Annex F City of Sacramento

F.1 Introduction

This Annex details the hazard mitigation planning elements specific to the City of Sacramento, a previously participating jurisdiction of the 2016 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 City. This Annex provides additional information specific to Sacramento, with a focus on providing additional details on the risk assessment and mitigation strategy for this community.

F.2 Planning Process

As described above, Sacramento 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 City 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 F-1. Additional details on Plan participation and City representatives are included in Appendix A.

Table F-1 City of Sacramento – Planning Team

Name	Position/Title	How Participated
Neal Joyce	Supervising Engineer	Utilities Department - Development Services. Provided information on floodplain management and impacts on development.
Samuel Leu	Administrative Analyst	Provided information on climate change.
Carson Anderson	Preservation Director	Community Development Department – Planning Design/Preservation: Provided information on cultural and historical resources.
Lisa Deklinski	Program Specialist	Utilities Department - Security and Emergency Preparedness: Provided information on the Department Operations Center, levee security, and emergency management practices.
Brett Ewart	Senior Engineer	Utilities Department - Capital Improvement Program (CIP): Provide information on current and future Capital Improvement Project related to water.
Brett Grant	Senior Engineer	Utilities Department – Drainage CIP, Provided information on current and future conditions of the drainage system. Identified hazard areas and possible mitigation projects.
Richard Dalrymple	Senior Engineer	Utilities Department - Sewer CIP: Provided information on current and future conditions of the combined sewer system.

Name	Position/Title	How Participated
Dave Hansen	Supervising Engineer	Utilities Department – Information Technology: Provided information on the technology infrastructure of our utilities. Also, provided background to generator mitigation project.
Kevin Hocker	Arborist/Urban Forester	Public Works - Urban Forestry: Provided information on natural resources.
Sherill Huun	Supervising Engineer	Utilities Department - Environmental and Regulatory Compliance: Provided input on regulatory mitigation capabilities as well as water quality issues.
King Tunson	Fire Program Specialist	Sacramento Fire Department: Provided information on the Fire Department's public education efforts and ISO rating.
Deanne Neighbours	Program Specialist	Utilities Department - Integrated Planning and Asset Management: Provided perspective on maintenance and disaster recovery related to city assets.
Jessica McCabe	Program Analyst	Utilities Department - Public Affairs: Provided information on current and future public outreach programs. Insight on emergency public outreach and media relations.
Remi Mendoza	Senior Planner	Community Development Department - Long Term Planning: Provided information on the City's development, building procedures, and planning aspects.
Rosa Millino	Senior Engineer	Utilities Department - Floodplain Management: Provide information on flooding hazards, dam failure, and levee failure.
Doug Henry	Superintendent	Utilities Department - Operations and Maintenance: Provided mitigation projects related to levee patrols and flood fighting activities.
Jamie McKinley	Program Analyst	Utilities Department - Floodplain Management: Provided information on flood hazards and researched other natural hazards within the City.
Jeanelle Gottlob	Emergency Manager	City of Sacramento - Emergency Operation Center: Provided information on the City's hazard history, current preparedness, and identified multiple mitigation projects.
Mark Severeid	Superintendent	Utilities Department - Water Quality Lab and Research & Development: Provided information on the City's water plant and provided mitigation project related to flood recovery.
Daniel Bowers	Director of Emergency Management	City of Sacramento - Director of Emergency Management – Plans and mitigation actions.
Angelina Wu	Engineering Student Intern	Utilities Department – Intern. Provided many of the mitigation action worksheets for inclusion into the Plan. Provided detailed research on mitigation actions included in this plan.

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

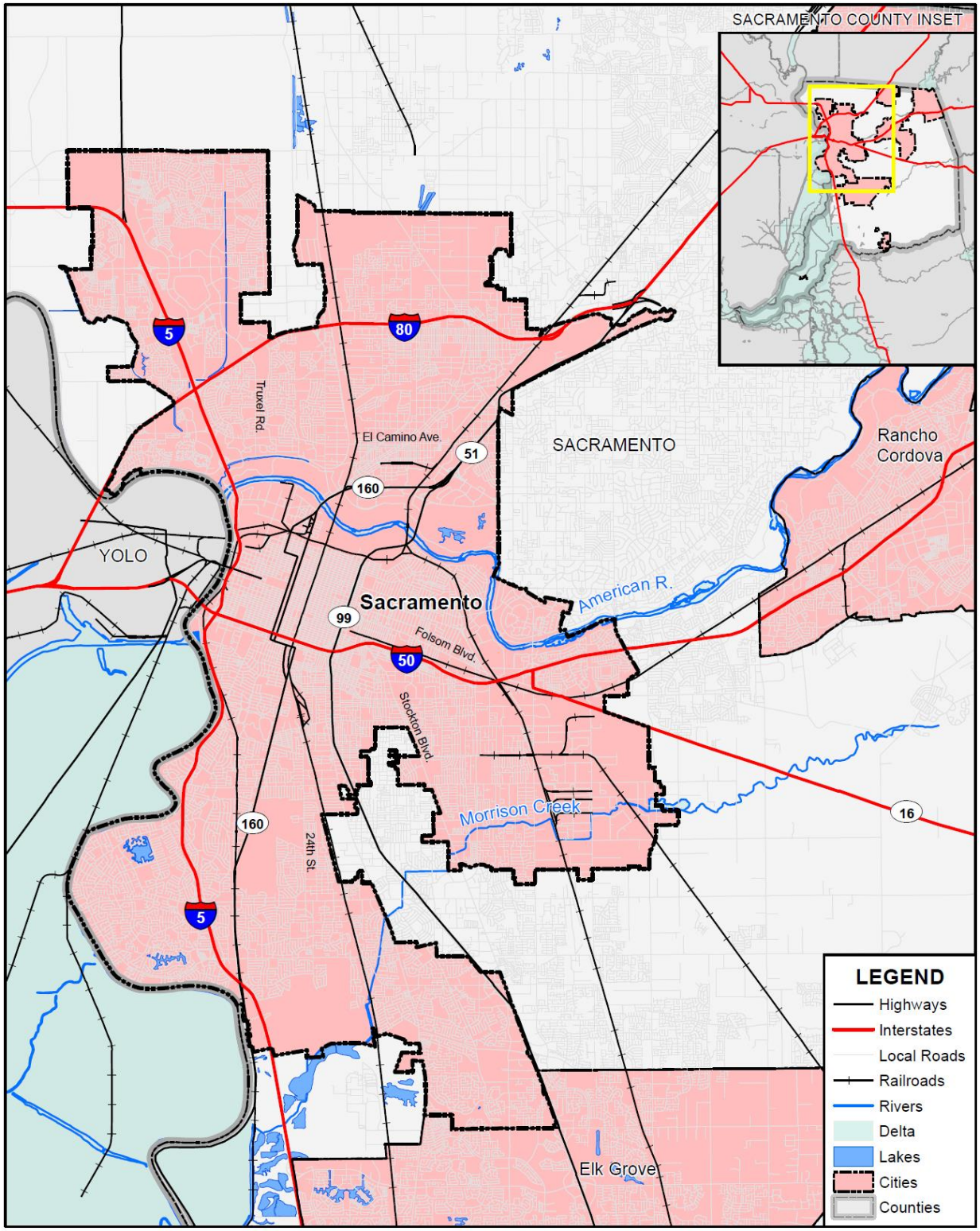
Table F-2 2016 LHMP Incorporation

Planning Mechanism 2016 LHMP Was Incorporated/Implemented In.	Details?
2035 General Plan	Goals and Policies related to fire prevention and suppression and flood protection have been incorporated into the Land Use, Public Health and Safety, and Environmental Constraints elements of the 2035 General Plan. The Public Health and Safety Goal 4.1.1 is to maintain and implement the Sacramento County Multi-Hazard Emergency Plan to address the major hazards facing the City of Sacramento
City Emergency Operations Plan/ Department of Utilities Emergency Action Plan	Plans to set procedures for emergency response based on natural hazards defined in the 2016 LHMP and 2018 Emergency Operations Plan. In addition, critical facilities identified in the 2011 LHMP were incorporated into these plans for emergency notification. The City of Sacramento, situated within Sacramento County, faces a variety of hazards. The city developed this plan on the basis of hazard and vulnerability findings that are identified in the Sacramento County Multi-Hazard Mitigation Plan. The analysis of these threats included both natural and technological hazards that affect the operational area.
Comprehensive Flood Management Plan	Another planning mechanism for the City that addresses flooding related hazards identified in the 2016 LHMP. This Plan discusses future development, internal drainage, Community Rating System program, National Flood Insurance Program, levee security, and flood control projects.
Repetitive Loss Area Analysis	A plan to further analyze repetitive loss properties that have flooded because of a high hazard – flooding, which was identified in the 2016 LHMP.

F.3 Community Profile

The community profile for the City of Sacramento is detailed in the following sections. Figure F-1 displays a City map and the location of Sacramento within Sacramento County.

Figure F-1 City of Sacramento



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

F.3.1. Geography and Climate

The City of Sacramento is located in the heart of California's Central Valley at the confluence of the Sacramento and American Rivers. The Great Valley is a flat alluvial plain approximately 50 miles wide and 400 miles long in the central portion of California. Its northern part is the Sacramento Valley drained by the Sacramento River, and its southern part is the San Joaquin Valley drained by the San Joaquin River. It is surrounded by the Sierra Nevada to the east, the Tehachapi Mountains to the south, Coastal Range to the west, and Cascade Range to the north. The topography of the area is relatively flat. There is a gradual slope rising from elevations as low as sea level in the southwestern portion of the Policy Area up to approximately 75 feet above sea level in the northeastern portion.

Sacramento is the cultural and economic center of its six-county metropolitan area (El Dorado, Placer, Sacramento, Sutter, Yolo, and Yuba counties) and the largest city in the Central Valley. The regional location of Sacramento, as shown on the map above, is roughly halfway between San Francisco to the west and Lake Tahoe to the east. Sacramento covers a total area of approximately 99 square miles and is the seventh most populous city in California with a 2010 estimated population of 466,087. Sacramento has a Mediterranean climate that is characterized by mild winters and dry, hot summers. Rain typically falls between November and March, with the rainy season tapering off almost completely by the end of April. Average daily high temperatures range from the 50s in December and January to the 90s in July (with many days of over 100).

Sacramento is accessible from Interstate 80 and U.S. Highway 50 (running east/west) and Interstate 5 and U.S. Highway 99 (running north/south). Amtrak serves Sacramento's passenger rail needs, while Sacramento International Airport (SMF) provides domestic and international flights through most major airlines. Within the city and surrounding region, Sacramento Regional Transit provides bus and light rail service.

F.3.2. History

Prior to European settlement, Nisenan (Southern Maidu) and Plains Miwok Indians lived in the area. In the early 1800s, the Spanish explorer Gabriel Moraga "discovered" and named the Sacramento Valley and the Sacramento River after the Spanish term for "sacrament." Sacramento was founded during the California Gold Rush and grew quickly due to the protection of Sutter's Fort, which was established by John Sutter in 1839.

The citizens of Sacramento adopted a city charter in 1849 and became the first incorporated city in California on February 27, 1850. During the California Gold Rush and through the 1800s, Sacramento became a major distribution point, a commercial and agricultural center, a terminus for wagon trains, stagecoaches, riverboats, the telegraph, the Pony Express, and the First Transcontinental Railroad, and in 1854 the state capital of California.

The city's current charter was adopted by voters in 1920, establishing a city council-and-manager form of government, still used today. The City expanded continuously over the years in the first half of the 1900s and in 1964 merged with the city of North Sacramento, just north of the American River. Large annexations

of the Pocket area on the south and Natomas area on the north eventually led to significant population growth throughout the 1970s, 1980s, and 1990s.

Sacramento experienced a massive growth in population in the 1990s and early 2000s. Primary sources of population growth are migration from the San Francisco Bay Area due to lower housing costs, as well as immigration from Asia, Central America, Mexico, Ukraine, and the rest of the former Soviet Union.

F.3.3. Economy and Tax Base

US Census estimates show economic characteristics for the City of Sacramento. These are shown in Table F-3 and Table F-4. Mean household income in the City was $93,318. Median household income in the City was $72,017.

Table F-3 City of Sacramento – Civilian Employed Population 16 years and Over

Industry	Estimated Employment	Percent
Agriculture, forestry, fishing and hunting, and mining	5,904	0.8%
Construction	46,204	6.6%
Manufacturing	38,614	5.5%
Wholesale trade	17,503	2.5%
Retail trade	77,625	11.0%
Transportation and warehousing, and utilities	40,437	5.7%
Information	12,024	1.7%
Finance and insurance, and real estate and rental and leasing	49,446	7.0%
Professional, scientific, and management, and administrative and waste management services	83,854	11.9%
Educational services, and health care and social assistance	15,996	2.3%
Arts, entertainment, and recreation, and accommodation and food services	66,807	9.5%
Other services, except public administration	35,285	5.0%
Public administration	74,604	10.6%

Source: US Census Bureau American Community Survey 2019 Estimates

Table F-4 City of Sacramento – Income and Benefits

Income Bracket	Percent
<$10,000	4.4%
$10,000 – $14,999	4.0%
$15,000 - $24,9999	7.1%
$25,000 – $34,999	7.8%
$35,000 – $49,999	11.1%
$50,000 – $74,999	17.6%
$75,000 – $99,999	13.7%

Income Bracket	Percent
$100,000 – $149,999	17.4%
$150,000 – $199,999	8.5%
$200,000 or more	8.4%

Source: US Census Bureau American Community Survey 2019 Estimates

The largest employers in the City of Sacramento are shown on Table F-5.

Table F-5 City of Sacramento – Largest Employers

California Department-Corrections	Sacramento	Insurance Agents Brokers & Service
California State Univ Sacramento	Sacramento	Schools-Universities & Colleges Academic
Corrections Department	Sacramento	State Govt-Correctional Institutions
Dept of Transportation In Ca	Sacramento	Government Offices-State
Disabled American Veterans	Sacramento	Veterans' & Military Organizations
Employment Development Dept	Sacramento	Outplacement Consultants
Environmental Protection Agency	Sacramento	State Government-Environmental Programs
Kaiser Permanente South	Sacramento	Hospitals
L A Care Health Plan	Sacramento	Health Plans
Mercy General Hospital	Sacramento	Hospitals
Sacramento Bee	Sacramento	Newspapers (publishers/Mfrs)
Sacramento Municipal Utility	Sacramento	Electric Contractors
Securitas Security Svc USA	Sacramento	Security Guard & Patrol Service
SMUD	Sacramento	Electric Companies
State Compensation Insurance Fund	Sacramento	Insurance
Summit Funding Inc	Sacramento	Financing
Sutter Medical Ctr-Sacramento	Sacramento	Hospitals
Water Resource Dept	Sacramento	Government Offices-State

Source: California Economic Development Department. Retrieved 6/2/2021.

TAX USE CATEGORY SUMMARY

F.3.4. Population

The California Department of Finance estimated the January 1, 2020 total population for the City of Sacramento was 510,931.

F.4 Hazard Identification

Sacramento's identified the hazards that affect the City and summarized their location, extent, likelihood of future occurrence, potential magnitude, and significance specific to Sacramento (see Table F-6).

Table F-6 City of Sacramento—Hazard Identification Assessment

Hazard	Geographic Extent	Likelihood of Future Occurrences	Magnitude/ Severity	Significance	Climate Change Influence
Climate Change	Extensive	Highly Likely	Critical	High	–High
Dam Failure	Significant	Unlikely	Catastrophic	High	Medium
Drought & Water Shortage	Extensive	Likely	Limited	Medium	High
Earthquake	Extensive	Occasional	Catastrophic	Medium	Low
Earthquake Liquefaction	Limited	Occasional	Critical	Medium	Low
Floods: 1%/0.2% annual chance	Significant	Occasional	Critical	High	High
Floods: Localized Stormwater	Extensive	Highly Likely	Limited	Medium	High
Landslides, Mudslides, and Debris Flow	Limited	Unlikely	Negligible	Low	Low
Levee Failure	Extensive	Unlikely	Critical	High	High
Pandemic	Extensive	Likely	Catastrophic	High	Medium
Severe Weather: Extreme Cold and Freeze	Extensive	Unlikely	Critical	High	High
Severe Weather: Extreme Heat	Extensive	Highly Likely	Limited	Medium	High
Severe Weather: Heavy Rains and Storms	Extensive	Highly Likely	Critical	High	High
Severe Weather: Wind and Tornado	Extensive	Highly Likely	Limited	Medium	Medium
Subsidence	Significant	Likely	Limited	Low	High
Volcano	Extensive	Unlikely	Negligible	Low	Low
Wildfire	Significant	Highly Likely	Critical	High	High

Geographic Extent
Limited: Less than 10% of planning area
Significant: 10-50% of planning area
Extensive: 50-100% of planning area

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.

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

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

F.5 Hazard Profile and Vulnerability Assessment

The intent of this section is to profile Sacramento's hazards and assess the City'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 City is included in this Annex. This vulnerability assessment analyzes the property, population, critical facilities, and other assets at risk to hazards ranked of medium or high significance specific to the City (as identified in the Significance column of Table F-6) and also includes a vulnerability assessment to the three primary hazards to the State of California: earthquake, flood, and wildfire. For more information about how hazards affect the County as a whole, see Chapter 4 Risk Assessment in the Base Plan.

F.5.1. Hazard Profiles

Each hazard vulnerability assessment in Section 0, includes a hazard profile/problem description as to how each medium or high significant hazard affects the City 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 Planning Area.

F.5.2. Vulnerability Assessment and Assets at Risk

This section identifies Sacramento'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 community. This data is not hazard specific, but is representative of total assets at risk within the community.

Values at Risk

The following data from the Sacramento County Assessor's Office is based on the 2020 Assessor's data. The methodology used to derive property values is the same as in Section 4.3.1 of the Base Plan. This data should only be used as a guideline to overall values in the County, as the information has some limitations. The most significant limitations are created by Proposition 13 and the Williamson Act as detailed in the Base Plan. With respect to Proposition 13, instead of adjusting property values annually, the values are not adjusted or assessed at fair market value until a property transfer occurs. As a result, overall value information is most likely low and does not reflect current market value of properties within the County. It is also important to note, in the event of a disaster, it is generally the value of the infrastructure or improvements to the land that is of concern or at risk. Generally, the land itself is not a loss. However, depending on the type of hazard and impact of any given hazard event, land values may be adversely affected; thus, land values are included as appropriate. Table F-7 shows the 2020 Assessor's values and content replacement values (e.g., the values at risk) broken down by property use for the City.

Table F-7 City of Sacramento – Total Values at Risk by Property Use

Property Use	Total Parcel Count	Improved Parcel Count	Total Land Value	Improved Structure Value	Estimated Contents Value	Total Value
Agricultural	14	2	$3,766,304	$623,292	$623,292	$5,012,888
Care/Health	158	132	$101,986,210	$1,650,906,442	$1,650,906,442	$3,403,799,094
Church/Welfare	539	440	$110,796,101	$547,917,921	$547,917,921	$1,206,631,943
Industrial	2,034	1,820	$715,773,896	$2,237,502,146	$3,356,253,213	$6,309,529,268
Miscellaneous	3,065	9	$3,772,608	$320,049	$320,049	$4,412,706
Office	1,796	1,452	$1,194,477,660	$5,063,635,910	$5,063,635,910	$11,321,749,480
Public/Utilities	768	1	$1,709,648	$31,233	$31,233	$1,772,114
Recreational	139	80	$91,014,962	$472,244,051	$472,244,051	$1,035,503,064
Residential	138,671	136,429	$11,850,039,828	$30,788,795,112	$15,394,397,104	$58,033,232,742
Retail/ Commercial	2,943	2,341	$1,341,124,596	$2,593,301,604	$2,593,301,604	$6,527,727,804
Unknown	2	1	$0	$86,693	$0	$86,693
Vacant	5,461	189	$917,560,472	$38,071,318	$0	$955,631,790
City of Sacramento Total	**155,590**	**142,896**	**$16,332,022,285**	**$43,393,435,771**	**$29,079,630,819**	**$88,805,089,586**

Source: Sacramento County 2020 Parcel/Assessor's Data

Critical Facilities and Infrastructure

Critical facilities and infrastructure are those buildings and infrastructure that are crucial to a community. Should these be damaged, it makes it more difficult for the community to respond to and recover from a disaster. For purposes of this Plan, a critical facility is defined as:

PLACE

Natural Resources

Natural resources are unique to each area and are difficult to replace. Should a natural disaster occur, these species and locations are at risk.

Habitats

The City of Sacramento has a variety of natural resources of value to the community:

- Annual Grassland
- Ruderal Habitats
- Riparian Woodland
- Oak Woodlands
- Wetlands
- Rivers, Creeks, and Canals

- Freshwater Marsh
- Vernal Pools and Seasonal Wetlands
- Ornamental Landscaping

Wetlands

The wetland and related habitat areas are some of the most important resources of the City. Wetlands are habitats in which soils are intermittently or permanently saturated or inundated. Wetland habitats vary from rivers to seasonal ponding of alkaline flats and include swamps, bogs, marshes, vernal pools, and riparian woodlands. Wetlands are considered to be waters of the United States and are subject to the jurisdiction of the U.S. Army Corps of Engineers as well as the California Department of Fish and Wildlife (CDFW). Where the waters provide habitat for federally endangered species, the U.S. Fish and Wildlife Service may also have authority.

Wetlands are a valuable natural resource for communities providing beneficial impact to water quality, wildlife protection, recreation, and education, and play an important role in hazard mitigation. Wetlands provide drought relief in water-scarce areas where the relationship between water storage and streamflow regulation is vital, and reduce flood peaks and slowly release floodwaters to downstream areas. When surface runoff is dampened, the erosive powers of the water are greatly diminished. Furthermore, the reduction in the velocity of inflowing water as it passes through a wetland helps remove sediment being transported by the water.

Wetlands are often found in floodplains and depressional areas of a watershed. Many wetlands receive and store floodwaters, thus slowing and reducing downstream flow. Wetlands perform a variety of ecosystem functions including food web support, habitat for insects and other invertebrates, fish and wildlife habitat, filtering of waterborne and dry-deposited anthropogenic pollutants, carbon storage, water flow regulation (e.g., flood abatement), groundwater recharge, and other human and economic benefits.

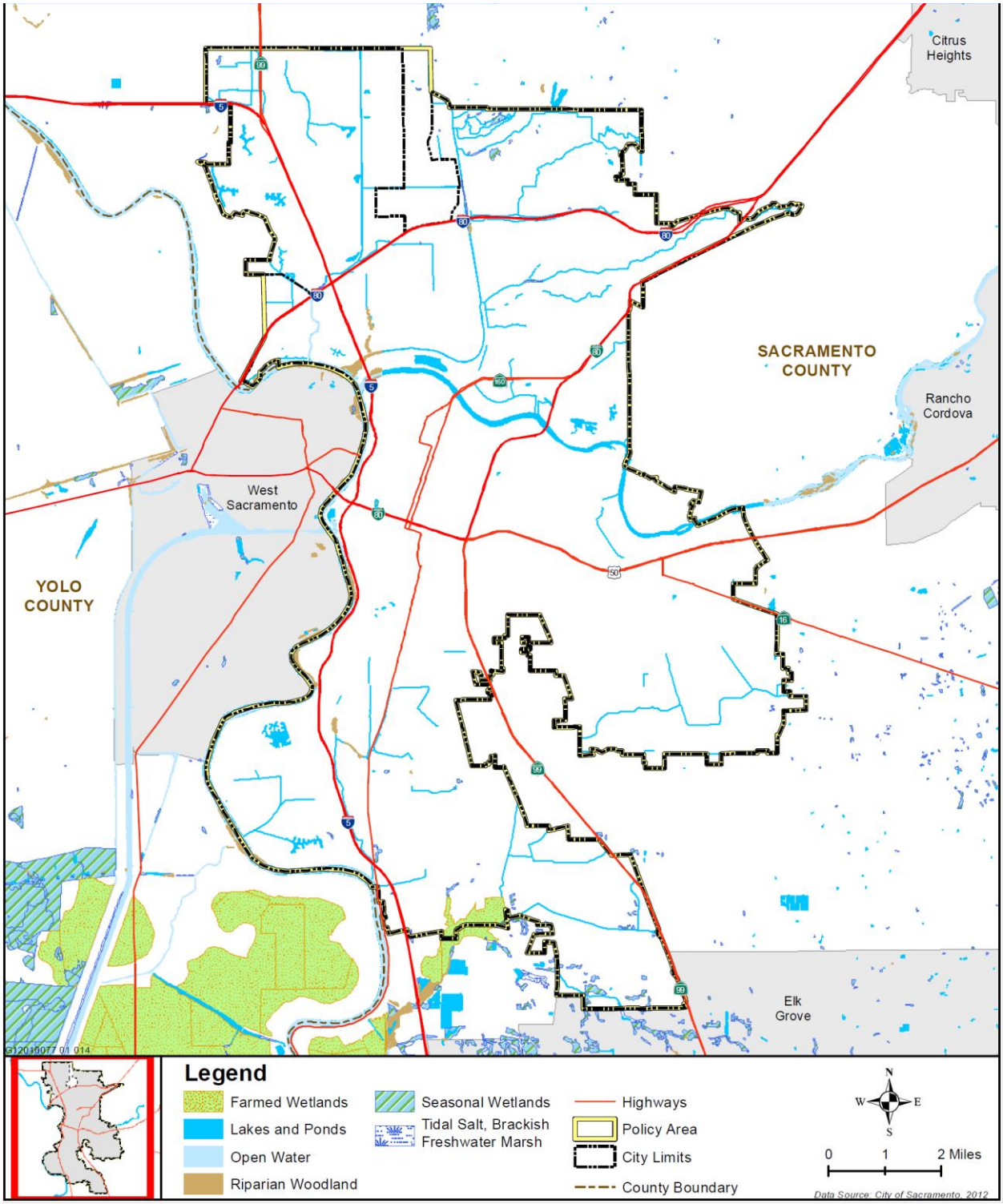
Wetlands, and other riparian and sensitive areas, provide habitat for insects and other invertebrates that are critical food sources to a variety of wildlife species, particularly birds. There are species that depend on these areas during all parts of their lifecycle for food, overwintering, and reproductive habitat. Other species use wetlands and riparian areas for one or two specific functions or parts of the lifecycle, most commonly for food resources. In addition, these areas produce substantial plant growth that serves as a food source to herbivores (wild and domesticated) and a secondary food source to carnivores.

Wetlands slow the flow of water through the vegetation and soil, and pollutants are often held in the soil. In addition, because the water is slowed, sediments tend to fall out, thus improving water quality and reducing turbidity downstream.

These natural floodplain functions associated with the natural or relatively undisturbed floodplain that moderates flooding, such as wetland areas, are critical for maintaining water quality, recharging groundwater, reducing erosion, redistributing sand and sediment, and providing fish and wildlife habitat. Preserving and protecting these areas and associated functions are a vital component of sound floodplain management practices for the City of Sacramento.

Wetlands function as natural sponges that trap and slowly release surface water, rain, snowmelt, groundwater and flood waters. Trees, root mats, and other wetland vegetation also slow the speed of floodwaters and distribute them more slowly over the floodplain. This combined water storage and braking action lowers flood heights and reduces erosion. Wetlands within and downstream of urban areas are particularly valuable, counteracting the greatly increased rate and volume of surface- water runoff from pavement and buildings. The holding capacity of wetlands helps control floods and prevents water logging of crops. Preserving and restoring wetlands, together with other water retention, can often provide the level of flood control otherwise provided by expensive dredge operations and levees. Figure F-2 provides a map of the City's wetland areas.

Figure F-2 City of Sacramento – Wetlands Location Map



Source: City of Sacramento 2035 General Plan

Special Status Species

The following special-status species are known to occur within the natural habitats most likely to be present within the Policy Area boundaries. These and other species potentially occurring in the Policy Area can be found in Table F-8. Figure F-3 shows the locations of sensitive elements within the Policy Area.

Table F-8 Special-Status Species Potentially Occurring in the City of Sacramento

Scientific Name	Common Name	Status	Habitat
Plants			
Astragalus tener var. tener	Alkali milk-vetch	1B.2	Vernal pools, playas and Valley grasslands on adobe clay and/or alkaline soils.
Atriplex depressa	Brittlescale	1B.2	Chenopod scrub, meadows, playas, valley grassland, vernal pools. Usually in alkali scalds or alkali clay in meadows or annual grassland.
Atriplex joaquiniana	San Joaquin saltbush	1B.2	Chenopod scrub, alkali meadow, valley and foothill grassland.
Balsamorhiza macrolepis var. macrolepis	Big-scale balsamroot	1B.2	Grassland
Chloropyron molle ssp. hispidum	Hispid bird's beak	1B.1	Grassland/ vernal pool.
Chloropyron palmatum	Palmate-bracted bird's-beak	FE, CE, 1B.1	Chenopod scrub, valley and foothill grassland. usually on alkaline clay, with Distichlis, Frankenia, etc.
Downingia pusilla	Dwarf downingia	2.2	Vernal pool
Gratiola heterosepala	Boggs Lake hedge-hyssop	CE, 1B.2	Vernal pool
Hibiscus lasiocarpus	Woolly rose-mallow	2.2	Freshwater marshes and swamps in the Central Valley.
Juglans hindsii	Northern California black walnut	1B.1	Riparian forest, and woodland. Few extant native stands remain; but is widely naturalized from rootstock plants
Juncus leiospermus var. ahartii	Ahart's dwarf rush	1B.2	Vernal pool
Legenere limosa	Legenere	1B.1	Vernal pool
Lepidium latipes var. heckardii	Heckard's pepper-grass	1B.2	Valley and foothill grassland and vernal pools on alkaline soils
Navarretia myersii ssp. myersii	Pincushion navarretia	1B.1	Vernal pool
Orcuttia tenuis	Slender orcutt grass	FT/CE/1B.1	Vernal pool
Orcuttia viscida	Sacramento orcutt grass	FE, 1B.1	Vernal pool and occasionally seasonal wetlands
Sagittaria sanfordii	Sanford's arrowhead	1B.2	Marshes and swamps (assorted shallow fresh water).
Invertebrates			
Branchinecta lynchi	Vernal pool fairy shrimp	FT	Vernal pools and seasonal wetlands in grassland habitats

Scientific Name	Common Name	Status	Habitat
Desmocerus californicus dimorphus	Valley elderberry longhorn beetle	FT (under review for de-listing)	Elderberry shrubs, typically in or near riparian areas.
Lepidurus packardi	Vernal pool tadpole shrimp	FE	Vernal pools and seasonal wetlands in grassland habitats
Fish			
Archoplites interruptus	Sacramento Perch	CSC	Historically found in the sloughs, slow-moving rivers, and lakes of the central valley. Prefer warm water. Aquatic vegetation is essential for young. Tolerant of a wide range of physiochemical water conditions.
Acipenser medirostris	Green Sturgeon	FT, CSC	Long-lived anadromous species that migrates through the Sacramento River to spawning grounds in the Feather and upper Sacramento rivers. Occurs in low numbers in the San Francisco Estuary and Sacramento River. Thought to spawn in deep holes with fast moving water over cobble substrates. Larvae develop within freshwater systems, migrate downstream and remain in the estuaries for between one and four years before migrating to the ocean. Mature adults move into estuaries in the spring, and spawning adults continue into natal rivers in late spring/early summer. Post spawning adults return to the estuary before migrating back to the ocean in late fall. Sub-adult fish are also thought to enter estuaries during the summer and fall months. The Sacramento River adjacent to the Policy Area does not support spawning habitat for adult fish or rearing habitat for juveniles.
Hypomesus transpacificus	Delta smelt	FT, CE	Occurs in Sacramento-San Joaquin Delta most of the year. Spawns in tidally influenced freshwater wetlands and seasonally submerged uplands along the Sacramento River, downstream from its confluence with the American River
Oncorhynchus mykiss	Central Valley steelhead	FT	Occurs in the Pacific Ocean for most of its life. Travels to clean gravel beds in the upper Sacramento and portions of the American River for spawning
Oncorhynchus tshawytscha	Central Valley spring run Chinook salmon	FT, CT	Occurs in the Pacific Ocean for most of its life. Travels to clean gravel beds in the upper Sacramento and portions of the American River for spawning

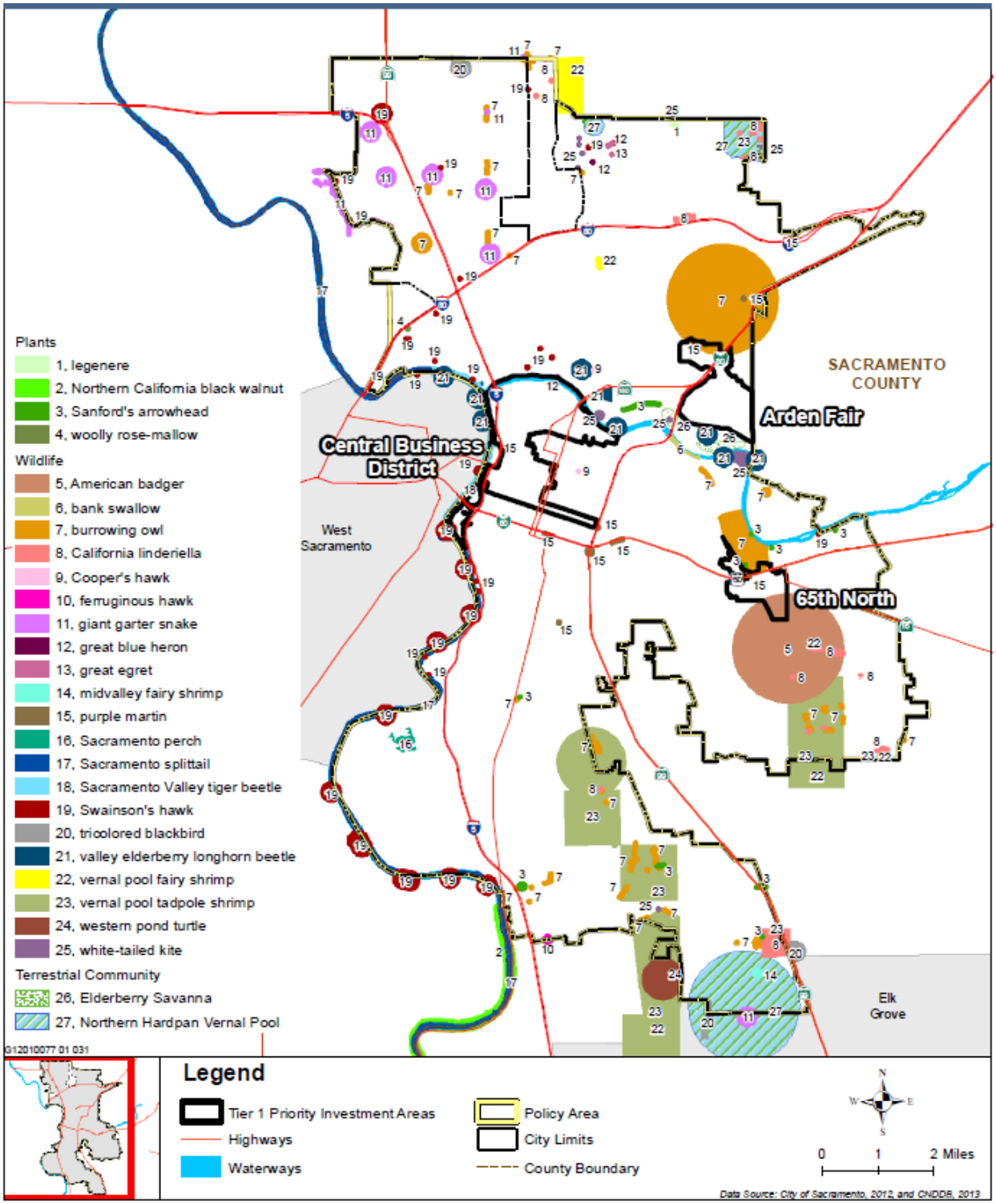
Scientific Name	Common Name	Status	Habitat
Oncorhynchus tshawytscha	Central Valley Winter run Chinook salmon	FE, CE	Occurs in the Pacific Ocean for most of its life. Travels to clean gravel beds in the upper Sacramento and portions of the American River for spawning.
Pogonichthys macrolepidotus	Sacramento splittail	SC/CSC	Endemic to the lakes and rivers of the central valley, but now confined to the Delta, Suisun Bay & associated marshes. Prefers slow moving river sections, dead end sloughs. Requires flooded vegetation for spawning & foraging for young.
Amphibians			
Spea hammondii	Western spadefoot	CSC	Breeds in seasonal wetlands and large vernal pools, spends most of the year underground in adjacent upland areas.
Reptiles			
Actinemys marmorata	Western pond turtle	CSC	Ponds, streams, rivers, marshes and canals with suitable basking sites and vegetative cover. Nests and aestivates in adjacent uplands.
Phrynosoma coronatum frontale	California horned lizard	CSC	Annual grassland, chaparral, saltbush scrub, alkali flats, oak woodland, riparian woodland, and coniferous forest; open habitats with loose fine (often sandy) soils.
Thamnophis gigas	Giant garter snake	FT, CT	Cattail and tule marshes, low gradient streams, rice fields and canals on the Valley floor
Birds			
Agelaius tricolor	Tricolor blackbird	CSC (nesting)	Nest in dense stands of cattails, thickets of willows, blackberries, or tall herbs adjacent to open grasslands
Athene cunicularia	Burrowing owl	CSC (burrow sites)	Grassland, deserts and other open habitats. Requires ground squirrel or other small mammal burrows for nesting
Buteo swainsoni	Swainson's hawk	CT	Nests in riparian trees; forages in open fields
Circus cyaneus	Northern harrier	CSC (nesting)	Nests in freshwater marsh and agricultural fields; forages in marshes, grasslands and agricultural fields
Elanus leucurus	White-tailed kite	CFP (Nesting)	Nests colonially in large trees adjacent to open grasslands for foraging.
Lanius ludovicianus	Loggerhead shrike	CSC (nesting)	Nests in woodlands adjacent to grassland foraging habitat
Melospiza melodia	Song sparrow "Modesto" population	CSC (year round)	Associated with emergent freshwater marshes, irrigation canals, riparian scrub, riparian woodland.

Scientific Name	Common Name	Status	Habitat
Progne subis	Purple martin	CSC (nesting)	Nest in cavities in trees, under bridges and other human-made structures
Riparia riparia	Bank swallow	CT	Nests in sandy banks or cliffs, usually over water (typically rivers and streams).
Mammals			
Antrozous pallida	Pallid bat	CSC	Roosts in crevices in caves, mines, large rock outcrops, under bridges and in abandoned buildings. Forages on or near the ground in a wide variety of open habitats
Corynorhinus townsendii townsendii	Pacific western big eared bat	CSC	Roosts in the open in large caves, abandoned mines and buildings. Very sensitive to roost disturbance
Lasiurus blossevillii	Western red bat	CSC	Roosts primarily in tree foliage, especially in cottonwood, sycamore, and other riparian trees or orchards. Although potential habitat for these species is present within the Policy Area, none have been recorded. Distribution of special-status bat species is difficult to study and therefore poorly known. Bat colonies that may harbor some or all of these specialstatus species are present in several of the older buildings in downtown Sacramento and in humanmade structures along the American and Sacramento rivers.
Taxidea taxus	American Badger	CSC	Principal habitat requirements include: sufficient prey base; friable soils; and relatively open, uncultivated ground such as grasslands. Prey primarily on burrowing rodents such as gophers, ground squirrels, marmots, and kangaroo rats. Badgers survive only in low numbers in peripheral parts of the Central Valley. The CNDDB includes one recorded occurrence in the Policy Area near Power Inn and Fruitridge roads.

Scientific Name	Common Name	Status	Habitat
Notes: Status = **Federal:** FE = Endangered, legally protected by the Federal Endangered Species Act (ESA) FT = Threatened, legally protected by the Federal Endangered Species Act (ESA) **State:** CE = Endangered, legally protected by the California Endangered Species Act (CESA) CFP = Fully Protected species (legally protected under Fish and Game Code) CSC = California Species of Concern by DFG (no formal protection other than CEQA consideration) CT = Threatened, legally protected by the California Endangered Species Act (CESA) SA = Animal included on the CDFW's Special Animal List. **California Rare Plant Ranks (no formal protection other than CEQA consideration):** 1B - Plant species that is rare or endangered in California or elsewhere. 2 - Plant species that is rare or endangered in California, but is more common elsewhere. ***Threat code extensions:*** .1 - Seriously endangered in California .2 – Fairly endangered in California .3 – Not very endangered in California			

Source: California Department of Fish and Game 2011, California Natural Diversity Database, 2007.

Figure F-3 City of Sacramento Biological Resources



Source: City of Sacramento 2035 General Plan Environmental Resources Background Report

Historic and Cultural Resources

Historic and cultural resources are difficult to replace. Should a natural disaster occur, these properties and locations can be at risk.

The City of Sacramento has a stock of historically significant homes, public buildings, and landmarks. To inventory these resources, the HMPC collected information from a number of sources. The California Department of Parks and Recreation Office of Historic Preservation (OHP) was the primary source of information. OHP administers the National Register of Historic Places, the California Register of Historical Resources, California Historical Landmarks, and the California Points of Historical Interest programs. Each program has different eligibility criteria and procedural requirements. These requirements are detailed in Section 4.3.1 of the Base Plan. Table F-9 lists the historical buildings in the City.

Table F-9 City of Sacramento – Historical Resources

Name (Landmark Plaque Number)	National Register	State Landmark	California Register	Point of Interest	Date Listed	City/Area
A. W. Clifton House, Compton Mansion (C17)			X		2/1/2002	Sacramento
Adams And Company Building (607)		X			5/22/1957	Sacramento
Alkali Flat Central Historic District (N1294)	X				7/26/1984	Sacramento
Alkali Flat North Historic District (N1279)	X				4/19/1984	Sacramento
Alkali Flat West Historic District (N1295)	X				7/26/1984	Sacramento
B. F. Hastings Building (606)		X			5/22/1957	Sacramento
Blue Anchor Building (N1171)	X				2/3/1983	Sacramento
Brighton School (N952)	X				4/3/1981	Sacramento
Business & Professional Building, Consumer Affairs Building (C8)			X		2/10/2000	Sacramento
California Almond Growers Exchange Processing Facility (967)		X			10/1/1985	Sacramento
California Governor's Mansion (N60)	X				11/10/1970	Sacramento
California State Capitol (N222)	X				4/3/1973	Sacramento
California's Capitol Complex (872)	X	X			5/6/1974	Sacramento
California's First Passenger Railroad (526)		X			3/7/1955	Sacramento
Calpak Plant No. 11 (N1285)	X				5/17/1984	Sacramento
Camp Union, Sacramentoville (666)		X			11/5/1958	Sacramento
Capitol Extension District (N1288)	X				5/24/1984	Sacramento
Chevra Kaddisha (Home Of Peace Cemetery) (654)		X			7/28/1958	Sacramento

Name (Landmark Plaque Number)	National Register	State Landmark	California Register	Point of Interest	Date Listed	City/Area
Coloma Road at Sacramento's Fort (745)		X			7/5/1960	Sacramento
Coolot Company Building (N671)	X				9/20/1978	Sacramento
Cranston--Geary House (N2010)	X				1/23/1998	Sacramento
Crocker, E. B., Art Gallery (N86)	X	X			5/6/1971	Sacramento
Curran Farmhouse (P666)				X	12/17/1985	Sacramento
D. O. Mills Bank Building (609)		X			5/22/1957	Sacramento
Dunlap's Dining Room (N1764)	X				4/2/1992	Sacramento
Eagle Theater (595)		X			5/22/1957	Sacramento
Eastern Star Hall (P754)	X			X	8/8/1991	Sacramento
Ebner's Hotel (602)		X			5/22/1957	Sacramento
Fire Station No. 6 (N1686)	X				4/25/1991	Sacramento
Firehouse No. 3 (N1743)	X				10/29/1991	Sacramento
First Transcontinental Railroad (780)		X			11/20/1962	Sacramento
First Transcontinental Railroad-Western Base of The Sierra Nevada (780)		X			11/20/1962	Sacramento
Five Mile House-Overland Pony Express Route in California (697)		X			9/11/1959	Sacramento
Galarneaux, Mary Haley, House (N2121)	X				2/12/2001	Sacramento
George Hack House (P800)				X	8/5/1994	Sacramento
Goethe House (N1036)	X				2/19/1982	Sacramento
Governor's Mansion (823)		X			6/7/1968	Sacramento
Greene, John T., House (N1092)	X				4/15/1982	Sacramento
Headquarters of The Big Four (600)		X			5/22/1957	Sacramento
Heilbron House (N462)	X				12/12/1976	Sacramento
Hotel Regis (N1147)	X				10/29/1982	Sacramento
Hotel Senator (N782)	X				5/30/1979	Sacramento
Howe, Edward P., Jr., House (N1037)	X				2/19/1982	Sacramento
Hubbard-Upson House (N543)	X				12/2/1977	Sacramento
I Street Bridge (N1094)	X				4/22/1982	Sacramento
J Street Wreck (N1692)	X				5/16/1991	Sacramento
Joe Mound (N121)	X				10/14/1971	Sacramento
Johnson, J. Neely, House (N438)	X				9/13/1976	Sacramento
Joseph Hampton Kerr Homesite (P126)				X	6/6/1969	Sacramento

Name (Landmark Plaque Number)	National Register	State Landmark	California Register	Point of Interest	Date Listed	City/Area
Judah, Theodore, School (N1985)	X				7/25/1997	Sacramento
Kuchler Row (N1121)	X				6/25/1982	Sacramento
Lady Adams Building (603)		X			5/22/1957	Sacramento
Lais, Charles, House (N1350)	X				2/28/1985	Sacramento
Libby Mcneil And Libby Fruit and Vegetable Cannery (N1050)	X				3/2/1982	Sacramento
McClatchy, C.K., Senior High School (N2148)	X				11/2/2001	Sacramento
Merchants National Bank of Sacramento (N1936)	X				2/16/1996	Sacramento
Merrium Apartments (N1654)	X				9/13/1990	Sacramento
Mesick House (N1002)	X				1/21/1982	Sacramento
Michigan (468)		X			8/30/1950	Sacramento
Motor Vehicle Building, Department of Food & Agriculture (C4)			X		11/5/1999	Sacramento
New Helvetia Cemetery (592)		X			5/22/1957	Sacramento
Nisipowinan Village Site (900)	X	X			6/16/1976	Sacramento
Old Elk Grove Hotel Site (P532)				X	6/29/1979	Sacramento
Old Folsom Powerhouse-Sacramento Station A (633)		X			3/3/1958	Sacramento
Old Sacramento (812)	X	X			12/30/1965	Sacramento
Old Tavern (N1242)	X				9/15/1983	Sacramento
Original Sacramento Bee Building (611)		X			5/22/1957	Sacramento
Overton Building (610)		X			5/22/1957	Sacramento
Pioneer Telegraph Station (366)		X			10/9/1939	Sacramento
Pony Express Terminal (N66000220)	X				10/15/1966	Sacramento
Public Works Office Building, Caltrans Building (C5)			X		11/5/1999	Sacramento
River Mansion (P149)				X	11/3/1969	Sacramento
Ruhstaller Building (N1003)	X				1/21/1982	Sacramento
Sacramento Bank Building (N1004)	X				1/21/1982	Sacramento
Sacramento City Cemetery (566)		X			2/25/1957	Sacramento
Sacramento City Library (N1784)	X				7/30/1992	Sacramento
Sacramento Hall of Justice (N2067)	X				9/24/1999	Sacramento
Sacramento Junior College Annex and Extensions (N1874)	X				8/22/1994	Sacramento

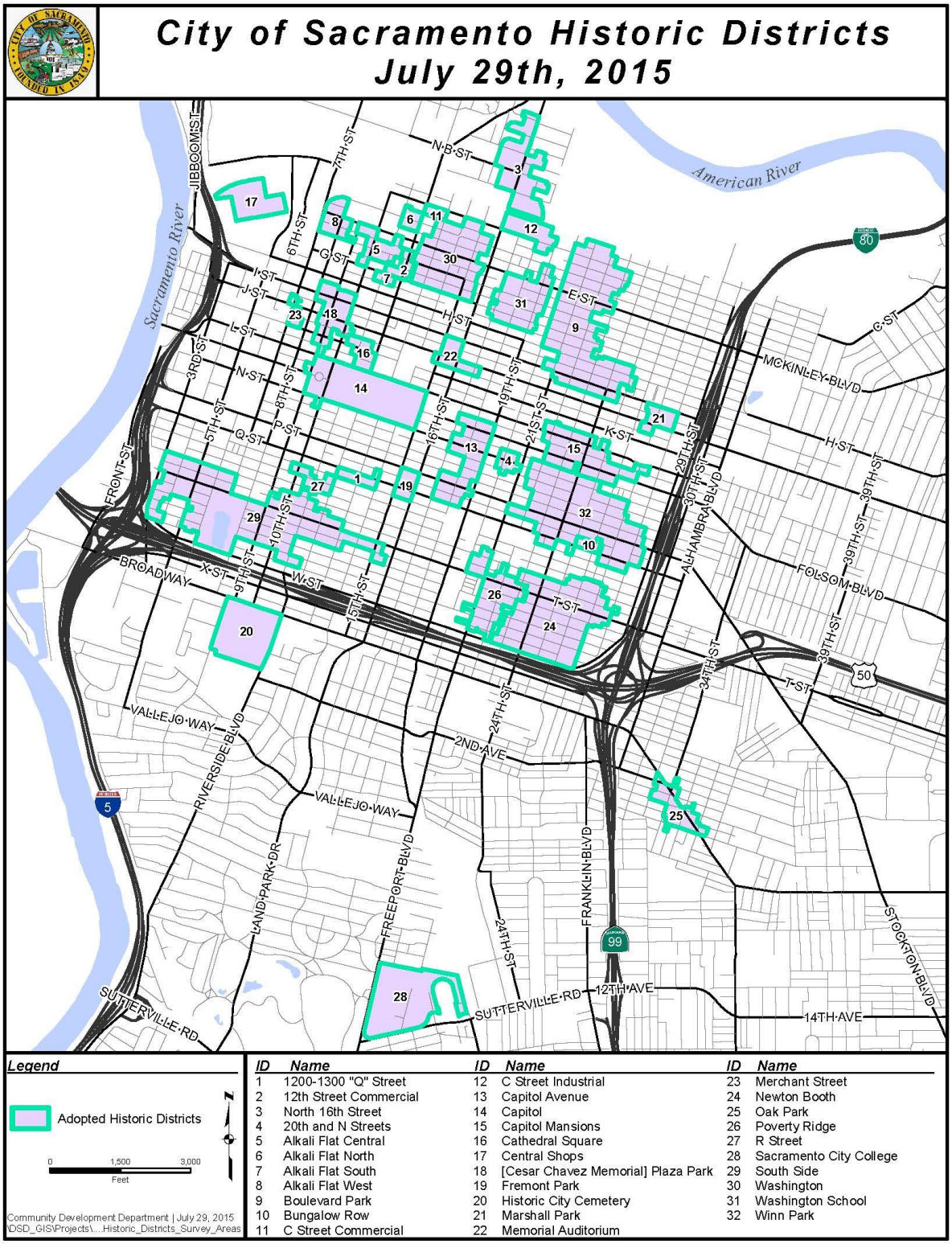
Name (Landmark Plaque Number)	National Register	State Landmark	California Register	Point of Interest	Date Listed	City/Area
Sacramento Masonic Temple (N2131)	X				5/17/2001	Sacramento
Sacramento Memorial Auditorium (N566)	X				3/29/1978	Sacramento
Site of China Slough (594)		X			5/22/1957	Sacramento
Site of Congregational Church (613)		X			5/22/1957	Sacramento
Site of First and Second State Capitols at Sacramento (869)		X			1/11/1974	Sacramento
Site of Home of Newton Booth (596)		X			5/22/1957	Sacramento
Site of Orleans Hotel (608)		X			5/22/1957	Sacramento
Site of Sacramento Union (605)		X			5/22/1957	Sacramento
Site of Sam Brannan House (604)		X			5/22/1957	Sacramento
Site of Stage and Railroad (First) (598)		X			5/22/1957	Sacramento
Site of The First African American Episcopal Church Established on The Pacific Coast (1013)		X			5/5/1994	Sacramento
Site of The First Jewish Synagogue Owned by A Congregation on The Pacific Coast (654)		X			7/28/1958	Sacramento
Site of Pioneer Mutual Volunteer Firehouse (612)		X			5/22/1957	Sacramento
Southern Pacific Railroad Company's Sacramento Depot (N353)	X				4/21/1975	Sacramento
St. Elizabeth's Church (P611)				X	3/2/1983	Sacramento
Stanford-Lathrop House (614)		X			5/22/1957	Sacramento
Sacramento's Fort (525)		X			11/1/1954	Sacramento
Sacramento's Landing (591)		X			5/22/1957	Sacramento
Sacramentoville (593)		X			5/22/1957	Sacramento
Temporary Detention Camps for Japanese Americans-Sacramento Assembly Center (934)		X			5/13/1980	Sacramento
Tower Bridge (N1116)	X				6/24/1982	Sacramento
Travelers' Hotel (N680)	X				10/19/1978	Sacramento
U.S. Post Office, Courthouse and Federal Building (N855)	X				1/25/1980	Sacramento
Van Voorhies House (N535)	X				11/17/1977	Sacramento
Wagner, Anton, Duplex (N923)	X				11/10/1980	Sacramento
Western Hotel (601)		X			5/22/1957	Sacramento

Name (Landmark Plaque Number)	National Register	State Landmark	California Register	Point of Interest	Date Listed	City/Area
Westminster Presbyterian Church (N2203)	X				5/22/2003	Sacramento
Wetzlar, Julius, House (N1183)	X				3/31/1983	Sacramento
What Cheer House (597)		X			5/22/1957	Sacramento
Whitter Ranch (Originally Saylor Ranch), Witter Ranch (P744)				X	5/8/1991	Sacramento
Winters House (N2046)	X				1/25/1999	Sacramento
Witter, Edwin, Ranch (N1675)	X				3/14/1991	Sacramento
Woodlake Site (N88)	X				5/6/1971	Sacramento

Source: California Department of Parks and Recreation Office of Historic Preservation, http://ohp.parks.ca.gov/

Over the years the City of Sacramento has undertaken several historic building surveys in an effort to establish specific Historic Districts. As of the date of this document's publication, the City of Sacramento has designated 32 Historic Districts and 14 Design Review Districts. The City Code provides for the compilation of Landmarks, Contributing Resources, and Historic Districts into the Sacramento Register of Historic and Cultural Resources (Sacramento Register). The Sacramento Register includes all listed or surveyed historic resources in the city of Sacramento. The Sacramento Register also includes listings or maps of the properties within the city's Design Review Districts that have been afforded preservation protection by ordinance, but are not designated as a Historic District. The historic districts are shown in Figure F-4.

Figure F-4 Historic Districts in the City of Sacramento



Source: Sacramento Register of Historic & Cultural Resources, 2016

It should be noted that these lists may not be complete, as they may not include those currently in the nomination process and not yet listed. Additionally, as defined by the California Environmental Quality Act (CEQA) and the National Environmental Policy Act (NEPA), any property over 50 years of age is considered a historic resource and is potentially eligible for the National Register. Thus, in the event that the property is to be altered, or has been altered, as the result of a major federal action, the property must be evaluated under the guidelines set forth by CEQA and NEPA. Structural mitigation projects are considered alterations for the purpose of this regulation.

Growth and Development Trends

As part of the planning process, the HMPC looked at changes in growth and development, both past and future, and examined these changes in the context of hazard-prone areas, and how the changes in growth and development affect loss estimates and vulnerability over time. Information from the City of Sacramento General Plan Housing Element, the California Department of Finance, the US Census Bureau form the basis of this discussion.

Historic Population Trends and Current Population

Population growth can increase the number of people living in hazard prone areas. Sacramento has generally seen steady growth. Sacramento has seen growth rates as shown in Table F-10.

Table F-10 City of Sacramento – Population Changes Since 1950

Year	Population	% Change
1950	137,572	–
1960	191,667	39.3%
1970	257,105	34.1%
1980	282,400	9.8%
1990	366,500	29.8%
2000	407,018	11.1%
2010[1]	466,488	14.6%
2020[2]	510,931	9.5%

Source: [1]US Census Bureau, [2]California Department of Finance

Special Populations and Disadvantaged Communities

Within the United States, those groups that have been found to generally be more vulnerable to climate impacts and natural hazards include the poor, communities of color, older adults, young children, people with physical and mental illness, people with cognitive and physical disabilities, immigrants, those experiencing discrimination, the socially isolated, those with limited transportation options, and those with inadequate housing. These groups of people experience elevated levels of vulnerability for a number of potentially overlapping reasons. Some of these factors include:

- Housing quality and location: Some populations have higher probabilities of living in risk prone areas, areas with poorly maintained infrastructure, and areas with increased levels of air pollution.

- Cultural barriers: Limited English speaking ability may make it more difficult for certain individuals to understand resources such as hazard warnings and emergency preparedness plans. Other cultural barriers, such as lack of familiarity with American government and planning processes, may prevent certain groups from engaging in planning processes and accessing key government-provided resources.
- Lack of access to critical services: Public facilities and services such as hospitals and community centers are key providers of shelter and support during extreme events. Access to transportation facilities that one can use to evacuate from harm's way are also important tools to addressing vulnerability. Those who lack access to these facilities or have limited mobility experience heightened levels of vulnerability.
- Health disparities: People experiencing higher rates of illnesses such as cardiovascular and kidney disease, diabetes, asthma, and COPD, whose effects can be exacerbated by climate impacts, are also more vulnerable. Health-related vulnerability may be especially significant for those who lack health insurance, have limited mobility, are undocumented, are experiencing social or linguistic isolation, or have a lack of funds to pay for medical care, as these factors all pose significant barriers to obtaining medical care.

It is important to remember that individuals and communities can be affected by more than one of these contributing factors at once. Those who are exposed to a higher number of contributing factors may be especially vulnerable.

Maps to include – CAN THESE BE PROVIDED TO FM? WE WILL PUT THEM IN AND FORMAT THEM.

- Children under 10 (only have children under 6 in Draft VA)
- % Adults over 65 (p 68 of Draft VA)
- Disability (p 70 of Draft VA)
- Concentration of Poverty (p 72 of Draft VA)
- Linguistic Isolation (p 79 of Draft VA)\

Other maps to consider:

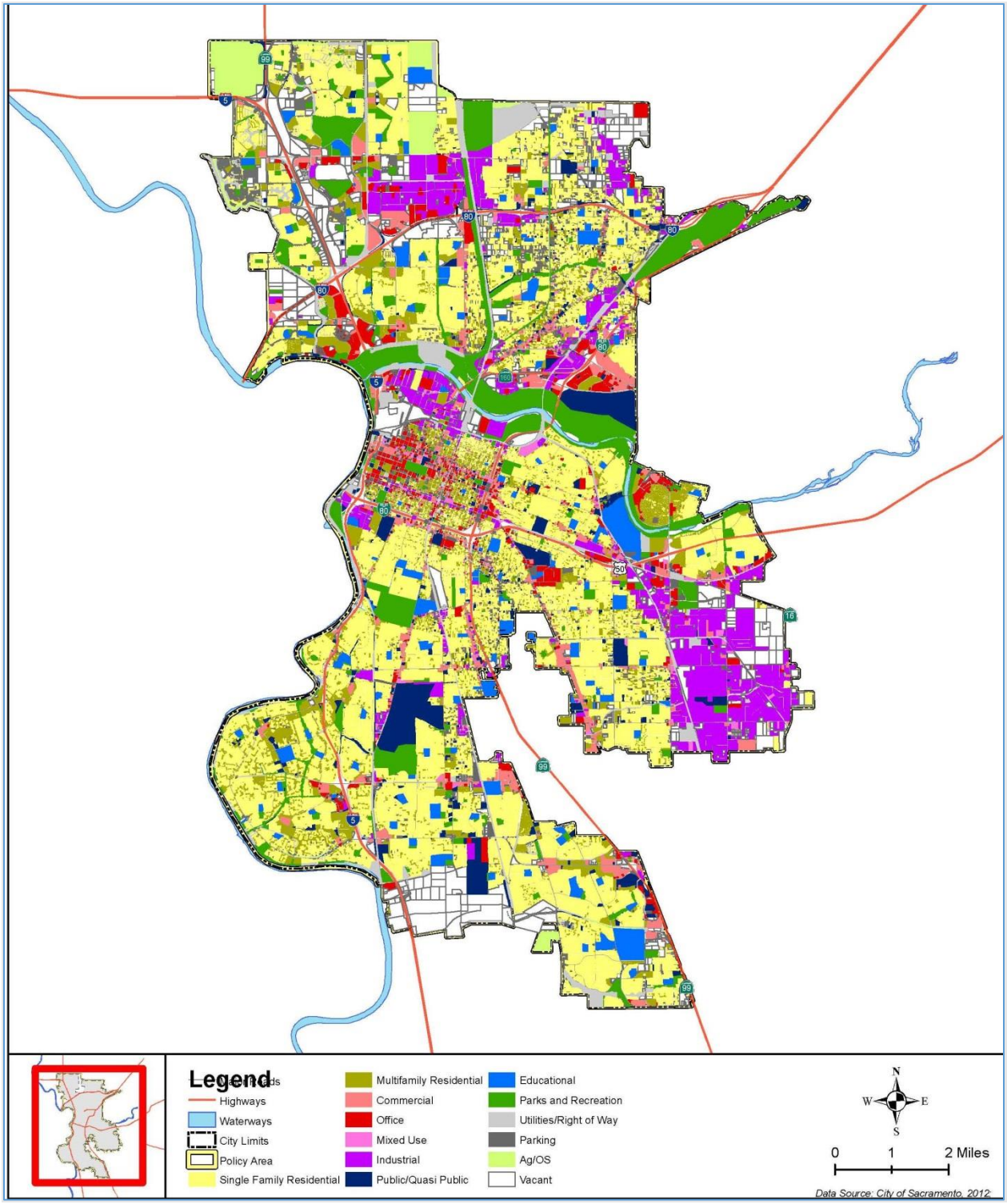
- Lack of access to critical facilities
- Lack of access to car

Land Use

State planning law requires that the land use element of a general plan include a statement of the standard population density, building intensity, and allowed uses for the various land use designations in the plan (Government Code Section 65302(a)). The City's land use designations are generally described below and mapped on the Land Use Diagram (Figure F-5). The Sacramento Municipal Code provides detailed land use and development standards for development.

