



Annex N Sacramento Metropolitan Fire District

N.1 Introduction

This Annex details the hazard mitigation planning elements specific to Sacramento Metro Fire District (SMFD or District), a previously participating jurisdiction to the 2021 Sacramento County Local Hazard Mitigation Plan (LHMP) Update. This Annex is not intended to be a standalone document, but appends to and supplements the information contained in the Base Plan document. As such, all sections of the Base Plan, including the planning process and other procedural requirements apply to and were met by the District. This Annex provides additional information specific to SMFD, with a focus on providing additional details on the risk assessment and mitigation strategy for this District.

N.2 Planning Process

As described above, the District followed the planning process detailed in Chapter 3 of the Base Plan. In addition to providing representation on the Sacramento County Hazard Mitigation Planning Committee (HMPC), the District formulated their own internal planning team to support the broader planning process requirements. Internal planning participants, their positions, and how they participated in the planning process are shown in Table N-1. Additional details on plan participation and District representatives are included in Appendix A.

Table N-1 SMFD – Planning Team

Name	Position/Title	How Participated
Ty Bailey	Exec. Director	Project Coordination. Attended meetings. Provided input on hazard identification.
Lisa Barsdale	Fire Marshal	Risk Analysis. Assisted with annex edits and mitigation actions. Attended meetings.
Jeff Frye	Chief Development Officer	Planning & Development. Assisted with annex edits and mitigation actions.
Erin Castleberry	Administrative Specialist	Planning & Development. Assisted with annex edits and mitigation actions.

Coordination with other community planning efforts is paramount to the successful implementation of this LHMP Update. This section provides information on how the District integrated the previously approved 2016 Plan into existing planning mechanisms and programs. Specifically, the District incorporated into or implemented the 2016 LHMP through other plans and programs shown in Table N-2.

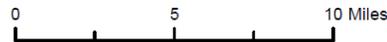
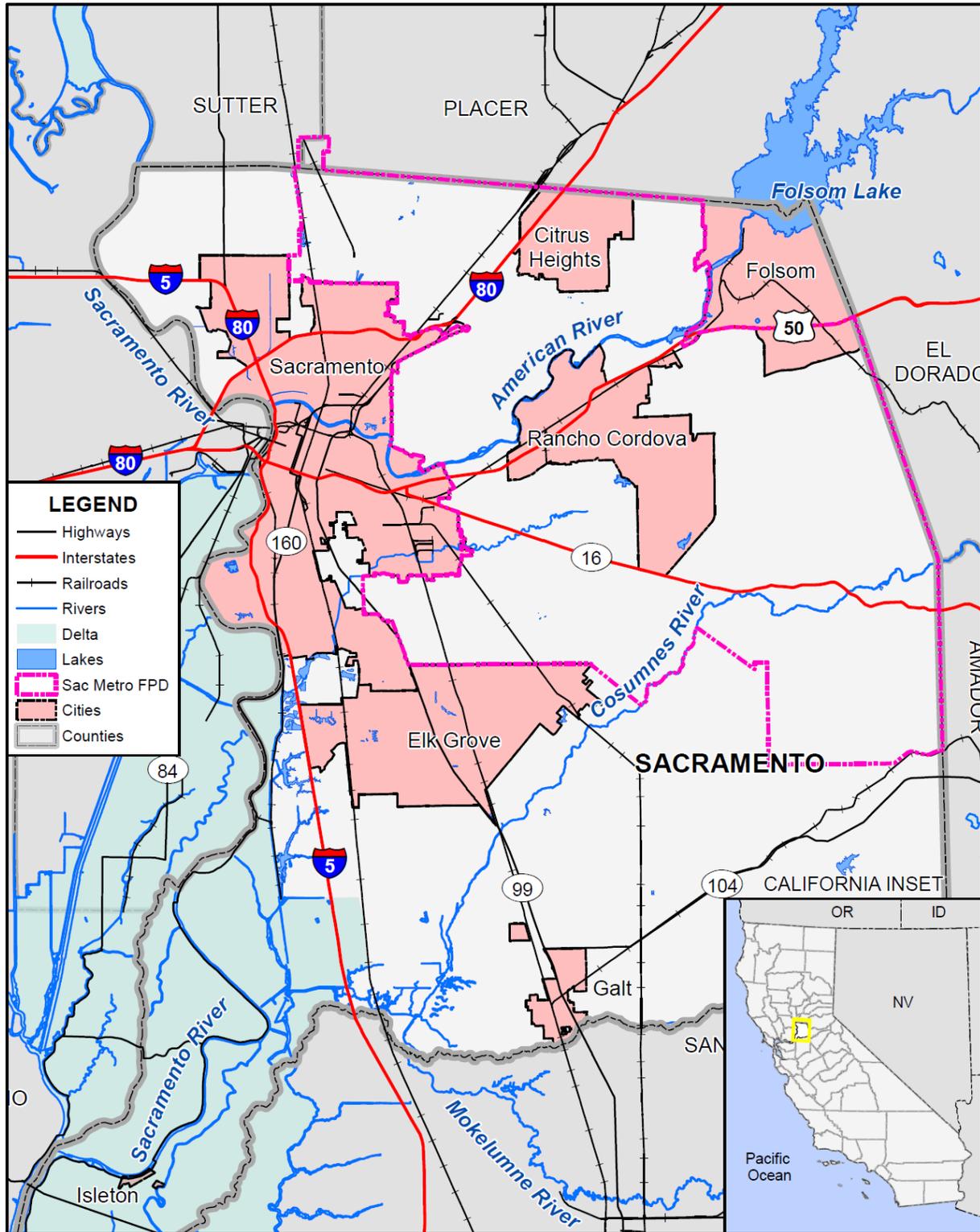
Table N-2 2016 LHMP Incorporation

Planning Mechanism 2016 LHMP Was Incorporated/Implemented In.	Details: How was it incorporated?
Community Risk Reduction Plan	LHMP was used to inform sections of this Plan.

N.3 District Profile

The District profile for the SMFD is detailed in the following sections. Figure N-1 displays a map and the location of the District within Sacramento County.

Figure N-1 SMFD



Data Source: Sacramento Metro Fire Protection District, Sacramento County GIS, Cal-Atlas; Map Date: 09/2020.

N.3.1. Overview and Background

The Sacramento Metropolitan Fire District, "Metro Fire," serves a population of over 738,000 in a 358 square mile service area. Metro Fire is the 7th largest fire agency in the State of California.

Metro Fire is a combination of 16 smaller fire departments that, over the years, merged to create this California Special District. The last merger was in December 2000 when American River Fire Department and Sacramento County Fire Protection District merged to form the Sacramento Metropolitan Fire District, pursuant to Government Code Section 56839. As a special district, Metro Fire is governed by a Board of Directors; each member is elected by the voters within a geographical area, or division, of Metro Fire's operational area.

On any given day, there are 155 on-duty personnel to serve the District's communities. Routine and emergency operations are managed with five (5) Battalion Chiefs with oversight through an Assistant Chief assigned a 24-hour shift. Metro Fire is comprised of three branches – Operations, Administration, and Support Services.

Operations includes Fire & Rescue, Emergency Medical, Training & Safety, Special Operations, Homeland Security, Fire Investigation, and Health & Wellness Divisions. The Administration Branch consists of Economic Development, Finance, Human Resources, and Information Technology Division. Support Services oversees Facilities, Fleet Maintenance, Logistics Division and Community Risk Reduction Division.

The coordinated efforts of all three branches provide the efficiencies necessary to provide all-hazard emergency response and community risk reduction services within the jurisdiction. This in conjunction with the collaborative relationships with County, City and allied partners aid to ensure the highest level of service is provided and maintained for the residents, businesses and visitors.

N.4 Hazard Identification

SMFD identified the hazards that affect the District and summarized their location, extent, frequency of occurrence, potential magnitude, and significance specific to District (see Table N-3).

Table N-3 SMFD—Hazard Identification Assessment

Hazard	Geographic Extent	Likelihood of Future Occurrences	Magnitude/Severity	Significance	Climate Change Influence
Climate Change	Significant	Highly Likely	Limited	Medium	–
Dam Failure	Limited	Unlikely	Catastrophic	High	Medium
Drought & Water Shortage	Extensive	Likely	Critical	High	High
Earthquake	Extensive	Occasional	Catastrophic	Medium	Low
Earthquake Liquefaction	Limited	Occasional	Limited	Medium	Low
Floods: 1%/0.2% annual chance	Limited	Occasional	Catastrophic	High	Medium
Floods: Localized Stormwater	Extensive	Highly Likely	Limited	Medium	Medium
Landslides, Mudslides, and Debris Flow	Limited	Unlikely	Negligible	Low	Medium
Levee Failure	Extensive	Occasional	Critical	High	Medium
Pandemic	Extensive	Likely	Catastrophic	Medium	Medium
Severe Weather: Extreme Cold and Freeze	Extensive	Occasional	Limited	Medium	Medium
Severe Weather: Extreme Heat	Extensive	Highly Likely	Critical	Medium	High
Severe Weather: Heavy Rains and Storms	Extensive	Likely	Limited	Medium	Medium
Severe Weather: Wind and Tornado	Extensive	Highly Likely	Limited	Medium	Low
Subsidence	Limited	Unlikely	Limited	Low	Medium
Volcano	Limited	Unlikely	Negligible	Low	Low
Wildfire	Extensive	Highly Likely	Catastrophic	High	High
Geographic Extent Limited: Less than 10% of planning area Significant: 10-50% of planning area Extensive: 50-100% of planning area		Magnitude/Severity Catastrophic—More than 50 percent of property severely damaged; shutdown of facilities for more than 30 days; and/or multiple deaths Critical—25-50 percent of property severely damaged; shutdown of facilities for at least two weeks; and/or injuries and/or illnesses result in permanent disability Limited—10-25 percent of property severely damaged; shutdown of facilities for more than a week; and/or injuries/illnesses treatable do not result in permanent disability Negligible—Less than 10 percent of property severely damaged, shutdown of facilities and services for less than 24 hours; and/or injuries/illnesses treatable with first aid			
Likelihood of Future Occurrences Highly Likely: Near 100% chance of occurrence in next year, or happens every year. Likely: Between 10 and 100% chance of occurrence in next year, or has a recurrence interval of 10 years or less. Occasional: Between 1 and 10% chance of occurrence in the next year, or has a recurrence interval of 11 to 100 years. Unlikely: Less than 1% chance of occurrence in next 100 years, or has a recurrence interval of greater than every 100 years.		Significance Low: minimal potential impact Medium: moderate potential impact High: widespread potential impact			
		Climate Change Influence Low: minimal potential impact Medium: moderate potential impact High: widespread potential impact			

N.5 Hazard Profile and Vulnerability Assessment

The intent of this section is to profile the District’s hazards and assess the District’s vulnerability separate from that of the Sacramento County Planning Area as a whole, which has already been assessed in Section 4.3 Hazard Profiles and Vulnerability Assessment in the Base Plan. The hazard profiles in the Base Plan discuss overall impacts to the Sacramento County Planning Area and describes the hazard problem description, hazard location and extent, magnitude/severity, previous occurrences of hazard events and the likelihood of future occurrences. Hazard profile information specific to the District is included in this Annex. This vulnerability assessment analyzes the property and other assets at risk to hazards ranked of medium or high significance specific to the District. For more information about how hazards affect the County as a whole, see Chapter 4 Risk Assessment in the Base Plan.

N.5.1. Hazard Profiles

Each hazard vulnerability assessment in Section N.5.3, includes a hazard profile/problem description as to how each medium or high significant hazard (as shown in Table N-3) affects the District and includes information on past hazard occurrences and the likelihood of future hazard occurrence. The intent of this section is to provide jurisdictional specific information on hazards and further describes how the hazards and risks differ across the Sacramento County Planning Area.

N.5.2. Vulnerability Assessment and Assets at Risk

This section identifies the District’s total assets at risk, including values at risk, populations at risk, critical facilities and infrastructure, natural resources, and historic and cultural resources. Growth and development trends are also presented for the District. This data is not hazard specific, but is representative of total assets at risk within the District.

Assets at Risk and Critical Facilities

This section considers the SMFD’s assets at risk, with a focus on key District assets such as critical facilities, infrastructure, and other District assets and their values. With respect to District assets, the majority of these assets are considered critical facilities as defined for this Plan. Critical facilities are defined for this Plan as:

Any facility, including without limitation, a structure, infrastructure, property, equipment or service, that if adversely affected during a hazard event may result in severe consequences to public health and safety or interrupt essential services and operations for the community at any time before, during and after the hazard event.

A critical facility is classified by the following categories: (1) Essential Services Facilities, (2) At-risk Populations Facilities, (3) Hazardous Materials and Solid Waste Facilities.

Table N-4 lists critical facilities and other District assets identified by the District Planning Team as important to protect in the event of a disaster. SMFD’s physical assets, valued at over \$153 million, consist of the buildings and infrastructure to support the District’s operations.

Table N-4 SMFD Critical Facilities, Infrastructure, and Other District Assets

Name of Asset	Facility Type	Replacement Value	Which Hazards Pose Risk
Station 21	Essential	5,441,361	Earthquake
Station 22	Essential	1,014,640	Earthquake
Station 23	Essential	1,361,669	Earthquake
Station 24	Essential	1,615,274	Earthquake
Station 25	Essential	1,879,527	Earthquake
Station 26	Essential	2,521,810	Earthquake
Station 27	Essential	999,352	Earthquake
Station 28	Essential	801,362	Earthquake
Station 29	Essential	6,147,942	Earthquake
Station 31	Essential	1,315,817	Earthquake
Station 32	Essential	6,253,853	Earthquake
Station 41	Essential	1,487,942	Earthquake
Station 42	Essential	851,879	Earthquake
Station 50	Essential	9,023,606	Earthquake, Dam Failure
Station 51	Essential	2,633,071	Earthquake, Flood, Dam Failure
Station 52	Training	1,002,297	Earthquake, Flood, Dam Failure
Station 53	Essential	982,137	Earthquake, Flood, Dam Failure
Station 54	Essential	943,672	Earthquake, Flood, Dam Failure
Station 55	Essential	1,554,895	Earthquake, Wildfire
Station 58	Essential	996,861	Earthquake, Wildfire
Station 59	Essential	1,687,979	Earthquake, Wildfire
Station 61	Essential	1,973,109	Earthquake, Flood, Dam Failure
Station 62	Essential	2,024,654	Earthquake, Dam Failure
Station 63	Essential	904,049	Earthquake, Dam Failure
Station 64	Essential	349,588	Earthquake, Dam Failure
Station 65	Essential	2,458,004	Earthquake, Flood, Dam Failure
Station 66	Essential	2,520,734	Earthquake, Dam Failure
Station 68	Essential	6,460,650	Earthquake, Dam Failure
Station 101	Essential	4,267,007	Earthquake
Station 102	Essential	801,514	Earthquake
Station 103	Essential	837,945	Earthquake
Station 105	Essential	1,960,039	Earthquake, Flood, Dam Failure
Station 106	Essential	2,758,026	Earthquake, Dam Failure
Station 108	Essential	939,409	Earthquake
Station 109	Essential	3,340,863	Earthquake
Station 110	Essential	3,293,177	Earthquake, Dam Failure

Name of Asset	Facility Type	Replacement Value	Which Hazards Pose Risk
Station 111	Essential	6,352,585	Earthquake, Dam Failure
Station 112	Essential	779,918	Earthquake
Station 114	Essential	County Owned	Earthquake
Station 115	Essential	County Owned	Earthquake
Station 116	Essential	1,214,663	Earthquake, Dam Failure
Station 117	Essential	576,391	Earthquake, Dam Failure
Headquarters	Essential	30,645,922	Earthquake, Dam Failure
Logistics	Essential	6,066,361	Earthquake, Dam Failure
Fleet	Essential	13,112,495	Earthquake
Hurley	Leased	5,987,786	Earthquake
Gold Canal	Leased	3,263,704	Earthquake, Dam Failure
Total		\$60,867,322	

Source: SMFD

Natural Resources

SMFD has a variety of natural resources of value to the District. These natural resources parallels that of Sacramento County as a whole. Information can be found in Section 4.3.1 of the Base Plan.

