | Staff time for coordination and training, developing materials for in-house training, and hiring outside instructors for advanced topics. | HIGH | **In-progress.** A training plan has been developed and will commence once a learning management system is implemented. |
| Provide portable power stations to communities without electricity for charging of cell phones. | Dam Failure 2020.LHMP.DF.08<br>Earthquake 2020.LHMP.EQ.08<br>Extreme Weather 2020.LHMP.EW.08<br>Flooding 2020.LHMP.FL.08<br>Landslide 2020.LHMP.L.08<br>Wildland Fire 2020.LHMP.WF.08 | Security and Emergency Preparedness, External Affairs, Electrical Engineering | Equipment costs, ongoing maintenance, set-up, and transportation costs when deployed. | LOW | **Not yet implemented.** Investigation of solutions for providing remote cell phone charging stations or portable generators/power units has not commenced. Adding TID External Affairs and Electrical Engineering departments as responsible partners for this activity. |

| Mitigation Activity | Mitigation Strategy | Responsible | Costs | Priority | Progress/Status |
|---|---|---|---|---|---|
| Dispose of floatable debris in the upper reaches of the reservoir that has washed downstream from the Tuolumne River. | Dam Failure 2020.LHMP.DF.09<br>Earthquake 2020.LHMP.EQ.09<br>Extreme Weather 2020.LHMP.EW.09<br>Flooding 2020.LHMP.FL.09<br>Landslide 2020.LHMP.L.09<br>Wildland Fire 2020.LHMP.WF.09 | DPRA | Investigate disposal techniques including burning of debris in place. | MEDIUM | **Complete.**<br>Through work contracted to a vendor as TID responded to the January and February 2023 storms, TID found that the best method to remove the debris from the Tuolumne River is to contain it within debris barrier booms to the side of the river canyon. Once the debris has been contained, we have a contractor tow, by boat, the debris to Moccasin for chipping and removal. |
| Provide a second method of egress from the Turlock Lake Campgrounds to be used in the event of an emergency at the facility necessitating the rapid evacuation of the campground. | Dam Failure 2020.LHMP.DF.10<br>Earthquake 2020.LHMP.EQ.10<br>Extreme Weather 2020.LHMP.EW.10<br>Flooding 2020.LHMP.FL.10<br>Landslide 2020.LHMP.L.10<br>Wildland Fire 2020.LHMP.WF.10 | Security and Emergency Preparedness, Chief Dam Safety Engineer, Civil Engineering | Staff time for investigation of possible alternative routes and acquisition of property or easements | LOW | **On-hold.**<br>Due to the uncertainty regarding the status of recreation at Turlock Lake and the ongoing closure of all recreation activity at the facility, this project is currently on hold. |
| Continue to review, update and exercise all dam related EAPs per the requirements of each plan. Continue to include outside agencies with a role in an activation of the plan to participate in the plan review and exercise. | Dam Failure 2020.LHMP.DF.11<br>Earthquake 2020.LHMP.EQ.18 | Chief Dam Safety Engineer | Staff time for preparation, coordination and exercises. Costs related to hosting the EAP presentations | HIGH | **On-going.**<br>EAP Seminar for Don Pedro, La Grange and Turlock Lake EAPs were hosted in August 2023. A June 2024 seminar was conducted for the Turlock Lake EAP. A tabletop exercise for the Don Pedro and La Grange EAPs are scheduled for fall of 2024. |

| Mitigation Activity | Mitigation Strategy | Responsible | Costs | Priority | Progress/Status |
|---|---|---|---|---|---|
| Continue to participate in Emergency Action Plan training and exercises by attending presentations of other local jurisdiction's plans. | Dam Failure 2020.LHMP.DF.12<br>Earthquake 2020.LHMP.EQ.18<br>Extreme Weather 2020.LHMP.EW.12<br>Flooding 2020.LHMP.FL.14<br>Public Health Emergency 2020.LHMP.PHE.11<br>Wildland Fire 2020.LHMP.WF.12 | Various TID Departments | Staff time to attend meetings | HIGH | **On-going.** TID attends the Stanislaus, San Joaquin and Tuolumne Operational Area Council meetings regularly and attend other related coordination meetings. TID participates in available trainings and exercises sponsored or conducted through other agencies. |
| Continue to work with Stanislaus County on the Tuolumne River /TID Flood Working Group to develop and approve plans specific to public notification and evacuation. | Dam Failure 2020.LHMP.DF.13<br>Flooding 2020.LHMP.FL.15 | Security and Emergency Preparedness, Chief Dam Safety Engineer | Staff time for development and coordination | HIGH | **On-going.** Stanislaus County continues regular testing of the La Grange Siren. TID continues to participate with Stanislaus County when they conduct Flood Working Group activities and meetings. |
| Provide a way to back-feed the DPRA warehouse and Don Pedro 2 Substation | Dam Failure 2020.LHMP.DF.14<br>Flooding 2020.LHMP.FL.16 | Electrical Engineering and Operations, Line Department | Staff time, equipment costs, ongoing maintenance costs | LOW | **Not yet implemented.** This project has not yet begun. |
| Develop alternate fuel sources should natural gas delivery be disrupted due to a major earthquake damaging supply pipelines. | Earthquake 2020.LHMP.EQ.12 | Security and Emergency Preparedness, Power Supply Administration | Staff time to conduct an investigation. | LOW | **Not yet implemented.** Alternate supplies of fuel for power plants should natural gas delivery be interrupted have not yet implemented. This project could include ways to import additional energy supplies or increase generation from alternate sources including hydropower, wind energy, and solar has not been explored at this time. |

| Mitigation Activity | Mitigation Strategy | Responsible | Costs | Priority | Progress/Status |
|---|---|---|---|---|---|
| Route power to critical facilities during power outages. | Earthquake 2020.LHMP.EQ.14 | Security and Emergency Preparedness, Engineering and Operations Administration, Line Department | Staff time to investigate a solution to provide power to critical facilities | MEDIUM | **Not yet implemented.** Work to identify critical facilities including hospitals, long-term care facilities, other health-related facilities and critical infrastructure including law enforcement facilities and Emergency Operations Centers has not yet completed. TID visited the Stanislaus County OES EOC in spring 2024 to perform a hazard assessment of the facility's backup generator. |
| Participate in the Great California Shakeout exercise conducted annually by CAL OES. | Earthquake 2020.LHMP.EQ.15 | Security and Emergency Preparedness, Communications Division | Staff time to develop and execute an employee awareness and participation campaign | HIGH | **On-going.** TID will again participate in the Great Shake-out in October 2024, and the Communications Department will support as needed. |
| Provide training to first responders about the hazards of electrical equipment during earthquake events. | Earthquake 2020.LHMP.EQ.17 | Line Division | Staff time during already scheduled presentations | HIGH | **On-going.** TID continues to train and promote training of first responders. TID also continues to promote its general first responder safety video. |
| Provide education to local First Responders on the dangers posed by electrical equipment during flood events. | Flooding 2020.LHMP.FL.21 | Line Division | Staff time during already scheduled presentations | HIGH | **On-going.** TID continues to train and promote training of first responders. TID also continues to promote its general first responder safety video. City of Turlock Fire Department was a recipient of such training this past year. |

| Mitigation Activity | Mitigation Strategy | Responsible | Costs | Priority | Progress/Status |
|---|---|---|---|---|---|
| Provide alternative fuel source for District vehicles and equipment. | Earthquake 2020.LHMP.EQ.19 | Security and Emergency Preparedness, Fleet, Materials Management | Staff time to develop bid specs, bid and establish emergency fuel agreements | MEDIUM | **Not yet implemented.** Investigation of alternate sources of fuel have not yet begun. |
| Provision for continuous operations at the DOC in the event of a power outage. | Extreme Weather 2020.LHMP.EW.13<br>Flooding 2020.LHMP.FL.17 | Security and Emergency Preparedness and Facilities | Equipment and ongoing maintenance | LOW | **In-progress.** There is a generator located near the DOC at the Shoemaker Building on the TID Canal Campus however, it is dedicated to providing backup power to the PCC building only. An alternate power source for the DOC has not been identified at this time. Upgraded main panels at DOC building have been installed, allowing staff to spec and expand alternative power solutions. |
| Notification system to primary personnel activated to the DOC | Extreme Weather 2020.LHMP.EW.14<br>Flooding 2020.LHMP.FL.18 | Security and Emergency Preparedness | Ongoing maintenance of a database of contact numbers and testing of the system | HIGH | **On-going.** TID uses the Everbridge mass notification system to communicate with employees. The system is installed and is used regularly to conduct notifications. Work is on-going to identify those who could be activated to an ICP or the DOC in the event of an emergency. |
| Increase the ability of TID to monitor local weather and streamflow conditions in order to more accurately forecast impacts of hyper-local weather events. | Extreme Weather 2020.LHMP.EW.16 | Hydrology Department | Equipment costs, staff time and maintenance costs | MEDIUM | **On-going.** Plans are under way to work with SCRIPPS Institute to incorporate NWS spatial and ensemble forecasts. |

| Mitigation Activity | Mitigation Strategy | Responsible | Costs | Priority | Progress/Status |
|---|---|---|---|---|---|
| Reduce the number of outages due to high overnight temperatures during a high heat event. | Extreme Weather 2020.LHMP. EW.18 | Electrical Engineering and Operations Department | Equipment costs, staff time and maintenance costs | HIGH | **In-progress.** The District is continually evaluating its system in order to reduce outages resulting from any cause, including high heat conditions with poor overnight recovery. As technology and equipment advances allow, the District will consider options to reduce these outages. This is an ongoing activity. |
| Utilize mobile air quality monitors on job sites when the AQI for PM2.5 is forecasted to be at a level determined by the DIR as a health risk to those working outside. | Extreme Weather 2020.LHMP. EW.20 | Environmental Health Division/ Security & Emergency Preparedness | Equipment costs, staff time and maintenance costs | LOW | **Not yet implemented.** Cost estimates and equipment specifications have not yet been assembled. |
| Mitigate the effects of extreme heat on employees working in older, existing buildings at the District which currently do not have air conditioning. | Extreme Weather 2020.LHMP. EW.21 | Environmental Health Division/ Facilities/ Construction & Maintenance/ Civil Engineering | Equipment costs, staff time and maintenance costs | LOW | **In-progress.** With adding swamp coolers to the roof of the TID Warehouse not being feasible due to the age of the structure, TID added four additional portable water coolers "port o cool" for a total of six portable coolers. |
| Increase the ability of TID to monitor water temperature and quality in Don Pedro Reservoir negatively impacted by runoff and debris flows resulting from storm events occurring in the Tuolumne River watershed and adjust operations in order to mitigate them. | Extreme Weather 2020.LHMP. EW.22 | Hydrology Department | Equipment costs, staff time and maintenance costs | MEDIUM | **Not yet implemented.** This project has not yet begun. TID has done some very preliminary investigations as to the type of equipment that could be used to monitor water temperature and quality. TID intends to pursue grant funding in order to complete this project. |

| Mitigation Activity | Mitigation Strategy | Responsible | Costs | Priority | Progress/Status |
|---|---|---|---|---|---|
| Purchase and implement an outage management system. | Extreme Weather 2020.LHMP. EW.23 | Electrical Engineering and Operations Administration | Equipment costs, staff time and maintenance costs | MEDIUM | **Completed.** Project was completed, and TID conducted a soft launch, then went live with the project in spring 2024. |
| Reduce the occurrence of tree limbs falling or being blown into power lines during storm events. | Extreme Weather 2020.LHMP. EW.24 | Electrical Engineering and Operations Administration | Contract tree trimming crew costs, equipment costs, staff time and maintenance costs | HIGH | **On-going.** A significant amount of work has been completed by trimming and removing trees in high fire-threat areas as per the Wildfire Mitigation Plan. Additionally, trimming distances have been greatly increased in both high fire-threat and urban areas of TID. The District continues to monitor conditions and perform trimming and tree removal work where necessary to protect system reliability. |
| Upgrade the building heaters in the water treatment facilities at DPRA in order to protect equipment in the event of extreme cold temperatures. | Extreme Weather 2020.LHMP. EW.25 | DPRA | Equipment costs, staff time and maintenance costs | LOW | **Complete.** Currently, all heaters are in working order. |
| Construction of a bridge or other means of passing water from the spillway without removing Bonds Flat Rd at the spillway. | Flooding 2020.LHMP.FL.13 | TID Civil Engineering and Dam Safety, DPRA and Tuolumne County | Estimate for construction of a bridge over the spillway from 2017 flood event was $6M. Ongoing costs include maintenance and repair of the roadway and bridge structure. | LOW | **Not yet implemented.** Initial estimates of $6M in 2017 need to be updated, a cooperative agreement drafted and adopted by TID and Tuolumne County, and initial designs and studies completed, prior to commencement of this project. At this time, the project is on-hold pending availability of grant funding opportunities, which if were to become available and awarded, the project could be implemented. |

| Mitigation Activity | Mitigation Strategy | Responsible | Costs | Priority | Progress/Status |
|---|---|---|---|---|---|
| Discourage further development in the historical river channel. | Flooding 2020.LHMP.FL.20 | Civil Engineering, Water Resources, Engineering and Standards and Line Engineering Dept. | Staff time | HIGH | **On-going.** As TID does not have regulatory authority over land use or development issues, its power to limit development in the historic river channel is limited. However, the District does support the efforts of those with the proper regulatory oversight to limit such growth and mentions it when appropriate at partner agency and community meetings and forums. |
| Prevent debris flow or rockfall from impacting the canal system in areas prone to landslide. | Landslide 2020.LHMP.L.12 | Civil Engineering, Water Distribution | Staff time for evaluation & mitigation research. Construction costs for projects identified as viable in the evaluation phase. | HIGH | **On-going.** TID continually monitors and inspects areas of the canal system where rockfall or landslide risks are elevated. In areas where the risks are determined to be unacceptable, work is undertaken to mitigate them in order to protect the ability of the District to deliver water. In 2021, landslide mitigation work was completed in the area of the Upper Main Canal. |
| Prevent rocks or debris from falling onto the La Grange Power Plant and infrastructure. | Landslide 2020.LHMP.L.13 | Civil Engineering, Hydroelectric Department, CDSE | Staff time for evaluation and mitigation research. Construction costs for projects identified as viable in the evaluation phase. | LOW | **Project Removed.** The risk from rockfall at the La Grange Powerplant has been determined to be low. This project may be undertaken at a future date. |