With this General Plan, a variety of new land use designations have been established to reflect the more mixed and, in some cases, more intense land uses envisioned for Sacramento. New mixed-use designations provide the opportunity for a combination of residential, commercial, and office uses on a single site, depending on the designation. Future land use for the City of Sacramento from the City of Sacramento General Plan Land Use Element is shown on Figure F-5.

Figure F-5 City of Sacramento – Land Use Diagram



Source: City of Sacramento General Plan Land Use Element

Table F-11 presents the proposed land uses for the 2035 General Plan Policy Area. The land use designations included in the table provides a summary and combines all the applicable land use designations

designated on the land use diagram included within the Policy Area boundaries. Figure F-6 shows the land uses in the Policy Area.

Table F-11 Land Uses for the 2035 General Plan

Land Use	Acres	Percent of City's Total[4]
Neighborhoods[1]	34,880	54%
Centers[2]	4,658	7%
Corridors[3]	3,111	5%
Employment Center/Industrial	9,163	14%
Public/Quasi Public	4,716	7%
Open Space, Parks, Recreation	8,554	13%
Total	**2**	**100%**

Source: City of Sacramento, GIS Database, 2012.

Notes:

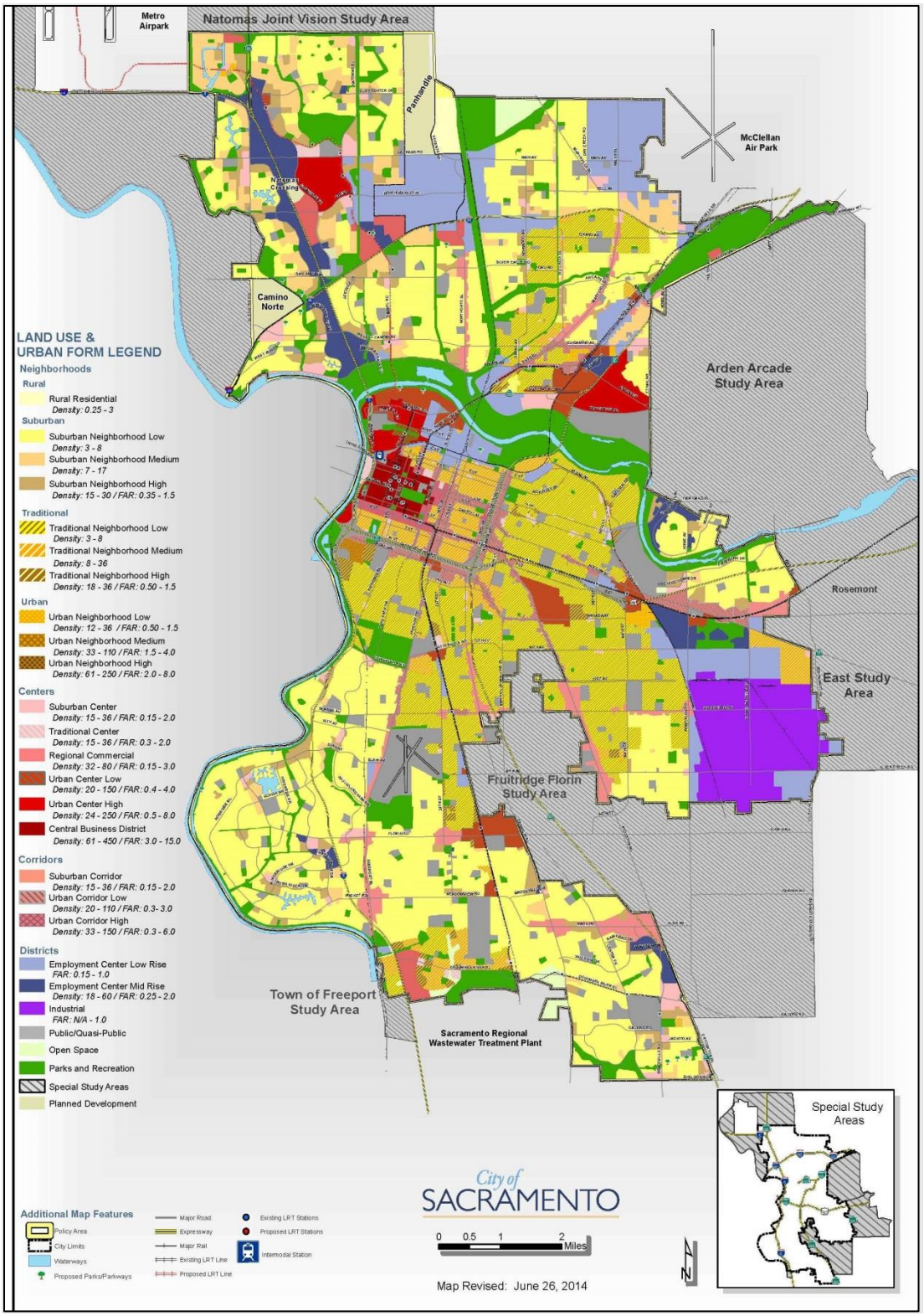
[1] Includes all residential designations including Planned Development/Special District, Rural Residential, Suburban Low Density, Suburban Medium Density, Suburban High Density, Traditional Low Density, Traditional Medium Density, Traditional High Density, Urban Low Density, Urban Medium Density, and Urban High Density.

[2] Includes Suburban Center, Traditional Center, Urban Center Low and High and CBD.

[3] Includes Suburban Corridor and Urban Corridor High and Low.

[4] Due to rounding the City's total % may be slightly higher than 100%.

Figure F-6 2035 General Plan Land Use and Urban Form



Source: City of Sacramento General Plan Environmental Impact Report

The Shovel-Ready Sites Program was established in FY2004/2005 with the intent of encouraging economic development at key areas in the City. These sites are based on the 2035 General Plan opportunity areas. They are broken down into Tier 1 and Tier 2 based on economic development potential. Tier 1 sites are more likely to generate a return on investment (e.g., property taxes, sales taxes, new jobs) sooner than Tier 2 sites.

Each tier is also broken down by the following types: Centers, Corridors, Neighborhoods, New Growth Areas, and Transit Centers. Table F-12 shows counts of all parcels centroids (geographic center of parcel polygon) that intersect these opportunity areas, sorted by opportunity area tier and type. There are a total of 17,229 parcels in the Opportunity Area. The two categories with the highest parcel counts within this area are Tier 2 Corridors and Neighborhoods.

Table F-12 Number of Parcels in Opportunity Areas - City of Sacramento

Tier	Type	Parcel Count
1	Centers	2,400
1	New Growth Areas	58
1	Transit Center	726
2	Centers	1,639
2	Corridors	4,907
2	Neighborhoods	6,252
2	New Growth Areas	311
2	Transit Center	1,325
Total		**17,618**

Source: City of Sacramento GIS

Development since 2016 Plan

As discussed in Section 4.3.1 of the Base Plan, future development has occurred in the County since the last plan. Some of this has occurred in hazard prone areas. The City Building Department tracked total building permits issued since 2016 for the City. These are tracked by total development, property use type, and hazard risk area. These are shown in Table F-13 and Table F-14.

Table F-13 City of Sacramento – Total Development Since 2016

Property Use	2016	2017	2018	2019	2020
Residential	1141	1839	1691	1679	1029
Commercial*	76	93	71	119	151
Total	**1,217**	**1,932**	**1,762**	**1,798**	**1,180**

Source: City of Sacramento Building Department

*Issued Permit Residential/Commercial New Buildings – Accela Report

Table F-14 City of Sacramento – Development in Hazard Areas since 2016

Property Use	1% Annual Chance Flood	Area Protected by Levee	Wildfire Risk Area[1]	Other
Residential	34 Units	1,327 Units	671 Units	–
Commercial	78,336 Sq Ft	826,487 Sq Ft	360,764 Sq Ft	–
Industrial	117,617 Sq Ft	244,161 Sq Ft	185,675 Sq Ft	–
Office	2,454 Sq Ft	69,524 Sq Ft	112,370 Sq Ft	–
Total	**198,407 Sq Ft**	**1,140,172 Sq Ft**	**658,809 Sq Ft**	**–**

Source: City of Sacramento Building Department
[1]Moderate or higher wildfire risk area

Future Development

The Sacramento Council of Governments (SACOG) modeled household and employment projections for the City of Sacramento and other areas of the region in 2018 for a Metropolitan Transportation Plan/Sustainable Communities Strategy update. Bay Area Economics (BAE) refined these projections further to be used for the City's 2040 General Plan Update. According to the City's Draft 2040 General Plan Update:

> ***It is anticipated that by the year 2040, Sacramento will have added 76,612, jobs; and 69,012 residential units. The City has historically relied on Greenfield development to meet the housing, retail, and service needs generated by growth. The City's Draft 2040 General Plan, (anticipated adoption in December 2021), takes a different approach and focuses growth inward, encouraging infill development.***

GIS Analysis

Table F-15 shows allocations of projected housing and jobs growth throughout the City and the Draft 2040 General Plan Opportunity Areas.

Table F-15 City of Sacramento – Citywide and Opportunity Area Growth Projection

Opportunity Areas	Housing Units	Jobs
47th	49	24
65th North	2,644	2,037
65th South	1,699	2,382
Arco Arena	2,097	2,467
Arden Fair	801	1,126
Arden/Del Paso	433	62
Broadway	942	247
Broadway East	234	100
C Street	493	180
CBD	7,452	6,298

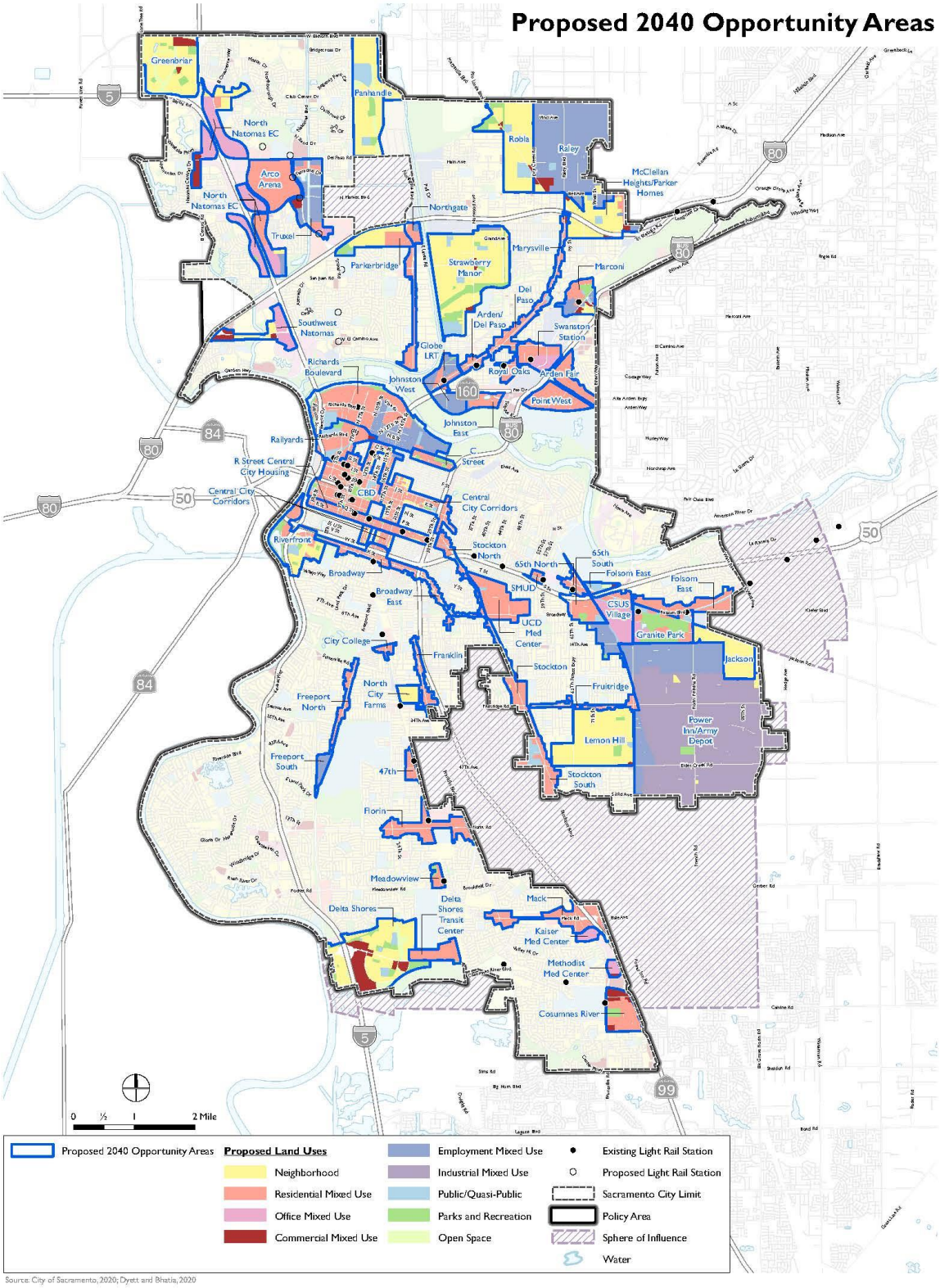
Opportunity Areas	Housing Units	Jobs
Central City Corridors	5,685	1,247
City College	150	15
Cosumnes River	521	420
CSUS Village	185	2,439
Del Paso	194	402
Delta Shores	5,855	1,698
Delta Shores Transit Center	372	620
Florin	1,302	246
Folsom East	634	132
Franklin	126	27
Freeport North	99	43
Freeport South	0	6
Fruitridge	41	3
Globe LRT	448	54
Granite Park	774	1,243
Greenbriar	2,757	810
Jackson	1,537	483
Johnston East	13	875
Johnston West	29	479
Kaiser Med Center	0	500
Lemon Hill	585	76
Mack	254	405
Marconi	139	94
Marysville	198	126
McClellan Heights/Parker Homes	373	1
Meadowview	631	11
Methodist Med Center	88	834
North City Farms	36	26
North Natomas EC	53	4,157
Northgate	275	45
Panhandle	894	611
Parkebridge	629	3
Point West	0	40
Power Inn/Army Depot	0	4,615
R Street Central City Housing	1,781	480
Railyards	7,299	10,603
Raley	41	1,359

Opportunity Areas	Housing Units	Jobs
Richards Boulevard	1,358	8,895
Riverfront	5,646	3,599
Robla	225	26
Royal Oaks	352	338
SMUD	940	30
Southwest Natomas	696	153
Stockton	918	110
Stockton North	484	89
Stockton South	265	183
Strawberry Manor	915	25
Swanston Station	51	178
Truxel	295	1,009
UCD Med Center	303	5,143
Outside Opportunity Areas	5,722	6,683
Total	**69,012**	**76,612**

Source: City of Sacramento GIS

Figure F-7 identifies those areas where future development is anticipated to occur over the next 25 years in different parts of the City.

Figure F-7 City of Sacramento Opportunity Areas



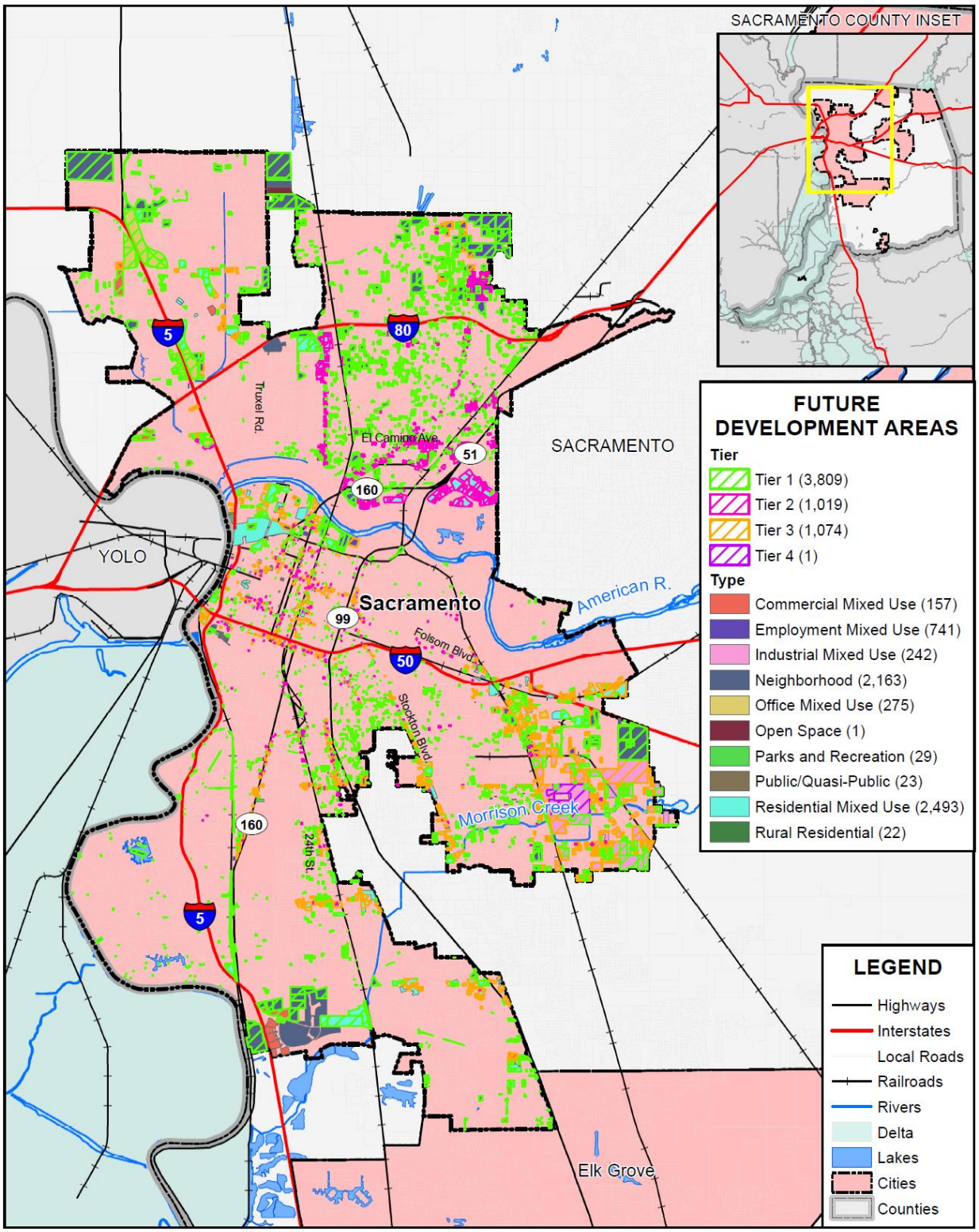
(Draft 2040 GP land use map (January 19, 2021). The final 2040 GP land use map is anticipated to be adopted by Council in Spring 2022.

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.

GIS Analysis

The City of Sacramento provided a list of projects that the City is seeing be developed. These were separated into tiers and types. Using GIS, the following methodology was used in determining parcel counts and acreages with future development projects in the City of Elk Grove. Future development areas in the City were provided in mapped format by the City. 4 tiers and 10 types of areas were provided. Using the GIS parcel spatial file for each of these areas, the 4 tiers and 10 types of areas associated with future development projects for which the analysis was to be performed were identified. Utilizing the future development project spatial layer, the parcel centroid data was intersected to determine the parcel counts within each area. Figure F-8 shows the locations of future development areas the City is planning to develop. Table F-13 shows the summary of parcels and acreages of each future development area in the City by Tier, while Table F-14 shows the summary of parcels and acreages of each future development area in the City by Type. Table F-16 shows the detail of parcels and acreages of each future development area in the City by Tier and Type.

Figure F-8 City of Sacramento – Future Development Areas



Data Source: Sacramento County GIS, Cal-Atlas; Map Date: 05/2021.

Table F-16 City of Sacramento – Future Development Tiers

Future Development Tier	Total Parcel Count	Improved Parcel Count	Total Acres
Tier 1	3,809	484	4,556.41
Tier 2	1,019	809	705.00
Tier 3	1,074	1,014	1,603.66
Tier 4	1	1	207.23
(blank)	243	140	927.28
Grand Total	**6,146**	**2,448**	**7,999.58**

Source: City of Sacramento GIS

Table F-17 City of Sacramento – Future Development Type

Future Development Type	Total Parcel Count	Improved Parcel Count	Total Acres
Commercial Mixed Use	157	61	309.14
Employment Mixed Use	741	295	1,249.98
Industrial Mixed Use	242	141	1,288.17
Neighborhood	2,163	482	2,236.31
Office Mixed Use	275	66	561.39
Open Space	1		34.76
Parks and Recreation	29	3	80.24
Public/Quasi-Public	23		64.84
Residential Mixed Use	2,493	1,398	2,152.68
Rural Residential	22	2	22.06
Grand Total	**6,146**	**2,448**	**7,999.58**

Source: City of Sacramento GIS

Table F-18 City of Sacramento – Future Development Tier and Type

Future Development Tier / Type	Total Parcel Count	Improved Parcel Count	Total Acres
Tier 1			
Commercial Mixed Use	98	7	192.07
Employment Mixed Use	394	12	804.09
Industrial Mixed Use	94	11	352.48
Neighborhood	2,054	404	1,831.06
Office Mixed Use	211	9	457.47
Parks and Recreation	21		67.10
Public/Quasi-Public	22		62.88
Residential Mixed Use	893	39	767.20
Rural Residential	22	2	22.06

Future Development Tier / Type	Total Parcel Count	Improved Parcel Count	Total Acres
Tier 1 Total	**3,809**	**484**	**4,556.41**
Tier 2			
Commercial Mixed Use	35	31	10.99
Employment Mixed Use	209	151	178.35
Industrial Mixed Use	5	3	1.04
Neighborhood	57	44	15.74
Office Mixed Use	21	18	24.09
Residential Mixed Use	692	562	474.79
Tier 2 Total	**1,019**	**809**	**705.00**
Tier 3			
Commercial Mixed Use	15	15	24.03
Employment Mixed Use	134	128	258.64
Industrial Mixed Use	137	122	675.54
Neighborhood	6	6	27.06
Office Mixed Use	41	39	74.20
Residential Mixed Use	741	704	544.18
Tier 3 Total	**1,074**	**1,014**	**1,603.66**
Tier 4			
Industrial Mixed Use	1	1	207.23
Tier 4 Total	**1**	**1**	**207.23**
(blank)			
Commercial Mixed Use	9	8	82.05
Employment Mixed Use	4	4	8.91
Industrial Mixed Use	5	4	51.88
Neighborhood	46	28	362.45
Office Mixed Use	2	0	5.63
Open Space	1	0	34.76
Parks and Recreation	8	3	13.14
Public/Quasi-Public	1		1.97
Residential Mixed Use	167	93	366.50
(blank) Total	**243**	**140**	**927.28**
Grand Total	**6,146**	**2,448**	**7,999.58**

Source: City of Sacramento GIS

F.5.3. Vulnerability to Specific Hazards

This section provides the vulnerability assessment, including any quantifiable loss estimates, for those hazards identified above in Table F-6 as high or medium significance hazards. Impacts of past events and vulnerability of the City 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 City 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, populations at risk, critical facilities and infrastructure, and future development.

Power Outage/Power Failure

An impact of almost all hazards below relates to power shortage 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 shortage/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.

Climate Change

Likelihood of Future Occurrence–Highly Likely
Vulnerability–High

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 City, 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 City declared a climate emergency in December 2019, no specific impacts of climate change could be recalled. The City and HMPC members noted that the strength of storms does seem to be increasing and the temperatures are getting hotter. A study on the American River Basin Study shows that the City may experience an increase of up to 8 degrees F and up to 58 days with temperatures above 100 degrees F by 2070. The American River temperature may rise up to 7 degrees F, affecting its ecosystem. Flows from the Sierra Nevada snowpack to Folsom Reservoir, which have typically peaked in May, will instead peak earlier in January, February, and March

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 City 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
  - ✓ While climate change may lead to more decreased precipitation in late spring and summer, it may also lead to heightened precipitation variability meaning increased precipitation and possibility of flooding during winter months.
- Reduced snowpack
- Reduced tourism
- Ecosystem change
- Sensitive species stress
- Increased wildfire

There are several concerns the City has – these include extreme heat days and its impact on local ecosystems and human life; changes in precipitation patterns leading to flooding and dry seasons; wildfire events; and climate equity (i.e. considering both protection from environmental hazards as well as access to environmental benefits for all people, regardless of income, race, location, and other characteristics).

Future Development

The City could see population fluctuations as a result of climate impacts relative to those experienced in other regions, and these fluctuations are expected to impact demand for housing and other development. While there are currently no formal studies of specific migration patterns expected to impact the City and County region, climate-induced migration was recognized within the UNFCCC Conference of Parties Paris Agreement of 2015 and is expected to be the focus of future studies.

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.

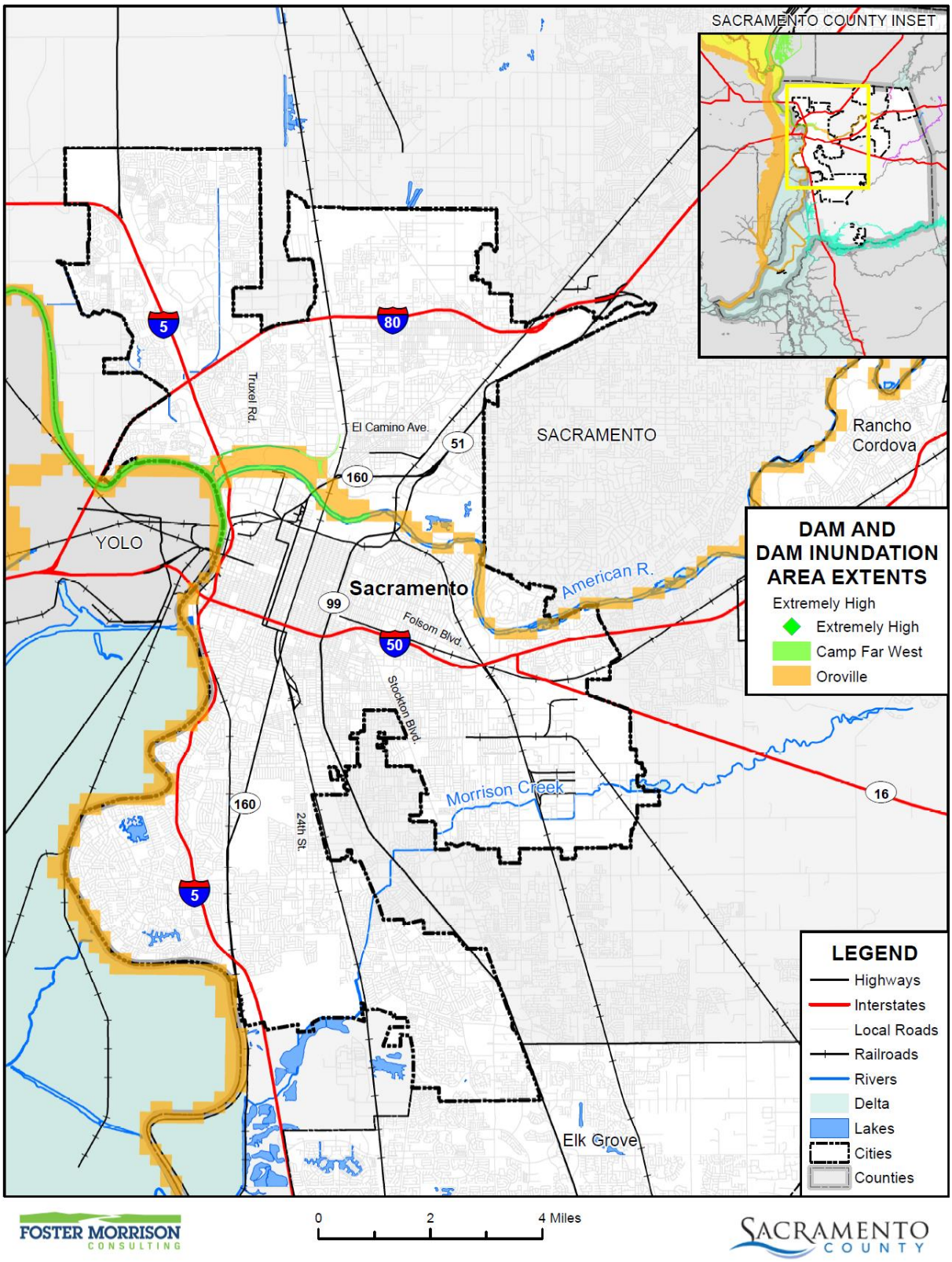
While a dam may fill slowly with runoff from winter storms, a dam break has a very quick speed of onset. The duration of dam failure is generally not long – only as long as it takes to empty the reservoir of water the dam held back. The City would be affected for as long as the flood waters from the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

Geographic flood extent from the DWR DSOD and Cal OES dam inundation areas is shown in the following:

- Figure F-9 shows dam inundation areas in the City from dams inside Sacramento County.
- Figure F-10 shows dam inundation areas in the City from dams outside Sacramento County.
- Table F-19 delineates geographical extents of the inundation areas from dams both inside and outside the County.
- Figure F-11 shows dam inundation areas in the City from the Folsom Dam 235,000 cfs Scenario (as discussed in Section 4.3.7 of the Base Plan).
- Table F-20 delineates geographical extents of the inundation areas the Folsom Dam 235,000 cfs Scenario.

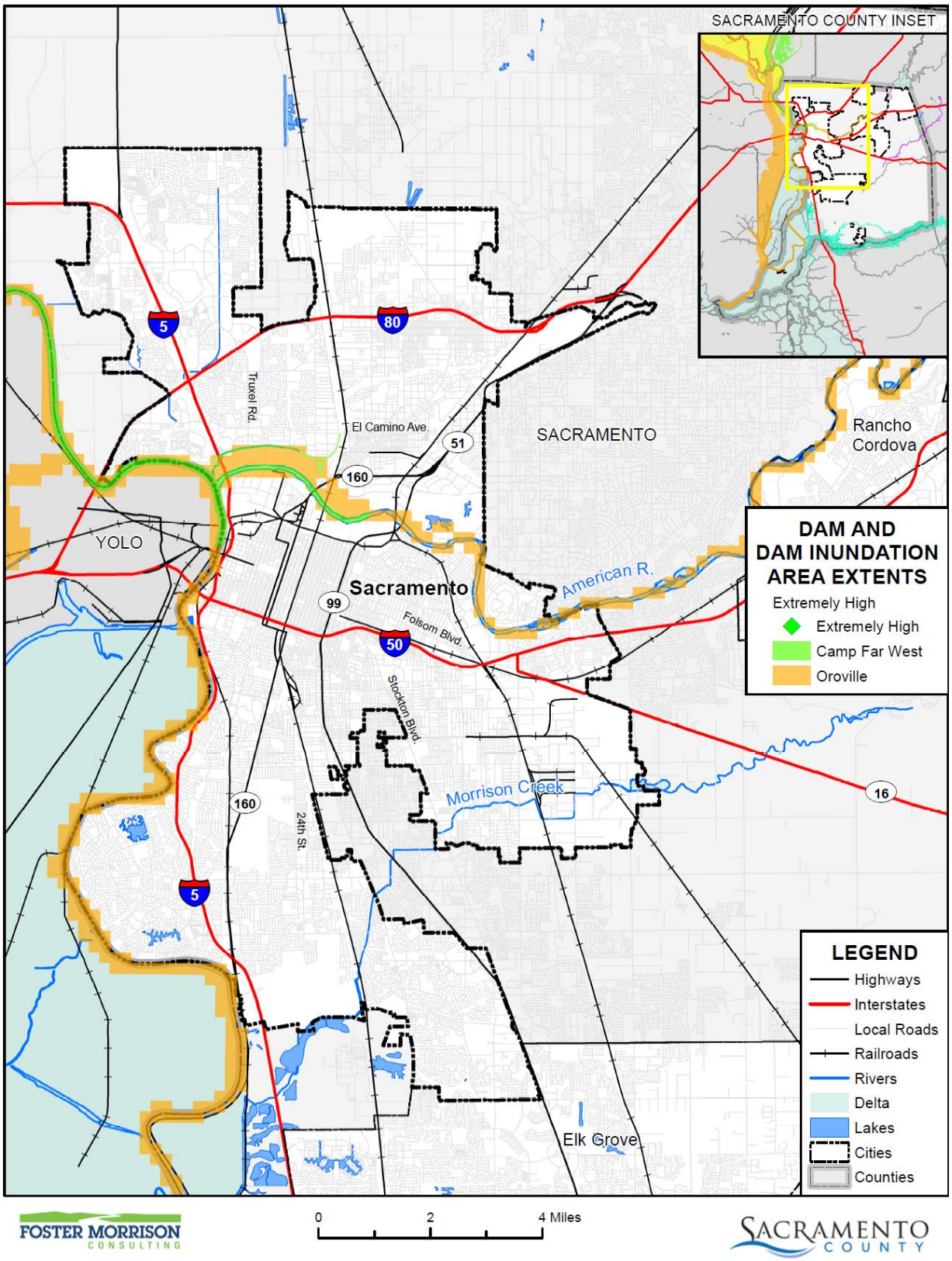
Note, the Cal OES and DSOD dam inundation data did not include inundation mapping of all dams that could affect the Sacramento County Planning Area and the City; thus, the below analysis reflects information based on available data. Other dams may be identified as a concern to the City. Based on available data, the City falls within the inundation areas of Camp Far West, Folsom, and Oroville dams.

Figure F-9 City of Sacramento – Dam Inundation Areas from Dams Inside the County



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

Figure F-10 City of Sacramento – Dam Inundation Areas from Dams Outside the County



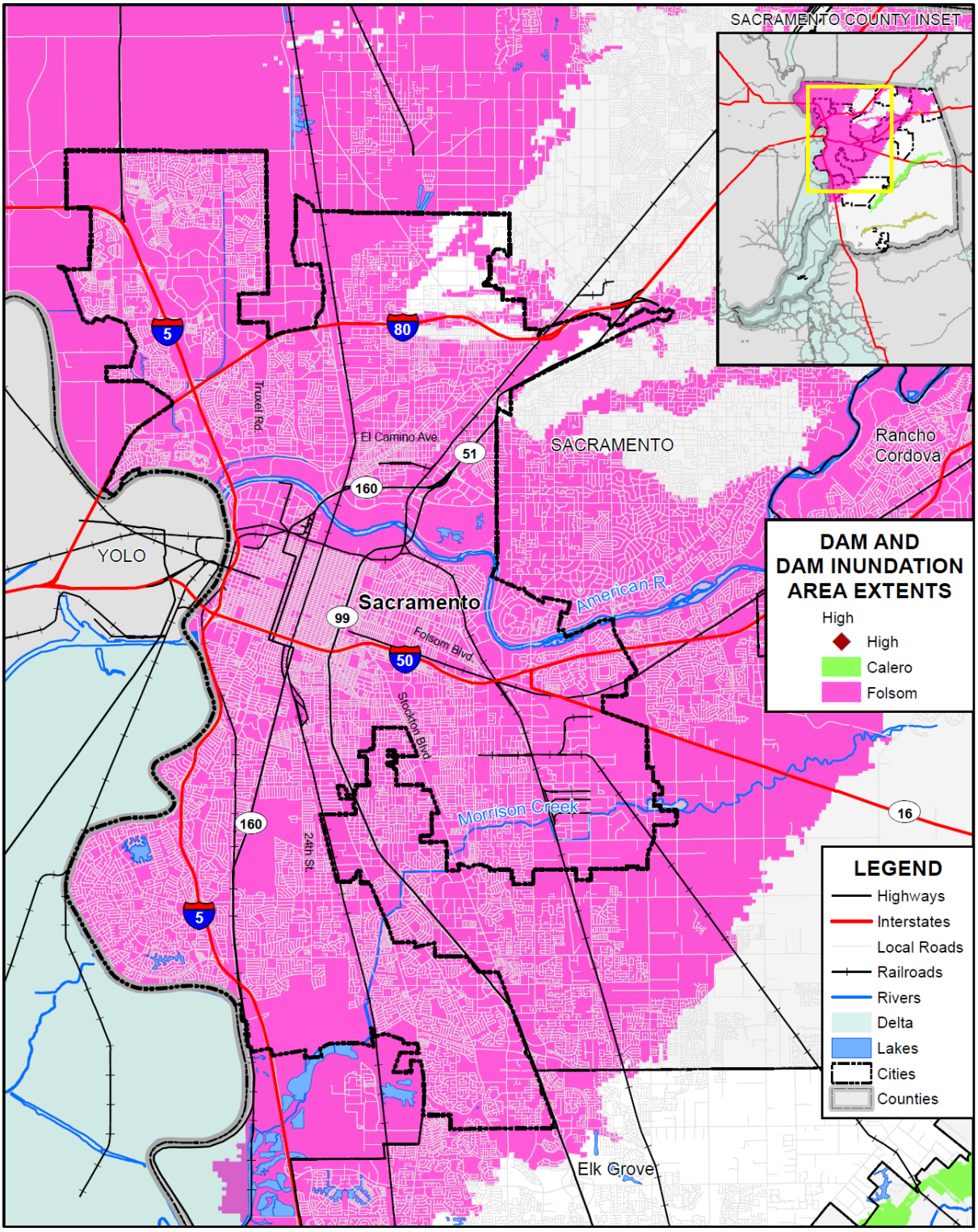
Data Source: DWR DSOD Data 2020 and Cal OES Dam Status 10/2017, Sacramento County GIS, Cal-Atlas; Map Date: 9/2020.

Table F-19 City of Sacramento – Geographical Dam Inundation Extents

Dam Inundation Areas	Jurisdiction	Total Acres	% of Total Acres	Improved Acres	% of Total Improved Acres	Unimproved Acres	% of Total Unimproved Acres
Extremely High Hazard Dams Outside the County							
Camp Far West	City of Sacramento	110.08	0.15%	5.86	0.01%	104.22	0.40%
Oroville	City of Sacramento	1,727.40	2.34%	256.54	0.53%	1,470.86	5.69%
High Hazard Dams Outside the County							
–	–	–	–	–	–	–	–
High Hazard Dams Inside the County							
Folsom	City of Sacramento	72,486.45	98.01%	47,239.98	98.19%	25,246.47	97.68%

Source: Cal OES, DSOD

Figure F-11 City of Sacramento – Inundation Areas from Folsom Dam 235,000 cfs Scenario



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.

Table F-20 City of Sacramento – Geographic Dam Inundation Extent of Folsom 235,000 cfs Scenario

Dam Inundation Areas	Jurisdiction	Total Acres	% of Total Acres	Improved Acres	% of Total Improved Acres	Unimproved Acres	% of Total Unimproved Acres
Folsom 235,000 CFS Scenario	City of Sacramento	66,339.94	10.26%	43,402.39	12.01%	22,937.55	8.04%

Source: Cal OES, DSOD

Past Occurrences

There has been no state or federal disaster declarations for dam failure in the County. The City noted the following past occurrence.

July 17, 1995: Folsom Dam Spillway Gate Failure – The failure resulted in the uncontrolled release of nearly 40 percent of Folsom Lake at a peak rate of approximately 40,000 cubic feet per second (1,100 m^3/s). The freshwater reaching San Francisco Bay was atypical for the summer season and confused salmon and striped bass, whose instincts told them that fall rains had arrived; they began their annual fall migrations months ahead of schedule.

February 2017: Oroville Dam Spillway – On Feb. 12, the Lake Oroville Dam emergency spillway structure suffered potentially catastrophic damage as a result of erosion secondary to water flow. The California Department of Water Resources increased exhaust water flow from the Gated Spillway to 100,000 cubic feet per second in an attempt to decrease Lake Oroville water levels. In response, the California Governor's Office of Emergency Services activated the State Operations Center in Sacramento in support of the Oroville Dam emergency spillway incident. Immediate evacuations were ordered for counties and cities near Lake Oroville, and Governor Brown issued state of emergency to help mobilize disaster response resources and support the local evacuations. The Sacramento Fire Department warned residents that the spillway failure could have effects, including flash flooding, downstream in Sacramento. The City also prepared to receive evacuees from Yuba and Butte counties. Ultimately, the dam held (though the spillway was damaged) and the City suffered no ill effects.

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. Folsom and Nimbus Dams are the two major dams which affect the City of Sacramento and the populations in their respective inundation areas. Of prime concern are the failures of the Folsom and/or Nimbus Dams, which are owned by the US Bureau of Reclamation. The flood waters from either dam would affect the City of Sacramento and the surrounding unincorporated areas.

The Sacramento Municipal Utility District (SMUD) inundation map indicates that a failure of the Rancho Seco Dam would flow to the Laguna Creek Basin and stop approximately at Stockton Boulevard. Failure of Shasta Dam would affect populations south along the Sacramento River basin to about Knights Landing

where the water would lose momentum. An Oroville Dam failure would impact populations southwest along the Feather River basin to about the Yolo Bypass.

Warning ability is generally determined by the frequency of inspections for structural integrity, the flood wave arrival time (the time it takes for the flood wave to reach its maximum distance of inundation), or the ability to notify persons downstream and their ability to evacuate. Having an evacuation plan that is updating and exercised frequently assists in the warning and evacuation functions.

A dam failure will cause loss of life, damage to property, and other ensuing hazards, as well as the displacement of persons residing in the inundation path. Damage to electric generating facilities and transmission lines could also impact life support systems in communities outside the immediate hazard areas.

A catastrophic dam failure, depending on size of dam and population downstream, could exceed the response capability of local communities. Damage control and disaster relief support would be required from other local governmental and private organizations, and from the state and federal governments. Mass evacuation of the inundation areas would be essential to save lives, if warning time should permit. Extensive search and rescue operations may be required to assist trapped or injured persons. Emergency medical care, food, and temporary shelter would be required for injured or displaced persons. These and other emergency operations could be seriously hampered by the loss of communications, damage to transportation routes, and the disruption of public utilities and other essential services.

Governmental assistance could be required and may continue for an extended period. These efforts would be required to remove debris and clear roadways, demolish unsafe structures, assist in re-establishing public services and utilities, and provide continuing care and welfare for the affected population including, as required, temporary housing for displaced persons.

Impacts to the City from a dam failure flood 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.

Assets at Risk

Based on the vulnerability of Sacramento to the dam failure hazard, the sections that follow describes significant assets at risk in the City of Sacramento. This section includes the values at risk, inundated acres, population at risk, and critical facilities at risk.

Values at Risk

GIS was used to determine the possible impacts of flooding within the City of Sacramento. The methodology described in Section 4.3.9 of the Base Plan was followed in determining structures and values at risk to dam failure. Table F-21 shows the property use, improved parcel count, improved values, estimated contents, and total values that fall in dam inundation areas in the City. Table F-22 shows the property use, improved parcel count, improved values, estimated contents, and total values that fall in the Folsom Dam 235,000 cfs Scenario inundation areas in the City

Table F-21 City of Sacramento – Count and Values of Parcels at Risk by Dam Inundation Area and Property Use

Property Use	Total Parcel Count	Improved Parcel Count	Total Land Value	Improved Structure Value	Estimated Contents Value	Total Value
Oroville (Extremely High Hazard Dam Outside the County)						
Church / Welfare	1	0	$10	$0	$0	$10
Miscellaneous	54	0	$301,456	$0	$0	$301,456
Office	4	3	$3,638,276	$10,693,990	$10,693,990	$25,026,256
Public / Utilities	17	0	$9	$0	$0	$9
Recreational	6	2	$925,915	$4,836,004	$4,836,004	$10,597,923
Residential	17	15	$3,233,349	$9,739,067	$4,869,534	$17,841,950
Vacant	14	0	$936,909	$0	$0	$936,909
City of Sacramento Total	**113**	**20**	**$9,035,924**	**$25,269,061**	**$20,399,528**	**$54,704,513**
Camp Far West (Extremely High Hazard Dam Outside the County)						
Church / Welfare	5	2	$2,351,656	$8,702,321	$8,702,321	$19,756,298
Industrial	17	12	$12,299,672	$38,798,046	$58,197,071	$109,294,788
Miscellaneous	201	0	$400,747	$0	$0	$400,747
Office	62	54	$41,652,929	$152,379,420	$152,379,420	$346,411,769
Public / Utilities	40	0	$9	$0	$0	$9
Recreational	13	2	$925,945	$4,836,004	$4,836,004	$10,597,953
Residential	823	789	$140,746,021	$468,991,846	$234,495,919	$844,233,805
Retail / Commercial	7	5	$1,787,493	$1,629,566	$1,629,566	$5,046,625
Vacant	78	0	$46,340,148	$0	$0	$46,340,148
City of Sacramento Total	**1,246**	**864**	**$246,504,620**	**$675,337,203**	**$460,240,301**	**$1,382,082,142**
Folsom Dam (High Hazard Dam Inside the County)						
Agricultural	14	2	$3,766,304	$623,292	$623,292	$5,012,888
Care / Health	155	129	$101,429,760	$1,648,454,989	$1,648,454,989	$3,398,339,738
Church / Welfare	520	422	$107,593,040	$513,340,064	$513,340,064	$1,134,273,168
Industrial	1,923	1,715	$687,351,014	$2,125,937,429	$3,188,906,135	$6,002,194,595
Miscellaneous	3,022	9	$3,759,124	$320,049	$320,049	$4,399,222
Office	1,789	1,445	$1,193,706,107	$5,060,985,045	$5,060,985,045	$11,315,676,197

Property Use	Total Parcel Count	Improved Parcel Count	Total Land Value	Improved Structure Value	Estimated Contents Value	Total Value
Public / Utilities	753	1	$1,177,449	$31,233	$31,233	$1,239,915
Recreational	135	79	$90,797,481	$471,484,271	$471,484,271	$1,033,766,023
Residential	136,513	134,294	$11,749,622,712	$30,529,316,646	$15,264,657,894	$57,543,597,902
Retail / Commercial	2,914	2,316	$1,333,991,116	$2,575,284,728	$2,575,284,728	$6,484,560,572
Unknown	2	1	$0	$86,693	$0	$86,693
Vacant	5,228	184	$899,079,311	$35,918,638	$0	$934,997,949
City of Sacramento Total	**152,968**	**140,597**	**$16,172,273,418**	**$42,961,783,077**	**$28,724,087,700**	**$87,858,144,862**

Source: CAL OES, DSOD, Sacramento County 2020 Parcel/Assessor's Data

Table F-22 City of Sacramento – Count and Values of Parcels at Risk by Folsom Dam 235,000 cfs Scenario and Property Use

Property Use / Jurisdiction	Total Parcel Count	Improved Parcel Count	Total Land Value	Improved Structure Value	Total Value
Agricultural	13	1	$3,422,972	$165,516	$3,588,488
Care / Health	134	112	$87,807,902	$1,496,333,030	$1,584,140,932
Church / Welfare	472	388	$97,221,229	$483,905,448	$581,126,677
Industrial	1,480	1,295	$509,432,078	$1,502,213,168	$2,011,645,246
Miscellaneous	2,790	8	$3,541,786	$136,288	$3,678,074
Office	1,697	1,368	$1,162,547,570	$4,918,640,334	$6,081,187,904
Public / Utilities	594	1	$312,134	$31,233	$343,367
Recreational	125	72	$89,591,717	$468,724,683	$558,316,400
Residential	126,382	124,262	$10,991,435,497	$28,437,470,147	$39,428,905,644
Retail / Commercial	2,706	2,123	$1,225,593,496	$2,371,742,203	$3,597,335,699
Unknown	2	1	$0	$86,693	$86,693
Vacant	4,606	164	$803,172,368	$31,538,113	$834,710,481
City of Sacramento Total	**141,001**	**129,795**	**$14,974,078,749**	**$39,710,986,856**	**$54,685,065,605**

Source: CAL OES, DSOD, Sacramento County 2020 Parcel/Assessor's Data

Population at Risk

The DSOD and Cal OES dam inundation areas were overlayed on the parcel layer. Those residential parcel centroids that intersect the dam inundation areas were counted and multiplied by the Census Bureau average household factors for Sacramento – 2.76. This is shown in Table F-36.

Table F-23 City of Sacramento – Count of Improved Residential Parcels and Population by Dam Inundation Area

Dam Inundation Area	Improved Residential Parcels	Population
Oroville	15	41
Camp Far West	789	2,178
Folsom	134,294	370,651

Source: Cal OES, DSOD, Sacramento County 2020 Parcel/Assessor's Data, US Census Bureau

Critical Facilities at Risk

An analysis was performed on the critical facility inventory in Sacramento in identified dam inundation areas. GIS was used to determine whether the critical facility locations intersect a DSOD or Cal OES dam inundation area. Details of critical facilities in mapped dam inundation areas in the City of Sacramento are shown in Figure F-12 and detailed in Table F-24. Details of critical facility definition, type, name and address and jurisdiction by dam inundation area are listed in Appendix F.

Figure F-12 City of Sacramento – Critical Facilities in Dam Inundation Areas

Table F-24 City of Sacramento – Critical Facilities in Dam Inundation Areas

Critical Facility Category/Dam Inundation Area	Facility Count

Source: Cal OES, DSOD, Sacramento County GIS

Future Development

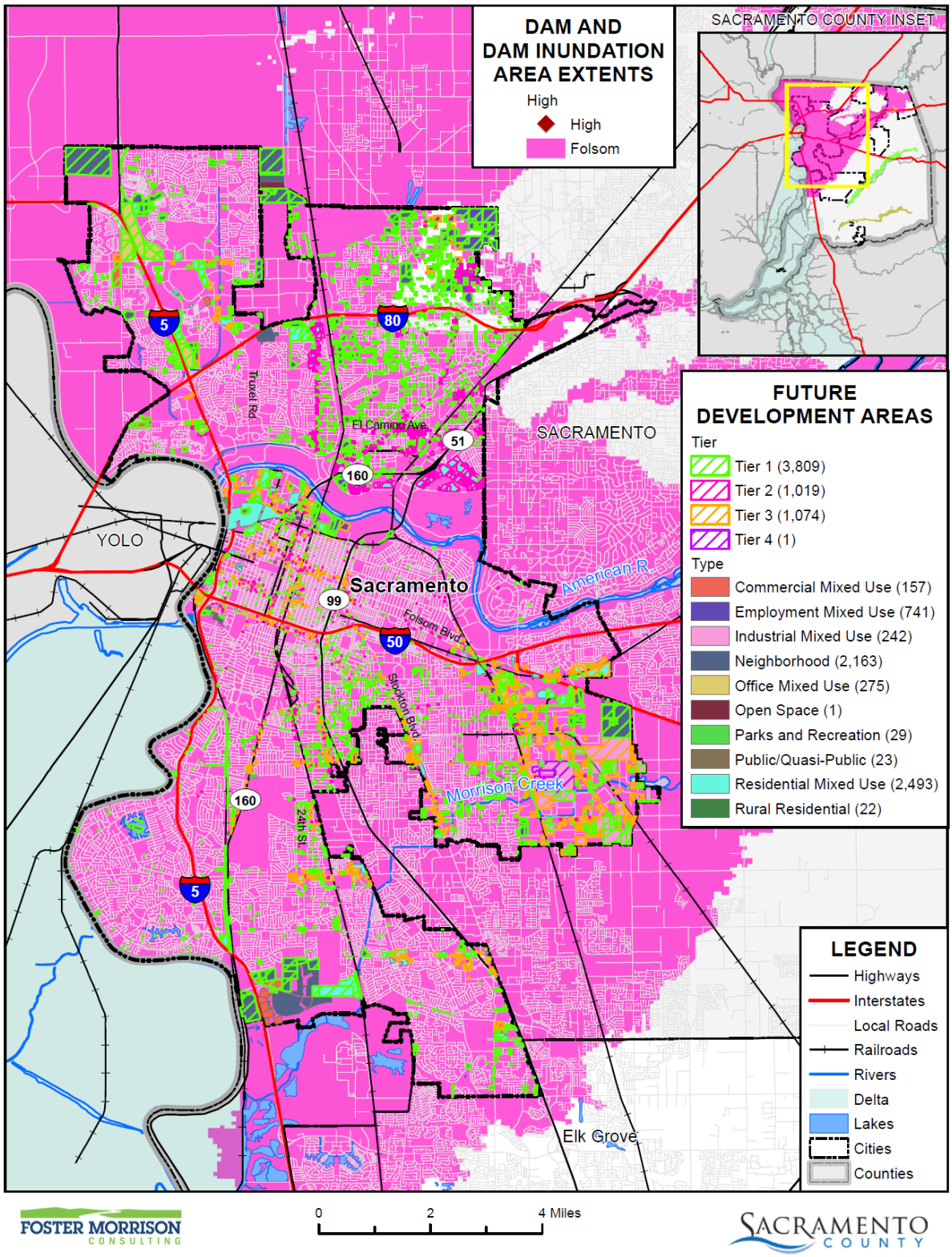
Future dam failures are considered unlikely. However, given the high number of affected parcels, future development in the City could be affected by dam failures and associated flooding. The City enforces it floodplain ordinance, which helps to reduce risk to flooding by requiring structures in the 1% annual chance floodplains to be above the base flood elevation, which depending on inundation depths and affected areas may provide some relief. Siting of future development areas should take dam failure flooding into account.

GIS Analysis

The City provided future development areas were used as the basis for the inventory of future development areas for the City. Using the GIS parcel spatial file for each of these areas, the areas and parcels associated with future development projects for which the analysis was to be performed were identified. Utilizing the future development project spatial layer, the parcel centroid data was intersected to determine the parcel counts within each area. Figure F-13 shows the locations of future development areas the City is planning to develop on the dam inundation zones from dams inside the County. Table F-25 shows the parcels and acreages of each future development area by tier and type in the City in the dam inundation areas from dams inside the County. Figure F-14 shows the locations of future development areas the City is planning to develop on the dam inundation zones from dams outside the County. Table F-26 shows the parcels and

acreages of each future development area by tier and type in the City in the dam inundation areas from dams outside the County. Figure F-15 shows the locations of future development areas the City is planning to develop on Folsom Dam 235,000 cfs scenario inundation zones. Table F-27 shows the parcels and acreages of each future development area by tier and type in the City in the Folsom 235,000 cfs release inundation area.

Figure F-13 City of Sacramento – Future Development Areas and 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: 5/2021.

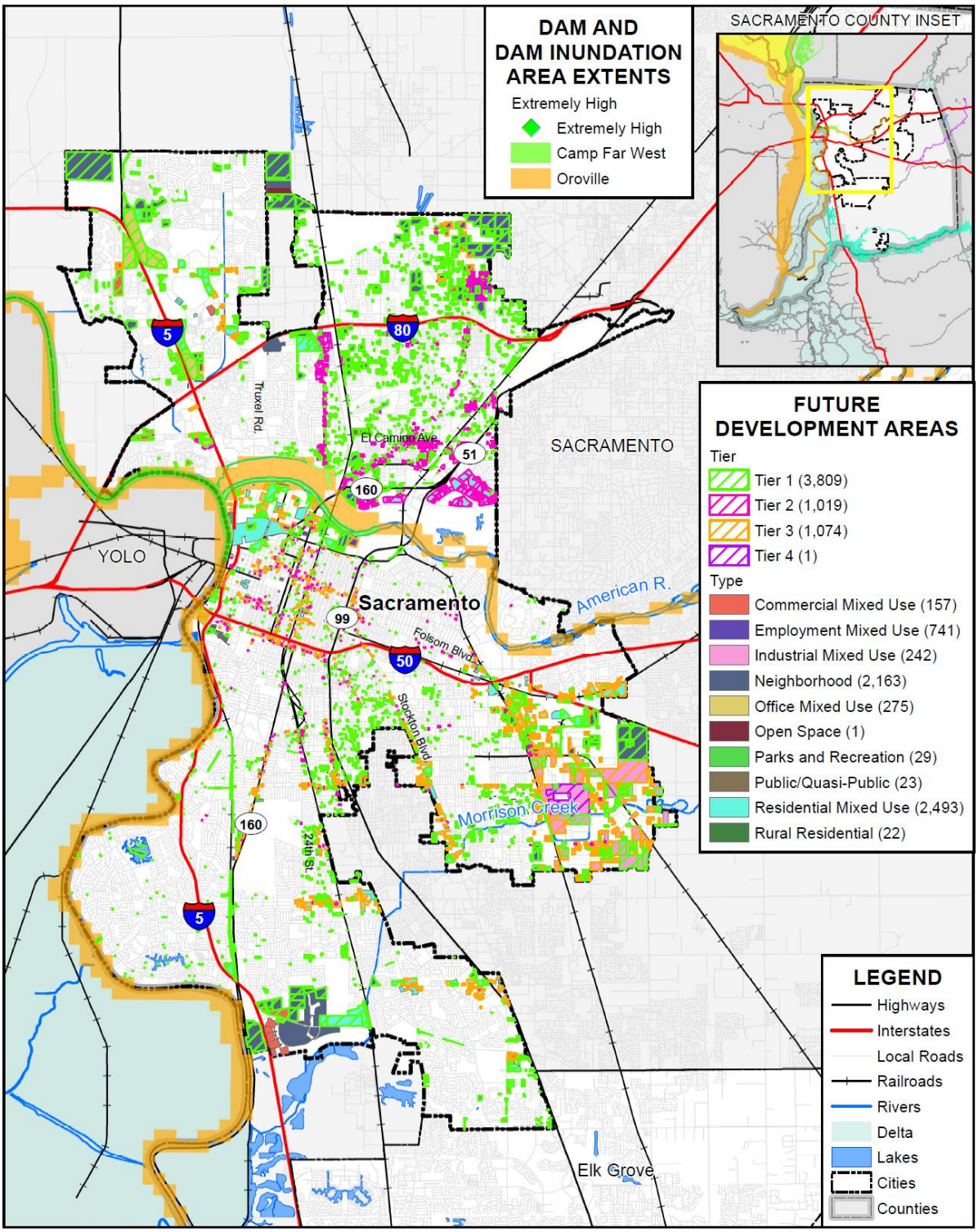
Table F-25 City of Sacramento – Future Development Areas and Dam Inundation Areas from Dams Inside the County by Tier and Type

Dam Inundation Areas / Future Development Tier / Type	Total Parcel Count	Improved Parcel Count	Total Acres
Folsom			
Tier 1			
Commercial Mixed Use	92	6	178.77
Employment Mixed Use	307	11	531.10
Industrial Mixed Use	94	11	352.48
Neighborhood	1,953	400	1,768.91
Office Mixed Use	211	9	457.47
Parks and Recreation	21		67.10
Public/Quasi-Public	22		62.88
Residential Mixed Use	879	39	759.86
Rural Residential	22	2	22.06
Tier 1 Total	**3,601**	**478**	**4,200.62**
Tier 2			
Commercial Mixed Use	31	27	9.84
Employment Mixed Use	187	130	119.21
Industrial Mixed Use	5	3	1.04
Neighborhood	54	42	14.85
Office Mixed Use	21	18	24.09
Residential Mixed Use	679	549	469.45
Tier 2 Total	**977**	**769**	**638.47**
Tier 3			
Commercial Mixed Use	15	15	24.03
Employment Mixed Use	119	113	198.53
Industrial Mixed Use	137	122	675.54
Neighborhood	4	4	25.62
Office Mixed Use	41	39	74.20
Residential Mixed Use	741	704	544.18
Tier 3 Total	**1,057**	**997**	**1,542.11**
Tier 4			
Industrial Mixed Use	1	1	207.23
Tier 4 Total	**1**	**1**	**207.23**
(blank)			
Commercial Mixed Use	9	8	82.05
Employment Mixed Use	4	4	8.91

Dam Inundation Areas / Future Development Tier / Type	Total Parcel Count	Improved Parcel Count	Total Acres
Industrial Mixed Use	5	4	51.88
Neighborhood	46	28	362.45
Office Mixed Use	2		5.63
Open Space	1		34.76
Parks and Recreation	8	3	13.14
Public/Quasi-Public	1		1.97
Residential Mixed Use	167	93	366.50
(blank) Total	**243**	**140**	**927.28**

Source: Cal OES, DSOD, City of Sacramento GIS

Figure F-14 City of Sacramento – Future Development Areas and Dam Inundation Areas from Dams Outside the County



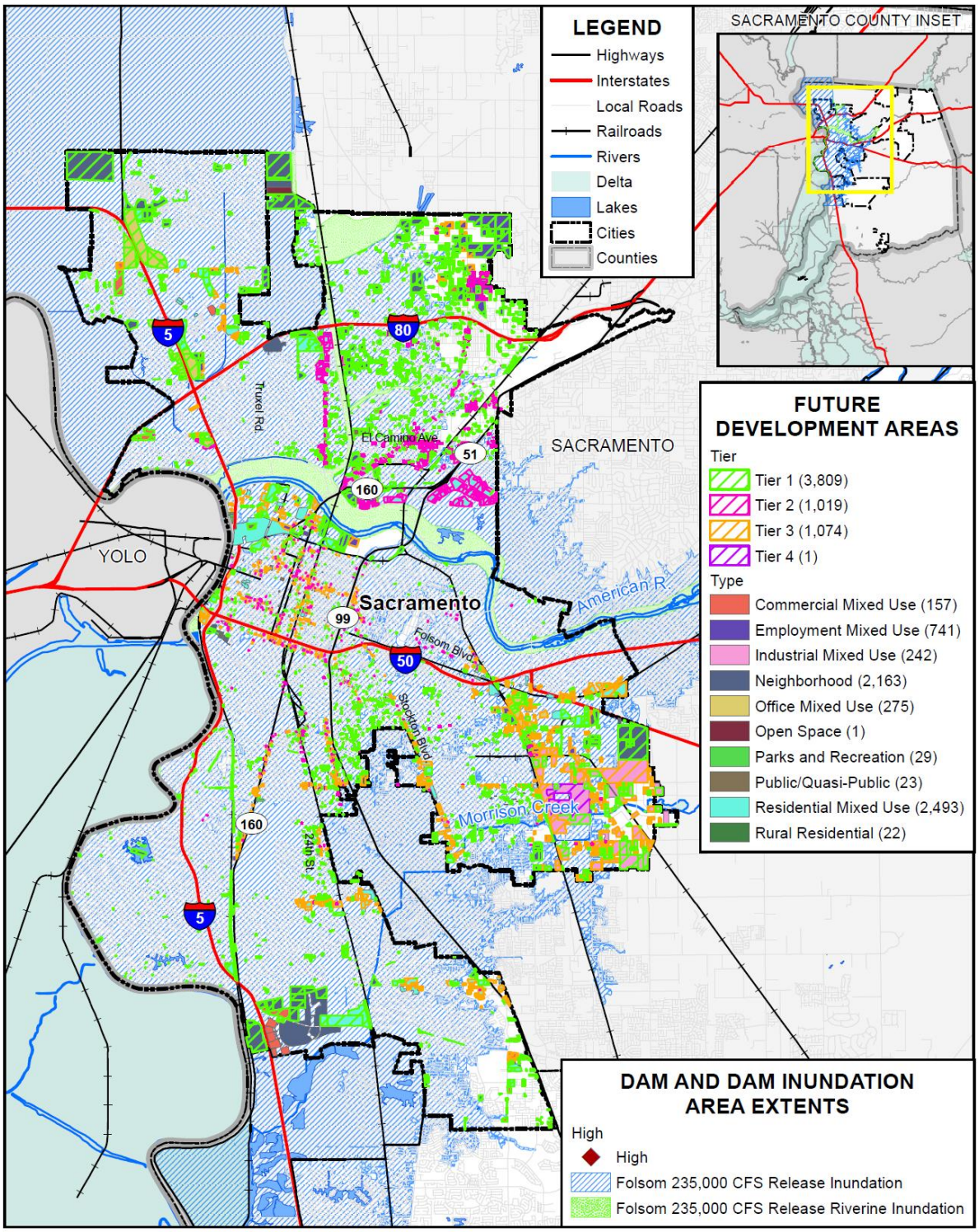
Data Source: DWR DSOD Data 2020 and Cal OES Dam Status 10/2017, Sacramento County GIS, Cal-Atlas; Map Date: 05/2021.

