



COACHELLA VALLEY WATER DISTRICT



2024



HAZARD MITIGATION PLAN UPDATE

VOLUME 1 - CORE PLAN

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Unless otherwise indicated, all photographs courtesy of Coachella Valley Water District.

Definitions and Acronyms

°F—Degrees Fahrenheit

0.2 percent-annual-chance flood—The flood that has a 0.2 percent chance of being equaled or exceeded in any given year; often referred to as the 500-year flood

0.2 percent-annual-chance (500-year) floodplain—The area flooded by the flood that has a 0.2-percent chance of being equaled or exceeded in a given year.

1.0 percent-annual-chance flood—The flood that has a 1 percent chance of being equaled or exceeded in any given year; often referred to as the 100-year flood

1 percent-annual-chance (100-year) floodplain—The area flooded by the flood that has a 1-percent chance of being equaled or exceeded in a given year. The 1-percent-annual-chance flood is the standard used by most federal and state agencies.

ac-ft—Unit of acre-feet

asset—Any man-made or natural feature that has value, including people; buildings; infrastructure, such as bridges, roads, sewers, and water systems; lifelines, such as electricity and communication resources; and environmental, cultural, or recreational features such as parks, wetlands, and landmarks

ASCE—American Society of Engineers

base flood—The flood having a 1% chance of being equaled or exceeded in any given year, also known as the “100-year” or “1 percent annual chance” flood. The base flood is a statistical concept used to ensure that all properties subject to the National Flood Insurance Program (NFIP) are protected to the same degree against flooding.

basin—The area within which all surface water—whether from rainfall, snowmelt, springs, or other sources—flows to a single water body or watercourse. The boundary of a river basin is defined by natural topography, such as hills, mountains, and ridges. Basins are also referred to as “watersheds.”

benefit/cost analysis—A systematic, quantitative method of comparing projected benefits to projected costs of a project or policy. It is used as a measure of cost effectiveness.

benefit—A net project outcome and is usually defined in monetary terms. Benefits may include direct and indirect effects. For the purposes of benefit/cost analysis of proposed mitigation measures, benefits are limited to specific, measurable, risk reduction factors, including reduction in

expected property losses (buildings, contents, and functions) and protection of human life.

BRIC—Building Resilient Infrastructure and Communities

CAL FIRE—California Department of Forestry and Fire Protection

Cal OES—California Office of Emergency Services

capability assessment—An analysis of a community’s capacity to address threats associated with hazards. The assessment includes two components: an inventory of an agency’s mission, programs, and policies, and an analysis of its capacity to carry them out.

CDC—Centers for Disease Control and Prevention

CFR—Code of Federal Regulations

civil unrest—A violent public disturbance of the peace by three or more individuals. Civil unrest is a result of displeasure with or protest against socio-political problems and varies in severity. The tactics can range from permitted protest to criminal activities, all of which can escalate into chaos for those participating in the activities as well as for the general public.

climate change—A change in global or regional climate patterns, in particular a change apparent from the mid to late 20th century onwards and attributed largely to the increased levels of atmospheric carbon dioxide produced by the use of fossil fuels.

Community Lifeline—As defined by FEMA, a community lifeline enables the continuous operation of critical government and business functions and is essential to human health and safety or economic security. The services provided by CVWD are defined under the “Water Systems” community lifeline.

Community Rating System (CRS)—A voluntary program under the NFIP that rewards participating communities (provides incentives) for exceeding the minimum requirements of the NFIP and completing activities that reduce flood hazard risk by providing flood insurance premium discounts.

cyber attack—An attempt to damage, disrupt, or gain unauthorized access to a computer, computer system, or electronic communications network.

DAC—Coachella Valley Disadvantaged Communities Infrastructure Task Force

dam failure—An uncontrolled release of impounded water due to structural deficiencies in dam.

dam—Any artificial barrier or controlling mechanism that can or does impound or divert water.

debris flow—Dense mixtures of water-saturated debris that move down-valley; looking and behaving much like flowing concrete. They form when loose masses of unconsolidated material are saturated, become unstable, and move down slope. The source of water varies but includes rainfall, melting snow or ice, and glacial outburst floods.