Project Removed

| Mitigation Activity | Mitigation Strategy | Responsible | Costs | Priority | Progress/Status |
|---|---|---|---|---|---|
| Access Road improvements or alternate routes to critical facilities. | Landslide 2020.LHMP.L.15 | Security and Emergency Preparedness, Civil Engineering | Staff time for evaluation and mitigation research. Construction costs for projects identified as viable in the evaluation phase. | HIGH | **Not Yet Implemented.** This project will be implemented at a later time as staff availability allows. |
| Discourage development in landslide-prone areas. | Landslide 2020.LHMP.L.16 | Civil Engineering | Staff time | HIGH | **On-going.** As TID does not have regulatory authority over land use or development issues, its power to limit development in landslide-prone areas is limited. However, the District does support the efforts of those with the proper regulatory oversight to limit such growth. |
| Mitigate landslide risk on all new access roads to TID infrastructure. | Landslide 2020.LHMP.L.17 | Civil Engineering | Staff time | HIGH | **On-going.** TID continually monitors and assesses conditions, particularly in areas known to be at heightened risk of landslides. If an area is considered at unacceptable risk, corrective action is taken to mitigate it. This activity is included when constructing new access roads in the TID. |

| Mitigation Activity | Mitigation Strategy | Responsible | Costs | Priority | Progress/Status |
|---|---|---|---|---|---|
| Evaluate areas of the District for landslide risk and correct issues prior to the winter storm season. | Landslide 2020.LHMP.L.18 | Water Distribution, Civil Engineering, Construction and Maintenance, Line Department | Staff time for evaluation and mitigation research. Construction costs for projects identified as viable in the evaluation phase. | HIGH | **In-progress.** TID continually monitors and assesses conditions, particularly in areas known to be at heightened risk of landslides. If an area is considered at unacceptable risk, corrective action is taken to mitigate it. |
| Provide better access to flu vaccines for all employees and other vaccines for those working outside District offices. | Public Health Emergency 2020. LHMP.PHE.09 | Security and Emergency Preparedness, Human Resources | Staff time and costs to administer the clinics. | MEDIUM | **Not yet implemented.** Investigation into the requirements and logistics of hosting flu shot clinics has not begun. However, TID's insurance plan will pay for flu shots for employees and their dependents. |
| Use FR3 overhead transformers in high fire-threat areas. | Wildland Fire 2020.LHMP.WF.15 | Electrical Engineering and Operations, Line Department | Equipment costs, staff time and maintenance costs | MEDIUM | **In-progress.** Installation of transformers with lower fire risk FR3 vegetable based fluid has begun in areas with increased fire risk. This activity will continue. |
| Construct a communication system in order to facilitate the use of SCADA in high fire-threat areas. | Wildland Fire 2020.LHMP.WF.16 | Electrical Engineering and Operations, Line Department | Equipment costs, staff time and maintenance costs | MEDIUM | **In-progress.** Project has been delayed but will be completed by the end of 2024. Added Civil Engineering as a Responsible entity to bolster ideas to improvements that could serve both emergency response and routine SCADA communications. |
| Where possible, under-ground electric distribution facilities and equipment. | Wildland Fire 2020.LHMP.WF.17 | Electrical Engineering and Operations, Line Department | Equipment costs, staff time and maintenance costs | MEDIUM | **On-going.** Where appropriate, TID continues to assess conditions which could allow for the undergrounding of equipment and facilities in all areas of the District. |

| Mitigation Activity | Mitigation Strategy | Responsible | Costs | Priority | Progress/Status |
|---|---|---|---|---|---|
| Install falling wire sensors to alert TID Power Control Center to downed lines. | Wildland Fire 2020.LHMP.WF.19 | Electrical Engineering and Operations/Line Department | Equipment costs, staff time and maintenance costs | MEDIUM | **In-progress.** TID is exploring options for falling wire sensors and is continuing the pilot project efforts. |
| Rehabilitate and rebuild selected dams at Turlock Lake to make them more resilient and resistant to seismic events or other potential impacts. | Earthquake 2020.LHMP.EQ.21 | CDSE, TID Civil Engineering | Staff time. If grant funds are used, staff time to administer the grant. | HIGH | **In-progress.** The Mitigated Negative Declaration for the project is now complete with the District moving forward with a Section 10 Consultation with USFWS. TID remains in the design process with DSOD. |
| Prepare for changes in water availability in the canal system due to the impacts of climate change. | Extreme Weather 2020.LHMP. EW.26 | Water Distribution, Hydrology, Civil Engineering, Construction & Maintenance | Staff time, construction and maintenance costs. | HIGH | **In-progress.** The District routinely makes improvements to the canal system, considers opportunities to install drought mitigation measures, and evaluates potential water storage projects as they are identified. This is an ongoing project. |
| Investigate the feasibility and effectiveness of reducing evaporation in the canal system. | Extreme Weather 2020.LHMP. EW.27 | Water Resources and Power Supply Administration | Staff time, construction & maintenance costs. | HIGH | **In-progress.** TID is partnering with UC Merced, the State of California and private companies on a pilot program to install solar panels over a portion of the canal system to test their effectiveness in reducing water loss through evaporation and limiting the growth of aquatic weeds which can lead to overtopping and a potential canal failure. The Project is underway and expected to be completed in 2025. |

| Mitigation Activity | Mitigation Strategy | Responsible | Costs | Priority | Progress/Status |
|---|---|---|---|---|---|
| Improve irrigation system efficiency by constructing regulating reservoirs on the lower end of the canal system. | Extreme Weather 2020.LHMP. EW.28 | Water Distribution, Civil Engineering, and Construction & Maintenance | Staff time, property acquisition, design, permitting, construction costs and ongoing maintenance | HIGH | **Project Complete.** Ceres Main Regulating Reservoir is complete and operational. |
| Improve TID's capability to forecast water content in the Tuolumne River Watershed. | Extreme Weather 2020.LHMP. EW.29 | Water Resources Administration | Staff time, investments in new or emerging technology | HIGH | **On-going.** TID always is looking to improve the various programs that it implements. TID is currently utilizing the Airborne Snow Observatory and the Hydrocomp Forecast and Analysis Modeling, to improve the District's ability to analyze the water content of the snowpack and determine runoff potential in the Tuolumne River. |
| Modernize water control structures on the lower canal system. | Extreme Weather 2020.LHMP. EW.30 | Water Resources Administration | Staff time, property acquisition, design, permitting, construction costs and ongoing maintenance | HIGH | **On-going.** |

| Mitigation Activity | Mitigation Strategy | Responsible | Costs | Priority | Progress/Status |
|---|---|---|---|---|---|
| Prepare for changes in water availability in the canal system due to the impacts of extreme weather by augmenting surface water supplies. | Extreme Weather 2020.LHMP. EW.31 | Water Resources Administration | Staff time, property acquisition, design, permitting, construction costs and ongoing maintenance | MEDIUM | **On-going.** |
| Acquire new technology including computer hardware, software, data management systems, and an expansion of the HFAM model to include Mustang and Sand Creek improving the ability to predict and respond to hyper-local weather events which are increasing in frequency and intensity due to the effects of climate change. Incorporate this new data into future modeling of watershed behavior. | Extreme Weather 2020.LHMP. EW.34 | Hydrology Department | Staff time, property acquisition, design, permitting, construction costs and ongoing maintenance | MEDIUM | **In-progress.** Work in this area continues and similarly in activity progress. |

| Mitigation Activity | Mitigation Strategy | Responsible | Costs | Priority | Progress/Status |
|---|---|---|---|---|---|
| Improve communication with assisting and cooperating agencies during an emergency condition at Don Pedro or other District owned or operated dam. Establish a method for sharing real-time information, video feeds and data. | Extreme Weather 2020.LHMP. EW.35 | Hydrology Department, Security and Emergency Preparedness | Staff time, equipment and maintenance costs | LOW | **In-progress.** In addition to pursuing grant funding, TID through its contacts with Stanislaus County Office of Emergency Services, has a relationship with the Amateur Radio Emergency Service, which has the ability to transmit real time information, feeds and multimedia. |
| Improve interoperability between TID and response agencies during a High Flow Condition or other emergency condition at any District owned or operated dam. | Extreme Weather 2020.LHMP. EW.36 | Hydrology Department, Security and Emergency Preparedness | Staff time, equipment and maintenance costs | LOW | **Not yet implemented.** This is a relatively new project and has not yet begun. TID intends to pursue grant funding in order to complete this project. |
| Add additional infiltration galleries in the Tuolumne River at Fox Grove. | Extreme Weather 2020.LHMP. EW.37 | Hydrology Department | Staff time, equipment, construction costs, permitting and environmental compliance costs, changes to water rights | MEDIUM | **Not yet implemented.** This is a relatively new project and has not yet begun. TID intends to pursue grant funding in order to complete this project. |

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# Local Hazard Mitigation Plan Annual Report

Date: July 29, 2024

Department: Security and Emergency Preparedness

Name of Person Completing the Report: Herb Smart

## Summary of Progress

Have any new hazard/disaster events occurred during the reporting period? If so, list the event(s).

***No new hazard or disaster events have occurred during the reporting period.***

To your knowledge, did anyone from the public comment on the plan during the reporting period? If so, list the comments.

***No comments have been received this reporting period***.

Do the goals and objectives of the plan address current and expected conditions? If not, please explain further:

***The goals and objectives identified in the plan meet the current and expected conditions.***

What obstacles, problems, or delays did any current or ongoing mitigation projects encounter, if any? How were the problems solved?

***No significant obstacles or problems were encountered on the current or ongoing projects that resulted in delays.***

Are current resources appropriate for implementing the plan? (Y) N

Have the outcomes occurred as expected? (Y) N

Have outside agencies participated as proposed? (Y) N

Where shortcomings have been identified, what can the District do to get things back on track?

***No shortcomings have been identified during this reporting period.***

Have there been changes in development trends that could create additional risks? If so, please explain.

***No changes in development trends creating additional risks have been identified during this reporting period.***

## LHMP Progress Report Verification

July 29, 2023

Signature Date

To view projects identified in the LHMP that were implemented, completed or not yet implemented during the current reporting period, see the accompanying Mitigation Action Plan Update for details.

# LHMP Annual Report 2023

WATER & POWER

Created: June, 01, 2023

# The Turlock Irrigation District
# Local Hazard Mitigation Plan Annual Report

June 2022

## Mitigation Action Plan Update

The following table provides a status update to the mitigation activities identified in the TID Local Hazard Mitigation Plan.

| Mitigation Activity | Mitigation Strategy | Responsible | Costs | Priority | Progress/Status |
|---|---|---|---|---|---|
| Integrate the LHMP priorities into other TID plans including the Emergency Operations Plan, Continuity of District/ Continuity of Operations Plan, Capital Improvement Plans and other District plans. | Dam Failure 2020.LHMP.DF.01<br>Earthquake 2020.LHMP.EQ.01<br>Extreme Weather 2020.LHMP. EW.01<br>Flooding 2020.LHMP.FL.01<br>Landslide 2020.LHMP.L.01<br>Public Health Emergency 2020. LHMP.PHE.01<br>Wildland Fire 2020.LHMP.WF.01 | Security and Emergency Preparedness, TID Management Team | Staff time for development and coordination | HIGH | **In-progress.** The priorities of the LHMP have begun to be implemented into other District plans such as the District's Strategic Plan, Emergency Operations Plan, Continuity of District/Continuity of Operations Plan, and Capital Improvement Plans for specific projects. This is an ongoing activity. |
| Improve cell phone coverage at Don Pedro Reservoir for internal communications capabilities and to allow for alerting and warning of watercraft via cell phones if it is necessary to evacuate the lake due to spillway operations, potential failure scenarios or unsafe conditions. | Dam Failure 2020.LHMP.DF.02<br>Earthquake 2020.LHMP.EQ.02<br>Extreme Weather 2020.LHMP. EW.02<br>Flooding 2020.LHMP.FL.02<br>Landslide 2020.LHMP.L.02<br>Wildland Fire 2020.LHMP.WF.02 | Security and Emergency Preparedness, Station Engineering, Electronics | Equipment costs and staff time to position it in the event of an emergency, ongoing training and maintenance costs | LOW | **Not yet implemented.** Investigation of methods for improving the alerting and warning of watercraft on the lake has not yet commenced due to Covid impacts and the demands of other projects on staff. |

| Mitigation Activity | Mitigation Strategy | Responsible | Costs | Priority | Progress/Status |
|---|---|---|---|---|---|
| Improve radio and cell phone coverage at locations where signal strength is weak or radio communication is difficult. | Dam Failure 2020.LHMP.DF.03<br>Earthquake 2020.LHMP.EQ.03<br>Extreme Weather 2020.LHMP.EW.03<br>Flooding 2020.LHMP.FL.03<br>Landslide 2020.LHMP.L.03<br>Wildland Fire 2020.LHMP.WF.03 | Security and Emergency Preparedness, Station Engineering, Electronics | Staff time for research and bid process, equipment costs, ongoing maintenance costs | LOW | **Not yet implemented.** Investigation into the equipment required to improve cell service have not yet begun but, is anticipated to commence in Q4 of 2022. |
| Improve radio communication capabilities and interoperability between TID, Don Pedro Recreation Agency (DPRA), and outside agencies. | Dam Failure 2020.LHMP.DF.04<br>Earthquake 2020.LHMP.EQ.04<br>Extreme Weather 2020.LHMP.EW.04<br>Flooding 2020.LHMP.FL.04<br>Landslide 2020.LHMP.L.04<br>Wildland Fire 2020.LHMP.WF.04 | Security and Emergency Preparedness, Station Engineering, Electronics | Equipment costs and staff time to train on the new system | MEDIUM | **In-progress.** Interoperability between TID and DPRA is complete. Investigation into potential solutions for improving communications capabilities with outside agencies has not yet begun. |
| Re-configure and expand TID's District Operations Center to include dedicated meeting space, JIC, and breakout rooms for Management/Command and General Staff and a separate area for meals/breaks. | Dam Failure 2020.LHMP.DF.05<br>Earthquake 2020.LHMP.EQ.05<br>Extreme Weather 2020.LHMP.EW.05<br>Flooding 2020.LHMP.FL.05<br>Landslide 2020.LHMP.L.05<br>Public Health Emergency 2020.LHMP.PHE.05<br>Wildland Fire 2020.LHMP.WF.05 | Security and Emergency Preparedness, Facilities | Staff time for remodel design work, permitting (if necessary) and construction | MEDIUM | **In-progress.** A partial remodel of the DOC has been completed. A space that can be dedicated to a Joint Information Center needs to be identified and properly equipped. The facility has not been used as a DOC in several years and needs to be upgraded, supplies replenished and signs and placards reinstalled that are used in a DOC activation. |