Table F-26 City of Sacramento – Future Development Areas and Dam Inundation Areas from Dams Outside the County by Tier and Type

Dam Inundation Areas / Future Development Tier / Type	Total Parcel Count	Improved Parcel Count	Total Acres
Camp Far West			
–	–	–	–
Oroville			
Tier 1			
Commercial Mixed Use	2		0.75
Employment Mixed Use	5		7.92
Neighborhood	8		6.09
Parks and Recreation	1		1.70
Residential Mixed Use	5		8.44
Tier 1 Total	**21**		**24.90**
Tier 3			
Residential Mixed Use	3	1	9.02
Tier 3 Total	**3**	**1**	**9.02**
(blank)			
Residential Mixed Use	1	1	0.28
(blank) Total	**1**	**1**	**0.28**

Source: Cal OES, DSOD, City of Sacramento GIS

Figure F-15 City of Sacramento – Future Development Areas and Folsom Dam 235,000 cfs Scenario Dam Inundation Areas



Data Source: County-provided dam inundation data (CA_DWR_200YEAR_FLOODPLAIN.zip 2020), DWR DSOD Data 2020, Sacramento County GIS, Cal-Atlas; Map Date: 05/2021.

Table F-27

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Drought & Water Shortage

Likelihood of Future Occurrence–Likely
Vulnerability–Medium

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 City, 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 City and the County are shown in Section 4.3.8 of the Base Plan.

Past Occurrences

There have been two state and one federal disaster declaration from drought. This can be seen in Table F-28.

Table F-28 Sacramento County – State and Federal Drought Disaster Declarations 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 City are the same as those for the County and includes 4 multi-year droughts since 1950. Details on past drought occurrences can be found in Section 4.3.8 of the Base Plan.

As dry conditions persist throughout the State the City's Department of Utilities is already proactively making changes to the way it produces drinking water and is increasing outreach to customers about water use efficiency.

- The City is shifting its drinking water productions to divert less water from the American River and more from the Sacramento River and previously stored water from its groundwater wells. Along with water conservation, this will reduce water diversions on the Lower American River (LAR) by about 30 percent from historic practice, which leaves more water in the river, keeping water levels higher and temperatures cooler to help fish populations.
- City of Sacramento customers currently use an average of 25 percent less water per person than before the drought in 2013, partially because the City has kept a two-day-per-week watering schedule since after the drought emergency ended in 2017.
- The City is asking that residents continue – and increase – their efforts to use water efficiently by following the watering schedule, avoiding water waste and taking advantage of water-efficiency rebates and programs available at SacWaterWise.com. Increased outreach campaigns include radio spots, digital and billboard ads, utility bill inserts and educational webinars.
- The City has increased water patrols that focus on educating residents about using water efficiently and adhering to watering day schedules. Fines will only be issued for egregious violations. If fines are issued, most customers are eligible to have fees waived by participating in City water conservation education and participating in rebate programs.

During the previous 2012-2016 drought the City maintained a reliable water supply, but instituted changes during and after that period to increase reliability.

- The City commissioned a study to model the correlation between river flows on the Sacramento and American River and the level of water above the diversion structures.
- The City commissioned a study to assimilate all physical information about its intakes, including sending divers into submerged areas to take physical measurements, create a three-dimension fluid dynamic model, determine the safety factor between design and likely failure point, and finally to recommend improvements to increase security.
- The City installed vortex breaker devices following those studies to improve hydraulics inside the facility, which allows select pumps to continue to operate at water levels below that seen in history.
- The City installed vibration monitoring technology on all to vortex breaker device to allow select pumps to continue to operate at water levels below diversion pumps to identify any adverse conditions.
- The City returned many groundwater wells to service, and is continuing to reinvest in future wells.

The City also coordinates with USBR so that they know how their release pattern affects our facilities on the Sacramento and American Rivers (particularly minimum release patterns), and so they can make decisions. Partly this is to ensure Reclamation is mindful of the City and its customers, but also to provide Reclamation an understanding of the City's flexibility as they endeavor to meet the myriad of needs in totality of California's water system.

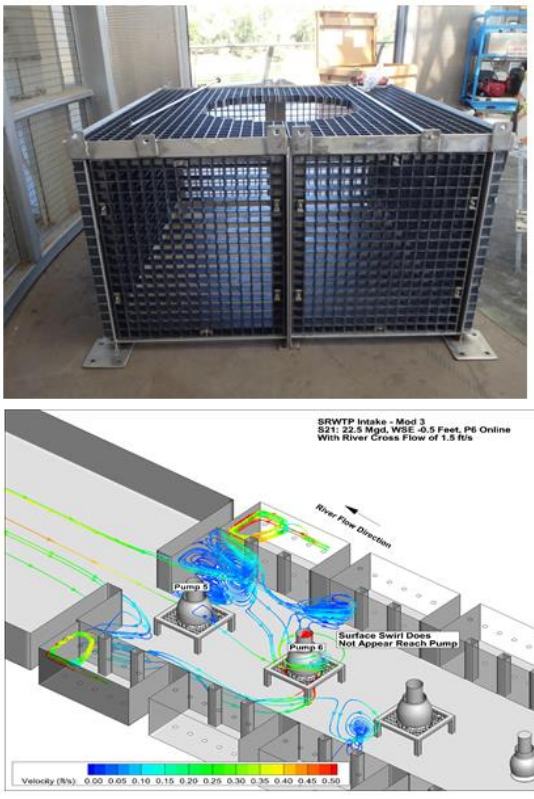
For example, the City needs a minimum flow of 500 cfs on the American to operate the intake. City water rights provide a diversion limitation is 64-100 mgd during low flow conditions on the river and a total limit of 50,000 acre-feet during year when inflow into Folsom Reservoir is particularly low.

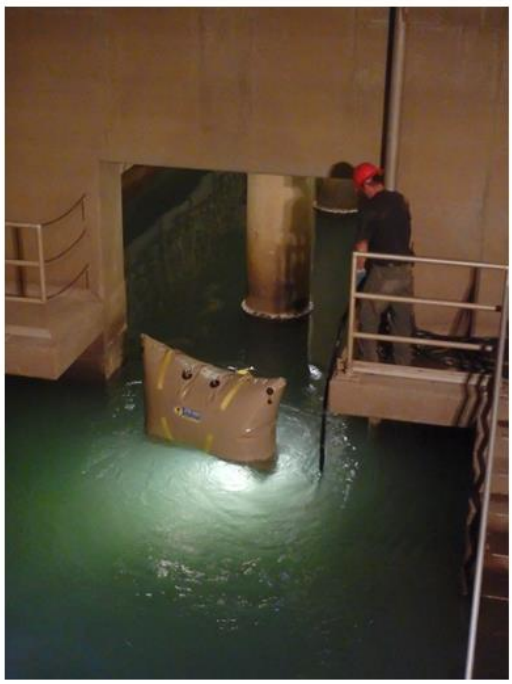
With the resiliency of the City water system, and the desire to benefit the Lower American River, the City will likely reduce its diversion requirements by half of the limiting factors stated above. The EAF Water Treatment Plant facility on the LAR will essentially be idling at a low rate to make sure the City meets level of service needs for its customers.

The Sacramento River is more challenging to predict given the tidal influence. In the 2012 – 2016 drought water level at I street dropped to elevation 1-ft Mean Sea Level (MSL) at an approximate river flow of 5000 cfs, which was a foot below design level of the City intake. The facility continued to perform. The facility evaluations suggest the actual point of failure (before installing improvements) is closer to 3600 CFS after removing all safety factors. With improvements (see Figure F-16) select pumps should continue to operate down to 0.5 feet below MSL. Aside from greater reliance on stored groundwater, the Sacramento River facility is planned to be the lead plant this year. Again, the goal is to meet all the level of service needs of its customers, but utilize operation flexibility to benefit the environment and State/Federal operation of the water system.

The latest release projections by the State/Fed agencies provide for flow patterns that allow operation of City treatment facilities. The City will continue to monitor conditions.

Figure F-16 City of Sacramento – Intake Modifications





Source: City of Sacramento

Vulnerability to and Impacts from Drought and Water Shortage

Based on historical information, the occurrence of drought in California, including the City, 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.

The vulnerability of the City to drought is City-wide, but impacts may vary and include reduction in water supply and an increase in dry fuels. The potential for a reduction in water supply during drought conditions generally leads to both mandated and voluntary conservations measures during extended droughts. During these times, the costs of water can also increase. The increased dry fuels and fuel loads associated with drought conditions can also result in an increased fire danger. In areas of extremely dry fuels, the intensity and speed of fires can be significant. Water supply and flows for fire suppression can also be an issue during extended droughts.

Other qualitative impacts associated with drought in the City and Sacramento County Planning Area are those related to water intensive activities such as, municipal usage, commerce, tourism, recreation and agricultural use. Drought conditions can also cause soil to compact and not absorb water well, potentially making an area more susceptible to flooding.

With more precipitation likely falling as rain instead of snow in the Sierra's, and warmer temperatures causing decreased snowfall to melt faster and earlier, water supply is likely to become more unreliable. In addition, drought and water shortage is predicted to become more common. This means less water available for use over the long run, and additional challenges for water supply reliability, especially during periods of extended drought.

Drought conditions lead to worse flooding in the future ground hardens. Drought also causes City parks issues with landscaping of grasses, trees, and bushes.

Future Development

As the population in the area continues to grow, so will the demand for water. Ongoing planning will be needed by the City and water agencies to account for population growth and increased future water demands.

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

Since earthquakes are regional events, the whole of the City is at risk to earthquake. Sacramento and the surrounding area are at limited risk from significant seismic and geologic hazards. 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 a 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.

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.

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 City 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 City fall within a low to moderate shake risk.

Past Occurrences

The City noted the following past occurrences of earthquakes that had some effect on the City

- 1892: Winters Earthquake (Magnitude 6.6) – Undetermined fault
- 1906: San Francisco Earthquake (Magnitude 7.8) – San Andreas Fault
- 1989 Loma Prieta Earthquake (Magnitude 6.9) – San Andreas Fault
- 2014 Napa Earthquake (Magnitude 6.0) - West Napa Fault
- 2021 Truckee Earthquake (Magnitude 4.7) - West Tahoe Fault

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.

There are no known faults within the City of Sacramento. However, significant earthquakes have occurred on previously undetected faults. Known faults located nearest to Sacramento are Foothills fault system to the east, the Midland Fault to the west, and the Dunnigan Hills Fault to the northwest.

The Foothills fault system is located on the western edge of the Sierra Nevada Range over 20 miles from the Policy Area and consists of a complex of north-south trending faults. The active Bear Mountain fault zone is at the western edge of the system (California Division of Mines and Geology 1978). The anticipated maximum magnitude of an earthquake originating from this fault zone is 6.5 moment magnitude (Mw). The Sacramento region has experienced groundshaking originating from faults in the Foothills fault system in the past. The Midland fault zone is considered to be a deep pre-Pleistocene subsurface feature extending nearly 50 miles along the west side of the Sacramento Valley, from the Delta to Lake Berryessa. This fault has been only approximately located from natural gas exploration work. Subsurface data indicate that there has been no appreciable movement on the Midland fault in the last 24 to 36 million years, and no evidence of surface expression has yet been found (Harwood and Helley 1987). The Dunnigan Hills Fault is located approximately 20 miles northwest of the City of Sacramento. The active fault is not within an Alquist-Priolo Earthquake Fault Zone.

Other faults in the region include the Great Valley fault (segments 3 and 4), located over 25 miles from the Policy Area and capable of producing a 6.5 – 6.8 Mw earthquake. The Concord-Green Valley fault and Hunting Creek-Berryessa fault are both located approximately 40 miles from the Policy Area and are capable of producing 6.9 Mw earthquakes. The Greenville fault is located approximately 50 miles from the Policy Area and is capable of producing a 6.8 Mw earthquake. The West Napa fault is also located approximately 50 miles from the Policy Area and could produce a 6.5 Mw earthquake.

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 housing is 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. The City does not have an inventory of URM or soft story buildings. It is thought that some may exist in the historic districts in the City.

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 City of Sacramento is within the less hazardous Zone 3.

Earthquake vulnerability is primarily based on population and the built environment. Urban areas in high seismic hazard zones are the most vulnerable, while uninhabited areas are less vulnerable.

Impacts from earthquake in the City 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.

Earthquake Analysis

Due to the regional effects of an earthquake, a Hazus earthquake analysis was performed on a countywide basis. This can be found in Section 4.3.11 of the Base Plan. While these runs were not done specific to the City, maps showing damage in the County show greater areas of damage near the cities in the County.

Future Development

Although new growth and development corridors would fall in the area affected by earthquake, given the small chance of major earthquake and the building codes in effect, development in areas prone to earthquakes will continue to occur. The City enforces the state building code, which mandates construction techniques that minimize seismic hazards. Future development in the City is subject to these building codes.

Earthquake Liquefaction

Likelihood of Future Occurrence–Occasional/Unlikely
Vulnerability–High

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.

Liquefaction during major earthquakes has caused severe damage to structures on level ground as a result of settling, titling, or floating. Such damage occurred in San Francisco on bay-filled areas during the 1989 Loma Prieta earthquake, even though the epicenter was several miles away. If liquefaction occurs in or under a sloping soil mass, the entire mass may flow toward a lower elevation. Also of particular concern in terms of developed and newly developing areas are fill areas that have been poorly compacted.

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.

Past Occurrences

The City noted no past events of liquefaction that affected the City.

Vulnerability to and Impacts from Earthquake: Liquefaction

Earthquake is discussed in the section 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.

A geological and seismological study in 1972 indicated that the Housing and Redevelopment Agency building site located downtown at the intersection of 7th and I Streets has a potential for liquefaction. This study also concluded that potential liquefaction problems may exist throughout the downtown area where loose sands and silts are present below the ground water table. Exact property value estimates are not available. Due to the fact that downtown Sacramento is located away from active faults, there may be limited vulnerability to damage from liquefaction.

Future Development

Although new growth and development corridors would fall in the area affected by earthquake, given the small chance of major earthquake and the building codes in effect, development in areas prone to earthquakes will continue to occur. The City enforces the state building code, which mandates construction techniques that minimize seismic hazards. Future development in the City is subject to these building codes.

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 City, and have caused damages in the past. Flooding is a significant problem in Sacramento County and the City. Historically, the City 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. Flooding has occurred both within the 1% and 0.2% annual chance floodplains and in other localized areas.

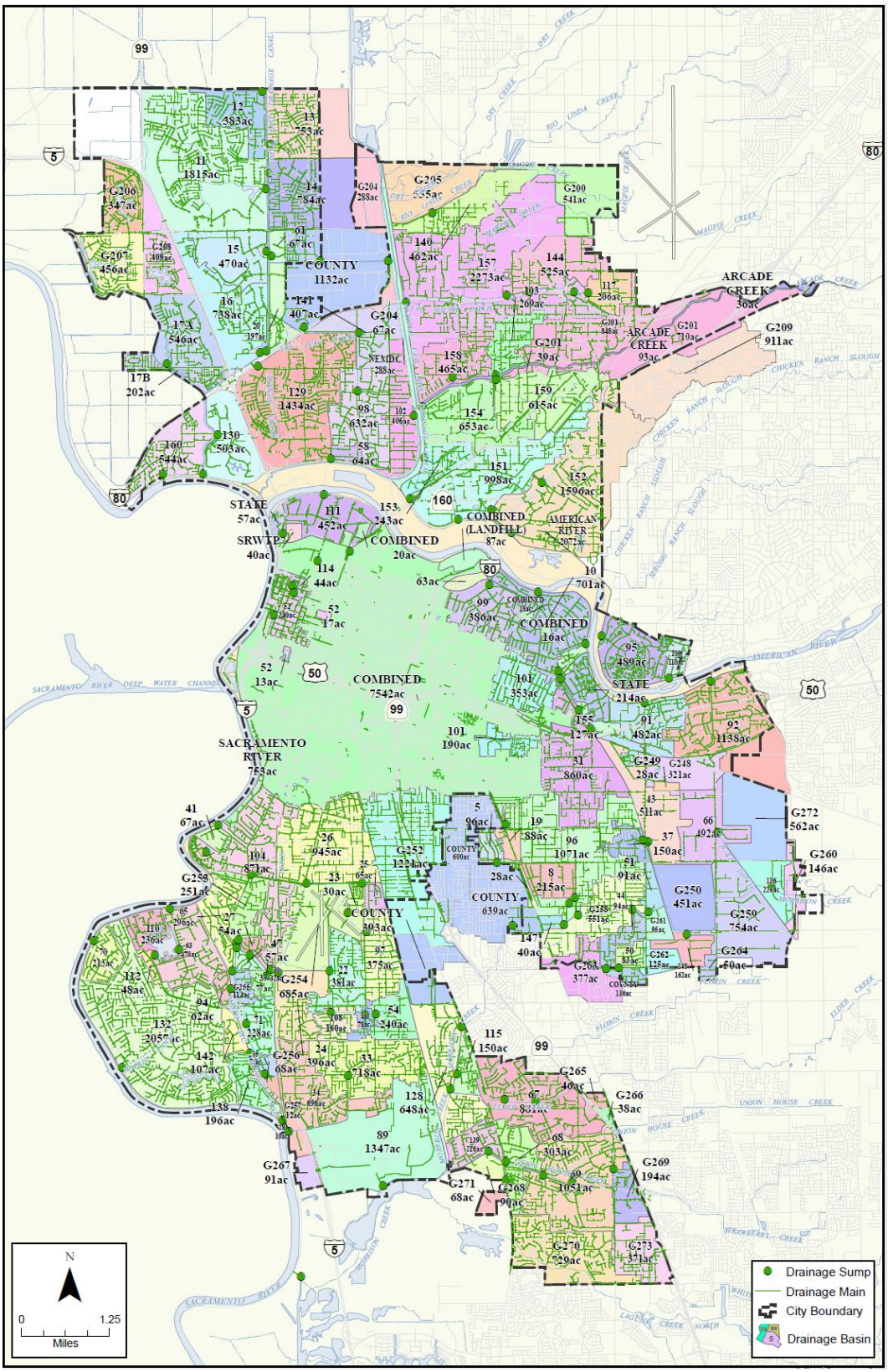
As previously described in Section 4.3.11 of the Base Plan, the Sacramento County Planning Area and the City of Sacramento have been subject to historical flooding. Sacramento is traversed by several stream systems and is at risk to the 1% and 0.2% flood.

Location and Extent

The City of Sacramento is traversed by several stream systems and is at risk to both riverine flooding and localized stormwater flooding. As previously described in Section 4.2.14 of the main plan, the Sacramento County Planning Area and the City of Sacramento have been subject to previous occurrences of flooding. In the City of Sacramento, much of the riverine flood damage occurs in the floodplains of the Sacramento River and the American River.

Six small tributaries of the Sacramento River pass through and provide drainage for the City of Sacramento. These tributaries are Dry Creek, Magpie Creek, and Arcade Creek in the northern portion of the city (north of the American River), and Morrison Creek, Elder Creek, Florin Creek, Unionhouse Creek, and Laguna Creek in the southern portion of the city (south of the American River). Waterways and drainages in the City are shown on Figure F-17.

Figure F-17 City of Sacramento Waterways and Drainage

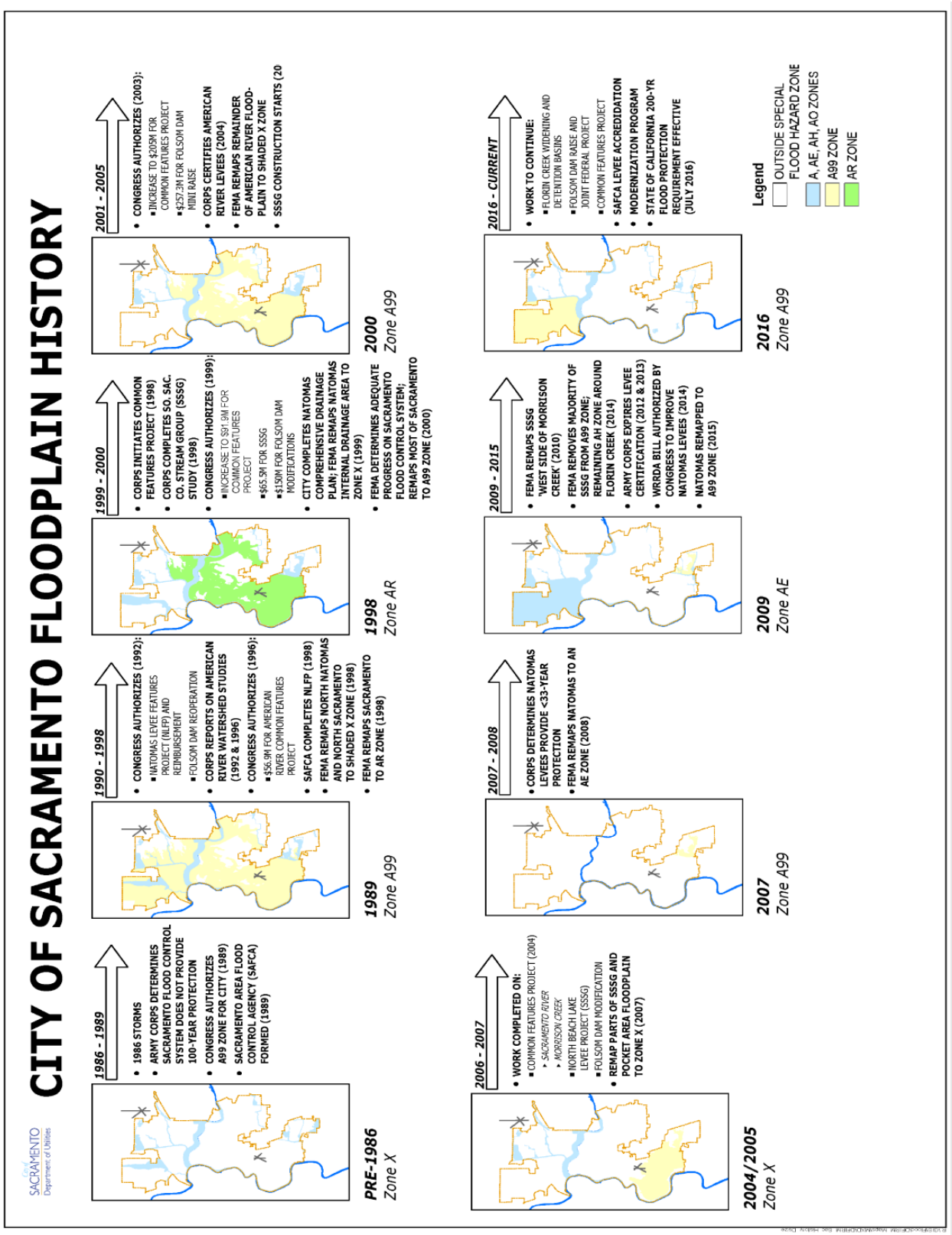


Source: City of Sacramento Department of Utilities

The City Planning Area contains many natural and man-made drainage features that ultimately drain into the Sacramento River. In addition to those listed above, local surface water drainages or creeks such as Chicken Ranch and Strong Ranch sloughs, Florin Creek, and Robla Creek are additional major natural drainages within the Policy Area. Man-made drainage canals, such as the Natomas East Main Drain Canal and the East, West, and Main Drainage Canals provide drainage for a large portion of the urbanized areas within the Policy Area that are not served by the City's combined sewer system or the City's storm drainage collection system.

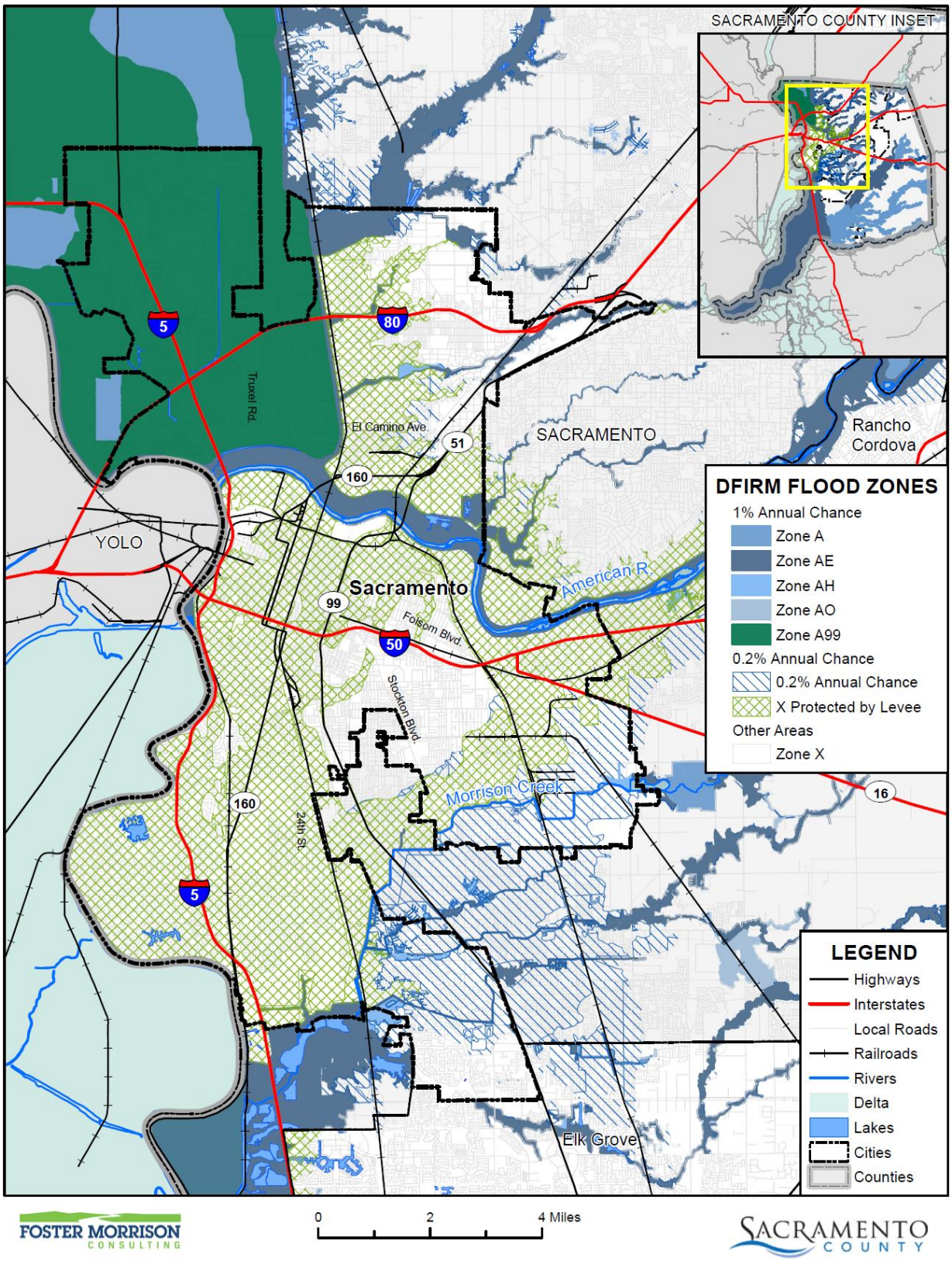
The City Planning area has had many changes to the designated floodplain since the 1986 flooding base on Flood Insurance Rate Maps provided by FEMA. These changes are shown in Figure F-18.

Figure F-18 City of Sacramento Floodplain History



The City of Sacramento has areas located in the 1% and 0.2% annual chance flood zones. This is seen in Figure F-19.

Figure F-19 City of Sacramento – FEMA DFIRM Flood Zones



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

Table F-29 details the DFIRM mapped flood zones located within the City.

Table F-29 City of Sacramento– DFIRM Flood Hazard Zones

Flood Zone	Description	Flood Zone Present in City
A	1% annual chance flooding: No base flood elevations provided. Mandatory flood insurance purchase requirements and floodplain management standards apply.	X
AE	1% annual chance flooding: Base flood elevations provided. Mandatory flood insurance purchase requirements and floodplain management standards apply.	X
AH	Areas subject to inundation by 1-percent-annual-chance shallow flooding (usually areas of ponding) where average depths are between one and three feet. Base Flood Elevations (BFEs) derived from detailed hydraulic analyses are shown in this zone. Mandatory flood insurance purchase requirements and floodplain management standards apply.	X
AO	Areas subject to inundation by 1-percent-annual-chance shallow flooding (usually sheet flow on sloping terrain) where average depths are between one and three feet. Average flood depths derived from detailed hydraulic analyses are shown in this zone. Mandatory flood insurance purchase requirements and floodplain management standards apply.	
A99	Areas subject to inundation by the 1-percent-annual-chance flood event, but which will ultimately be protected upon completion of an under-construction Federal flood protection system. These are areas of special flood hazard where enough progress has been made on the construction of a protection system, such as dikes, dams, and levees, to consider it complete for insurance rating purposes. Zone A99 may only be used when the flood protection system has reached specified statutory progress toward completion. No Base Flood Elevations (BFEs) or depths are shown. Mandatory flood insurance purchase requirements and floodplain management standards apply.	X
Shaded X	0.2% annual chance flooding: The areas between the limits of the 1% annual chance flood and the 0.2-percent-annual-chance (or 500-year) flood. Flood insurance is not mandatory but is available.	X
X Protected by Levee	Areas protected by levees from 1% annual chance flood event. Levee protection places these areas in the 0.2% annual chance flood zone. Flood insurance is not mandatory but is available.	X
X (unshaded)	No flood hazard	X

Source: FEMA

Additionally, flood extents can generally be measured in volume, velocity, and depths of flooding. Expected flood depths in the City vary, depending on the nature and extent of a flood event; specific depths are unknown. Flood durations in the City 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 City tends to have a shorter speed of onset, due to the amount of water that flows through the City.

Geographical flood extent for the City from the FEMA DFIRMs are shown in Table F-30.

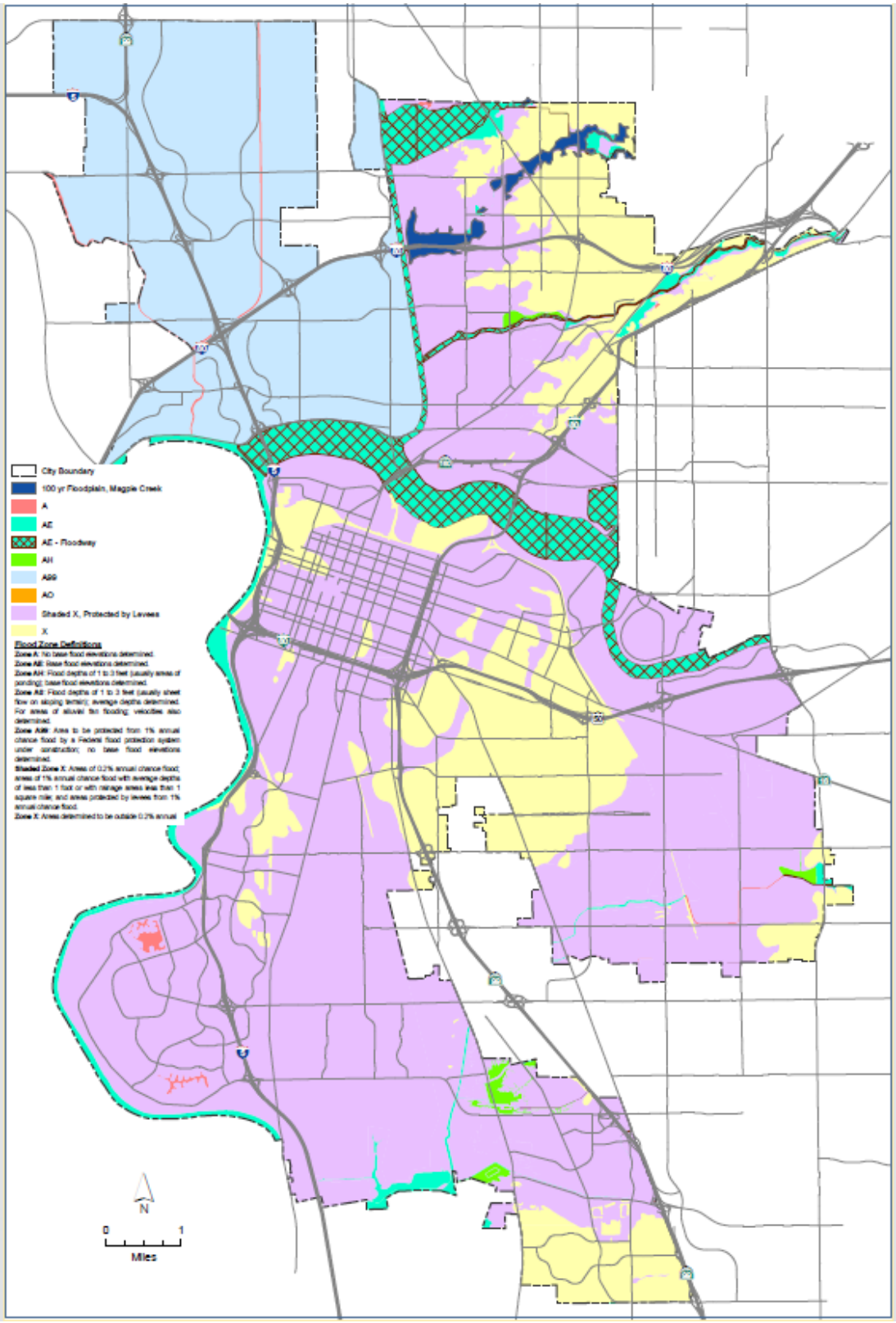
Table F-30 City of Sacramento – Geographical DFIRM Flood Zone Extents

Flood Zone	Total Acres	% of Total Acres	Improved Acres	% of Total Improved Acres	Unimproved Acres	% of Total Unimproved Acres
1% Annual Chance	34,002	45.98%	20,537	42.69%	13,465	52.10%
0.2% Annual Chance	30,304	40.98%	21,078	43.81%	9,226	35.70%
Other Areas	9,649	13.05%	6,496	13.50%	3,154	12.20%
Total	**73,956**	**100.00%**	**48,110**	**100.00%**	**25,845**	**100.00%**

Source: FEMA DFIRM 11/2/2018

In addition to FEMA floodplains, the City also regulates a local floodplain. FEMA floodplains and local floodplains are shown on Figure F-20. For purposes on analysis in this plan, only FEMA floodplains are analyzed.

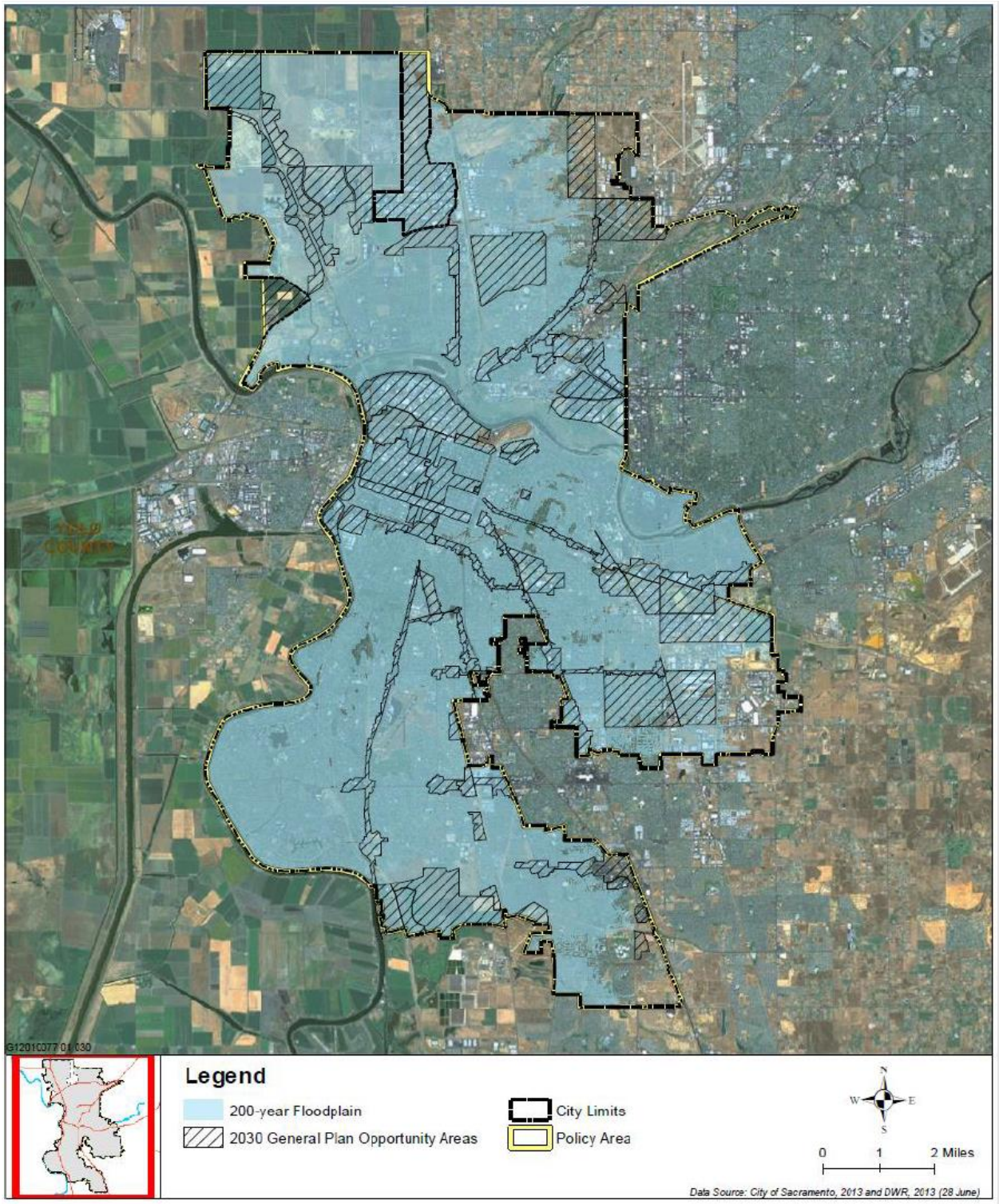
Figure F-20 City of Sacramento – FEMA and Local Floodplains



Source: City of Sacramento Department of Utilities GIS

An estimation of the City's 200-year floodplain can be seen in Figure F-21. While no analysis was performed using 200-year flood layer, it is presented here for informational purposes.

Figure F-21 City of Sacramento 200-year Floodplain



Past Occurrences

A list of state and federal disaster declarations for Sacramento County from flooding is shown on Table F-31. These events also likely affected the City to some degree.

Table F-31 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

The City noted other past occurrences of flooding.

Sacramento experienced great floods in 1850, 1852, 1862, 1911, 1913, 1951, 1956, 1963, 1964, 1986, 1995, 1997, 2005, and 2016. Record breaking flood events are detailed further below:

1850 Flood - During the night of January 7, 1850, a great storm swept in from the west. Almost overnight the water posed a grave threat to life and property. Within two days of the storms beginnings, downpours that reached an inch an hour, had transformed the rivers into raging torrents. There was no levee protecting the new city which started right at the river banks. Within hours, the entire community, for a mile back from the river, was deep under rushing waters. Houses were toppled; businessmen watched as thousands of dollars in inventory was washed out their doors; and a small steamboat navigated the town's streets to deliver goods. Very few homes escaped having water on the first floors. Many were swept from their underpinnings.

Figure F-22 Sketch of the City of Sacramento during the Flood of 1850

Source: California State Library

1852-53 Flood – In December of 1852, the Sacramento Valley was again inundated, even more deeply than they had in the high water of 1850. On March 29, 1853, the Sacramento River rose twelve feet within twenty-four hours. When the water finally broke through the levees, it was at a point south of the city,

toward Sutterville. The out rush of waters on the flatlands were sweeping and violent. By April 2, 1853, the water had backed up into the city. Again the City was under water. Sacramento was a city submerged. The City was a lake, boats were in the streets and the water didn't drain away for two months. The City had levees along both the Sacramento and American Rivers. Although levees served to prevent the rivers from invading the growing city, they also served to trap storm and refuse water that would otherwise drain directly into those rivers.

1861-1862 Flood – Sacramento had enjoyed eight winters of the rivers staying in-bank. The City had prospered and became the State capital. On December 9, 1861, at 8:00 A.M., the American River suddenly went over the levee at Smith's Gardens, about 31st & B Streets, in the northeastern part of the City. The water took its old channel, rushed through the slough west of the Fort and over its banks in less than 30 minutes, the low lots between 0 & R Streets were overflowed two to three feet deep. The R Street levee stopped its flow, causing it to back up into the City. By 9 A.M., the entire City, south of J Street, was inundated. By 11:30 A.M., only J, K and the levee streets (1, R, and Front) were above water. Within an hour and a half, J and K Streets were under water.

1951 Record Flood – Just after ground is broken on Folsom Dam, the American River watershed experiences the first of five record storms.

1956 Record Flood – Though engineers had been predicting it would take a year to fill the nearly completed upstream Folsom Dam, the second record storm filled the dam in a week and Sacramento is saved from flooding.

1964 Record Flood – the 3rd record flood in less than 15 years. Engineers concluded that Folsom Dam was only designed to handle a 120-year storm, not a 500-year storm.

1986 Record Flood: In February 1986, major storms in northern California caused record flood flows in the American River basin. Overflows from Folsom Reservoir, together with high flows in the Sacramento River, caused water levels to rise above the safety margin on levees protecting the Sacramento area. A series of tropical storms roared through the State that month. Ten inches of rain fell in 11 days. The levee overtopped in a low spot of Strawberry Manor, flooding approximately 500 homes. Outflows from Folsom Reservoir, together with high flows in the Sacramento River, caused water levels to rise above the safety margin on levees protecting the Sacramento area. The storm brought large flood flows into Folsom Reservoir with a maximum six-day record inflow of 1.14 million acre-feet, exceeding the six-day design inflow of 987,000 acre- feet. To relieve the pressure on the dam, 115,000 cubic feet per second (cfs), the design capacity of the levees downstream, was released from the reservoir for two days. As the rain continued, officials boosted those releases to 130,000 cfs for 24 hours. Officials considered increasing releases to 150,000 cfs, but the rain let up, and disaster was averted. At that point, it was estimated by flood officials that three more hours of rainfall would have overwhelmed the system, flooding thousands of homes. Runoff in the American River quickly filled the temporary diversion dam built at the Auburn Dam site, approximately ten years earlier, causing it to burst, and sending 100,000 acre feet of water rushing into Folsom Reservoir. Folsom Dam was downgraded to about a 60-year storm. The USACE determined that a majority of the City did not have 100-year level of flood protection.

Figure F-23 Ariel View of 1986 Flood

Source: SAFCA

1997 Record Flood: The fifth record flood in 46 years occurs over the New Year's holiday. Unprecedented flows from rain and melted snow surge into the Feather and the San Joaquin. Sacramento is spared when the fury of the storm hits 40 miles north in the Feather River. Levee failures flood Olivehurst, Adboga, Wilton, Manteca, and Modesto. By the end of January 1997, 48 counties were declared disaster areas and 290 square miles of property, valued at about $2 billion, including homes, farmlands, bridges, roads and flood management infrastructures were damaged. Nine people were killed and 120,000 people were evacuated from their homes.

Other large flood events will certainly occur in the future, leaving the City vulnerable to additional, potentially catastrophic flooding. Further localized flooding problems both in and outside of the natural floodplains are likely to continue as drainage channels are altered and confined with new development.

December 2012: McKinley Park Flooding - Several houses were flooded during a rain storm due to a failed programmable logic controller. DOC activation due to weather forecast.

Figure F-24 January 2003 Tower Bridge

Source: The Sacramento Area Flood Control Agency

Figure F-25 December 30, 2005 Pomegranate Avenue along Florin Creek in South Sacramento

Source: The Sacramento Area Flood Control Agency

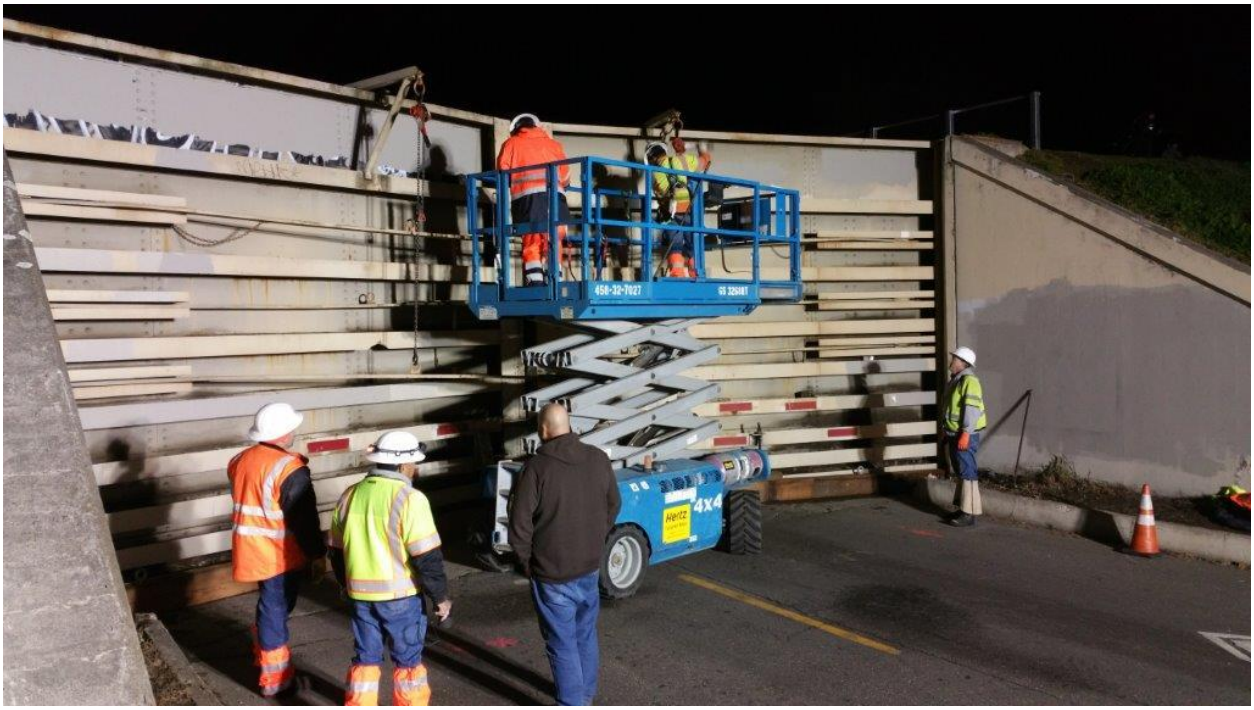
December 15, 2016 – The Natomas Four Season development was hit by flooding (see Figure F-26). Drainage backed up in the area due to raised floodgates. The City of Sacramento Department of Utilities had lowered floodgates in the area, but a private operator raised them later, causing flooding. Street flooding was reported, but no damages were suffered.

Figure F-26 City of Sacramento – December 2016 Flooding in Natomas Four Season Development

Source: City of Sacramento

January 6 to 12, 2017 – Heavy rains caused flooding throughout the City. In response, the EOC was activated. In anticipation of flooding, the Del Paso floodgates were raised. Floodgates were also raised at the Union Pacific Railway. Flooding occurred in the Garcia Bend Park. Sloughing occurred on the Executive Airport Canal. Floodwater temporarily threatened the I Street bridge. Flooding occurred an NEMDC and on Magpie Creek. Nimbus Dam was not in danger, but high flows were discharged down the spillway and into downstream rivers. High water was seen at the Sacramento weir.

Figure F-27 Del Paso Floodgate Closure



Source: City of Sacramento

Figure F-28 High Water at Sacramento Weir

Source: City of Sacramento

Figure F-29 Nimbus Dam in January 2017

Source: City of Sacramento

Vulnerability to and Impacts from Flood

Floods have been a part of the City'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. Public schools may also be required to close or be placed on a delayed start schedule. 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.

Health Hazards from Flooding

Certain health hazards are also common to flood events. While such problems are often not reported, three general types of health hazards accompany floods. The first comes from the water itself. Floodwaters carry anything that was on the ground that the upstream runoff picked up, including dirt, oil, animal waste, and lawn, farm and industrial chemicals. Pastures and areas where cattle and other livestock are kept or their wastes are stored can contribute polluted waters to the receiving streams.

Floodwaters also saturate the ground, which leads to infiltration into sanitary sewer lines. When wastewater treatment plants are flooded, there is nowhere for the sewage to flow. Infiltration and lack of treatment can lead to overloaded sewer lines that can back up into low-lying areas and homes. Even when it is diluted by flood waters, raw sewage can be a breeding ground for bacteria such as e. coli and other disease causing agents.

The second type of health problem arises after most of the water has gone. Stagnant pools can become breeding grounds for mosquitoes, and wet areas of a building that have not been properly cleaned breed mold and mildew. A building that is not thoroughly cleaned becomes a health hazard, especially for small children and the elderly.

Another health hazard occurs when heating ducts in a forced air system are not properly cleaned after inundation. When the furnace or air conditioner is turned on, the sediments left in the ducts are circulated throughout the building and breathed in by the occupants. If a city or county water system loses pressure, a boil order may be issued to protect people and animals from contaminated water.

The third problem is the long-term psychological impact of having been through a flood and seeing one's home damaged and irreplaceable keepsakes destroyed. The cost and labor needed to repair a flood-damaged home puts a severe strain on people, especially the unprepared and uninsured. There is also a long-term problem for those who know that their homes can be flooded again. The resulting stress on floodplain residents takes its toll in the form of aggravated physical and mental health problems.

The HMPC for the City also noted another issue. When the City's combined sewer system is overloaded with stormwater, it frequently backs up into the streets causing a health hazard.

Warning and Evacuation Procedures

The City of Sacramento in conjunction with Sacramento County and other incorporated communities have a variety of systems and procedures established to protect its residents and visitors to plan for, avoid, and respond to a hazard event including those associated with floods and wildfires. This includes Pre-Disaster Public Awareness and Education information which is major component in successfully reducing loss of life and property in a community when faced with a potentially catastrophic incident. Much of this information is not specific to a given hazard event and is always accessible to the public on local City and County websites. Specific warning and evacuation systems and procedures include information relative to: Flood Forecasting (e.g., California Data Exchange Center), ALERT System, Warning Systems, dam protocols, evacuation procedures, and sheltering in place. Additional information on these warning and evacuation procedures as well as post-disaster mitigation policies and procedures can be found within the Capability Section of this Annex and in Section 4.4 of the Base plan and in the Emergency Management discussions in Appendix C.

Assets at Risk

Based on the vulnerability of Sacramento to the flood hazard, the sections that follow describes significant assets at risk in the City of Sacramento. This section includes the values at risk, flooded acres, population at risk, and critical facilities at risk.

Values at Risk

GIS was used to determine the possible impacts of flooding within the City of Sacramento. The methodology described in Section 4.3.12 of the Base Plan was followed in determining structures and values at risk to the 1% (100-year) and 0.2% (500-year) annual chance flood event. Table F-32 is a summary table for the City of Sacramento. Parcel counts, values, estimated contents, and total values in the City are shown for the 1% and 0.2% annual chance flood zones, as well as for those properties that fall outside of the mapped FEMA DFIRM flood zones. Table F-33 breaks down Table F-32 and shows the property use, improved parcel count, improved values, estimated contents, and total values that fall in FEMA flood zones in the City.

Table F-32 City of Sacramento – Count and Value of Parcels at Risk in Summary DFIRM Flood Zones

Flood Zone	Total Parcel Count	Improved Parcel Count	Total Land Value	Improved Structure Value	Estimated Contents Value	Total Value
1% Annual Chance Flood Hazard	34,612	30,884	$3,473,949,831	$10,066,624,818	$5,878,442,788	$19,419,017,610
0.2% Annual Chance Flood Hazard	90,649	84,438	$10,037,993,408	$26,076,921,127	$18,395,244,253	$54,510,159,160
Other Areas	30,329	27,574	$2,820,079,046	$7,249,889,826	$4,805,943,778	$14,875,912,816
City of Sacramento Total	**155,590**	**142,896**	**$16,332,022,285**	**$43,393,435,771**	**$29,079,630,819**	**$88,805,089,586**

Source: FEMA 11/2/2018 DFIRM, Sacramento County 2020 Parcel/Assessor's Data

*With respect to improve parcels within the floodplain, the actual structures on the parcels may not be located within the actual floodplain, may be elevated and or otherwise outside of the identified flood zone

**This parcel count only includes those parcels in the 0.2% annual chance flood zone, exclusive of the 1% annual chance flood zone. The 0.2% annual chance flood, in actuality, also includes all parcels in the 1% annual chance flood zone.