Historic and Cultural Resources

SMFD has a variety of historic and cultural resources of value to the District. These historic and cultural resources parallels that of Sacramento County as a whole. Information can be found in Section 4.3.1 of the Base Plan.

Growth and Development Trends

General growth in the District parallels that of the Sacramento County Planning Area as a whole. Information can be found in Section 4.3.1 of the Base Plan.

Development since 2016

No new facilities were built since 2016. As such, vulnerability of the District is assumed to have not changed since 2016.

Future Development

Station 68 is currently under construction. We will also likely add a station in between 50 and 55 as well. This future development will serve to reduce hazard risk, and these building will be built to code and in locations so as to reduce risk to the structure. As such, a lowering of in vulnerability is likely.

The District has no control over future development in areas the District services. Future development in these areas parallels that of the Sacramento County Planning Area. More general information on growth and development in Sacramento County as a whole can be found in “Growth and Development Trends” in Section 4.3.1 Sacramento County Vulnerability and Assets at Risk of the Base Plan.

N.5.3. Vulnerability to Specific Hazards

This section provides the vulnerability assessment, including any quantifiable loss estimates, for those hazards identified above in Table N-3 as high or medium significance hazards. Impacts of past events and vulnerability of the District to specific hazards are further discussed below (see Section 4.1 Hazard Identification in the Base Plan for more detailed information about these hazards and their impacts on the Sacramento County Planning Area). Methodologies for evaluating vulnerabilities and calculating loss estimates are the same as those described in Section 4.3 of the Base Plan.

An estimate of the vulnerability of the District to each identified priority hazard, in addition to the estimate of likelihood of future occurrence, is provided in each of the hazard-specific sections that follow. Vulnerability is measured in general, qualitative terms and is a summary of the potential impact based on past occurrences, spatial extent, and damage and casualty potential. It is categorized into the following classifications:

- **Extremely Low**—The occurrence and potential cost of damage to life and property is very minimal to nonexistent.
- **Low**—Minimal potential impact. The occurrence and potential cost of damage to life and property is minimal.
- **Medium**—Moderate potential impact. This ranking carries a moderate threat level to the general population and/or built environment. Here the potential damage is more isolated and less costly than a more widespread disaster.
- **High**—Widespread potential impact. This ranking carries a high threat to the general population and/or built environment. The potential for damage is widespread. Hazards in this category may have occurred in the past.
- **Extremely High**—Very widespread with catastrophic impact.

Depending on the hazard and availability of data for analysis, this hazard specific vulnerability assessment also includes information on values at risk, critical facilities and infrastructure, populations at risk, and future development.

Power Outage/Power Failure

An impact of almost all hazards below relates to power outage and/or power failures. The US power grid crisscrosses the country, bringing electricity to homes, offices, factories, warehouses, farms, traffic lights and even campgrounds. According to statistics gathered by the Department of Energy, major blackouts are on the upswing. Incredibly, over the past two decades, blackouts impacting at least 50,000 customers have increased 124 percent. The electric power industry does not have a universal agreement for classifying disruptions. Nevertheless, it is important to recognize that different types of outages are possible so that plans may be made to handle them effectively. In addition to blackouts, brownouts can occur. A brownout is an intentional or unintentional drop in voltage in an electrical power supply system. Intentional brownouts are used for load reduction in an emergency. Electric power disruptions can be generally

grouped into two categories: intentional and unintentional. More information on types of power disruptions can be found in Section 4.3.2 of the Base Plan.

Public Safety Power Shutoff (PSPS)

A new intentional disruption type of power outage/failure event has recently occurred in California. In recent years, several wildfires have started as a result of downed power lines or electrical equipment. This was the case for the Camp Fire in 2018. As a result, California's three largest energy companies (including PG&E), at the direction of the California Public Utilities Commission (CPUC), are coordinating to prepare all Californians for the threat of wildfires and power outages during times of extreme weather. To help protect customers and communities during extreme weather events, electric power may be shut off for public safety in an effort to prevent a wildfire. This is called a PSPS. More information on PSPS criteria can be found in Section 4.3.2 of the Base Plan.

Metro Fire's Emergency Operations Plan (EOP) addresses power outages in Incident Annex 9 – Utility and Power Failure Response. The purpose of this Incident Annex is to provide resources and support to affiliated agencies for emergent needs in Metro Fire's jurisdiction in the event of a major electrical power or natural gas supply failure. The Incident Annex provides guidelines for planning and reducing the impacts associated with large utility failures and ensuring that emergency services are not interrupted. The Incident Annex includes information on standard operating procedures for emergency routes, movement of responders, victims and supplies associated with response and recovery efforts following a major disaster. Also included is information on major response services critical to the welfare of the citizens living and conducting business within Metro Fire's boundaries. The Incident Annex is responsible for coordinating with all affiliated agencies to manage the auxiliary needs before (preparedness), during (response), and after (recovery and mitigation) the event.

This Incident Annex was last updated in 2016 and does not specifically address PSPS planned power outages, which began in 2019. Metro Fire attests that future updates to Incident Annex 9 will specifically address PSPS planned outages in its scope.

Metro Fire has 26 facilities with emergency back-ups generators, however 6 of them are in poor condition. There are 19 facilities without any form of emergency back-up power.

Climate Change

Likelihood of Future Occurrence—Highly Likely

Vulnerability—Medium

Hazard Profile and Problem Description

Climate change adaptation is a key priority of the State of California. The 2018 State of California Multi-Hazard Mitigation Plan stated that climate change is already affecting California. Sea levels have risen by as much as seven inches along the California coast over the last century, increasing erosion and pressure on the state's infrastructure, water supplies, and natural resources. The State has also seen increased average temperatures, more extreme hot days, fewer cold nights, a lengthening of the growing season, shifts in the water cycle with less winter precipitation falling as snow, and earlier runoff of both snowmelt and

rainwater in the year. In addition to changes in average temperatures, sea level, and precipitation patterns, the intensity of extreme weather events is also changing.

Location and Extent

Climate change is a global phenomenon. It is expected to affect the whole of the District, Sacramento County, and State of California. There is no scale to measure the extent of climate change. Climate change exacerbates other hazards, such as drought, extreme heat, flooding, wildfire, and others. The speed of onset of climate change is very slow. The duration of climate change is not yet known, but is feared to be tens to hundreds of years.

Past Occurrences

Climate change has never been directly linked to any declared disasters. While the District noted that climate change is of concern, no specific impacts of climate change could be recalled. The District and HMPC members did, however, note that in Sacramento County, the strength of storms does seem to be increasing and the temperatures seem to be getting hotter.

Vulnerability to and Impacts from Climate Change

The California Adaptation Planning Guide (APG) prepared by California OES and CNRA was developed to provide guidance and support for local governments and regional collaboratives to address the unavoidable consequences of climate change. California's APG: Understanding Regional Characteristics has divided California into 11 different regions based on political boundaries, projected climate impacts, existing environmental setting, socioeconomic factors and regional designations. Sacramento County falls within the North Sierra Region characterized as a sparsely settled mountainous region where the region's economy is primarily tourism-based. The region is rich in natural resources, biodiversity, and is the source for the majority of water used by the state. This information can be used to guide climate adaptation planning in the District and Sacramento County Planning Area.

The California APG: Understanding Regional Characteristics identified the following impacts specific to the North Sierra region in which the Sacramento County Planning Area is part of:

- Temperature increases
- Decreased precipitation
- Reduced snowpack
- Reduced tourism
- Ecosystem change
- Sensitive species stress
- Increased wildfire

The District noted that climate change could increase outdoor fires in general not necessarily just wildfires. Also, if snowpack melt increases its logical to assume rescue calls along the rivers could also increase. For EMS, medical calls for dehydration/exposure could increase.

Assets at Risk

The District noted that its facilities will most likely not be at risk from climate change.

Dam Failure

Likelihood of Future Occurrence–Unlikely

Vulnerability–High

Hazard Profile and Problem Description

Dams are manmade structures built for a variety of uses including flood protection, power generation, agriculture, water supply, and recreation. When dams are constructed for flood protection, they are usually engineered to withstand a flood with a computed risk of occurrence. For example, a dam may be designed to contain a flood at a location on a stream that has a certain probability of occurring in any one year. If prolonged periods of rainfall and flooding occur that exceed the design requirements, that structure may be overtopped or fail. Overtopping is the primary cause of earthen dam failure in the United States.

Location and Extent

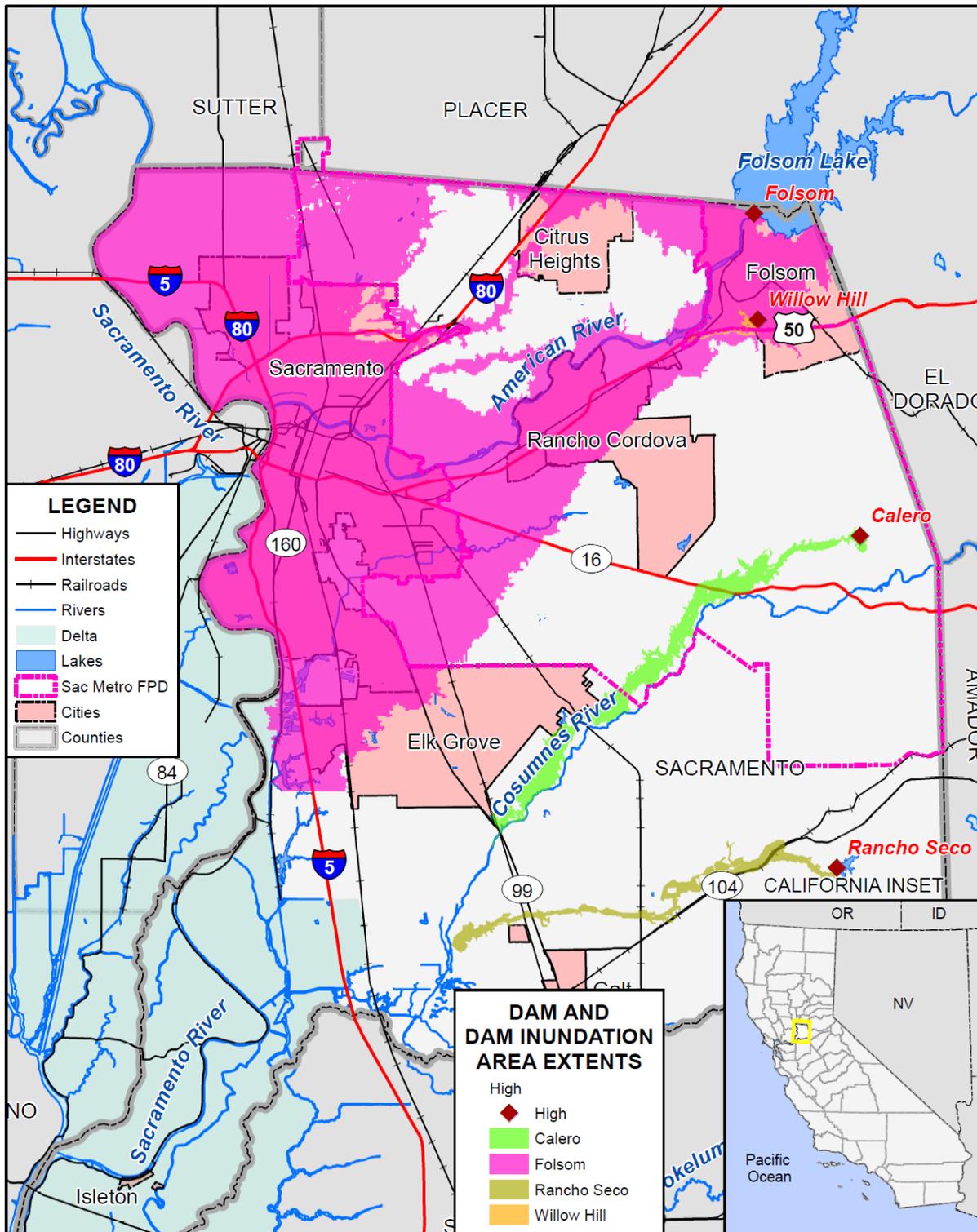
Dam failure is a natural disaster from two perspectives. First, the inundation from released waters resulting from dam failure is related to naturally occurring floodwaters. Second, a total dam failure would most probably happen as a consequence of the natural disaster triggering the event, such as an earthquake. There is no scale with which to measure dam failure. However, Cal DWR Division of Safety of Dams (DOSD) assigns hazard ratings to dams within the State that provides information on the potential impact should a dam fail. The following two factors are considered when assigning hazard ratings: existing land use and land use controls (zoning) downstream of the dam. Dams are classified in four categories that identify the potential hazard to life and property: Low, Significant, High, and Extremely High. These were discussed in more detail in Section 4.3.7 of the Base Plan.

While a dam may fill slowly with runoff from winter storms, a dam break has a very quick speed of onset. The duration of dam failure is generally not long – only as long as it takes to empty the reservoir of water the dam held back. The District would be affected for as long as the flood waters from the dam failure took to drain downstream.