| Mitigation Activity | Mitigation Strategy | Responsible | Costs | Priority | Progress/Status |
|---|---|---|---|---|---|
| Mobile command post for locating District response personnel in close proximity to damaged facilities during recovery. | Dam Failure 2020.LHMP.DF.06<br>Earthquake 2020.LHMP.EQ.06<br>Extreme Weather 2020.LHMP.EW.06<br>Flooding 2020.LHMP.FL.06<br>Landslide 2020.LHMP.L.06<br>Public Health Emergency 2020.LHMP.PHE.06<br>Wildland Fire 2020.LHMP.WF.06 | Security and Emergency Preparedness | Equipment costs, ongoing maintenance, set-up and transportation costs when deployed | MEDIUM | **Not yet implemented.**<br>Initial investigations into available equipment have begun and once a solution is identified, it will be evaluated and a budget proposal developed. |
| Provide NIMS, SEMS and ICS training to TID employees with a role in an emergency response. The National Incident Management System (NIMS), Standardized Emergency Management System (SEMS), and the Incident Command System (ICS) were developed so that responders from different jurisdictions and disciplines can work together to provide a unified approach to incident management using a common set of operating principles, organizational structure, and terminology. | Dam Failure 2020.LHMP.DF.07<br>Earthquake 2020.LHMP.EQ.07<br>Extreme Weather 2020.LHMP.EW.07<br>Flooding 2020.LHMP.FL.07<br>Landslide 2020.LHMP.L.07<br>Wildland Fire 2020.LHMP.WF.07 | Security and Emergency Preparedness | Staff time for coordination and training, developing materials for in-house training, and hiring outside instructors for advanced topics. | HIGH | **In-progress.**<br>A training plan has been developed and will commence in Q2 2022. This is an ongoing project. |

| Mitigation Activity | Mitigation Strategy | Responsible | Costs | Priority | Progress/Status |
|---|---|---|---|---|---|
| Provide portable power stations to communities without electricity for charging of cell phones. | Dam Failure 2020.LHMP.DF.08<br>Earthquake 2020.LHMP.EQ.08<br>Extreme Weather 2020.LHMP.EW.08<br>Flooding 2020.LHMP.FL.08<br>Landslide 2020.LHMP.L.08<br>Wildland Fire 2020.LHMP.WF.08 | Security and Emergency Preparedness | Equipment costs, ongoing maintenance, set-up, and transportation costs when deployed. | LOW | **Not yet implemented.** Investigation of solutions for providing remote cell phone charging stations or portable generators/power units has not commenced. |
| Dispose of floatable debris in the upper reaches of the reservoir that has washed downstream from the Tuolumne River. | Dam Failure 2020.LHMP.DF.09<br>Earthquake 2020.LHMP.EQ.09<br>Extreme Weather 2020.LHMP.EW.09<br>Flooding 2020.LHMP.FL.09<br>Landslide 2020.LHMP.L.09<br>Wildland Fire 2020.LHMP.WF.09 | DPRA | Investigate disposal techniques including burning of debris in place. | MEDIUM | **In-progress.** Preliminary work has begun to determine options that may be suitable for disposing of the debris. More work is needed to determine the best method and identify alternatives. Some initial cost estimates for equipment have been gathered. |
| Provide a second method of egress from the Turlock Lake Campgrounds to be used in the event of an emergency at the facility necessitating the rapid evacuation of the campground. | Dam Failure 2020.LHMP.DF.10<br>Earthquake 2020.LHMP.EQ.10<br>Extreme Weather 2020.LHMP.EW.10<br>Flooding 2020.LHMP.FL.10<br>Landslide 2020.LHMP.L.10<br>Wildland Fire 2020.LHMP.WF.10 | Security and Emergency Preparedness, Chief Dam Safety Engineer, Civil Engineering | Staff time for investigation of possible alternative routes and acquisition of property or easements | LOW | **On-hold.** Due to the uncertainty regarding the status of recreation at Turlock Lake and the ongoing closure of all recreation activity at the facility, this project is currently on hold. |

| Mitigation Activity | Mitigation Strategy | Responsible | Costs | Priority | Progress/Status |
|---|---|---|---|---|---|
| Continue to review, update and exercise all dam related EAPs per the requirements of each plan. Continue to include outside agencies with a role in an activation of the plan to participate in the plan review and exercise. | Dam Failure 2020.LHMP.DF.11<br>Earthquake 2020.LHMP.EQ.18 | Chief Dam Safety Engineer | Staff time for preparation, coordination and exercises. Costs related to hosting the EAP presentations | HIGH | **On-going.** EAP Seminar for DP in August 2022, Turlock Lake in November 2022 and La Grange in September 2022. Turlock Lake EAP approved by CalOES in 2022. |
| Continue to participate in Emergency Action Plan training and exercises by attending presentations of other local jurisdiction's plans. | Dam Failure 2020.LHMP.DF.12<br>Earthquake 2020.LHMP.EQ.18<br>Extreme Weather 2020.LHMP.EW.12<br>Flooding 2020.LHMP.FL.14<br>Public Health Emergency 2020.LHMP.PHE.11<br>Wildland Fire 2020.LHMP.WF.12 | Various TID Departments | Staff time to attend meetings | HIGH | **In-progress.** Attend the Stanislaus and San Joaquin Operational Area Council meetings regularly and attend other meetings. Participate in available trainings and exercises sponsored or conducted through other agencies. This is an ongoing activity. |
| Continue to work with Stanislaus County on the Tuolumne River /TID Flood Working Group to develop and approve plans specific to public notification and evacuation. | Dam Failure 2020.LHMP.DF.13<br>Flooding 2020.LHMP.FL.15 | Security and Emergency Preparedness, Chief Dam Safety Engineer | Staff time for development and coordination | HIGH | **On-going.** Stanislaus County continues regular testing of the La Grange Siren. TID continues to participate with Stanislaus County when they conduct Flood Working Group activities and meetings. |
| Provide a way to back-feed the DPRA warehouse and Don Pedro 2 Substation | Dam Failure 2020.LHMP.DF.14<br>Flooding 2020.LHMP.FL.16 | Electrical Engineering and Operations, Line Department | Staff time, equipment costs, ongoing maintenance costs | LOW | **Not yet implemented.** This project has not yet begun. |

| Mitigation Activity | Mitigation Strategy | Responsible | Costs | Priority | Progress/Status |
|---|---|---|---|---|---|
| Develop alternate fuel sources should natural gas delivery be disrupted due to a major earthquake damaging supply pipelines. | Earthquake 2020.LHMP.EQ.12 | Security and Emergency Preparedness, Power Supply Administration | Staff time to conduct an investigation. | LOW | **Not yet implemented.** Alternate supplies of fuel for power plants should natural gas delivery be interrupted have not yet implemented. This project could include ways to import additional energy supplies or increase generation from alternate sources including hydropower, wind energy, and solar has not been explored at this time. |
| Route power to critical facilities during power outages. | Earthquake 2020.LHMP.EQ.14 | Security and Emergency Preparedness, Engineering and Operations Administration, Line Department | Staff time to investigate a solution to provide power to critical facilities | MEDIUM | **Not yet implemented.** Work to identify critical facilities including hospitals, long-term care facilities, other health-related facilities and critical infrastructure including law enforcement facilities and Emergency Operations Centers has not yet completed. |
| Participate in the Great California Shakeout exercise conducted annually by CAL OES. | Earthquake 2020.LHMP.EQ.15 | Security and Emergency Preparedness, Communications Division | Staff time to develop and execute an employee awareness and participation campaign | HIGH | **In-progress.** TID will be participating in the Great Shake-out exercise held annually in October of 2022. |
| Provide training to first responders about the hazards of electrical equipment during earthquake events. | Earthquake 2020.LHMP.EQ.17 | Line Division | Staff time during already scheduled presentations | HIGH | **In-progress.** TID produced a video demonstrating the dangers of downed power lines and has conducted training seminars with local first-responders. That program was put on-hold during the COVID pandemic but will be reinstated once in-person meetings and trainings are again possible. |

| Mitigation Activity | Mitigation Strategy | Responsible | Costs | Priority | Progress/Status |
|---|---|---|---|---|---|
| Provide education to local First Responders on the dangers posed by electrical equipment during flood events. | Flooding 2020.LHMP.FL.21 | Line Division | Staff time during already scheduled presentations | HIGH | **In-progress.** TID produced a video demonstrating the dangers of downed power lines and has conducted training seminars with local first-responders. That program was put on-hold during the COVID pandemic but will be reinstated once in-person meetings and trainings are again possible. |
| Provide alternative fuel source for District vehicles and equipment. | Earthquake 2020.LHMP.EQ.19 | Security and Emergency Preparedness, Fleet, Materials Management | Staff time to develop bid specs, bid and establish emergency fuel agreements | MEDIUM | **Not yet implemented.** Investigation of alternate sources of fuel have not yet begun. |
| Provision for continuous operations at the DOC in the event of a power outage. | Extreme Weather 2020.LHMP.EW.13<br>Flooding 2020.LHMP.FL.17 | Security and Emergency Preparedness and Facilities | Equipment and ongoing maintenance | LOW | **Not yet implemented.** There is a generator located near the DOC at the Shoemaker Building on the TID Canal Campus however, it is dedicated to providing backup power to the PCC building only. An alternate power source for the DOC has not been identified at this time. |
| Notification system to primary personnel activated to the DOC | Extreme Weather 2020.LHMP.EW.14<br>Flooding 2020.LHMP.FL.18 | Security and Emergency Preparedness | Ongoing maintenance of a database of contact numbers and testing of the system | HIGH | **In-progress.** TID uses the Everbridge mass notification system to communicate with employees. The system is installed and is used regularly to conduct notifications. Work is on-going to identify those who could be activated to an ICP or the DOC in the event of an emergency. |

| Mitigation Activity | Mitigation Strategy | Responsible | Costs | Priority | Progress/Status |
|---|---|---|---|---|---|
| Increase the ability of TID to monitor local weather and streamflow conditions in order to more accurately forecast impacts of hyper-local weather events. | Extreme Weather 2020.LHMP. EW.16 | Hydrology Department | Equipment costs, staff time and maintenance costs | MEDIUM | **Not yet implemented.** This project has not yet begun. Equipment requirements and costs are unknown at this time. TID intends to pursue grant funding in order to complete this project. |
| Reduce outages during high wind events by improving the ability of transmission and distribution lines to withstand high winds. | Extreme Weather 2020.LHMP. EW.17 | Electrical Engineering and Operations Department | Equipment costs, staff time and maintenance costs | LOW | **In progress.** As part of its existing design standards, and maintenance and operations program, TID continuously inspects, evaluates, and upgrades its system to improve reliability under all conditions including high winds. When appropriate, improvements are made to the system to make it more resilient. This is an ongoing activity. |
| Reduce the number of outages due to high overnight temperatures during a high heat event. | Extreme Weather 2020.LHMP. EW.18 | Electrical Engineering and Operations Department | Equipment costs, staff time and maintenance costs | HIGH | **In progress.** The District is continually evaluating its system in order to reduce outages resulting from any cause, including high heat conditions with poor overnight recovery. As technology and equipment advances allow, the District will consider options to reduce these outages. This is an ongoing activity. |
| Utilize mobile air quality monitors on job sites when the AQI for PM2.5 is forecasted to be at a level determined by the DIR as a health risk to those working outside. | Extreme Weather 2020.LHMP. EW.20 | Environmental Health Division/ Security & Emergency Preparedness | Equipment costs, staff time and maintenance costs | LOW | **Not yet implemented.** Cost estimates and equipment specifications have not yet been assembled. |