Table F-33 City of Sacramento – Count and Values of Parcels at Risk by Detailed Flood Zone and Property Use

Flood Zone / Property Use	Total Parcel Count	Improved Parcel Count	Total Land Value	Improved Structure Value	Estimated Contents Value	Total Value
1% Annual Chance Flood Hazard						
Zone A						
Agricultural	0	0	$0	$0	$0	$0
Care/Health	0	0	$0	$0	$0	$0
Church/Welfare	0	0	$0	$0	$0	$0
Industrial	0	0	$0	$0	$0	$0
Miscellaneous	37	0	$918	$0	$0	$918
Office	0	0	$0	$0	$0	$0
Public/Utilities	0	0	$0	$0	$0	$0
Recreational	0	0	$0	$0	$0	$0
Residential	11	0	$0	$0	$0	$0
Retail/ Commercial	0	0	$0	$0	$0	$0
Unknown	0	0	$0	$0	$0	$0
Vacant	1	0	$10	$0	$0	$10
Zone A Total	**49**	**0**	**$928**	**$0**	**$0**	**$928**
Zone AE						
Agricultural	0	0	$0	$0	$0	$0
Care/Health	1	1	$3,080,974	$17,467,737	$17,467,737	$38,016,448

Flood Zone / Property Use	Total Parcel Count	Improved Parcel Count	Total Land Value	Improved Structure Value	Estimated Contents Value	Total Value
Church/Welfare	2	0	$20	$0	$0	$20
Industrial	7	5	$3,309,543	$5,474,577	$8,211,866	$16,995,985
Miscellaneous	330	0	$448,956	$0	$0	$448,956
Office	5	4	$3,763,605	$11,441,156	$11,441,156	$26,645,917
Public/Utilities	40	0	$9	$0	$0	$9
Recreational	17	3	$1,038,277	$5,930,196	$5,930,196	$12,898,669
Residential	86	79	$10,058,050	$20,754,434	$10,377,219	$41,189,704
Retail/ Commercial	12	10	$5,463,192	$7,693,547	$7,693,547	$20,850,286
Unknown	0	0	$0	$0	$0	$0
Vacant	81	0	$4,336,837	$0	$0	$4,336,837
Zone AE Total	**581**	**102**	**$31,499,463**	**$68,761,647**	**$61,121,721**	**$161,382,831**
Zone AH						
Agricultural	0	0	$0	$0	$0	$0
Care/Health	0	0	$0	$0	$0	$0
Church/Welfare	0	0	$0	$0	$0	$0
Industrial	8	8	$5,361,464	$17,610,653	$26,415,980	$49,388,099
Miscellaneous	27	0	$241	$0		$241
Office	0	0	$0	$0	$0	$0
Public/Utilities	3	0	$0	$0	$0	$0
Recreational	0	0	$0	$0	$0	$0
Residential	166	162	$8,674,540	$19,190,390	$9,595,191	$37,460,126
Retail/ Commercial	5	4	$2,564,760	$2,583,690	$2,583,690	$7,732,140
Unknown	0	0	$0	$0	$0	$0
Vacant	14	0	$610,913	$0	$0	$610,913
Zone AH Total	**223**	**174**	**$17,211,918**	**$39,384,733**	**$38,594,861**	**$95,191,519**
Zone A99						
Agricultural	10	1	$3,414,513	$165,516	$165,516	$3,745,545
Care/Health	13	11	$14,098,088	$53,243,114	$53,243,114	$120,584,316
Church/Welfare	17	16	$14,902,100	$48,883,844	$48,883,844	$112,669,788
Industrial	49	45	$29,453,067	$121,659,409	$182,489,113	$333,601,589
Miscellaneous	937	0	$599,594	$0	$0	$599,594
Office	195	176	$187,192,861	$762,586,024	$762,586,024	$1,712,364,909
Public/Utilities	29	0	$83	$0	$0	$83
Recreational	11	9	$38,979,673	$49,605,218	$49,605,218	$138,190,109

Flood Zone / Property Use	Total Parcel Count	Improved Parcel Count	Total Land Value	Improved Structure Value	Estimated Contents Value	Total Value
Residential	31,029	30,119	$2,720,832,858	$8,465,381,086	$4,232,690,505	$15,418,904,615
Retail/ Commercial	213	207	$197,459,470	$449,062,872	$449,062,872	$1,095,585,214
Unknown	1	1	$0	$86,693	$0	$86,693
Vacant	1,255	23	$218,305,215	$7,804,662	$0	$226,109,877
Zone A99 Total	**33,759**	**30,608**	**$3,425,237,522**	**$9,958,478,438**	**$5,778,726,206**	**$19,162,442,332**
1% Annual Chance Flood Hazard Total	**34,612**	**30,884**	**$3,473,949,831**	**$10,066,624,818**	**$5,878,442,788**	**$19,419,017,610**
0.2% Annual Chance Flood Hazard						
0.2% Annual Chance						
Agricultural	1	1	$343,332	$457,776	$457,776	$1,258,884
Care/Health	14	12	$10,053,253	$436,512,590	$436,512,590	$883,078,433
Church/Welfare	48	37	$9,595,334	$34,872,379	$34,872,379	$79,340,092
Industrial	468	444	$212,609,294	$831,052,142	$1,246,578,217	$2,290,239,651
Miscellaneous	154	0	$238,420	$0	$0	$238,420
Office	55	46	$20,865,031	$79,297,498	$79,297,498	$179,460,027
Public/Utilities	48	0	$47	$0	$0	$47
Recreational	2	2	$841,668	$1,817,754	$1,817,754	$4,477,176
Residential	10,573	10,361	$511,415,995	$1,535,215,644	$767,607,747	$2,814,239,489
Retail/ Commercial	173	151	$100,650,954	$189,065,272	$189,065,272	$478,781,498
Unknown	0	0	$0	$0	$0	$0
Vacant	348	20	$56,829,407	$12,432,868	$0	$69,262,275
0.2% Annual Chance Total	**11,884**	**11,074**	**$923,442,735**	**$3,120,723,923**	**$2,756,209,233**	**$6,800,375,992**
X Protected by Levee						
Agricultural	2	0	$4,382	$0	$0	$4,382
Care/Health	95	82	$56,338,066	$948,186,157	$948,186,157	$1,952,710,380
Church/Welfare	286	236	$58,219,993	$245,515,904	$245,515,904	$549,251,801
Industrial	1,066	927	$340,988,541	$868,045,887	$1,302,068,816	$2,511,103,265
Miscellaneous	1,148	6	$2,219,040	$134,491	$134,491	$2,488,022
Office	1,307	1,043	$834,541,039	$3,568,339,668	$3,568,339,668	$7,971,220,375
Public/Utilities	401	1	$311,958	$31,233	$31,233	$374,424
Recreational	83	46	$45,215,017	$402,974,334	$402,974,334	$851,163,685
Residential	70,328	69,537	$6,561,266,974	$15,479,336,428	$7,739,668,041	$29,780,271,693
Retail/ Commercial	1,853	1,383	$774,751,530	$1,432,116,376	$1,432,116,376	$3,638,984,282

Flood Zone / Property Use	Total Parcel Count	Improved Parcel Count	Total Land Value	Improved Structure Value	Estimated Contents Value	Total Value
Unknown	1	0	$0	$0	$0	$0
Vacant	2,195	103	$440,694,133	$11,516,726	$0	$452,210,859
X Protected by Levee Total	**78,765**	**73,364**	**$9,114,550,673**	**$22,956,197,204**	**$15,639,035,020**	**$47,709,783,168**
0.2% Annual Chance Flood Hazard Total	**90,649**	**84,438**	**$10,037,993,408**	**$26,076,921,127**	**$18,395,244,253**	**$54,510,159,160**
Other Areas						
Zone X						
Agricultural	1	0	$4,077			$4,077
Care/Health	35	26	$18,415,829	$195,496,844	$195,496,844	$409,409,517
Church/Welfare	186	151	$28,078,654	$218,645,794	$218,645,794	$465,370,242
Industrial	436	391	$124,051,987	$393,659,478	$590,489,221	$1,108,200,679
Miscellaneous	432	3	$265,439	$185,558	$185,558	$636,555
Office	234	183	$148,115,124	$641,971,564	$641,971,564	$1,432,058,252
Public/Utilities	247	0	$1,397,551			$1,397,551
Recreational	26	20	$4,940,327	$11,916,549	$11,916,549	$28,773,425
Residential	26,478	26,171	$2,037,791,411	$5,268,917,130	$2,634,458,401	$9,941,167,115
Retail/ Commercial	687	586	$260,234,690	$512,779,847	$512,779,847	$1,285,794,384
Unknown	0	0	$0	$0	$0	$0
Vacant	1,567	43	$196,783,957	$6,317,062	$0	$203,101,019
Zone X Total	**30,329**	**27,574**	**$2,820,079,046**	**$7,249,889,826**	**$4,805,943,778**	**$14,875,912,816**
Other Areas Total	**30,329**	**27,574**	**$2,820,079,046**	**$7,249,889,826**	**$4,805,943,778**	**$14,875,912,816**
City of Sacramento Total	**155,590**	**142,896**	**$16,332,022,285**	**$43,393,435,771**	**$29,079,630,819**	**$88,805,089,586**

Source: FEMA 11/2/2018 DFIRM, Sacramento County 2020 Parcel/Assessor's Data

*With respect to improve parcels within the floodplain, the actual structures on the parcels may not be located within the actual floodplain, may be elevated and or otherwise outside of the identified flood zone

**This parcel count only includes those parcels in the 0.2% annual chance flood zone, exclusive of the 1% annual chance flood zone. The 0.2% annual chance flood, in actuality, also includes all parcels in the 1% annual chance flood zone.

Table F-34 summarizes Table F-33 above and shows City of Sacramento loss estimates and improved values at risk by FEMA 1% and 0.2% annual chance flood zones.

Table F-34 City of Sacramento – Flood Loss Estimates

Flood Zone	Total Parcel Count	Improved Parcel Count	Improved Structure Value	Estimated Contents Value	Total Value	Loss Estimate	Loss Ratio
1% Annual Chance Flood Hazard	34,612	30,884	$10,066,624,818	$5,878,442,788	$15,945,067,606	$3,189,013,521	1.77%
0.2% Annual Chance Flood Hazard	90,649	84,438	$26,076,921,127	$18,395,244,253	$44,472,165,380	$8,894,433,076	4.95%
Grand Total	**125,261**	**115,322**	**$36,143,545,945**	**$24,273,687,041**	**$60,417,232,986**	**$12,083,446,597**	**6.72%**

Source: FEMA 11/2/2018 DFIRM, Sacramento County 2020 Parcel/Assessor's Data

*With respect to improve parcels within the floodplain, the actual structures on the parcels may not be located within the actual floodplain, may be elevated and or otherwise outside of the identified flood zone

**This parcel count only includes those parcels in the 0.2% annual chance flood zone, exclusive of the 1% annual chance flood zone. The 0.2% annual chance flood, in actuality, also includes all parcels in the 1% annual chance flood zone.

According to Table F-33 and Table F-34, the City of Sacramento has 30,884 parcels and $15.95 billion of structure and contents values or values in the 1% annual chance flood zone, and 84,438 improved parcels and $44.47 billion of structure and contents values in the 0.2% annual chance flood zone. These values can be refined a step further. Applying the 20 percent damage factor as previously described in Section 4.3.11 of the Base Plan, there is a 1% chance in any given year of a flood event causing $3.2 billion in damage and a 0.2% chance in any given year of a flood event causing $8.9 billion in damage in the City of Sacramento. The loss ratio of 1.77% and 4.95% indicates that flood losses for 1% and 0.2% annual chance flooding, respectively, would be sizable and difficult to recover from.

Flooded Acres

Also of interest is the land area affected by the various flood zones. The following is an analysis of flooded acres in the City in comparison to total area within the City limits. The same methodology, as discussed in Section 4.3.12 of the Base Plan, was used for the City of Sacramento as well as for the County as a whole. Table F-35 represents a detailed and summary analysis of total acres for each FEMA DFIRM flood zone in the City.

Table F-35 City of Sacramento – Flooded Acres by Flood Zone and Property Use

Flood Zone/ Property Use	Total Acres	% of Total Acres	Improved Acres	% of Total Improved Acres	Unimproved Acres	% of Total Unimproved Acres
1% Annual Chance Flood Hazard						
Zone A						
Agricultural	2.3	0.00%	2.3	0.00%	0	0.00%
Care/Health	0	0.00%	0	0.00%	0	0.00%

Flood Zone/ Property Use	Total Acres	% of Total Acres	Improved Acres	% of Total Improved Acres	Unimproved Acres	% of Total Unimproved Acres
Church/Welfare	0	0.00%	0	0.00%	0	0.00%
Industrial	13.3	0.00%	2.9	0.00%	10.4	0.00%
Miscellaneous	97.5	0.02%	0	0.00%	97.5	0.03%
Office	0.0	0.00%	0.0	0.00%	0	0.00%
Public/Utilities	10.8	0.00%	0	0.00%	10.8	0.00%
Recreational	1.7	0.00%	0	0.00%	1.7	0.00%
Residential	85.4	0.01%	8.6	0.00%	76.8	0.03%
Retail/ Commercial	0.0	0.00%	0.0	0.00%	0	0.00%
Unknown	0	0.00%	0	0.00%	0	0.00%
Vacant	16.0	0.00%	0.0	0.00%	16.0	0.01%
Zone A Total	**227.1**	**0.04%**	**13.9**	**0.00%**	**213.2**	**0.08%**
Zone AE						
Agricultural	1.1	0.00%	0.5	0.00%	0.6	0.00%
Care/Health	7.1	0.00%	7.1	0.00%	0	0.00%
Church/Welfare	12.3	0.00%	1.3	0.00%	11.0	0.00%
Industrial	36.4	0.01%	32.9	0.01%	3.4	0.00%
Miscellaneous	2,147.1	0.33%	0	0.00%	2,147.1	0.76%
Office	8.3	0.00%	7.2	0.00%	1.2	0.00%
Public/Utilities	363.3	0.06%	0	0.00%	363.3	0.13%
Recreational	229.3	0.04%	5.0	0.00%	224.3	0.08%
Residential	151.6	0.02%	144.7	0.04%	7.0	0.00%
Retail/ Commercial	15.4	0.00%	13.5	0.00%	1.9	0.00%
Unknown	0	0.00%	0	0.00%	0	0.00%
Vacant	745.1	0.12%	0.3	0.00%	744.8	0.26%
Zone AE Total	**3,717.1**	**0.58%**	**212.5**	**0.06%**	**3,504.5**	**1.24%**
Zone AH						
Agricultural	0	0.00%	0	0.00%	0	0.00%
Care/Health	0	0.00%	0	0.00%	0	0.00%
Church/Welfare	0.5	0.00%	0.5	0.00%	0	0.00%
Industrial	36.0	0.01%	35.9	0.01%	0.1	0.00%
Miscellaneous	22.1	0.00%	0	0.00%	22.1	0.01%
Office	0	0.00%	0	0.00%	0	0.00%
Public/Utilities	30.8	0.00%	0	0.00%	30.8	0.01%
Recreational	0	0.00%	0	0.00%	0	0.00%

Flood Zone/ Property Use	Total Acres	% of Total Acres	Improved Acres	% of Total Improved Acres	Unimproved Acres	% of Total Unimproved Acres
Residential	33.6	0.01%	32.1	0.01%	1.5	0.00%
Retail/ Commercial	13.2	0.00%	10.6	0.00%	2.7	0.00%
Unknown	0	0.00%	0	0.00%	0	0.00%
Vacant	13.1	0.00%	0	0.00%	13.1	0.00%
Zone AH Total	**149.3**	**0.02%**	**79.1**	**0.02%**	**70.2**	**0.02%**
Zone A99						
Agricultural	159.6	0.02%	2.0	0.00%	157.7	0.06%
Care/Health	29.7	0.00%	22.8	0.01%	6.9	0.00%
Church/Welfare	57.6	0.01%	57.5	0.02%	0.1	0.00%
Industrial	132.2	0.02%	112.4	0.03%	19.8	0.01%
Miscellaneous	1,566.0	0.24%	0	0.00%	1,566.0	0.55%
Office	672.9	0.10%	524.3	0.15%	148.6	0.05%
Public/Utilities	235.7	0.04%	0	0.00%	235.7	0.08%
Recreational	216.8	0.03%	110.5	0.03%	106.3	0.04%
Residential	24,187.9	3.75%	18,670.4	5.17%	5,517.4	1.95%
Retail/ Commercial	368.3	0.06%	351.3	0.10%	17.0	0.01%
Unknown	0.0	0.00%	0.0	0.00%	0	0.00%
Vacant	2,282.3	0.35%	380.5	0.11%	1,901.8	0.67%
Zone A99 Total	**29,909.0**	**4.64%**	**20,231.7**	**5.60%**	**9,677.3**	**3.41%**
1% Annual Chance Flood Hazard Total	**34,002.5**	**5.28%**	**20,537.2**	**5.69%**	**13,465.3**	**4.75%**
0.2% Annual Chance Flood Hazard						
0.2% Annual Chance						
Agricultural	17.2	0.00%	17.2	0.00%	0	0.00%
Care/Health	72.5	0.01%	71.0	0.02%	1.5	0.00%
Church/Welfare	244.7	0.04%	93.9	0.03%	150.8	0.05%
Industrial	1,665.8	0.26%	1,538.7	0.43%	127.1	0.04%
Miscellaneous	265.6	0.04%	0	0.00%	265.6	0.09%
Office	123.4	0.02%	108.5	0.03%	14.9	0.01%
Public/Utilities	162.0	0.03%	0	0.00%	162.0	0.06%
Recreational	60.9	0.01%	3.3	0.00%	57.7	0.02%
Residential	2,307.1	0.36%	2,236.1	0.62%	71.0	0.03%
Retail/ Commercial	217.4	0.03%	205.6	0.06%	11.8	0.00%

Flood Zone/ Property Use	Total Acres	% of Total Acres	Improved Acres	% of Total Improved Acres	Unimproved Acres	% of Total Unimproved Acres
Unknown	0	0.00%	0	0.00%	0	0.00%
Vacant	812.7	0.13%	58.7	0.02%	754.0	0.27%
0.2% Annual Chance Total	**5,949.2**	**0.92%**	**4,333.0**	**1.20%**	**1,616.2**	**0.57%**
X Protected by Levee						
Agricultural	0.3	0.00%	0	0.00%	0.3	0.00%
Care/Health	248.6	0.04%	231.1	0.06%	17.5	0.01%
Church/Welfare	681.7	0.11%	322.4	0.09%	359.4	0.13%
Industrial	2,148.0	0.33%	1,445.6	0.40%	702.4	0.25%
Miscellaneous	1,327.6	0.21%	0.5	0.00%	1,327.1	0.47%
Office	1,339.6	0.21%	866.1	0.24%	473.5	0.17%
Public/Utilities	1,301.3	0.20%	0.6	0.00%	1,300.6	0.46%
Recreational	511.9	0.08%	57.3	0.02%	454.6	0.16%
Residential	13,281.4	2.06%	12,788.3	3.54%	493.1	0.17%
Retail/ Commercial	1,165.9	0.18%	957.2	0.27%	208.7	0.07%
Unknown	1.2	0.00%	0	0.00%	1.2	0.00%
Vacant	2,347.3	0.36%	75.6	0.02%	2,271.6	0.80%
X Protected by Levee Total	**24,354.8**	**3.78%**	**16,744.7**	**4.64%**	**7,610.1**	**2.69%**
0.2% Annual Chance Flood Hazard Total	**30,304.0**	**4.70%**	**21,077.7**	**5.84%**	**9,226.3**	**3.26%**
Other Areas						
Zone X						
Agricultural	0.3	0.00%	0	0.00%	0.3	0.00%
Care/Health	110.0	0.02%	88.0	0.02%	22.0	0.01%
Church/Welfare	324.1	0.05%	247.5	0.07%	76.6	0.03%
Industrial	764.2	0.12%	677.7	0.19%	86.5	0.03%
Miscellaneous	303.5	0.05%	0.1	0.00%	303.4	0.11%
Office	279.6	0.04%	99.9	0.03%	179.7	0.06%
Public/Utilities	688.6	0.11%	0	0.00%	688.6	0.24%
Recreational	304.4	0.05%	22.0	0.01%	282.5	0.10%
Residential	5,036.2	0.78%	4,901.5	1.36%	134.7	0.05%
Retail/ Commercial	402.1	0.06%	319.3	0.09%	82.8	0.03%
Unknown	0	0.00%	0	0.00%	0	0.00%
Vacant	1,436.2	0.22%	139.7	0.04%	1,296.5	0.46%

Flood Zone/ Property Use	Total Acres	% of Total Acres	Improved Acres	% of Total Improved Acres	Unimproved Acres	% of Total Unimproved Acres
Zone X Total	**9,649.1**	**1.50%**	**6,495.6**	**1.80%**	**3,153.5**	**1.11%**
Other Areas Total	**9,649.1**	**1.50%**	**6,495.6**	**1.80%**	**3,153.5**	**1.11%**
City of Sacramento Total	**73,955.6**	**11.48%**	**48,110.5**	**13.33%**	**25,845.1**	**9.12%**

Source: FEMA 11/2/2018 DFIRM

Population at Risk

The DFIRM flood zones were overlayed on the parcel layer. Those residential parcel centroids that intersect the flood zones were counted and multiplied by the 2010 Census Bureau average household factors for Sacramento – 2.76. According to this analysis, there is a total population of 80,757 and 27,560 residents of the City at risk to flooding in the 1% and 0.2% annual chance floodplains, respectively. This is shown in Table F-36.

Table F-36 City of Sacramento – Count of Improved Residential Parcels and Population by Flood Zone

Jurisdiction	1% Annual Chance		0.2% Annual Chance	
	Improved Residential Parcels	Population at Risk	Improved Residential Parcels	Population at Risk
City of Sacramento	30,360	80,757	10,361	27,560

Source: FEMA DFIRM 11/2/2018, Sacramento County 2020 Parcel/Assessor's Data, US Census Bureau

Critical Facilities at Risk

PLACE

Insurance Coverage, Claims Paid, and Repetitive Losses

The City of Sacramento joined the National Flood Insurance Program (NFIP) on September 15, 1978. The City participates in CRS program and is currently a CRS Class 3. This provides a discount of 35% to those policies in the Special Flood Hazard Area. NFIP data indicates that as of March 24, 2020, there were 43,303 flood insurance policies in force in the City with $6,937,000 of coverage. Of the 43,303 policies, 42,269 were residential, while 1,034 were non-residential structures. Of the 43,303 policies, 26,639 were in A zones, while 16,664 were in B, C, and X zones. There has been 1,855 historical claims for flood losses totaling $9,852,037.68. NFIP data further indicates that there are 106 repetitive loss (RL) and no severe repetitive loss (SRL) buildings in Sacramento. There have been 158 RL claims totaling $2,110,551.25. There have been 43 substantial damage claims since 1978.

Based on this analysis of insurance coverage, the City has values at risk to the 1% annual chance and greater floods. Of the 30,884 improved parcels within the 1% annual chance flood zone, 26,596 (or 29.3 percent) of those parcels maintain flood insurance. This can be seen on Table F-37.

Table F-37 City of Sacramento – Percentage of Policy Holders to Improved Parcels in the 1% Annual Chance Floodplain

Jurisdiction	Improved Parcels in SFHA (1% Annual Chance) Floodplain*	Insurance Policies in the SFHA (1% Annual Chance) Floodplain	Percentage of 1% Annual Chance Floodplain Parcels Currently Insured
City of Sacramento	30,884	26,596	86.1%

Source: FEMA DFIRM 11/2/2018, Sacramento County 2020 Parcel/Assessor's Data, NFIP CIS data 3/2020.

2016 CFMP Flood Insurance Analysis

Most every primary building or substantial improvement within the City of Sacramento's SFHA must have a flood insurance policy if there is a federally-backed mortgage. The majority of mortgage loans are backed by the federal government through either Fannie Mae or Freddie Mac. Since flood insurance rates are driven by location of the building and the BFE, structures in the SFHA usually pay higher rates than do those buildings located outside the designated higher risk areas. Typically when BFEs increase, flood insurance premiums also increase, unless some type of mitigation is implemented on that building.

While flood insurance can do nothing to prevent actual flood damage or loss of life it can mitigate the economic risk associated with flooding to the insured in many ways. Flood insurance is a property owner's first line of defense against flood damage. A property which is damaged or destroyed can be replaced more quickly without using financial resources devoted to other things such as the mortgage, utilities or maintenance. Additionally, compensation for flood losses (through flood insurance payments) can help families get back on their feet with minimal financial hardship and can also aid businesses in getting back open to avoid potential financial ruin.

Table F-38 shows historically the number of flood insurance policies in the A, AE, AH and AO-Zones, the number of Standard X-Zone policies in AR, A99-Zones, and the number of Preferred Risk Policies in the B, C or X-Zones. The table also shows the average number of flood insurance policies by flood zone from August 2008 through March of 2012.

Table F-38 Flood Insurance Policies in Sacramento by Zone and Year

Year	Zone A, AE, AH, AO	Zone AR, A99*	Zone B, C, X**	Total
Aug 2008	737	12,360	30,050	43,147
May 2009	1,318	16,984	30,107	48,409
Aug 2009	924	30,974	19,459	51,357
May 2010	1,047	15,091	33,434	49,572
Sept 2010	1,106	15,372	32,722	49,200
Jan 2011	708	4,656	40, 637	46,001
Mar 2012	791	10,676	36,459	47,926

Year	Zone A, AE, AH, AO	Zone AR, A99*	Zone B, C, X**	Total
Oct 2013	571	8,020	36,045	44,636
April 2015	372	13,350	28,245	41,967
Jan 2016	360	22,170	21,407	43,937
Average	**793**	**14,965**	**26,793**	**46,615**

Source: 2016 City of Sacramento Comprehensive Flood Management Plan * Standard X-Zone Policies ** Preferred Risk Policies

Table F-39 indicates that as of January 31, 2016, the City of Sacramento had 43,937 active flood insurance policies in force with total premiums of more than $20 million. These active polices represent more than $14 billion of insurance in place covering both structure and contents. Historically, the City has had 967 claims paid against the NFIP totaling $9.9 million in paid losses.

Table F-39 Flood Insurance Policies by Occupancy (Data as of 01/31/2016)

Property Type	Policies in Force	Premium	Insurance in Force	Number of Closed Paid Losses	$ of Closed Paid Losses	Adjustment Expense
Single Family	37,691	$16,291,601	$12,278,053,400	799	$7,237,612.26	$332,146.93
2-4 Family	1,474	$606,999	$430,073,500	73	$533,676.99	$29,085.00
All Other Residential	3,662	$1,644,288	$1,053,055,600	32	$385,040.51	$16,950.26
Non Residential	1,110	$2,191,166	$593,896,000	63	$1,749,978.23	$57,185.26
Total	**43,937**	**$20,734,054**	**$14,355,078,500**	**967**	**$9,906,306.00**	**$435,366.00**

Source: 2016 City of Sacramento Comprehensive Flood Management Plan

Table F-40 presents the number of insurance policies in force, as of January 1, 2016, by occupancy type in relation to condominiums.

Table F-40 Flood Insurance Policies by Occupancy (Data as of 01/31/2016)

Property Type	Policies in Force	Premium	Insurance in Force	Number of Closed Paid Losses	$ of Closed Paid Losses	Adjustment Expense
Condo	3,391	$1,332,563	$733,995,500	28	$210,664.78	$11,403.89
Non Condo	40,546	$19,401,491	$13,621,083,000	939	$9,695,643.20	$423,963.56
Total	**43,937**	**$20,734,054**	**$14,355,078,500**	**967**	**$9,906,307.00**	**$435,366.00**

Source: 2016 City of Sacramento Comprehensive Flood Management Plan

Table F-41 indicates the number of flood insurance policies by flood zone as of January 31, 2016. The total number of flood insurance policies in the A, AE, AH and AO-zones decreased by 12 from 372 in April 2015 to 360 in January of 2016. The number of flood insurance policies in the A99, AR, and Standard X increased from 13,350 in April of 2015 to 22,170 in January of 2016. The total number of flood insurance policies dropped in the B, C and X-zones from 28,245 to 21,407, a net decrease of 6,838 policies or 24.2%. The total number of flood insurance policies in the City decreased from 2015 to 2016. In April 2015, the

City had 41,967 flood insurance policies in force and in January of 2016 the total policies in force increased to 43,937 or 4.69%.

Table F-41 Flood Insurance Policies by Flood Zone (Data as of 01/31/2016)

Property Type	Policies in Force	Premium	Insurance in Force	Number of Closed Paid Losses	$ of Closed Paid Losses	Adjustment Expense
A01-30 & AE Zones	209	$300,475	$46,734,900	37	$465,140.87	$18,539.98
A Zones	9	$20,500	$2,736,500	21	$239,984.28	$9,972.87
AO Zones	43	$29,374	$9,776,600	16	$255,574.76	$7,775.00
AH Zones	99	$77,150	$21,666,400	14	$186,562.71	$6,975.00
AR Zones	152	$161,180	$35,614,900	15	$376,173.26	$14,557.02
A99 Zones	1,641	$1,556,635	$350,476,700	715	$6,265,285.28	$300,944.93
B, C & X Zones						
Standard	20,377	$9,610,229	$6,700,808,500	115	$1,764,167.91	$55,762.65
Preferred	21,407	$8,978,511	$12,122,796,000	27	$324,467.81	$17,800.00
Total	**43,937**	**$20,734,054**	**$14,355,078,500**	**960**	**$9,854,918.00**	**$432,324.00**

Source: 2016 City of Sacramento Comprehensive Flood Management Plan

As of January 31, 2016, the City of Sacramento had 14,768 pre-FIRM flood insurance policies in force as shown in Table F-42 These pre-FIRM policies in the AE, A, and AH zones have the potential to be affected by rate increases through the Biggert-Waters Flood Insurance Reform Act of 2012 and the Homeowner's Flood Insurance Affordability Act of 2014. The City does not have any AO or AR zone currently.

Table F-42 Pre-FIRM Flood Insurance Policies by Zone (Data as of 01/31/2016)

Property Use	Policies in Force	Premium	Insurance in Force	# of Closed Paid Losses	$ of Closed Paid Losses	Adjustment Expense
A01-30 & AE Zones	147	$249,203	$26,677,500	30	$413,959.08	$15,789.98
A Zones	7	$19,313	$1,986,500	20	$235,967.81	$9,622.87
AO Zones	31	$21,214	$7,075,900	7	$24,882.14	$2,300.00
AH Zones	58	$47,395	$11,846,600	3	$19,019.64	$1,275.00
AR Zones	66	$73,591	$14,424,200	11	$369,349.34	$13,802.02
A99 Zones	658	$670,171	$139,093,600	500	$3,298,247.38	$193,500.69
B, C & X Zones	13,801	$5,714,882	$4,561,985,200	111	$1,691,090.71	$58,807.65
Standard	1,582	$831,287	$494,537,200	91	$1,492,497.04	$45,252.65
Preferred	12,219	$4,883,595	$4,766,089,500	20	$198,116.67	$13,555.00
Total	**14,768**	**$6,795,769**	**$4,766,089,500**	**681**	**$6,052,243.00**	**$294,375.00**

Source: 2016 City of Sacramento Comprehensive Flood Management Plan

Table F-43 shows there were 29,169 post-FIRM flood insurance policies as of January 31, 2016; 18,795 were Standard Flood Insurance Policies and just over 9,188 were PRP.

Table F-43 Post-FIRM Flood Insurance Policies by Zone (Data as of 01/31/2016)

	Policies in Force	Premium	Insurance in Force	# of Closed Paid Losses	$ of Closed Paid Losses	Adjustment Expense
A01-30 & AE Zones	62	$51,272	$17,057,400	7	$51,181.79	$2,750.00
A Zones	2	$1,187	$750,000	1	$4,286.47	$350.00
AO Zones	12	$8,160	$2,700,700	9	$230,692.62	$5,475.00
AH Zones	41	$29,755	$9,819,800	11	$167,543.07	$5,700.00
AR Zones	86	$87,589	$21,190,700	4	$6,823.92	$1,475.00
A99 Zones	983	$886,464	$211,383,100	215	$2,967,037.90	$107,444.24
B, C & X Zones	27,983	$12,873,858	$9,326,087,300	33	$415,563.65	$16,705.00
Standard	18,795	$8,778,942	$6,206,271,300	24	$271,193.87	$10,510.00
Preferred	9,188	$4,094,916	$3,119,816,000	9	$144,369.78	$6,195.00
Total	**29,169**	**$13,938,285**	**$9,588,989,000**	**280**	**$3,843,125.00**	**$139,899.00**

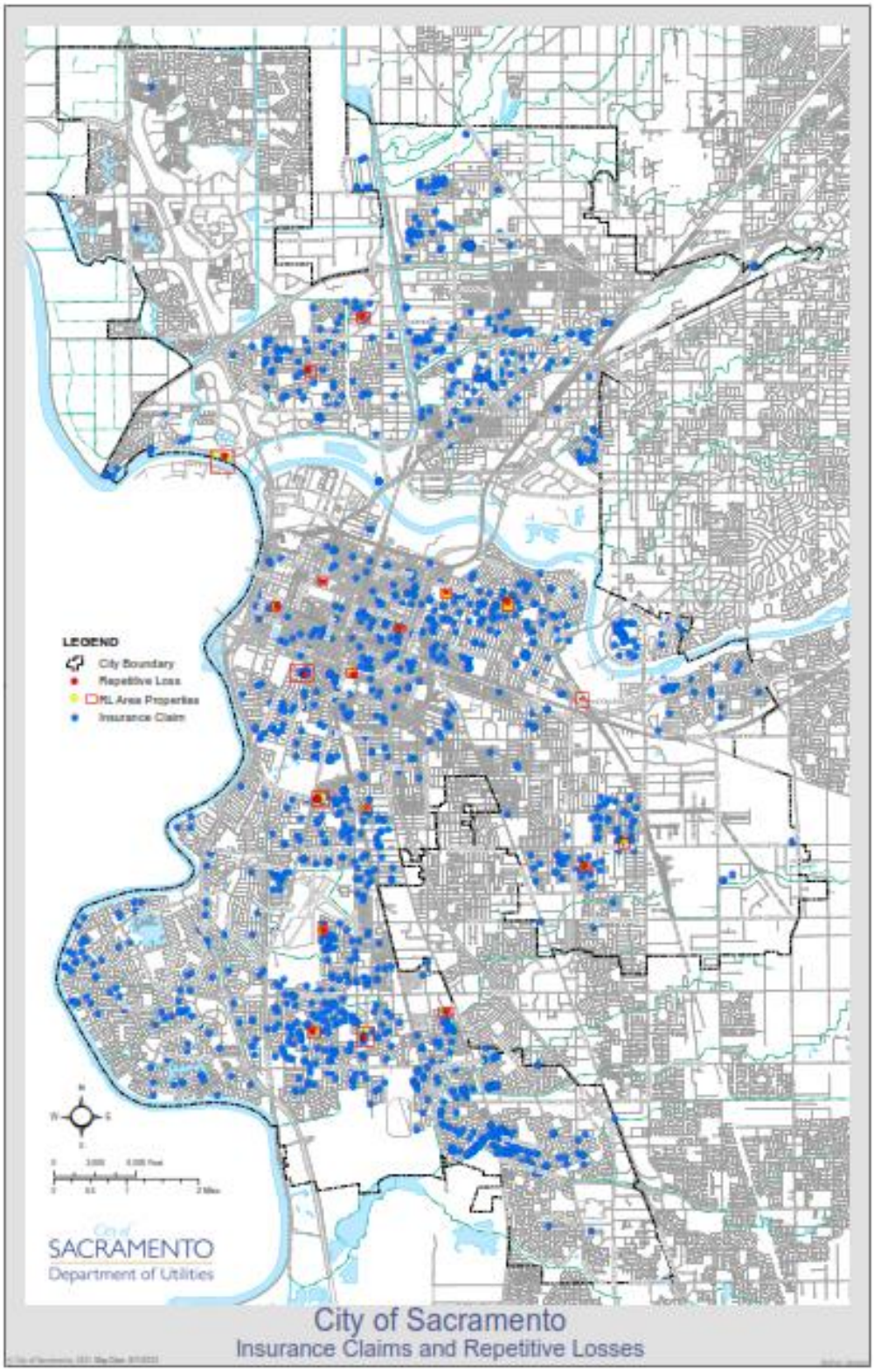
Source: 2016 City of Sacramento Comprehensive Flood Management Plan

Many factors change the number of flood insurance policies in the City. In 2015, the City saw a drop in the number of A99 policies in Pre-FIRM and Post-FIRM policies because over 3,000 residents were removed from the A99 Zone on May 12, 2014 in South Sacramento. Hopefully, the City will see an increase in PRP policies as residents convert in this area over the next few years. On another note, Natomas was remapped from an AE to A99 zone in June 2015, so the City expects to see an increase in A99 policies in the first part of 2016. Also, the numbers may conflict in the table above because Natomas residents have been in multiple subsidized programs since 2008 – Preferred Risk Policy Eligibility Extension and Properties Newly Mapped. Also, the numbers may conflict in the table above because the Natomas Basin was remapped from X to AE zone in 2008 and from AE to A99 zone in 2015 and has been in multiple subsidized programs since 2008 - Preferred Risk Policy Eligibility Extension, Properties Newly Mapped, and now PRP.

Repetitive Loss Analysis

NFIP data further indicates that there are 21 repetitive loss (RL) buildings, with 5 RL buildings being insured. There have been a total of 49 RL losses, with 10 insured RL losses. None of the insured RL buildings has incurred 4 or more losses. 18 of the properties are located in the A zone, and 3 RL buildings are located outside of the 100- and 500-year floodplain in the B, C, or X zones. The RL properties are located throughout the city. Repetitive flooding is generally a result of a combination of poor drainage and homes below the street elevation. Drainage improvements in the area have alleviated some of the flooding issues to these RL structures over the years. Citizens are required to have flood insurance in an A zone if they have a federally backed mortgage. Repetitive loss properties are shown in Figure F-30 and detailed in Table F-44. A detailed repetitive loss area analyses of the City's repetitive loss properties is located in the City's Comprehensive Flood Management Plan.

Figure F-30 Unmitigated Repetitive Loss Areas



Source: City of Sacramento, 2016 Comprehensive Flood Management Plan

Table F-44 Repetitive Loss Property Information (as of 2009)

Street	Dates of Losses	Building Payment	Contents Payment	Flood Zone (2009)	Investigation of Flooding	Status of Drainage Improvements Provided to Reduce Flooding	Submitted to FEMA/ Changes Requested
14th St	01/10/1995 09/19/2004	$4,402.03 $1,582.67	$0.00 $0.00	X(s)	Investigated in 2008. Flooding from backed up combined system. Water came up to top step and flooded the resident's garage and basement.	Combined system	–
20th Av	01/10/1995 02/07/1996 01/22/1997	$10,792.02 $1,530.54 $21,271.07	$0.00 $0.00 $0.00	X(s)	These three addresses are individual structures within the same apartment complex, but on 3 separate flood policies. Property in low lying area with an undersized drainage conveyance system. Combined mailing	Leonardo Divinci basin was constucted in 2008 in Basin 26, but it is too far away from these properties to have a significant impact. Future projects with Land Park have been verbally discussed.	–
20th Av	01/10/1995 01/22/1997	$11,657.56 $20,903.32	$0.00 $0.00	–	–	–	–
20th Av	01/10/1995 01/22/1997	$5,169.30 $16,734.55	$0.00 $0.00	–	–	–	–
20th Av	03/25/1989 01/12/1990 01/13/1993 01/09/1995 02/20/1996 01/22/1997	$423(B/C?) $1,228(B/C?) $5,052.24 $7,566.43 $2,575.04 $7,838.39	$0.00 $0.00 $0.00 $0.00 $0.00 $0.00	X(s)	Property in low lying area with an undersized drainage conveyance system.	Drainage study is being conducted to determine a location for a drainage basin to reduce the flooding in the area.	–

Street	Dates of Losses	Building Payment	Contents Payment	Flood Zone (2009)	Investigation of Flooding	Status of Drainage Improvements Provided to Reduce Flooding	Submitted to FEMA/ Changes Requested
21st St	01/10/95 01/26/97 9/19/2004	$24,938.03 $9,441.28 $26,963.58	$0.00 $0.00 $0.00	X(s)	Property located in the Combined Sewer System with an undersized drainage conveyance system.	Combined sewer main in the area was increased from a 12" to a 24" main in late 1997.	Flood Protection Provided - Reported 2007. Documentation provided to FEMA in August 2009.
21st Av	01/10/1995 03/11/1995	$2,878.36 $5,161.85	$0.00 $0.00	X(s)	According to owner structure has never flooded. Owner has installed a sump pump in a low area in the backyard to drain storm water away from residence in the rear.	Need pictures of sump pump	Flood Protection Provided - Reported 2007
24th St	02/23/2000 12/31/2005	$7,707.72 $80,632.86	$0.00 $0.00	X(s)	Property has been assessed using Lidar data and flooding source has been found.	In process.	In process.
36th St	01/09/95 01/22/97	$1,157.89 $1,926.32	$0.00 $0.00	X	Property located in the Combined Sewer System. Flooding caused by clogged storm drains and street flooding in the area.	Older street drain inlet in front of property replaced with current larger standard drain inlet as part of the McKinley sewer construction project in 2006 .	Flood Protection Provided - Reported 2007. Documentation provided to FEMA in August 2009.
37th Av	01/10/1995 01/22/1997 12/31/2005	$2,167.18 $1,670.55 $5,291.95	$1,850.00 $0.00 $0.00	X(s)	Flooding from adjacent vacant lot behind property.	Basin 96 Master Plan and pipe upsizing completed. A detention basin is still needed.	–

Street	Dates of Losses	Building Payment	Contents Payment	Flood Zone (2009)	Investigation of Flooding	Status of Drainage Improvements Provided to Reduce Flooding	Submitted to FEMA/ Changes Requested
45th St	04/08/95 02/04/98	$4,411.79 $4,159.33	$0.00 $0.00	X	Property in low lying area of Basin 10 with an undersized drainage conveyance system	Basin 10 Drainage Master Plan completed. Currently determining projects to reduce flooding in the area.	–
48th Av	01/25/1997 12/23/2004	$15,391.57 $10,672.22	$0.00 $0.00	X(s)	Property has a drain in front, but is elevated way above the street. Looks like a partial new roof.	Flood source has been determined. Drainage improvements are being assessed.	–
68th Av	01/10/95 02/26/00	$4,164.52 $2,814.97	$0.00 $0.00	X(s)	Flood sources has been recently identified.	Drainage basin is currently being studied to develop a plan to reduce flooding in the area.	–
Alcedo Cr	01/10/95 01/27/95	$1,911.80 $5,661.33	$0.00 $0.00	X	Source of flooding is unknown. Lowest floor of the structure appears to be higher than adjacent structures that have not flooded.	Need to investigate further.	–
Arabella Wy	03/23/1995 01/04/1997	$3,556.23 $3,634.90	$0.00 $0.00	X(s)	Property adjacent to the Sac. River levee. Flooding of house from levee seepage.	USACE & SAFCA did levee work in this area. The work was completed at the end of 2006.	Flood Protection Provided - Reported 2007. Documentation provided in 2009.

Street	Dates of Losses	Building Payment	Contents Payment	Flood Zone (2009)	Investigation of Flooding	Status of Drainage Improvements Provided to Reduce Flooding	Submitted to FEMA/ Changes Requested
Berthoud St	01/13/93 01/10/95	$1,465.21 $7,777.06	$0.00 $480.55	X(s)	Higher adjacent lot was draining onto subject property.	Drainage ditch was constructed on adjacent lot to divert drainage to Norwood Avenue. Older street drain inlets replaced with current larger standard drain inlets. SEE 1996 MEMO. School was built across the street.	Flood Protection Provided - Reported 2007 - Report in 2011 that ditch was built for this house and 329.
Berthoud St	1/13/93 1/9/95	$2,583.22 $5,278.40	$0.00 $0.00	X(s)	Higher adjacent lot was draining onto subject property.	Berthoud Street Drainage Extension was completed in 2005. Stormwater diversion pipeline basin was installed.	Flood Protection Provided - Reported 2007. Documentation provided to FEMA in August 2009.
Binghamton Dr	1/10/1995 1/24/2010	$3,177.02 $2,590.42	$0.00 $0.00	X(s)	Water seeps through landscaping into sunken living room and gets the carpet wet.	Need to elevate living room.	–
E Curtis Dr	01/10/1995 01/26/1997	$17,370.04 $2,663.91	$0.00 $595.40	X(s)	Basement flooding. Flooding caused by clogged storm drains and street flooding in the area.	Older street drain inlet in front of property replaced with current larger standard drain inlet. Very low spot - Sump 4 pumps this ara in a circle. Once the Curtis Park Regional Storage Project is constructed, this property can be taken out.	Flood Protection Provided - Reported 2007, but documentation not submitted in 2009.

Street	Dates of Losses	Building Payment	Contents Payment	Flood Zone (2009)	Investigation of Flooding	Status of Drainage Improvements Provided to Reduce Flooding	Submitted to FEMA/ Changes Requested
Custis Av	01/10/1995 01/22/1997	$1,261.74 $8,058.51	01/10/1995 01/22/1997	X(s)	Lot lower than adjacent lots. Drainage from adjacent lots was going into garage which was converted to living quarters.	Garage portion of structure will be raised with HUD Grant funds. Elevation of structure expected to completed in November 2001.	Flood Protection Provided - Reported 2007. Documentation provided to FEMA in August 2009.
Elvas Av	02/18/1986 06/04/1993 01/22/1997	$13,179.30 $12,556.61 $38,718.83	02/18/1986 06/04/1993 01/22/1997	X(s)	These three addresses are individual structures within the same apartment complex, but on 3 separate flood policies. Property in low lying area with an undersized drainage conveyance system. Combined mailing	Leonardo Divinci basin was constucted in 2008 in Basin 26, but it is too far away from these properties to have a significant impact. Future projects with Land Park have been verbally discussed.	–
Folsom Blvd	01/04/1998 01/15/1990	–	01/04/1998 01/15/1990		–	–	–
Folsom Blvd Unit 9c	02/12/2000 09/19/2004	–	02/12/2000 09/19/2004		–	–	–
Frienza Av	01/04/82 01/13/83	$1,002.46 $3,594.28	01/04/82 01/13/83	X(s)	Property in low lying area with an undersized drainage conveyance system.	Drainage study is being conducted to determine a location for a drainage basin to reduce the flooding in the area.	–

Street	Dates of Losses	Building Payment	Contents Payment	Flood Zone (2009)	Investigation of Flooding	Status of Drainage Improvements Provided to Reduce Flooding	Submitted to FEMA/ Changes Requested
Garden Hwy	01/09/95 01/01/97	$6,100.00 $7,594.96	01/09/95 01/01/97	X(s)	Property located in the Combined Sewer System with an undersized drainage conveyance system.	Combined sewer main in the area was increased from a 12" to a 24" main in late 1997.	Flood Protection Provided - Reported 2007. Documentation provided to FEMA in August 2009.
Henrietta Dr	01/12/1993 01/10/1995 01/25/1997	$8,660.85 $6,272.51 $3,292.51	$0.00 $0.00 $0.00	X(s)	According to owner structure has never flooded. Owner has installed a sump pump in a low area in the backyard to drain storm water away from residence in the rear.	Need pictures of sump pump	Flood Protection Provided - Reported 2007
Henrietta Dr	01/10/1995 01/22/1997	$19,725.94 $13,741.60	$0.00 $0.00	X(s)	Need to investigate!	–	–
K St, Suite 1517	01/09/1995 01/01/1997	$5,195.74 $9,535.42	$0.00 $0.00	X	Property located in the Combined Sewer System. Flooding caused by clogged storm drains and street flooding in the area.	Older street drain inlet in front of property replaced with current larger standard drain inlet as part of the McKinley sewer construction project in 2006 .	Flood Protection Provided - Reported 2007. Documentation provided to FEMA in August 2009.
Johns Dr	01/13/1993 01/11/1995 01/03/1997	$2,489.90 $1,977.43 $2,427.86	$0.00 $0.00 $0.00	X(s)	Flooding from adjacent vacant lot behind property.	Basin 96 Master Plan and pipe upsizing completed. A detention basin is still needed.	–

Street	Dates of Losses	Building Payment	Contents Payment	Flood Zone (2009)	Investigation of Flooding	Status of Drainage Improvements Provided to Reduce Flooding	Submitted to FEMA/ Changes Requested
La Almendra Wy (Srl)	01/10/1995 01/27/1997	$29,693.68 $48,733.49	$0.00 $0.00	X	Property in low lying area of Basin 10 with an undersized drainage conveyance system	Basin 10 Drainage Master Plan completed. Currently determining projects to reduce flooding in the area.	–
La Almendra Wy	01/10/1995 01/22/1997	$29,662.06 $26,811.07	$0.00 $22,679.58	X(s)	Property has a drain in front, but is elevated way above the street. Looks like a partial new roof.	Need to investigated flood source further	–
Las Palmas Av (Srl)	01/13/93 01/20/93 01/09/95 01/22/97 02/06/98 01/24/00	$1,336.55 $8,891.96 $28,803.57 $19,291.63 $10,068.13 $4,898.80	$0 $1,776.88 $5,637.45 $11,972.96 $2,750.00 $0	X(s)	Source of flooding is unknown. Property is on the highest portion of the street. No reported flooding of adjacent properties which are lower.	Drainage basin is currently being studied to develop a plan to reduce flooding in the area.	–
Las Palmas Av	01/09/95 01/26/97	$11,395.87 $7,497.82	$0.00 $0.00	A99	Source of flooding is unknown. Lowest floor of the structure appears to be higher than adjacent structures that have not flooded.	Need to investigate further.	–
Manacor Dr	12/28/1996 01/28/1997 12/30/2005	$2,198.26 $2,581.42 $2,606.40	$0.00 $0.00 $1,985.00	X(s)	Property adjacent to the Sac. River levee. Flooding of house from levee seepage.	USACE & SAFCA did levee work in this area. The work was completed at the end of 2006.	Flood Protection Provided - Reported 2007. Documentation provided in 2009.

Street	Dates of Losses	Building Payment	Contents Payment	Flood Zone (2009)	Investigation of Flooding	Status of Drainage Improvements Provided to Reduce Flooding	Submitted to FEMA/ Changes Requested
N St	01/10/1995 01/25/1997 09/19/2004	$5,588.09 $1,344.59 $8,884.87	$0.00 $0.00 $0.00	X(s)	Higher adjacent lot was draining onto subject property.	Drainage ditch was constructed on adjacent lot to divert drainage to Norwood Avenue. Older street drain inlets replaced with current larger standard drain inlets. SEE 1996 MEMO. School was built across the street.	Flood Protection Provided - Reported 2007 - Report in 2011 that ditch was built for this house and 329.
N St	01/09/1995 09/19/2004	$3,302.60 $8,948.96	$0.00 $0.00	X(s)	Higher adjacent lot was draining onto subject property.	Berthoud Street Drainage Extension was completed in 2005. Stormwater diversion pipeline basin was installed.	Flood Protection Provided - Reported 2007. Documentation provided to FEMA in August 2009.
Norwood Av	1/10/1995 1/22/1997 2/2/1998	$10,000.76 $4,440.26 $2,951.82	$0.00 $1,528.55 $246.50	X(s)	Water seeps through landscaping into sunken living room and gets the carpet wet.	Need to elevate living room.	–
Oak Nob Wy	01/05/97 02/04/98	$8,005.41 $3,797.03	$0.00 $2,030.00	X(s)	Basement flooding. Flooding caused by clogged storm drains and street flooding in the area.	Older street drain inlet in front of property replaced with current larger standard drain inlet. Very low spot - Sump 4 pumps this ara in a circle. Once the Curtis Park Regional Storage Project is constructed, this property can be taken out.	Flood Protection Provided - Reported 2007, but documentation not submitted in 2009.

Street	Dates of Losses	Building Payment	Contents Payment	Flood Zone (2009)	Investigation of Flooding	Status of Drainage Improvements Provided to Reduce Flooding	Submitted to FEMA/ Changes Requested
Ortega St	01/14/1995 01/25/1997	$1,321.05 $1,692.08	$0.00 $0.00	X(s)	Lot lower than adjacent lots. Drainage from adjacent lots was going into garage which was converted to living quarters.	Garage portion of structure will be raised with HUD Grant funds. Elevation of structure expected to completed in November 2001.	Flood Protection Provided - Reported 2007. Documentation provided to FEMA in August 2009.
Ortega St	01/09/95 01/25/97	$3,485.33 $5,333.80	$0.00 $0.00	X(s)	These three addresses are individual structures within the same apartment complex, but on 3 separate flood policies. Property in low lying area with an undersized drainage conveyance system. Combined mailing	Leonardo Divinci basin was constucted in 2008 in Basin 26, but it is too far away from these properties to have a significant impact. Future projects with Land Park have been verbally discussed.	–
Park Wy	01/10/1995 12/21/1996 01/22/1997	$2,186.10 $2,195.02 $13,779.28	$0.00 $0.00 $0.00		–	–	–
Priscilla Ln	03/02/95 01/25/97 09/19/2004	$0.00 $903.00 $5,716.00	40,161.00 9,474.00 26,909.64		–	–	–
Q St	1/10/1995 1/22/97			X(s)	Property in low lying area with an undersized drainage conveyance system.	Drainage study is being conducted to determine a location for a drainage basin to reduce the flooding in the area.	–

Street	Dates of Losses	Building Payment	Contents Payment	Flood Zone (2009)	Investigation of Flooding	Status of Drainage Improvements Provided to Reduce Flooding	Submitted to FEMA/ Changes Requested
Rio Linda Blvd	01/10/1995 01/22/1997	$2,186.10 $13,779.28	$0.00 $0.00	X(s)	Property located in the Combined Sewer System with an undersized drainage conveyance system.	Combined sewer main in the area was increased from a 12" to a 24" main in late 1997.	Flood Protection Provided - Reported 2007. Documentation provided to FEMA in August 2009.
Ventura St	01/14/1995 01/25/1997	$1,321.05 $1,692.08	$0.00 $0.00	X(s)	According to owner structure has never flooded. Owner has installed a sump pump in a low area in the backyard to drain storm water away from residence in the rear.	Need pictures of sump pump	Flood Protection Provided - Reported 2007

Source: City of Sacramento

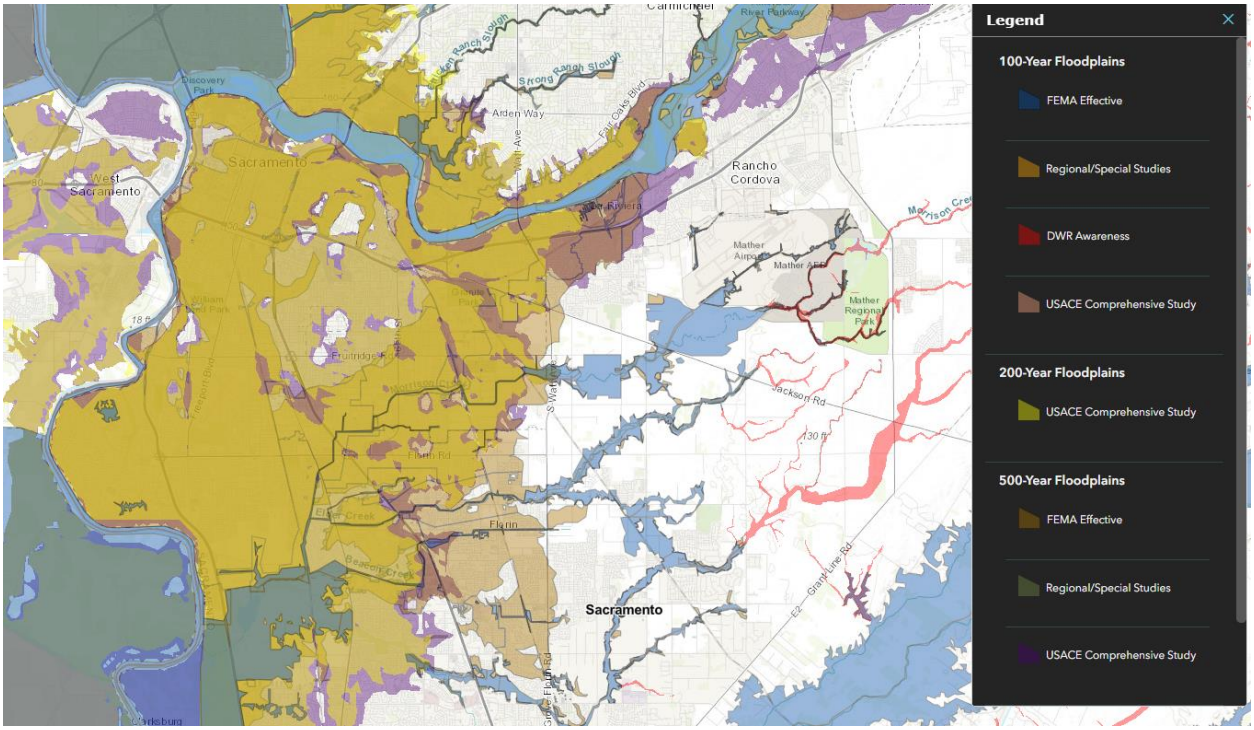
California Department of Water Resources Best Available Maps (BAM)

The FEMA regulatory maps provide just one perspective on flood risks in Sacramento County. Senate Bill 5 (SB 5), enacted in 2007, authorized the California DWR to develop the Best Available Maps (BAM) displaying 100- and 200-year floodplains for areas located within the Nevada-San Joaquin (SAC-SJ) Valley watershed. This effort was completed by DWR in 2008. DWR has expanded the BAM to cover all counties in the State and to include 500-year floodplains.

Different than the FEMA DFIRMs which have been prepared to support the NFIP and reflect only the 100-year event risk, the BAMs are provided for informational purposes and are intended to reflect current 100-, 200-(as applicable), and 500-year event risks using the best available data. The 100-year floodplain limits on the BAM are a composite of multiple 100-year floodplain mapping sources. It is intended to show all currently identified areas at risk for a 100-year flood event, including FEMA's 100-year floodplains. The BAM are comprised of different engineering studies performed by FEMA, Corps, and DWR for assessment of potential 100-, 200-, and 500-year floodplain areas. These studies are used for different planning and/or regulatory applications, and for each flood frequency may use varied analytical and quality control criteria depending on the study type requirements.

The value in the BAMs is that they provide a bigger picture view of potential flood risk to the City than that provided in the FEMA DFIRMs. The BAM map for Sacramento is shown in Figure F-31.

Figure F-31 City of Sacramento – Best Available Map



Source: California DWR

Legend explanation: Blue - FEMA 1%, Orange – Local 1% (developed from local agencies), Red – DWR 1%r (Awareness floodplains identify the 1% annual chance flood hazard areas using approximate assessment procedures.), Pink – USACE 1% (2002 Sac and San Joaquin River Basins Comp Study), Yellow – USACE 0.5% (2002 Sac and San Joaquin River Basins Comp Study), Tan – FEMA 0.2%, Grey – Local 0.2% (developed from local agencies), Purple – USACE 0.2% (2002 Sac and San Joaquin River Basins Comp Study).

Future Development

The potential for flooding may increase as floodwaters are channeled due to land development. Such changes can exacerbate flooding problems inside and outside of natural floodplains by altering or confining natural drainage channels. Floodplain modeling and master planning should be based on build out property use to ensure that all new development remains safe from future flooding. While local floodplain management, stormwater management, and water quality regulations and policies address these changes on a site-by-site basis, their cumulative effects can have a negative impact on the overall floodplain.

Future Development: General Considerations

Communities that participate in the NFIP adopt regulations and codes that govern development in special flood hazard areas, and enforce those requirements through their local floodplain management ordinances through the issuance of permits. The City of Sacramento's floodplain management ordinance provides standards for development, subdivision of land, construction of buildings, and improvements and repairs to buildings that meet or exceed the minimum requirements of the NFIP.

The International Residential Code (IRC) and International Building Code (IBC), by reference to ASCE 24, include requirements that govern the design and construction of buildings and structures in flood hazard

areas. FEMA has determined that the flood provisions of the I-Codes are consistent with the requirements of the NFIP (the I-Code requirements shown either meet or exceed NFIP requirements). ASCE 24, a design standard developed by the American Society of Civil Engineers, expands on the minimum NFIP requirements with more specificity, additional requirements, and some limitations.

With the adoption of the 2015 International Code, communities will be moving towards a more stringent approach to regulatory floodplain management. The adoption and enforcement of disaster-resistant building codes is a core community action to promote effective mitigation. When communities ensure that new buildings and infrastructure are designed and constructed in accordance with national building codes and construction standards, they significantly increase local resilience now and in the future. With continued advancements in building codes, local ordinances should be reviewed and updated to meet and exceed standards as practicable to protect new development from future flood events and to further promote disaster resiliency.

Master planning will also be necessary to assure that open channel flood flow conveyances serving the smaller internal streams and drainage areas are adequately prepared to accommodate the flows. Preservation and maintenance of natural and riparian areas should also be an ongoing priority to realize the flood control benefits of the natural and beneficial functions of these areas. Also to be considered in reducing flooding in areas of existing and future development is to promote implementation of stormwater program elements and erosion and sediment controls, including the clearing of vegetation from natural and man-made drains that are critical to flood protection. Both native and invasive species can clog drains, and reduce flows of floodwaters, which slow that natural drainage process and can exacerbate flooding.

One of the most effective ways to reduce vulnerability to potential flood damage is through careful land use planning that fully considers applicable flood management information and practices. California's 2007 flood legislation (Senate Bill 5) directly linked system-wide flood management planning to local land use planning, requiring local jurisdictions to demonstrate an urban level of flood protection before approving new development in urban and urbanizing areas. "Urban level of flood protection" means the level of protection necessary to withstand flooding that has a 1-in-200 chance of occurring in any given year (California Government Code Section 65007). DWR has been developing criteria to guide local jurisdiction compliance with the new requirements. In addition to developing criteria to help local jurisdictions in their land use planning, DWR is preparing criteria for use in the design of levees protecting urban and urbanizing areas. DWR is also working with local partners to develop guidance related to nonurban flood protection levels.

As of July 2, 2016 these standards became effective, and cities and counties within the Sacramento-San Joaquin Valley cannot enter into development agreements or issue a permit to construct a new structure in areas located within a flood hazard zone unless the following is established:

- Find that existing facilities protect urban and urbanizing areas to a 1-in 200 chance of flooding in any given year or the FEMA standard of flood protection in non-urbanized areas, or
- Find that the local flood management agency has made adequate progress on the construction of the flood protection system to provide the required level of protection, or
- Impose conditions on the development agreement that will provide the required level of protection.

City of Sacramento SB 5 Compliance

Senate Bills (SB) 5 and 17 and Assembly Bills (AB) 5, 70, 156, and 162 (Legislation) were signed into law in 2007 to address flood problems. As part of this Legislation, DWR was required to develop a Central Valley Flood Protection Plan (CVFPP). The CVFPP was adopted in 2012 and will be updated every 5 years. In 2012, SB1278 and AB1965 were enacted, revising provisions related to planning and zoning for flood protection.

The City will be required to make findings related to an urban level of flood protection (200-year) as stipulated in California Government Code Sections 65865.5, 65962, and 66474.5, using criteria consistent with, or developed by DWR. DWR has developed draft criteria, *Urban Level of Flood Protection* (ULOP) (November 2013).

The ULOP requires a minimum urban level of 200-year flood protection before a community can issue a building permit or approve a parcel map. This requirement affects areas in the Sacramento-San Joaquin Valley where flood depths are anticipated to exceed three feet and are in a watershed greater than 10 square miles for the 200-year flood event. If a ULOP plan is in place to reach 200-year flood protection and adequate progress is shown annually, then these requirements can be delayed until 2025. SAFCA will have a ULOP plan by the July deadline.