Based on dam inundation data obtained from CA DWR and Cal OES the was discussed in Section 4.3.7 of the Base Plan, dams inside the County that can affect the District can be seen on Figure N-2. Dams outside the County that can affect the District can be seen on Figure N-3. The Folsom Dam 235,000 cfs scenario discussed in Section 4.3.7 of the Base Plan is shown in Figure N-3. While Figure N-2 and Figure N-3 illustrate dam inundation areas from an actual dam failure, Figure N-3, the Folsom 235,000 cfs scenario reflects the likely inundation area associated with a possible “super” release of water from Folsom. This updated Folsom scenario reflects the Folsom dam improvements which make a dam failure unlikely, with any resulting downstream inundation from Folsom associated with an intentional release of water from the dam. It is anticipated that the worst case scenario would be a 235,000 cfs release, which is comparable to a 200-year flood. The area labeled Folsom 235,000 CFS Release Riverine Inundation is the American

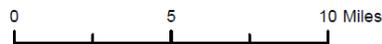
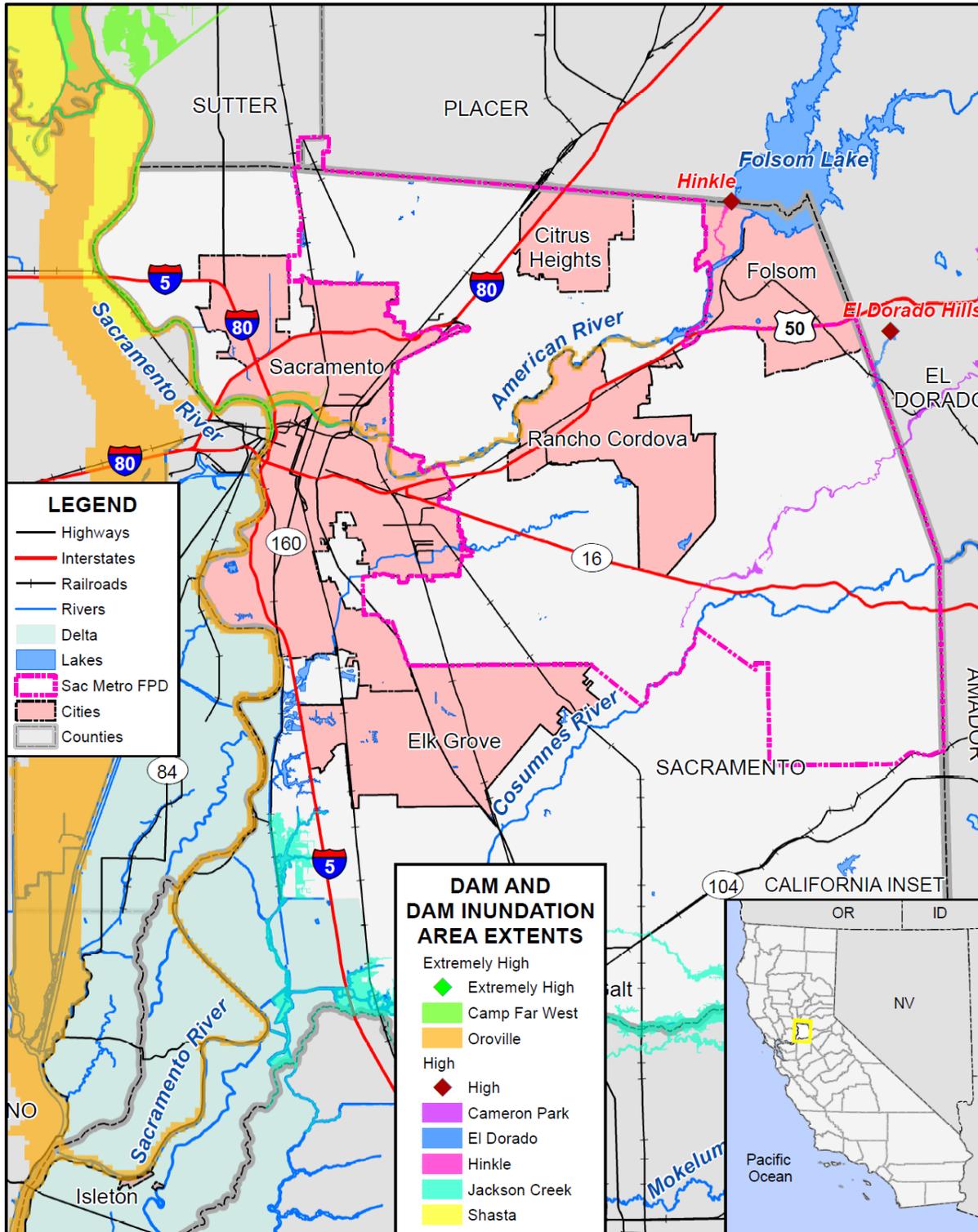
River corridor and the backwater of the Natomas East Main Drainage Channel (aka Steelhead Creek) to the flood control pump station.

Figure N-2 SMFD – Dam Inundation Areas from Dams Inside the County



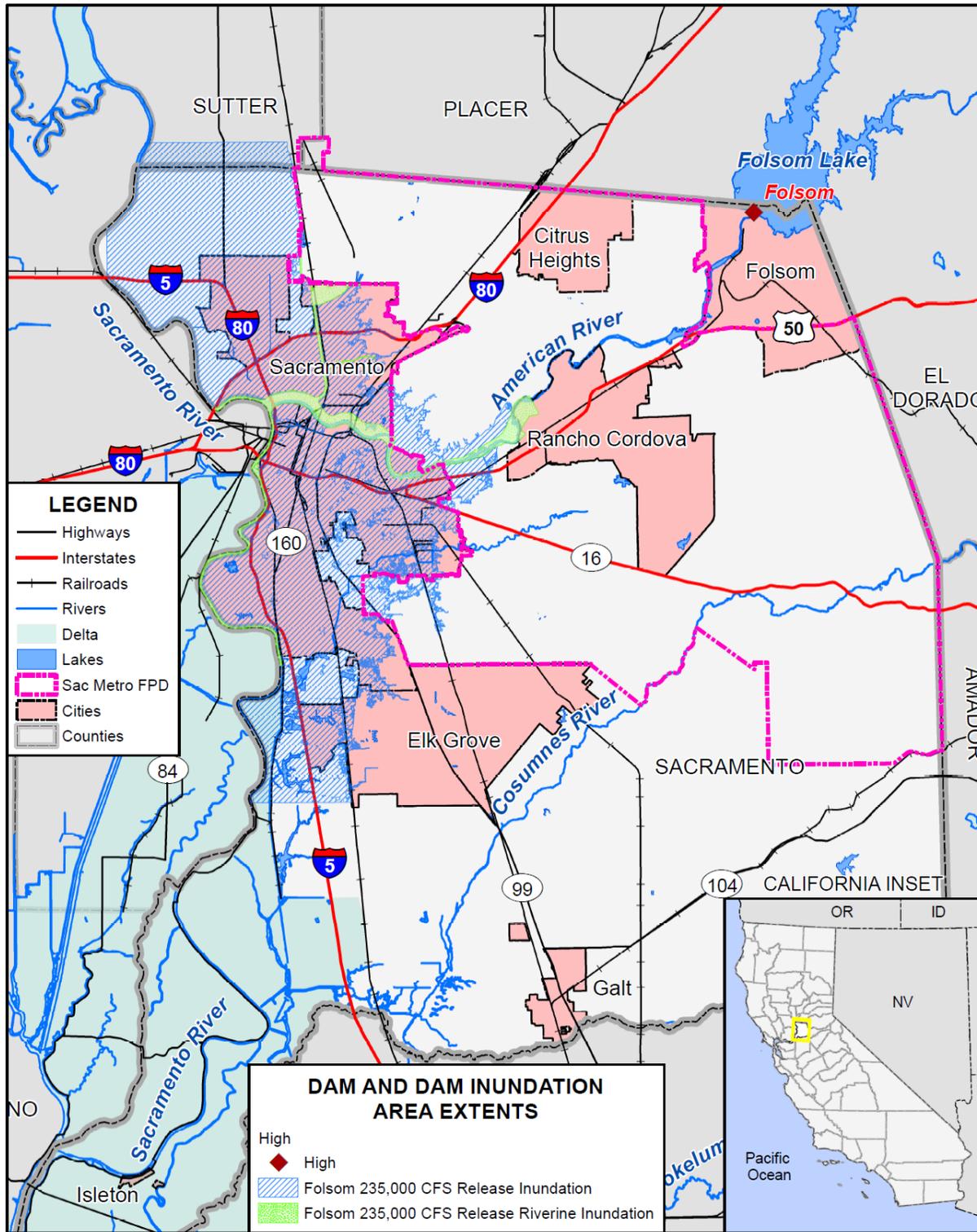
Data Source: County-provided dam inundation data (FOLSOM_DAM_INUNDATION_AREA.shp 2016), DWR DSOD Data 2020 and Cal OES Dam Status 10/2017, Sacramento County GIS, Cal-Atlas; Map Date: 2/2021.

Figure N-3 SMFD – Dam Inundation Areas from Dams Outside the County



Data Source: DWR DSOD Data 2020 and Cal OES Dam Status 10/2017, Sacramento Metro Fire Protection District, Sacramento County GIS, Cal-Atlas; Map Date: 9/2020.

Figure N-4 SMFD – Dam Inundation Areas from Folsom Dam 235,000 cfs Scenario



Data Source: County-provided dam inundation data (CA_DWR_200YEAR_FLOODPLAIN.zip 2020), DWR DSOD Data 2020, Sacramento County GIS, Cal-Atlas; Map Date: 02/2021.

Past Occurrences

There has been no federal or state disaster declarations for dam failure in the County. Metro Fire responded to the Oroville Spillway incident through agreements with Cal Fire and Cal OES. Direct costs were reimbursed through the agreements and mutual aid system. The District noted no other dam failure occurrences that have affected the District.

Vulnerability to and Impacts from Dam Failure

Dam failure flooding would vary by community depending on which dam fails and the nature and extent of the dam failure and associated flooding. Impacts to the District from a dam failure flood could include loss of life and injury, flooding and damage to property and structures, damage to critical facilities and infrastructure, loss of natural resources, and all other flood related impacts. Additionally, mass evacuations and associated economic losses can also be significant.

The District noted risk to Folsom Dam. Operationally, Metro Fire overburdened and would likely need mutual aid assistance. If stations were rendered inoperable due to inundation, apparatus wouldn't be deployable.

Assets at Risk

The District noted the following assets at risk to dam failure as shown in Table N-5.

Table N-5 SMFD – Assets at Risk to Dam Failure

Name of Asset	Facility Type	Replacement Value (\$)
Station 50	Essential	9,023,606
Station 51	Essential	2,633,071
Station 52	Training	1,002,297
Station 53	Essential	982,137
Station 54	Essential	943,672
Station 61	Essential	1,973,109
Station 62	Essential	2,024,654
Station 63	Essential	904,049
Station 64	Essential	349,588
Station 65	Essential	2,458,004
Station 66	Essential	2,520,734
Station 68	Essential	6,460,650
Station 105	Essential	1,960,039
Station 106	Essential	2,758,026
Station 110	Essential	3,293,177
Station 111	Essential	6,352,585
Station 116	Essential	1,214,663

Name of Asset	Facility Type	Replacement Value (\$)
Station 117	Essential	576,391
Headquarters	Essential	30,645,922
Logistics	Essential	6,066,361
Gold Canal	Leased	3,263,704
Total		\$81,060,207

Source: SMFD

Drought & Water Shortage

Likelihood of Future Occurrence–Likely

Vulnerability–High

Hazard Profile and Problem Description

Drought is a complex issue involving many factors—it occurs when a normal amount of precipitation and snow is not available to satisfy an area’s usual water-consuming activities. Drought can often be defined regionally based on its effects. Drought is different than many of the other natural hazards in that it is not a distinct event and usually has a slow onset. Drought can severely impact a region both physically and economically. Drought affects different sectors in different ways and with varying intensities. Adequate water is the most critical issue and is critical for agriculture, manufacturing, tourism, recreation, and commercial and domestic use. As the population in the area continues to grow, so will the demand for water.

Location and Extent

Drought and water shortage are regional phenomenon. The whole of the County, as well as the whole of the District, is at risk. The US Drought Monitor categorizes drought conditions with the following scale:

- None
- D0 – Abnormally dry
- D1 – Moderate Drought
- D2 – Severe Drought
- D3 – Extreme drought
- D4 – Exceptional drought

Drought has a slow speed of onset and a variable duration. Drought can last for a short period of time, which does not usually affect water shortages and for longer periods. Should a drought last for a long period of time, water shortage becomes a larger issue. Current drought conditions in the District and the County are shown in Section 4.3.8 of the Base Plan.

Past Occurrences

There has been two state and one federal disaster declaration due to drought since 1950. This can be seen in Table N-6.

Table N-6 Sacramento County – State and Federal Disaster Declarations Summary 1950-2020

Disaster Type	State Declarations		Federal Declarations	
	Count	Years	Count	Years
Drought	2	2008, 2014	1	1977

Source: Cal OES, FEMA

Since drought is a regional phenomenon, past occurrences of drought for the District are the same as those for the County and includes 5 multi-year droughts over an 85-year period. Details on past drought occurrences can be found in Section 4.3.8 of the Base Plan.

Vulnerability to and Impacts from Drought and Water Shortage

Based on historical information, the occurrence of drought in California, including the District, is cyclical, driven by weather patterns. Drought has occurred in the past and will occur in the future. Periods of actual drought with adverse impacts can vary in duration, and the period between droughts can be extended. Although an area may be under an extended dry period, determining when it becomes a drought is based on impacts to individual water users. Drought impacts are wide-reaching and may be economic, environmental, and/or societal. Tracking drought impacts can be difficult.

The most significant qualitative impacts associated with drought in the Planning Area are those related to water intensive activities such as agriculture, wildfire protection, municipal usage, commerce, tourism, recreation, and wildlife preservation. Mandatory conservation measures are typically implemented during extended droughts. Drought conditions can also cause soil to compact and not absorb water well, potentially making an area more susceptible to flooding. With a reduction in water, water supply issues based on water rights becomes more evident. Climate change may create additional impacts to drought and water shortage in the County and the District.

During periods of drought, vegetation can dry out which increases fire risk. Drought that occurs during periods of extreme heat and high winds can cause Public Safety Power Shutoff (PSPS) events to be declared in the County. More information on power outage and failure can be found in the discussion at the beginning of Section N.5.3, as well as in Section 4.3.3 of the Base Plan.

The District noted that access to water is an issue for wildland fire suppression. Helicopter operations rely largely on surface water for suppression. Also, decreasing water levels in rivers make our boat inoperable for rescue operations. Shallow bottom boats may be required

Assets at Risk

The District noted that no facilities were at risk from drought directly. Drought can exacerbate wildfire, which could affect both District property and those the District is sworn to protect. More information on these facilities can be found in the Assets at Risk of the Wildfire section below.