Project Complete

| Mitigation Activity | Mitigation Strategy | Responsible | Costs | Priority | Progress/Status |
|---|---|---|---|---|---|
| Mitigate the effects of extreme heat on employees working in older, existing buildings at the District which currently do not have air conditioning. | Extreme Weather 2020.LHMP. EW.21 | Environmental Health Division/ Facilities/ Construction & Maintenance/ Civil Engineering | Equipment costs, staff time and maintenance costs | LOW | **In Progress.** Swamp Coolers have been added to the Hazmat, Building, warehouse, and welding shop, and continue to add swamp coolers or A/C where appropriate. This item will also be incorporated into the Broadway Yard master plan being completed in 2022. |
| Increase the ability of TID to monitor water temperature and quality in Don Pedro Reservoir negatively impacted by runoff and debris flows resulting from storm events occurring in the Tuolumne River watershed and adjust operations in order to mitigate them. | Extreme Weather 2020.LHMP. EW.22 | Hydrology Department | Equipment costs, staff time and maintenance costs | MEDIUM | **Not yet implemented.** This project has not yet begun. TID has done some very preliminary investigations as to the type of equipment that could be used to monitor water temperature and quality. TID intends to pursue grant funding in order to complete this project. |
| Purchase and implement an outage management system. | Extreme Weather 2020.LHMP. EW.23 | Electrical Engineering and Operations Administration | Equipment costs, staff time and maintenance costs | MEDIUM | **In progress.** TID is in the process of implementing an outage management system. This project is anticipated to be completed in 2023. |

| Mitigation Activity | Mitigation Strategy | Responsible | Costs | Priority | Progress/Status |
|---|---|---|---|---|---|
| Reduce the occurrence of tree limbs falling or being blown into power lines during storm events. | Extreme Weather 2020.LHMP.EW.24 | Electrical Engineering and Operations Administration | Contract tree trimming crew costs, equipment costs, staff time and maintenance costs | HIGH | **In progress.** A significant amount of work has been completed by trimming and removing trees in high fire-threat areas as per the Wildfire Mitigation Plan. Additionally, trimming distances have been greatly increased in both high fire-threat and urban areas of TID. The District continues to monitor conditions and perform trimming and tree removal work where necessary to protect system reliability. This is an ongoing project. |
| Upgrade the building heaters in the water treatment facilities at DPRA in order to protect equipment in the event of extreme cold temperatures. | Extreme Weather 2020.LHMP.EW.25 | DPRA | Equipment costs, staff time and maintenance costs | LOW | **Not yet implemented.** This project has not yet begun. Equipment specifications and cost estimates have not been determined. |
| Construction of a bridge or other means of passing water from the spillway without removing Bonds Flat Rd at the spillway. | Flooding 2020.LHMP.FL.13 | TID, DPRA and Tuolumne County | Estimate for construction of a bridge over the spillway from 2017 flood event was $6M. Ongoing costs include maintenance and repair of the roadway and bridge structure. | LOW | **Not yet implemented.** Initial estimates of $6M in 2017 need to be updated, a cooperative agreement drafted and adopted by TID and Tuolumne County, and initial designs and studies completed, prior to commencement of this project. At this time, the project is on-hold pending availability of grant funding opportunities, which if were to become available and awarded, the project could be implemented. |

| Mitigation Activity | Mitigation Strategy | Responsible | Costs | Priority | Progress/Status |
|---|---|---|---|---|---|
| Discourage further development in the historical river channel. | Flooding 2020.LHMP.FL.20 | Civil Engineering, Water Resources, Engineering and Standards and Line Engineering Dept. | Staff time | HIGH | **In progress.** As TID does not have regulatory authority over land use or development issues, its power to limit development in the historic river channel is limited. However, the District does support the efforts of those with the proper regulatory oversight to limit such growth and mentions it when appropriate at partner agency and community meetings and forums. This is an ongoing project. |
| Prevent debris flow or rockfall from impacting the canal system in areas prone to landslide. | Landslide 2020.LHMP.L.12 | Civil Engineering, Water Distribution | Staff time for evaluation & mitigation research. Construction costs for projects identified as viable in the evaluation phase. | HIGH | **In progress.** TID continually monitors and inspects areas of the canal system where rockfall or landslide risks are elevated. In areas where the risks are determined to be unacceptable, work is undertaken to mitigate them in order to protect the ability of the District to deliver water. In 2021, landslide mitigation work was completed in the area of the Upper Main Canal. This is an ongoing project. |
| Prevent rocks or debris from falling onto the La Grange Power Plant and infrastructure. | Landslide 2020.LHMP.L.13 | Civil Engineering, Hydroelectric Department, CDSE | Staff time for evaluation and mitigation research. Construction costs for projects identified as viable in the evaluation phase. | LOW | **Not yet implemented.** The risk from rockfall at the La Grange Powerplant has been determined to be low. This project may be undertaken at a future date. |

| Mitigation Activity | Mitigation Strategy | Responsible | Costs | Priority | Progress/Status |
|---|---|---|---|---|---|
| Access Road improvements or alternate routes to critical facilities. | Landslide 2020.LHMP.L.15 | Security and Emergency Preparedness, Civil Engineering | Staff time for evaluation and mitigation research. Construction costs for projects identified as viable in the evaluation phase. | HIGH | **Not Yet Implemented.** This project will be implemented at a later time as staff availability allows. |
| Discourage development in landslide-prone areas. | Landslide 2020.LHMP.L.16 | Civil Engineering | Staff time | HIGH | **In progress.** As TID does not have regulatory authority over land use or development issues, its power to limit development in landslide-prone areas is limited. However, the District does support the efforts of those with the proper regulatory oversight to limit such growth. |
| Mitigate landslide risk on all new access roads to TID infrastructure. | Landslide 2020.LHMP.L.17 | Civil Engineering | Staff time | HIGH | **In Progress**. TID continually monitors and assesses conditions, particularly in areas known to be at heightened risk of landslides. If an area is considered at unacceptable risk, corrective action is taken to mitigate it. This activity is included when constructing new access roads in the TID. This is an on-going project. |

| Mitigation Activity | Mitigation Strategy | Responsible | Costs | Priority | Progress/Status |
|---|---|---|---|---|---|
| Evaluate areas of the District for landslide risk and correct issues prior to the winter storm season. | Landslide 2020.LHMP.L.18 | Water Distribution, Civil Engineering, Construction and Maintenance, Line Department | Staff time for evaluation and mitigation research. Construction costs for projects identified as viable in the evaluation phase. | HIGH | **In Progress**. TID continually monitors and assesses conditions, particularly in areas known to be at heightened risk of landslides. If an area is considered at unacceptable risk, corrective action is taken to mitigate it. |
| Provide better access to flu vaccines for all employees and other vaccines for those working outside District offices. | Public Health Emergency 2020. LHMP.PHE.09 | Security and Emergency Preparedness, Human Resources | Staff time and costs to administer the clinics. | MEDIUM | **Not yet implemented.** Investigation into the requirements and logistics of hosting flu shot clinics has not begun. However, TID's insurance plan will pay for flu shots for employees and their dependents. |
| Use FR3 overhead transformers in high fire-threat areas. | Wildland Fire 2020.LHMP.WF.15 | Electrical Engineering and Operations, Line Department | Equipment costs, staff time and maintenance costs | MEDIUM | **In progress.** Installation of transformers with lower fire risk FR 3 vegetable based fluid has begun in areas with increased fire risk. This activity will continue. |
| Construct a communication system in order to facilitate the use of SCADA in high fire-threat areas. | Wildland Fire 2020.LHMP.WF.16 | Electrical Engineering and Operations, Line Department | Equipment costs, staff time and maintenance costs | MEDIUM | **In progress.** A communication system for remote control of Fire Zone equipment has been constructed and weather stations are scheduled to be installed in 2022/2023. |
| Where possible, under-ground electric distribution facilities and equipment. | Wildland Fire 2020.LHMP.WF.17 | Electrical Engineering and Operations, Line Department | Equipment costs, staff time and maintenance costs | MEDIUM | **In progress.** Where appropriate, TID continues to assess conditions which could allow for the under-grounding of equipment and facilities in all areas of the District. This is an ongoing project. |

| Mitigation Activity | Mitigation Strategy | Responsible | Costs | Priority | Progress/Status |
|---|---|---|---|---|---|
| Install falling wire sensors to alert TID Power Control Center to downed lines. | Wildland Fire 2020.LHMP.WF.19 | Electrical Engineering and Operations/Line Department | Equipment costs, staff time and maintenance costs | MEDIUM | **In progress.** TID is exploring options for falling wire sensors and is continuing the pilot project efforts. |
| Incorporate the Everbridge Alert System (TIDAlert) into the procedures for making notifications to entities identified on the Notification Flowcharts for all dam EAPs and other EAP/IAP activations. | Dam Failure 2020.LHMP.DF.15 | Security and Emergency Preparedness | Added cost of the Everbridge System due to increased capacity and message quantities. Staff time to implement, test and train. | HIGH | **In-progress.** This is a new activity. Capacity on the Everbridge System has already been added. Dam EAPs need to be updated, impacted groups notified of the changes and the contacts uploaded to Everbridge. |
| Rehabilitate and rebuild selected dams at Turlock Lake to make them more resilient and resistant to seismic events or other potential impacts. | Earthquake 2020.LHMP.EQ.21 | CDSE, TID Civil Engineering | Staff time. If grant funds are used, staff time to administer the grant. | HIGH | **In-progress.** TID remains in the design process with preliminary plans sent to DSOD for review and released a draft Initial Study/Mitigated Negative Declaration for public review in December 2022. |
| Prepare for changes in water availability in the canal system due to the impacts of climate change. | Extreme Weather 2020.LHMP. EW.26 | Water Distribution, Hydrology, Civil Engineering, Construction & Maintenance | Staff time, construction and maintenance costs. | HIGH | **In Progress.** The District routinely makes improvements to the canal system, considers opportunities to install drought mitigation measures, and evaluates potential water storage projects as they are identified. This is an ongoing project. |

Project Complete

| Mitigation Activity | Mitigation Strategy | Responsible | Costs | Priority | Progress/Status |
|---|---|---|---|---|---|
| Investigate the feasibility and effectiveness of reducing evaporation in the canal system. | Extreme Weather 2020.LHMP. EW.27 | Water Resources and Power Supply Administration | Staff time, construction & maintenance costs. | HIGH | **In Progress.** TID is partnering with UC Merced, the State of California and private companies on a pilot program to install solar panels over a portion of the canal system to test their effectiveness in reducing water loss through evaporation and limiting the growth of aquatic weeds which can lead to overtopping and a potential canal failure. This project has been awarded grant funding. |
| Improve irrigation system efficiency by constructing regulating reservoirs on the lower end of the canal system. | Extreme Weather 2020.LHMP. EW.28 | Water Distribution, Civil Engineering, and Construction & Maintenance | Staff time, property acquisition, design, permitting, construction costs and ongoing maintenance | HIGH | **In Progress.** Construction of the Ceres Main Regulating Reservoir is underway and is expected to be completed by July 2023. Design and CEQA clearance are complete for the Lateral 5.5 Regulating Reservoir. More projects like these are being considered and will move forward with construction once they are deemed viable. |
| Improve TID's capability to forecast water content in the Tuolumne River Watershed. | Extreme Weather 2020.LHMP. EW.29 | Water Resources Administration | Staff time, investments in new or emerging technology | HIGH | **In Progress.** TID is currently utilizing the Airborne Snow Observatory and the Hydrocomp Forecast and Analysis Modeling, to improve the District's ability to analyze the water content of the snowpack and determine runoff potential in the Tuolumne River. |

| Mitigation Activity | Mitigation Strategy | Responsible | Costs | Priority | Progress/Status |
|---|---|---|---|---|---|
| Modernize water control structures on the lower canal system. | Extreme Weather 2020.LHMP. EW.30 | Water Resources Administration | Staff time, property acquisition, design, permitting, construction costs and ongoing maintenance | HIGH | **In Process.** The District modernizes several water control structures in its lower canal system annually. This is an ongoing project. |
| Prepare for changes in water availability in the canal system due to the impacts of extreme weather by augmenting surface water supplies. | Extreme Weather 2020.LHMP. EW.31 | Water Resources Administration | Staff time, property acquisition, design, permitting, construction costs and ongoing maintenance | MEDIUM | **In Process.** This project is ongoing. |

## New Projects

| Mitigation Activity | Mitigation Strategy | Location in the LHMP | Responsible | Costs | Priority | Progress/Status |
|---|---|---|---|---|---|---|
| Acquire new technology including computer hardware, software, data management systems, and an expansion of the HFAM model to include Mustang and Sand Creek improving the ability to predict and respond to hyper-local weather events which are increasing in frequency and intensity due to the effects of climate change. Incorporate this new data into future modeling of watershed behavior. | 2020.LHMP.EW.34 | 6-43 | Hydrology Department | Staff time, property acquisition, design, permitting, construction costs and ongoing maintenance | MEDIUM | **Not yet implemented.** This is a new project in 2023, not yet begun. TID intends to pursue grant funding in order to complete this project. |
| Improve communication with assisting and cooperating agencies during an emergency condition at Don Pedro or other District owned or operated dam. Establish a method for sharing real-time information, video feeds and data. | 2020.LHMP.EW.35 | 6-43 | Hydrology Department, Security and Emergency Preparedness | Staff time, equipment and maintenance costs | LOW | **Not yet implemented.** This is a new project in 2023, not yet begun. TID intends to pursue grant funding in order to complete this project. |
| Improve interoperability between TID and response agencies during a High Flow Condition or other emergency condition at any District owned or operated dam. | 2020.LHMP.EW.36 | 6-43 | Hydrology Department, Security and Emergency Preparedness | Staff time, equipment and maintenance costs | LOW | **Not yet implemented.** This is a new project in 2023, not yet begun. TID intends to pursue grant funding in order to complete this project. |

| Mitigation Activity | Mitigation Strategy | Location in the LHMP | Responsible | Costs | Priority | Progress/Status |
|---|---|---|---|---|---|---|
| Add additional infiltration galleries in the Tuolumne River at Fox Grove. | 2020.LHMP.EW.37 | 6-43 | Hydrology Department | Staff time, equipment, construction costs, permitting and environmental compliance costs, changes to water rights | MEDIUM | **Not yet implemented.** This is a new project in 2023, not yet begun. TID intends to pursue grant funding in order to complete this project. |
| | | | | | | |
| | | | | | | |

WATER & POWER

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# Local Hazard Mitigation Plan Annual Report

Date: June 1, 2023

Department: Security and Emergency Preparedness

Name of Person Completing the Report: Calvin Curtin

## Summary of Progress

Have any new hazard/disaster events occurred during the reporting period? If so, list the event(s).

***No new hazard or disaster events have occurred during the reporting period.***

To your knowledge, did anyone from the public comment on the plan during the reporting period? If so, list the comments.