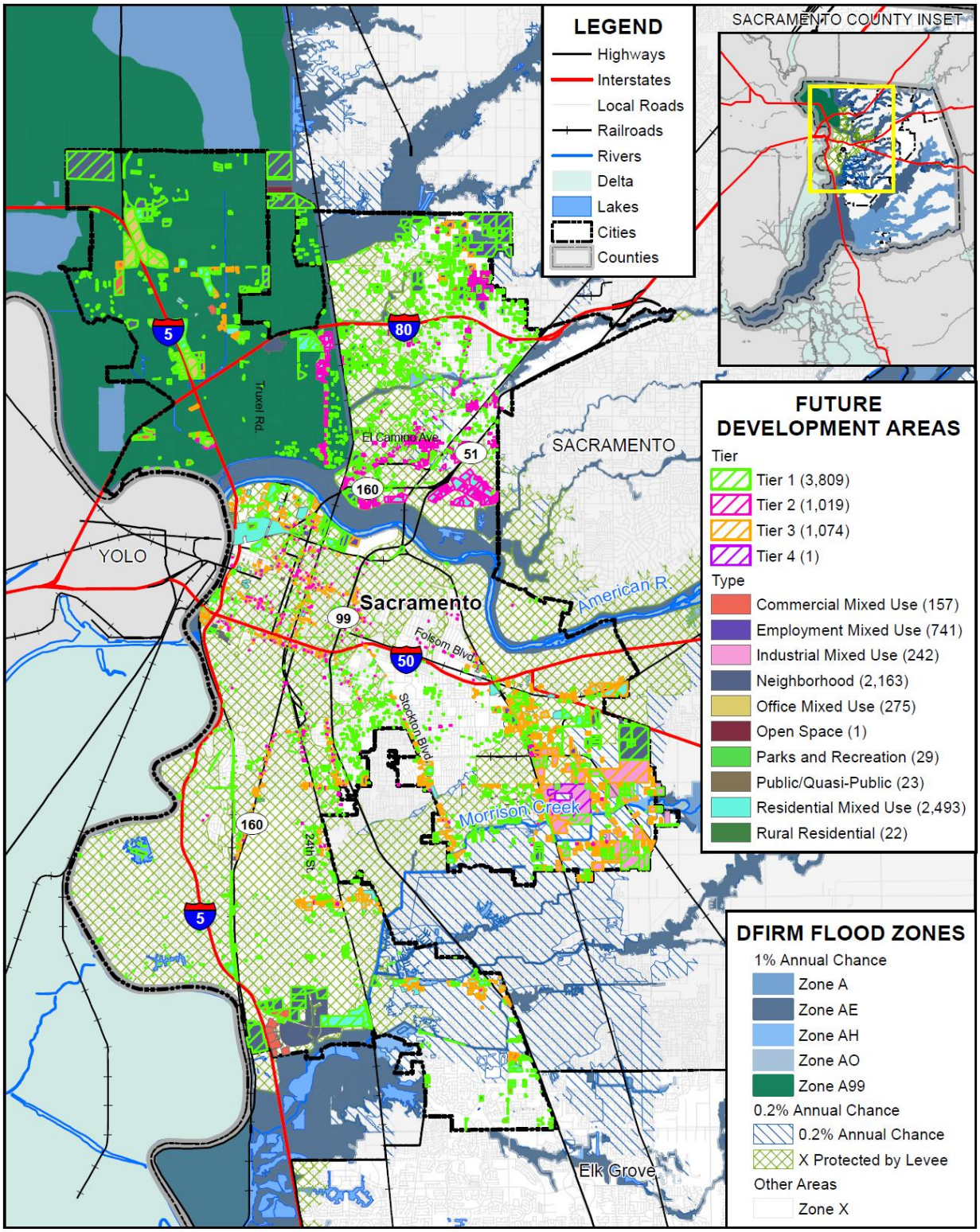
Many areas of the City that are in watersheds greater than 10 square miles and exceed three feet in depth will not be covered by the ULOP plan. The 200-year floodplain in these areas were mapped and will be utilized for development purposes.

The City enforces the floodplain ordinance. If any development is to occur in the FEMA 100-year flood hazard area or the 200-year flood hazard area not covered by the ULOP plan, it will have to conform to the elevation or floodproofing standards of the floodplain ordinance.

GIS Analysis

The City provided future development areas were used as the basis for the inventory of future development areas for the City. Using the GIS parcel spatial file for each of these areas, the areas and parcels associated with future development projects for which the analysis was to be performed were identified. Utilizing the future development project spatial layer, the parcel centroid data was intersected to determine the parcel counts within each area. Figure F-32 shows the locations of future development areas the City is planning to develop on the DFIRM flood zones. Table F-45 shows the parcels and acreages of each future development area in the City in the DFIRM flood zones.

Figure F-32 City of Sacramento – Future Development and DFIRM Flood Zones



Data Source: FEMA NFHL 07/19/2018, Sacramento County GIS, Cal-Atlas; Map Date: 05/2021.

Table F-45 City of Sacramento – Future Development in DFIRM Flood Zones by Tier and Type

Flood Zone / Future Development Tier / Type	Total Parcel Count	Improved Parcel Count	Total Acres
1% Annual Chance Flood Hazard			
Zone A			
Tier 1			
Neighborhood	1	0	9.59
Tier 1 Total	***1***	***0***	***9.59***
Zone A Total	**1**	**0**	**9.59**
Zone AE			
Tier 1			
Commercial Mixed Use	2	0	1.25
Employment Mixed Use	6	0	43.97
Industrial Mixed Use	1	0	4.69
Neighborhood	22	0	28.53
Parks and Recreation	1	0	1.70
Tier 1 Total	***32***	***0***	***80.13***
Tier 2			
Residential Mixed Use	5	5	2.04
Tier 2 Total	***5***	***5***	***2.04***
Tier 3			
Industrial Mixed Use	2	2	7.53
Tier 3 Total	***2***	***2***	***7.53***
Zone AE Total	**39**	**7**	**89.71**
Zone AH			
Tier 1			
Neighborhood	11	0	1.68
Residential Mixed Use	1	0	1.18
Tier 1 Total	***12***	***0***	***2.87***
Tier 3			
Industrial Mixed Use	1	1	7.99
Residential Mixed Use	3	3	2.19
Tier 3 Total	***4***	***4***	***10.18***
Zone AH Total	**16**	**4**	**13.05**
Zone A99			
***Tier* 1**			
Commercial Mixed Use	21	4	83.62

Flood Zone / Future Development Tier / Type	Total Parcel Count	Improved Parcel Count	Total Acres
Employment Mixed Use	10	1	50.20
Neighborhood	426	238	686.30
Office Mixed Use	179	6	400.10
Parks and Recreation	2		6.72
Public/Quasi-Public	3		15.78
Residential Mixed Use	49	2	207.93
Rural Residential	22	2	22.06
Tier 1 Total	***712***	***253***	***1,472.71***
Tier 2			
Commercial Mixed Use	1	1	1.18
Employment Mixed Use	1	1	4.70
Office Mixed Use	3	3	8.19
Residential Mixed Use	84	82	93.21
Tier 2 Total	***89***	***87***	***107.29***
Tier 3			
Commercial Mixed Use	2	2	8.50
Employment Mixed Use	23	22	33.18
Neighborhood	1	1	3.53
Office Mixed Use	9	9	13.27
Residential Mixed Use	7	7	9.16
Tier 3 Total	***42***	***41***	***67.65***
(blank)			
Commercial Mixed Use	1	1	10.41
Neighborhood	2		74.64
Open Space	1		34.76
Residential Mixed Use	5		23.78
(blank) Total	***9***	***1***	***143.60***
Zone A99 Total	**852**	**382**	**1,791.25**
1% Annual Chance Flood Hazard Total	**908**	**393**	**1,903.59**
0.2% Annual Chance Flood Hazard			
0.2% Annual Chance			
Tier 1			
Commercial Mixed Use	19		20.29
Employment Mixed Use	24		118.12
Industrial Mixed Use	60	10	181.36
Neighborhood	108	13	267.88

Flood Zone / Future Development Tier / Type	Total Parcel Count	Improved Parcel Count	Total Acres
Office Mixed Use	4		4.81
Residential Mixed Use	52	3	40.13
Tier 1 Total	***267***	***26***	***632.59***
Tier 2			
Commercial Mixed Use	2	2	0.40
Employment Mixed Use	5	5	5.33
Industrial Mixed Use	5	3	1.04
Neighborhood	1	1	0.13
Office Mixed Use	1	1	1.14
Residential Mixed Use	61	55	27.24
Tier 2 Total	***75***	***67***	***35.29***
Tier 3			
Commercial Mixed Use	13	13	15.53
Employment Mixed Use	23	23	39.99
Industrial Mixed Use	85	76	426.42
Neighborhood	1	1	12.85
Office Mixed Use	2	2	0.72
Residential Mixed Use	39	39	71.04
Tier 3 Total	***163***	***154***	***566.55***
Tier 4			
Industrial Mixed Use	1	1	207.23
Tier 4 Total	***1***	***1***	***207.23***
(blank)			
Commercial Mixed Use	1	1	0.92
Industrial Mixed Use	3	3	34.22
Neighborhood	4	3	4.19
Residential Mixed Use	6	2	19.25
(blank) Total	***14***	***9***	***58.58***
0.2% Annual Chance Total	**520**	**257**	**1,500.24**
X Protected by Levee			
Tier 1			
Commercial Mixed Use	22	1	52.34
Employment Mixed Use	199	9	193.02
Industrial Mixed Use	11	1	23.18
Neighborhood	860	108	652.30
Office Mixed Use	27	3	51.14

Flood Zone / Future Development Tier / Type	Total Parcel Count	Improved Parcel Count	Total Acres
Parks and Recreation	11		43.03
Public/Quasi-Public	16		36.32
Residential Mixed Use	487	25	406.59
Tier 1 Total	***1,633***	***147***	***1,457.92***
Tier 2			
Commercial Mixed Use	11	9	4.54
Employment Mixed Use	140	93	74.58
Neighborhood	23	20	6.78
Office Mixed Use	4	2	3.28
Residential Mixed Use	426	321	320.77
Tier 2 Total	***604***	***445***	***409.94***
Tier 3			
Employment Mixed Use	65	61	89.59
Industrial Mixed Use	19	17	162.93
Neighborhood	1	1	0.14
Office Mixed Use	30	28	60.21
Residential Mixed Use	526	500	374.01
Tier 3 Total	***641***	***607***	***686.88***
(blank)			
Commercial Mixed Use	7	6	70.72
Employment Mixed Use	4	4	8.91
Neighborhood	39	24	283.34
Office Mixed Use	2		5.63
Parks and Recreation	8	3	13.14
Public/Quasi-Public	1		1.97
Residential Mixed Use	107	71	106.94
(blank) Total	***168***	***108***	***490.64***
X Protected by Levee Total	**3,046**	**1,307**	**3,045.37**
0.2% Annual Chance Flood Hazard Total	**3,566**	**1,564**	**4,545.61**
Other Areas			
Zone X			
Tier 1			
Commercial Mixed Use	34	2	34.57
Employment Mixed Use	155	2	398.79
Industrial Mixed Use	22		143.25

Flood Zone / Future Development Tier / Type	Total Parcel Count	Improved Parcel Count	Total Acres
Neighborhood	626	45	184.78
Office Mixed Use	1		1.42
Parks and Recreation	7		15.66
Public/Quasi-Public	3		10.77
Residential Mixed Use	304	9	111.37
Tier 1 Total	***1,152***	***58***	***900.60***
Tier 2			
Commercial Mixed Use	21	19	4.86
Employment Mixed Use	63	52	93.74
Neighborhood	33	23	8.83
Office Mixed Use	13	12	11.48
Residential Mixed Use	116	99	31.53
Tier 2 Total	***246***	***205***	***150.44***
Tier 3			
Employment Mixed Use	23	22	95.88
Industrial Mixed Use	30	26	70.67
Neighborhood	3	3	10.54
Residential Mixed Use	166	155	87.78
Tier 3 Total	***222***	***206***	***264.86***
(blank)			
Industrial Mixed Use	2	1	17.66
Neighborhood	1	1	0.28
Residential Mixed Use	49	20	216.53
(blank) Total	**52**	**22**	**234.47**
Zone X Total	**1,672**	**491**	**1,550.37**
Other Areas Total	**1,672**	**491**	**1,550.37**
Grand Total	**6,146**	**2,448**	**7,999.58**

Source: FEMA DFIRM 11/2/2018, City of Sacramento GIS

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 City of Sacramento is subject to localized flooding throughout the City. Flood extents are usually measured in areas affected, velocity of flooding, and depths of flooding. Expected flood depths in the City vary by location. Flood durations in the City 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 City 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 City local drainage system services approximately 100 square miles and is handled by a combination of gravity and lift stations which a total of approximately some 140 storm drainage basins. Since the City is typically lower than the elevated rivers by as much as 5-25 feet, the majority of the local drainage must be pumped into the rivers. The City operates 94 sumps and pumps to keep the drainage pumped down. A major power outage within any of these basins can cause significant local flooding.

The City tracks localized flooding areas. The list below and Table F-46 identify known and past occurrences of such areas and the associated problems encountered. This list is an initial inventory of key problem areas and is not intended to be a complete inventory of all problems and locations associated with severe weather events and localized flooding in the City of Sacramento.

1. Sump (pump station) 157 screen. During rain events the north channel which empties into sump 157 conveys debris onto the screen which can reduce the pumping capacity of the station. The screen is monitored during rain events and cleaned as necessary.
2. Riza ditch near Stockton Boulevard and Riza Avenue. During rain events the screen on the culvert on the east side of Stockton Boulevard can become clogged with debris. The screen is monitored during rain events and cleaned as necessary.
3. Culvert at John Stiles ditch at Interstate 5 upstream of Sump 134. This culvert tends to clog during rain events. The culvert is monitored and cleaned as necessary.
4. Bypass pipe between Sumps 37 and 43 under Power Inn Road. Pipe tends to clog. Maintenance crews keep the pipe free and clear prior to rain events.
5. Inverted siphon under Fruitridge Road – Proctor and Gamble Ditch. Headwalls have been installed upstream and downstream of the inverted siphon, which allows crews to better service the siphon. During rain events the siphon is monitored and cleaned as necessary.
6. Sears ditch near Arden Way onramp to Business 80 freeway. This ditch terminates at a box culvert. The box culvert has a screen at the entrance to the culvert which tends to clog during first flush rain events. The screen is monitored and cleaned as necessary.
7. San Juan Road bridge. Screen on the south side of the bridge tends to clog during rain events. The screen is monitored during rain events and cleaned as necessary.
8. Sump 95 and 98. If these stations lose electrical power during rain events, the watershed tends to flood rapidly. Power to these stations is monitored during rain events and trailer mounted generators are available to provide backup power to these pump stations.

9. Sutterville Road at 24th Street. An 8-inch pipe in this area routinely plugs. Field crews check this pipe during storm events and provide the necessary maintenance to keep the pipe cleared.
10. Hagginwood ditch downstream of Arcade Boulevard near Acacia Avenue. This ditch has an ongoing trash problem and is difficult to clean. This ditch is monitored during rain events and cleaned as necessary.
11. Low lying area of the Valley Hi neighborhood
12. River Park neighborhood
13. Downtown Area – during rain events, the combined storm/sewer system can't handle all of the water causing a lot of street flooding
14. Florin Road and Meadowview Intersection
15. Sump 96 at Beach Lake Stables
16. Magpie Creek at Raley Blvd. A low lying area of Raley Blvd always fills up with water during rain events making it almost impossible to drive through.
17. Elvas Avenue & 65th Street near walking path to Sacramento State University
18. Sump 99 at McKinley Park in East Sacramento

Table F-46 City of Sacramento's Road List of Localized Flooding Problem Areas

Road Name	Flooding	Pavement Deterioration	Washout	High Water	Landslide/ Mudslide	Debris	Downed Trees
Stockton Boulevard at Riza Avenue	X						
Interstate 5 upstream of Sump 134	X						
Arden Way onramp to Business 80 freeway	X						
Sutterville Road at 24th Street	X						
Arcade Boulevard near Acacia Avenue	X						
Florin Road at Meadowview Blvd.	X						
Raley Blvd	X						
Power Inn Road at Fruitridge Blvd.	X						
Mack Road at Franklin Blvd.	X						

Source: City of Sacramento

Past Occurrences

The situation brought about by extremely heavy local rain storms could conceivably result in badly flooded streets and flooding of homes in some areas. It is probable that such situations would be brought about by a slow-moving high-intensity rainstorm over several hours reaching a peak intensity of ½" per hour later in the storm event. Any higher intensity storm event will cause localized flooding problems. An example is shown in Figure F-33.

Figure F-33 City of Sacramento – Localized Flooding at Anita Avenue and 23rd Street

Source: City of Sacramento Department of Utilities

The City noted the following past occurrences of localized flooding:

- **December 2012**: Severe rain for several days. The Department Operation Center (DOC) was activated for approximately a week due extreme weather forecasts.
- **2013**: Sewer system overflow incident. DOC activation was not required.
- **December 2014** – Media and reports claimed severe rain predicted for multiple days. DOC activated for several days.
- **March 2016** – DOC was on alert due to heavy rain projections. DOC activation was ultimately not required.
- **March 3- 10, 2016**: Projected winter storm affecting the Sacramento Valley – Almost activated, but storm fizzled out at the end
- **October 10 – 20, 2017**: Purple colored water detected in one neighborhood in North Sacramento. Activation was for one day on the 20th.
- **April 5 – 12, 2018**: Heavy rains predicted for a four day stretch and light rains continuing into the following week
- **January 16, 2019**: National Weather predicting a series of storms for three days straight with as much as ¼ of an inch to fall for one hour. Concerns over winds and high river levels.
- **February 26, 2019**: The National Weather Service is predicting an wet atmospheric river starting in the evening along with gusty winds. Rain totals for the Sacramento area is predicted of up to 6" by the

end of the fourth day. In addition, Folsom is releasing water which will created high levels in the creeks and rivers.

- **December 6 - 8, 2019**: Steady rain slowly creeping into Sacramento Monday and continuing through Thursday with only one dry day. Another system began with breezy conditions and heavier rains Friday and peaking on Sunday during the California International Marathon (CIM).

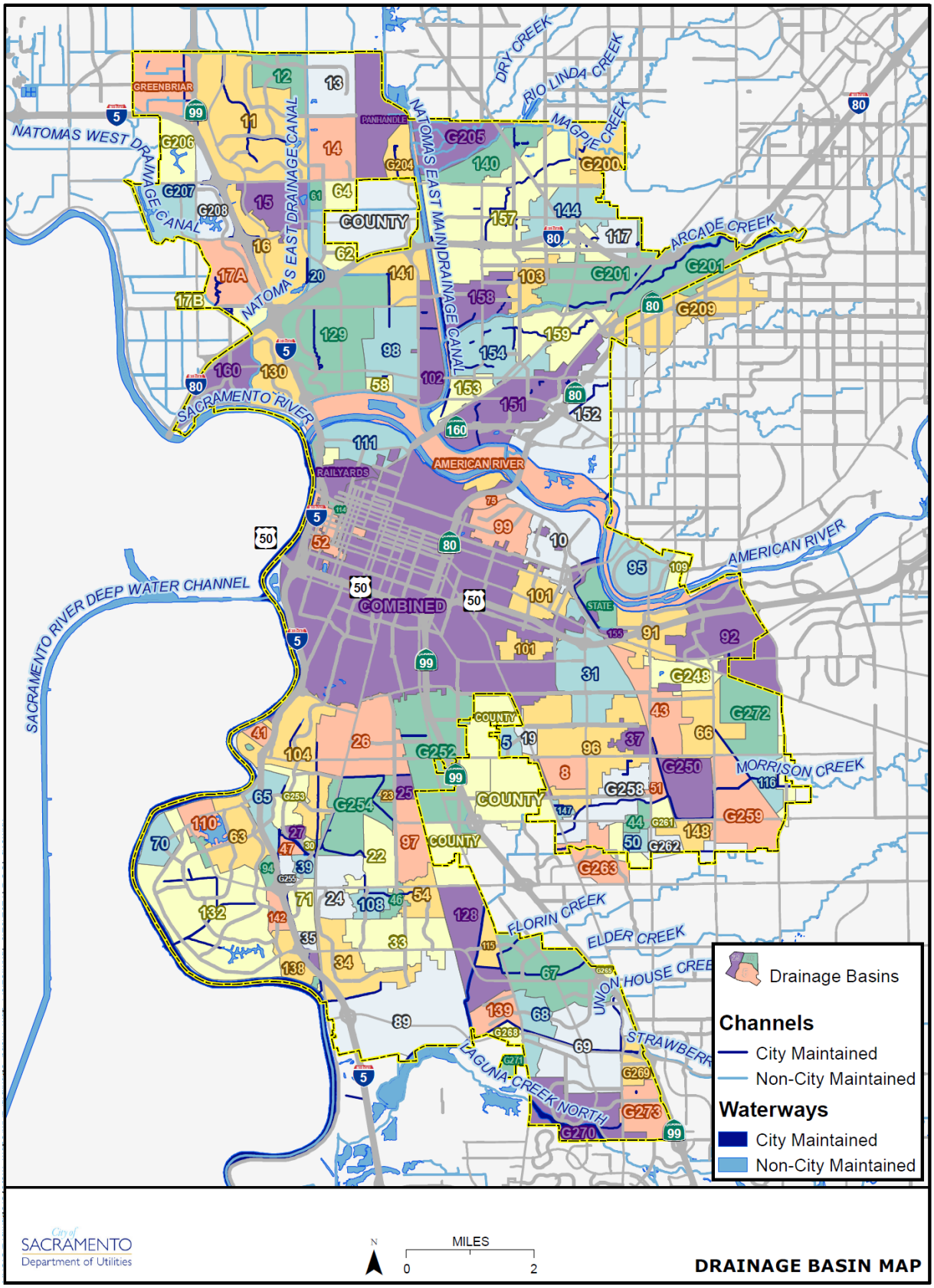
Vulnerability to and Impacts from Localized Flooding

Historically, much of the growth in the City 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.

Although levee failure may result in much more catastrophic damage than flooding from internal drainage, most of the City's flood damage since 1955 has resulted from drainage deficiencies. In 1995, for instance, approximately 100 homes in 4 south area drainage basins incurred flood damage due to internal drainage system failure during a particularly intense storm. The City has a total of 1,354 miles of storm drain pipes, 49,914 DIs, and 105 pump stations. The City's drainage basins are shown in Figure F-34. Much of this infrastructure was constructed before current storm drainage design guidelines were in place. In many areas, the system is sized based on outdated hydrology and does not have capacity to drain a 100-year storm event.

Figure F-34 City of Sacramento – Drainage Basins



Source: City of Sacramento Department of Utilities

Assets at Risk

Sewer and Drainage System Damage

In case of a major disaster, such as an earthquake or flood, the City of Sacramento's sewer collection system may be subject to many severe pipe failures. In the City's combined system, there may be complete pipe collapses, especially where the City's brick mains are located. Sewage pumping stations could and probably would be damaged at these locations. The Operations & Maintenance Division's sewer maintenance would close down and isolate areas where severely damaged pipes were located and bypass pumping would be implemented. Furthermore, this Division would have the responsibility of inspecting and evaluating the restoration of all sewers, sewer collections mains, and service laterals.

Energy Shortage

Should the City experience a shortage or shut-down of the fuel supply or electrical distribution system due to a flood, the Public Works Energy Emergency Coordinator will provide critical information and coordination. The Energy Coordinator will report to the Emergency Operations Center and provide information regarding critical City facilities in relation to function and auxiliary power.

Back-up generators at the pump stations are also available in case of a loss of power.

Future Development

Future development in the City will add more impervious surfaces causing an increase in stormwater runoff and the continued need to drain these waters. Future development in the City will add more impervious surfaces and need to drain those waters. The City will be proactive to ensure that increased development has proper siting and drainage for stormwaters. New development and redevelopment requirements have been approved to mitigate flooding, hydromodification and water quality issues. The risk of localized flooding to future development can also be minimized by accurate recordkeeping of repetitive localized storm activity. Mitigating the root causes of the localized stormwater flooding will reduce future risks of losses.

Levee Failure

Likelihood of Future Occurrence–Unlikely
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 channel of a stream. By confining the flow to a narrower steam 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,

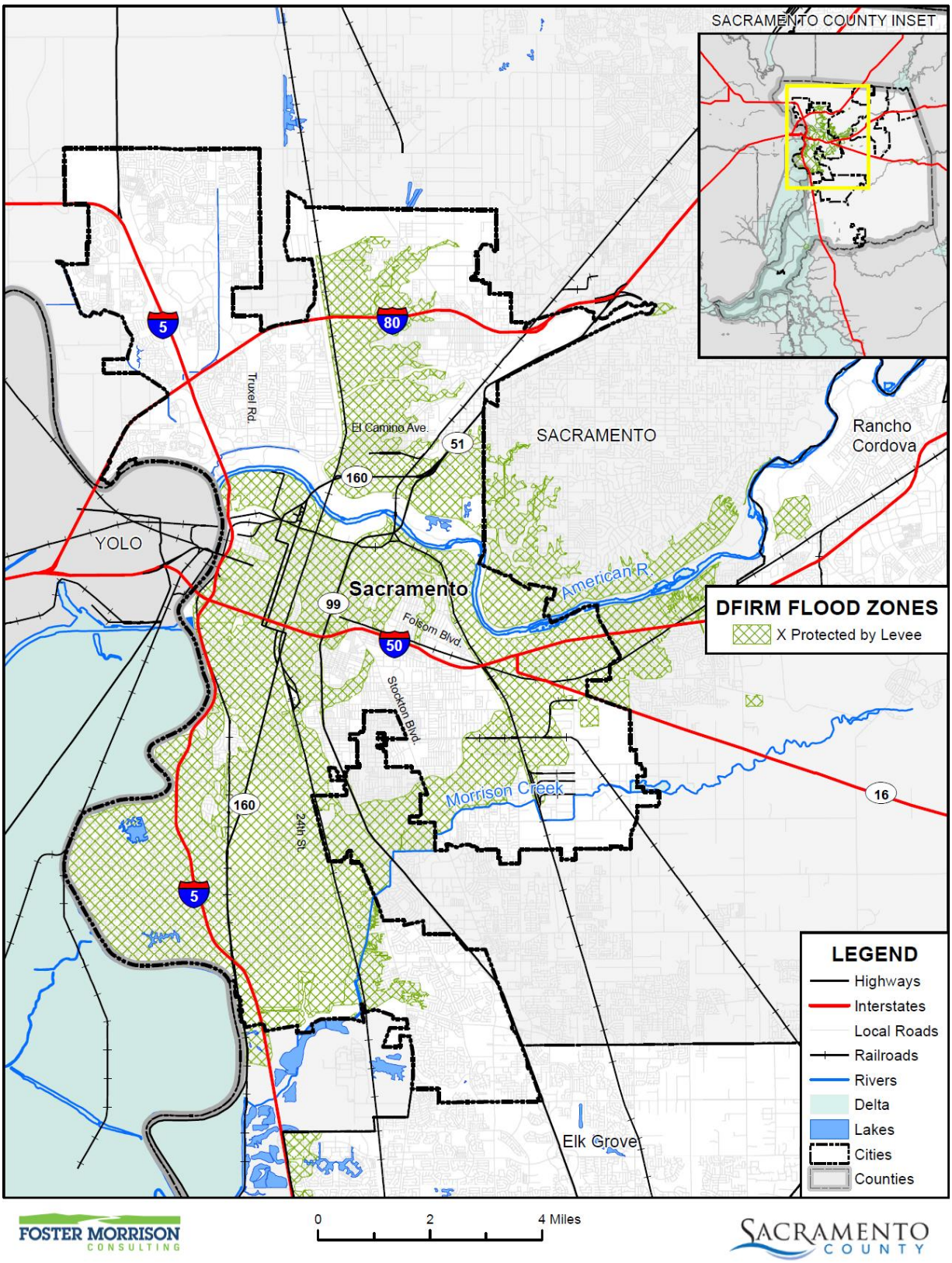
levees can be certified to provide protection against the 1% annual chance flood. Levees reduce, not eliminate, the risk to individuals and structures located behind them. A levee system failure or overtopping can create severe flooding and high water velocities. Levee failure can occur through overtopping 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 City are not known. 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. The HMPC noted that when northern California reservoirs are nearing maximum capacity, they release water through the river systems, causing additional burdens on County levees.

Figure F-35 shows the FEMA DFIRM X Protected by Levee areas in the City. Geographical levee failure flood extent for the City from the FEMA DFIRMs is shown in Table F-47.

Figure F-35 City of Sacramento – DFIRM X Protected by Levee Areas



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

Table F-47 City of Sacramento – Geographical Levee Failure Extents

X Protected by Levee/ Jurisdiction	Total Acres	% of Total Acres*	Improved Acres	% of Total Improved Acres*	Unimproved Acres	% of Total Unimproved Acres*
City of Sacramento	24,355	32.93%	16,745	34.80%	7,610	29.44%

Source: FEMA DFIRM 7/19/2018

*Percentage of total acres is the percent of total acres of the entire County Planning Area, not the total acres of the jurisdiction

Levee Status

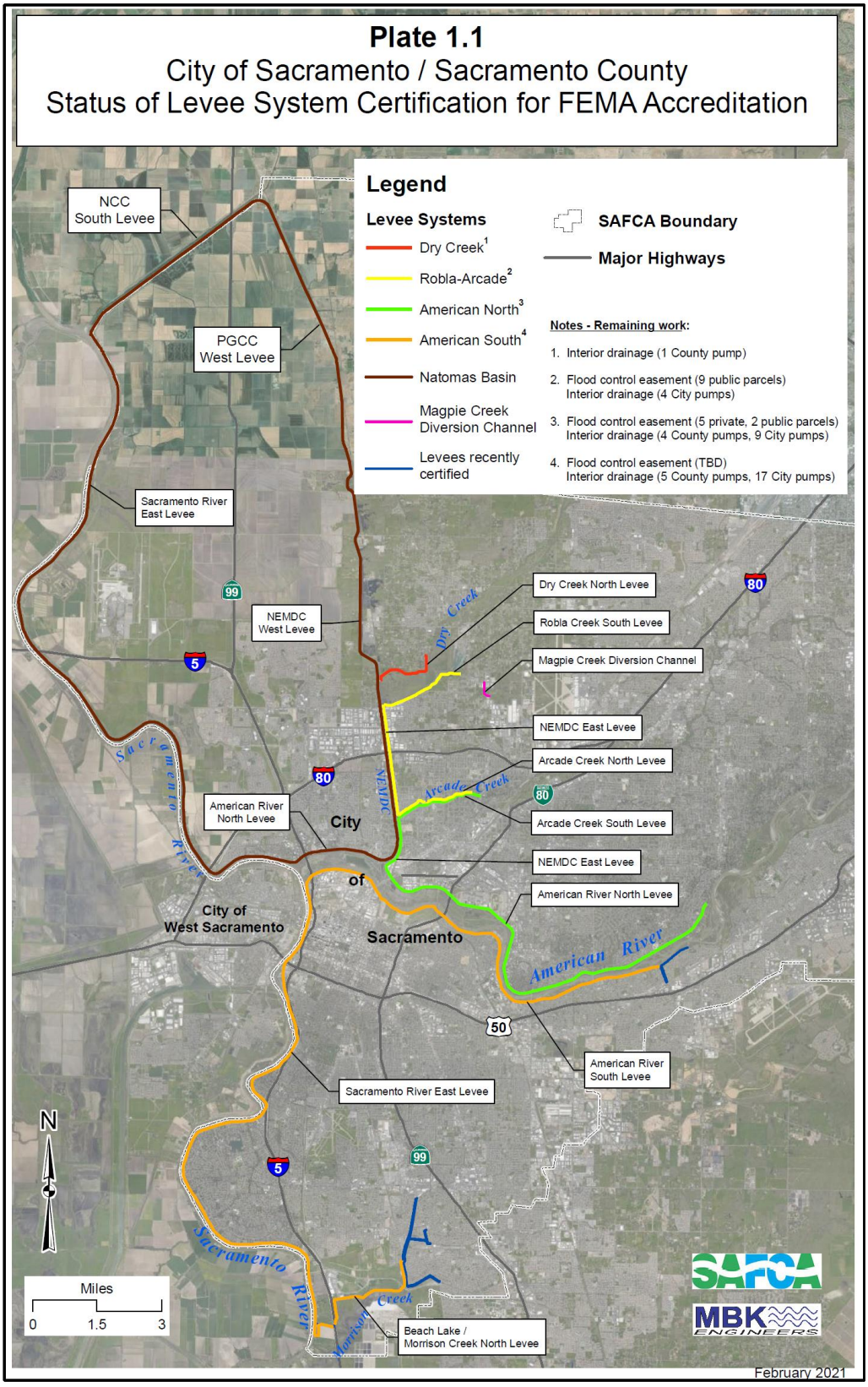
USACE expired the City's levee certifications in 2012 and 2013 because the certifications no longer met USACE's risk & uncertainty criteria and/or were older than 10 years. This is shown in Table F-48. Figure F-36 shows the City of Sacramento's current levee status.

Table F-48 USACE Levee Certification Expiration Dates Stream Reach Expiration Date

Stream	Reach	Expiration Date
Dry Creek	North levee	March 19, 2012
Robla Creek	South levee from approximately Sully Street to City border on the east	August 31, 2013
Robla Creek	South levee from junction with Natomas East Main Drainage Canal to approximately Sully Street	March 19, 2012
Arcade Creek	North and south levees	March 19, 2012
Natomas East Main Drainage Canal	East levee from junction with American River north levee to the pump station north of Dry Creek	March 19, 2012
American River	North and south levee (not including Natomas)	August 31, 2013
Sacramento River	Left bank levee from the junction with the American River to the southern City limits	August 31, 2013
Morrison Creek	Junction with Sacramento River to Unionhouse Creek Right bank from Unionhouse Creek to Brookfield Drive	August 31, 2013

Source: 2016 Comprehensive Flood Management Plan

Figure F-36 City of Sacramento Levee Status



Source: City of Sacramento Department of Utilities, MBK Engineers, SAFCA

In 2012, SAFCA along with the local communities and maintaining agencies, began developing a levee accreditation program to determine whether the levees protecting Sacramento along the lower American and Sacramento rivers and their tributaries (outside the Natomas Basin) adequately met the minimum requirements of the NFIP. The following projects need to be completed to accredit the levees:

Federal projects:

- Folsom Dam JFP
- Folsom Dam Raise
- American River Common Features WRDA 96/99
- South Sacramento Streams

State and local projects:

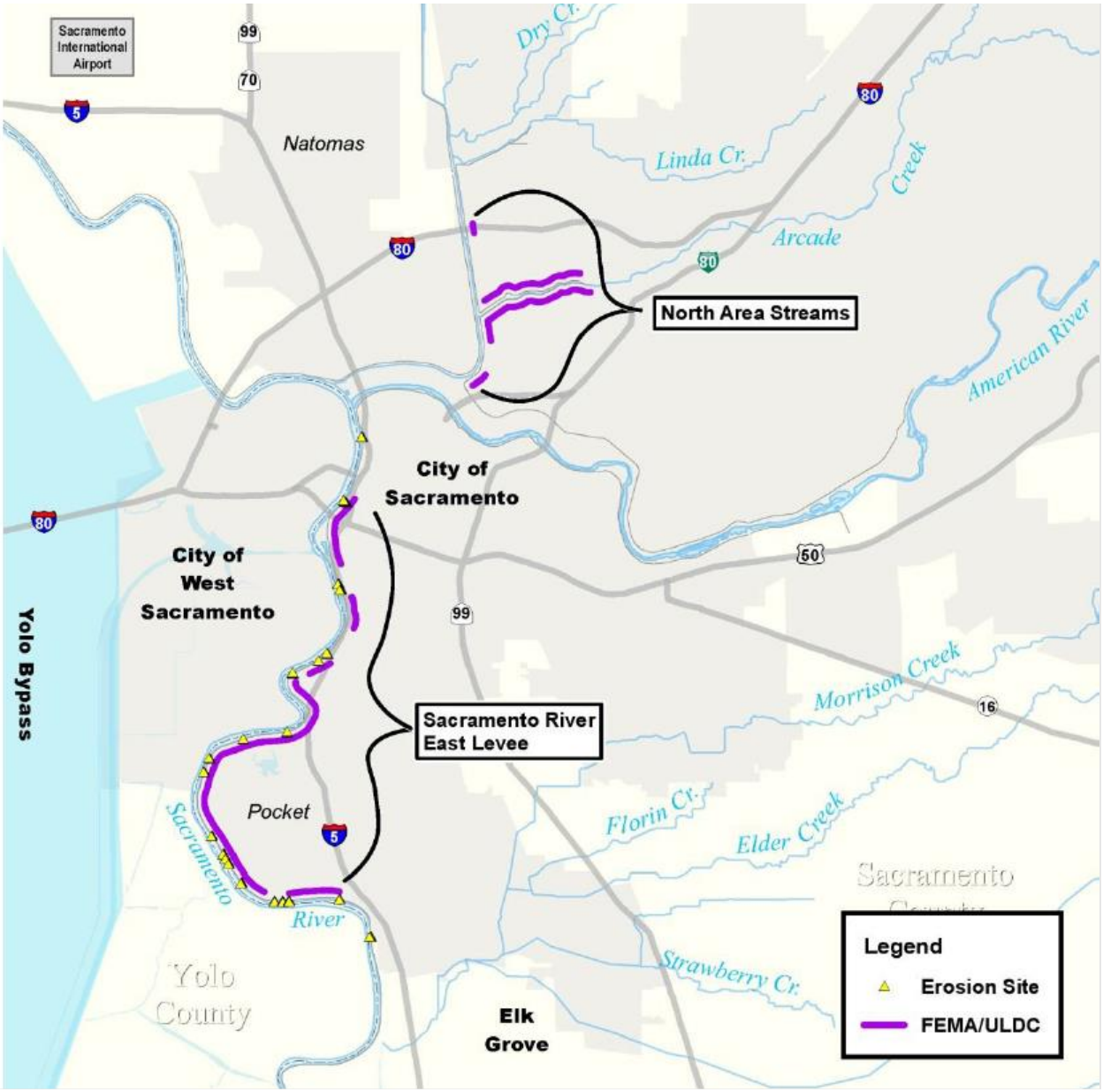
- North Area Streams
- Sacramento River East Levee downstream of the American River
- Various high hazard encroachments/vegetation

The levees must also meet the State of California's Urban Levee Design Criteria (ULDC). The ULDC requires the city to address additional criteria including encroachments, vegetation, and access to the levees. It was decided that the levee deficiencies would be addressed in two phases – accreditation and modernization.

Figure F-37 shows areas that need to be addressed in the short term (5 to 7 years) to meet the NFIP accreditation and immediate ULDC requirements.

From Rosa - needs to be updated-*: The purple levee segments in the North Sac Stream can be removed since the work to address FEMA/ULDC deficiencies have been completed. The work along SREL has expanded based on USACE's engineering analysis for the Common Features project; however, the purple levee segments shown are the reaches that were originally identified by SAFCA to address FEMA/ULDC deficiencies before work for Common Features had started.

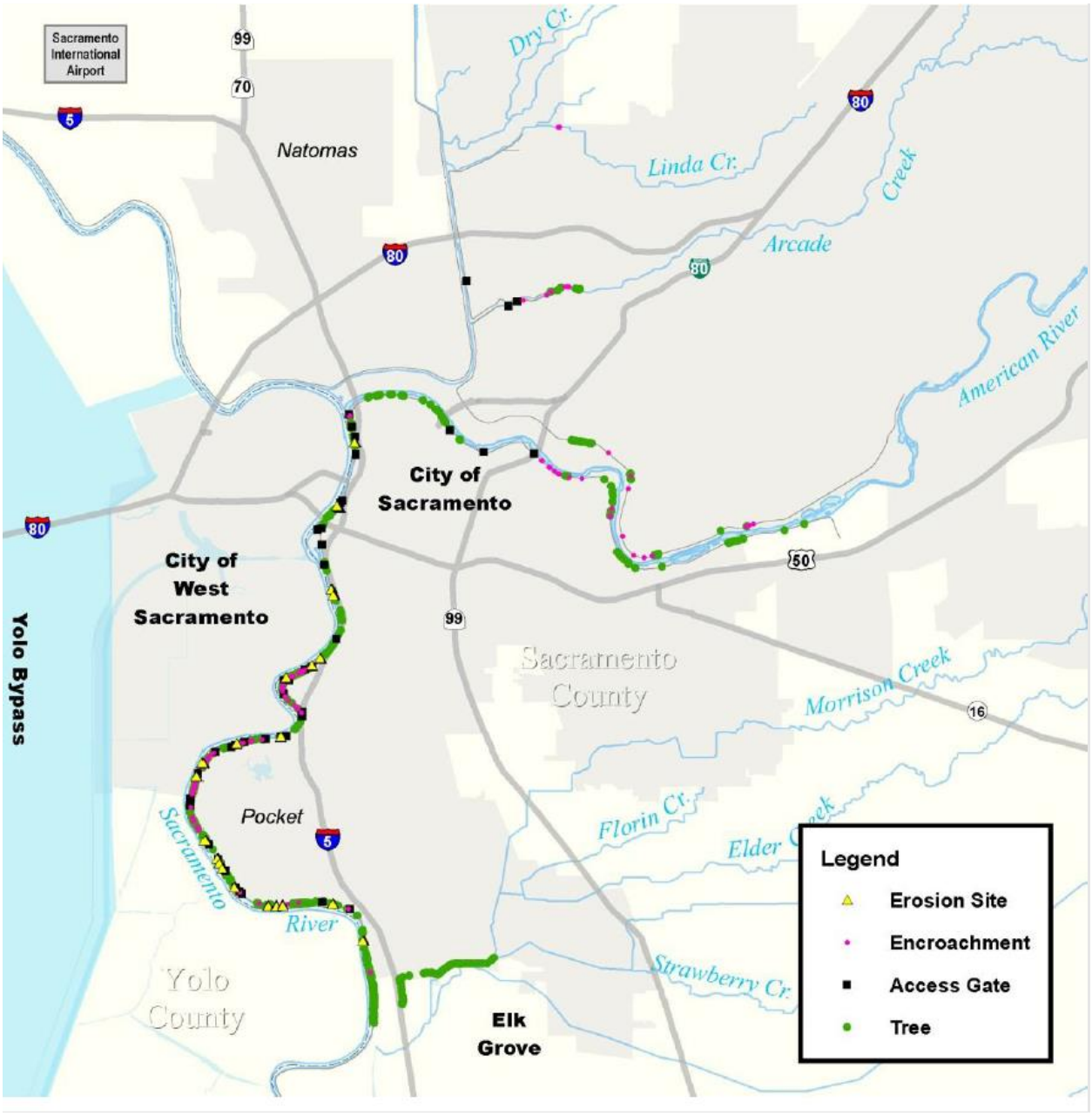
Figure F-37 City of Sacramento – Areas to be Addressed to Meet NFIP Accreditation and Immediate ULDC Requirements



Source: 2016 Comprehensive Flood Management Plan

The second phase is the modernization phase, which will be accomplished over 10-30 years. This will address encroachments, access, and vegetation that are categorized as low risk at the sites shown in Figure F-38. FROM ROSA - needs to be updated-Several trees and encroachments along Arcade Creek and American River have been address by ARFCD. Looking for an updated map.

Figure F-38 City of Sacramento – Sites in Long Term Modernization Process



Source: 2016 Comprehensive Flood Management Plan

Past Occurrences

There have been two state and two federal disaster declaration from levee failure. This can be seen in Table F-49.

Table F-49 Sacramento County – State and Federal Levee Failure Disaster Declarations 1950-2020

Disaster Type	State Declarations		Federal Declarations	
	Count	Years	Count	Years
Levee Break	2	1972, 1980	2	1972, 1980

Source: Cal OES, FEMA

The City Planning Team noted the following past occurrence of levee failures.

December 9, 1861 - American River Levee failed east of 30th street, flooding what is now known as River Park. The water then overran the City's levee built to protect it. To relieve the building water levels, the levee at R & 5th Streets was cut to drain the "lake" but houses were swept away in the current in the cut in the levee.

Figure F-39 January 1862 K Street Flooding

Source: Drainage and Flood Control, 152 Year.

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.

Generally, levees fail due to overtopping or collapse. A catastrophic levee failure resulting from collapse probably will occur very quickly with relatively little warning. Such a failure would occur where the levee is saturated and the high hydrostatic water pressure on the river side, coupled with erosion of the levee from high water flows or an inherent defect in the levee that causes an almost instant collapse of a portion of the levee. Under such circumstances, structures located relatively near the break will suffer immediate and extensive damage. Several hundred yards away from the break the energy of the flood waters will be dispersed sufficiently to reduce, but not eliminate, flooding damage to structures in its path. The flood water will flow in a relatively shallow path toward any low point in the affected area. Flood water will

collect in these low areas and the levels will rise as the flow continues. When the rivers are high, it is not possible to close or repair a levee break until the water surface in the river and the flooded area equalize.

Assets at Risk

Based on the vulnerability of Sacramento to the levee failure hazard, the sections that follow describes significant assets at risk in the City of Sacramento. This section includes the values at risk, population at risk, and critical facilities at risk.

Values at Risk

GIS was used to determine the possible impacts of levee failure flooding within the City of Sacramento. The methodology described in Section 4.3.14 of the Base Plan was followed in determining structures and values at risk to the levee failure flooding. Table F-50 shows the property use, improved parcel count, improved values, estimated contents, and total values that fall in FEMA X Protected by Levee flood zones in the City.

Table F-50 City of Sacramento – Count and Values of Parcels at Risk in X Protected by Levee Flood Zone and Property Use

Flood Zone / Property Use	Total Parcel Count	Improved Parcel Count	Total Land Value	Improved Structure Value	Estimated Contents Value	Total Value
X Protected by Levee						
Agricultural						
Care/Health						
Church/Welfare						
Industrial						
Miscellaneous						
Office						
Public/Utilities						
Recreational						
Residential						
Retail/ Commercial						
Unknown						
Vacant						
X Protected by Levee Total						

Source: FEMA 11/2/2018 DFIRM, Sacramento County 2020 Parcel/Assessor's Data

*With respect to improve parcels within the floodplain, the actual structures on the parcels may not be located within the actual floodplain, may be elevated and or otherwise outside of the identified flood zone

**This parcel count only includes those parcels in the 0.2% annual chance flood zone, exclusive of the 1% annual chance flood zone. The 0.2% annual chance flood, in actuality, also includes all parcels in the 1% annual chance flood zone.

Table F-51 shows City of Sacramento levee failure flood loss estimates and improved values at risk by FEMA X Protected by Levee flood zones.

Table F-51 City of Sacramento – X Protected by Levee Flood Loss Estimates

Flood Zone	Total Parcel Count	Improved Parcel Count	Improved Structure Value	Estimated Contents Value	Total Value	Loss Estimate	Loss Ratio
X Protected by Levee	11,884	11,074	$3,120,723,923	$2,756,209,233	$5,876,933,156	$1,175,386,631	0.65%

Source: FEMA 11/2/2018 DFIRM, Sacramento County 2020 Parcel/Assessor's Data

*With respect to improve parcels within the floodplain, the actual structures on the parcels may not be located within the actual floodplain, may be elevated and or otherwise outside of the identified flood zone

**This parcel count only includes those parcels in the 0.2% annual chance flood zone, exclusive of the 1% annual chance flood zone. The 0.2% annual chance flood, in actuality, also includes all parcels in the 1% annual chance flood zone.

According to Table F-51, the City of Sacramento has 11,074 parcels and $5.88 billion of structure and contents values or values in the X Protected by Levee flood zone. These values can be refined a step further. Applying the 20 percent damage factor as previously described in Section 4.3.11 of the Base Plan, two feet of flooding would cause $1.18 billion in flood damages in the City.

Structures protected by levees that fail are often total losses. The analysis above assumes all levees in the City break at one time, which is unlikely. The extent and depth of actual flooding and associated damage will vary depending on the location, nature, depth, and extent of any levee break.

Population at Risk

The DFIRM flood zones were overlayed on the parcel layer. Those residential parcel centroids that intersect the levee failure flood zones were counted and multiplied by the 2010 Census Bureau average household factors for Sacramento – 2.76. According to this analysis, there is a total population of 813 residents of the City at risk to levee failure flooding. This is shown in Table F-36.

Table F-52 City of Sacramento – Count of Improved Residential Parcels and Population by Flood Zone

Jurisdiction	X Protected by Levee	
	Improved Residential Parcels	Population at Risk
City of Sacramento	69,537	184,968

Source: FEMA DFIRM 11/2/2018, Sacramento County 2020 Parcel/Assessor's Data, US Census Bureau

Critical Facilities at Risk

PLACE

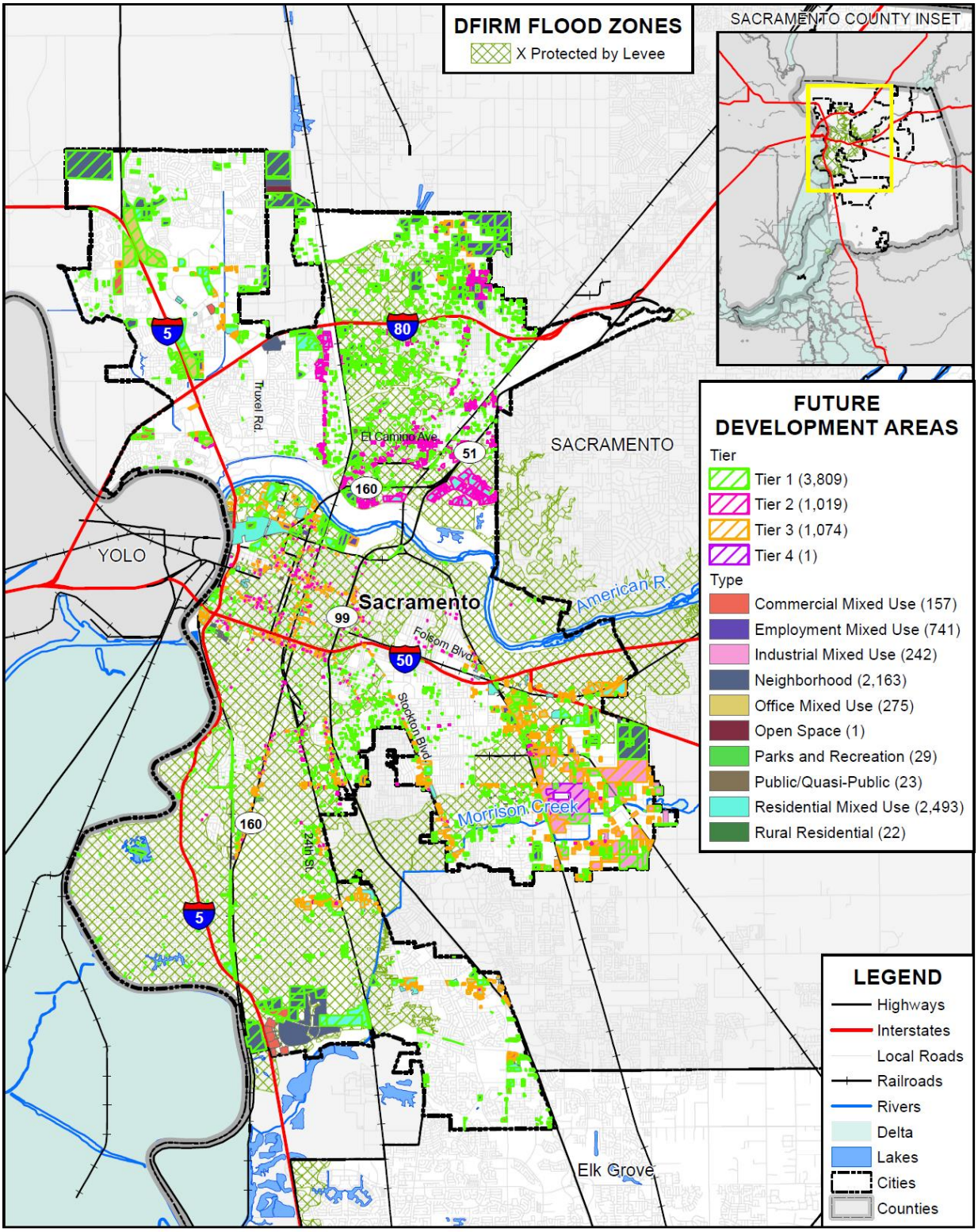
Future Development

Future development built in the areas protected by levees is subject to being built to the standards in the City of Sacramento Floodplain Ordinance. Whether a levee is certified as providing protection from the 1% annual chance flood will also factor into development requirements. Per Sacramento City Code: A minimum 20-foot setback from the landside toe of any flood control levee is required for development less than five acres in size. A minimum 50-foot setback is required from the landside toe of any flood control levee for development five acres or greater in size. No primary or accessory structures may encroach into the levee setback. Future development in levee protected areas may be affected by this hazard, thus there will always be some level of concern.

GIS Analysis

The City provided future development areas were used as the basis for the inventory of future development areas for the City. Using the GIS parcel spatial file for each of these areas, the areas and parcels associated with future development projects for which the analysis was to be performed were identified. Utilizing the future development project spatial layer, the parcel centroid data was intersected to determine the parcel counts within each area. Figure F-40 shows the locations of future development areas the City is planning to develop on the DFIRM X Protected by Levee layer. Table F-53 shows the parcels and acreages of each future development area by tier and type in the City in the X Protected by Levee areas.

Figure F-40 City of Sacramento – Future Development and X Protected by Levee Flood Zones



Data Source: FEMA NFHL 07/19/2018, Sacramento County GIS, Cal-Atlas; Map Date: 05/2021.

Table F-53 City of Sacramento – Future Development in DFIRM X Protected by Levee Flood Zones by Tier and Type

Flood Zone / Future Development Tier / Type	Total Parcel Count	Improved Parcel Count	Total Acres
0.2% Annual Chance Flood Hazard			
X Protected by Levee			
Tier 1			
Commercial Mixed Use	22	1	52.34
Employment Mixed Use	199	9	193.02
Industrial Mixed Use	11	1	23.18
Neighborhood	860	108	652.30
Office Mixed Use	27	3	51.14
Parks and Recreation	11		43.03
Public/Quasi-Public	16		36.32
Residential Mixed Use	487	25	406.59
Tier 1 Total	***1,633***	***147***	***1,457.92***
Tier 2			
Commercial Mixed Use	11	9	4.54
Employment Mixed Use	140	93	74.58
Neighborhood	23	20	6.78
Office Mixed Use	4	2	3.28
Residential Mixed Use	426	321	320.77
Tier 2 Total	***604***	***445***	***409.94***
Tier 3			
Employment Mixed Use	65	61	89.59
Industrial Mixed Use	19	17	162.93
Neighborhood	1	1	0.14
Office Mixed Use	30	28	60.21
Residential Mixed Use	526	500	374.01
Tier 3 Total	***641***	***607***	***686.88***
(blank)			
Commercial Mixed Use	7	6	70.72
Employment Mixed Use	4	4	8.91
Neighborhood	39	24	283.34
Office Mixed Use	2		5.63
Parks and Recreation	8	3	13.14
Public/Quasi-Public	1		1.97
Residential Mixed Use	107	71	106.94

Flood Zone / Future Development Tier / Type	Total Parcel Count	Improved Parcel Count	Total Acres
(blank) Total	*168*	*108*	*490.64*
X Protected by Levee Total	**3,046**	**1,307**	**3,045.37**
0.2% Annual Chance Flood Hazard Total	**3,566**	**1,564**	**4,545.61**

Source: FEMA DFIRM 11/2/2018, City of Sacramento GIS

Pandemic

Likelihood of Future Occurrence–Likely
Vulnerability–High

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 City, County, and surrounding region is at risk, as pandemic is a regional, national, or 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 F-54.

Table F-54 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 flu.

- 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**

Sacramento City Office of Emergency Management activated a virtual EOC, a Crisis Activation Team, and Operational Planning Team in March of 2019 in response to the global pandemic. Coordination efforts to provide critical supplies to essential workers, maintain continuity of city essential services, public messaging, and emergency programs are still on-going. Significant impacts of Shelter-In-Place orders to our unhoused citizens occurred in the City.

Vulnerability to and Impacts from Pandemic

Pandemic has 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 current pandemic, use of infection control techniques, and administration of vaccines once they become available. Citizens can help prevent 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 City. Pandemic can have varying levels of impact to the citizens of the City 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) an unemployment rose significantly. Supply chains for food can be interrupted. Prisons may need to release prisoners to comply with social distance standards.

Sacramento City Office of Emergency Management activated a virtual EOC, a Crisis Activation Team, and Operational Planning Team in March of 2019 in response to the global pandemic. Coordination efforts to provide critical supplies to essential workers, maintain continuity of city essential services, public messaging, and emergency programs are still on-going.

Future Development

Future development is not expected to be significantly impacted by this hazard, though population growth in the City could increase exposure to a pandemic, and increase the ability of each disease to be transmitted among the population of the City. If the median age of City residents continues to increase, vulnerability

to pandemic diseases may increase, due to the fact that these diseases are often more deadly to senior citizens.

Severe Weather: Extreme Cold and Freeze

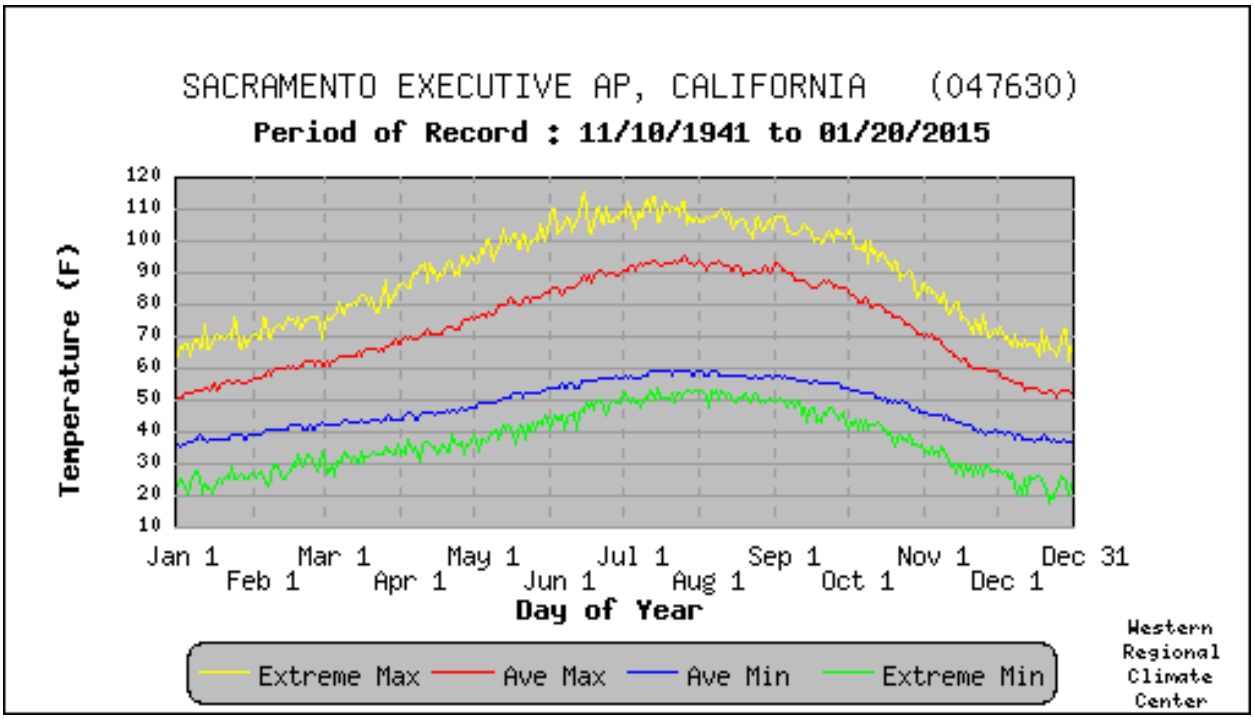
Likelihood of Future Occurrence–Unlikely
Vulnerability–High

Hazard Profile and Problem Description

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

The City of Sacramento experiences severe weather including peak periods of extreme cold and freeze. In general, individuals are able to dress appropriately and stay sheltered during these peak periods, however the City's elderly population and homeless are highly susceptible to the extreme temperatures. The City experiences temperatures that hover around or below 32 degrees during the winter months (see Figure F-41). Many months see a high number of days where daily low temperatures fall below 32°F. Generally, people who live and work in this weather are prepared to cope with the extremes in that they dress appropriately and stay indoors.

Figure F-41 Daily Temperatures Averages and Extremes for the City of Sacramento



Source: Western Regional Climate Center, Sacramento FAA Airport Station

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 minimum temperatures fall below 32°F on 8.3 days with no days falling below 0°F. 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. When it does snow, the snow often melts relatively quickly.

Past Occurrences

Past average occurrences of extreme cold in the City of Sacramento are shown in both Table F-55 and Table F-56.

Table F-55 Record Low Temperatures in the City of Sacramento

Month	Temperature	Date	Month	Temperature	Date
January	23°	1/1979	July	48°	7/1983
February	23°	2/1989	August	49°	8/1978
March	26°	3/1971	September	43°	9/1978
April	32°	4/1953	October	36°	10/1989
May	36°	5/1974	November	26°	11/1993
June	41°	6/1990	December	18°	12/1990

Source: Western Regional Climate Center, Sacramento FAA Airport Station

Table F-56 Average Number of Days in a Month Below 32°F

Month	Days Below 32°F	Month	Days Below 32°F
January	7.2	July	0
February	2.2	August	0
March	0.5	September	0
April	0	October	0
May	0	November	1.5
June	0	December	6.4

Source: Western Regional Climate Center, Sacramento FAA Airport Station

There has been no federal or state disaster declarations in the County for freeze and snow. The City noted that cold and freeze is a regional phenomenon; events that affected the County also affected the City. Those past occurrences were shown in the Base Plan in Section 4.3.3.

In **January of 2017**, cold weather hit the City. The City opened warming centers. This can be seen on Figure F-42.

Figure F-42 January 2017 Warming Center

Source: City of Sacramento

The City noted an event on **August 14-19, 2020**. High temperatures in the region. Incidents of heat related illnesses, dehydration and strain on emergency response. The City activated warming center to provide warm weather-related respite to the community. COVID-19 precautions and screenings were in place.

The City noted an event on **September 6-7, 2020**. High temperatures in the region. Incidents of heat related illnesses, dehydration and strain on emergency response. The City activated warming center to provide warm weather-related respite to the community. COVID-19 precautions and screenings were in place.

The City noted an event on **December 29, 2020**. Cold hit the City and the region. Incidents of cold related illnesses strained emergency response. The City activated Library Galleria as a warming center to provide cold weather-related respite to the community. COVID-19 precautions and screenings were in place.