Earthquake

Likelihood of Future Occurrence—Occasional

Vulnerability—Medium

Hazard Profile and Problem Description

An earthquake is caused by a sudden slip on a fault. Stresses in the earth's outer layer push the sides of the fault together. Stress builds up, and the rocks slip suddenly, releasing energy in waves that travel through the earth's crust and cause the shaking that is felt during an earthquake. Earthquakes can cause structural damage, injury, and loss of life, as well as damage to infrastructure networks, such as water, power, gas, communication, and transportation. Earthquakes may also cause collateral emergencies including dam and levee failures, seiches, hazmat incidents, fires, avalanches, and landslides. The degree of damage depends on many interrelated factors. Among these are: the magnitude, focal depth, distance from the causative fault, source mechanism, duration of shaking, high rock accelerations, type of surface deposits or bedrock, degree of consolidation of surface deposits, presence of high groundwater, topography, and the design, type, and quality of building construction.

Location and Extent

The amount of energy released during an earthquake is usually expressed as a magnitude and is measured directly from the earthquake as recorded on seismographs. An earthquake's magnitude is expressed in whole numbers and decimals (e.g., 6.8). Seismologists have developed several magnitude scales, as discussed in Section 4.3.9 of the Base Plan. Geological literature indicates that no major active faults transect the County; however, there are several subsurface faults in the Delta. The Midland fault, buried under alluvium, extends north of Bethel Island in the Delta to the east of Lake Berryessa and is considered inactive but possibly capable of generating a near 7.0 (Richter Scale) earthquake. This magnitude figure is speculative based on an 1895 earthquake measuring 6.9 on the Richter Scale with an epicenter possibly in the Midland Fault vicinity. However, oil and gas companies exploring the area's energy potential have identified several subsurface faults, none of which show any recent surface rupture. A second, presumably inactive, fault is in the vicinity of Citrus Heights near Antelope Road. This fault's only exposure is along a railroad cut where offsetting geologic beds can be seen. Neither the lateral extent of the trace, the magnitude of the offset, nor the age of faulting has been determined. To the east, the Bear Mountain fault zone trends northwest-southeast through Amador and El Dorado Counties. Geologists believe this series of faults has not been active in historic time.

Another measure of earthquake severity is intensity. Intensity is an expression of the amount of shaking at any given location on the ground surface. Seismic shaking is typically the greatest cause of losses to structures during earthquakes. The District is located in an area where few earthquakes of significant magnitude occur, so both magnitude and intensity of earthquakes are expected to remain low. Seismic shaking maps for the area show Sacramento County and the District fall within a low to moderate shake risk, with most of the moderate risk in the Delta area of the County.

Past Occurrences

There have been no past federal or state disaster declarations from this hazard. The District noted no past occurrences of earthquakes or that affected the District in any meaningful way.

Vulnerability to and Impacts from Earthquake

The combination of plate tectonics and associated California coastal mountain range building geology generates earthquake as a result of the periodic release of tectonic stresses. Sacramento County lies in the center of the North American and Pacific tectonic plate activity. There have been earthquakes as a result of this activity in the historic past, and there will continue to be earthquakes in the future of the California north coastal mountain region.

Fault ruptures itself contributes very little to damage unless the structure or system element crosses the active fault; however, liquefaction can occur further from the source of the earthquake. In general, newer construction is more earthquake resistant than older construction due to enforcement of improved building codes. Manufactured buildings can be very susceptible to damage because their foundation systems are rarely braced for earthquake motions. Locally generated earthquake motions and associated liquefaction, even from very moderate events, tend to be more damaging to smaller buildings, especially those constructed of unreinforced masonry (URM) and soft story buildings. A majority of Metro Fire's older stations are structurally masonry. Whether or not its reinforced is unknown.

The Uniform Building Code (UBC) identifies four seismic zones in the United States. The zones are numbered one through four, with Zone 4 representing the highest level of seismic hazard. The UBC establishes more stringent construction standards for areas within Zones 3 and 4. All of California lies within either Zone 3 or Zone 4. The SMFD is within the less hazardous Zone 3.

Impacts from earthquake in the District will vary depending on the fault that the earthquake occurs on, the depth of the earthquake strike, and the intensity of shaking. Large events could cause damages to infrastructure, critical facilities, residential and commercial properties, and possible injuries or loss of life.

The District noted that the Search and Rescue Team would be at risk if they were sent out to respond to an earthquake event.

Assets at Risk

SMFD has assets at risk to earthquake, as shown on Table N-7.

Table N-7 SMFD – Assets at Risk to Earthquake

Name of Asset	Facility Type	Replacement Value (\$)
Station 21	Essential	5,441,361
Station 22	Essential	1,014,640
Station 23	Essential	1,361,669
Station 24	Essential	1,615,274

Name of Asset	Facility Type	Replacement Value (\$)
Station 25	Essential	1,879,527
Station 26	Essential	2,521,810
Station 27	Essential	999,352
Station 28	Essential	801,362
Station 29	Essential	6,147,942
Station 31	Essential	1,315,817
Station 32	Essential	6,253,853
Station 41	Essential	1,487,942
Station 42	Essential	851,879
Station 50	Essential	9,023,606
Station 51	Essential	2,633,071
Station 52	Training	1,002,297
Station 53	Essential	982,137
Station 54	Essential	943,672
Station 55	Essential	1,554,895
Station 58	Essential	996,861
Station 59	Essential	1,687,979
Station 61	Essential	1,973,109
Station 62	Essential	2,024,654
Station 63	Essential	904,049
Station 64	Essential	349,588
Station 65	Essential	2,458,004
Station 66	Essential	2,520,734
Station 68	Essential	6,460,650
Station 101	Essential	4,267,007
Station 102	Essential	801,514
Station 103	Essential	837,945
Station 105	Essential	1,960,039
Station 106	Essential	2,758,026
Station 108	Essential	939,409
Station 109	Essential	3,340,863
Station 110	Essential	3,293,177
Station 111	Essential	6,352,585
Station 112	Essential	779,918
Station 114	Essential	County Owned
Station 115	Essential	County Owned
Station 116	Essential	1,214,663

Name of Asset	Facility Type	Replacement Value (\$)
Station 117	Essential	576,391
Headquarters	Essential	30,645,922
Logistics	Essential	6,066,361
Fleet	Essential	13,112,495
Hurley	Leased	5,987,786
Gold Canal	Leased	3,263,704
Total		\$60,867,322

Source: SMFD

Earthquake: Liquefaction

Likelihood of Future Occurrence—Occasional

Vulnerability—Medium

Hazard Profile and Problem Description

Liquefaction can be defined as the loss of soil strength or stiffness due to a buildup of pore-water pressure during a seismic event and is associated primarily with relatively loose, saturated fine- to medium-grained unconsolidated soils. Seismic ground shaking of relatively loose, granular soils that are saturated or submerged can cause the soils to liquefy and temporarily behave as a dense fluid. If this layer is at the surface, its effect is much like that of quicksand for any structure located on it. If the liquefied layer is in the subsurface, the material above it may slide laterally depending on the confinement of the unstable mass. Liquefaction is caused by a sudden temporary increase in pore-water pressure due to seismic densification or other displacement of submerged granular soils. Liquefiable soil conditions are not uncommon in alluvial deposits in moderate to large canyons and could also be present in other areas of alluvial soils where the groundwater level is shallow (i.e., 50 feet below the surface). Bedrock units, due to their dense nature, are unlikely to present a liquefaction hazard.

Location and Extent

There is no scientific scale for earthquake related liquefaction. The speed of onset is short, as is the duration. The effects from liquefaction can last for days, weeks, months or even years as areas of the County are rebuilt or leveed areas are dewatered, and the levees rebuilt. In Sacramento County, the Delta and areas of downtown Sacramento are at risk to liquefaction. The Delta sits atop a blind fault system on the western edge of the Central Valley. Moderate earthquakes in 1892 near Vacaville and in 1983 near Coalinga demonstrate the seismic potential of this structural belt. The increasing height of the levee system has prompted growing concern about the seismic stability of the levees. The concern is based on the proximity of faulting, the nature of the levee foundations, and the materials used to build the levees. Many levees consist of uncompacted weak local soils that may be unstable under seismic loading. The presence of sand and silt in the levees and their foundations indicates that liquefaction is also a possibility. No District facilities are located in these areas.

Past Occurrences

There have been no past federal or state disaster declarations from this hazard. The District noted no past occurrences of earthquake liquefaction or that affected the District in any meaningful way.

Vulnerability to and Impacts from Liquefaction

Earthquake is discussed above, but is primarily focused on the vulnerability of buildings and people from earthquake shaking. This section deals with a secondary hazard associated with earthquake – the possible collapse of structural integrity of the ground underneath liquefaction prone areas. In Sacramento County, two of these areas have been identified: downtown Sacramento and the Delta area, which could lead to a possible collapse of delta levees and any above ground structures. While this levee failure differs from the levee failure discussion below which generally focuses on levee failure due to high water conditions or other types of structural failure, the resulting impacts would be similar and include those related to a large flood event. Though no facilities are at risk, the District noted that there would be an increased call volume for rescue subject to secondary effects.

Assets at Risk

Though no facilities are at risk, the District noted that there would be an increased call volume for rescue subject to secondary effects.

Flood: 1%/0.2% Annual Chance

Likelihood of Future Occurrence–Occasional/Unlikely
Vulnerability–High

Hazard Profile and Problem Description

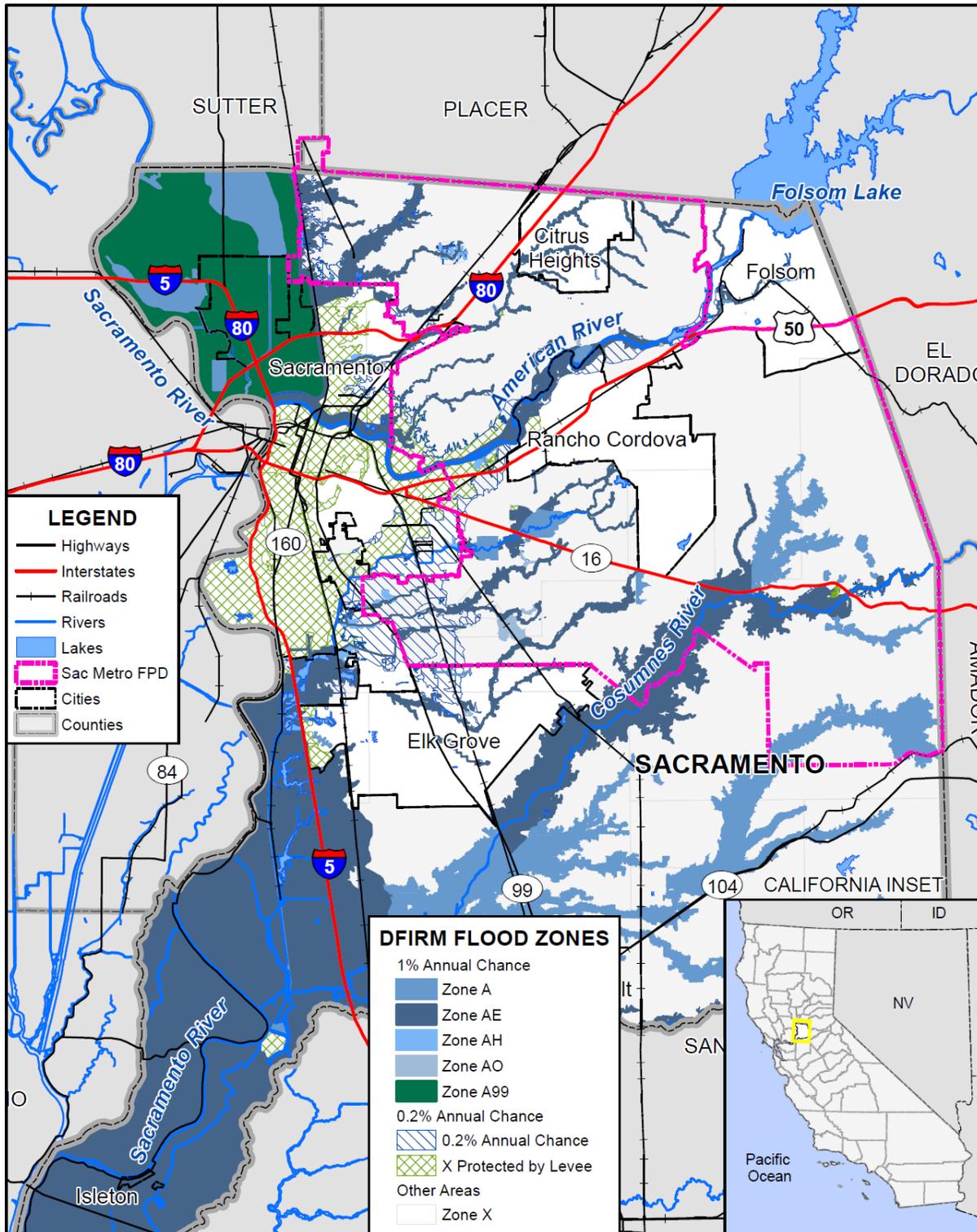
This hazard analyzes the FEMA DFIRM 1% and 0.2% annual chance floods. These tend to be the larger floods that can occur in the County or in the District, and have caused damages in the past. Flooding is a significant problem in Sacramento County and the District. Historically, the District has been at risk to flooding primarily during the winter and spring months when river systems in the County swell with heavy rainfall and snowmelt runoff. Normally, storm floodwaters are kept within defined limits by a variety of storm drainage and flood control measures. Occasionally, extended heavy rains result in floodwaters that exceed normal high-water boundaries and cause damage.

As previously described in Section 4.3.11 of the Base Plan, the Sacramento County Planning Area and the SMFD have been subject to historical flooding.

Location and Extent

The SMFD has areas located in the 1% and 0.2% annual chance floodplain. This is seen in Figure N-5.

Figure N-5 SMFD – FEMA DFIRM Flood Zones



Data Source: FEMA NFHL 07/19/2018, Sacramento Metro Fire Protection District, Sacramento County GIS, Cal-Atlas; Map Date: 09/2020.

Table N-8 details the DFIRM mapped flood zones within the 1% annual chance flood zone as well as other flood zones located within the District.