***No comments have been received this reporting period***.

Do the goals and objectives of the plan address current and expected conditions? If not, please explain further:

***The goals and objectives identified in the plan meet the current and expected conditions.***

The following projects identified in the LHMP were implemented during the current reporting period. *(See the accompanying Mitigation Action Plan Update for details)*

## Projects Implemented During the Reporting Period

| Dam Failure Mitigation Projects Implemented | | | | | |
|---|---|---|---|---|---|
| 2020.LHMP.DF.03 | 2020.LHMP.DF.09 | | | | |
| | | | | | |
| **Earthquake Mitigation Projects Implemented** | | | | | |
| 2020.LHMP.EQ.03 | 2020.LHMP.EQ.09 | | | | |
| | | | | | |
| **Extreme Weather Mitigation Projects Implemented** | | | | | |
| 2020.LHMP.EW.03 | 2020.LHMP.EW.23 | 2020.LHMP.EW.27 | | | |
| | | | | | |
| **Flooding Mitigation Projects Implemented** | | | | | |
| 2020.LHMP.FL.03 | 2020.LHMP.FL.05 | 2020.LHMP.FL.09 | | | |
| | | | | | |
| **Landslide Mitigation Projects Implemented** | | | | | |
| 2020.LHMP.L.03 | 2020.LHMP.L.05 | 2020.LHMP.L.09 | | | |
| | | | | | |
| **Public Health Emergency Mitigation Projects Implemented** | | | | | |
| 2020.LHMP.PHE.05 | | | | | |
| **Wildland Fire Mitigation Projects Implemented** | | | | | |
| 2020.LHMP.WF.03 | 2020.LHMP.WF.05 | 2020.LHMP.WF.09 | 2020.LHMP.WF.07 | | |
| | | | | | |

The following projects identified in the LHMP were completed during the current reporting period. *(See the accompanying Mitigation Action Plan Update for details)*

## Projects Completed During the Reporting Period

| | | | | | |
|---|---|---|---|---|---|
| Dam Failure Mitigation Projects Completed | | | | | |
| 2020.LHMP.DF.15 | | | | | |
| Earthquake Mitigation Projects Completed | | | | | |
| | | | | | |
| Extreme Weather Mitigation Projects Completed | | | | | |
| 2020.LHMP.EW.17 | | | | | |
| Flooding Mitigation Projects Completed | | | | | |
| | | | | | |
| Landslide Mitigation Projects Completed | | | | | |
| | | | | | |
| Public Health Emergency Mitigation Projects Completed | | | | | |
| | | | | | |
| Wildland Fire Mitigation Projects Completed | | | | | |
| 2020.LHMP.WF.16 | | | | | |

The following projects identified in the LHMP were not implemented during the current reporting period. *(See the accompanying Mitigation Action Plan Update for details)*

## Projects Not Implemented During the Reporting Period

| | | | | | |
|---|---|---|---|---|---|
| Dam Failure Projects Not Implemented | | | | | |
| 2020.LHMP.DF.02 | 2020.LHMP.DF.04 | 2020.LHMP.DF.06 | 2020.LHMP.DF.08 | 2020.LHMP.DF.10 | 2020.LHMP.DF.14 |
| Earthquake Mitigation Projects Not Implemented | | | | | |
| 2020.LHMP.EQ.02 | 2020.LHMP.EQ.06 | 2020.LHMP.EQ.08 | 2020.LHMP.EQ.10 | 2020.LHMP.EQ.16 | 2020.LHMP.EQ.19 |
| 2020.LHMP.EQ.20 | | | | | |
| Extreme Weather Mitigation Projects Not Implemented | | | | | |
| 2020.LHMP.EW.02 | 2020.LHMP.EW.04 | 2020.LHMP.EW.06 | 2020.LHMP.EW.08 | 2020.LHMP.EW.10 | 2020.LHMP.EW.13 |
| 2020.LHMP.EW.16 | 2020.LHMP.EW.20 | 2020.LHMP.EW.21 | 2020.LHMP.EW.25 | | |
| Flooding Mitigation Projects Not Implemented | | | | | |
| 2020.LHMP.FL.02 | 2020.LHMP.FL.04 | 2020.LHMP.FL.06 | 2020.LHMP.FL.08 | 2020.LHMP.FL.10 | 2020.LHMP.FL.13 |
| 2020.LHMP.FL.16 | 2020.LHMP.FL.17 | | | | |
| Landslide Mitigation Projects Not Implemented | | | | | |
| 2020.LHMP.L.02 | 2020.LHMP.L.04 | 2020.LHMP.L.05 | 2020.LHMP.L.06 | 2020.LHMP.L.08 | 2020.LHMP.L.10 |
| 2020.LHMP.L.13 | | | | | |
| Public Health Emergency Mitigation Projects Not Implemented | | | | | |
| 2020.LHMP.PHE.06 | 2020.LHMP.PHE.09 | | | | |
| Wildland Fire Mitigation Projects Not Implemented | | | | | |
| 2020.LHMP.WF.02 | 2020.LHMP.WF.04 | 2020.LHMP.WF.06 | 2020.LHMP.WF.08 | 2020.LHMP.WF.10 | 2020.LHMP.WF.10 |

The following projects were added to the LHMP during the current reporting period. *(See the accompanying Mitigation Action Plan Update for details)*

## Projects Added to the LHMP During the Reporting Period

| | | | | | |
|---|---|---|---|---|---|
| **Dam Failure Projects Added** | | | | | |
| 2020.LHMP.DF.15 | | | | | |
| **Earthquake Mitigation Projects Added** | | | | | |
| 2020.LHMP.EQ.21 | | | | | |
| **Extreme Weather Mitigation Projects Added** | | | | | |
| 2020.LHMP.EW.34 | 2020.LHMP.EW.35 | 2020.LHMP.EW.36 | 2020.LHMP.EW.37 | | |
| **Flooding Mitigation Projects Added** | | | | | |
| | | | | | |
| **Landslide Mitigation Projects Added** | | | | | |
| | | | | | |
| **Public Health Emergency Mitigation Projects Added** | | | | | |
| | | | | | |
| **Wildland Fire Mitigation Projects Added** | | | | | |
| | | | | | |

What obstacles, problems, or delays did any current or ongoing mitigation projects encounter, if any? How were the problems solved?

***No significant obstacles or problems were encountered on the current or ongoing projects that resulted in delays.***

Are current resources appropriate for implementing the plan? (Y) N

Have the outcomes occurred as expected? (Y) N

Have outside agencies participated as proposed? (Y) N

Where shortcomings have been identified, what can the District do to get things back on track?

***No shortcomings have been identified during this reporting period.***

## LHMP Progress Report Verification

Have there been changes in development trends that could create additional risks? If so, please explain.

***No changes in development trends creating additional risks have been identified during this reporting period.***

June 1, 2023

Signature Date

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# LHMP Annual Report 2022

WATER & POWER

# The Turlock Irrigation District
# Local Hazard Mitigation Plan Annual Report

June 2022

## Mitigation Action Plan Update

The following table provides a status update to the mitigation activities identified in the TID Local Hazard Mitigation Plan.

| Mitigation Activity | Mitigation Strategy | Location in LHMP | Responsible | Costs | Priority | Progress/Status |
|---|---|---|---|---|---|---|
| Integrate the LHMP priorities into other TID plans including the Emergency Operations Plan, Continuity of District/ Continuity of Operations Plan, Capital Improvement Plans and other District plans. | Dam Failure 2020.LHMP.DF.01 | page 6-14 | Security and Emergency Preparedness, TID Management Team | Staff time for development and coordination | HIGH | **In-progress.** The priorities of the LHMP have begun to be implemented into other District plans such as the District's Strategic Plan, Emergency Operations Plan, Continuity of District/Continuity of Operations Plan, and Capital Improvement Plans for specific projects. This is an ongoing activity. |
| | Earthquake 2020.LHMP.EQ.01 | page 6-24 | | | | |
| | Extreme Weather 2020.LHMP.EW.01 | page 6-36 | | | | |
| | Flooding 2020.LHMP.FL.01 | page 6-52 | | | | |
| | Landslide 2020.LHMP.L.01 | page 6-64 | | | | |
| | Public Health Emergency 2020.LHMP.PHE.01 | page 6-76 | | | | |
| | Wildland Fire 2020.LHMP.WF.01 | page 6-82 | | | | |
| Improve cell phone coverage at Don Pedro Reservoir for internal communications capabilities and to allow for alerting and warning of watercraft via cell phones if it is necessary to evacuate the lake due to spillway operations, potential failure scenarios or unsafe conditions. | Dam Failure 2020.LHMP.DF.02 | page 6-15 | Security and Emergency Preparedness, Station Engineering, Electronics | Equipment costs and staff time to position it in the event of an emergency, ongoing training and maintenance costs | LOW | **Not yet implemented.** Investigation of methods for improving the alerting and warning of watercraft on the lake has not yet commenced due to Covid impacts and the demands of other projects on staff. |
| | Earthquake 2020.LHMP.EQ.02 | page 6-25 | | | | |
| | Extreme Weather 2020.LHMP.EW.02 | page 6-37 | | | | |
| | Flooding 2020.LHMP.FL.02 | page 6-52 | | | | |
| | Landslide 2020.LHMP.L.02 | page 6-64 | | | | |
| | Wildland Fire 2020.LHMP.WF.02 | page 6-82 | | | | |

| Mitigation Activity | Mitigation Strategy | Location in LHMP | Responsible | Costs | Priority | Progress/Status |
|---|---|---|---|---|---|---|
| Improve radio and cell phone coverage at locations where signal strength is weak or radio communication is difficult. | Dam Failure 2020.LHMP.DF.03 | page 6-15 | Security and Emergency Preparedness, Station Engineering, Electronics | Staff time for research and bid process, equipment costs, ongoing maintenance costs | LOW | **Not yet implemented.** Investigation into the equipment required to improve cell service have not yet begun but, is anticipated to commence in Q4 of 2022. |
| | Earthquake 2020.LHMP.EQ.03 | page 6-25 | | | | |
| | Extreme Weather 2020.LHMP.EW.03 | page 6-37 | | | | |
| | Flooding 2020.LHMP.FL.03 | page 6-53 | | | | |
| | Landslide 2020.LHMP.L.03 | page 6-65 | | | | |
| | Wildland Fire 2020.LHMP.WF.03 | page 6-83 | | | | |
| Improve radio communication capabilities and interoperability between TID, Don Pedro Recreation Agency (DPRA), and outside agencies. | Dam Failure 2020.LHMP.DF.04 | page 6-15 | Security and Emergency Preparedness, Station Engineering, Electronics | Equipment costs and staff time to train on the new system | MEDIUM | **In-progress.** Interoperability between TID and DPRA is complete. Investigation into potential solutions for improving communications capabilities with outside agencies has not yet begun. |
| | Earthquake 2020.LHMP.EQ.04 | page 6-25 | | | | |
| | Extreme Weather 2020.LHMP.EW.04 | page 6-37 | | | | |
| | Flooding 2020.LHMP.FL.04 | page 6-53 | | | | |
| | Landslide 2020.LHMP.L.04 | page 6-65 | | | | |
| | Wildland Fire 2020.LHMP.WF.04 | page 6-83 | | | | |
| Re-configure and expand TID's District Operations Center to include dedicated meeting space, JIC, and breakout rooms for Management/Command and General Staff and a separate area for meals/ breaks. | Dam Failure 2020.LHMP.DF.05 | page 6-15 | Security and Emergency Preparedness, Facilities | Staff time for remodel design work, permitting (if necessary) and construction | MEDIUM | **In-progress.** A partial remodel of the DOC has been completed. A space that can be dedicated to a Joint Information Center needs to be identified and properly equipped. The facility has not been used as a DOC in several years and needs to be upgraded, supplies replenished and signs and placards reinstalled that are used in a DOC activation. |
| | Earthquake 2020.LHMP.EQ.05 | page 6-25 | | | | |
| | Extreme Weather 2020.LHMP.EW.05 | page 6-37 | | | | |
| | Flooding 2020.LHMP.FL.05 | page 6-53 | | | | |
| | Landslide 2020.LHMP.L.05 | page 6-65 | | | | |
| | Public Health Emergency 2020.LHMP.PHE.05 | page 6-76 | | | | |
| | Wildland Fire 2020.LHMP.WF.05 | page 6-83 | | | | |

| Mitigation Activity | Mitigation Strategy | Location in LHMP | Responsible | Costs | Priority | Progress/Status |
|---|---|---|---|---|---|---|
| Mobile command post for locating District response personnel in close proximity to damaged facilities during recovery. | Dam Failure 2020.LHMP.DF.06 | page 6-15 | Security and Emergency Preparedness | Equipment costs, ongoing maintenance, set-up and transportation costs when deployed | MEDIUM | **Not yet implemented.** Initial investigations into available equipment have begun and once a solution is identified, it will be evaluated and a budget proposal developed. |
| | Earthquake 2020.LHMP.EQ.06 | page 6-25 | | | | |
| | Extreme Weather 2020.LHMP.EW.06 | page 6-38 | | | | |
| | Flooding 2020.LHMP.FL.06 | page 6-53 | | | | |
| | Landslide 2020.LHMP.L.06 | page 6-65 | | | | |
| | Public Health Emergency 2020.LHMP.PHE.06 | page 6-77 | | | | |
| | Wildland Fire 2020.LHMP.WF.06 | page 6-83 | | | | |
| Provide NIMS, SEMS and ICS training to TID employees with a role in an emergency response. The National Incident Management System (NIMS), Standardized Emergency Management System (SEMS), and the Incident Command System (ICS) were developed so that responders from different jurisdictions and disciplines can work together to provide a unified approach to incident management using a common set of operating principles, organizational structure, and terminology. | Dam Failure 2020.LHMP.DF.07 | page 6-16 | Security and Emergency Preparedness | Staff time for coordination and training, developing materials for in-house training, and hiring outside instructors for advanced topics. | HIGH | **In-progress.** A training plan has been developed and will commence in Q2 2022. This is an ongoing project. |
| | Earthquake 2020.LHMP.EQ.07 | page 6-26 | | | | |
| | Extreme Weather 2020.LHMP.EW.07 | page 6-38 | | | | |
| | Flooding 2020.LHMP.FL.07 | page 6-54 | | | | |
| | Landslide 2020.LHMP.L.07 | page 6-66 | | | | |
| | Wildland Fire 2020.LHMP.WF.07 | page 6-84 | | | | |