DFIRM—Digital Flood Insurance Rate Map

Disaster Mitigation Act (DMA; Public Law 106-390)—The latest federal legislation enacted to encourage and promote proactive, pre-disaster planning as a condition of receiving certain federal financial assistance.

DMA—Disaster Mitigation Act

drought—The cumulative impacts of long periods of dry weather. These can include deficiencies in surface and subsurface water supplies and general impacts on health, well-being, and quality of life.

DWR—Department of Water Resources (California)

EAP—Emergency action plan

earthquake—The shaking of the ground caused by an abrupt shift of rock along a fracture in the earth or a contact zone between tectonic plates.

emergency action plan—A formal document that identifies potential emergency conditions at a dam and specifies actions to be followed to minimize property damage and loss of life. The plan specifies actions the dam owner should take to alleviate problems at a dam. It contains procedures and information to assist the dam owner in issuing early warning and notification messages to responsible downstream

emergency management authorities of the emergency situation. It also contains inundation maps to show emergency management authorities the critical areas for action in case of an emergency.

epicenter—The point on the earth's surface directly above the hypocenter of an earthquake. The location of an earthquake is commonly described by the geographic position of its epicenter and by its focal depth.

epidemic—The spread of an infectious disease beyond a local population, reaching people in a wider geographical area. Several factors determine whether an outbreak will become an epidemic: the ease with which the disease spreads from vectors, such as animals, to people, and the ease with which it spreads from person to person.

exposure—Exposure is defined as the number and dollar value of assets considered to be at risk during the occurrence of a specific hazard.

extreme heat—Temperatures that hover 10 °F or more above the average high temperature for a region and last for several days.

fault—A fracture in the earth's crust along which two blocks of the crust have slipped with respect to each other.

federal disaster declaration—Declarations for events that cause more damage than state and local governments and resources can handle without federal government assistance. A federal disaster declaration puts into motion long-term federal recovery programs, some of which are matched by state programs, to help disaster victims, businesses, and public entities.

FEMA—Federal Emergency Management Agency

fire behavior—Fire behavior refers to the physical characteristics of a fire and is a function of the interaction between the fuel characteristics (such as type of vegetation and structures that could burn), topography, and weather. Variables that affect fire behavior include the rate of spread, intensity, fuel consumption, and fire type (such as underbrush versus crown fire).

FIRM—Flood Insurance Rate Map

flash flood—A flood that occurs with little or no warning when water levels rise at an extremely fast rate

flood control system—A system of open channels, flood control basins, storm drains, catch basins, culverts, low-flow diversion structures, pump stations, debris basins, detention basins, and spreading grounds developed to protect an area from flooding.

Flood Insurance Rate Map (FIRM)—The official maps on which the Federal Emergency Management Agency delineate the Special Flood Hazard Area.

floodplain—The land area along the sides of a river that becomes inundated with water during a flood.

flood—The inundation of normally dry land resulting from the rising and overflowing of a body of water.

floodway—Floodways are areas within a floodplain that are reserved for the purpose of conveying flood discharge without increasing the base flood elevation more than 1 foot. Generally speaking, no development is allowed in floodways, as any structures located there would block the flow of floodwaters.

frequency—How often a hazard of specific magnitude, duration, and/or extent is expected to occur on average. Statistically, a hazard with a 100-year frequency is expected to occur about once every 100 years on average and has a 1 percent chance of occurring any given year. Frequency reliability varies depending on the type of hazard considered.

g—Gravity (%g, percent acceleration force of gravity)

geographic information system (GIS)—A computer software application that relates data regarding physical and other features on the earth to a database for mapping and analysis.