Table N-8 SMFD– DFIRM Flood Hazard Zones

Flood Zone	Description	Flood Zone Present in the District
A	100-year Flood: No base flood elevations provided	X
AE	100-year Flood: Base flood elevations provided	X
AH	An area inundated by 1% annual chance flooding (usually an area of ponding), for which BFEs have been determined; flood depths range from 1 to 3 feet	X
AO	Areas subject to inundation by 100-year shallow flooding (usually sheet flow on sloping terrain) where average depths are between one and three feet	X
A99	Areas with a 1% annual chance of flooding that will be protected by a Federal flood control system where construction has reached specified legal requirements. No depths or base flood elevations are shown within these zones	X
Shaded X	500-year flood the areas between the limits of the 1% annual chance flood and the 0.2-percent-annual-chance (or 500-year) flood	X
X Protected by Levee	An area determined to be outside the 500-year flood and protected by levee from 100-year flood	X
X	Outside of flood zones	X

Source: FEMA

Additionally, flood extents can generally be measured in volume, velocity, and depths of flooding. Expected flood depths in the District vary, depending on the nature and extent of a flood event; specific depths are unknown. Flood durations in the District tend to be short to medium term, or until either the storm drainage system can catch up or flood waters move downstream. Flooding in the District tends to have a shorter speed of onset, due to the amount of water that flows through the District.

Past Occurrences

A list of state and federal disaster declarations for Sacramento County from flooding is shown on Table N-9. These events also likely affected the District to some degree.

Table N-9 Sacramento County – State and Federal Disaster Declarations from Flood 1950-2020

Disaster Type	Federal Declarations		State Declarations	
	Count	Years	Count	Years
Flood (including heavy rains and storms)	19	1950, 1955, 1958 (twice), 1963, 1969, 1982 (twice), 1983, 1986, 1995 (twice), 1996, 1997, 1998, 2008, 2017 (three times)	14	1955, 1958, 1964, 1969, 1983, 1986, 1995 (twice), 1997, 1998, 2006, 2017 (three times)

Source: Cal OES, FEMA

Vulnerability to and Impacts from Flood

Floods have been a part of the District’s historical past and will continue to be so in the future. During winter months, long periods of precipitation and the timing of that precipitation are critical in determining the threat of flood, and these characteristics further dictate the potential for widespread structural and property damages. Predominantly, the effects of flooding are generally confined to areas near the waterways of the County. As waterways grow in size from local drainages, so grows the threat of flood and dimensions of the threat. This threatens structures in the floodplain. Structures can also be damaged from trees falling as a result of water-saturated soils. Electrical power outages happen, and the interruption of power causes major problems. Loss of power is usually a precursor to closure of governmental offices and community businesses. Roads can be damaged and closed, causing safety and evacuation issues. People may be swept away in floodwaters, causing injuries or deaths.

Floods are among the costliest natural disasters in terms of human hardship and economic loss nationwide. Floods can cause substantial damage to structures, landscapes, and utilities as well as life safety issues. Floods can be extremely dangerous, and even six inches of moving water can knock over a person given a strong current. During a flood, people can also suffer heart attacks or electrocution due to electrical equipment short outs. Floodwaters can transport large objects downstream which can damage or remove stationary structures. Ground saturation can result in instability, collapse, or other damage. Objects can also be buried or destroyed through sediment deposition. Floodwaters can also break utility lines and interrupt services. Standing water can cause damage to crops, roads, foundations, and electrical circuits. Direct impacts, such as drowning, can be limited with adequate warning and public education about what to do during floods. Other problems connected with flooding and stormwater runoff include erosion, sedimentation, degradation of water quality, loss of environmental resources, and economic impacts.

The District noted that the Search and Rescue team could be called upon to respond to flood events, putting those individuals at risk

Assets at Risk

The District noted that there were certain assets at risk to flooding, as shown in Table N-10.

Table N-10 SMFD Assets at Risk to Flooding

Name of Asset	Facility Type	Replacement Value (\$)
Station 51	Essential	2,633,071
Station 52	Training	1,002,297
Station 53	Essential	982,137
Station 54	Essential	943,672
Station 61	Essential	1,973,109
Station 65	Essential	2,458,004
Station 105	Essential	1,960,039
Total		\$11,952,329

Source: SMFD

Flood: Localized Stormwater Flooding

Likelihood of Future Occurrence–Highly Likely

Vulnerability–Medium

Hazard Profile and Problem Description

Flooding occurs in areas other than the FEMA mapped 1% and 0.2% annual chance floodplains. Flooding may be from drainages not studied by FEMA, lack of or inadequate drainage infrastructure, or inadequate maintenance. Localized, stormwater flooding occurs throughout the County during the rainy season from November through April. Prolonged heavy rainfall contributes to a large volume of runoff resulting in high peak flows of moderate duration.

Location and Extent

The SMFD is subject to localized flooding throughout the District. Flood extents are usually measured in areas affected, velocity of flooding, and depths of flooding. Expected flood depths in the District vary by location. Flood durations in the District tend to be short to medium term, or until either the storm drainage system can catch up or flood waters move downstream. Localized flooding in the District tends to have a shorter speed of onset, especially when antecedent rainfall has soaked the ground and reduced its capacity to absorb additional moisture.

The District noted no specific areas of localized flooding that affect District facilities. While facilities may not be affected, transportation routes that are flooded can cause response times to incidents to increase.

Past Occurrences

There have been no federal or state disaster declarations in the County due to localized flooding. The District noted no past occurrences of localized flooding that caused damages to District facilities.

Vulnerability to and Impacts from Localized Flooding

Historically, much of the growth in the District and County has occurred adjacent to streams, resulting in significant damages to property, and losses from disruption of community activities when the streams overflow. Additional development in the watersheds of these streams affects both the frequency and duration of damaging floods through an increase in stormwater runoff.

Primary concerns associated with stormwater flooding include impacts to infrastructure that provides a means of ingress and egress throughout the community. Ground saturation can result in instability, collapse, or other damage to trees, structures, roadways and other critical infrastructure. Objects can also be buried or destroyed through sediment deposition. Floodwaters can break utility lines and interrupt services. Standing water can cause damage to crops, roads, and foundations. Other problems connected with flooding and stormwater runoff include erosion, sedimentation, degradation of water quality, losses of environmental resources, and certain health hazards.

Assets at Risk

The District noted no specific areas of localized flooding that affect District facilities. While facilities may not be affected, transportation routes that are flooded can cause response times to incidents to increase.

Levee Failure

Likelihood of Future Occurrence—Occasional

Vulnerability—High

Hazard Profile and Problem Description

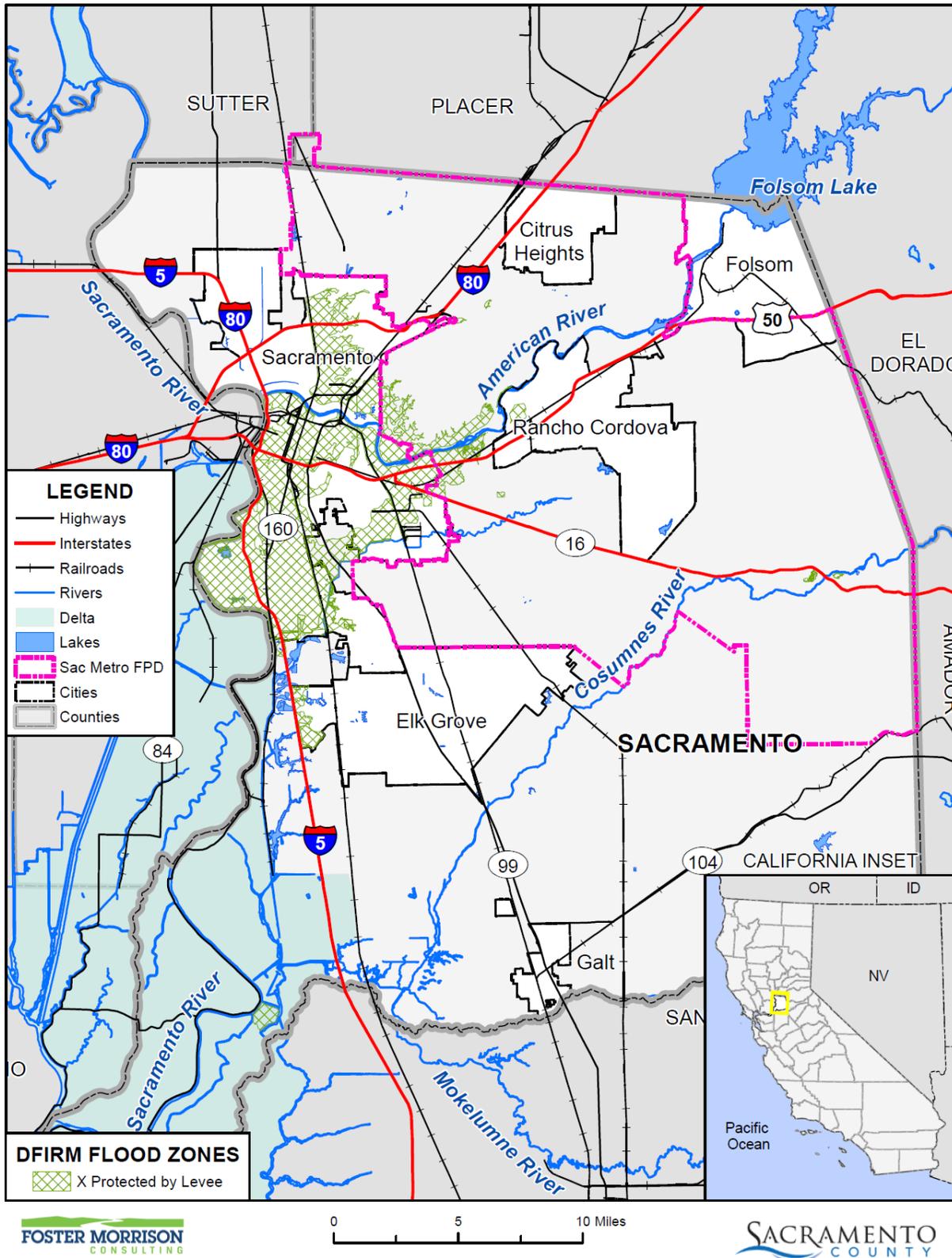
A levee is a raised area that runs along the banks of a stream or canal. Levees reinforce the banks and help prevent flooding by containing higher flow events to the main stream channel. By confining the flow to a narrower stream channel, levees can also increase the speed of the water. Levees can be natural or man-made.

Levees provide strong flood protection, but they are not failsafe. Levees are designed to protect against a specific flood level and could be overtopped during severe weather events or dam failure. For example, levees can be certified to provide protection against the 1% annual chance flood. Levees reduce, not eliminate, the risk to individuals and structures located behind them. A levee system failure or overtopping can create severe flooding and high water velocities. Levee failure can occur through overtopping or from seepage issues resulting from burrowing rodents, general erosion, excessive vegetation and root systems and other factors that compromise the integrity of the levee. No levee provides protection from events for which it was not designed, and proper operation and maintenance are necessary to reduce the probability of failure.

Location and Extent

There is not a scientific scale or measurement system in place for levee failure. Expected flood depths from a levee failure in the District vary by event and location. The speed of onset is slow as the river rises, but if a levee fails the warning times are generally short for those in the inundation area. The duration of levee failure risk times can be hours to weeks, depending on the river flows that the levee holds back. When northern California dams and reservoirs are nearing maximum capacity, they release water through the river systems, causing additional burdens on County levees. Levees in the District are shown on Figure N-6.

Figure N-6 SMFD – Levee Protected Areas



Data Source: FEMA NFHL 07/19/2018, Sacramento Metro Fire Protection District, Sacramento County GIS, Cal-Atlas; Map Date: 09/2020.

Past Occurrences

There have been no federal or state disaster declarations from levee failure. The District Planning Team noted no past occurrences of levee failures.

Vulnerability to and Impacts from Levee Failure

A levee failure can range from a small, uncontrolled release to a catastrophic failure. Levee failure flooding can occur as the result of prolonged rainfall and flooding. The primary danger associated with levee failure is the high velocity flooding of those properties outside and downstream of the breach.

Should a levee fail, some or all of the area protected by the levees would be at risk to flooding. Impacts from a levee failure include property damage, critical facility damage, and life safety issues. Business and economic losses could be large as facilities could be flooded and services interrupted. School and road closures could occur. Road closures would impede both evacuation routes and ability of first responders to quickly respond to calls for aid. Other problems connected with levee failure flooding include erosion, sedimentation, degradation of water quality, losses of environmental resources, and certain health hazards.

Assets at Risk

The District noted that its facilities would likely not be affected by levee failure flooding, but that there would be mutual aid and Search and Rescue responses to a levee failure.

Pandemic

Likelihood of Future Occurrence–Likely

Vulnerability–Medium

Hazard Profile and Problem Description

According to the World Health Organization (WHO), a disease epidemic occurs when there are more cases of that disease than normal. A pandemic is a worldwide epidemic of a disease. A pandemic may occur when a new virus appears against which the human population has no immunity. A pandemic occurs when a new virus emerges for which people have little or no immunity, and for which there is no vaccine. This disease spreads easily person-to-person, causes serious illness, and can sweep across the country and around the world in a very short time. The U.S. Centers for Disease Control and Prevention has been working closely with other countries and the WHO to strengthen systems to detect outbreaks of that might cause a pandemic and to assist with pandemic planning and preparation. An especially severe a pandemic could lead to high levels of illness, death, social disruption, and economic loss.

Location and Extent

During a pandemic, the whole of the District, County, and surrounding region is at risk, as pandemic is a regional, national, and international event. The speed of onset of pandemic is usually short, while the duration is variable, but can last for more than a year as shown in the 1918/1919 Spanish Flu. There is no

scientific scale to measure the magnitude of pandemic. Pandemics are usually measured in numbers affected by the pandemic, and by number who die from complications from the pandemic.

Past Occurrences

There has been one state and federal disaster declaration due to pandemic, as shown in Table N-11.

Table N-11 Sacramento County – State and Federal Pandemic Disaster Declarations 1950-2020

Disaster Type	Federal Declarations		State Declarations	
	Count	Years	Count	Years
Pandemic	1	2020	1	2020

Source: Cal OES, FEMA

The 20th century saw three outbreaks of pandemic.

- The 1918-1919 Influenza Pandemic (H1N1)
- The February 1957-1958 Influenza Pandemic (H2N2)
- The 1968 Influenza Pandemic (H3N2)

To date, the 21st century has seen two acknowledged pandemics.

- 2009 Swine Flu (H1N1)
- 2019/2020 COVID 19

Vulnerability to and Impacts from Pandemic

Pandemics have and will continue to have impacts on human health in the region. A pandemic occurs when a new virus emerges for which there is little or no immunity in the human population; the virus causes serious illness and spreads easily from person-to-person worldwide. There are several strategies that public health officials can use to combat a pandemic. Constant surveillance regarding the current pandemic, use of infection control techniques, and administration of vaccines once they become available. Citizens can help prevent the spread of a pandemic by staying home, or “self-quarantining,” if they suspect they are infected. Pandemic does not affect the buildings, critical facilities, and infrastructure in the District. Pandemic can have varying levels of impact to the citizens of the District and greater County, depending on the nature of the pandemic.