| Mitigation Activity | Mitigation Strategy | Location in LHMP | Responsible | Costs | Priority | Progress/Status |
|---|---|---|---|---|---|---|
| Provide portable power stations to communities without electricity for charging of cell phones. | Dam Failure 2020.LHMP.DF.08 | page 6-16 | Security and Emergency Preparedness | Equipment costs, ongoing maintenance, set-up, and transportation costs when deployed. | LOW | **Not yet implemented.** Investigation of solutions for providing remote cell phone charging stations or portable generators/power units has not commenced. |
| | Earthquake 2020.LHMP.EQ.08 | page 6-26 | | | | |
| | Extreme Weather 2020.LHMP.EW.08 | page 6-38 | | | | |
| | Flooding 2020.LHMP.FL.08 | page 6-54 | | | | |
| | Landslide 2020.LHMP.L.08 | page 6-66 | | | | |
| | Wildland Fire 2020.LHMP.WF.08 | page 6-84 | | | | |
| Dispose of floatable debris in the upper reaches of the reservoir that has washed downstream from the Tuolumne River. | Dam Failure 2020.LHMP.DF.09 | page 6-16 | DPRA | Investigate disposal techniques including burning of debris in place. | MEDIUM | **In-progress.** Preliminary work has begun to determine options that may be suitable for disposing of the debris. More work is needed to determine the best method and identify alternatives. Some initial cost estimates for equipment have been gathered. |
| | Earthquake 2020.LHMP.EQ.09 | page 6-26 | | | | |
| | Extreme Weather 2020.LHMP.EW.09 | page 6-38 | | | | |
| | Flooding 2020.LHMP.FL.09 | page 6-54 | | | | |
| | Landslide 2020.LHMP.L.09 | page 6-66 | | | | |
| | Wildland Fire 2020.LHMP.WF.09 | page 6-84 | | | | |
| Provide a second method of egress from the Turlock Lake Campgrounds to be used in the event of an emergency at the facility necessitating the rapid evacuation of the campground. | Dam Failure 2020.LHMP.DF.10 | page 6-16 | Security and Emergency Preparedness, Chief Dam Safety Engineer, Civil Engineering | Staff time for investigation of possible alternative routes and acquisition of property or easements | LOW | **On-hold.** Due to the uncertainty regarding the status of recreation at Turlock Lake and the ongoing closure of all recreation activity at the facility, this project is currently on hold. |
| | Earthquake 2020.LHMP.EQ.10 | page 6-26 | | | | |
| | Extreme Weather 2020.LHMP.EW.10 | page 6-39 | | | | |
| | Flooding 2020.LHMP.FL.10 | page 6-54 | | | | |
| | Landslide 2020.LHMP.L.10 | page 6-66 | | | | |
| | Wildland Fire 2020.LHMP.WF.10 | page 6-84 | | | | |

| Mitigation Activity | Mitigation Strategy | Location in LHMP | Responsible | Costs | Priority | Progress/Status |
|---|---|---|---|---|---|---|
| Continue to review, update and exercise all dam related EAPs per the requirements of each plan. Continue to include outside agencies with a role in an activation of the plan to participate in the plan review and exercise. | Dam Failure 2020.LHMP.DF.11 | page 6-17 | Chief Dam Safety Engineer | Staff time for preparation, coordination and exercises. Costs related to hosting the EAP presentations | HIGH | **In-progress.** TID hosted a review of the EAPs for Don Pedro and Turlock Lake in December 2021 and verified the contact information for each impacted agency and jurisdiction downstream of both facilities. The La Grange EAP was re-written and approved by the FERC and the Don Pedro EAP was also re-written and approved by Cal OES. The Turlock Lake EAP will be submitted to Cal OES for approval in Q2 of 2022. |
| | Earthquake 2020.LHMP.EQ.18 | page 6-27 | | | | |
| Continue to participate in Emergency Action Plan training and exercises by attending presentations of other local jurisdiction's plans. | Dam Failure 2020.LHMP.DF.12 | page 6-17 | Various TID Departments | Staff time to attend meetings | HIGH | **In-progress.** Attend the Stanislaus and San Joaquin Operational Area Council meetings regularly and attend other meetings. Participate in available trainings and exercises sponsored or conducted through other agencies. This is an ongoing activity. |
| | Earthquake 2020.LHMP.EQ.18 | page 6-27 | | | | |
| | Extreme Weather 2020.LHMP.EW.12 | page 6-39 | | | | |
| | Flooding 2020.LHMP.FL.14 | page 6-55 | | | | |
| | Public Health Emergency 2020.LHMP.PHE.11 | page 6-77 | | | | |
| | Wildland Fire 2020.LHMP.WF.12 | page 6-85 | | | | |

| Mitigation Activity | Mitigation Strategy | Location in LHMP | Responsible | Costs | Priority | Progress/Status |
|---|---|---|---|---|---|---|
| Continue to work with Stanislaus County on the Tuolumne River /TID Flood Working Group to develop and approve plans specific to public notification and evacuation. | Dam Failure 2020.LHMP.DF.13 | page 6-17 | Security and Emergency Preparedness, Chief Dam Safety Engineer | Staff time for development and coordination | HIGH | **In-progress.** TID continues to work with the Tuolumne River Flood Working Group and has finalized an MOU with Stanislaus County for maintenance of the siren. The county has developed a notification implementation procedure for activating it. This is an ongoing activity. |
| | Flooding 2020.LHMP.FL.15 | page 6-55 | | | | |
| Provide a way to back-feed the DPRA warehouse and Don Pedro 2 Substation | Dam Failure 2020.LHMP.DF.14 | page 6-17 | Electrical Engineering and Operations, Line Department | Staff time, equipment costs, ongoing maintenance costs | LOW | **Not yet implemented.** This project has not yet begun. |
| | Flooding 2020.LHMP.FL.16 | page 6-55 | | | | |
| Enhance TID's ability to selectively de-energize lines or portions of lines in the high fire-threat zones to reduce the chance of its equipment starting a fire. | Earthquake 2020.LHMP.EQ.11 | page 6-27 | Electrical Engineering and Operations, Line Department | Equipment costs, staff time and maintenance costs | MEDIUM | **Complete.** Additional equipment has been added to facilities in high fire-threat areas allowing TID to selectively de-energize those areas to reduce the risk of its equipment starting or contributing to wildland fires. |
| | Extreme Weather 2020.LHMP.EW.11 | page 6-39 | | | | |
| | Flooding 2020.LHMP.FL.11 | page 6-55 | | | | |
| | Landslide 2020.LHMP.L.11 | page 6-67 | | | | |
| | Wildland Fire 2020.LHMP.WF.11 | page 6-85 | | | | |

| Mitigation Activity | Mitigation Strategy | Location in LHMP | Responsible | Costs | Priority | Progress/Status |
|---|---|---|---|---|---|---|
| Develop alternate fuel sources should natural gas delivery be disrupted due to a major earthquake damaging supply pipelines. | Earthquake 2020.LHMP.EQ.12 | page 6-27 | Security and Emergency Preparedness, Power Supply Administration | Staff time to conduct an investigation. | LOW | **Not yet implemented.** Alternate supplies of fuel for power plants should natural gas delivery be interrupted have not yet implemented. This project could include ways to import additional energy supplies or increase generation from alternate sources including hydropower, wind energy, and solar has not been explored at this time. |
| Limit electricity availability during periods of prolonged fuel unavailability. | Earthquake 2020.LHMP.EQ.13 | page 6-27 | Security and Emergency Preparedness, Power Supply Administration, Engineering and Operations Administration | Staff time to conduct the investigation. | MEDIUM | **Complete.** The OH5200 TID Firm Load Curtailment Procedure documents the process for limiting the availability of electricity during periods of prolonged disruption of energy supplies. This plan is current and maintained by TID. |
| Route power to critical facilities during power outages. | Earthquake 2020.LHMP.EQ.14 | page 6-27 | Security and Emergency Preparedness, Engineering and Operations Administration, Line Department | Staff time to investigate a solution to provide power to critical facilities | MEDIUM | **Not yet implemented.** Work to identify critical facilities including hospitals, long-term care facilities, other health-related facilities and critical infrastructure including law enforcement facilities and Emergency Operations Centers has not yet completed. |

| Mitigation Activity | Mitigation Strategy | Location in LHMP | Responsible | Costs | Priority | Progress/Status |
|---|---|---|---|---|---|---|
| Participate in the Great California Shakeout exercise conducted annually by CAL OES. | Earthquake 2020.LHMP.EQ.15 | page 6-27 | Security and Emergency Preparedness, Communications Division | Staff time to develop and execute an employee awareness and participation campaign | HIGH | **In-progress.** TID will be participating in the Great Shake-out exercise held annually in October of 2022. |
| Improve earthquake resistance at District facilities. | Earthquake 2020.LHMP.EQ.16 | page 6-27 | Security and Emergency Preparedness, Civil Engineering | Staff time to investigate facilities and potential mitigations. Capital costs to implement any approved improvements to facilities. | MEDIUM | **In Progress.** TID is developing a 20 year master plan for all operational buildings at the Broadway Yard and North Annex which includes seismic improvements. |
| Provide training to first responders about the hazards of electrical equipment during earthquake events. | Earthquake 2020.LHMP.EQ.17 | page 6-27 | Line Division | Staff time during already scheduled presentations | HIGH | **In-progress.** TID produced a video demonstrating the dangers of downed power lines and has conducted training seminars with local first-responders. That program was put on-hold during the COVID pandemic but will be reinstated once in-person meetings and trainings are again possible. |

| Mitigation Activity | Mitigation Strategy | Location in LHMP | Responsible | Costs | Priority | Progress/Status |
|---|---|---|---|---|---|---|
| Provide education to local First Responders on the dangers posed by electrical equipment during flood events. | Flooding 2020.LHMP.FL.21 | page 6-55 | Line Division | Staff time during already scheduled presentations | HIGH | **In-progress.** TID produced a video demonstrating the dangers of downed power lines and has conducted training seminars with local first-responders. That program was put on-hold during the COVID pandemic but will be reinstated once in-person meetings and trainings are again possible. |
| Provide alternative fuel source for District vehicles and equipment. | Earthquake 2020.LHMP.EQ.19 | page 6-28 | Security and Emergency Preparedness, Fleet, Materials Management | Staff time to develop bid specs, bid and establish emergency fuel agreements | MEDIUM | **Not yet implemented.** Investigation of alternate sources of fuel have not yet begun. |
| Provision for continuous operations at the DOC in the event of a power outage. | Extreme Weather 2020.LHMP.EW.13<br>Flooding 2020.LHMP.FL.17 | page 6-39<br>page 6-55 | Security and Emergency Preparedness and Facilities | Equipment and ongoing maintenance | LOW | **Not yet implemented.** There is a generator located near the DOC at the Shoemaker Building on the TID Canal Campus however, it is dedicated to providing backup power to the PCC building only. An alternate power source for the DOC has not been identified at this time. |

| Mitigation Activity | Mitigation Strategy | Location in LHMP | Responsible | Costs | Priority | Progress/Status |
|---|---|---|---|---|---|---|
| Notification system to primary personnel activated to the DOC | Extreme Weather 2020.LHMP.EW.14<br>Flooding 2020.LHMP.FL.18 | page 6-39<br>page 6-55 | Security and Emergency Preparedness | Ongoing maintenance of a database of contact numbers and testing of the system | HIGH | **In-progress.** TID uses the Everbridge mass notification system to communicate with employees. The system is installed and is used regularly to conduct notifications. Work is on-going to identify those who could be activated to an ICP or the DOC in the event of an emergency. |
| Update maps of river elevations and facilities inundated to reflect correct information after 2017 Increased Flows Event. | Extreme Weather 2020.LHMP.EW.15<br>Flooding 2020.LHMP.FL.19 | page 6-39<br>page 6-56 | Security and Emergency Preparedness/TID Hydrology/TID Civil Engineering | Staff time | HIGH | **Completed.** Updated inundation maps were created after the 2017 floods indicating areas expected to flood under various flow criteria. |
| Increase the ability of TID to monitor local weather and streamflow conditions in order to more accurately forecast impacts of hyper-local weather events. | Extreme Weather 2020.LHMP.EW.16 | page 6-39 | Hydrology Department | Equipment costs, staff time and maintenance costs | MEDIUM | **Not yet implemented.** This project has not yet begun. Equipment requirements and costs are unknown at this time. TID intends to pursue grant funding in order to complete this project. |

| Mitigation Activity | Mitigation Strategy | Location in LHMP | Responsible | Costs | Priority | Progress/Status |
|---|---|---|---|---|---|---|
| Reduce outages during high wind events by improving the ability of transmission and distribution lines to withstand high winds. | Extreme Weather 2020.LHMP.EW.17 | page 6-39 | Electrical Engineering and Operations Department | Equipment costs, staff time and maintenance costs | LOW | **In progress.** As part of its existing design standards, and maintenance and operations program, TID continuously inspects, evaluates, and upgrades its system to improve reliability under all conditions including high winds. When appropriate, improvements are made to the system to make it more resilient. This is an ongoing activity. |
| Reduce the number of outages due to high overnight temperatures during a high heat event. | Extreme Weather 2020.LHMP.EW.18 | page 6-40 | Electrical Engineering and Operations Department | Equipment costs, staff time and maintenance costs | LOW | **In progress.** The District is continually evaluating its system in order to reduce outages resulting from any cause, including high heat conditions with poor overnight recovery. As technology and equipment advances allow, the District will consider options to reduce these outages. This is an ongoing activity. |

| Mitigation Activity | Mitigation Strategy | Location in LHMP | Responsible | Costs | Priority | Progress/Status |
|---|---|---|---|---|---|---|
| Provide appropriate breathing protection for employees working outside during elevated levels of wildfire smoke which result in an AQI for PM2.5 forecast to be at a level determined by the Department of Industrial Relations (DIR) as a health risk to those working outside. | Extreme Weather 2020.LHMP.EW.19 | page 6-40 | Environmental Health Division/ Security & Emergency Preparedness | Mask costs and staff time | MEDIUM | **Complete.** TID maintains a supply of N95 and KN95 masks for employees who must work outdoors when PM 2.5 levels are forecast to exceed safe levels. Potentially impacted employees are aware that these masks are readily available and how to access them. Education and reminders to employees is an on-going project. |
| Utilize mobile air quality monitors on job sites when the AQI for PM2.5 is forecasted to be at a level determined by the DIR as a health risk to those working outside. | Extreme Weather 2020.LHMP.EW.20 | page 6-40 | Environmental Health Division/ Security & Emergency Preparedness | Equipment costs, staff time and maintenance costs | LOW | **Not yet implemented.** Cost estimates and equipment specifications have not yet been assembled. |
| Mitigate the effects of extreme heat on employees working in older, existing buildings at the District which currently do not have air conditioning. | Extreme Weather 2020.LHMP.EW.21 | page 6-40 | Environmental Health Division/ Facilities/ Construction & Maintenance/ Civil Engineering | Equipment costs, staff time and maintenance costs | LOW | **In Progress.** Swamp Coolers have been added to the Hazmat, Building, warehouse, and welding shop, and continue to add swamp coolers or A/C where appropriate. This item will also be incorporated into the Broadway Yard master plan being completed in 2022. |