GIS—Geographic Information System

goal—A general guideline that explains what is to be achieved. Goals are usually broad-based, long-term, policy-type statements and represent global visions. Goals help define the benefits that a plan is trying to achieve. The success of a hazard mitigation plan is measured by the degree to which its goals have been met (that is, by the actual benefits in terms of actual hazard mitigation).

greenhouse gases—Methane, nitrous oxide and other gases that trap heat and warm the Earth, as a greenhouse traps heat from the sun.

ground shaking—The result of rapid ground acceleration caused by seismic waves passing beneath buildings, roads, and other structures.

gust—a strong rush of wind

Hazard Mitigation Grant Program (HMGP)—Authorized under Section 202 of the Robert T. Stafford Disaster Relief and Emergency Assistance Act, the HMGP is administered by FEMA and provides grants to states, tribes, and local governments to implement hazard mitigation actions after a major disaster declaration. The purpose of the program is to reduce the loss of life and property due to disasters and to enable mitigation activities to be implemented as a community recovers from a disaster

hazard—A source of potential danger or adverse condition that could harm people and/or cause property damage.

hazardous material—A substance or combination of substances (biological, chemical, radiological, and/or physical) that, because of its quantity, concentration, or physical, chemical or infectious characteristics, has the potential to cause harm to humans, animals, or the environment, either by itself or through interaction with other factors.

high-hazard dam—Dams that can cause loss of human life from the failure or improper operation of the dam.

HMA—Hazard Mitigation Assistance

HMGP—Hazard Mitigation Grant Program

HMP—Hazard Mitigation Plan

hydrology—Hydrology is the analysis of waters of the earth. For example, a flood discharge estimate is developed by conducting a hydrologic study.

hypocenter—The region underground where an earthquake's energy originates

intensity—The measure of the effects of a hazard

inventory—The assets identified in a study region. Inventories include assets that could be lost when a disaster occurs, and community resources are at risk. Assets include people, buildings, transportation, and other valued community resources.

landslide—The movement of masses of loosened rock and soil down a hillside or slope. Slope failures occur when the strength of the soils forming the slope is exceeded by the pressure, such as weight or saturation, acting upon them.

lightning—Lightning is an electrical discharge resulting from the buildup of positive and negative charges within a thunderstorm. When the buildup becomes strong enough, lightning appears as a “bolt,” usually within or between clouds and the ground. A bolt of lightning instantaneously reaches temperatures approaching 50,000 degrees F. The rapid heating and cooling of air near lightning causes thunder. Lightning is a major threat during thunderstorms. In the United States, 75 to 100 Americans are struck and killed by lightning each year

liquefaction—Loosely packed, water-logged sediments losing their strength in response to strong shaking, causing major damage during earthquakes.

local government—Any county, municipality, city, town, township, public authority, school district, special district, intrastate district, council of governments (regardless of whether the council of governments is incorporated as a nonprofit corporation under State law), regional or interstate government entity, or agency or instrumentality of a local government; any Indian tribe or authorized tribal organization, or Alaska Native village or organization; and any rural community, unincorporated town or village, or other public entity.

magnitude—The measure of the strength of an earthquake

mass movement—A collective term for landslides, debris flows, and lahars

mitigation actions—Specific actions to achieve goals and objectives that minimize the effects from a disaster and reduce the loss of life and property.

mitigation—A preventive action taken in advance of an event to reduce or eliminate risk to life or property.

millimeter (mm)—unit of length, equal to one thousandth of a meter

Mw—Moment Magnitude Scale

NCEI—National Centers for Environmental Information

NFIP—National Flood Insurance Program

NRI—National Risk Index

NOAA—National Oceanic and Atmospheric Administration

NWS—National Weather Service

objective—For the purposes of this plan, an objective is defined as a short-term aim that, when combined with other objectives, forms a strategy or course of action to meet a goal. Unlike goals, objectives are specific and measurable.

PA—Public Assistance

pandemic—An epidemic of infectious disease that has spread through human populations across a large region, multiple continents, or worldwide.