The City noted an event on **January 25, 2021**. Cold hit the City and the region. Incidents of cold related illnesses strained emergency response. The City activated Library Galleria as a warming center to provide cold weather-related respite to the community. COVID-19 precautions and screenings were in place.

Vulnerability to and Impacts from Severe Weather: Extreme Cold and Freeze

The City experiences temperatures below 32 degrees during the winter months. The temperature moves to the 20s in rather extreme situations. Freeze can cause injury or loss of life to residents of the City. 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.

Extreme cold and freeze can affect critical facilities and infrastructure, down trees, break pipes, and can be a life safety issue. When extreme cold is coupled with high winds or ice storms, power lines may be downed, resulting in an interruption of utilities and critical services. Transportation networks, communications, and utilities infrastructure are the most vulnerable physical assets in the City. The elderly and young population is most vulnerable to temperature extremes. The residents of nursing homes and elder care facilities, as well as transient and homeless populations are especially vulnerable to extreme cold events.

Future Development

Future development built to code should be able to withstand issues associated with extreme cold and freeze events. Pipes at risk of freezing should be buried or insulated from freeze as new facilities are improved or added. Vulnerability to extreme cold will increase as the average age of the population in the County shifts and homelessness becomes more of an issue.

The Sacramento Housing and Rehabilitation Agency and County Department of Human Services currently operate programs such as the Winter Shelter Program and In-Home Support Services which help address severe weather conditions needs for vulnerable populations. Continued community outreach and potential regulatory mitigation capabilities would further address the extreme cold/freeze hazard within the community.

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 lasts 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 City, there are risk to the built environment from extreme heat. While extreme heat on its own does not usually affect structures, extreme heat during times of drought can cause wildfire risk to heighten. Extreme heat can lead to power outages and when combined with high winds, to Public Safety Power Shutdown (PSPS) events, creating significant issues in the City. However,

PSPS events in the City have been declining with PG&E's refined system for shutting power off in high wildfire risk areas. More information on power failure and PSPS can be found at the beginning of Section F.5.3.

Location and Extent

Heat is a regional phenomenon and affects the whole of the City. 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

Past average occurrences of extreme heat in the City of Sacramento are shown in both Table F-57 and Table F-58.

Table F-57 Record High Temperatures in the City of Sacramento

Month	Temperature	Date	Month	Temperature	Date
January	74°	1/12/2009	July	114°	7//1983
February	76°	2/19/1964	August	110°	8/10/1996
March	88°	3/5/1971	September	108°	9/01/1950
April	95°	4/9/1999	October	104°	10/02/2001
May	105°	5/3/1950	November	87°	11/01/1960
June	115°	6/7/1950	December	73°	12/02/2011

Source: Western Regional Climate Center, Sacramento FAA Airport Station

Table F-58 Average Number of Days in a Month Exceeding 90°F

Month	Days Exceeding 90°F	Month	Days Exceeding 90°F
January	0	July	21.3
February	0	August	19.1
March	0	September	12.8
April	0.5	October	2.5
May	5.4	November	0
June	11.6	December	0

Source: Western Regional Climate Center, Sacramento FAA Airport Station

The City Planning Team noted that since extreme heat is a regional phenomenon, events that affected the County also affected the City. Those past occurrences were shown in the Base Plan in Section 4.3.3.

The City did note an even on **August 6, 2020**. Incidents of heat related illnesses, dehydration, and strain on emergency response. Sacramento City Office of Emergency Management conducted interdepartmental and Public Health coordination to ensure activation of two cooling centers were made available September 6-7 in response to high temperatures. COVID-19 precautions and screenings were in place.

Vulnerability to and Impacts from Extreme Heat

The City experiences temperatures in excess of 100°F during the summer and fall months. The temperature moves to 105-115°F in rather extreme situations. During these times, drought conditions may worsen and the City may see an increase in dry fuels. Also, power outage and PSPS events may occur during these times as well. Health issues are the primary concern with this hazard, although economic impacts can also be an issue.

The elderly and individuals below the poverty level are the most vulnerable to extreme temperatures. Nursing homes and elder care facilities are especially vulnerable to extreme heat events if power outages occur and air conditioning is not available. In addition, individuals below the poverty level may be at increased risk to extreme heat if use of air conditioning is not affordable. This is especially true of homeless people and the transient population.

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.

Future Development

Future development of new buildings in the City will likely not be affected by extreme heat. Extreme heat is more likely to affect vulnerable populations. Vulnerability to extreme heat will increase as the average age of the population in each City shifts. It is encouraged that nursing homes and elder care facilities have emergency plans or backup power to address power failure during times of extreme heat and in the event of a PSPS. Low income residents and homeless populations are also vulnerable. Cooling centers for these populations should be utilized when necessary. The City will continue to enhance the City's tree canopy and encourage "green" infrastructure, such as rooftop gardens and light-colored pavement, to reduce urban heat island effects.

Severe Weather: Heavy Rains and Storms

Likelihood of Future Occurrence–Highly Likely
Vulnerability–High

Hazard Profile and Problem Description

Storms in the City 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 City falls mainly in the fall, winter, and spring months. Wind often accompanies these storms; hail and lightning are rare in the City.

Location and Extent

Heavy rain events occur on a regional basis. Rains and storms can occur in any location of the City. All portions of the City 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. Hail and lightning are rare in the City and Sacramento County. Duration of severe storms in California, Sacramento County, and the City 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

According to historical hazard data, severe weather, including heavy rains and storms, is an annual occurrence in the City. This is the cause of many of the federal disaster declarations related to flooding.

- **December 2012** – Severe rain for several days. The DOC was activated for approximately a week due extreme weather forecasts.
- **December 2014** – Media and reports claimed severe rain predicted for multiple days. DOC activated for several days.
- **March 2016** – DOC was on alert due to heavy rain projections. DOC activation was ultimately not required.
- **January 2017-March 2017** – Drainage crews increased monitoring of Sacramento River and South Sacramento Streams.
- **April 2018** – DOC was activated.
- **January 2019** – Major storm - Wind Event. Winds 25-35 MPH sustained winds with gusts up to 65 MPH accompanied by persistent rain, falling trees, drainage disruption, power outages, and localized flooding. IAP established with unified response.
- **February 2019** – DOC was activated.

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 City. These events can cause significant and 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 City, but also can cause damage, with lightning occasionally igniting wildfires.

Actual damage associated with the effects of severe weather include impacts to property, critical facilities (such as utilities), and life safety. Power outages may also occur. Heavy rains and storms often result in 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.

Future Development

Building codes in the City ensure that new development is built to current building standards, which should reduce the risk to future development in the City from heavy rains and storms. New critical facilities such as communications towers and others should be built to withstand hail damage, lightning, and thunderstorm winds. With adherence to development standards, future losses to new development should be minimal.

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 City 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 City. 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 City noted that since high winds is a regional phenomenon, events that affected the lower elevations of the City also affected the City. Those past occurrences were shown in the Base Plan in Section 4.3.5.

Listed below are the largest tornadoes for the Sacramento area:

- **February 7, 1978**: Fujita 2, Width 20 yards, Length 1.9 miles
- **March 22, 1983**: Fujita 1, Width 50 yards, Length 2 miles
- **April 19, 1988**: Fujita 1, Width 30 yards, Length 1 mile

Source: Tornado History Project

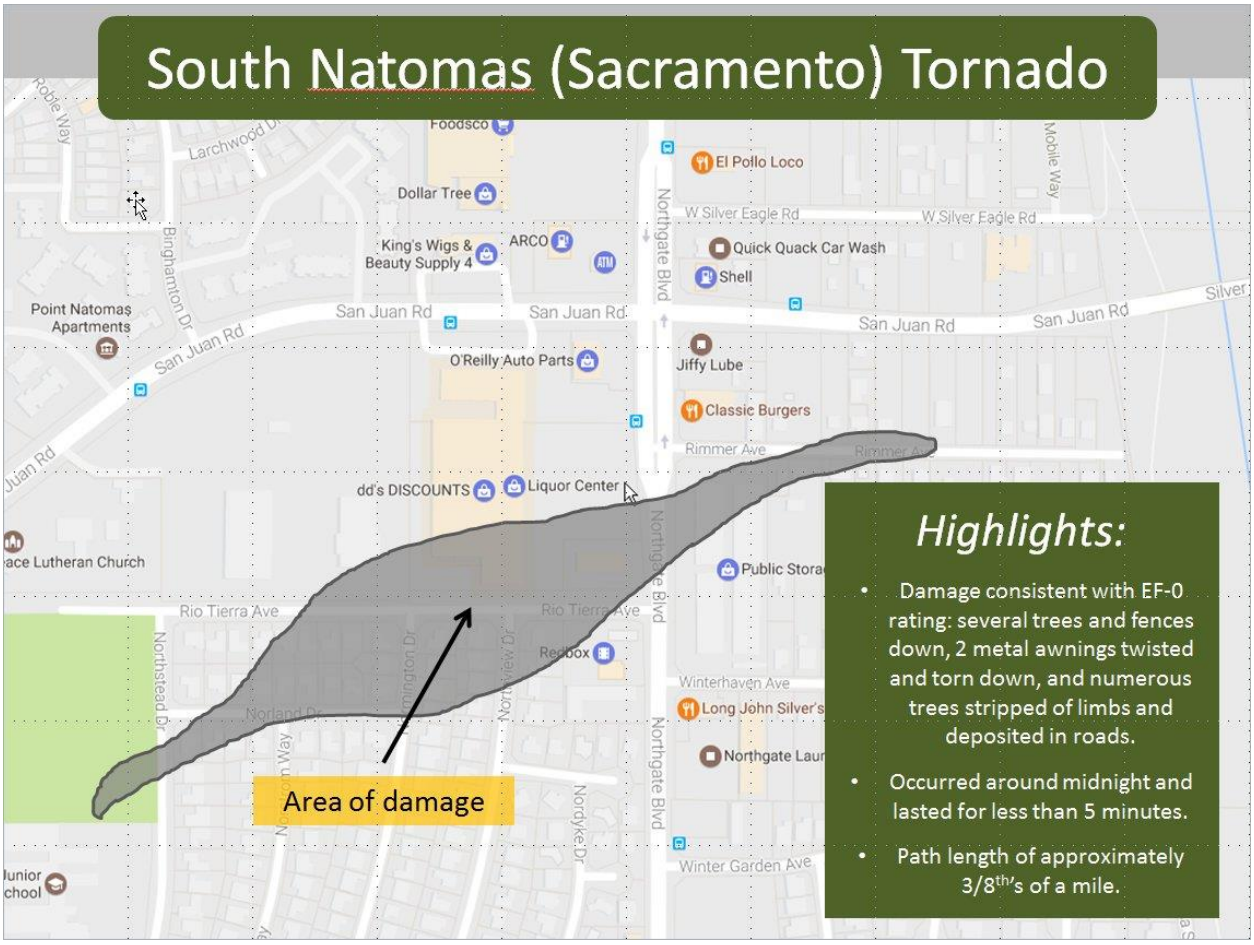
City specific events include the following:

January 2006: A series of storms accompanied by winds as fast as 63 MPH struck Northern California for a period of a week. Two deaths were recorded by falling trees as a result of high winds. The storm resulted in over $300 million of damage and 10 counties, including Sacramento, being classified as federal disaster areas.

January 2008: Severe winds exceeding hurricane force strength were a part of the January 2008 North American Storm Complex, a series of 3 storms that hit the California region. In California, 1.2 million residents were left without power due to the approximately 500 miles of power lines were damaged in the state. Listed below are the largest tornadoes for the Sacramento area.

The City noted a tornado that occurred in the Natomas Area on January 10, 2017. The tornado was estimated as a EF0. Information on the tornado and the areas impacted can be seen on Figure F-43, while Figure F-44 shows an example of the damage that occurred in the area.

Figure F-43 City of Sacramento – 2017 Natomas Tornado Event



Source: City of Sacramento

Figure F-44 Example of Damage from 2017 Tornado

Source: City of Sacramento

The City did note and event on January 16, 2019. The National Weather Service noted 25-35mph sustained winds with gusts up to 65mph accompanied by persistent rain that impacted the City and the region. Falling trees, drainage disruptions, power outages, and localized flooding reported. Damages, injuries, and deaths were not known.

Vulnerability to and Impacts from Severe Weather: Wind and Tornado

High winds are common occurrences in the City 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 shortage and failure can be found in the Severe Weather: Extreme Heat Section above, as well as in Section 4.3.3 of the Base Plan.

Impacts from high winds in the City 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

Strong wind is a frequent type of severe weather occurrence in the area. Wind often accompanies the region's storms and has caused damage in the past. Buildings that house populations at risk such as schools, nursing homes, hospitals, and urgent care facilities are at risk to wind and tornadoes. Also at risk are power lines, which can arc or be damaged during high wind events. The City has had power outages and damages to electric lines in past storms. This is especially difficult when the outages impact the stormwater pumps, which can exacerbate flooding.

Future Development

Future development projects will consider wind hazards at the planning, and design stage with the goal of reducing vulnerability. The City enforces the state building code and other ordinances, which regulate construction techniques that minimize damage from windstorms. Future development in the City is subject to these building codes. New critical facilities should also consider adding generators for times of PSPS.

Wildfire

Likelihood of Future Occurrence–Highly Likely
Vulnerability–High

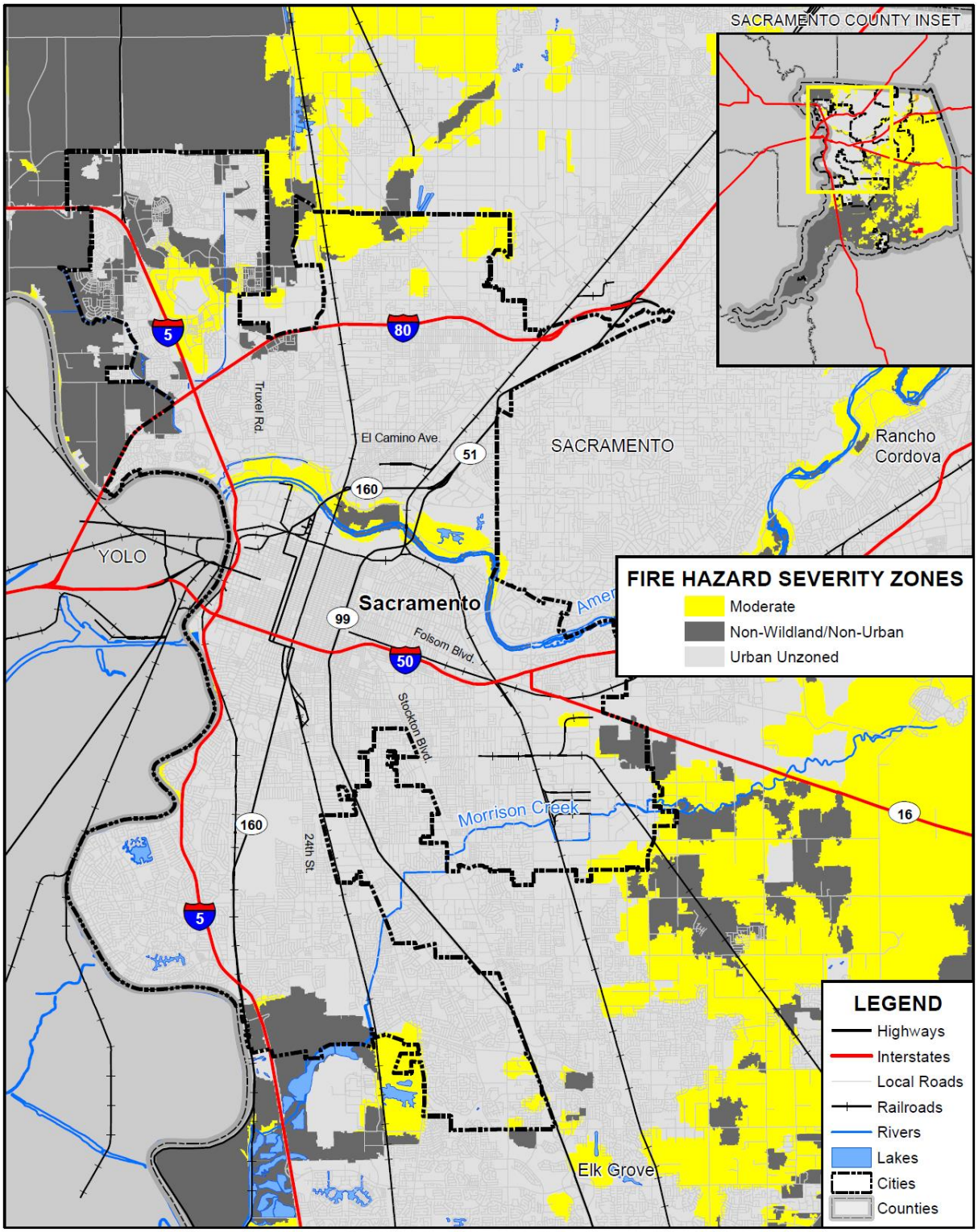
Hazard Profile and Problem Description

Wildland fire and the risk of a conflagration is an ongoing concern for the City of Sacramento. 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. These high winds can result in red flag days, and can result in PSPS events in the City. 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 City. CAL FIRE has estimated that the risk varies across the City and has created maps showing risk variance. Following the methodology described in Section 4.3.19 of the Base Plan, wildfire maps for the City of Sacramento were created. Figure F-45 shows the CAL FIRE Fire Hazard Severity Zone (FHSZ) in the City. As shown on the maps, FHSZs within the City range from Urban Uzoned to Moderate. Figure F-46 shows the CAL FIRE Fire Threat Areas in the City. As shown on the maps, fire threat within the City range from No Threat to High.

Figure F-45 City of Sacramento – Fire Hazard Severity Zones

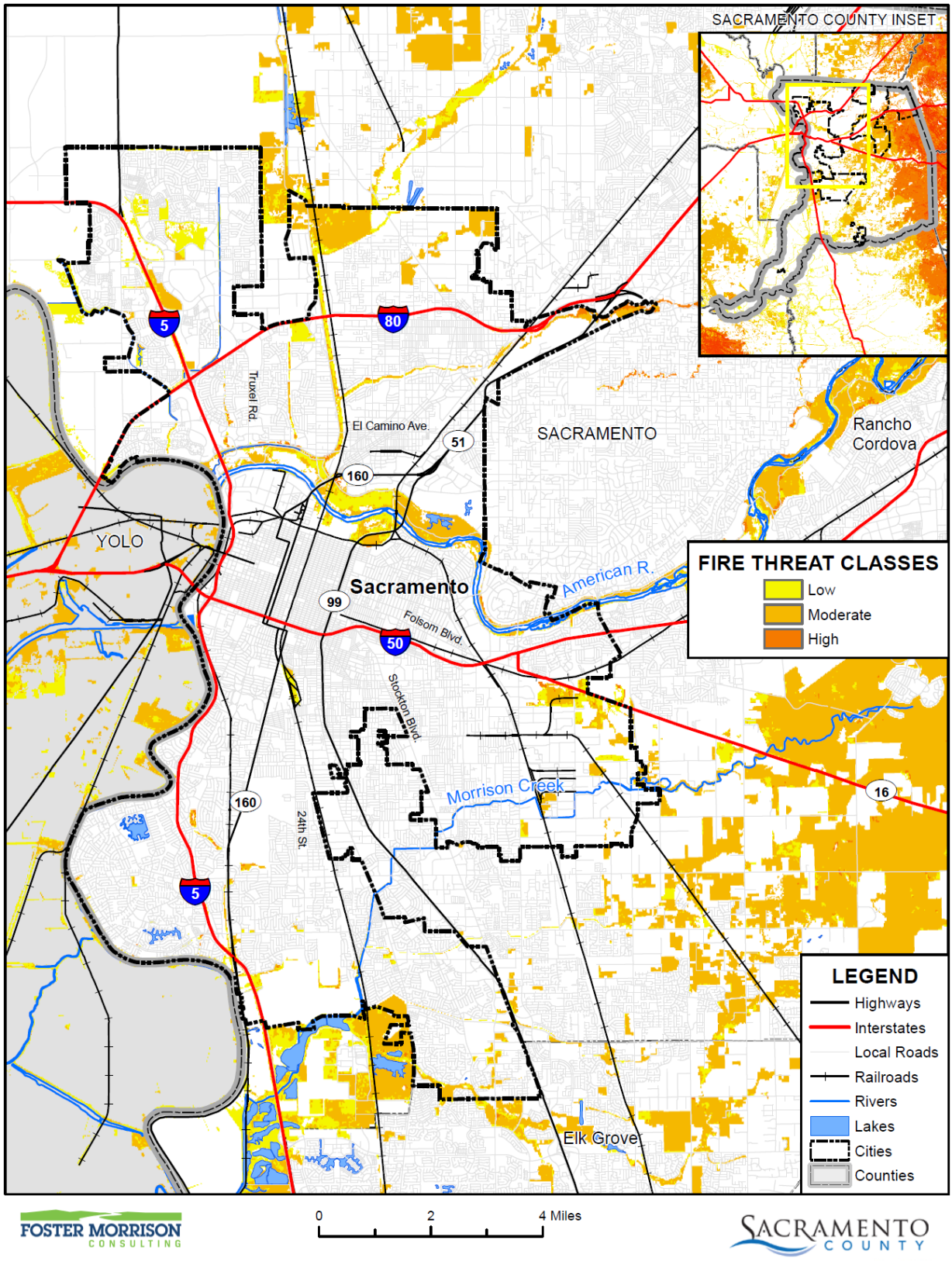


FOSTER MORRISON CONSULTING

SACRAMENTO COUNTY

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

Figure F-46 City of Sacramento – Fire Threat Areas



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

Some areas of the City have been identified as susceptible to urban-wildland fires. The areas are generally along the America River Parkway from Watt Avenue to the Sacramento River and along the Garden Highway in the Natomas area.

The American River Parkway is a stretch of a dense trees and brush on both sides of the American River. It is bordered by extensive commercial and residential development, including California State University, Sacramento. The parkway property is owned by the State of California, maintained by the Sacramento County Parks Department, and protected from fire by the Sacramento City Fire Department. The area is natural habitat with no fire break areas. Access for fire equipment is difficult and is limited to the paved stretches of the bicycle path. Some of the potential fire areas are not accessible to vehicular traffic. Fires occurred in the area in 1985 and 1992.

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. Geographical FHSZ extent from CAL FIRE is shown in Table F-59. Geographical Fire Threat Area extents from CAL FIRE are shown on Table F-60.

Table F-59 City of Sacramento – Geographical FHSZ Extents

Fire Hazard Severity Zone	Total Acres	% of Total Acres	Improved Acres	% of Total Improved Acres	Unimproved Acres	% of Total Unimproved Acres
Very High	0	0.00%	0	0.00%	0	0.00%
High	0	0.00%	0	0.00%	0	0.00%
Moderate	6,600.9	8.93%	3,705.6	7.70%	2,895.3	11.20%
Non-Wildland/non-Urban	14,662.3	19.83%	5,758.5	11.97%	8,903.9	34.45%
Urban Unzoned	52,692.3	71.25%	38,646.4	80.33%	14,045.9	54.35%
Total	73,955.6	100.00%	48,110.5	100.00%	25,845.1	100.00%

Source: CAL FIRE

Table F-60 City of Sacramento – Geographical Fire Threat Area Extents

Fire Hazard Severity Zone	Total Acres	% of Total Acres	Improved Acres	% of Total Improved Acres	Unimproved Acres	% of Total Unimproved Acres
Very High	0	0.00%	0	0.00%	0	0.00%
High	176.8	0.24%	18.5	0.04%	158.3	0.61%
Moderate	3,043.0	4.11%	459.8	0.96%	2,583.2	9.99%
Low	2,063.1	2.79%	218.7	0.45%	1,844.5	7.14%
No Threat	68,672.6	92.86%	47,413.4	98.55%	21,259.2	82.26%
Total	**73,955.6**	**100.00%**	**48,110.5**	**100.00%**	**25,845.1**	**100.00%**

Source: CAL FIRE

Past Occurrences

There has been no state and one federal disaster declaration due to fire, as shown in Table F-61. It should be noted that this fire disaster was from an explosion in Roseville, and not from an actual wildfire.

Table F-61 Sacramento County – State and Federal Wildfire Disaster Declarations 1950-2020

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

Source: Cal OES, FEMA

According to the City Planning Team, large wildland fires occur approximately every 2-3 years that require a large number of fire resources and affect the adjacent populations. The last large fire occurred on July 4, 2014 that burned approximately 100 acres in the Bushy Lake area adjacent to the Cal Expo Fairgrounds. The fire caused the evacuation of the nearby water park, caused the cancellation of the professional soccer game, and postponed the largest pyrotechnic show in the region. Additionally, the incident drew down fire resources from the entire county and required the request of resources from Cal Fires Amador, El Dorado Ranger Unit to assist in mitigation.

Since 2016, the City has been indirectly affected by two wildfires. Neither burned property within the City, but air quality issues were felt by City residents.

- The City noted that on November 10, 2018, wildfires in the region caused smoke issues in the City from the Camp Fire in Butte County. The Sacramento City Office of Emergency Management routed a resource request through the County to CalOES to received 260,000 N95 masks to distribute to essential workers, the public, and unhoused persons who were impacted by the unhealthy Air Quality Index. Sacramento Fire educated and distributed the masks to employees and the community.
- On August 22, 2020, the North Complex Fire caused smoke issues in the City. County Public Health issues recommendations for public to remain indoors. This impacted businesses and unhoused persons. N95 masks were distributed in the City during this event.

Vulnerability to and Impacts from Wildfire

Fuel loads in the County and Cities, along with geographical and topographical features, 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 sometimes catastrophic fires. The more urbanized areas within the County are not immune from fire. The dry vegetation and hot and sometimes windy weather, combined with continued growth in the WUI areas, 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 City, especially in these interface areas, the risk and vulnerability to wildfires will likely increase.

Sacramento is not immune to numerous types of grass and brush fires and any one of them may accelerate into an urban interface wildfire. Such a situation could lead to evacuation of large portions of the population and the potential for significant loss of personal property, structures, and rangeland. The natural fuels

available in or near the City vary greatly in the rate and intensity of burning. Fires in heavy brush and stands of trees burn with great intensity but more slowly than in dry grass and leaves. Dense fuels will propagate fire better than sparse fuels. In the City, this occurs generally along the America River Parkway from Watt Avenue to the Sacramento River and along the Garden Highway in the Natomas area.

Potential impacts from wildfire include loss of life and injuries; damage to structures and other improvements, natural and cultural resources, croplands, and timber; and loss of recreational opportunities. Wildfires can cause short-term and long-term disruption to the City. Fires can have devastating effects on watersheds through loss of vegetation and soil erosion, which may impact the City 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 City; smoke and air pollution from wildfires can be a severe health hazard.

Although the physical damages and casualties arising from wildland-urban interface 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 a PSPS 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. In addition, catastrophic wildfire can create favorable conditions for other hazards such as flooding, landslides, and erosion during the rainy season.

Assets at Risk

Based on the vulnerability of Sacramento to the wildfire hazard, the sections that follow describes significant assets at risk in the City of Sacramento. This section includes the values at risk, population at risk, and critical facilities at risk.

Values at Risk in Fire Hazard Severity Zones

GIS was used to determine the possible impacts of wildfire within the City of Sacramento. The methodology described in Section 4.3.19 of the Base Plan was followed in determining structures and values at risk in fire hazard severity zones. Summary analysis results for Sacramento are shown in Table F-62, which summarizes total parcel counts, improved parcel counts and their structure values by fire hazard severity zone.

Table F-62 City of Sacramento – Count and Value of Parcels by Fire Hazard Severity Zone

Fire Hazard Severity Zone	Total Parcel Count	Improved Parcel Count	Total Land Value	Improved Structure Value	Estimated Contents Value	Total Value
Moderate	3,966	3,052	$476,852,476	$1,381,070,910	$948,198,494	$2,806,121,933

Fire Hazard Severity Zone	Total Parcel Count	Improved Parcel Count	Total Land Value	Improved Structure Value	Estimated Contents Value	Total Value
Non-Wildland/Non-Urban	5,208	3,798	$766,099,910	$1,882,990,400	$1,136,701,772	$3,785,792,130
Urban Unzoned	146,416	136,046	$15,089,069,899	$40,129,374,461	$26,994,730,553	$82,213,175,523
City of Sacramento Total	**155,590**	**142,896**	**$16,332,022,285**	**$43,393,435,771**	**$29,079,630,819**	**$88,805,089,586**

Source: Sacramento County 2020 Parcel/Assessor's Data, CAL FIRE

Table F-63 breaks out the Table F-62 by adding the property use details by fire hazard severity zone for the City. As shown in both of these tables, the City has no properties in the very high or high fire hazard severity zone.

Table F-63 City of Sacramento – Count and Value of Parcels by Fire Hazard Severity Zone and Property Use

Fire Hazard Severity Zone / Property Use	Total Parcel Count	Improved Parcel Count	Total Land Value	Improved Structure Value	Estimated Contents Value	Total Value
Moderate						
Agricultural	4	1	$343,359	$457,776	$457,776	$1,258,911
Care/Health	5	4	$7,819,964	$23,969,017	$23,969,017	$55,757,998
Church/Welfare	6	4	$2,767,584	$28,242,377	$28,242,377	$59,252,338
Industrial	112	101	$36,055,709	$121,095,875	$181,643,815	$338,795,400
Miscellaneous	234	0	$318,525	$0	$0	$318,525
Office	33	31	$54,614,941	$110,594,561	$110,594,561	$275,804,063
Public/Utilities	20	0	$865,251	$0	$0	$865,251
Recreational	1	0	$0	$0	$0	$0
Residential	3,016	2,846	$268,109,138	$978,535,308	$489,267,610	$1,735,912,108
Retail / Commercial	53	51	$41,175,104	$114,023,338	$114,023,338	$269,221,780
Unknown	0	0	$0	$0	$0	$0
Vacant	482	14	$64,782,901	$4,152,658		$68,935,559
Moderate Total	**3,966**	**3,052**	**$476,852,476**	**$1,381,070,910**	**$948,198,494**	**$2,806,121,933**
Non-Wildland/Non-Urban						
Agricultural	5	1	$3,414,468	$165,516	$165,516	$3,745,500
Care/Health	1	1	$4,473,720	$31,867,452	$31,867,452	$68,208,624
Church/Welfare	0	0	$0	$0	$0	$0
Industrial	1	1	$2,398,330	$6,621,937	$9,932,906	$18,953,172
Miscellaneous	194	0	$518,095	$0	$0	$518,095

Fire Hazard Severity Zone / Property Use	Total Parcel Count	Improved Parcel Count	Total Land Value	Improved Structure Value	Estimated Contents Value	Total Value
Office	72	67	$19,194,876	$92,074,975	$92,074,975	$203,344,826
Public/Utilities	8	0	$9	$0	$0	$9
Recreational	7	1	$1,623,678	$5,412,160	$5,412,160	$12,447,998
Residential	4,237	3,693	$426,841,526	$1,498,996,058	$749,498,003	$2,675,335,636
Retail / Commercial	32	32	$76,283,580	$247,750,760	$247,750,760	$571,785,100
Unknown	0	0	$0	$0	$0	$0
Vacant	651	2	$231,351,628	$101,542	$0	$231,453,170
Non-Wildland/Non-Urban Total	**5,208**	**3,798**	**$766,099,910**	**$1,882,990,400**	**$1,136,701,772**	**$3,785,792,130**
Urban Unzoned						
Agricultural	5	0	$8,477	$0	$0	$8,477
Care/Health	152	127	$89,692,526	$1,595,069,973	$1,595,069,973	$3,279,832,472
Church/Welfare	533	436	$108,028,517	$519,675,544	$519,675,544	$1,147,379,605
Industrial	1,921	1,718	$677,319,857	$2,109,784,334	$3,164,676,492	$5,951,780,696
Miscellaneous	2,637	9	$2,935,988	$320,049	$320,049	$3,576,086
Office	1,691	1,354	$1,120,667,843	$4,860,966,374	$4,860,966,374	$10,842,600,591
Public/Utilities	740	1	$844,388	$31,233	$31,233	$906,854
Recreational	131	79	$89,391,284	$466,831,891	$466,831,891	$1,023,055,066
Residential	131,418	129,890	$11,155,089,164	$28,311,263,746	$14,155,631,491	$53,621,984,998
Retail / Commercial	2,858	2,258	$1,223,665,912	$2,231,527,506	$2,231,527,506	$5,686,720,924
Unknown	2	1	$0	$86,693	$0	$86,693
Vacant	4,328	173	$621,425,943	$33,817,118	$0	$655,243,061
Urban Unzoned Total	**146,416**	**136,046**	**$15,089,069,899**	**$40,129,374,461**	**$26,994,730,553**	**$82,213,175,523**
City of Sacramento Total	**155,590**	**142,896**	**$16,332,022,285**	**$43,393,435,771**	**$29,079,630,819**	**$88,805,089,586**

Source: Sacramento County 2020 Parcel/Assessor's Data, CAL FIRE

Values at Risk in Fire Threat Areas

GIS was used to determine the possible impacts of wildfire within the City of Sacramento. The methodology described in Section 4.3.19 of the Base Plan was followed in determining structures and values at risk in fire threat area. Summary analysis results for Sacramento are shown in Table F-64, which summarizes total parcel counts, improved parcel counts and their structure values by fire threat area. Table F-65 breaks out the Table F-64 by adding the property use details by threat areas for the City.

Table F-64 City of Sacramento – Count and Value of Parcels by Fire Threat Area

Fire Threat Class	Total Parcel Count	Improved Parcel Count	Total Land Value	Improved Structure Value	Estimated Contents Value	Total Value
Very High	0	0	$0	$0	$0	$0
High	109	67	$15,788,630	$38,303,420	$28,104,152	$82,196,206
Moderate	820	354	$142,451,051	$214,897,344	$149,835,830	$507,184,233
Low	693	245	$74,272,287	$129,795,580	$80,617,834	$284,685,707
No Threat	153,968	142,230	$16,099,510,317	$43,010,439,427	$28,821,073,003	$87,931,023,440
City of Sacramento Total	**155,590**	**142,896**	**$16,332,022,285**	**$43,393,435,771**	**$29,079,630,819**	**$88,805,089,586**

Source: Sacramento County 2020 Parcel/Assessor's Data, CAL FIRE

Table F-65 City of Sacramento – Count and Value of Parcels by Fire Threat Area and Property Use

Fire Threat Class / Property Use	Total Parcel Count	Improved Parcel Count	Total Land Value	Improved Structure Value	Estimated Contents Value	Total Value
High						
Agricultural	0	0	$0	$0	$0	$0
Care/Health	1	1	$3,080,974	$17,467,737	$17,467,737	$38,016,448
Church/Welfare	0	0	$0	$0	$0	$0
Industrial	1	1	$274,617	$218,572	$327,858	$821,047
Miscellaneous	25	0	$159	$0	$0	$159
Office	0	0	$0	$0	$0	$0
Public/Utilities	3	0	$0	$0	$0	$0
Recreational	0	0	$0	$0	$0	$0
Residential	69	65	$12,095,119	$20,617,111	$10,308,557	$43,020,791
Retail/ Commercial	0	0	$0	$0	$0	$0
Unknown	0	0	$0	$0	$0	$0
Vacant	10	0	$337,761	$0	$0	$337,761
High Total	**109**	**67**	**$15,788,630**	**$38,303,420**	**$28,104,152**	**$82,196,206**
Moderate						
Agricultural	1	0	$9	$0	$0	$9
Care/Health	2	1	$5,061,341	$980,000	$980,000	$7,021,341
Church/Welfare	3	2	$2,156,602	$21,959,741	$21,959,741	$46,076,084
Industrial	7	6	$5,992,597	$12,597,016	$18,895,524	$37,485,137
Miscellaneous	170	0	$24,502	$0	$0	$24,502
Office	4	3	$28,443,746	$20,508,772	$20,508,772	$69,461,290

Fire Threat Class / Property Use	Total Parcel Count	Improved Parcel Count	Total Land Value	Improved Structure Value	Estimated Contents Value	Total Value
Public/Utilities	16	0	$19	$0	$0	$19
Recreational	2	0	$8,936	$0	$0	$8,936
Residential	365	335	$55,522,564	$141,614,769	$70,807,377	$267,944,718
Retail/ Commercial	6	4	$8,144,494	$16,684,416	$16,684,416	$41,513,326
Unknown	0	0	$0	$0	$0	$0
Vacant	244	3	$37,096,241	$552,630	$0	$37,648,871
Moderate Total	**820**	**354**	**$142,451,051**	**$214,897,344**	**$149,835,830**	**$507,184,233**
Low						
Agricultural	1	0	$1,888	$0	$0	$1,888
Care/Health	0	0	$0	$0	$0	$0
Church/Welfare	0	0	$0	$0	$0	$0
Industrial	0	0	$0	$0	$0	$0
Miscellaneous	183	0	$113,405	$0	$0	$113,405
Office	7	6	$1,821,049	$6,055,146	$6,055,146	$13,931,341
Public/Utilities	10	0	$0	$0	$0	$0
Recreational	1	1	$171,367	$5,335	$5,335	$182,037
Residential	248	231	$39,925,423	$98,160,494	$49,080,247	$187,166,170
Retail/ Commercial	5	5	$3,063,256	$25,477,106	$25,477,106	$54,017,468
Unknown	0	0	$0	$0	$0	$0
Vacant	238	2	$29,175,899	$97,499	$0	$29,273,398
Low Total	**693**	**245**	**$74,272,287**	**$129,795,580**	**$80,617,834**	**$284,685,707**
No Threat						
Agricultural	12	2	$3,764,407	$623,292	$623,292	$5,010,991
Care/Health	155	130	$93,843,895	$1,632,458,705	$1,632,458,705	$3,358,761,305
Church/Welfare	536	438	$108,639,499	$525,958,180	$525,958,180	$1,160,555,859
Industrial	2,026	1,813	$709,506,682	$2,224,686,558	$3,337,029,831	$6,271,223,084
Miscellaneous	2,687	9	$3,634,542	$320,049	$320,049	$4,274,640
Office	1,785	1,443	$1,164,212,865	$5,037,071,992	$5,037,071,992	$11,238,356,849
Public/Utilities	739	1	$1,709,629	$31,233	$31,233	$1,772,095
Recreational	136	79	$90,834,659	$472,238,716	$472,238,716	$1,035,312,091
Residential	137,989	135,798	$11,742,496,722	$30,528,402,738	$15,264,200,923	$57,535,101,063
Retail/ Commercial	2,932	2,332	$1,329,916,846	$2,551,140,082	$2,551,140,082	$6,432,197,010
Unknown	2	1	$0	$86,693	$0	$86,693
Vacant	4,969	184	$850,950,571	$37,421,189	$0	$888,371,760

Fire Threat Class / Property Use	Total Parcel Count	Improved Parcel Count	Total Land Value	Improved Structure Value	Estimated Contents Value	Total Value
No Threat Total	**153,968**	**142,230**	**$16,099,510,317**	**$43,010,439,427**	**$28,821,073,003**	**$87,931,023,440**
City of Sacramento Total	**155,590**	**142,896**	**$16,332,022,285**	**$43,393,435,771**	**$29,079,630,819**	**$88,805,089,586**

Source: Sacramento County 2020 Parcel/Assessor's Data, CAL FIRE

Population at Risk

The FHSZ dataset was overlayed on the parcel layer. Those residential parcel centroids that intersect the FHSZs were counted and multiplied by the 2010 Census Bureau average household factors for the City of Sacramento – 2.76. According to this analysis, there is a total population of 7,570 residents of Sacramento at risk to moderate or higher FHSZs, while there is a total of 1,064 in the moderate or higher fire threat areas. This is shown in Table F-66 and Table F-67, respectively.

Table F-66 City of Sacramento – Count of Improved Residential Parcels and Population by Fire Hazard Severity Zone

Jurisdiction	Very High		High		Moderate	
	Improved Residential Parcels	Population at Risk	Improved Residential Parcels	Population at Risk	Improved Residential Parcels	Population at Risk
City of Sacramento	0	0	0	0	2,846	7,570

Source: CAL FIRE, US Census Bureau Average Household Sizes: Sacramento City (2.76)

Table F-67 City of Sacramento – Count of Improved Residential Parcels and Population by Fire Threat Area

Jurisdiction	Very High		High		Moderate	
	Improved Residential Parcels	Population at Risk	Improved Residential Parcels	Population at Risk	Improved Residential Parcels	Population at Risk
City of Sacramento	0	0	65	173	335	891

Source: CAL FIRE, US Census Bureau Average Household Sizes: Sacramento City (2.76)

Critical Facilities at Risk

An analysis was performed on the critical facility inventory in Sacramento in identified FHSZs. Critical facilities in a FHSZ in the City of Sacramento are shown in Figure F-47 and detailed in Table F-68. Critical facilities in a fire threat area in the City of Sacramento are shown in Figure F-48 and detailed in Table F-69. Details of critical facility definition, type, name and address and jurisdiction by fire hazard severity zone are listed in Appendix F.

Figure F-47 City of Sacramento – Critical Facilities in Fire Hazard Severity Zones

Table F-68 City of Sacramento – Critical Facilities by Fire Hazard Severity Zone

Source: CAL FIRE, Sacramento County

Figure F-48 City of Sacramento – Critical Facilities in Fire Threat Areas

Table F-69 City of Sacramento – Critical Facilities by Fire Threat Areas

Source: CAL FIRE, Sacramento County

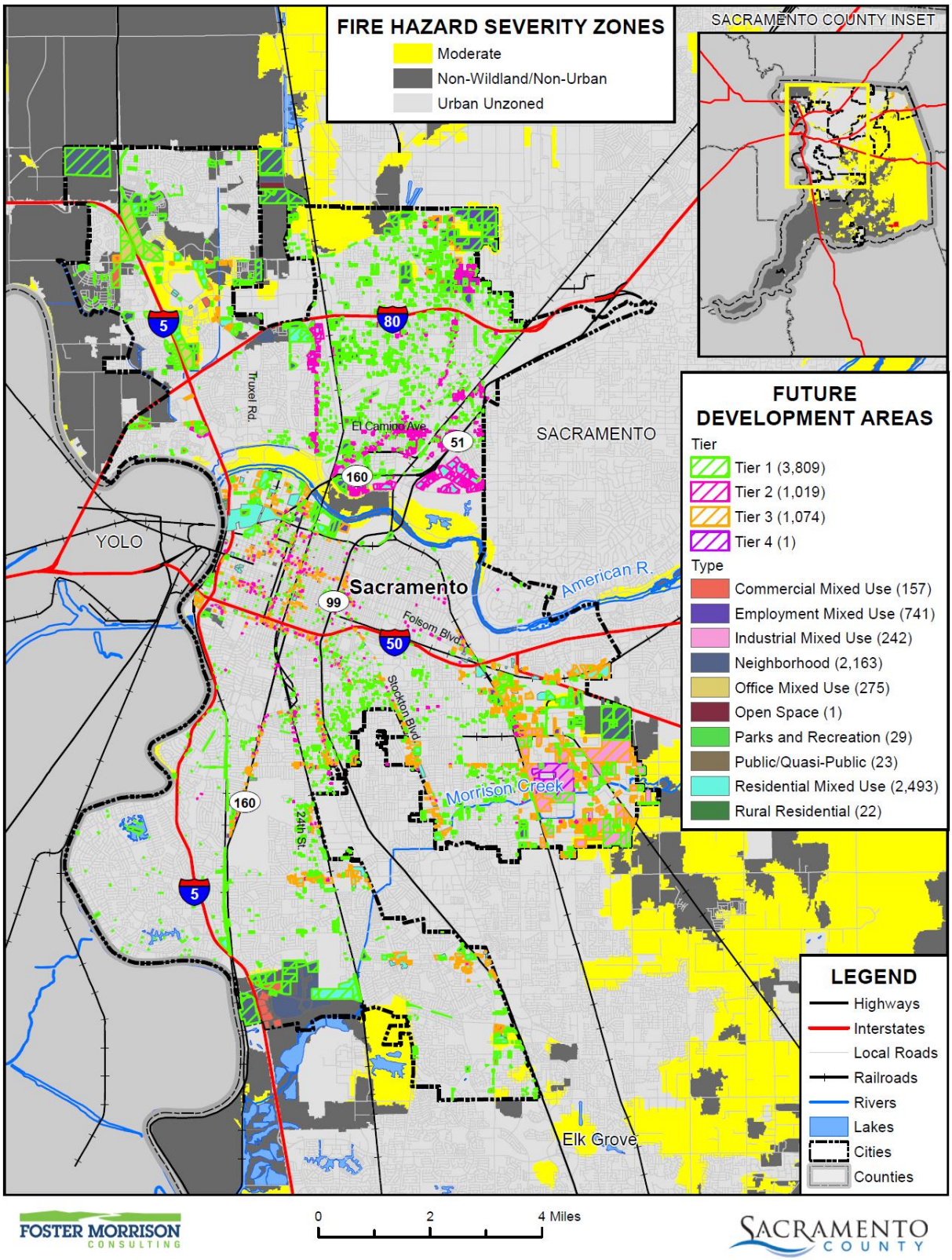
Future Development

Additional growth and development within moderate or higher fire hazard severity zones in the City would place additional values at risk to wildfire. City building codes are in effect and should continue to be updated as appropriate to reduce this risk. Most the City's wildfire hazard area is owned by the State of California or Sacramento County and is preserved as a natural habitat.

GIS Analysis

The City provided future development areas were used as the basis for the inventory of future development areas for the City. Using the GIS parcel spatial file for each of these areas, the areas and parcels associated with future development projects for which the analysis was to be performed were identified. Utilizing the future development project spatial layer, the parcel centroid data was intersected to determine the parcel counts within each area. Figure F-49 shows the locations of future development areas the City is planning to develop on the FHSZs. Table F-70 shows the parcels and acreages of each future development area by tier and type in the City in each FHSZ. Figure F-50shows the locations of future development areas the City is planning to develop on the Fire Threat Area. Table F-71 shows the parcels and acreages of each future development area by tier and type in the City in each Fire Threat Area.

Figure F-49 City of Sacramento - Future Development and FHSZs



Data Source: Cal-Fire 2017 (Draft 9/2007 - c34fhszl06_1, Adopted 11/2007 - fhsz06_3_34, Recommended 10/2008 - c34fhszl06_3), Sacramento County GIS, Cal-Atlas; Map Date: 05/2021.

Table F-70 City of Sacramento – Future Development and FHSZs by Tier and Type

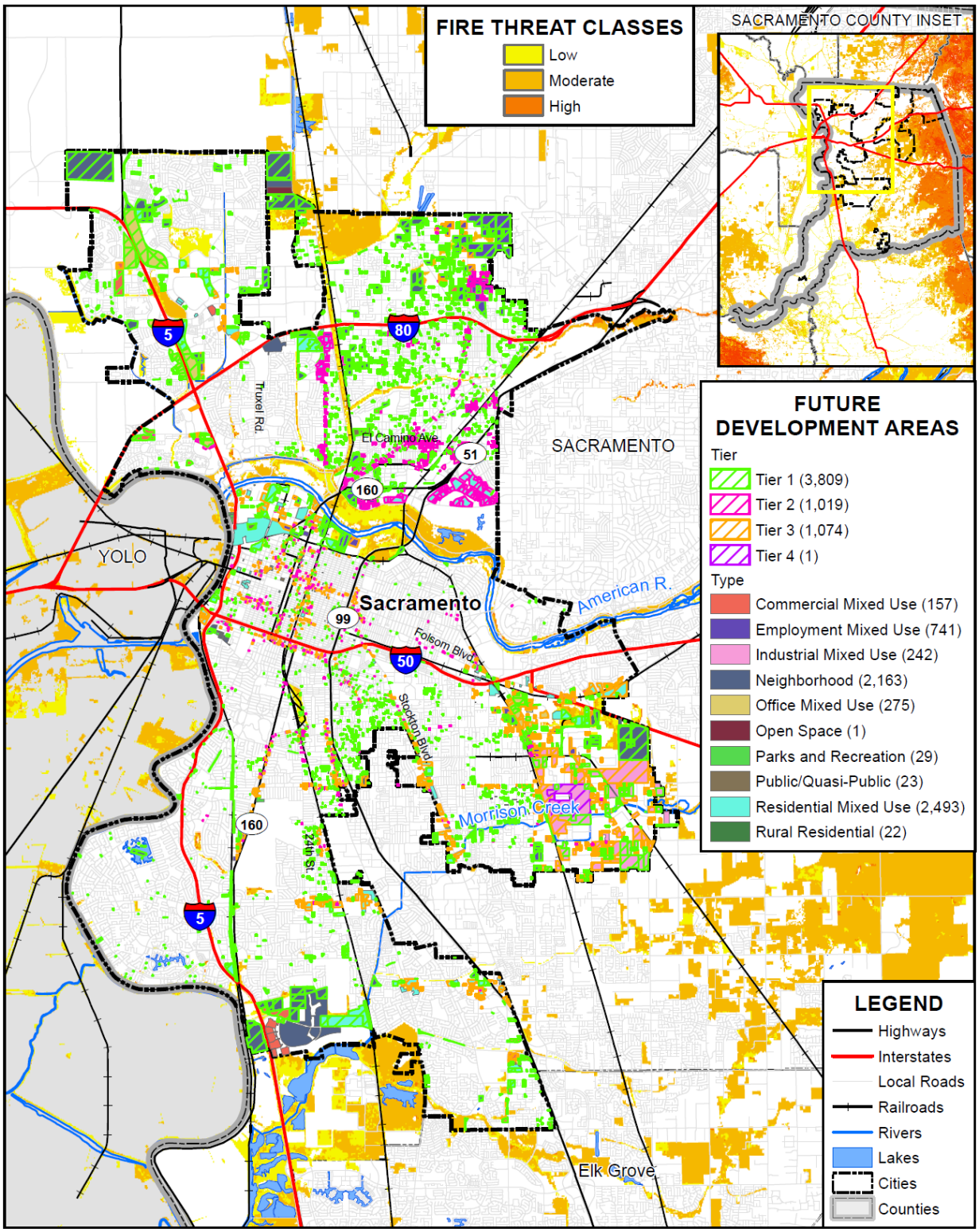
Fire Hazard Severity Zone / Future Development Tier / Type	Total Parcel Count	Improved Parcel Count	Total Acres
Moderate			
Tier 1			
Commercial Mixed Use	24	0	19.33
Employment Mixed Use	26	0	287.09
Industrial Mixed Use	16	3	121.24
Neighborhood	112	9	249.24
Office Mixed Use	136	5	23.18
Parks and Recreation	1	0	1.70
Public/Quasi-Public	3	0	15.78
Residential Mixed Use	23	1	158.42
Rural Residential	13	1	14.89
Tier 1 Total	**354**	**19**	**890.87**
Tier 2			
Employment Mixed Use	3	3	4.06
Residential Mixed Use	2	2	6.18
Tier 2 Total	**5**	**5**	**10.24**
Tier 3			
Commercial Mixed Use	5	5	2.99
Employment Mixed Use	11	11	34.29
Industrial Mixed Use	17	13	48.41
Neighborhood	1	1	3.53
Residential Mixed Use	7	7	9.16
Tier 3 Total	**41**	**37**	**98.38**
(blank)			
Commercial Mixed Use	2	2	11.33
Industrial Mixed Use	2	1	17.66
Neighborhood	1	0	33.92
Open Space	1	0	34.76
Residential Mixed Use	1	0	8.01
(blank) Total	**7**	**3**	**105.68**
Moderate Total	**407**	**64**	**1,105.17**
Non-Wildland/Non-Urban			
Tier 1			
Commercial Mixed Use	10	0	85.36

Fire Hazard Severity Zone / Future Development Tier / Type	Total Parcel Count	Improved Parcel Count	Total Acres
Employment Mixed Use	4	0	28.16
Neighborhood	242	179	795.12
Office Mixed Use	19	0	273.56
Residential Mixed Use	4	0	101.02
Rural Residential	1	0	0.42
Tier 1 Total	**280**	**179**	**1,283.63**
Tier 3			
Commercial Mixed Use	1	1	7.66
Employment Mixed Use	12	11	11.26
Tier 3 Total	**13**	**12**	**18.91**
(blank)			
Commercial Mixed Use	7	6	70.72
Neighborhood	1	0	254.72
(blank) Total	**8**	**6**	**325.44**
Non-Wildland/Non-Urban Total	**301**	**197**	**1,627.99**
Urban Unzoned			
Tier 1			
Commercial Mixed Use	64	7	87.38
Employment Mixed Use	364	12	488.84
Industrial Mixed Use	78	8	231.23
Neighborhood	1,700	216	786.70
Office Mixed Use	56	4	160.74
Parks and Recreation	20	0	65.40
Public/Quasi-Public	19	0	47.09
Residential Mixed Use	866	38	507.76
Rural Residential	8	1	6.75
Tier 1 Total	**3,175**	**286**	**2,381.91**
Tier 2			
Commercial Mixed Use	35	31	10.99
Employment Mixed Use	206	148	174.29
Industrial Mixed Use	5	3	1.04
Neighborhood	57	44	15.74
Office Mixed Use	21	18	24.09
Residential Mixed Use	690	560	468.61
Tier 2 Total	**1,014**	**804**	**694.76**

Fire Hazard Severity Zone / Future Development Tier / Type	Total Parcel Count	Improved Parcel Count	Total Acres
Tier 3			
Commercial Mixed Use	9	9	13.39
Employment Mixed Use	111	106	213.09
Industrial Mixed Use	120	109	627.14
Neighborhood	5	5	23.53
Office Mixed Use	41	39	74.20
Residential Mixed Use	734	697	535.02
Tier 3 Total	**1,020**	**965**	**1,486.36**
Tier 4			
Industrial Mixed Use	1	1	207.23
Tier 4 Total	**1**	**1**	**207.23**
(blank)			
Employment Mixed Use	4	4	8.91
Industrial Mixed Use	3	3	34.22
Neighborhood	44	28	73.81
Office Mixed Use	2		5.63
Parks and Recreation	8	3	13.14
Public/Quasi-Public	1		1.97
Residential Mixed Use	166	93	358.49
(blank) Total	**228**	**131**	**496.16**
Urban Unzoned Total	**5,438**	**2,187**	**5,266.41**
Grand Total	**6,146**	**2,448**	**7,999.58**

Source: CAL FIRE, City of Sacramento GIS

Figure F-50 City of Sacramento - Future Development and Fire Threat Areas



Data Source: Cal-Fire 2017 Fire Threat Data (fthrt14_2), Sacramento County GIS, Cal-Atlas; Map Date: 05/2021.

Table F-71 City of Sacramento – Future Development and Fire Threat Areas by Tier and Type

Fire Threat / Future Development Tier / Type	Total Parcel Count	Improved Parcel Count	Total Acres
High			
Tier 1			
Employment Mixed Use	2		9.44
Neighborhood	4		1.81
Parks and Recreation	1		5.56
Tier 1 Total	**7**		**16.81**
Tier 2			
Employment Mixed Use	1	1	1.46
Tier 2 Total	**1**	**1**	**1.46**
High Total	**8**	**1**	**18.27**
Low			
Tier 1			
Commercial Mixed Use	2	0	5.29
Employment Mixed Use	12	0	51.10
Neighborhood	28	4	136.17
Office Mixed Use	5	0	10.37
Parks and Recreation	1	0	1.70
Residential Mixed Use	12	0	96.94
Tier 1 Total	**60**	**4**	**301.57**
(blank)			
Residential Mixed Use	1	0	13.36
(blank) Total	**1**	**0**	**13.36**
Low Total	**61**	**4**	**314.93**
Moderate			
Tier 1			
Commercial Mixed Use	8	0	14.80
Employment Mixed Use	36	0	186.17
Industrial Mixed Use	4	0	24.65
Neighborhood	23	2	192.25
Office Mixed Use	7	0	2.90
Public/Quasi-Public	1	0	7.92
Residential Mixed Use	16	0	68.68
Rural Residential	2	0	4.38
Tier 1 Total	**97**	**2**	**501.77**
Tier 3			

Fire Threat / Future Development Tier / Type	Total Parcel Count	Improved Parcel Count	Total Acres
Commercial Mixed Use	1	1	0.62
Industrial Mixed Use	1	1	44.11
Neighborhood	1	1	12.85
Tier 3 Total	**3**	**3**	**57.58**
(blank)			
Commercial Mixed Use	1	1	0.92
Industrial Mixed Use	2	2	26.22
Open Space	1		34.76
Residential Mixed Use	2		12.25
(blank) Total	**6**	**3**	**74.15**
Moderate Total	**106**	**8**	**633.50**
No Threat			
Tier 1			
Commercial Mixed Use	88	7	171.98
Employment Mixed Use	344	12	557.39
Industrial Mixed Use	90	11	327.82
Neighborhood	1,999	398	1,500.82
Office Mixed Use	199	9	444.20
Parks and Recreation	19		59.84
Public/Quasi-Public	21		54.95
Residential Mixed Use	865	39	601.57
Rural Residential	20	2	17.68
Tier 1 Total	**3,645**	**478**	**3,736.26**
Tier 2			
Commercial Mixed Use	35	31	10.99
Employment Mixed Use	208	150	176.89
Industrial Mixed Use	5	3	1.04
Neighborhood	57	44	15.74
Office Mixed Use	21	18	24.09
Residential Mixed Use	692	562	474.79
Tier 2 Total	**1,018**	**808**	**703.54**
Tier 3			
Commercial Mixed Use	14	14	23.41
Employment Mixed Use	134	128	258.64
Industrial Mixed Use	136	121	631.43
Neighborhood	5	5	14.21

Fire Threat / Future Development Tier / Type	Total Parcel Count	Improved Parcel Count	Total Acres
Office Mixed Use	41	39	74.20
Residential Mixed Use	741	704	544.18
Tier 3 Total	**1,071**	**1,011**	**1,546.08**
Tier 4			
Industrial Mixed Use	1	1	207.23
Tier 4 Total	**1**	**1**	**207.23**
(blank)			
Commercial Mixed Use	8	7	81.13
Employment Mixed Use	4	4	8.91
Industrial Mixed Use	3	2	25.66
Neighborhood	46	28	362.45
Office Mixed Use	2		5.63
Parks and Recreation	8	3	13.14
Public/Quasi-Public	1		1.97
Residential Mixed Use	164	93	340.89
(blank) Total	**236**	**137**	**839.76**
No Threat Total	**5,971**	**2,435**	**7,032.87**
Grand Total	**6,146**	**2,448**	**7,999.58**

Source: CAL FIRE, City of Sacramento GIS

F.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.

F.6.1. Regulatory Mitigation Capabilities

Table F-72 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 City of Sacramento.

Table F-72 City of Sacramento 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 2015	The General Plan identifies hazards within the City. Identified mitigation actions can be implemented from this document.
Capital Improvements Plan	Y 2021-2026	The Capital Improvement Program is a five-year expenditure plan which provides the City with a financial plan for the funding of infrastructure and facility projects. The program identifies projects to address the City's natural hazards.
Economic Development Plan	N	
Local Emergency Operations Plan	Y 2018	This plan addresses potential hazards that face the community. Mitigation projects are not identified.
Continuity of Operations Plan	Y	Essential functions of City staff, relocation strategies, recover and reconstruction strategies have been developed in the event of a disaster. Does not identify mitigation strategies.
Transportation Plan	Y	This City's transportation plan is incorporated into the 2035 General Plan, Mobility. This portion of the plan identifies mitigation goal for greenhouse gases related to extreme weather hazards.
Stormwater Management Plan/Program	Y	This program regulates future and current stormwater standards to protect the City against high priority hazards, such as, flooding and severe storms.
Engineering Studies for Streams	Y	Many of the studies exam the impacts of a 100-year and 200-year storm. At times the studies provide mitigation options for flooding issues.
Community Wildfire Protection Plan	N	
Other special plans (e.g., brownfields redevelopment, disaster recovery, coastal zone management, climate change adaptation)	Y	The City has prepared the 2035 General Plan as a qualified plan for the reduction of greenhouse gas emissions. Therefore, the General Plan serves as the City's Climate Action Plan. City Pre-Disaster Recovery Plan was completed in 2019. This plan guides decisions that affect the City's short, intermediate, and long-term recovery after a disaster.
Building Code, Permitting, and Inspections	**Y/N**	**Are codes adequately enforced?**
Building Code	Y	Version/Year: 2019 The Building Code is adequately enforced.
Building Code Effectiveness Grading Schedule (BCEGS) Score	Y	Score: 2/2 The Building Code is adequately enforced.
Fire department ISO rating:	Y	Rating: 2 (within city limits), 3 (in contract areas – Natomas and Fruitridge Pacific) The fire protection codes is adequately enforced.
Site plan review requirements	Y	Site plan review requirements are adequately enforced.