| Mitigation Activity | Mitigation Strategy | Location in LHMP | Responsible | Costs | Priority | Progress/Status |
|---|---|---|---|---|---|---|
| Increase the ability of TID to monitor water temperature and quality in Don Pedro Reservoir negatively impacted by runoff and debris flows resulting from storm events occurring in the Tuolumne River watershed and adjust operations in order to mitigate them. | Extreme Weather 2020.LHMP.EW.22 | page 6-40 | Hydrology Department | Equipment costs, staff time and maintenance costs | MEDIUM | **Not yet implemented.** This project has not yet begun. TID has done some very preliminary investigations as to the type of equipment that could be used to monitor water temperature and quality. TID intends to pursue grant funding in order to complete this project. |
| Purchase and implement an outage management system. | Extreme Weather 2020.LHMP.EW.23 | page 6-41 | Electrical Engineering and Operations Administration | Equipment costs, staff time and maintenance costs | MEDIUM | **In progress.** TID is in the process of implementing an outage management system. This project is anticipated to be completed in 2023. |
| Reduce the occurrence of tree limbs falling or being blown into power lines during storm events. | Extreme Weather 2020.LHMP.EW.24 | page 6-41 | Electrical Engineering and Operations Administration | Contract tree trimming crew costs, equipment costs, staff time and maintenance costs | HIGH | **In progress.** A significant amount of work has been completed by trimming and removing trees in high fire-threat areas as per the Wildfire Mitigation Plan. Additionally, trimming distances have been greatly increased in both high fire-threat and urban areas of TID. The District continues to monitor conditions and perform trimming and tree removal work where necessary to protect system reliability. This is an ongoing project. |

| Mitigation Activity | Mitigation Strategy | Location in LHMP | Responsible | Costs | Priority | Progress/Status |
|---|---|---|---|---|---|---|
| Upgrade the building heaters in the water treatment facilities at DPRA in order to protect equipment in the event of extreme cold temperatures. | Extreme Weather 2020.LHMP.EW.25 | page 6-41 | DPRA | Equipment costs, staff time and maintenance costs | LOW | **Not yet implemented.** This project has not yet begun. Equipment specifications and cost estimates have not been determined. |
| Security fencing around dam and spillway to keep onlookers away from spill operations. | Flooding 2020.LHMP.FL.12 | page 6-55 | Security and Emergency Preparedness, Facilities | Fencing, engineering and other associated costs. Costs for maintenance and upkeep once installed | HIGH | **Complete.** The dam and spillway fencing project has been completed. |
| Construction of a bridge or other means of passing water from the spillway without removing Bonds Flat Rd at the spillway. | Flooding 2020.LHMP.FL.13 | page 6-55 | TID, DPRA and Tuolumne County | Estimate for construction of a bridge over the spillway from 2017 flood event was $6M. Ongoing costs include maintenance and repair of the roadway and bridge structure. | LOW | **Not yet implemented.** Initial estimates of $6M in 2017 need to be updated, a cooperative agreement drafted and adopted by TID and Tuolumne County, and initial designs and studies completed, prior to commencement of this project. At this time, the project is on-hold pending availability of grant funding opportunities, which if were to become available and awarded, the project could be implemented. |

| Mitigation Activity | Mitigation Strategy | Location in LHMP | Responsible | Costs | Priority | Progress/Status |
|---|---|---|---|---|---|---|
| Discourage further development in the historical river channel. | Flooding 2020.LHMP.FL.20 | page 6-56 | Civil Engineering, Water Resources, Engineering and Standards and Line Engineering Dept. | Staff time | HIGH | **In progress.** As TID does not have regulatory authority over land use or development issues, its power to limit development in the historic river channel is limited. However, the District does support the efforts of those with the proper regulatory oversight to limit such growth and mentions it when appropriate at partner agency and community meetings and forums. This is an ongoing project. |
| Prevent debris flow or rockfall from impacting the canal system in areas prone to landslide. | Landslide 2020.LHMP.L.12 | page 6-66 | Civil Engineering | Staff time for evaluation and mitigation research. Construction costs for projects identified as viable in the evaluation phase. | HIGH | **In progress.** TID continually monitors and inspects areas of the canal system where rockfall or landslide risks are elevated. In areas where the risks are determined to be unacceptable, work is undertaken to mitigate them in order to protect the ability of the District to deliver water. In 2021, landslide mitigation work was completed in the area of the Upper Main Canal. This is an ongoing project. |

| Mitigation Activity | Mitigation Strategy | Location in LHMP | Responsible | Costs | Priority | Progress/Status |
|---|---|---|---|---|---|---|
| Prevent rocks or debris from falling onto the La Grange Power Plant and infrastructure. | Landslide 2020.LHMP.L.13 | page 6-67 | Civil Engineering, Hydroelectric Department, CDSE | Staff time for evaluation and mitigation research. Construction costs for projects identified as viable in the evaluation phase. | MEDIUM | **Not yet implemented.** The risk from rockfall at the La Grange Powerplant has been determined to be low. This project may be undertaken at a future date. |
| Prevent rocks or debris from falling onto the Don Pedro Power Plant and infrastructure. | Landslide 2020.LHMP.L.14 | page 6-67 | Security and Emergency Preparedness, Civil Engineering, Hydroelectric Department, CDSE | Staff time for evaluation and mitigation research. Construction costs for projects identified as viable in the evaluation phase. | MEDIUM | **Complete.** Rockfall protection measures have been constructed at the Don Pedro Power Plant facility. |

| Mitigation Activity | Mitigation Strategy | Location in LHMP | Responsible | Costs | Priority | Progress/Status |
|---|---|---|---|---|---|---|
| Access Road improvements or alternate routes to critical facilities. | Landslide 2020.LHMP.L.15 | page 6-67 | Security and Emergency Preparedness, Civil Engineering | Staff time for evaluation and mitigation research. Construction costs for projects identified as viable in the evaluation phase. | HIGH | **Not Yet Implemented.** This project will be implemented at a later time as staff availability allows. |
| Discourage development in landslide-prone areas. | Landslide 2020.LHMP.L.16 | page 6-67 | Civil Engineering | Staff time | HIGH | **In progress.** As TID does not have regulatory authority over land use or development issues, its power to limit development in landslide-prone areas is limited. However, the District does support the efforts of those with the proper regulatory oversight to limit such growth. |
| Mitigate landslide risk on all new access roads to TID infrastructure. | Landslide 2020.LHMP.L.17 | page 6-67 | Civil Engineering | Staff time | HIGH | **In Progress**. TID continually monitors and assesses conditions, particularly in areas known to be at heightened risk of landslides. If an area is considered at unacceptable risk, corrective action is taken to mitigate it. This activity is included when constructing new access roads in the TID. This is an on-going project. |

| Mitigation Activity | Mitigation Strategy | Location in LHMP | Responsible | Costs | Priority | Progress/Status |
|---|---|---|---|---|---|---|
| Evaluate areas of the District for landslide risk and correct issues prior to the winter storm season. | Landslide 2020.LHMP.L.18 | page 6-67 | Water Distribution, Civil Engineering, Construction and Maintenance, Line Department | Staff time for evaluation and mitigation research. Construction costs for projects identified as viable in the evaluation phase. | HIGH | **In Progress**. TID continually monitors and assesses conditions, particularly in areas known to be at heightened risk of landslides. If an area is considered at unacceptable risk, corrective action is taken to mitigate it. |
| Evaluate the need for landslide mitigation in the District. | Landslide 2020.LHMP.L.19 | page 6-68 | Civil Engineering | Staff time for evaluation and mitigation research. Construction costs for projects identified as viable in the evaluation phase. | HIGH | **In Progress**. TID continually monitors and assesses conditions, particularly in areas known to be at heightened risk of landslides. If an area is considered at unacceptable risk, corrective action is taken to mitigate it. |
| Maintain equipment necessary to clear slides from District-owned access roads or rights-of-way in the event a slide occurs. | Landslide 2020.LHMP.L.20 | page 6-68 | Fleet and Plant Services | Equipment costs, ongoing maintenance, set-up and transportation costs when deployed | MEDIUM | **Complete.** TID maintains a fleet of heavy and medium equipment necessary to clear debris resulting from landslides or other events. In addition, the District can contract with outside vendors to provide equipment and support. |

| Mitigation Activity | Mitigation Strategy | Location in LHMP | Responsible | Costs | Priority | Progress/Status |
|---|---|---|---|---|---|---|
| To the extent possible, provide alternate work schedules and/or telecommuting options for healthy staff unable to report for work because they are home caring for ill family members. | Public Health Emergency 2020.LHMP. PHE.02 | page 6-76 | Human Resources | Staff time and possibly equipment such as laptops or tablets to allow employees to work from home. | MEDIUM | **Complete.** TID has developed plans and processes for accommodating alternate work locations for employees who cannot report to their normal work location due to symptoms, exposure or illness due to a Public Health Emergency. |
| Provide personal protective equipment (PPE) to employees interacting with members of the public during a health emergency. | Public Health Emergency 2020.LHMP. PHE.03 | page 6-76 | Security and Emergency Preparedness and Environmental Health and Safety | Staff time, equipment costs and supplies. | HIGH | **Complete.** TID maintains a stock of PPE for employee use and makes it readily available as needed. |
| Segment the air handling equipment to isolate zones where the public has access in order to minimize the exposure of healthy employees. | Public Health Emergency 2020.LHMP. PHE.04 | page 6-77 | Facilities | Staff time, possible costs to redesign the air handling system or, install HEPA filters or other means of cleaning the air. | LOW | **Complete.** Increased filtration capacity has been added to the air handling systems. It has been determined that physically separating the systems between public and private areas at the Canal Office is not practical. |

| Mitigation Activity | Mitigation Strategy | Location in LHMP | Responsible | Costs | Priority | Progress/Status |
|---|---|---|---|---|---|---|
| Provide alternate remote customer service locations in place of the Canal Office. | Public Health Emergency 2020.LHMP.PHE.07 | page 6-77 | Customer Service, Facilities and Civil Engineering, Security and Emergency Preparedness | Staff time, possibly capital costs to remodel another building on the Canal Campus to be able to process customer payments. | LOW | **Complete.** TID has installed customer self-service kiosks outside the Canal and Ceres offices and has opened additional Pay Station locations to serve customers remotely. The primary customer service call-handling team has been decentralized and placed on a monthly telecommuting rotation, limiting exposure and decreasing the likelihood of a staffing shortage due to communicable illness. |
| Provide for proper PPE and sanitizing of facilities and machinery used to count money. | Public Health Emergency 2020.LHMP.PHE.08 | page 6-77 | Security and Emergency Preparedness and Environmental Health and Safety, Customer Service | Staff time, equipment costs and supplies. | HIGH | **Complete.** PPE is available for employees as described in Public Health Emergency 2020.LHMP.PHE.03. Sanitizing of equipment and frequently touched surfaces is regularly conducted and is increased as needed during a public health emergency, as was done during the COVID Pandemic. |
| Provide better access to flu vaccines for all employees and other vaccines for those working outside District offices. | Public Health Emergency 2020.LHMP.PHE.09 | page 6-77 | Security and Emergency Preparedness, Human Resources | Staff time and costs to administer the clinics. | MEDIUM | **Not yet implemented.** Investigation into the requirements and logistics of hosting flu shot clinics has not begun. However, TID's insurance plan will pay for flu shots for employees and their dependents. |

| Mitigation Activity | Mitigation Strategy | Location in LHMP | Responsible | Costs | Priority | Progress/Status |
|---|---|---|---|---|---|---|
| Provide for mass prophylaxis of employees during pandemic or epidemics. | Public Health Emergency 2020.LHMP.PHE.10 | page 6-78 | Security and Emergency Preparedness | Staff time for development and coordination. | HIGH | **Complete.** TID has drafted and approved a Closed POD Plan for use during a pandemic or other public health emergency when mass prophylaxis is necessary. |
| Improve access to equipment necessary for proper hand sanitizing throughout the District. | Public Health Emergency 2020.LHMP.PHE.12 | page 6-78 | Security and Emergency Preparedness, Facilities, Communications Division | Staff time, equipment costs and supplies. | HIGH | **Complete.** Touchless fixtures and hand sanitizing stations are in place throughout the District. |
| Replace wood poles that failed the intrusive test in high fire-threat areas with more resilient types of poles. | Wildland Fire 2020.LHMP.WF.13 | page 6-85 | Electrical Engineering and Operations, Line Department | Equipment costs, staff time and maintenance costs | MEDIUM | **Complete.** In 2020 TID identified 469 poles in the eastern and western portions of the District that were included in elevated fire threat areas. Of the poles tested, 2.5% of them failed and were replaced with steel or fiberglass poles. |
| Replace existing conductors prone to failure and falling to the ground in the East and West side fire zones. | Wildland Fire 2020.LHMP.WF.14 | page 6-85 | Electrical Engineering and Operations, Line Department | Equipment costs, staff time and maintenance costs | MEDIUM | **Complete.** Replaced 12 kV copper conductors in areas of increased fire risk including Diablo Grande and La Grange with lower hazard aluminum and steel conductors. |

| Mitigation Activity | Mitigation Strategy | Location in LHMP | Responsible | Costs | Priority | Progress/Status |
|---|---|---|---|---|---|---|
| Use FR3 overhead transformers in high fire-threat areas. | Wildland Fire 2020.LHMP.WF.15 | page 6-85 | Electrical Engineering and Operations, Line Department | Equipment costs, staff time and maintenance costs | MEDIUM | **In progress.** Installation of transformers with lower fire risk FR 3 vegetable based fluid has begun in areas with increased fire risk. This activity will continue. |
| Construct a communication system in order to facilitate the use of SCADA in high fire-threat areas. | Wildland Fire 2020.LHMP.WF.16 | page 6-85 | Electrical Engineering and Operations, Line Department | Equipment costs, staff time and maintenance costs | MEDIUM | **In progress.** A communication system for remote control of Fire Zone equipment has been constructed and weather stations are scheduled to be installed in 2022/2023. |
| Where possible, under-ground electric distribution facilities and equipment. | Wildland Fire 2020.LHMP.WF.17 | page 6-85 | Electrical Engineering and Operations, Line Department | Equipment costs, staff time and maintenance costs | MEDIUM | **In progress.** Where appropriate, TID continues to assess conditions which could allow for the under-grounding of equipment and facilities in all areas of the District. This is an ongoing project. |
| Where possible, use tree wire in high fire-threat areas. | Wildland Fire 2020.LHMP.WF.18 | page 6-86 | Electrical Engineering and Operations/Line Department | Equipment costs, staff time and maintenance costs | MEDIUM | **Complete.** Tree wire is not being utilized as TID was able to harden the system by reconductoring distribution conductors. |

| Mitigation Activity | Mitigation Strategy | Location in LHMP | Responsible | Costs | Priority | Progress/Status |
|---|---|---|---|---|---|---|
| Install falling wire sensors to alert TID Power Control Center to downed lines. | Wildland Fire 2020.LHMP.WF.19 | page 6-85 | Electrical Engineering and Operations/Line Department | Equipment costs, staff time and maintenance costs | MEDIUM | **In progress.** TID is exploring options for falling wire sensors and is continuing the pilot project efforts. |
| Improve access to electrical facilities and exit routes in remote areas. | Wildland Fire 2020.LHMP.WF.20 | page 6-86 | Line Department/ Construction and Maintenance | Equipment costs, staff time and maintenance costs | MEDIUM | **Complete.** Distribution lines on the west side of the District were re-routed in response to the SCU Lightning Complex Fire. |