PDM—Pre-Disaster Mitigation

peak ground acceleration (PGA)—A measure of the highest amplitude of ground shaking that accompanies an earthquake, based on a percentage of the force of gravity.

PGA—Peak Ground Acceleration

preparedness—Actions that strengthen the capability of government, people, and communities to respond to disasters.

presidential disaster declaration (same as federal disaster declaration)—These declarations are typically made for events that cause more damage than state and local governments and resources can handle without federal government assistance. Generally, no specific dollar loss threshold has been established for such declarations. A presidential disaster declaration puts into motion long-term federal recovery programs, some of which are matched by state programs, designed to help disaster victims, businesses, and public entities.

probability of occurrence—A statistical measure or estimate of the likelihood that a hazard will occur. This probability is generally based on past hazard events in the area and a forecast of events that could occur in the future. A probability factor based on yearly values of occurrence is used to estimate probability of occurrence.

recurrence interval —The recurrence interval (sometimes called the return period) is based on the probability that the given event will be equaled or exceeded in any given year.

residual risk—The risk that remains after controls are accounted for.

return period—The average number of years between occurrences of a hazard (equal to the inverse of the annual likelihood of occurrence).

risk assessment—The process of measuring potential loss of life, personal injury, economic injury, and property damage resulting from hazards. This process assesses the vulnerability of people, buildings, and infrastructure to hazards

risk ranking—Process to score and rank hazards based on the probability that they will occur and the impact they will have if they do.

risk—The estimated impact that a hazard would have on people, services, facilities, and structures in a community. Risk measures the likelihood of a hazard occurring and resulting in an adverse condition that causes injury or damage. Risk is often expressed in relative terms such as a high, moderate, or low likelihood of sustaining damage above a particular threshold due to occurrence of a specific type of hazard. Risk also can be expressed in terms of potential monetary losses associated with the intensity of the hazard.

riverine—Of or produced by a river. Riverine floodplains have readily identifiable channels.

Robert T. Stafford Act—The statutory authority for most federal disaster response activities, especially as they pertain to FEMA and its programs (Robert T. Stafford Disaster Relief and Emergency Assistance Act, Public Law 100-107). Signed into law November 23, 1988; amended by the Disaster Relief Act of 1974 (Public Law 93-288).

SCADA—Supervisory Control and Data Acquisition

SFHA—Special Flood Hazard Area

social vulnerability / socially vulnerable community—Social vulnerability for the purposes of hazard mitigation planning is the susceptibility of social groups to the adverse impacts of natural hazards. Social vulnerability can be determined by

numerous metrics. For the 2024 CVWD HMP, the DAC definition was adopted which defines a socially vulnerable community as a community with an annual median household income of less than 80 percent of the statewide annual median household income.

special flood hazard area—The base floodplain delineated on a Flood Insurance Rate Map. The SFHA is mapped as a Zone A in riverine situations and zone V in coastal situations. The SFHA may or may not encompass all of a community's flood problems

stakeholder—Business leaders, civic groups, academia, non-profit organizations, major employers, managers of critical facilities, farmers, developers, special purpose districts, and others whose actions could impact hazard mitigation.

steep slope—Different communities and agencies define it differently, depending on what it is being applied to, but generally a steep slope is a slope in which the percent slope equals or exceeds 25%. For this study, steep slope is defined as slopes greater than 33%.

technological hazards—Hazards from accidents associated with human activities such as the manufacture, transportation, storage and use of hazardous materials.

terrorism—The unlawful use or threatened use of force or violence against people or property with the intention of intimidating or coercing societies or governments. Terrorism is either foreign or domestic, depending on the origin, base, and objectives of the terrorist or organization.