Impacts could range from school and business closings to the interruption of basic services such as public transportation, health care, and the delivery of food and essential medicines. Hospitalizations and deaths can occur, especially to the elderly or those with pre-existing underlying conditions. As seen with Covid-19, multiple businesses were forced to close temporarily (some permanently), and unemployment rose significantly. Supply chains for food and essentials can be interrupted. Prisons may need to release prisoners to comply with social distance standards.

The impact of the COVID-19 pandemic on Metro Fire has been profound, both fiscally and operationally. More than one month before a State of Emergency Declaration was made in California, Metro Fire began

changing operational response protocols as the CDC confirmed the first COVID-19 case in the State on January 26, 2020. These changes altered every aspect of how service is provided, including PPE protocols, patient care protocols, supply utilization and stocking, health and safety procedures, staffing plans, and exposure reporting, among a multitude of others. Each time new guidance and recommendations were issued by public health officials, operational changes were necessary. Implementing these changes came at a significant cost. Faster PPE and supply burn rates resulted in increased PPE and supply costs; increases that were exacerbated by supply chain disruptions. Workers' compensation claims and overtime costs skyrocketed as maintaining sufficient staffing in a high-exposure environment became the norm. Labor costs were further increased to provide support to public health officials in their testing and vaccination efforts throughout the State.

While response and recovery costs were mounting, vital revenue sources were reduced, with fee-for-service EMS transport revenues plummeting for a good portion of 2020. For the Sacramento Metropolitan Fire District (Metro Fire), this impact has been a net loss of nearly \$5.5 million since March of 2020, with only an estimated \$1 million expected to be reimbursed through current available relief sources.

The mission of Metro Fire is to ensure the safety of our community. The losses experienced as a result of the COVID-19 pandemic have compromised the capacity to fulfill this mission, resulting in reduced service, un-funded programs, and deferred capital projects, among others. While other industries and public service agencies have access to lifeline funding, this funding has not been made available to the very agencies that provide lifeline support to the community.

Assets at Risk

Pandemics do not affect District facilities, but can affect District personnel who operate District facilities.

Severe Weather: Extreme Cold and Freeze

Likelihood of Future Occurrence—Occasional

Vulnerability—Medium

Hazard Profile and Problem Description

According to the National Weather Service (NWS), extreme cold often accompanies a winter storm or is left in its wake. Freezing temperatures can also occur without the accompanying winter storm.

Location and Extent

Extreme cold and freeze are regional issues, meaning the entire City is at risk to cold weather and freeze events. While there is no scale (i.e. Richter, Enhanced Fujita) to measure the effects of extreme cold and freeze, temperature data from the County from the WRCC indicates that there are 21.8 days that fall below 32°F in western Sacramento County. Freeze has a slow onset and can generally be predicted in advance for the County. Freeze events can last for hours (in a cold overnight), or for days to weeks at a time.

Past Occurrences

There has been no federal or state disaster declarations in the County for cold or freeze. The District noted that cold and freeze is a regional phenomenon; events that affected the County also affected the District. Those past occurrences were shown in the Base Plan in Section 4.3.2.

Vulnerability to and Impacts from Severe Weather: Freeze and Winter Storms

The District experiences temperatures below 32 degrees during the winter months. Freeze can cause injury or loss of life to residents of the District. While it is rare for buildings to be affected directly by freeze, damages to pipes that feed building can be damaged during periods of extreme cold. This is the greatest concern to the District.

Assets at Risk

No District facilities are at direct risk from extreme cold and freeze. District response personnel would be at risk.

Severe Weather: Extreme Heat

Likelihood of Future Occurrence–Highly Likely

Vulnerability–Medium

Hazard Profile and Problem Description

According to FEMA, extreme heat is defined as temperatures that hover 10 degrees or more above the average high temperature for the region and last for several weeks. Heat kills by taxing the human body beyond its abilities. In extreme heat and high humidity, evaporation is slowed, and the body must work extra hard to maintain a normal temperature.” Most heat disorders occur because the victim has been overexposed to heat or has over-exercised for his or her age and physical condition. Older adults, young children, and those who are sick or overweight are more likely to succumb to extreme heat.

In addition to the risks faced by citizens of the District, there are risk to the built environment from extreme heat. While extreme heat on its own does not usually affect structure, extreme heat during times of drought can cause wildfire risk to heighten. Extreme heat and high winds can cause power outages and PSPS events, causing issues to buildings in the District.

Location and Extent

Heat is a regional phenomenon and affects the whole of the District. Heat emergencies are often slower to develop, taking several days of continuous, oppressive heat before a significant or quantifiable impact is seen. Heat waves do not strike victims immediately, but rather their cumulative effects slowly affect vulnerable populations and communities. Heat waves do not generally cause damage or elicit the immediate response of floods, fires, earthquakes, or other more “typical” disaster scenarios.

The NWS has in place a system to initiate alert procedures (advisories or warnings) when extreme heat is expected to have a significant impact on public safety. The expected severity of the heat determines whether advisories or warnings are issued. The NWS HeatRisk forecast provides a quick view of heat risk potential over the upcoming seven days. The heat risk is portrayed in a numeric (0-4) and color (green/yellow/orange/red/magenta) scale which is similar in approach to the Air Quality Index (AQI) or the UV Index. This can be seen in Section 4.3.3 of the Base Plan.

Past Occurrences

There has been no federal or state disaster declarations in the County for heat. The District Planning Team note that since extreme heat is a regional phenomenon, events that affected the County also affected the District. Those past occurrences were shown in the Base Plan in Section 4.3.3.

Vulnerability to and Impacts from Extreme Heat

The District experiences temperatures in excess of 100°F during the summer and fall months. The temperature moves to 105-110°F in rather extreme situations. During these times, drought conditions may worsen. Also, power outages and PSPS events may occur during these times as well. Health impacts are the primary concern with this hazard, though economic impacts are also an issue.

Days of extreme heat have been known to result in medical emergencies, and unpredictable human behavior. Periods of extended heat and dryness (droughts) can have major economic, agricultural, and water resources impacts. Extreme heat can also dry out vegetations, making it more vulnerable to wildfire ignitions.

Many firefighter injuries are due to heat stress, which exacerbates the likelihood of a variety of injuries including muscle sprains and strains, respiratory distress, stroke, and cardiac arrest (which accounts for approximately 50% of firefighter line-of-duty deaths).

The risk of heat-related injury in wildland firefighting is something that firefighters face practically daily during fire season each year. While wearing and carrying an average of 50lbs of gear, and working in temperatures that can soar to 1,472 degrees, firefighters lose approximately 1 gallon of sweat per hour, putting them at a high risk for dehydration. Dehydration significantly affects firefighter performance, causing delays and inefficiencies, and, most importantly, compromises firefighter safety.

This risk is especially significant considering the high response rate of Metro Fire's personnel to wildland fires. Metro Fire personnel respond to more wildland fires than structure fires each year; last year, responding to 685 wildland fires that burned more than 6 times the acreage of the previous year. Additionally, Metro Fire provides automatic aid to 5 neighboring jurisdictions and mutual aid for wildland fire incidents throughout the state. In recent years, approximately 65% of Metro Fire personnel are deployed at some point during the 7-month wildland season, an average of 12 deployments per month in-season. These deployments typically last 1-2 weeks with firefighters spending 12-24 hours on shift.

Recent wildfires throughout California have resulted in billions of dollars of property loss and many fatalities for both civilians and firefighters. Some of these fires have spread at rates upward of 50 acres per minute. Minutes matter in wildland incidents. Delays and inefficiencies on the part of firefighters due to

compromised performance caused by dehydration have catastrophic implications. Ensuring proper hydration leads to a chain reaction of benefits including increased operational effectiveness and efficiency of suppression and property conservation activities, drop in property damage, and reduction of injuries and fatalities for firefighters and civilians. Proper hydration is a matter of life and death.

Assets at Risk

While the District has no assets at risk to extreme heat, District personnel would be at risk. In addition, extreme heat can exacerbate wildfire risk in the District. Facilities at risk to wildfire are discussed in the Assets at Risk section of Wildfire below.

Severe Weather: Heavy Rains and Storms

Likelihood of Future Occurrence—Likely

Vulnerability—Medium

Hazard Profile and Problem Description

Storms in the District occur annually and are generally characterized by heavy rain often accompanied by strong winds and sometimes lightning and hail. Approximately 10 percent of the thunderstorms that occur each year in the United States are classified as severe. A thunderstorm is classified as severe when it contains one or more of the following phenomena: hail that is three-quarters of an inch or greater, winds in excess of 50 knots (57.5 mph), or a tornado. Heavy precipitation in the District falls mainly in the fall, winter, and spring months.

Location and Extent

Heavy rain events occur on a regional basis. Rains and storms can occur in any location of the District. All portions of the District are at risk to heavy rains. Most of the severe rains occur during the fall, winter, and spring months. There is no scale by which heavy rains and severe storms are measured. Magnitude of storms is measured often in rainfall and damages. The speed of onset of heavy rains can be short, but accurate weather prediction mechanisms often let the public know of upcoming events. Duration of severe storms in California, Sacramento County, and the District can range from minutes to hours to days. Information on precipitation extremes can be found in Section 4.3.4 of the Base Plan.

Past Occurrences

There have been past disaster declarations from heavy rains and storms, which were discussed in Past Occurrences of the flood section above. According to historical hazard data, severe weather, including heavy rains and storms, is an annual occurrence in the District. This is the cause of many of the federal disaster declarations related to flooding.

Vulnerability to and Impacts from Heavy Rain and Storms

Heavy rain and severe storms are the most frequent type of severe weather occurrences in the District. These events can cause localized flooding. Elongated events, or events that occur during times where the

ground is already saturated can cause 1% and 0.2% annual chance flooding. Wind often accompanies these storms and has caused damage in the past. Hail and lightning are rare in the District.

Actual damage associated with the effects of severe weather include impacts to property, critical facilities (such as utilities), and life safety. Heavy rains and storms often result in localized flooding creating significant issues. Roads can become impassable and ground saturation can result in instability, collapse, or other damage to trees, structures, roadways and other critical infrastructure. Floodwaters and downed trees can break utilities and interrupt services.

During periods of heavy rains and storms, power outages can occur. These power outages can affect pumping stations and lift stations that help alleviate flooding. More information on power outage and failure can be found at the beginning of Section N.5.3 above, as well as in Section 4.3.3 of the Base Plan.

Assets at Risk

There are no District facilities at direct risk to heavy rains and storms. It is the resultant flooding that puts the District at Risk. These facilities were discussed in the Assets at Risk section of the Flood: 1%/0.2% Chance above.

Severe Weather: High Winds and Tornadoes

Likelihood of Future Occurrence—Highly Likely

Vulnerability—Medium

Hazard Profile and Problem Description

High winds, as defined by the NWS glossary, are sustained wind speeds of 40 mph or greater lasting for 1 hour or longer, or winds of 58 mph or greater for any duration. High winds can cause significant property and crop damage, threaten public safety, and have adverse economic impacts from business closures and power loss. High winds can also cause PSPS events.

Tornadoes are rotating columns of air marked by a funnel-shaped downward extension of a cumulonimbus cloud whirling at destructive speeds of up to 300 mph, usually accompanying a thunderstorm. Tornadoes form when cool, dry air sits on top of warm, moist air. Tornadoes are the most powerful storms that exist. Tornadoes, though rare, are another severe weather hazard that can affect areas of the Sacramento County Planning Area, primarily during the rainy season in the late fall, winter, and early spring.

Location and Extent

The entire District is subject to significant, non-tornadic (straight-line), winds. Each area of the County is at risk to high winds. Magnitude of winds is measured often in speed and damages. These events are often part of a heavy rain and storm event, but can occur outside of storms. The speed of onset of winds can be short, but accurate weather prediction mechanisms often let the public know of upcoming events. Duration of winds in California is often short, ranging from minutes to hours. The Beaufort scale is an empirical 12 category scale that relates wind speed to observed conditions at sea or on land. Its full name is the Beaufort Wind Force Scale. The Beaufort Scale was shown in Section 4.3.5 of the Base Plan.

Tornadoes, while rare, can occur at any location in the County and District. Prior to February 1, 2007, tornado intensity was measured by the Fujita (F) scale. This scale was revised and is now the Enhanced Fujita scale. Both scales are sets of wind estimates (not measurements) based on damage. The new scale (EF) provides more damage indicators (28) and associated degrees of damage, allowing for more detailed analysis and better correlation between damage and wind speed. It is also more precise because it considers the materials affected and the construction of structures damaged by a tornado. The F Scale and EF Scale are shown in Section 4.3.5 of the Base Plan.

Past Occurrences

There has been no federal or state disaster declarations in the County for winds and tornadoes. The District noted that since high winds is a regional phenomenon, events that affected the lower elevations of the County also affected the District. Those past occurrences were shown in the Base Plan in Section 4.3.5.

Vulnerability to and Impacts from Severe Weather: Wind and Tornado

High winds are common occurrences in the District throughout the entire year. Straight line winds are primarily a public safety and economic concern. Windstorm can cause damage to structures and power lines which in turn can create hazardous conditions for people. Debris flying from high wind events can shatter windows in structures and vehicles and can harm people that are not adequately sheltered. High winds can impact critical facilities and infrastructure and can lead to power outages. Wind can also drive wildfire flames, spreading wildfires quickly. During periods of high winds and dry vegetation, wildfire risk increases. High winds that occur during periods of extreme heat can cause PSPS events to be declared in the County. More information on power outage and failure can be found at the beginning of Section N.5.3 above, as well as in Section 4.3.3 of the Base Plan.

Impacts from high winds in the District will vary. Future losses from straight line winds include:

- Downed trees
- Power line impacts and economic losses from power outages
- Increased PSPS events
- Occasional building damage, primarily to roofs

Assets at Risk

The District noted that all assets from Table N-4 are at risk to this hazard.