Land Use Planning and Ordinances	Y/N	Is the ordinance an effective measure for reducing hazard impacts? Is the ordinance adequately administered and enforced?
Zoning ordinance	Y	Yes, the ordinance is an effective measure for reducing hazard impacts and is adequately administered and enforced.
Subdivision ordinance	Y	Yes, the ordinance is an effective measure for reducing hazard impacts and is adequately administered and enforced.
Floodplain ordinance	Y	Yes, the ordinance is an effective measure for reducing hazard impacts and is adequately administered and enforced.
Natural hazard specific ordinance (stormwater, steep slope, wildfire)	Y	2008 American River Parkway Plan is an effective measure for reducing hazard impacts and is adequately administered and enforced.
Flood insurance rate maps	Y	This plan presents a set of strategies that will achieve a community-wide greenhouse gas reduction goal.
Elevation Certificates	Y	Yes, the FIRMs are an effective measure for reducing hazard impacts and is adequately administered and enforced.
Acquisition of land for open space and public recreation uses	Y	Yes, the Elevation Certificates are an effective measure for reducing hazard impacts and is adequately administered and enforced.
Erosion or sediment control program	Y	When used, acquisition of land is an effective measure for reducing hazard impacts and is adequately administered and enforced.
Other	Y	Yes, the erosion control program for the region is an effective measure for reducing hazard impacts and is adequately administered and enforced.
How can these capabilities be expanded and improved to reduce risk?		
The City continually evaluates the ordinance requirements of FEMA's CRS program. Improvements are made as needed to reduce risk to people and property.		

Source: City of Sacramento

City of Sacramento 2035 General Plan

The City of Sacramento 2035 General Plan serves as a blueprint for future growth and development and provides comprehensive planning for the future. It encompasses what the City currently is and what it intends to be. It provides the general framework to achieve the desired future condition.

The General Plan includes a Public Health and Safety Element that focuses on safety issues to be considered in planning for the present and future development for the City. The General Plan also addresses Environmental Resources which considers climate change and severe weather hazards facing the City. Goals related to mitigation strategies are outlined.

City of Sacramento Urban Water Management Plan (2020 Draft)

An Urban Water Management Plan (UWMP) helps water suppliers assess the availability and reliability of their water supplies and current and projected water use to help ensure reliable water service under different conditions. This water supply planning is especially critical for California currently, as climate change is resulting in changes in rainfall and snowfall which impact water supply availability and development is occurring throughout the State resulting in increased needs for reliable water supplies. The Urban Water

Management Planning Act (Act) requires larger water suppliers that provide water to urban users (whether directly or indirectly) to develop UWMPs every five years. UWMPs evaluate conditions for the next 20 years, so these regular updates ensure continued long-term planning.

Since the City of Sacramento (City) provides water service directly to more than 3,000 connections, it is required to prepare a UWMP.

City of Sacramento Emergency Operations Plan

The City of Sacramento Emergency Operations Plan (EOP) addresses the planned response for the City of Sacramento to emergencies associated with disasters, technological incidents, or other dangerous conditions created by either man or nature. It provides an overview of operational concepts, identifies components of the City emergency management organization, and describes the overall responsibilities of local, state, and federal entities. It addresses the hazards addressed in the previous 2011 City and County of Sacramento Hazard Mitigation Plan.

Sacramento County Warning and Evacuation Procedures

The City of Sacramento in conjunction with Sacramento County and other incorporated communities have a variety of systems and procedures established to protect its residents and visitors to plan for, avoid, and respond to a hazard event including those associated with floods and other natural disasters. This includes Pre-Disaster Public Awareness and Education information which is major component in successfully reducing loss of life and property in a community when faced with a potentially catastrophic incident. Much of this information is not specific to a given hazard event and is always accessible to the public on local City and County websites, while other information is incident-specific. A general overview of specific warning and evacuation systems and procedures are summarized further below.

Monitoring for Alerts, Watches and Warnings

Emergency officials constantly monitor events and the environment to identify specific threats that may affect their jurisdiction and increase awareness levels of emergency personnel and the community when a threat is approaching or imminent.

The National Weather Service (NWS), a part of the U.S. Department of Commerce's National Oceanic and Atmospheric Administration (NOAA), is the prime agency for detecting meteorological threats, such as floods and severe weather. Severe weather warnings are transmitted through NOAA's Weather Radio System, considered by the federal government as the official source for weather information. Federal agencies can only look at the large scale, (e.g., whether conditions are appropriate for the formation of a thunderstorm.) Local emergency managers can provide more site-specific and timely recognition by sending out NWS trained spotters to watch the skies when the Weather Service issues a watch or a warning. The NWS page for Sacramento County and incorporated communities is accessible through the Sacramento County website and at the following: http://forecast.weather.gov/MapClick.php?zoneid=CAZ017

A flood threat recognition system predicts the time and height of a flood crest. This can be done by measuring rainfall, soil moisture, and stream flows upstream of the community and calculating the subsequent flood levels.

On larger rivers, this measuring and calculating is performed by the NWS. Support for NOAA's efforts is provided by cooperating partners from state and local agencies. Forecasts of expected river stages are made through the Advanced Hydrologic Prediction Service (AHPS) of the NWS. Flood threat predictions are disseminated on the NOAA Weather Wire or NOAA Weather Radio.

On smaller rivers, locally established rainfall and river gauges are needed to establish a flood threat recognition system. The NWS may issue a "flash flood watch." This is issued to indicate current or developing hydrologic conditions that are favorable for flash flooding in and close to the watch area, but the occurrence is neither certain nor imminent. These events are so localized and so rapid that a "flash flood warning" may not be issued, especially if no remote threat recognition equipment is available. In the absence of a gauging system on small streams, the best threat recognition system is to have local personnel monitor rainfall and stream conditions. While specific flood crests and times will not be predicted, this approach will provide advance notice of potential local or flash flooding.

The City and County EOPs include procedures for threat identification. The City and County work closely with the NWS for issuing an Emergency Alert System (EAS). Additional threat identification mechanisms include:

California Data Exchange Center (CDEC). The CDEC provides information for flood forecasting information at http://cdec.water.ca.gov/. The CDEC installs, maintains, and operates an extensive hydrologic data collection network including automatic snow reporting gages for the Cooperative Snow Surveys Program and precipitation and river stage sensors for flood forecasting.

Automated Local Evaluation in Real Time (ALERT) System. ALERT was created by the NWS to provide continuous and automatic reports from river levels and rainfall gauges detect impending high water levels. ALERT information includes:

- Rainfall Summary
- Stage Summary
- Storm Ready
- Sandbag Information
- Detailed Forecast
- Quantitative Precipitation Forecasts (QPF)
- NWS River Forecasts

The regional ALERT system consists of 2 base stations, and 50 gaging stations. The purpose of the County's ALERT website is to provide real time monitoring information to stage and rainfall information during storm events, which assist in informing the activation of additional warning and potential evacuation of affected areas. This information which can be accessed through links from the City of Sacramento's website to the Sacramento County website includes information for: Stream Level Summaries and Maps; and Rainfall Summaries and Maps. See https://www.sacflood.org/home.php.

Dam Protocols. Should an event trigger the activation of an Emergency Action Plan (EAP) for a potential dam failure, City and County OES receives this information via direct phone calls from the originating source/agency or from Sacramento County Dispatch and/or Cal OES. City OES then follows the notification and evacuation procedures called for in the EOP.

Notifications and Warning Systems

Once a disaster is imminent, action is taken to control the situation, save lives, protect property, and minimize the effects of the disaster. During this phase, warning systems are activated; resources and first responders notified and mobilized; and evacuations begin.

After a threat recognition system tells the emergency services office that a flood, severe weather or other hazard is coming, the next step is to notify the public and staff of other agencies and critical facilities. Providing adequate and timely notification to the public is the greatest challenge, especially with sudden or no-notice events. The earlier and more specific the warning, the greater the number of people that can implement protection measures.

As previously described, the NWS issues notices to the public using two levels of notification:

- **Watch.** Conditions are right for flooding, thunderstorms, or other hazard event.
- **Warning**. A flood or other event has started or been observed.

In coordination with established public safety warning protocols, the activated EOC will manage the dissemination of timely and adequate warnings to threatened populations in the most direct and effective means possible. Depending upon the threat and time availability, the City and County EOCs will initiate alerts and warnings utilizing any of the following methods:

- Activation of the Emergency Alert System (EAS)
- Activation of the Telephonic Alert and Warning
- System (Everbridge and Reverse 911)
- Activation of the Emergency Digital Information System (EDIS)
- Activation of the California Law Enforcement Mutual Aid Radio System (CLEMARS)
- Media broadcast alerts.
- Commercial or public radio or TV stations
  - ✓ Radio: KFBK 1530 am, KSTE 650, KGBY, 92.5 FM
  - ✓ TV: KCRA Channel 3, www.KCRA.com; KXTV Channel 10; KOVR Channel 13; KTXL Channel 40
- NOAA Weather Radio
- www.saccounty.net; SacramentoReady.org websites
- 211/311 Sacramento
- CalTrans 511
- Telephone trees/mass telephone notifications
- Tone activated receivers in key facilities
- Fire and Law enforcement loudspeakers
- Outdoor warning sirens
- Mobile public address sirens/systems
- Door-to-door contact
- Vulnerable population databases
- Email notifications

Multiple or redundant systems are most effective – if people do not hear one warning, they may still get the message from another part of the system. Just as important as issuing a warning is telling people what to

do in case of an emergency. A warning program should have a public information aspect that details appropriate warnings and responses.

Sacramento ALERT

The City of Sacramento Police Department in partnership with all public safety agencies within Sacramento, Yolo and Placer counties, use a state-of-the-art emergency alert system known as Sacramento Alert. The system provides information to residents about emergency events quickly and through a variety of communication methods.

The alert system currently includes all listed and unlisted landline telephone numbers in Yolo, Placer, and Sacramento counties that are serviced by AT&T and Verizon.

To ensure emergency notices are received quickly both at work and home, residents are encouraged to log onto the Sacramento Alert Self- Registration Portal and provide phone numbers for both home and work, including land and cell phone numbers, email addresses, TTY device information and instant messaging information.

Residents will only receive alerts that are critical and time-sensitive, including: flooding, levee failures, severe weather, disaster events, unexpected road closures, missing persons, and evacuations of buildings or neighborhoods in specific geographic locations.

The system, which uses Everbridge Alert and Notifications System, was made possible for all three counties by a grant from CAL OES and supported by CA Department of Water Resources, Flood Operations Center.

StormReady

The NWS established the StormReady program to help local governments improve the timeliness and effectiveness of hazardous weather related warnings for the public. The City of Sacramento and Sacramento County are StormReady certified. StormReady communities are better prepared to save live from the onslaught of severe weather through advanced planning, education, and awareness. Being designated a StormReady community by the NWS is a good measure of a community's emergency warning program for weather hazards.

Evacuation and Shelter-in-Place

The principle of evacuation is to move citizens from a place of relative danger to a place of relative safety, via a route that does not pose significant danger. There are six key components to a successful evacuation:

- Adequate warning
- Adequate routes
- Proper timing to ensure the routes are clear
- Traffic control
- Knowledgeable travelers
- Care for special populations (e.g., disabled, hospital patients, school children)

Evacuation planning also considers sheltering options for those that cannot get out of harm's way. Shelters can also serve as a temporary place after the storm for those who have lost their homes.

The City maintains an Evacuation Plan that outline strategies and protocols for medium to high-level (catastrophic) evacuation events. These plans also include procedures for sheltering to provide people affected by a disaster with a safe, temporary place to be housed during or immediately after a disaster until they can either return to their homes or be relocated to other housing facilities. Highlights of these City plans are detailed below.

City of Sacramento Evacuation Plan

The Evacuation Plan is an Annex to the City of Sacramento's Emergency Operations Plan. As such its intent is to support and guide the City's Emergency Managers, Emergency Operations Center staff, and other governmental and non-governmental agencies who would be involved with an Evacuation Event in the City. The Evacuation Plan provides evacuation specific strategy and information that is intended to support but not supplant operational strategy as provided in the City's EOP and Departmental operations plans.

The primary threat that would incite the City to begin an evacuation event is a flood. As such, much of the material was written with flood as the primary concern. The overall evacuation strategy and associated plan details, however, would also serve the City in conducting an evacuation due to other hazards and as such the Plan is intended to provide an all-hazards approach.

The plan is organized such that the first five sections provide quick reference materials to support emergency workers. The plan begins with Section 1 – Triggers and Activation, which details the flood threat triggers that would initiate the opening and staffing of the City EOC, and initiate notification, evacuation, and sheltering actions that need to take place as the imminent and substantial threat of a flood increases. Section 2 - Roles, Responsibilities, and Resources is meant to support emergency managers with deciding minimal personnel requirements to complete actions defined in the trigger section, who they should seek to fulfill certain roles, and to provide some general notion of resources likely already available for the situation. The next part, Section 3- Emergency Public Notifications, provides the emergency staff with a brief description of each of the notification systems the City has available to notify the citizenry, along with a How To Activate description. Section 4 – Area Evacuation Control by Police Beats, provides evacuation routes for every area of the City as broken out by the Sacramento Police Department Beat maps. Many critical facilities, schools and shelters in each beat are identified. This information is useful both for supporting evacuations out of an area, and supporting evacuees coming into an area. In Section 5 – Care and Sheltering, the community centers and schools that have been assessed as available and ready to support sheltering of people and their pets, and may be assessable to people with disabilities, are listed with contact information.

Evacuation maps, by police beat, are shown. Flood scenarios are also given, and evacuation routing planned for. An example is shown in Figure F-51.

Figure F-51 Sacramento River Sutter Scenario Evacuation Routes for Beat 1-A

Evacuation Routes: 0-4 Hours
Police Beat 1A

Flood Scenario 1 - Sacramento River - Sutter

Status *PASSABLE STREETS (1)*

	Street	*Direction*	*# of Lanes*	*Comments*
	ARENA BLVD	E/W	4	
(2)	DEL PASO RD	E/W	4	
	EL CENTRO RD	N/S	2	
(2)	ELKHORN BL	E/W	2	
(2)	ELVERTA RD	E/W	2	
(2)	GARDEN HWY	E/W	2	
	N MARKET BLVD	E/W	4	
	NATOMAS BLVD	N/S	4	
(2)	SAN JUAN RD	E/W	2	

Notes:
(1) Streets that are expected to be open for at least the first 4 hours of an event.
(2) Roadways which take evacuees directly out of the flood area.

Source: City of Sacramento Evacuation Plan, 2008

Rescue and Evacuation Maps

These maps show the depth of flooding with a 300-foost levee breach, 100-year storm, and running 10 days straight without mitigation. These maps also show the rescue and evacuation areas. The rescue areas show which areas would have 2' of water within an hour. These maps are available online at: http://mysacramento.org/utilities/flood-ready/city_county_neighborhood_flood_depth_maps.cfm.

More information on the importance of including evacuation procedures and maps as part of a sound mitigation strategy can be found in Appendix C to this plan. In addition, Appendix C contains additional information on post mitigation policies and procedures. More information specific to the City can be found in their various other response and recovery plans.

City of Sacramento Post Disaster Mitigation Policies and Procedure

The City of Sacramento EOP, and related documents, are intended to facilitate multi-agency and multi-jurisdictional coordination during emergencies including hazard events. Through it policies and procedures it seeks to mitigate the effects of hazards, prepare for measures to be taken which will preserve life and minimize damage, enhance response during emergencies and provide necessary assistance, and establish a recovery system in order to return the community to their normal state of affairs.

The goal of the recovery phase of an emergency incident or natural disaster is to return the residents, public services and private sector in an impacted area to their pre-disaster state, and through implementation of hazard mitigation measures, seek to prevent, as much as possible, similar damage, destruction or chaos after incidents and disasters in the future. Sacramento policies include objectives, responsibilities and procedures

for restoration of services and returning of the affected area to its pre-emergency condition. Mitigation is emphasized as a major component of recovery efforts.

Post-disaster recovery activities are designed to protect public health and safety and facilitate recovery. Appropriate measures include:

- Patrolling evacuated areas to prevent looting
- Providing safe drinking water
- Monitoring for diseases
- Vaccinating residents for tetanus and other diseases
- Clearing streets
- Cleaning up debris and garbage

As the initial and sustained operational priorities are met, emergency management officials consider the recovery phase needs. Short-term and long-term recovery is covered in EOP and related documents. Short-term recovery operations begin during the response phase and include rapid debris removal and cleanup and restoration of essential services to minimum operating standards. Long-term recovery operations work to restore the community to pre-disaster conditions and include hazard mitigation activities, restoration and reconstruction of public facilities, and disaster response cost recovery. Local Assistance Centers and/or Disaster Recovery Centers are opened and damages assessed. Elements of recovery include:

- Windshield survey and documentation of flood impacts
- Safety assessment
- Damage assessments
- Engineering assessments
- Post-flood building entry
- High water marks (also risk communication)
- Code enforcement/triage process
- Permitting process
- Temporary housing
- After action reporting

Regulating Reconstruction

Requiring permits for building repairs and conducting inspections are vital activities to ensure that damaged structures are safe for people to reenter and repair. The NFIP requires that local officials enforce the substantial damage regulations. These rules require that if the cost to repair a building in the mapped floodplain equals or exceeds 50% of the building's market value, the building must be retrofitted to meet the standards of a new building in the floodplain. In most cases, this means that a substantially damaged building must be elevated above the base flood elevation.

Mitigation

Mitigation measures to reduce the risk and vulnerability of a community to future disaster losses can be implemented in advance of a disaster event and also as part of post-disaster recovery efforts. Mitigation is the effort to reduce loss of life and property by lessening the impact of disasters. Effective mitigation can break the cycle of disaster damage, reconstruction, and repeated damage. Categories of mitigation measures

include prevention, emergency services, property protection, natural resource protection, structural, and public information, many of which are discussed throughout this document.

Additional mitigation elements specific to the Sacramento area are discussed further below.

LHMP

The Federal Disaster Mitigation Act (DMA) of 2000 requires communities to develop an approved Local Hazard Mitigation Plan (LHMP) to remain eligible to apply for certain FEMA Hazard Mitigation Assistance (HMA) grants. Applications submitted for funding from the FEMA HMA grant programs must "be consistent with" the mitigation strategy outlined in the LHMP. Sacramento County and the City of Sacramento are in process with the update of their 2016 LHMP Update. Once complete and adopted, this LHMP update will provide continued eligibility for all participating jurisdictions for FEMA pre- and post-disaster mitigation funding.

Grant Funding

An understanding of the various funding streams and opportunities will enable the communities to match up identified flood mitigation projects with the grant programs that are most likely to fund them. Additionally, some of the funding opportunities can be utilized together. Mitigation grant funding opportunities available pre- and post- disaster include the following:

- FEMA Hazard Mitigation Assistance (HMA) Grants (Pre-disaster Mitigation (PDM), Flood Mitigation Assistance (FMA), and Hazard Mitigation Grant Program (HMGP))
- FEMA Public Assistance Section 406 Mitigation
- Community Development Block Grants
- Small Business Loans
- Increased Cost of Compliance

Other Key City of Sacramento Emergency Plans

- ✓ Emergency Operations Plan, 2018
- ✓ Pre-Disaster Recovery Plan, 2019
- ✓ Annexes in Process for: Mass Care/Sheltering, Temporary Housing, Human Services
- ✓ Evacuation Plan for Flood and other Emergencies, 2008
- ✓ Continuity of Operations/Continuity of Government, 2009
- ✓ Field Services – Drainage Collection, Standard Operating Procedures (SOPs) for Emergency Response, 2007
- ✓ Utilities Operation Center Plan, 2007
- ✓ Resources and References – Drainage Collection
- ✓ Local Hazard Mitigation Plan, Update 2011, 2016 Update in process

Other Key City Data Related to Education and Communication of Flood Hazard Information

- FEMA DFIRMs and Flood Insurance Studies (FIS)
- DWR BAM maps
- Ultimate flood depths map

- Areas dependent on levees map
- Levee break scenario mapping
- Historical flood information which may include location of nearest high water mark, repetitive loss area, flood photos, and flood calls
- Rescue and evacuation maps
- Community assets inventory: people, structures, infrastructure, critical facilities
- Emergency Action Plans

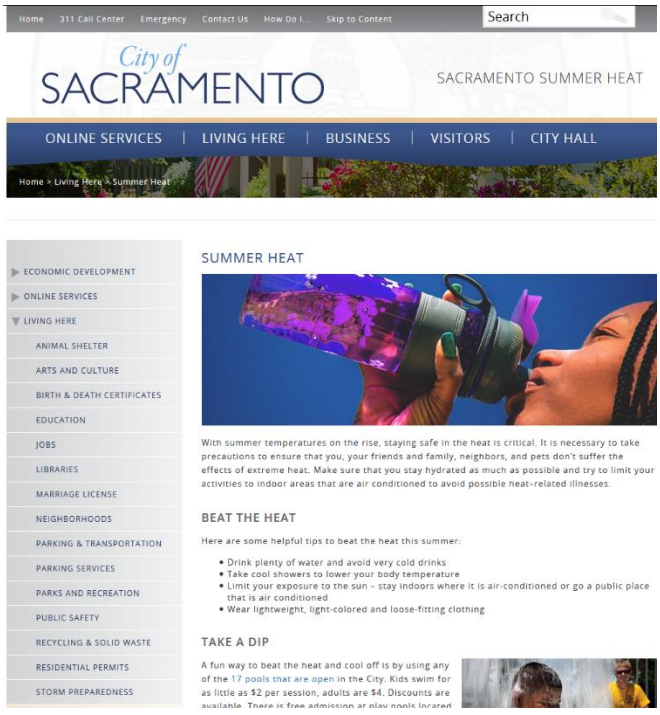
Climate Action Plan

The City's Climate Action Plan (CAP) was adopted in February 2012 pursuant to General Plan Policy ER 6.1.7. The City's CAP presents a set of strategies that will achieve a community-wide greenhouse gas reduction goal. Many of these strategies will have environmental co-benefits including improving air quality.

City of Sacramento Extreme Heat Plan/Cooling Centers

When summer temperatures rise, staying safe in the heat is critical for Sacramento residents. The City publishes information on its website on how to deal with extreme heat.

It is necessary to take precautions to ensure that you, your friends and family, neighbors, and pets don't suffer the effects of extreme heat. Make sure that you stay hydrated as much as possible and try to limit your activities to indoor areas that are air conditioned to avoid possible heat–related illnesses



The City has a cooling center plan. The criteria for opening one includes temperatures of 105 degrees or more for three consecutive days WITH night time low temperatures of 75 or above. If cooling centers are open at faith-based and other community facilities, the list is posted at 211sacramento.org or is available by calling 2-1-1.

The City website notes that a complete list of pools and openings can be found on the City's website.

Ordinances

The City of Sacramento has many ordinances related to mitigation. These ordinances can be primarily or secondarily focused on mitigation.

Ordinances Primarily Focused on Mitigation

Zoning and Land Use Ordinance (Title 17)

This title and its accompanying maps are known as "the comprehensive zoning plan of the City of Sacramento." It is adopted as a further refinement of the land use plan for Sacramento under the provisions of the "Conservation and Planning Law of the State of California." The purpose of these regulations is to do the following:

- Regulate the use of land, buildings, or other structures for residences, commerce, industry, and other uses required by the community;
- Regulate the location, height, and size of buildings or structures, yards, courts, and other open spaces, the amount of building coverage permitted in each zone, and population density, among other things;
- Divide the city into zones of such shape, size, and number best suited to carry out these regulations, and to provide for their enforcement;
- Ensure the provision of adequate open space for recreational, aesthetic and environmental amenities.

These zoning regulations are necessary to:

- Encourage the most appropriate use of land;
- Conserve, stabilize and improve the value of property;
- Provide adequate open space for recreational, aesthetic and environmental amenities;
- Control the distribution of population;
- Promote health, safety and the general welfare.

Subdivision Ordinance (Title 16)

This title is adopted pursuant to Article XI, Section 7 of the California Constitution, and to supplement and implement the Subdivision Map Act, Government Code Section 66410, et seq., and may be cited as the subdivision ordinance of the city. The regulations established by this title are designed to assist in the systematic implementation of the general plan, specific and community plans, the zoning ordinance, and other land use regulations, and to provide for public needs, health and safety, convenience, and general welfare.

Neither the approval nor conditional approval of the tentative map shall constitute or waive compliance with any other applicable provisions of the city code or other applicable ordinances or regulations adopted by the city, nor shall any such approval authorize or be deemed to authorize a violation or failure to comply with other applicable provisions of the city code or other applicable ordinances or regulations adopted by the city. Nothing in these regulations shall be construed to permit the premature or haphazard subdivision of lands in violation of the applicable zoning and land use regulations.

Building Code (Title 15)

The chapters of this title shall be known and referred to as the Sacramento City Building Code, and may be cited as such, and will be referred to as "this code" or "this building code." The purpose of this code is to provide minimum requirements and standards for the protection of the public safety, health, property, and welfare. This code is not intended as a design specification or an instructional manual for untrained persons.

This code shall apply to all new construction and to any alterations, repairs, relocations or reconstruction of a building or any portion thereof including any electrical, mechanical, gas, or plumbing equipment installed on any property or used on or within any building.

As part of the construction permitting process, the City requires completed reports of soil conditions at the specific construction sites to identify potentially unsuitable soil conditions including liquefaction, settlement, subsidence, lateral spreading, and collapse. The City requires that these evaluations be conducted by registered soil professionals, and measures to eliminate inappropriate soil conditions must be applied, depending on the soil conditions. The design of foundation and excavation-wall support must conform to the analysis and implementation criteria described in the CBC, Chapters 16, 18, 33, and the appendix to Chapter 33. Adherence to the CBC and City policies contained in the 2035 General Plan would ensure the maximum practicable protection available for users of buildings and infrastructure and their associated trenches, slopes, and foundations.

Floodplain Management Ordinance (Chapter 15.104)

This chapter is designed to promote the public health, safety, and general welfare, and to minimize public and private losses due to flood conditions in specific areas. This chapter regulates development which is or might be dangerous to health, safety and property by requiring at the time of initial development or substantial improvement methods of protection against flood damage in areas vulnerable to flooding in order to minimize flood damage. This chapter regulates the following developmental impacts: filling, grading or erosion, alteration of natural flood plains, stream channels or water courses, the imposition of barriers which increase flood hazards, or any other impacts that aggravate or cause flood hazards. This ordinance establishes the City's participation in the NFIP, and establishes base flood elevations at 1 foot above the FIRM flood depth for zones A, AH, and AE. In zones AO, the lowest floor will be elevated to one foot above the FIRM flood depth, or two feet above the highest adjacent grade if not depth number is specified.

Since the floodway is an extremely hazardous area due to the velocity of flood waters which carry debris, potential projectiles, and erosion potential, the following provisions apply:

- Prohibit encroachments, including fill, new construction, substantial improvements, and other development unless certification by a registered professional engineer is provided demonstrating that encroachments shall not result in any increase in flood levels during the occurrence of the base flood discharge.
- If the above subsection of this section is satisfied, all new construction and substantial improvements shall comply with all other applicable flood hazard reduction provisions of this section.

The local administrator is empowered to issue a variance only for purposes consistent with the objectives of FEMA's floodplain management regulations. However, a variance could affect flood insurance rates and may result in flood insurance premium rates on structures which are beyond the means of the person receiving the variance. FEMA requires the city to make an annual report on any variance which is granted, and if FEMA determines that such variance is inconsistent with the objectives of sound floodplain management, FEMA may take action to suspend the city from the National Flood Insurance Program.

Weed and Rubbish Abatement Ordinance (Chapter 8.28)

In order to reduce wildfire potential in the City, excess weeds and rubbish must be mitigated. Weed and rubbish abatement in the city is performed pursuant to Title 4, Division 3, Part 2 of the Government Code. This ordinance places the fire chief as the code enforcement director.

Stormwater Management Ordinance (Chapter 13.16)

This chapter is known as the Stormwater Management and Discharge Control Code. The purpose of this chapter is to protect and promote the health, safety and general welfare of the citizens of the City by controlling non-stormwater discharges to the stormwater conveyance system, by eliminating discharges to the stormwater conveyance system from spills, dumping, or disposal of materials other than stormwater, and by reducing pollutants in urban stormwater discharges to the maximum extent practicable. This chapter is intended to assist in the protection and enhancement of the water quality of watercourses, water bodies, and wetlands in a manner pursuant to and consistent with the Federal Water Pollution Control Act, Porter-Cologne Water Quality Control Act, and National Pollutant Discharge Elimination System (NPDES) Permit No. CAS082597, as such permit is amended and/or renewed.

Grading and Erosion and Sediment Control (Chapter 15.88)

The City's grading ordinance is enacted for the purpose of regulating grading on property within the city to safeguard life, limb, health, property and the public welfare; to avoid pollution of watercourses with nutrients, sediments, or other materials generated or caused by surface water runoff from construction sites; to comply with the City's National Pollution Discharge Elimination System (NPDES) Permit No. CAS082597 issued by the California Regional Water Quality Control Board; and to ensure that the graded site within the city limits complies with all applicable City ordinances and regulations. The grading ordinance is intended to control all aspects of grading operations within the city.

Ordinances Secondarily Focused on Mitigation

City of Sacramento Tree Preservation Ordinance

The City of Sacramento adopted the Tree Preservation Ordinance to protect trees as they are a significant resource for the community. It is the City's policy to retain trees whenever possible regardless of their size. When circumstances will not allow for retention, permits are required to remove heritage trees that are within the City's jurisdiction. Removal of, or construction around, trees that are protected by the tree ordinance are subject to permission and inspection by City arborists. The City of Sacramento Tree Service Division reviews project plans and works with the City of Sacramento Public Works during the construction process to minimize impacts to street trees in the city.

Historic Preservation Ordinance

The City of Sacramento's historic preservation program began in 1975 with the enactment of the City's first Historic Preservation Ordinance. The current Historic Preservation Ordinance (No. 2006-063) was enacted in October 2006. The purpose of the Historic Preservation Ordinance is to identify, protect, and encourage the preservation of significant resources; maintain an inventory and ensure the preservation of

these resources; encourage maintenance and rehabilitation of the resources; encourage retention, preservation, and re-use of the resources; safeguard city resources; provide consistency with state and federal regulations; protect and enhance the city's attraction to tourists; foster civic pride in the city's resources; and encourage new development to be aesthetically compatible.

F.6.2. Administrative/Technical Mitigation Capabilities

Table F-73 identifies the City department(s) responsible for activities related to mitigation and loss prevention in Sacramento.

Table F-73 City of Sacramento's Administrative and Technical Mitigation Capabilities

Administration	Y/N	Describe capability Is coordination effective?
Planning Commission	Y	Approves variances, special permits, tentative maps, and development plans
Mitigation Planning Committee	N	
Maintenance programs to reduce risk (e.g., tree trimming, clearing drainage systems)	Y	Department of Utilities', RD1000, and American River Flood Control District, and State of CA maintain the drainage system, pump stations, and levees within the City. Public Works trims trees.
Mutual aid agreements	Y	Mutual aid agreements are maintained, but reside with different departments in the City.
Other	Y	Law and Legislation Committee
Staff	**Y/N FT/PT**	**Is staffing adequate to enforce regulations? Is staff trained on hazards and mitigation? Is coordination between agencies and staff effective?**
Chief Building Official	Y/FT	Staff is adequate and trained. Coordination efforts between agencies.
Floodplain Administrator	Y/FT	Staff is adequate and trained. Coordination efforts between agencies.
Emergency Manager	Y/FT	Staff is adequate and trained. Coordination efforts between agencies.
Community Planner	Y/FT	Staff is adequate and trained. Coordination efforts between agencies.
Civil Engineer	Y/FT	Staff is adequate and trained. Coordination efforts between agencies.
GIS Coordinator	Y/FT	Staff is adequate and trained. Coordination efforts between agencies.
Other		
Technical		
Warning systems/services (Reverse 911, outdoor warning signals)	Y	Sacramento, Yolo, and Placer County oversee an alert system called Everbridge. In addition, the City has outdoor warning signals.
Hazard data and information	Y	Sacramento County Environmental Management runs a hazardous materials program

Grant writing	Y	The City employees grant writers. The Department of Utilities has a grant writer on staff in the Business Services Division.
Hazus analysis	N	Many of the studies performed include Hazus analysis.
Other	Y	River and creeks conditions, water levels, forecasts, etc.
How can these capabilities be expanded and improved to reduce risk?		
The City continually seeks out new grant opportunities to improve and generate new mitigation related activities. The Department of Utility (DOU) Floodplain staff will continue to attend informational meetings to take advantage of any grant opportunities available. DOU Floodplain staff work with a dedicated DOU grant writer.		

Source: City of Sacramento

F.6.3. Fiscal Mitigation Capabilities

Table F-74 identifies financial tools or resources that the City could potentially use to help fund mitigation activities.

Table F-74 City of Sacramento'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	Funding has been used for mitigation action projects. It also can be used for future projects.
Authority to levy taxes for specific purposes	Y	There are special taxes to mitigate hazards (i.e., SAFCA development impact fee and property tax assessment). This method can be used in the future.
Fees for water, sewer, gas, or electric services	Y	Utility bill fees and development review costs are used and can be used in the future.
Impact fees for new development	Y	Development impact fees for certain hazards
Storm water utility fee	Y	
Incur debt through general obligation bonds and/or special tax bonds	Y	
Incur debt through private activities	Y	
Community Development Block Grant	Y	
Other federal funding programs	Y	FEMA, HUD, etc.
State funding programs	Y	DWR, SRF loans, etc.
Other		
How can these capabilities be expanded and improved to reduce risk?		
Future increases in the City's drainage rate will allow for needed improvements to the system. The improvements will reduce the flooding risk.		

Source: City of Sacramento

F.6.4. Mitigation Education, Outreach, and Partnerships

Table F-75 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 F-75 City of Sacramento'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.	Yes	American River Parkway Foundation Certified Emergency Response Teams (CERT)
Ongoing public education or information program (e.g., responsible water use, fire safety, household preparedness, environmental education)	Yes	The City of Sacramento has multiple public education campaigns that promote preparedness and mitigation information. The campaigns include: Stormwater Program Flood Fight Preparedness Event – Highwater Jamboree CRS Program for Public Information (Flood) Fire Suppression Fire Safety
Natural disaster or safety related school programs	No	
StormReady certification	Yes	
Firewise Communities certification	No	
Public-private partnership initiatives addressing disaster-related issues	Yes	
Other		
How can these capabilities be expanded and improved to reduce risk?		
Work with teachers, students, and school administrators to develop a program that addresses natural hazards and preparedness.		

Source: City of Sacramento

The City currently has several outreach programs that are conducted on an annual basis:

- Public Assistance: The City has a floodplain information hotline (916) 808-5061 or floodinfo@ciytofsacramento.org for citizen inquiries about flood insurance, development standards in a floodplain, and flood map information.
- "Be Flood Ready" brochure – this brochure is sent annually to all parcel owners in the City of Sacramento through their Utility bill in October/November.
- "Be Flood Ready" billboard – this billboard is posted up in various locations within the City of Sacramento in October/November.
- Dam Brochure – this brochure is sent annually in the Utility bill in November/December to warn residents about how to be prepared in case of a dam break.
- Repetitive Loss Outreach. The City annually mails a letter of notice on property protection to repetitive loss properties.

- Storm Preparation Outreach
  - ✓ The City annually encourages residents to purchase flood insurance with bus advertising and a billboard along Business 80.
  - ✓ The City works closely with its Fire Department and the City/County Office of Emergency Services to share information at community events about flood risks in our community and flood insurance.
  - ✓ The City is actively working with community volunteers through "Sacramento Ready" to prepare our community for flooding emergencies. The group works with Community Emergency Response Volunteers, American Red Cross and local service agencies to have a team of volunteers ready to assist residents with winter weather preparation and planning, evacuation, and care and shelter.
- "Flood Watch". SAFCA develops and distributes a newsletter called, "Flood Watch", to provide information to the public on levee work status, and assessment information. SAFCA periodically holds community meetings in coordination with the City in areas where levee work is being completed.
- "Flood Risk Notice". As part of Assembly Bill 156, which is part of the Central Valley Flood Protection Plan, the Department of Water Resources is required to send out a "Flood Risk Notice" to all property owners receiving protection from State-Federal project levees. The goal of the notice is to raise flood risk awareness and encourage actions on an individual basis to reduce flood losses. The first notice was sent in approximately September 2010 and will be continued to be sent annually. Instead of sending out a separate notice to all floodplain residents in the City, the City used this notice in 2010 instead as required by the Community Rating System program.
- "Program for Public Information". The City are completed an outreach program under the Community Rating System guidelines, which gives citizens discounts on flood insurance. This strategy will under Activity 330-Outreach Projects.
- The City sponsors/encourages participation in area clean up events and funded several clean up events in Spring/Summer through its Community Action Grant Program.
- The City funds the Sacramento Splash in the Class program, which provides presentations focused on stormwater pollution prevention to third through sixth grade classrooms. On average, the presentations are given to 102 classrooms throughout the City.
- The City supports/sponsors the Pups in the Parkway program which provides pet waste stations along the American River Parkway including Discovery Park.
- The City carries out stormwater pollution prevention outreach by participating in various community outreach events throughout the year (i.e., Earth Day events, cultural events, etc.).
- The City is part of the Sacramento Stormwater Quality Partnership, and as a partner, the City both sponsors and directly carries out stormwater pollution prevention outreach activities. These activities include, but are not limited to:
  - ✓ Participating in clean up events and engaging the public in clean ups.
  - ✓ Implementing pet waste reduction programs and promoting the use of pet waste disposal stations.
  - ✓ Developing and distributing stormwater pollution prevention brochures and promotional materials. Conducting mixed media campaigns (e.g., radio, print ads, television, signage, etc.).
  - ✓ Implementing home and garden care programs, including the distribution of educational materials (e.g., Our Water Our World, Waterwise, and River-Friendly Landscaping).
  - ✓ Increasing awareness on the impact of fundraiser carwash discharges in waterways by maintaining the River-Friendly Fundraiser Carwash Program (RFFCP) website and distributing promotional materials
  - ✓ Working with the Business Environmental Resource Center (BERC) to encourage stormwater pollution prevention and to establish stormwater practices for businesses and mobile businesses

F.6.5. Other Mitigation Efforts

To mitigate winter storms and the flooding associated with them, the Department of Utilities and Department of Public Works perform work year around.

- During the summer, crews assist in maintaining channels, canals and creeks by removing weeds and debris that can impede water flow during winter storms.
- Floodgates are inspected and maintained throughout the City. Also inspected and maintained are drainage inlets, pumps and generators, which are vital tools in removing water from City streets and discharging storm water into local waterways.
- Materials are stored close to floodgates or areas prone to flooding. Not only does this provide easy access to materials when needed, but also it helps City crews to open a sandbag station within two hours of being instructed to do so.
- Drills are held to rehearse floodgate closures to ensure that they can be quickly closed in an emergency.
- The City's 100,000 public trees are pruned on a 10-year cycle and crews respond promptly to calls about trees that may pose a safety hazard.
- During a storm event, extra crews are on-call after hours responding to hundreds of calls to 311.
- Flood Preparedness Week and Annual interagency community event to encourage home and family preparedness, flood protection, floodplain information, evacuation routes and tips, flood warning systems, and sandbag availability

F.7 Mitigation Strategy

F.7.1. Mitigation Goals and Objectives

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

F.7.2. NFIP Mitigation Strategy

Given the flood hazard in the Planning Area, an emphasis will be placed on continued compliance with the National Flood Insurance Program (NFIP) and participation by Sacramento County and the City of Sacramento in the Community Rating System. Other cities are encouraged to begin participating in the CRS. Detailed below is a description of the City's flood management program to ensure continued compliance with the NFIP.

City of Sacramento's Flood Management Program: Recent Activities

The City of Sacramento has participated in the Regular Phase of the NFIP since September 1978. Since then, the City has administered floodplain management regulations that meet the minimum requirements of the NFIP. Under that arrangement, residents and businesses paid the same flood insurance premium rates as most other communities in the country.

The City of Sacramento submitted applications to participate in the CRS program in December 1990 and again 1992, shortly after its 1990 launch. It is designed to recognize floodplain management activities that are above and beyond the NFIP's minimum requirements. CRS is designed to reward a community for implementing public information, mapping, regulatory, loss reduction and/or flood preparedness activities.

On a scale of 10 to 1, the City is currently ranked Class 5. As of January 2011, the City of Sacramento receives the highest reduction in flood insurance rates, about $1.7 million per year, than any other community in California.

The activities credited by the CRS provide direct benefits to the City of Sacramento and its residents, including:

- Enhanced public safety;
- A reduction in damage to property and public infrastructure;
- Avoidance of economic disruption and losses;
- Reduction of human suffering; and
- Protection of the environment.

The activities that City of Sacramento implements and receives CRS credits include:

- **Activity 310** – Elevation Certificates: The Department of Utilities (DOU) maintains elevation certificates for new and substantially improved buildings. Copies of elevation certificates are made available upon request. Elevation Certificates are also kept for post-FIRM and pre-FIRM buildings. The City maintains hard copies in folders at DOU (away from the permit office) and electronically in the City's building permit database.
- **Activity 320** – Map Information Service: Credit is provided for furnishing inquirers with flood zone information from the community's Flood Insurance Rate Map (FIRM), publicizing the service annually and maintaining records.
- **Activity 330** – Outreach Projects: A community brochure is mailed to all properties in the community on an annual basis. An outreach brochure is mailed annually to all properties in the community's Special Flood Hazard Area (SFHA). The community also provides flood information through displays on buses and billboards, and at community events.
- **Activity 340** – Hazard Disclosure: Credit is provided for state and community regulations requiring disclosure of flood hazards.
- **Activity 350** – Flood Protection Information: Documents relating to floodplain management are available in the reference section of the Sacramento Public Library. Credit is also provided for floodplain information displayed on the City's website.
- **Activity 360** – Flood Protection Assistance: The community provides technical advice and assistance to interested property owners and annually publicizes the service.
- **Activity 410** – Additional Flood Data: Credit is provided for conducting and adopting flood studies for areas not included on the flood insurance rate maps and that exceed minimum mapping standards. Credit for determining Base Flood Elevations in approximate A zones. Credit is also provided for a cooperating technical partnership agreement with FEMA.
- **Activity 420** – Open Space Preservation: Credit is provided for preserving approximately 5 acres in the Special Flood Hazard Area (SFHA) as open space. Credit is also provided for open space land that is deed restricted.
- **Activity 430** – Higher Regulatory Standards: Credit is provided for enforcing regulations that require freeboard for new and substantial improvement construction, protection of floodplain storage capacity, natural and beneficial functions, enclosure limits, other higher regulatory standards, land development criteria and state mandated regulatory standards. Credit is also provided for a Building Code Effectiveness Grading Schedule (BCEGS) Classification of 2/2, certification as a floodplain manager, EMI NFIP class graduates, and the adoption of the International Building Codes.
- **Activity 440** – Flood Data Maintenance: Credit is provided for maintaining and using digitized maps in the day to day management of the floodplain. Credit is also provided for maintaining copies of all previous FIRMs and Flood Insurance Study Reports.

- **Activity 450** – Stormwater Management: The community enforces regulations for stormwater management, soil and erosion control, and water quality. Credit is also provided for watershed management master planning.
- **Activity 510** – Floodplain Management Planning: Based on NFIP Repetitive Losses data as of January 2016, the City has 21 repetitive loss properties and is a Category C community for CRS purposes. Credit is provided for preparing an area analyses the covers the repetitive loss areas.
- **Activity 520** – Acquisition and Relocation: Credit is provided for acquiring and relocating buildings from the community's flood hazard area.
- **Activity 530** – Flood Protection: Credit is provided for buildings that have been flood proofed, elevated or otherwise modified to protect them from flood damage.
- **Activity 540** – Drainage System Maintenance: Portions of the community's drainage system are inspected regularly throughout the year and maintenance is performed as needed by the Department of Water Resources. Records are being maintained for both inspections and required maintenance. Credit is also provided for an ongoing Capital Improvements Program. The community also enforces a regulation prohibiting dumping in the drainage system.
- **Activity 610** – Flood Warning Program: Credit is provided for a program that provides timely identification of impending flood threats, disseminates warnings to appropriate floodplain residents, and coordinates flood response activities.
- **Activity 620** – Levees: Credit is provided for maintaining levees, having a warning system, a response operations, and critical facilities planning.
- **Activity 630** – Dam Safety: All California communities currently receive CRS credit for the state's dam safety program.

City of Sacramento's Flood Management Program: 5-year Outlook

The following is a description/list of those flood management activities that will be enhanced and/or added over the next five years to show continued compliance with the NFIP

- Continuing in the CRS program, while making an effort to implement new CRS activities to benefit the City of Sacramento and residents.
- Working with more Repetitive Loss properties to mitigate flooding problems and implement the Repetitive Loss Area Analysis
- Adding more restrictions in Building Divisions on building next to a levee and compensatory storage
- Increasing the amount of public outreach by implementing a Program for Public Information
- Implementing the requirements in the State of California's Central Valley Flood Protection Plan
- Improving the City/County's emergency response system
- Implementing flood control projects to better protect property and life safety

More information about the floodplain administration in the City of Sacramento can be found in Table F-76.

Table F-76 City of Sacramento Compliance with NFIP

NFIP Topic	Comments
Insurance Summary	
How many NFIP policies are in the community? What is the total premium and coverage?	43,303 policies $18,492,906 in premiums $14,714,226,400 in coverage
How many claims have been paid in the community? What is the total amount of paid claims? How many of the claims were for substantial damage?	1,855 claims $9,852,037.68 in claims paid 43 substantial damage claims

NFIP Topic	Comments
How many structures are exposed to flood risk within the community?	30,884 in 1% annual chance 84,838 in 0.2% annual chance
Repetitive Loss (RL) and Severe Repetitive Loss Properties (SRL)	106 RL properties 0 SRL properties (post-FIRM)
Describe any areas of flood risk with limited NFIP policy coverage	The Natomas Basin (A99) is an area within the City that has a relatively low percentage of NFIP policies compared to the number of insurable structures.
Staff Resources	
Is the Community Floodplain Administrator or NFIP Coordinator certified?	Yes
Provide an explanation of NFIP administration services (e.g., permit review, GIS, education or outreach, inspections, engineering capability)	The City reviews permits, provides flood insurance information, GIS support, and many outreach/education projects
What are the barriers to running an effective NFIP program in the community, if any?	The large community size makes communication with all residence difficult. Also, changes in the status of level certifications have cause major changes in the City's floodplains over the years.
Compliance History	
Is the community in good standing with the NFIP?	Y
Are there any outstanding compliance issues (i.e., current violations)?	N
When was the most recent Community Assistance Visit (CAV) or Community Assistance Contact (CAC)?	CAV 7/16/2008
Is a CAV or CAC scheduled or needed?	Y
Regulation	
When did the community enter the NFIP?	09/15/1978
Are the FIRMs digital or paper?	Digital
Do floodplain development regulations meet or exceed FEMA or State minimum requirements? If so, in what ways?	Yes, Freeboard and local floodplain requirements
Provide an explanation of the permitting process.	Permit system flags permits applied for in floodplain areas. Floodplain staff review the permit and advise the owner of flood protection measures that must be done. Permit is not issued until flood projection requirements are met.
Community Rating System	
Does the community participate in CRS?	Y
What is the community's CRS Class Ranking?	2

NFIP Topic	Comments
What categories and activities provide CRS points and how can the class be improved?	Receive points for all categories. Class will be improved by new Plan for Public Information, additional outreach to stakeholders, flood response projects, and completion of Comprehensive Flood Management Plan
Does the plan include CRS planning requirements?	Y

F.7.3. Mitigation Actions

The planning team for the City of Sacramento 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: 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: High Winds and Tornadoes
- 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. Integrate Local Hazard Mitigation Plan into Safety Element of General Plan

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: High Winds and Tornadoes, Wildfire)

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

Issue/Background: Local jurisdictional reimbursement for mitigation projects and cost recovery after a disaster is guided by Government Code Section 8685.9 (AB 2140).

Project Description: Specifically, this section requires that each jurisdiction adopt a local hazard mitigation plan (LHMP) in accordance with the federal Disaster Mitigation Act of 2000 as part of the Safety Element of its General Plan. Adoption of the LHMP into the Safety Element of the General Plan may be by reference or incorporation.

Other Alternatives: No action

Existing Planning Mechanisms through which Action will be Implemented: Safety Element of General Plan

Responsible Office: City of Sacramento Planning Department

Priority (H, M, L): High

Potential Funding: Local budgets

Benefits (avoided Losses): Incorporation of an adopted LHMP into the Safety Element of the General Plan will help jurisdictions maximize the cost recovery potential following a disaster.

Schedule: As soon as possible

Action 2. Enhance Public Education and Awareness of Natural Hazards and Public Understanding of Disaster Preparedness

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: High Winds and Tornadoes, Wildfire)

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

Issue/Background: The City and County play a key role in public outreach/education efforts to communicate the potential risk and vulnerability of their community to the effects of natural hazards. A

comprehensive multi-hazard public education program will better inform the community of natural hazards of concern and actions the public can take to be better prepared for the next natural disaster event.

Project Description: A comprehensive multi-hazard outreach program will ascertain both broad and targeted educational needs throughout the community. The City will work with the County and other agencies as appropriate to develop timely and consistent annual outreach messages in order to communicate the risk and vulnerability of natural hazards of concern to the community. This includes measures the public can take to be better prepared and to reduce the damages and other impacts from a hazard event. The public outreach effort will leverage and build upon existing mechanisms.

Other Alternatives: Continue public information activities currently in place.

Existing Planning Mechanism(s) through which Action Will Be Implemented: Existing County outreach programs will be reviewed for effectiveness and leveraged and expanded upon to reach the broader region.

Responsible Office: City of Sacramento in partnership with the County

Priority (H, M, L): High

Cost Estimate: Annual costs to be determined, and will depend on the scope and frequency of activities and events as well as volunteer participation

Benefits (Losses Avoided): Increase residents' knowledge of potential hazards and activities required to mitigate hazards and be better prepared. Protect lives and reduce damages, relatively low cost to implement.

Potential Funding: Local budgets, grant funds

Timeline: Ongoing/Annual public awareness campaign

Action 3. Coordination with Relevant Organizations and Agencies to Consider the Impacts of Urbanization and Climate Change on Long-Term Natural Hazard Safety

Hazards Addressed: Multi-Hazard

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

Issue/Background: In 2014, due to extremely low water levels, the City of Sacramento Department of Utilities performed an emergency retrofit of the water intake on the Sacramento River. This is an example of the kind of adaptive measures that may be required in the future as Sacramento adapts to the impacts of climate change.

Climate change and urbanization may intensify natural and manmade hazards, sometimes combining to amplify hazards such as increased flooding, water shortages, disease vectors, and air pollution. The City of Sacramento provides infrastructure and services including water supply, wastewater, stormwater

drainage, solid waste, street and urban forest maintenance. Management plans and specifications are prepared and updated by various City Departments and agencies, including but not limited to:

- Urban Water Management Plan – City of Sacramento Department of Utilities
- Comprehensive Flood Management Plan - City of Sacramento Department of Utilities
- City of Sacramento Standard Specifications for Public Construction (with Addendums #1 and #2)
- Stormwater Quality Design Manual for Sacramento and South Placer Regions
- Hydromodification Management Plan – Sacramento Stormwater Quality Partnership
- Additional standards and design manuals can be found at: http://www.cityofsacramento.org/Utilities/Resources/Specs-and-Drawings

The 2040 General Plan includes a policy to "continue to analyze information on potential impacts of climate change on government operations and the local economy, and actively share results to foster public awareness and support for adaptation policy."

Predictions on the specific local impacts of climate change are not necessarily available, however to the extent feasible, climate change impacts should be incorporated into City infrastructure and operations.

Project Description: Develop an Interagency Adaptation Team to work with appropriate agencies (e.g., California Natural Resources Agency, State Lands Commission, California Energy Commission, Sacramento Area Flood Control Agency [SAFCA], UC Davis) and neighboring jurisdictions (e.g., Sacramento County) to:

- Ensure that current information and data on climate change effects and impacts are considered and addressed as part of updates to infrastructure and utility plans, manuals, and specifications.
- Review existing infrastructure plans, policies, standards, and investments to ensure information about projected climate change impacts is included.
- Assess impacts of climate change effects when siting new infrastructure and maintaining or renovating existing infrastructure.
- Incorporate climate change impact information into the design, construction, operation, and maintenance of infrastructure.
- Identify inadequate existing infrastructure.

The work products of this effort are updated standards and specifications for infrastructure; updated management plans; and design guidelines; and an inventory of inadequate existing infrastructure.

Other Alternatives: Actively collaborate with regional agencies and neighboring jurisdictions to ensure that planning for future development and redevelopment incorporates risks from climate change effects/impacts.

Existing Planning Mechanism(s) through which Action Will Be Implemented: Project is an implementation program listed in the 2035 General Plan.

Responsible Agency/ Department/Partners: Community Development Department, Public Works Department, Department of Utilities

Cost Estimate: $500,000

Benefits (Losses Avoided): Reduced damage to property and/or infrastructure.

Potential Funding: State and/or Federal Grant

Timeline: 2021-2026

Project Priority (H, M, L): H

Action 4. Maintain and Identify Changes in Critical Facilities GIS Lay to Support Emergency Management Efforts

Hazards Addressed: Multi-Hazard: Flood, Wildfire, Dam Failure, Levee Failure, Severe Weather

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

Issue/Background: GIS databases of critical facilities have been used by the City for incident management and emergency planning purposes. These databases need to be continuously updated with the results from GIS analysis associated with the development of the Multi-Hazard Mitigation Plan.

Project Description: Businesses, schools, EMS Services or any other identified critical facilities will have contact information collected and mapped for analyzing and preparation for the Multi-Hazard Mitigation Plan.

Other Alternatives: No action.

Existing Planning Mechanism(s) through which Action Will Be Implemented: Implement through existing emergency preparedness activities.

Responsible Agency/ Department/Partners: City GIS Technical Group, City Department of Utilities, and City & County Office of Emergency Services

Cost Estimate: City staff time

Benefits (Losses Avoided): Life safety and early notification

Potential Funding: None

Timeline: 2026

Project Priority (H, M, L): H

Action 5. Community Outreach on Multi-Hazard Preparation & Pre-mitigation

Hazards Addressed: Multi-Hazard: Flood, Dam Failure, Fire, Earthquake, Severe Weather, Drought

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

Issue/Background: With the broad spectrum of hazards that can affect the City of Sacramento it is important for the Community to know how to be prepared for and execute pre-mitigation (if possible) for these hazards.

Project Description: Continue to maintain and improve webpage that addresses the multi-hazard threat and add measures for preparation and pre-mitigation. Continue to participate and host many community outreach events associated with Hazard awareness and preparation. These events include: "Capitol Action Day", "Flood Preparedness Week", "Highwater Jamboree" Annual Flood Preparedness Event and visiting neighborhood meetings and community events to share preparedness information.

Other Alternatives: Other forms of media outreach

Existing Planning Mechanism(s) through which Action Will Be Implemented: Continuing to maintain OEM's Preparing For a Disaster - City of Sacramento webpage.

Responsible Agency/ Department/Partners: City Department of Utilities, Office of Emergency Management

Cost Estimate: City staff time

Benefits (Losses Avoided): Reduction in the loss of life & property damage through education. Better prepared citizens before and during an event.

Potential Funding: None

Timeline: Long-term

Project Priority (H, M, L): H

Action 6. Evaluation and Mitigation of Critical Facilities in Identified Hazard Areas

Hazards Addressed: Multi-Hazard: Flood, Dam Inundation, Levee Failure, Wildfire

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

Issue/Background: Based on the critical facility analysis completed for this plan, over 3,000 critical facilities have been identified within the Sacramento County Planning Area. This number is anticipated to go up based on additional mapping of critical facilities as the GIS mapping effort is completed. For Sacramento County, 52 mapped critical facilities have been identified within the 100-year floodplain and another 164 (81-city) in the 500-year floodplain. A detailed list of those affected critical facilities are included in Appendix E. Due to the significant number of critical facilities identified within the flood and other hazard areas, additional evaluation of each affected facility is required in order to determine which facilities should be potentially relocated and/or protected.

Project Description: This project addresses the additional evaluation of identified critical facilities to determine options for mitigation. The initial focus will be on those facilities within the flood hazard areas,

with other hazard-prone facilities to follow. The end result of this analysis will be a list of facilities within the 100- and 500-year floodplain and their mitigation recommendations and priorities.

Other Alternatives: Remove all critical facilities from the floodplain or no action.

Existing Planning Mechanism(s) through which Action Will Be Implemented: This will be implemented through existing floodplain management programs.

Responsible Agency/ Department/Partners: City Department of Utilities

Cost Estimate: Analysis and recommendations should involve staff time; resulting mitigation measures will be cost on an individual facility basis.

Benefits (Losses Avoided): Increase property protection and life safety for City residents.

Potential Funding: City of Sacramento, Grants

Timeline: 2026

Project Priority (H, M, L): H

Action 7. Retrofit of Repetitive Loss Properties

Hazards Addressed: Multi-Hazard – Flood, Localized Stormwater Flooding, Severe Weather: Heavy Rains and Storms

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

Issue/Background: The City of Sacramento has 21 repetitive loss structures. Some of these structures can be structurally retrofitted or elevated to fix the flooding problem and remove them from FEMA's Repetitive Loss List.

Project Description: The City must identify property owners interested in retrofits and also obtain grant money to assist with the retrofits.

Other Alternatives: Promote flood insurance

Existing Planning Mechanism(s) through which Action Will Be Implemented: The City's Repetitive Loss Analysis

Responsible Agency/ Department/Partners: City Department of Utilities

Cost Estimate: $250,000-$1,000,000 (depending on number of structures retrofitted)

Benefits (Losses Avoided): The structures would be less prone to flooding, resulting in less flood insurance claims

Potential Funding: FEMA grants, Department of Utilities, property owners

Timeline: 2026

Project Priority (H, M, L): H

Action 8. Safeguard Essential Communication Services

Hazards Addressed: Multi-Hazard– Flood, Dam Failure, Earthquake, Fire, Severe Weather

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

Issue/Background: Communication services during and after a disaster event is essential. The ability to communicate real time information to first responders, the public, and the Emergency Operations Center is critical.

Project Description: Maintenance and continued testing of essential communication services, and have a plan in place to restore those essential services should they be damaged in an event. They include the City phone system, electronic mail, network services and servers. The creation of redundancy and safeguarding the City's communication infrastructure will be necessary.

Other Alternatives: No action.

Existing Planning Mechanism(s) through which Action Will Be Implemented: Implement through existing emergency preparedness activities.

Responsible Agency/ Department/Partners: Emergency Operations Center, City Department of Utilities, Department of Information Technology

Cost Estimate: $300,000

Benefits (Losses Avoided): Ensured communication, faster response times

Potential Funding: Local funding, Grants

Timeline: Long-term

Project Priority (H, M, L): H

Action 9. Multi-lingual Disaster Education

Hazards Addressed: Multi-Hazard - Floods, Severe Weather, Fires, Earthquakes, Dam/Levee Failure,

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

Issue/Background: The City of Sacramento is a diverse city. The City must establish a method to inform our diverse population of seasonal disaster safety issues and general emergency preparedness. The City of

Sacramento Office of Emergency Management established citywide translation services contracts accessible to all City Departments.

Project Description: Develop Public Service Announcements, educational videos, a social media campaign, and other material in a variety of languages to provide our diverse community with information on how to develop a personal/family safety plan

Other Alternatives: No action

Existing Planning Mechanism(s) through which Action Will Be Implemented: Program for Public Information Committee (Flooding Hazard) and Neighborhood Services activities

Responsible Agency/ Department/Partners: City Office of Emergency Management, Department of Utilities, Community Development Department

Cost Estimate: $50,000

Benefits (Losses Avoided): Vulnerable populations will be better prepared to protect themselves and property before and during an event. During an event, faster notifications and evacuations.

Potential Funding: FEMA Grants

Timeline: On-going

Project Priority (H, M, L): H

Action 10. Cal OES Safety Assessment Program Evaluators

Hazards Addressed: Multi-Hazard– Flood, Levee Failure, Dam Failure, Earthquake, Fire, Severe Weather

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

Issue/Background: A large disaster in Sacramento would have a major impact on the city's built environment. The city's ability to quick recovery from a disaster will require a large amount of personnel to inspect and evaluate the condition of structures in the impacted areas. It is important city staff to be trained in post-disaster assessment. This will allow the community to return to their homes and business in a timely manner as well has prohibit people from entering unsafe structures after a disaster.

Project Description: Increase the number of Cal OES Safety Assessment Program Evaluators within the City. The Safety Assessment Program utilizes volunteers and mutual aid resources to provide professional engineers and architects and certified building inspectors to assist local governments in safety evaluation of their built environment in the aftermath of a disaster.

Other Alternatives: No action.

Existing Planning Mechanism(s) through which Action Will Be Implemented: Implement through current Building Department personnel training program.

Responsible Agency/ Department/Partners: City Community Development Department

Cost Estimate: $3,000

Benefits (Losses Avoided): Life Safety, Correct Structural Evaluation

Potential Funding: City Community Development Department

Timeline: On going

Project Priority (H, M, L): H

Action 11. National Flood Insurance Program & Community Rating System Continuation

Hazards Addressed: Multi-Hazard – Flood, Levee/Dam Failure

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

Issue/Background: The City of Sacramento is susceptible to various types of flood events: riverine, flash, and localized stormwater flooding; and levee and dam failure flooding. Regardless of the type of flood, the cause is most often the result of severe weather patterns and excessive rainfall, either in the flood area or upstream reach. Flooding is the most significant natural hazard that the City faces.