USACE—U.S. Army Corps of Engineers

USDA—U.S. Department of Agriculture

USDM—U.S. Drought Monitor

USGS—U.S. Geological Survey

vector—An organism (such as an insect or rodent) that transmits pathogens that cause disease

vector-borne illness—Diseases transmitted to people from insects and other animals. These include, but are not limited to, Hanta Virus, Plague, Tularemia, Lyme Disease, West Nile Virus and the Zika Virus.

vulnerability—Assessment of how exposed or susceptible an asset is to damage. Vulnerability depends on an asset's construction, contents, and the economic value of its functions.

watershed—An area that drains downgradient from areas of higher land to areas of lower land to the lowest point.

wildfire—Fires that result in uncontrolled destruction of forests, brush, field crops, grasslands, and real and personal property in non-urban areas. Because of their distance from firefighting resources, they can be difficult to contain and can cause a great deal of destruction.

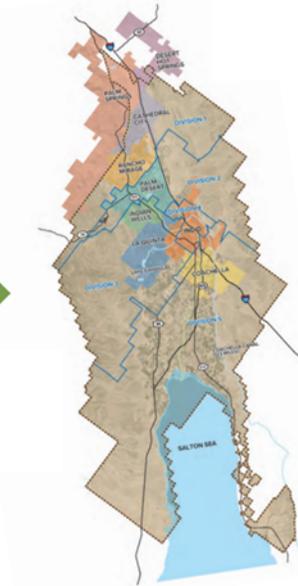
wildland-urban interface area (WUI)—An area susceptible to wildfires and where wildland vegetation and urban or suburban development occur together. An example would be smaller urban areas and dispersed rural housing in forested areas.

Executive Summary

What is Hazard Mitigation?

Hazard mitigation is the use of long-term and short-term policies, programs, projects, and other activities to protect people and alleviate property damage and service interruptions that can result from a natural disaster. The Coachella Valley Water District (CVWD or the District) has developed a hazard mitigation plan to reduce risk for District assets that are vital for its continuity of operations following hazard events. The contents of this plan comply with the requirements of the federal Disaster Mitigation Act, under which communities with approved hazard mitigation plans are eligible for various hazard mitigation programs. These funds primarily fall under the Federal Emergency Management Agency (FEMA) Hazard Mitigation Assistance (HMA) program. Grant programs available to CVWD under HMA include the following:

- **Hazard Mitigation Grant Program (HMGP)**
- **Hazard Mitigation Grant Program Post Fire**
- **Building Resilient Infrastructure and Communities (BRIC)**
- **Pre-Disaster Mitigation (PDM)**
- **Public Assistance (PA) – Categories C through G**



Updating the Coachella Valley Water District Hazard Mitigation Plan

The 2024 Coachella Valley Water District Hazard Mitigation Plan is the second plan developed by the District and includes a number of changes and enhancements:

- An enhanced, updated natural hazard risk assessment
- Updated mitigation goals
- Enhanced stakeholder and public outreach, including a focus on reaching socially vulnerable communities
- Expanded descriptions of future hazard vulnerability based on climate change projections

The development of this plan was funded and managed by the District. Contract consultant support was provided by Black & Veatch.

Plan Development Approach

A small Planning Team was assembled to guide the update of this plan. The Planning Team was made up of District staff and contract consultants. An 18-member Steering Committee was formed from a broad cross-section of CVWD employees with diverse roles including stormwater, operations, and engineering. Coordination with other local, state, and federal agencies involved in hazard mitigation occurred throughout the plan update process. Local county and state hazard mitigation plans were reviewed along with other plans, programs, and policies that support hazard mitigation.

Robust stakeholder and public outreach were guided by the Planning Team and approved by the Steering Committee. The strategy included the Neighboring Jurisdiction Meeting which included emergency management representatives from local, state, and Tribal agencies in the Coachella Valley, participation in local hazard awareness events, focused coordination with the Coachella Valley Disadvantaged Communities Infrastructure Task Force, a hazard mitigation survey, a website, social media outreach and press releases.