Wildfire

Likelihood of Future Occurrence—Highly Likely

Vulnerability—High

Hazard Profile and Problem Description

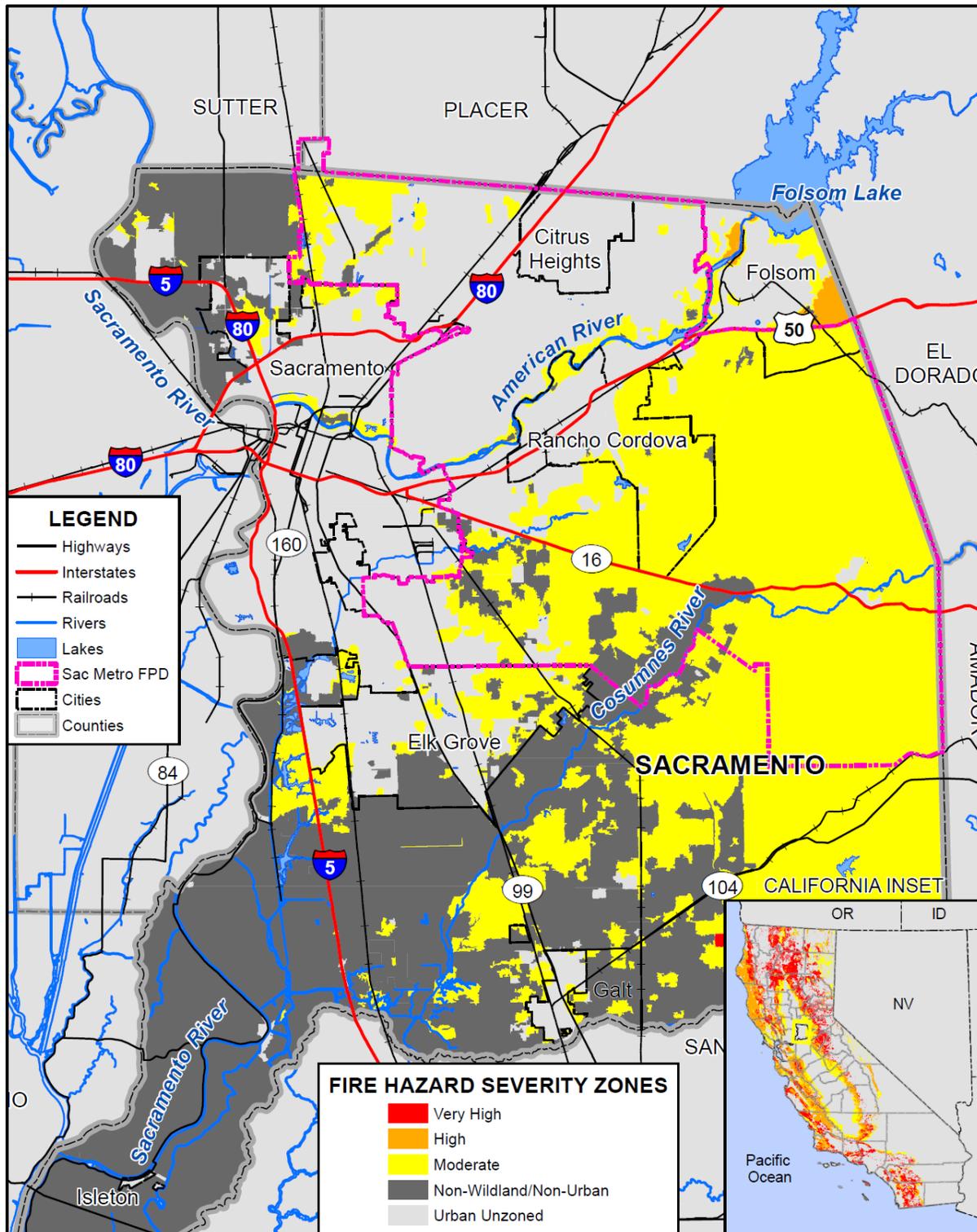
Wildland fire and the risk of a conflagration is an ongoing concern for the SMFD. Throughout California, communities are increasingly concerned about wildfire safety as increased development in the foothills and mountain areas and subsequent fire control practices have affected the natural cycle of the ecosystem.

Wildland fires affect grass, forest, and brushlands, as well as any structures located within them. Where there is human access to wildland areas the risk of fire increases due to a greater chance for human carelessness and historical fire management practices. Historically, the fire season extends from early spring through late fall of each year during the hotter, dryer months; however, in recent years, the risk of wildfire has become a year around concern. Fire conditions arise from a combination of high temperatures, low moisture content in the air and fuel, accumulation of vegetation, and high winds. While wildfire risk has predominantly been associated with more remote forested areas and wildland urban interface (WUI) areas, significant wildfires can also occur in more populated, urban areas.

Location and Extent

Wildfire can affect all areas of the District. CAL FIRE has estimated that the risk varies across the District and has created maps showing risk variance. Following the methodology described in Section 4.3.16 of the Base Plan, wildfire maps for the SMFD were created. Figure N-7 shows the CAL FIRE FHSZ in the District. As shown on the maps, fire hazard severity zones within the District range from Urban/Unzoned to Moderate. Figure N-8 shows the CAL FIRE Fire Threat Areas in the City. As shown on the maps, fire threat within the District ranges from No Threat to High.

Figure N-7 SMFD – Fire Hazard Severity Zones

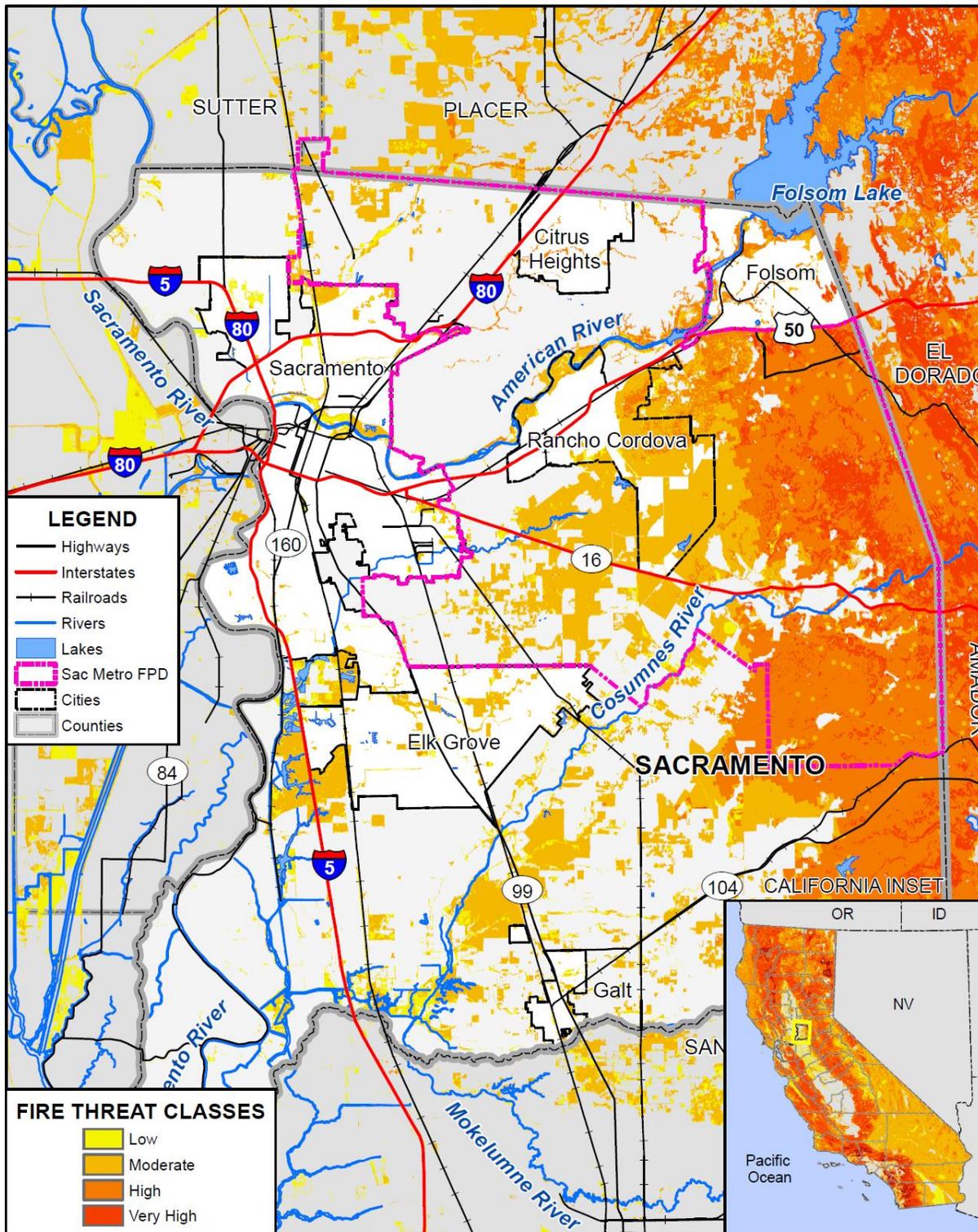


0 5 10 Miles



Data Source: Cal-Fire 2017 (Draft 9/2007 - c34fhszl06_1, Adopted 11/2007 - fhsz06_3_34, Recommended 10/2008 - c34fhszl06_3), Sacramento Metro Fire Protection District, Sacramento County GIS, Cal-Atlas; Map Date: 09/2020.

Figure N-8 SMFD – Fire Threat Areas



FOSTER MORRISON
CONSULTING

0 5 10 Miles

SACRAMENTO
COUNTY

Data Source: Cal-Fire 2017 Fire Threat Data (fthrt14_2), Sacramento Metro Fire Protection District, Sacramento County GIS, Cal-Atlas; Map Date: 09/2020.

Wildfires tend to be measured in structure damages, injuries, and loss of life as well as on acres burned. Fires can have a quick speed of onset, especially during periods of drought or during hot dry summer months. Fires can burn for a short period of time, or may have durations lasting for a week or more.

Past Occurrences

There has been one state and no federal disaster declarations for Sacramento County from fire. It should be noted that this was from Southern Pacific Railroad Fires and Explosions (Roseville), so it was not truly a wildfire.

Table N-12 Sacramento County – State and Federal Disaster Declarations Summary 1950-2020

Disaster Type	State Declarations		Federal Declarations	
	Count	Years	Count	Years
Fire	1	1973	0	–

Source: Cal OES, FEMA

The SMFD averages over 100 initial attack wildland and structure fires a year. This is usually between May and November for wildland incidents.

Vulnerability to and Impacts from Wildfire

Risk and vulnerability to the Sacramento County Planning Area and the District from wildfire is of significant concern, with some areas of the Planning Area being at greater risk than others as described further in this section. High fuel loads in the Planning Area, combined with a large built environment and population, create the potential for both natural and human-caused fires that can result in loss of life and property. These factors, combined with natural weather conditions common to the area, including periods of drought, high temperatures, low relative humidity, and periodic winds, can result in frequent and potentially catastrophic fires. During the May to October fire season, the dry vegetation and hot and sometimes windy weather results in an increase in the number of ignitions. Any fire, once ignited, has the potential to quickly become a large, out-of-control fire. As development continues throughout the County and the District, especially in these interface areas, the risk and vulnerability to wildfires will likely increase.

Potential impacts from wildfire include loss of life and injuries; damage to structures and other improvements, natural and cultural resources, croplands, and loss of recreational opportunities. Wildfires can cause short-term and long-term disruption to the District. Fires can have devastating effects on watersheds through loss of vegetation and soil erosion, which may impact the District by changing runoff patterns, increasing sedimentation, reducing natural and reservoir water storage capacity, and degrading water quality. Fires can also affect air quality in the District; smoke and air pollution from wildfires can be a severe health hazard.

Although the physical damages and casualties arising from large fires may be severe, it is important to recognize that they also cause significant economic impacts by resulting in a loss of function of buildings and infrastructure. Economic impacts of loss of transportation and utility services may include traffic delays/detours from road and bridge closures and loss of electric power, potable water, and wastewater services. Schools and businesses can be forced to close for extended periods of time. Recently, the threat

of wildfire, combined with the potential for high winds, heat, and low humidity, has caused PG&E to initiate PSPSs which can also significantly impact a community through loss of services, business closures, and other impacts associated with loss of power for an extended period. More information on power outage and failure can be found at the beginning of Section N.5.3 above, as well as in Section 4.3.3 of the Base Plan. In addition, catastrophic wildfire can create favorable conditions for other hazards such as flooding, landslides, and erosion during the rainy season.

The SMFD averages over 100 initial attack wildland and structure fires a year. This is usually between May and November for wildland incidents. Prairie lands are often damaged. Grass and woodland damaged, and there are losses of crop for cattle. Minor business and economic impacts occur each year. Road and school closures are usually minor to moderate depending on incident.

Many firefighter injuries are due to heat stress, which exacerbates the likelihood of a variety of injuries including muscle sprains and strains, respiratory distress, stroke, and cardiac arrest (which accounts for approximately 50% of firefighter line-of-duty deaths).

The risk of heat-related injury in wildland firefighting is something that firefighters face practically daily during fire season each year. While wearing and carrying an average of 50lbs of gear, and working in temperatures that can soar to 1,472 degrees, firefighters lose approximately 1 gallon of sweat per hour, putting them at a high risk for dehydration. Dehydration significantly affects firefighter performance, causing delays and inefficiencies, and, most importantly, compromises firefighter safety.

This risk is especially significant considering the high response rate of Metro Fire’s personnel to wildland fires. Metro Fire personnel respond to more wildland fires than structure fires each year; last year, responding to 685 wildland fires that burned more than 6 times the acreage of the previous year. Additionally, Metro Fire provides automatic aid to 5 neighboring jurisdictions and mutual aid for wildland fire incidents throughout the state. In recent years, approximately 65% of Metro Fire personnel are deployed at some point during the 7-month wildland season, an average of 12 deployments per month in-season. These deployments typically last 1-2 weeks with firefighters spending 12-24 hours on shift.

Recent wildfires throughout California have resulted in billions of dollars of property loss and many fatalities for both civilians and firefighters. Some of these fires have spread at rates upward of 50 acres per minute. Minutes matter in wildland incidents. Delays and inefficiencies on the part of firefighters due to compromised performance caused by dehydration have catastrophic implications. Ensuring proper hydration leads to a chain reaction of benefits including increased operational effectiveness and efficiency of suppression and property conservation activities, drop in property damage, and reduction of injuries and fatalities for firefighters and civilians. Proper hydration is a matter of life and death.

Assets at Risk

The District noted that there are a few fire stations at risk to wildfire, as shown on Table N-13.

Table N-13 SMFD Assets at Risk to Wildfire

Name of Asset	Facility Type	Replacement Value
Station 55	Essential	1,554,895

Name of Asset	Facility Type	Replacement Value
Station 58	Essential	996,861
Station 59	Essential	1,687,979
Total		\$4,239,735

Source: SMFD

N.6 Capability Assessment

Capabilities are the programs and policies currently in use to reduce hazard impacts or that could be used to implement hazard mitigation activities. This capabilities assessment is divided into five sections: regulatory mitigation capabilities, administrative and technical mitigation capabilities, fiscal mitigation capabilities, mitigation education, outreach, and partnerships, and other mitigation efforts.

N.6.1. Regulatory Mitigation Capabilities

Table N-14 lists regulatory mitigation capabilities, including planning and land management tools, typically used by local jurisdictions to implement hazard mitigation activities and indicates those that are in place in the SMFD.