## New Projects

| Mitigation Activity | Mitigation Strategy | Location in the LHMP | Responsible | Costs | Priority | Progress/Status |
|---|---|---|---|---|---|---|
| Incorporate the Everbridge Alert System (TIDAlert) into the procedures for making notifications to entities identified on the Notification Flowcharts for all dam EAPs and other EAP/IAP activations. | Dam Failure 2020.LHMP.DF.15 | page 6-17 | Security and Emergency Preparedness | Added cost of the Everbridge System due to increased capacity and message quantities. Staff time to implement, test and train. | HIGH | **In-progress.** This is a new activity. Capacity on the Everbridge System has already been added. Dam EAPs need to be updated, impacted groups notified of the changes and the contacts uploaded to Everbridge. |
| Rehabilitate and rebuild selected dams at Turlock Lake to make them more resilient and resistant to seismic events or other potential impacts. | Earthquake 2020.LHMP.EQ.21 | page 6-28 | CDSE, TID Civil Engineering | Staff time. If grant funds are used, staff time to administer the grant. | HIGH | **In-progress.** This is a new activity and is currently in the design process. TID has applied for a grant to complete this project. |
| Prepare for changes in water availability in the canal system due to the impacts of climate change. | Extreme Weather 2020.LHMP.EW.26 | page 6-41 | Water Distribution, Hydrology, Civil Engineering, Construction & Maintenance | Staff time, construction and maintenance costs. | HIGH | **In Progress.** The District routinely makes improvements to the canal system, considers opportunities to install drought mitigation measures, and evaluates potential water storage projects as they are identified. This is an ongoing project. |

| Mitigation Activity | Mitigation Strategy | Location in the LHMP | Responsible | Costs | Priority | Progress/Status |
|---|---|---|---|---|---|---|
| Investigate the feasibility and effectiveness of reducing evaporation in the canal system. | Extreme Weather 2020.LHMP.EW.27 | page 6-42 | Water Resources and Power Supply Administration | Staff time, construction & maintenance costs. | HIGH | **In Progress.** TID is partnering with UC Merced, the State of California and private companies on a pilot program to install solar panels over a portion of the canal system to test their effectiveness in reducing water loss through evaporation and limiting the growth of aquatic weeds which can lead to overtopping and a potential canal failure. This project has been awarded grant funding. |
| Improve irrigation system efficiency by constructing regulating reservoirs on the lower end of the canal system. | Extreme Weather 2020.LHMP.EW.28 | page 6-42 | Water Distribution, Civil Engineering, and Construction & Maintenance | Staff time, property acquisition, design, permitting, construction costs and ongoing maintenance | HIGH | **In Progress.** Design has been completed and CEQA clearance obtained for the Ceres Main Regulating Reservoir. Construction is expected to begin in late Summer of 2022 and be completed in early 2023. Design and CEQA clearance are currently underway for the Lateral 5.5 Regulating Reservoir. More projects like these are being considered and will move forward with construction once they are deemed viable. |

| Mitigation Activity | Mitigation Strategy | Location in the LHMP | Responsible | Costs | Priority | Progress/Status |
|---|---|---|---|---|---|---|
| Improve TID's capability to forecast water content in the Tuolumne River Watershed. | Extreme Weather 2020.LHMP.EW.29 | page 6-42 | Water Resources Administration | Staff time, investments in new or emerging technology | HIGH | **In Progress.** TID is currently utilizing the Airborne Snow Observatory and the Hydrocomp Forecast and Analysis Modeling, to improve the District's ability to analyze the water content of the snowpack and determine runoff potential in the Tuolumne River. |
| Modernize water control structures on the lower canal system. | Extreme Weather 2020.LHMP.EW.30 | page 6-42 | Water Resources Administration | Staff time, property acquisition, design, permitting, construction costs and ongoing maintenance | HIGH | **In Process.** The District modernizes several water control structures in its lower canal system annually. This is an ongoing project. |
| Prepare for changes in water availability in the canal system due to the impacts of extreme weather by augmenting surface water supplies. | Extreme Weather 2020.LHMP.EW.31 | page 6-42 | Water Resources Administration | Staff time, property acquisition, design, permitting, construction costs and ongoing maintenance | MEDIUM | **In Process.** This project is ongoing. |

WATER & POWER

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# Local Hazard Mitigation Plan Annual Report

Date: June 8, 2022

Department: Security and Emergency Preparedness

Name of Person Completing the Report: Calvin Curtin

## Summary of Progress

Have any new hazard/disaster events occurred during the reporting period? If so, list the event(s).

***No new hazard or disaster events have occurred during the reporting period.***

To your knowledge, did anyone from the public comment on the plan during the reporting period? If so, list the comments.

***No comments have been received this reporting period***.

Do the goals and objectives of the plan address current and expected conditions? If not, please explain further:

***The goals and objectives identified in the plan meet the current and expected conditions.***

The following projects identified in the LHMP were implemented during the current reporting period. *(See the accompanying Mitigation Action Plan Update for details)*

## Projects Implemented During the Reporting Period

| Dam Failure Mitigation Projects Implemented | | | | | |
|---|---|---|---|---|---|
| 2020.LHMP.DF.01 | 2020.LHMP.DF.04 | 2020.LHMP.DF.05 | 2020.LHMP.DF.07 | 2020.LHMP.DF.09 | 2020.LHMP.DF.11 |
| 2020.LHMP.DF.12 | 2020.LHMP.DF.13 | | | | |
| **Earthquake Mitigation Projects Implemented** | | | | | |
| 2020.LHMP.EQ.01 | 2020.LHMP.EQ.04 | 2020.LHMP.EQ.05 | 2020.LHMP.EQ.07 | 2020.LHMP.EQ.09 | 2020.LHMP.EQ.15 |
| 2020.LHMP.EQ.16 | 2020.LHMP.EQ.17 | 2020.LHMP.EQ.18 | 2020.LHMP.EQ.21 | | |
| **Extreme Weather Mitigation Projects Implemented** | | | | | |
| 2020.LHMP.EW.01 | 2020.LHMP.EW.04 | 2020.LHMP.EW.05 | 2020.LHMP.EW.07 | 2020.LHMP.EW.09 | 2020.LHMP.EW.12 |
| 2020.LHMP.EW.14 | 2020.LHMP.EW.17 | 2020.LHMP.EW.18 | 2020.LHMP.EW.21 | 2020.LHMP.EW.23 | 2020.LHMP.EW.24 |
| **Flooding Mitigation Projects Implemented** | | | | | |
| 2020.LHMP.FL.01 | 2020.LHMP.FL.04 | 2020.LHMP.FL.05 | 2020.LHMP.FL.07 | 2020.LHMP.FL.09 | 2020.LHMP.FL.14 |
| 2020.LHMP.FL.15 | 2020.LHMP.FL.18 | 2020.LHMP.FL.20 | 2020.LHMP.FL.21 | | |
| **Landslide Mitigation Projects Implemented** | | | | | |
| 2020.LHMP.L.01 | 2020.LHMP.L.04 | 2020.LHMP.L.05 | 2020.LHMP.L.07 | 2020.LHMP.L.09 | 2020.LHMP.L.12 |
| 2020.LHMP.L.16 | 2020.LHMP.L.17 | 2020.LHMP.L.18 | 2020.LHMP.L.19 | | |
| **Public Health Emergency Mitigation Projects Implemented** | | | | | |
| 2020.LHMP.PHE.01 | 2020.LHMP.PHE.05 | 2020.LHMP.PHE.11 | | | |
| **Wildland Fire Mitigation Projects Implemented** | | | | | |
| 2020.LHMP.WF.01 | 2020.LHMP.WF.04 | 2020.LHMP.WF.05 | 2020.LHMP.WF.07 | 2020.LHMP.WF.09 | 2020.LHMP.WF.12 |
| 2020.LHMP.WF.15 | 2020.LHMP.WF.16 | 2020.LHMP.WF.17 | 2020.LHMP.WF.19 | | |

The following projects identified in the LHMP were completed during the current reporting period. *(See the accompanying Mitigation Action Plan Update for details)*

## Projects Completed During the Reporting Period

| | | | | | |
|---|---|---|---|---|---|
| Earthquake Mitigation Projects Completed | | | | | |
| 2020.LHMP.EQ.11 | 2020.LHMP.EQ.13 | | | | |
| Extreme Weather Mitigation Projects Completed | | | | | |
| 2020.LHMP.EW.11 | 2020.LHMP.EW.15 | 2020.LHMP.EW.19 | | | |
| Flooding Mitigation Projects Completed | | | | | |
| 2020.LHMP.FL.11 | 2020.LHMP.FL.12 | 2020.LHMP.FL.19 | | | |
| Landslide Mitigation Projects Completed | | | | | |
| 2020.LHMP.L.11 | 2020.LHMP.L.14 | 2020.LHMP.L.20 | | | |
| Public Health Emergency Mitigation Projects Completed | | | | | |
| 2020.LHMP.PHE.01 | 2020.LHMP.PHE.02 | 2020.LHMP.PHE.03 | 2020.LHMP.PHE.04 | 2020.LHMP.PHE.07 | 2020.LHMP.PHE.08 |
| 2020.LHMP.PHE.10 | 2020.LHMP.PHE.12 | | | | |
| Wildland Fire Mitigation Projects Completed | | | | | |
| 2020.LHMP.WF.11 | 2020.LHMP.WF.13 | 2020.LHMP.WF.14 | 2020.LHMP.WF.18 | 2020.LHMP.WF.20 | |

The following projects identified in the LHMP were not implemented during the current reporting period. *(See the accompanying Mitigation Action Plan Update for details)*

## Projects Not Implemented During the Reporting Period

| | | | | | |
|---|---|---|---|---|---|
| Dam Failure Projects Not Implemented | | | | | |
| 2020.LHMP.DF.02 | 2020.LHMP.DF.03 | 2020.LHMP.DF.06 | 2020.LHMP.DF.08 | 2020.LHMP.DF.10 | 2020.LHMP.DF.14 |
| Earthquake Mitigation Projects Not Implemented | | | | | |
| 2020.LHMP.EQ.02 | 2020.LHMP.EQ.03 | 2020.LHMP.EQ.06 | 2020.LHMP.EQ.08 | 2020.LHMP.EQ.10 | 2020.LHMP.EQ.12 |
| 2020.LHMP.EQ.14 | 2020.LHMP.EQ.19 | | | | |
| Extreme Weather Mitigation Projects Not Implemented | | | | | |
| 2020.LHMP.EW.02 | 2020.LHMP.EW.03 | 2020.LHMP.EW.06 | 2020.LHMP.EW.08 | 2020.LHMP.EW.10 | 2020.LHMP.EW.13 |
| 2020.LHMP.EW.16 | 2020.LHMP.EW.20 | 2020.LHMP.EW.22 | 2020.LHMP.EW.25 | | |
| Flooding Mitigation Projects Not Implemented | | | | | |
| 2020.LHMP.FL.02 | 2020.LHMP.FL.03 | 2020.LHMP.FL.06 | 2020.LHMP.FL.08 | 2020.LHMP.FL.10 | 2020.LHMP.FL.13 |
| 2020.LHMP.FL.16 | 2020.LHMP.FL.17 | | | | |
| Landslide Mitigation Projects Not Implemented | | | | | |
| 2020.LHMP.L.02 | 2020.LHMP.L.03 | 2020.LHMP.L.06 | 2020.LHMP.L.08 | 2020.LHMP.L.10 | 2020.LHMP.L.13 |
| 2020.LHMP.L.15 | | | | | |
| Public Health Emergency Mitigation Projects Not Implemented | | | | | |
| 2020.LHMP.PHE.06 | 2020.LHMP.PHE.09 | | | | |
| Wildland Fire Mitigation Projects Not Implemented | | | | | |
| 2020.LHMP.WF.02 | 2020.LHMP.WF.03 | 2020.LHMP.WF.06 | 2020.LHMP.WF.08 | 2020.LHMP.WF.10 | |

The following projects were added to the LHMP during the current reporting period. *(See the accompanying Mitigation Action Plan Update for details)*

## Projects Added to the LHMP During the Reporting Period

| | | | | | |
|---|---|---|---|---|---|
| Dam Failure Projects Added | | | | | |
| 2020.LHMP.DF.15 | | | | | |
| Earthquake Mitigation Projects Added | | | | | |
| 2020.LHMP.EQ.21 | | | | | |
| Extreme Weather Mitigation Added | | | | | |
| 2020.LHMP.EW.26 | 2020.LHMP.EW.27 | 2020.LHMP.EW.28 | 2020.LHMP.EW.29 | 2020.LHMP.EW.30 | 2020.LHMP.EW.31 |

What obstacles, problems, or delays did any current or ongoing mitigation projects encounter, if any? How were the problems solved?

***No significant obstacles or problems were encountered on the current or ongoing projects that resulted in delays.***

Are current resources appropriate for implementing the plan? (Y) N

Have the outcomes occurred as expected? (Y) N

Have outside agencies participated as proposed? (Y) N

Where shortcomings have been identified, what can the District do to get things back on track?

***No shortcomings have been identified during this reporting period.***

Have there been changes in development trends that could create additional risks? If so, please explain.

***No changes in development trends creating additional risks have been identified during this reporting period.***

LHMP Progress Report Verification

June 8, 2022

Signature Date

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