Based on the review of existing plans and programs, input received through stakeholder and public outreach, Steering Committee direction, and outcomes of the new risk assessment performed for this update, the Planning Team assembled the 2024 Coachella Valley Water District Hazard Mitigation Plan that meets federal hazard mitigation planning requirements. After pre-adoption approval of the Plan was granted by the California Governor’s Office of Emergency Services and FEMA Region 9, the Coachella Valley Water District Board of Directors formally adopted the plan. Coordination and collaboration throughout the planning process is shown in Figure ES-1.

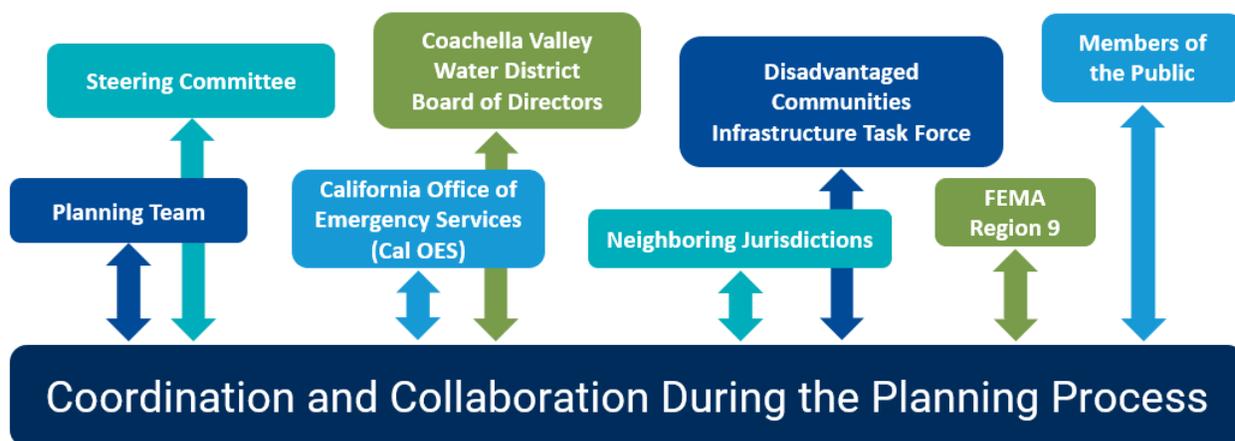


Figure ES-1 Planning Process Coordination

Risk Assessment

Risk assessments in the Plan describe the risks associated with each identified natural hazard of concern. A general profile of the hazard as it may impact the District was developed, and an assessment was performed to determine the number of District facilities the hazard could affect and the potential damage that may result based on replacement cost values. For this update, total and socially vulnerable populations were also considered in the risk assessment.

Hazards of Concern and Risk Ranking

The Steering Committee considered the full list of hazards included in the California State Hazard Mitigation Plan to determine which natural hazards could impact the District. Eight natural hazards were selected and assessed for risk. Six other hazards of interest were also selected for assessment but were not ranked for risk. The natural hazards were ranked using a Priority Risk Index Score. Figure ES-2 shows the hazard risk ranking.