Table N-14 SMFD Regulatory Mitigation Capabilities

Plans	Y/N Year	Does the plan/program address hazards? Does the plan identify projects to include in the mitigation strategy? Can the plan be used to implement mitigation actions?
Comprehensive/Master Plan/General Plan	Y 2021	Community Risk Assessment/ Community Risk Reduction Plan
Capital Improvements Plan		Yes
Economic Development Plan		N/A
Local Emergency Operations Plan		Yes
Continuity of Operations Plan		
Transportation Plan		N/A
Stormwater Management Plan/Program		N/A
Engineering Studies for Streams		
Community Wildfire Protection Plan		Yes, 2016
Other special plans (e.g., brownfields redevelopment, disaster recovery, coastal zone management, climate change adaptation)	N	
Building Code, Permitting, and Inspections	Y/N	Are codes adequately enforced?
Building Code	N/A	Version/Year:
Building Code Effectiveness Grading Schedule (BCEGS) Score	N/A	Score:
Fire department ISO rating:	Varies	Rating:

Site plan review requirements		
		Is the ordinance an effective measure for reducing hazard impacts?
Land Use Planning and Ordinances	Y/N	Is the ordinance adequately administered and enforced?
Zoning ordinance	N/A	
Subdivision ordinance	N/A	
Floodplain ordinance	N/A	
Natural hazard specific ordinance (stormwater, steep slope, wildfire)	N/A	
Flood insurance rate maps	N/A	
Elevation Certificates	N/A	
Acquisition of land for open space and public recreation uses	N/A	
Erosion or sediment control program	N/A	
Other	N	
How can these capabilities be expanded and improved to reduce risk?		
The Community Risk Reduction Plan will identify specific educational, outreach and/or enforcement programs to mitigate the District's Identified Risks. The programs are identified at the community level based on specific needs and will include benchmarks, as well as feedback, to measure effectiveness.		

Source: SMFD

N.6.2. Administrative/Technical Mitigation Capabilities

Table N-15 identifies the District department(s) responsible for activities related to mitigation and loss prevention in SMFD.

Table N-15 SMFD's Administrative and Technical Mitigation Capabilities

Administration	Y/N	Describe capability Is coordination effective?
Planning Commission	N/A	
Mitigation Planning Committee	Y	Put together for this LHMP planning effort.
Maintenance programs to reduce risk (e.g., tree trimming, clearing drainage systems)		
Mutual aid agreements	Y	
Other		
		Is staffing adequate to enforce regulations? Is staff trained on hazards and mitigation? Is coordination between agencies and staff effective?
Staff	Y/N FT/PT	
Chief Building Official	N	
Floodplain Administrator	N	
Emergency Manager	N	
Community Planner	N	

Civil Engineer	N	
GIS Coordinator	Y PT	
Other	Y	Exec. Director, Fire Marshal, Chief Development Officer, Administrative Specialist are trained on mitigation (though additional training is always sought). Coordination is effective.
Technical		
Warning systems/services (Reverse 911, outdoor warning signals)		
Hazard data and information		
Grant writing	Y FT	
Hazus analysis	N	
Other		
How can these capabilities be expanded and improved to reduce risk?		
Additional training is needed. The Community Risk Reduction Plan will be implemented and some of the training from it will help the District reduce risk.		

Source: SMFD

N.6.3. Fiscal Mitigation Capabilities

Table N-16 identifies financial tools or resources that the District could potentially use to help fund mitigation activities.

Table N-16 SMFD's Fiscal Mitigation Capabilities

Funding Resource	Access/ Eligibility (Y/N)	Has the funding resource been used in past and for what type of activities? Could the resource be used to fund future mitigation actions?
Capital improvements project funding	Y	Could be used in the future
Authority to levy taxes for specific purposes	Y	No, unlikely
Fees for water, sewer, gas, or electric services		
Impact fees for new development	Y	Station Construction, unlikely
Storm water utility fee		
Incur debt through general obligation bonds and/or special tax bonds	Y	No, unlikely
Incur debt through private activities		
Community Development Block Grant		
Other federal funding programs	Y	Yes
State funding programs	Y	Yes
Other		
How can these capabilities be expanded and improved to reduce risk?		

Funding Resource	Access/ Eligibility (Y/N)	Has the funding resource been used in past and for what type of activities? Could the resource be used to fund future mitigation actions?
The District is always looking for additional revenues to increase and expand its abilities. The District will continue to seek state, federal, and other grant sources to expand mitigation capabilities.		

Source: SMFD

N.6.4. Mitigation Education, Outreach, and Partnerships

Table N-17 identifies education and outreach programs and methods already in place that could be/or are used to implement mitigation activities and communicate hazard-related information.

Table N-17 SMFD’s Mitigation Education, Outreach, and Partnerships

Program/Organization	Yes/No	Describe program/organization and how relates to disaster resilience and mitigation. 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.	Y	CERT
Ongoing public education or information program (e.g., responsible water use, fire safety, household preparedness, environmental education)	Y	Community Relations
Natural disaster or safety related school programs	Y	Fire Safety
StormReady certification	N	
Firewise Communities certification	Y	
Public-private partnership initiatives addressing disaster-related issues	N	
Other		
How can these capabilities be expanded and improved to reduce risk?		
The District will seek to expand its CERT teams, community relations, and mitigation partnerships with the County and the cities SMFD serves and protects.		

Source: SMFD

N.6.5. Other Mitigation Efforts

The District has many other completed or ongoing mitigation efforts that include the following:

- The District trains firefighters on the most up to date methods of firefighting, EMT, and Search and Rescue.

N.7 Mitigation Strategy

N.7.1. Mitigation Goals and Objectives

The SMFD adopts the hazard mitigation goals and objectives developed by the HMPC and described in Chapter 5 Mitigation Strategy.

N.7.2. Mitigation Actions

The planning team for the SMFD identified and prioritized the following mitigation actions based on the risk assessment. Background information and information on how each action will be implemented and administered, such as ideas for implementation, responsible office, potential funding, estimated cost, and timeline are also included. The following hazards were considered a priority for purposes of mitigation action planning:

- Climate Change
- Dam Failure
- Drought & Water Shortage
- Earthquake
- Earthquake Liquefaction
- Floods: 1%/0.2% annual chance
- Floods: Localized Stormwater
- Levee Failure
- Pandemic
- Severe Weather: Extreme Cold and Freeze
- Severe Weather: Extreme Heat
- Severe Weather: Heavy Rains and Storms
- Severe Weather: Wind and Tornado
- Wildfire

It should be noted that many of the projects submitted by each jurisdiction in Table 5-4 in the Base Plan benefit all jurisdictions whether or not they are the lead agency. Further, many of these mitigation efforts are collaborative efforts among multiple local, state, and federal agencies. In addition, the countywide public outreach action, as well as many of the emergency services actions, apply to all hazards regardless of hazard priority. Collectively, this multi-jurisdictional mitigation strategy includes only those actions and projects which reflect the actual priorities and capacity of each jurisdiction to implement over the next 5-years covered by this plan. It should further be noted, that although a jurisdiction may not have specific projects identified for each priority hazard for the five year coverage of this planning process, each jurisdiction has focused on identifying those projects which are realistic and reasonable for them to implement and would like to preserve their hazard priorities should future projects be identified where the implementing jurisdiction has the future capacity to implement.

Multi-Hazard Actions

Action 1. Finalization and Implementation of Metro Fire's Community Risk Assessment and Associated Community Risk Reduction Plan

Hazards Addressed: Earthquake, Earthquake: Liquefaction, Flooding, Drought/Water Shortage, Pandemic, Wildfire

Goals Addressed: 1, 2, 3, 4, 5, 6

Issue/Background: Identifying and prioritizing risks at the community level is a significant investment to aid in the safety, sustainability and resiliency of the Communities Metro Fire serves. Through the completion of a comprehensive and evidence-based evaluation that identifies, prioritizes, and defines risks within a particular community, we are able to coordinate the application of resources to mitigate or minimize the occurrence and/or impact of such risks.

Project Description: Deployment of the Community Risk Reduction Plan (CRRP) based on the findings and priorities identified in the comprehensive assessment as they relate to the hazards noted above. This process provides data-driven guidance for the effective deployment of education, prevention, enforcement and/or mitigation strategies to maximize impact on safety enhancement of the community. The majority of the actionable items will relate to educational and outreach opportunities, however there will be mitigation items we would be able to incorporate and/or expand upon. Because this document is in draft form, it will be difficult to provide all mitigation measures. Some examples of potential mitigation measures might be offering residence sandbags to areas subject to flooding, assistance to the business community with emergency evacuation plans, community based projects to incorporate drought resistant/fire restive landscaping in rural/WUI areas. A more complete list of measures will be included in the final draft of Metro Fire's CRRP.

Other Alternatives: None

Existing Planning Mechanism(s) through which Action Will Be Implemented: Actions will be implemented based on Metro Fire's CRRP.

Responsible Agency/ Department/Partners: Metro Fire and identified partners when applicable.

Cost Estimate: Individual and total costs for mitigation measures will be outlined in Metro Fire's CRRP.

Benefits (Losses Avoided): Continuous monitoring and evaluation along with the specific details of benefits, status updates and challenges will be outlined in Metro Fire's CRRP. The information and results will be documented and updated on an annual basis.

Potential Funding: Grant funding

Timeline: Metro Fire's CRA and CRRP will be reviewed on an annual basis with the potential of a comprehensive review and revision every 5 years.

Project Priority (H, M, L): H

Action 2. *Evaluation and Implementation of Measures Necessary to Mitigate Fire Stations that Would be Directly Affected by Dam Failure*

Hazards Addressed: Dam Failure

Goals Addressed: 1, 2, 3, 4, 5, 6

Issue/Background: There are several fire stations that would be significantly impacted in the event of dam failure. These stations would become uninhabitable and apparatus and equipment would be vulnerable to damage.

- Fire Station 50
- Fire Station 51
- Fire Station 52
- Fire Station 53
- Fire Station 54
- Fire Station 61
- Fire Station 62
- Fire Station 63
- Fire Station 64
- Fire Station 65
- Fire Station 66
- Fire Station 68
- Fire Station 105
- Fire Station 106
- Fire Station 110
- Fire Station 111
- Fire Station 116
- Fire Station 117
- Headquarters
- Logistics
- 3101 Gold Canal

Project Description: Determine the extent of mitigation and retrofitting of the above noted facilities, including items such as flood proofing or relocation of the facilities to outside the inundation zone.

Other Alternatives: Elevating the fire station structures above the flood level.

Existing Planning Mechanism(s) through which Action Will Be Implemented: Capital Improvement Plan (CIP)

Responsible Agency/ Department/Partners: Sacramento Metropolitan Fire District Chief Financial Officer

Cost Estimate: Individual and total cost estimates are listed in the CIP

Benefits (Losses Avoided): Prevents the loss of critical infrastructure facilities.

Potential Funding: Capital Improvement Funds, Grant Funding

Timeline: 5 years (CIP contains detailed timeframes)

Project Priority (H, M, L): Medium

Action 3. *Modernization/Upgrade all District Facilities to Comply with Essential Services Code Requirements*

Hazards Addressed: Multi-Hazard (Climate Change, Dam Failure, Drought & Water Shortage, Earthquake, Earthquake Liquefaction, Floods: 1%/0.2% annual chance, Floods: Localized Stormwater, Levee Failure, Pandemic, Severe Weather: Extreme Cold and Freeze, Severe Weather: Extreme Heat, Severe Weather: Heavy Rains and Storms, Severe Weather: Wind and Tornado, Wildfire)

Goals Addressed: 1, 2, 3, 4, 5, 6

Issue/Background: All of Metro Fire's facilities are categorized as essential services facilities, thus requiring upgrades for code compliance.

Project Description: Upgrade fire stations to address all hazard related codes/best practices and/or locate suitable properties and construct new fire stations to replace the current station locations vulnerable to natural hazards. This includes relocating/hardening all facilities to withstand severe weather events, flooding, levee failure, dam failure, and other natural hazards of concern.

Other Alternatives: Relocation of specific facilities.

Existing Planning Mechanism(s) through which Action Will Be Implemented: Capital Improvement Plan (CIP)

Responsible Agency/ Department/Partners: Sacramento Metropolitan Fire District Chief Financial Officer

Cost Estimate: Individual and total cost estimates are listed in the CIP, Grant Funds

Benefits (Losses Avoided): Prevents the loss of critical infrastructure facilities.

Potential Funding: Capital Improvement Funds, Grant Funding

Timeline: 5-10 years (CIP contains detailed timeframes)

Project Priority (H, M, L): Medium

Action 4. *Community Wildfire Protection Plan (CWPP) – Revision and Implementation of Resulting Changes*

Hazards Addressed: Wildfire

Goals Addressed: 1, 2, 3, 4, 5, 6

Issue/Background: There is a significant portion of Metro Fire’s jurisdiction that consists of larger rural/agricultural properties that remain undeveloped and/or will not be developed in the foreseeable future. Many of these properties are adjacent to pockets of smaller, developed residential communities posing a potential threat to life and property.

Project Description: Mitigate the loss of life and property during wildfires, with drought like conditions compounding and intensify fire behavior. These measures will be implemented through a combination of education, outreach, fuels reduction and enforcement.

Other Alternatives: None

Existing Planning Mechanism(s) through which Action Will Be Implemented: Community Wildfire Protection Plan

Responsible Agency/ Department/Partners: Community Risk Reduction Division

Cost Estimate: Total and individual costs will be outlined in Metro Fire’s CWPP.

Benefits (Losses Avoided): Mitigate the potential for property loss in rural/agricultural areas by reducing ignitable fuels and the ignition potential for structures.

Potential Funding: Grant Funding, Staff time

Timeline: 1-2 years

Project Priority (H, M, L): high

Action 5. Relocate the Essential Facilities in the 200 year Floodplain

Hazards Addressed: Flooding

Goals Addressed: 1, 2, 3, 4, 5, 6

Issue/Background: Three fire stations are located within the 200 year flood plain of the American River. These stations would become uninhabitable during a significant flood. Apparatus and equipment are vulnerable to damage.

- Fire Station 51
- Fire Station 52
- Fire Station 53
- Fire Station 54
- Fire Station 61
- Fire Station 65
- Fire Station 105

Project Description: Locate suitable properties and construct the new fire stations to replace the current station locations falling within the flood plain.

Other Alternatives: Elevating the fire station structures above the flood level.

Existing Planning Mechanism(s) through which Action Will Be Implemented: Capital Improvement Plan (CIP)

Responsible Agency/ Department/Partners: Sacramento Metropolitan Fire District Chief Financial Officer

Cost Estimate: Individual and total cost estimates are listed in the CIP

Benefits (Losses Avoided): Prevents the loss of critical infrastructure facilities.

Potential Funding: Capital Improvement Funds, Grant Funding

Timeline: 5 years (CIP contains detailed timeframes)

Project Priority (H, M, L): Medium