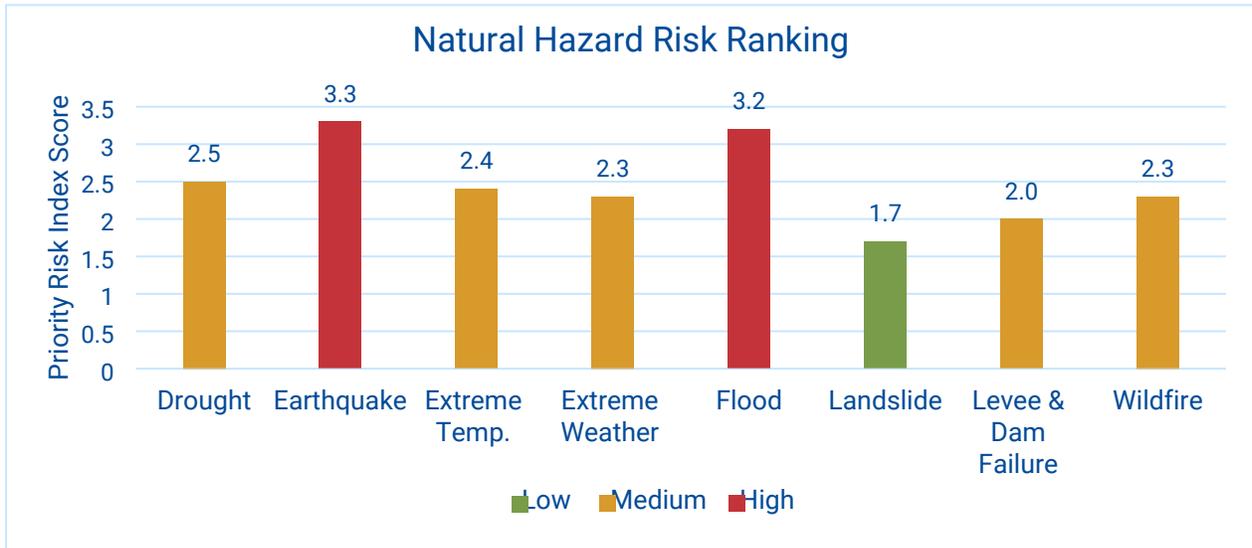


Figure ES-2 Natural Hazard Risk Ranking

Mitigation Goals

The Steering Committee reviewed and updated the mitigation goals from the prior plan to reflect the current focus of the District:

1. Identify, expand, and prioritize hazard mitigation activities to protect CVWD assets from current and future hazard events.
2. Increase the resilience of CVWD by ensuring hazard mitigation and climate change policies, projects and activities receive consideration for funding, integration, and implementation.
3. Engage in a regional mitigation effort by building stronger partnerships between CVWD and local, county and Tribal governments, businesses, residents, community-based organizations, and other entities within the service area.
4. Maintain operational capacity and functionality during natural, technological, or human-caused hazard events through mitigation of current and future CVWD infrastructure, including those providing domestic water, sewer, irrigation, and stormwater, among other services.
5. Identify emerging technology to detect and mitigate risk to critical assets from theft and vandalism that increase vulnerability to hazard events.

Success Stories and Mitigation Actions

During the past five years, all District Enterprise Areas have successfully implemented hazard mitigation and response measures. Highlights are listed below:

Coordination with the Disadvantaged Communities Infrastructure Task Force—The District worked closely with the Disadvantaged Communities Infrastructure Task Force to address the needs of socially vulnerable communities in the planning area. CVWD used construction grants to fund three projects to bring safe, reliable water and fire protection to two disadvantaged communities and one elementary school in the Eastern Coachella Valley.

Drought Mitigation—CVWD implemented significant actions to reduce water demand and protect water supplies during two of the driest years in California’s history.

Wildfire and Drought Mitigation—CVWD increased storage capacities by completing four reservoirs which improved domestic water infrastructure, increased fire flow capacity and enhanced fire protection.

Flood Mitigation—dikes, levee, and 169 miles of storm channels protect 590 square miles of the Coachella Valley from flooding. One major flood protection project was completed during the past five years and construction is underway on two additional major projects. These projects will lessen the burden of flood insurance for some residents in the area.

COVID-19 Response—During the COVID-19 pandemic, the District Board of Directors suspended late penalties and assisted customers with economic hardship through the Help2Others program.

Emergency Response—Construction of CVWD’s Critical Support Services Building was completed which houses several critical departments. The building is designed and built to remain operational after a major earthquake and has emergency backup power.

Building on the success from the last plan, mitigation actions included in this update are designed to reduce or eliminate losses resulting from hazard events. This update has identified 50 mitigation actions led by Enterprise Area. Each action was given a priority ranking based on weighted answers to 15 questions. Many of the actions are within the extensive current capabilities of the CVWD and will not require outside funding. Other actions are identified for potential mitigation grant funding pursuits for implementation.