Project Description: Continue to meet minimum NFIP requirements and exceed those requirements by participating in the CRS program.

Other Alternatives: No action.

Existing Planning Mechanism(s) through which Action Will Be Implemented: Floodplain Management Staff

Responsible Agency/ Department/Partners: City Department of Utilities

Cost Estimate: $25,000 and staff time

Benefits (Losses Avoided): Increased flood insurance, increased public awareness, and community preparedness

Potential Funding: Local

Timeline: On-going

Project Priority (H, M, L): H

Action 12. Develop a Master Generation Plan for Pump Stations

Hazards Addressed: Multi-Hazard - Severe weather, Earthquakes, Floods, Dam/Levee Failure

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

Issue/Background: The city is divided into approximately 120 drainage basins. Drainage from most of these basins flows to local rivers or creeks or drainage channels through pumping. The City owns and operates 105 storm drainage pumping stations throughout the city. The drainage canals and local creeks eventually drain into the Sacramento and American Rivers.

Project Description: Develop a plan for identifying, prioritizing, and implementing power generation needs for pumping stations. Perform a power audit to identify needs. Plan will identify needs, costs, funding, and lead personnel. Plan will include the purchase and installation of necessary built-in and mobile generators and additional equipment. The City has a robust generator plan but a master plan is still in the process. Sumps that need generators have been identified but the program has been delayed due to funding.

Other Alternatives: No action.

Existing Planning Mechanism(s) through which Action Will Be Implemented: Implement through existing Capital Improvement Program.

Responsible Agency/ Department/Partners: City Department of Utilities

Cost Estimate: $200,000

Benefits (Losses Avoided): Avoids flooding during power outages to pumping stations

Potential Funding: FEMA Grant

Timeline: 2026

Project Priority (H, M, L): H

Action 13. Develop a Disaster Housing Plan

Hazards Addressed: Multi-Hazard

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

Issue/Background: Effective disaster housing is a critical step on the road to long-term recovery. A balance between providing housing assistance rapidly in the wake of a disaster and meeting the diverse needs of individuals and households within the community for a longer period of time during disaster recovery.

Project Description: Develop a Disaster Housing Plan to identify potential disaster housing partners and outline the principles, practices, and implantation phase of such a plan. Supplement with OEM Emergency Operations Plan and Pre-Disaster Recovery Plan.

Other Alternatives: No action.

Existing Planning Mechanism(s) through which Action Will Be Implemented: Unknown

Responsible Agency/ Department/Partners: City Community Development Department, Office of Emergency Management, Office of Innovation and Economic Development

Cost Estimate: $30,000

Benefits (Losses Avoided): Increased community resiliency, avoid potential financial losses

Potential Funding: Grants

Timeline: 2026

Project Priority (H, M, L): H

Action 14. Disaster Resistant Business Program

Hazards Addressed: Multi-Hazard

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

Issue/Background: During a disaster, businesses are disrupted. This disruption can cause loss in revenue, costumers, and potentially employees.

Project Description: Provide materials and administrative support for a comprehensive Business Continuity Planning (BCP) program, to include presentation s to business, non-profits and professional groups, Chamber of Commerce events, etc. The program would include a one-day event with an overview on developing a Business Continuity Plan and breakout sessions addressing specific BCP issues.

Other Alternatives: No action

Existing Planning Mechanism(s) through which Action Will Be Implemented: None

Responsible Agency/ Department/Partners: City of Sacramento, Local Business Partners

Cost Estimate: $80,000

Benefits (Losses Avoided): Increased community resiliency and avoided financial losses.

Potential Funding: Grants, Local Funding

Timeline: 2026

Project Priority (H, M, L): H

Action 15. Develop Enhanced Emergency Planning for Special Needs Populations in the City of Sacramento Emergency Operations Plan and Other Planning Documents

Hazards Addressed: Multi-Hazard

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

Issue/Background: Special needs populations will require additional measures in order to support alerts and warnings, evacuation, and medical response.

Project Description: By working with local advocacy groups, and by identifying weaknesses and gaps in the City's emergency planning, the increased capabilities of the enhanced plan will enable emergency responders to more effectively support the most vulnerable segment of the population. Access and Functional Needs (AFN) is included throughout the Emergency Operations Plan (EOP) and Pre-Disaster Recovery Plan. OEM continues to meet with AFN leaders to ensure accessibility and inclusion are maintained in compliance with the Americans with Disabilities Act. OEM plans are updated on a continuous basis and ensure that AFN is included throughout the entirety of the plan. Efforts to strengthen inclusivity continues as OEM networks and attends trainings, seminars, and events pertaining to AFN and diversity.

Other Alternatives: No action.

Existing Planning Mechanism(s) through which Action Will Be Implemented: Emergency Operations Plan

Responsible Agency/ Department/Partners: City Office of Emergency Management

Cost Estimate: $20,000

Benefits (Losses Avoided): Preservation of life and ability to evacuate more effectively

Potential Funding: Grants, City Office of Emergency Management

Timeline: On-going

Project Priority (H, M, L): H

Action 16. Establish a Post-Disaster Action Plan

Hazards Addressed: Multi-Hazard

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

Issue/Background: As home of the State Capitol, it is imperative that the city of Sacramento can recover quickly from a disaster. The amount of time it takes for the City's infrastructure, cultural resources, and the economy to recover will impact the ability of California's government to function.

Project Description: Establish a City post-disaster action plan that outlines the procedures for public information, post-disaster damage assessment, code enforcement, financial recovery, and redundant operations. Continue to update the plan.

Other Alternatives: No action.

Existing Planning Mechanism(s) through which Action Will Be Implemented: Emergency preparedness planning.

Responsible Agency/ Department/Partners: City Office of Emergency Services, Department of Utilities, Community Development Department

Cost Estimate: $50,000

Benefits (Losses Avoided): A more resilient community and avoided economic loss.

Potential Funding: Grants

Timeline: On-going

Project Priority (H, M, L): H

Action 17. Flood Recovery Plan

Hazards Addressed: Multi-Hazard - Flood, Localized Flooding, Levee/Dam Break

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

Issue/Background: Immediately following a flood, the City will be left with massive amounts of debris and debilitated infrastructure. A proactive approach to this portion of the recovery process with increase the community's resiliency.

Project Description: Create a plan that addresses key elements of flood recovery, such as, restoring infrastructure, debris removal, water quality, building inspection, facilitating access to individual assistance, providing temporary housing, assisting with business recover, and identify needed resources to support recovery efforts. Continue to update plan.

Other Alternatives: No action.

Existing Planning Mechanism(s) through which Action Will Be Implemented: Emergency Response Protocols for Floods

Responsible Agency/ Department/Partners: City Department of Utilities, Office of Emergency Management

Cost Estimate: $20,000 or staff time

Benefits (Losses Avoided): Improved Community Resilience

Potential Funding: Department Budgets, Grants

Timeline: Ongoing

Project Priority (H, M, L): M

Action 18. Public Information Flood Response Plan (Action #18 from 2016)

Hazards Addressed: Flood, Levee/Dam Failure, Localized Flooding

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

Issue/Background: Program for Public Information (PPI) Committee recommends the development of outreach materials that will be implemented during and after a flood. These projects are drafted and made ready for production and dissemination after a flood warning. The PPI Committee also discussed the use of the City's website during a flood event. General emergency preparedness information and citywide evacuation routes are on the website, however, special elements will need to be added during a flood threat. Press releases providing information about the flood threat levels, conditions, evacuation routes, and preparedness actions will be posted on the City's website. The proposed projects are included in the City's Comprehensive Flood Management Plan.

Project Description: Develop a pre-flood plan for public information projects that will be implemented during and after a flood. The plan will include a collection of outreach projects templates including key messages that need to be disseminated before, during, and after a flood. The plan will also include written procedures that explain how the materials will be disseminated and when the information should be released.

Other Alternatives: No Action

Existing Planning Mechanism(s) through which Action Will Be Implemented: Program for Public Information Committee

Responsible Office/Partners: City of Sacramento, Department of Utilities and City of Sacramento Office of Emergency Services

Cost Estimate: Staff Time

Benefits (Losses Avoided): Quicker flood warning response, better quality of information to the public during a flood event, coordinated disaster recovery information

Potential Funding: City of Sacramento, Department of Utilities and City of Sacramento Office of Emergency Services Budgets

Timeline: 2025

Project Priority (H, M, L): High

Action 19. Construction of a New Emergency Operation Center (EOC) (Action 19 from 2016 plan)

Hazards Addressed: Multi Hazard

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

Issue/Background: The city of Sacramento's EOC is the central location of authority and information, and allows for face-to-face coordination among personnel who must make policy-level emergency decisions. The EOC can be activated and staffed to the extent deemed necessary to deal with the existing or impending emergency. The current size of the City EOC is inadequate for personnel needs and disrupts the face-to-face coordination necessary during an emergency.

Project Description: Build and equip a new Emergency Operations Center, to replace the inadequate EOC currently located in the city of Sacramento's dispatch center. The new facility would be developed to FEMA 361 standards. Grant funding would be used to supplement normal construction costs with the additional cost for increasing the armoring of the facility to meet the FEMA 361 standards for Community SafeRooms.

Other Alternatives: None

Existing Planning Mechanism(s) through which Action Will Be Implemented: None

Responsible Office/Partners: City of Sacramento Office of Emergency Services

Cost Estimate: $10,000,000

Benefits (Losses Avoided): More space for operations & upgraded information technology systems

Potential Funding: City of Sacramento Emergency Management Budget, Grants

Timeline: 2025

Project Priority (H, M, L): Medium

Action 20. Emergency Operation Center (EOC) Expansion and Information Technology Upgrade (Action 20 from 2016 plan)

Hazards Addressed: Multi Hazard

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

Issue/Background: The city of Sacramento's EOC is the central location of authority and information, and allows for face-to-face coordination among personnel who must make policy-level emergency decisions. The EOC can be activated and staffed to the extent deemed necessary to deal with the existing

or impending emergency. The current size and information technology infrastructure of the City EOC is inadequate for personnel needs during an emergency situation.

Project Description: Improvements to the City current EOC is necessary to meet the demands of a large-scale natural disaster. The facility has size limitations that will restrict the amount of personnel located in the same room. Potentially unit will have to operate in separate rooms or building which would reduce real-time communications. Also, the facility needs improvements on the usability of the information technology infrastructure. A network separate from the police dispatch's system is needed. Currently there is a shared network which has high security restrictions. The security restrictions make it difficult for a city employee to sign in at the EOC and be fully functional.

Other Alternatives: No Action

Existing Planning Mechanism(s) through which Action Will Be Implemented: Department of Information Technology's updates and maintenance schedule for the EOC.

Responsible Office/Partners: City of Sacramento Emergency Management Budget, Grants

Cost Estimate: $3,000,000

Benefits (Losses Avoided): More space for operations & upgraded information technology systems, facilitates a more effective emergency response

Potential Funding: City of Sacramento Emergency Management Budget, Grants

Timeline: 2025

Project Priority (H, M, L): Medium

Action 21. Protection of Transportation Infrastructure (Action 21 from 2016 plan)

Hazards Addressed: Multi Hazard

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

Issue/Background: The City's roadway network consists of a combination of Federal interstates, a United States highway, California State highways, and city streets. This roadway network is used extensively for personal vehicle travel. Approximately 86 percent of all city residents travel from home to work by automobile.

Project Description: Retrofit all bridges in the city of Sacramento to current seismic standards. Elevate roads and bridges above the base flood elevation to maintain dry access. In situations where flood waters tend to wash roads out, construction, reconstruction, or repair can include not only attention to drainage, but also stabilization or armoring of vulnerable shoulders or embankments.

Other Alternatives: None

Existing Planning Mechanism(s) through which Action Will Be Implemented: Department of Transportation Capital Improvement Project Planning Process

Responsible Office/Partners: City of Sacramento Department of Transportation

Cost Estimate: $200,000,000

Benefits (Losses Avoided): Enhanced bridge safety, increased evacuation routes possibilities, shorter disaster recovery timeline

Potential Funding: Grants, Capital Improvement Project Funding

Timeline: 2025

Project Priority (H, M, L): High

Action 22. Public Education Campaign for Everbridge System (Action 22 from 2016 plan)

Hazards Addressed: Multi Hazard

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

Issue/Background: The County Office of Emergency Services has replaced the Reverse 911 system with "Everbridge", a faster system than Reverse 911. Residents must register for this system in order to received emergency alerts.

Project Description: Outreach will be performed using a variety of methods to inform residents about the City emergency alert system, Everbridge. The campaign will direct resident to sign up for emergency alerts.

Other Alternatives: No Action

Existing Planning Mechanism(s) through which Action Will Be Implemented: Neighborhood Services and Emergency Management Efforts

Responsible Office/Partners: City of Sacramento Office of Emergency Management

Cost Estimate: $100,000

Benefits (Losses Avoided): Avoided Loss of Life, More Evacuation Time

Potential Funding: City of Sacramento Emergency Management Budget, Grants

Timeline: 2025

Project Priority (H, M, L): High

Action 23. Regional Emergency and Disaster Preparedness Exercises to Test Operational & Emergency Plans (Action 23 from the 2016 plan)

Hazards Addressed: Multi Hazard

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

Issue/Background: The City of Sacramento has an Emergency Operation Plan that addresses the City's planned response to extraordinary emergency situations associated with natural disasters, technological incidents, and nuclear defense operations. The City of Sacramento has adopted the Standardized Emergency Management System for managing response to multi-agency and multi-jurisdiction emergencies and to facilitate communications and coordination between all levels of the system and among all responding agencies. Additionally, Sacramento is part of the State's mutual aid system and can give or receive support in an emergency situation.

Project Description: Conduct regional, multi-agency emergency and disaster preparedness exercises to test operational and emergency plans. Tests will include levee or dam failure and other natural hazards.

Other Alternatives: No Action

Existing Planning Mechanism(s) through which Action Will Be Implemented: Emergency Services Training Program

Responsible Office/Partners: City of Sacramento Office of Emergency Services, City of Sacramento Department of Utilities

Cost Estimate: $10,000

Benefits (Losses Avoided): Identify weaknesses in current plans and communications, better prepared for a disaster.

Potential Funding: Training Budgets, Grants

Timeline: Ongoing

Project Priority (H, M, L): High

Action 24. Special Needs and Critical Facilities Database and Advanced Warning System (Action 24 from 2016 plan)

Hazards Addressed: Multi Hazard

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

Issue/Background: Public alert and warning systems are necessary to increase public awareness of an impending threat and provide clear instructions. In the city of Sacramento, existing systems include the Emergency Alert System, fire and law enforcement vehicle loudspeakers, Everbridge, and agency websites.

The Emergency Alert System is designed to provide emergency information via radio and television. The city of Sacramento's Everbridge system can send pre-recorded messages to individuals who sign up for the service. However, an advanced warning system for special needs populations and critical facilities has not been developed.

Project Description: Through outreach activities, develop a database of vulnerable population groups and critical facilities in need of advance warning or evacuation assistance. Development and implementation of an advanced warning procedure. Successful programs have been developed in Houston, San Antonio and Florida and could serve as a model for implementation and personnel training.

Other Alternatives: No action

Existing Planning Mechanism(s) through which Action Will Be Implemented: Emergency Action Plan

Responsible Office/Partners: Office of Emergency Management

Cost Estimate: $200,000

Benefits (Losses Avoided): Avoid loss of life and critical facilities. Faster & more coordinated emergency response times.

Potential Funding: Grants or Emergency Management Budget

Timeline: Short-Term

Project Priority (H, M, L): High

Action 25. Asset Inventory

Hazards Addressed: Multi-Hazard

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

Issue/Background: A current detailed list of city assets itemized by facility is needed in the case of disaster recovery. In the event that a city facility was damaged a during a natural disaster a detailed list of the assets impact would be needed.

Project Description: Development of a list of all city assets with specific location information that can be easily maintained by all departments. The list will include information technology equipment, communication equipment, machinery, office furniture, etc. The list will also indicate which facilities and assets are located in a hazard area.

Other Alternatives: Current Inventory Lists

Existing Planning Mechanism(s) through which Action Will Be Implemented: Each department within the City has asset tracking methods.

Responsible Office/Partners: City of Sacramento Asset Management

Cost Estimate: $200,000

Benefits (Losses Avoided): Identification of assets in hazard area may prompt relocation or protection of assets. Also, quick assessment of what city assets have been damaged or lost during a disaster which will allow for a quicker recovery period.

Potential Funding: City of Sacramento and Grants

Timeline: 2025

Project Priority (H, M, L): Medium

Action 26. Protection of City Information Technology Infrastructure (Action 27 from 2016 plan)

Hazards Addressed: Multi-Hazard

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

Issue/Background: Due to the massive amount of destruction that can be caused by cyber terrorism it is vital to protect the City's network from attacks. Disruption of the City's information technology infrastructure will weaken and potentially disable the City's ability to respond to a natural disaster.

Project Description: Develop a system to withstand the variety of natural disaster the City is vulnerable to, such as, flooding, fire, and severe storms and wind.

Other Alternatives: No action

Existing Planning Mechanism(s) through which Action Will Be Implemented: City of Sacramento Department of Information Technology's maintenance and upgrade schedule.

Responsible Office/Partners: City of Sacramento Department of Information Technology

Cost Estimate: Unknown

Benefits (Losses Avoided): Protection of the city's ability to operate vital systems during emergency events and the protection of technical infrastructure and data.

Potential Funding: Possible Grants, Department of Information Technology Budget

Timeline: Ongoing

Project Priority (H, M, L): High

Action 27. Travel Time Model for Lower American and Sacramento Rivers and their Major Tributaries (Action 29 from 2016 plan)

Hazards Addressed: All

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

Issue/Background: Drinking water source water is potentially vulnerable to watershed spills, which can be caused or contributed to by natural disaster events. It is important to be able to estimate the travel time from the location of the spill to the water treatment plant intakes. The City of Sacramento has developed a rough river travel time estimating tool for the Lower American River and Sacramento River using model information obtained from the National Oceanic and Atmospheric Administration (NOAA) CA/NV River Forecast Center. The travel time tool was developed to allow a rough estimate for the amount of time it will take for water to move downstream from selected locations on the rivers to the City's water treatment plant intakes. The existing tool is shared with the other Lower American and Sacramento River water utilities, but the information is not developed for other intake locations. The current river model has limitations, including locations modelled and other features that an updated model may be able to address. To our best knowledge, there is no information available on travel time for major tributaries to the Lower American River and Sacramento Rivers within or proximate to Sacramento County.

Project Description: Provide resources for improved travel time modeling of the Lower American and Sacramento Rivers, and develop model for travel time on major tributaries and other water bodies of interest. Translate model results into resource(s) that is readily available for Lower American and Sacramento River water treatment plant operators and water utility management to use as a tool for preparedness, response, and recovery for watershed hazardous material spill events. There is potential to include water quality modeling in the model capabilities, or develop the model for future expansion to include water quality.

Other Alternatives: Continue to use current rough estimating tool for river travel time and networking with NOAA for other opportunities.

Existing Planning Mechanism(s) through which Action Will Be Implemented: City of Sacramento Department of Utilities Source Water Protection Program\Potentially through Lower American River and Sacramento River Joint Source Water Protection Programs

Responsible Office/Partners: City of Sacramento Department of Utilities, Engineering and Water Resources Division, Environmental and Regulatory Compliance Section or Potential for other Responsible Office/Other Drinking Water Utilities that Treat Lower American River and Sacramento River Water/Potential for Partnership with National Oceanic and Atmospheric Administration (NOAA)

Cost Estimate: $500,000-$3,000,000

Benefits (Losses Avoided): Protection of public health, reducing cost emergency response or other alternate water supplies.

Potential Funding: Grant, to be determined

Timeline: 2-5 years

Project Priority (H, M, L): High

Action 28. Watershed Spill Contamination to Drinking Water Quality: Preparedness for Events and Recovery

Hazards Addressed: All

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

Issue/Background: When utilizing surface water as a source of drinking water, the source water is potentially vulnerable to watershed spills that can enter the supply. Watershed spills can be caused or contributed to by natural hazards. Spills have the potential to impact source water quality and therefore water treatment plant operations. Changes in source water quality may necessitate a response action at a drinking water treatment plant, such as implementing an increased level of treatment, alternate treatment, or avoiding diversion altogether. Both during a spill and after a watershed spill has ended, it is important to determine if there is residual contamination in the surface water and if the water treatment plant intakes and treatment facilities have been impacted. There could be a wide range of contaminants released in watershed spills, including petroleum products from fuel spills, a wide range of synthetic chemicals, and those associated with wastewater such as bacteria, viruses, and protozoa. The contamination may constitute a hazard to public health for regulated and unregulated water quality contaminants.

Project Description: Provide resources to support water utility preparedness and recovery planning for chemical and wastewater hazardous spills in the watersheds upstream of water treatment plant intakes caused or contributed to by natural disaster events. This includes development of information and resources to identify the potential impacts of the spill, conduct of emergency exercises, planning coordination with emergency response agencies regarding environmental mitigation and cleanups, and preparing information and resources for water treatment facilities and treatment recovery. The project may also include providing supplies to support spill containment and watershed/surface water clean-up and water treatment intake and plant clean-up and restoration.

Other Alternatives: Continue to support and develop resources to support City of Sacramento Water Treatment Plant Operations, and continue to share information with other Sacramento and American River water utilities. Continue to coordinate and manage the Lower American River and Sacramento River Water Utilities Voluntary Spill Notification Program including potential opportunities to develop additional preparedness resources together. Continue to coordinate with and participate in the American River Water Utilities Voluntary Spill Notification Program.

Existing Planning Mechanism(s) through which Action Will Be Implemented: City of Sacramento Department of Utilities Source Water Protection Program/Potentially through Lower American River and Sacramento River Joint Source Water Protection Programs

Responsible Office/Partners: City of Sacramento Department of Utilities, Engineering and Water Resources Division, Environmental and Regulatory Compliance Section or Potential for other Responsible Office/Other Local Drinking Water Utilities that Treat Lower American River and Sacramento River water.

Cost Estimate: $250,000-$500,000

Benefits (Losses Avoided):): Protection of public health, reducing cost for emergency response or other alternate water supplies.

Potential Funding: Grant, to be determined

Timeline: 1-2 years

Project Priority (H, M, L): High

Action 29. Purchase Drones for Use in Disaster Preparedness, Mitigation, and Response

Hazards Addressed: Multi-hazard. (Compromised or failing structural integrity that would cause a critical facility to not withstand a hazard or disaster event as designed or as expected/anticipated. Earth movement or subsidence, or a change in earth properties which jeopardizes an area's intended purpose or gives rise to unanticipated negative consequences. Levee deterioration, damage and failure. Loss of protective banks (barriers/constraints) over time.)

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

Issue/Background: Critical facilities are assessed and a determined to be able to withstand hazards/events at a certain level. As the structural integrity of a facility deteriorates, its ability to perform as anticipated is compromised, possibly leading to increased damages/costs. A primary California hazard is earthquake activity, which can result in liquefaction. Due to its location, the City of Sacramento relies heavily on its levee system for flood control/ protection. The City of Sacramento area has numerous creeks/channels with a bank network that serves as barriers or water constraints.

Project Description: Integrate the use of drones into the City's scheduled facility inspection program. Implement inspection of areas that may have been impossible and/or very difficult to inspect in the past, with a program goal to increase efficiency, comprehensiveness, and frequency of inspections as a best practices measure.

Integrate the use of drones in establishing a program (if one does not already exist) to (1) document the position of baseline land markers in areas identified as being susceptible to liquefaction and (2) verify/ update the positions of the land markers on a scheduled basis. Following a seismic event, use drones to conduct a priority re-check of land mark locations over a designated time span to determine whether a susceptible area is demonstrating signs of liquefaction and at what rate in order to take mitigating action.

Integrate the use of drones in the regulatory inspection process in order to capture, retain, and utilize imagery/GPS coordinates for geospatial analysis. The geospatial analysis would provide information and/or changes in condition of levees and banks not readily detectible by the human eye, and can be used to visually demonstrate the changes over time and potentially project out a timeline that could predict critical failure. This information can then be used by Operations & Maintenance to conduct proactive high-level maintenance and spot repair activities and by Engineering/Asset Management to analyze changes in noted anomalies in order to determine areas where large scale rehabilitation/reinforcement and/or CIP needs

should be addressed to ensure levee and bank integrity. The drones can also be used to inspect levees from the water-side potentially increasing the safety of City staff as well as the efficiency with which they are conducted. Because of the numerous environmental regulatory guidelines in place, drones can be used to view areas where protected species are habituating, greatly increasing our ability to leave them as undisturbed as possible while conducting operations.

Other Alternatives: None.

Existing Planning Mechanism(s) through which Action Will Be Implemented: The current facility maintenance program is scheduled in Maintenance Connections and is performed visually by experienced City staff. Inspections are currently scheduled in CityWorks and conducted visually by experienced City staff.

Responsible Office/Partners: City of Sacramento, Department of Utilities, Drainage Levee Inspection Section

Cost Estimate: $35,000 - $45,000 per drone

Benefits (Losses Avoided): The benefits are as noted above the Project Description.

Potential Funding: FEMA Grant or Department of Utilities

Timeline: 1-3 years

Project Priority (H, M, L): High

Action 30. Map and Assess Vulnerability to Sea Level Rise (Action 32 from 2016 plan)

Hazards Addressed: Climate Change

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

Issue/Background: The Sacramento and American Rivers are affected by sea level rise. When originally constructed, the majority of the City's drainage and levee systems did not account for future sea level rise. This rise may impact the City's levee freeboard and the drainage capacity.

Project Description: Model various "what-if" scenarios to estimate potential vulnerability in order to develop sea level rise mitigation priorities. Develop an inventory of critical facilities and infrastructure that may be particularly vulnerable to sea level rise.

Other Alternatives: No Action

Existing Planning Mechanism(s) through which Action Will Be Implemented: City of Sacramento, Department of Utilities Capital Improvement Planning

Responsible Office/Partners: City of Sacramento, Department of Utilities

Cost Estimate: Unknown

Benefits (Losses Avoided): This study would allow the City of Sacramento to proactively safeguard development and improve systems to accommodate the Sea Level Rise.

Potential Funding: Possible grants and capital improvement funds

Timeline: 5 years

Project Priority (H, M, L): Medium

Action 31. Emission Study of City Sump and Pump Stations (Action 33 from 2016 plan)

Hazards Addressed: Climate Change

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

Issue/Background: During the last 200 years the atmospheric concentrations of greenhouse gases (GHGs) have been increasing. Human activities such as agriculture, industry, waste disposal, deforestation, and especially fossil fuel have been producing increasing amounts of GHGs.

Project Description: Determine the level of emissions from all 94 sumps and pumps operated by the City of Sacramento Department of Utilities. Provide recommendations for mitigation and reduction of emissions.

Other Alternatives: No Action

Existing Planning Mechanism(s) through which Action Will Be Implemented: City of Sacramento Department of Utilities Capital Improvement Plans

Responsible Office/Partners: City of Sacramento Department of Utilities

Cost Estimate: $200,000

Benefits (Losses Avoided): Reduction in greenhouse gases. Improvement of air quality.

Potential Funding: City of Sacramento Wastewater and Stormwater Drainage Fund and Grants

Timeline: 2 years

Project Priority (H, M, L): Medium

Action 32. Climate Change Mitigation Actions/Climate Change Adaptation Plan for Drinking Water Quality (Action 34 from 2016 plan)

Hazards Addressed: Drought, Severe Weather

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

Issue/Background: Studies and evaluations by US EPA and others indicate that climate change may result in long-term significant changes to watersheds, watershed management, and drinking water source water quality. Changes can include snowpack, timing of storms and runoff, reservoir operations, and wildfires. The result of such changes can have a significant impact on drinking water source water quality, which can result in the need to modify water treatment operations and treatment facilities.

Project Description: Develop a City of Sacramento Climate Change Adaptation Plan for Drinking Water Quality. (Or potentially Multiple Jurisdiction Plan/Resources for some components). Project could include development/preparation of tools and long-term water quality data review and analysis on selected constituents.

Other Alternatives: Continue general tracking of climate change potential impacts to Sacramento and Lower American River water quality through the Lower American River Joint Source Water Protection Program, watershed sanitary survey reports, and other tracking of water industry information.

Existing Planning Mechanism(s) through which Action Will Be Implemented: City of Sacramento Department of Utilities Engineering and Water Resources Division

Responsible Office/Partners: City of Sacramento Department of Utilities, Engineering and Water Resources Division

Cost Estimate: $100,000-$750,000 (Large range to provide range of resources for developing a plan to also provide support for plan implementation including setting up tools and resources, long-term review/evaluations, etc.)

Benefits (Losses Avoided): Protection of public health, planning ahead for potential future changes to water treatment plant processes and facilities for cost efficiency, and potentially avoiding costs for response to impacted water quality from watershed emergencies that are linked to climate change.

Potential Funding: Grant, to be determined

Timeline: 2 years

Project Priority (H, M, L): High

Action 33. Harmful Algal Bloom (HAB) Surveillance and Response Planning (Action 35 from 2016 plan)

Hazards Addressed: Climate Change (Drought and Severe Weather)

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

Issue/Background: A harmful algal bloom (HAB) can occur in water bodies and can affect those who use these water bodies for recreation, agricultural, or drinking. People can be exposed to a HAB or HAB toxins when they swim, wade, or play in or near contaminated water; eat contaminated fish or shellfish; or use

contaminated drinking water. The severity of illness and symptoms can vary depending on the type of exposure and the type of HAB toxin.

The main routes of exposure to HAB toxins are:

- Skin contact (through activities like swimming)
- Inhalation (by breathing in tiny airborne droplets or mist contaminated with HAB toxins)
- Ingestion (by eating or drinking food or water contaminated with HAB toxins)
- Reference: http://www.cdc.gov/habs/exposure-sources.html

Project Description: Develop a County-wide (preferred) or City of Sacramento plan for surveillance and response planning for Harmful Algal Bloom events that may impact drinking water source waters and/or water bodies with recreational use. The project could be used to support monitoring. The project could also be used to identify new technologies and develop opportunities to support national, state, regional, or local programs that may provide early warning and other environmental indicators to help local agencies prepare for HABs and mitigate their effects.

Other Alternatives: Continue City of Sacramento tracking and response efforts, which includes lead efforts by the Department of Utilities Engineering and Water Resources Division Water Quality Lab and R&D Section for preparedness and coordination with other local water utilities, as well as tracking information on source water surveillance programs and the latest drinking water industry research.

Existing Planning Mechanism(s) through which Action Will Be Implemented: City of Sacramento Department of Utilities Engineering and Water Resources Division to provide initial coordination to help identify the best fit for the lead role in the Sacramento County area.

Responsible Office/Partners: City of Sacramento Department of Utilities, Engineering and Water Resources Division /Potentially Sacramento County Environmental Health Department/Potentially Other Drinking Water Utilities that Treat Lower American River and Sacramento River Water

Cost Estimate: $100,000-$3,000,000 (large range to show range for potential efforts from Plan only to Plan plus supporting technical programs to provide monitoring, surveillance and early warning, and other ideas/technologies to protect public health.)

Benefits (Losses Avoided): Protection of public health, reducing cost for emergency response or other alternate water supplies.

Potential Funding: Grant, to be determined

Timeline: 2 -3 years

Project Priority (H, M, L): High

Action 34. Perform a Groundwater Recharge Feasibility Study (Action 37 from 2016 plan)

Hazards Addressed: Drought & Water Storage

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

Issue/Background: The City currently operates 27 active municipal groundwater supply wells within the city limits. Twenty-five of these wells are located north of the American River in the communities of North Sacramento, South Natomas and Arcade-Arden. The City wells supply the City with a maximum total capacity of about 20.7 mgd. In 2010, the groundwater supply wells pumped approximately 21.1 mgd. The City also operates 14 wells for the irrigation of parks. Although the City relies predominantly on surface water as its primary source of water supply, the groundwater well system provides flexibility in providing domestic water to the City, especially in years when there are low river flows, as well as providing water that can be delivered on a retail or wholesale basis outside the area authorized to receive delivery of the City's surface water supply.

Project Description: Preform a groundwater recharge feasibility study to determine the most cost-effective way to replenish groundwater resources within Sacramento.

Other Alternatives: No Action

Existing Planning Mechanism(s) through which Action Will Be Implemented: Department of Utilities Water Treatment

Responsible Office/Partners: City of Sacramento Department of Utilities

Cost Estimate: $80,000

Benefits (Losses Avoided): Increased water supply

Potential Funding: Grants

Timeline: 2025

Project Priority (H, M, L): Medium

Action 35. Retrofit Historical Buildings

Hazards Addressed: Earthquake

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

Issue/Background: The City of Sacramento has many older structures that are not protected against earthquakes because they were designed and constructed according to current building standards. These types of buildings are the single biggest contributor to seismic risk in the United States today. Seismic retrofitting of vulnerable structures is critical to reducing risk, protection of life and property, and preservation of historical points of interest.

Project Description: Evaluating older buildings and retrofitting structural and non-structural components.

Other Alternatives: Retrofit buildings when major improvement are made to structure.

Existing Planning Mechanism(s) through which Action Will Be Implemented: Building Permit Process and Code Enforcement

Responsible Agency/ Department/Partners: City of Sacramento Community Development Department

Cost Estimate: $3,000,000-$20,000,000

Benefits (Losses Avoided): Protection of life and assets. Increased resilience after an earthquake. Preservation of historical structures within the City.

Potential Funding: City of Sacramento Community Development Department and Grants

Timeline: 2021

Project Priority (H, M, L): Medium

Action 36. Heating Centers in High Priority Locations

Hazards Addressed: Extreme Cold

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

Issue/Background: Cold weather does not occur in Sacramento as severely as it does in other regions of Northern California as well as the rest of the United States. The average lowest temperature in Sacramento during December is 38°F. However, for the vulnerable populations, especially the homeless this cold weather can be harsh for them resulting in the need of heating centers.

Project Description: This project entails the identification of the locations of the most vulnerable populations too extreme cold and working with recreational and faith-based centers to provide a refuge from the harsh weather to keep them warm throughout the night when temperatures drop to the lowest. This can be achieved by providing a stipend for every night the center is in use to cover the costs of heat generation. Centers would be placed in locations closest to populations in need.

Other Alternatives: No Action

Existing Planning Mechanism(s) through which Action Will Be Implemented: This will be implemented through current offerings of cooling centers by the City, faith-based, and recreational facilities and can be upgraded to include city owned facilities not in use.

Responsible Agency/ Department/Partners: City of Sacramento – Homeless Coordination

Cost Estimate: $10,000

Benefits (Losses Avoided): Homeless assistance, health & safety of vulnerable populations

Potential Funding: City of Sacramento, Grants

Timeline: Winter 2021

Project Priority (H, M, L): High

Action 37. Cooling Centers in High Priority Locations

Hazards Addressed: Extreme Heat

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

Issue/Background: With increasing temperatures every summer at risks residents of Sacramento including, the homeless population need a place to escape the harsh weather. It is at this time that the at-risk populations such as low income, homeless and the elderly are at risk for heat exhaustion, heat stroke and dehydration among other illnesses. Heat related deaths rose in 2015 compared to 2014 where they were up to 45 from 20 deaths.

Project Description: This project includes the opening of cooling centers in high priority locations throughout the City where these at risk populations are centered as well as high population areas where the general public may need to cool down. This can be an incentive for recreational centers and faith-based centers that can receive stipends for every day they are in use.

Other Alternatives: No Action

Existing Planning Mechanism(s) through which Action Will Be Implemented: This will be implemented through current offerings of cooling centers by the City, faith-based, and recreational facilities and can be upgrade to include city owned facilities not in use.

Responsible Agency/ Department/Partners: City of Sacramento

Cost Estimate: $25,000

Benefits (Losses Avoided): Health & safety of residents, reduced emergency service calls

Potential Funding: City of Sacramento, Grants

Timeline: Summer 2021

Project Priority (H, M, L): High

Action 38. Extreme Weather Outreach Strategy

Hazards Addressed: Extreme heat/cold

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

Issue/Background: Extreme heat and cold weather are no stranger to the Sacramento region. In July of 2016 we saw the temperature mark hit over 100F for five days straight. And during the winter months some

residents of Sacramento are used to seeing their pipes freezing overnight. The biggest group of people affected by this come from the homeless population and low-income areas around Sacramento who do not have adequate resources to keep themselves warm or cool during these harsh times.

Project Description: This project is meant to serve as an outreach to the population in Sacramento. It will be completed mainly by providing social media toolkits for the general population with access to internet. For more at-risk populations such as the homeless the outreach will be completed in person by targeting the areas of Sacramento where the homeless population tends to stay. Outreach will also be completed via food banks and homeless assistance centers.

Other Alternatives: No Action

Existing Planning Mechanism(s) through which Action Will Be Implemented: City of Sacramento Public Information Office

Responsible Agency/ Department/Partners: City of Sacramento – Homeless Coordination, Sacramento Steps Forward

Cost Estimate: $5,000 + Staff Time

Benefits (Losses Avoided): Reduced calls for emergency services, health & safety of Sacramento's population

Potential Funding: City of Sacramento, Grants

Timeline: Summer 2017

Project Priority (H, M, L): High

Action 39. Severe Weather Action Plan

Hazards Addressed: Extreme heat/cold

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

Issue/Background: Extreme heat and cold weather are no stranger to the Sacramento region. In July of 2016 the City saw the temperature mark hit over 100F for five days straight. During the winter months some residents of Sacramento experience pipes freezing overnight and low temperatures. There are individuals in the community who do not have adequate resources to keep themselves warm or cool during these harsh times. The largest group of people affected by Sacramento's severe weather is the homeless population and low-income areas around Sacramento.

Project Description: The Severe Weather Action Plan will outline key triggers, such as, when to begin weather monitoring and cooling/warming centers activations. The Plan would also outline media and boots-on-the-ground outreach to the populations in need. The Plan will also identify community partners who will provide shelter and/or services during severe weather events.

Other Alternatives: No Action

Existing Planning Mechanism(s) through which Action Will Be Implemented: City of Sacramento Office of Emergency Services Management Planning Process

Responsible Agency/ Department/Partners: City of Sacramento – Homeless Coordination, Sacramento Steps Forward

Cost Estimate: $50,000

Benefits (Losses Avoided): Reduced calls for emergency services, health & safety of Sacramento's population

Potential Funding: Local Funding, Grants

Timeline: Discussing City guidelines that meet the needs of our jurisdiction in relation to set County severe weather guidance plan thresholds

Project Priority (H, M, L): High

Action 40. Coordinate with Stakeholder on Proposed Flood Control Project on Magpie Creek

Hazards Addressed: Flooding

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

Issue/Background: Since the early 1990s, SAFCA has been working with USACE and CVFPB to improve the Magpie Creek Diversion Channel (MCDC) and levee to reduce the risk of overflow into the historic Magpie Creek floodplain downstream of the diversion channel. This effort has focused on a combination of floodplain storage and levee rehabilitation improvements that would be carried out as part of the American River Common Features General Reevaluation Report (ARCF GRR). This is a low priority on SAFCA's list.

Project Description: The project would raise approximately 2,100 feet of the MCDC left bank levee and extending the levee south along the west side of Raley Boulevard to Santa Ana Avenue, with floodgates at two driveways.

Other Alternatives: Increase pumping capacity at Magpie Creek and the NEMDC

Existing Planning Mechanism(s) through which Action Will Be Implemented: US Army Corps of Engineers, Sacramento District, General Reevaluation Report (GRR)

Responsible Agency/ Department/Partners: Sacramento Area Flood Control Association, US Army Corps of Engineers, County of Sacramento, Department of Water Resources, City of Sacramento, Department of Utilities

Cost Estimate: Unknown

Benefits (Losses Avoided): Protects the safety of residents and their structures. Flood insurance relief to residents in the Historic Magpie Creek floodplain.

Potential Funding: SAFCA/Grants/City

Timeline: 2023

Project Priority (H, M, L): Medium

Action 41. Adopt Additional Floodplain Development Standards

Hazards Addressed: Flooding

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

Issue/Background: The City has created a Development Services Task Force that meets on a regular basis to discuss the City's floodplain development standards. Additional regulations may include evacuation and rescue requirements, additional freeboard, elevation of utilities, and 200-year level of protection.

Project Description: The Development Services Task Force will discuss the adoption of additional development standards related to floodplain management and best practices.

Other Alternatives: No action

Existing Planning Mechanism(s) through which Action Will Be Implemented: The Development Service Task Force would implement necessary action.

Responsible Agency/ Department/Partners: City of Sacramento, Department of Utilities and Community Development Department

Cost Estimate: Staff time

Benefits (Losses Avoided): New and substantially improved structures will be better protected from flooding.

Potential Funding: City of Sacramento, Department of Utilities and Community Development Department

Timeline: 2025

Project Priority (H, M, L): Medium

Action 42. Drainage Projects for Repetitive Loss Properties

Hazards Addressed: Flooding

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

Issue/Background: The City has set a goal to remove at least four repetitive loss (RL) structures from FEMA"s Repetitive Loss List within the City by September 2018. A lot of the RL structure have flooded because undersized local drainage issues.

Project Description: Many potential drainage projects that have been identified in the City's Drainage Master Plans. These projects include upsizing pipelines, adding detention basins, adding bypass pipelines, retrofitting pump stations, and land acquisition. These projects will be ranked and grant funding will be pursued.

Other Alternatives: Promote flood insurance.

Existing Planning Mechanism(s) through which Action Will Be Implemented: Mitigation of repetitive loss properties is a mitigation measure in the City's Corrective Action Plan approved by FEMA.

Responsible Agency/ Department/Partners: City of Sacramento, Department of Utilities

Cost Estimate: $0.2 million - $15 million per project

Benefits (Losses Avoided): No more structural damage and flood insurance claims.

Potential Funding: FEMA grants, Corrective Action Plan funding, and DOU

Timeline: On-going

Project Priority (H, M, L): Medium

Action 43. Emergency Notification and Evacuation Planning

Hazards Addressed: Flooding

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

Issue/Background: As part of a corrective action plan approved by FEMA, the City of Sacramento in conjunction with the Sacramento Office of Emergency Services has committed to upgrading and improving emergency notification and evacuation planning systems and processes using the current Reverse 911 system, which is administered by the Sacramento Police Department, as the primary method.

Project Description: Enhancements to the existing Reverse 911 system to more effectively notify mass populations of evacuation orders and routes, consistent with FEMA guidelines, identifying special needs communities and transportation providers, targeted outreach to maximize the capabilities of Reverse 911, and strategic training to assure effective deployment of the enhanced capabilities.

Other Alternatives: No action

Existing Planning Mechanism(s) through which Action Will Be Implemented: The multi-hazard response plan and ongoing training programs administered by Sacramento County Office of Emergency Services

Responsible Agency/ Department/Partners: Sacramento County Office of Emergency Services

Cost Estimate: Approximately $350,000

Benefits (Losses Avoided): Early notification times, better prepared evacuations, preventing loss of life and property

Potential Funding: $350,000 appropriated from the City's Community Development Department as part of the City's Corrective Action Plan to FEMA

Timeline: Within 5 years

Project Priority (H, M, L): High

Action 44. Historic Magpie Creek

Hazards Addressed: Flooding

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

Issue/Background: For years, the City has used floodplain maps and data from the City's Drainage Master Plan and a Corps of Engineers study for development purposes in the Historic Magpie Creek floodplain. The City would like to have this area studied and have the actual current floodplain and BFEs incorporated into FEMA's DFIRMs. FEMA is in the process of restudying this area.

Project Description: The Magpie Creek Diversion Channel is part of the Corps levee improvement project under the WRDA 16 authorization. The work consists of cutting off all (or the majority) of the spill into historic Magpie and keeping it contained in the diversion channel as it heads north then west.

Other Alternatives: No action

Existing Planning Mechanism(s) through which Action Will Be Implemented: FEMA is in the process of restudying historic Magpie Creek.

Responsible Agency/ Department/Partners: City of Sacramento, DOU

Cost Estimate: $0

Benefits (Losses Avoided): Base Flood Elevations provided for development will be more accurate, and the correct data will be on the DFIRMs. Structures that will be put into the floodplain will be required to carry flood insurance, which will protect those structures.

Potential Funding: $0 (Funded by FEMA)

Timeline: 2024

Project Priority (H, M, L): Medium

Action 45. Natomas Internal Drainage Canals/Levees

Hazards Addressed: Flooding and Levee Failure

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

Issue/Background: Based on the hydrology and hydraulics modeling, the majority of the area greater than 3 feet in the 200-year Natomas interior floodplain is confined to the drainage basins, parks, and street flooding. Contrarily, the internal levees along the canals were last certified to the 100-year in 1989. Once the exterior levee work around the Natomas Basin is complete (approx. 10 years), the internal levees will need to be recertified. The recertification will need to be submitted to FEMA. Also, while in the process of recertifying to the 100-year, the internal levees should be certified to the 200-year (meet the State ULDC requirements).

Project Description: Certify the Natomas Internal Drainage Canals/Levees to the 100-year and 200-year Level. DOU currently has a contract with KSN to provide the evaluation and recertification of the interior levees in the Natomas Basin.

Other Alternatives: No action

Existing Planning Mechanism(s) through which Action Will Be Implemented: The regional coordination process facilitated through Sacramento Area Flood Control Association (SAFCA).

Responsible Agency/ Department/Partners: SAFCA, USACE, City of Sacramento Department of Water Resources, City of Sacramento Department of Utilities, Reclamation District 1000, Sutter County

Cost Estimate: $800,000

Benefits (Losses Avoided): Once completed the protection level of the Natomas Internal Basin will be verified. Weakness within the system will be identified and addressed. This will also allow residents to purchase PRP flood insurance and development will be protected.

Potential Funding: City of Sacramento Department of Utilities, County of Sacramento Department of Water Resources, Sutter County, Reclamation District 1000, Grants

Timeline: 2025

Project Priority (H, M, L): High

Action 46. Drainage Projects from the City's Priority Drainage Project List

Hazards Addressed: Local Flooding, Severe Rain and Storms

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

Issue/Background: The City is continually improving the local drainage system and the combined sewer and storm water system.

Project Description: Many potential drainage projects that have been identified in the City's Drainage Master Plans and have been prioritized on a Basin Master Planning and Improvement Projects priority list. These projects include upsizing pipelines, adding detention basins, adding pipelines, retrofitting pump stations, and land acquisition. These projects are ranked by priority.

Other Alternatives: No action

Existing Planning Mechanism(s) through which Action Will Be Implemented: The Department of Utilities has a Drainage CIP Group

Responsible Agency/ Department/Partners: City of Sacramento, Department of Utilities

Cost Estimate: $200,000 to 15,000,000 per project

Benefits (Losses Avoided): Eliminate structural damages and flood insurance claims, avoid economic loss from flooded streets, and life safety

Potential Funding: FEMA grants and DOU CIP funds

Timeline: 2022-2026

Project Priority (H, M, L): Medium

Action 47. Projects Identified in the Combined Sewer System Improvement Plan Update

Hazards Addressed: Localized Stormwater Flooding and Severe Rain and Storms

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

Issue/Background: The City of Sacramento (City) owns and operates a combined sewer system (CSS) that conveys residential and commercial wastewater and storm water runoff from approximately 11.7 square miles in downtown Sacramento, East Sacramento, Oak Park, and the Land Park area. There are 5.8 square miles of separated areas of the City north, east, and south of the CSS that contribute sanitary flows to the CSS. The City also includes approximately 76 square miles of separated areas that are not served by the CSS. The CSS serves approximately 205,000 people. The CSS includes four key facilities to manage the collected flow: Sumps 1/1A, Sumps 2/2A, Pioneer Reservoir, and the Combined Wastewater Treatment Plant (CWTP). Sumps 1/1A and 2/2A pump up to 60 million gallons per day (mgd) of flows to the Sacramento Regional County Sanitation District's Regional Wastewater Treatment Plant (SRWTP). Pioneer Reservoir and CWTP provide additional storage and, when needed, primary treatment, and disinfection of combined sewage prior to discharge to the Sacramento River. The CSS is regulated under the August 2015 National Pollutant Discharge Elimination System (NPDES) waste discharge permit, No. CA0079111. The permit allows for CSS discharge to the Sacramento River at six locations: two for primary treated (plus disinfection) effluent, and four that can discharge untreated combined sewage. The secondary treated effluent from SRWTP is discharged to the Sacramento River at a permitted location under a separate NPDES permit. The Combined Sewer System Improvement Plan outlines improvement projects and

programs to reduce flooding, constructability and cost/benefit analysis, and project prioritization for implementation.

Project Description: Identified projects were categorized into storage and conveyance. The storage projects are located upstream or downstream of local flooding areas, and are intended to detain flows until the CSS has re-generated capacity (i.e., peak of the storm has passed and HGL in the system has receded from peak conditions) and the storage facilities can be dewatered. The storage projects can be linear or parcel based. Conveyance projects would generally be located in proximity to or just downstream of localized flooding areas. Their objective would generally be to convey peak flows from and through the flood-prone areas to points downstream with greater capacity. The analysis carefully considered whether the increased conveyance had the potential to cause or exacerbate downstream flooding. If that was determined to be true, the conveyance project(s) were combined with upstream or downstream storage projects to mitigate the downstream flood exacerbation risk. Conveyance projects included upsizing existing pipes or constructing new pipes. Where baseline flooding occurred in a location with no opportunities for storage, a new pipe was sized to convey the 10-year storm design peak flows to the downstream system. Factors such as ground cover requirements, right-of-way width, and existing system pipe invert elevations (to which linear storage facilities must connect) were factored into the storage configurations

Other Alternatives: No improvements to the system.

Existing Planning Mechanism(s) through which Action Will Be Implemented: City of Sacramento Department of Utilities Wastewater & Storm Drain Engineering Program.

Responsible Agency/ Department/Partners: City of Sacramento Department of Utilities Wastewater & Storm Drain Engineering Program.

Cost Estimate: Projects range from $510,000 to $22,000,000.

Benefits (Losses Avoided): Reduced of localized flooding. Increased system resiliency and capacity.

Potential Funding: City of Sacramento Department of Utilities and Grants

Timeline: 2021-2025

Project Priority (H, M, L): High

Action 48. Easements for Open Land Along Levees

Hazards Addressed: Flood and Levee Failure

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

Issue/Background: The Urban Levee Design Criteria (ULDC) requires fee title or an easement for the entire levee prism extending to a minimum of 20 feet beyond the landside toe of the flood protection system

needs to be acquired. This is needed to provide adequate room for maintenance, inspection, flood-fighting and protection of the levees.

Project Description: Analysis of current levee easements and setback to determine where additional and future easements will be needed. Develop a method and funding source to acquire the needed easements and open space to meet the ULDC standards.

Other Alternatives: No Action

Existing Planning Mechanism(s) through which Action Will Be Implemented: City of Sacramento Development Review

Responsible Agency/ Department/Partners: City of Sacramento, Department of Utilities and Community Development Department, Sacramento Area Flood Control Agency

Cost Estimate: $2,000,000

Benefits (Losses Avoided): Quicker detection of levee distress during high water events, higher level of flood projection, the ability to widen the levee in the future, if needed.

Potential Funding: City of Sacramento and Grants

Timeline: 2021

Project Priority (H, M, L): High

Action 49. Emergency Management Planning and Levee Security

Hazards Addressed: Flood

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

Issue/Background: The City of Sacramento focuses its emergency management activities within the City on four phases: preparedness, response, recovery, and mitigation. Public outreach, warning systems, post-flood building entry, levee security, and EOC operations are examples of the City's extensive emergency management system.

Project Description: Implementation of the emergency management and levee security action items outlined in the City of Sacramento's Comprehensive Flood Management Plan. Highlighted projects include continued National Incident Management System (NIMS) and Standardized Emergency Management System (SEMS) exercises and training, creation of a disaster housing plan, increased public education and alerts efforts, development of an intergovernmental flood management and control standards, annual review of the Levee Security Plan, and improvement of flood warning systems.

Other Alternatives: No Action

Existing Planning Mechanism(s) through which Action Will Be Implemented: Implementation of the Comprehensive Flood Management Plan

Responsible Agency/ Department/Partners: City of Sacramento, Department of Utilities, Office of Emergency Services, and other maintaining agencies responsible of levee systems within the region.

Cost Estimate: $100,000 and staff time

Benefits (Losses Avoided): These projects would decrease the loss of life and property and establishes clear guidelines for recovery from a flood.

Potential Funding: City of Sacramento Department Budgets, Grants

Timeline: Within 5 years

Project Priority (H, M, L): High

Action 50. Flood Fighting Equipment

Hazards Addressed: Flood and Levee Failure

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

Issue/Background: During high water events an effort will be made to prevent the effects of flood waters. The City of Sacramento currently has to borrow necessary equipment from neighboring agencies to conduct levee repair and flood fighting operations.

Project Description: Purchase flood fighting equipment such as a utility landing craft, long reach excavator, and the tuck (tractor) trailer.

Other Alternatives: Borrow equipment from neighboring agencies.

Existing Planning Mechanism(s) through which Action Will Be Implemented: Operations and Maintenance equipment budgetary and procurement process.

Responsible Agency/ Department/Partners: City of Sacramento Department of Utilities Operations and Maintenance

Cost Estimate: $550,000

Benefits (Losses Avoided): These projects would decrease the loss of life and property and establishes clear guidelines for recovery from a flood.

Potential Funding: City of Sacramento Department Budgets, Grants

Timeline: Within 5 years

Project Priority (H, M, L): High

Action 51. Flood Management Land Use Planning and Development

Hazards Addressed: Flood

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

Issue/Background: Both land use planning and development guidelines are implemented using the City's zoning, building, and subdivision codes. The City is currently implementing various federal, state, and local mandates for land use planning and development.

Project Description: Implementation of the land use planning and development action items outlined in the City of Sacramento's Comprehensive Flood Management Plan. Highlighted projects include 200-year floodplain ordinance and projection plan, development guidelines for rescue and evacuation areas, City Code update for new development adjacent to levees.

Other Alternatives: No Action

Existing Planning Mechanism(s) through which Action Will Be Implemented: Implementation of the Comprehensive Flood Management Plan

Responsible Agency/ Department/Partners: City of Sacramento, Department of Utilities and Community Development Department

Cost Estimate: Staff time

Benefits (Losses Avoided): Decrease the number of structures at risk from flooding and an increased in levee and structure protection measures.

Potential Funding: City of Sacramento Department Budgets, Grants

Timeline: Within 5 years

Project Priority (H, M, L): High

Action 52. Florin Creek Pump at Pomegranate Avenue

Hazards Addressed: Localized Flooding, Heavy Rains and Storms

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

Issue/Background: The U.S. Army Corps of Engineers (Corps) is constructing improvements to the Florin Creek Channel Project from Highway 99 to Franklin Boulevard. In addition, Sacramento Area Flood Control Agency (SAFCA) is constructing a multi-use detention basin upstream. These improvements will increase the channel capacity and enable the conveyance of 100-year event flood flows within the channel. This public safety improvement project will reduce the risk of flooding in the area during extreme storm

events and ultimately provide financial relief to several-hundred property owners currently subject to mandatory, high-cost flood insurance. To provide additional flood protection in this area a pump station at Pomegranate Avenue would be necessary.

Project Description: Construction of a Florin Creek pump station at Pomegranate Avenue.

Other Alternatives: No Action

Existing Planning Mechanism(s) through which Action Will Be Implemented: SAFCA's South Sacramento County Streams Project

Responsible Agency/ Department/Partners: City of Sacramento Department of Utilities

Cost Estimate: $800,000

Benefits (Losses Avoided): Increased flood protection to local residence. Decrease in property damage and insurance claims.

Potential Funding: City of Sacramento Department of Utilities Stormwater Drainage Fund and Grants

Timeline: 1 year

Project Priority (H, M, L): High

Action 53. Internal Drainage System Improvements

Hazards Addressed: Flood

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

Issue/Background: In addition to the risk of flooding from levee failure, a considerable flood risk exists due to aging internal drainage infrastructure. Although levee failure may result in much more catastrophic damage than flooding from internal drainage, most of the City's flood damage since 1955 has resulted from drainage deficiencies. In 1995, for instance, approximately 100 homes in four south area drainage basins incurred flood damage due to internal drainage system failure during a particularly intense storm.

Project Description: Implementation of the internal drainage system improvement action items outlined in the City of Sacramento's Comprehensive Flood Management Plan. Highlighted projects include development of a grant program for drainage improvements, develop an Engineering Services efficiency plan, work on the passage of Proposition 218 drainage fee increase, and drainage master planning.

Other Alternatives: No Action

Existing Planning Mechanism(s) through which Action Will Be Implemented: Implementation of the Comprehensive Flood Management Plan

Responsible Agency/ Department/Partners: City of Sacramento Department of Utilities

Cost Estimate: Range of staff time to $800,000

Benefits (Losses Avoided): These projects would decrease property damage and the number of flood insurance claims. Drainage system improvements will also increase the City's resiliency after a large scale weather event.

Potential Funding: City of Sacramento Department of Utilities Stormwater Drainage Fund and Grants

Timeline: 2021 and ongoing

Project Priority (H, M, L): High

Action 54. Levee and Structural Flood Management Improvements

Hazards Addressed: Flood

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

Issue/Background: The City of Sacramento works alongside the Sacramento Area Flood Control Agency, US Army Corps of Engineers, Central Valley Flood Protection Board, Reclamation District No. 1000, Maintaining Agency 9, American River Flood Control District, and others to implement and maintain flood control projects that protect the City.

Project Description: Implementation of the levee and structural improvement action items outlined in the City of Sacramento's Comprehensive Flood Management Plan. Highlighted projects include support of local efforts to improve flood facilities, plan and implement modernization phase of levee accreditation and ULDC, and participate in the Regional Flood Management Plan.

Other Alternatives: No Action

Existing Planning Mechanism(s) through which Action Will Be Implemented: Implementation of the Comprehensive Flood Management Plan

Responsible Agency/ Department/Partners: City of Sacramento Department of Utilities, Community Development Department, SAFCA

Cost Estimate: Range of staff time to $1,000,000

Benefits (Losses Avoided): These projects would decrease the loss of life and property and decrease the number of flood insurance claims.

Potential Funding: City of Sacramento, SAFCA, and possible grants

Timeline: 2021 and ongoing

Project Priority (H, M, L): High

Action 55. Master planning to identify facilities needed to prevent 10-year event street flooding and 100-year event structure flooding

Hazards Addressed: Localized Stormwater Flooding and Severe Rain and Storms

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

Issue/Background: The majority of the City has master plans in place, however with additional development needs and infrastructure projects master planning is needed in portions of the City

Project Description: Develop master plans to identify facilities needed to prevent 10-year event street flooding and 100-year event structure flooding in areas of the City that do not currently have master planning. Prioritize the projects and formulate timeline for the identified projects. Execute the projects to provide protection from flooding.

Other Alternatives: No Action

Existing Planning Mechanism(s) through which Action Will Be Implemented: City of Sacramento Department of Utilities Wastewater & Storm Drain Engineering Program

Responsible Agency/ Department/Partners: City of Sacramento Department of Utilities Wastewater & Storm Drain Engineering Program

Cost Estimate: $900,000

Benefits (Losses Avoided): Protection of life and property and reduced flooding on roadways

Potential Funding: City of Sacramento Department of Utilities and Grants

Timeline: 2021 and ongoing

Project Priority (H, M, L): High

Action 56. Retrofit Pumping Plans with Discharge Monitoring Devices

Hazards Addressed: Localized Stormwater Flooding and Severe Rain and Storms

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

Issue/Background: All our drainage master plans recommend retrofit of our pumping plants with discharge measuring/monitoring devices. The average test capacity of pumps is approximately 75 percent of Rated Capacity.

Project Description: Retrofit pumping plants to measure discharge and monitor devices. Identify pumps that are underperforming and raise Reliable Capacity to 90 percent service factor.

Other Alternatives: Check pumping capacity when issues arise or develop a testing schedule.

Existing Planning Mechanism(s) through which Action Will Be Implemented: City of Sacramento Department of Utilities Operations and Maintenance Procedures

Responsible Agency/ Department/Partners: City of Sacramento Department of Utilities Operations and Maintenance

Cost Estimate: $500,000

Benefits (Losses Avoided): Protection of life and property, increased pumping capacity, and early identification of device fatigue.

Potential Funding: City of Sacramento Department of Utilities Capital Improvement Funds and Grants

Timeline: 2021 and ongoing

Project Priority (H, M, L): High

Action 57. Risk Communication and NFIP/CRS Projects

Hazards Addressed: Flood

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

Issue/Background: The City of Sacramento residents hold over 40,000 National Flood Insurance Program (NFIP) policies and the City has a Class 5 standing in FEMA's Community Rating System (CRS). In coordinate with these two programs, the City has also established a Program of Public Information (PPI) Committee which develops communication strategies related to flood and flood insurance information.

Project Description: Implementation of the risk communication and NFIP/CRS action items outlined in the City of Sacramento's Comprehensive Flood Management Plan. Highlighted projects include implementation of the City's Program of Public Information, develop a Flood Response PPI projects, increase freeboard development to two feet, write a Levee Failure Response Plan for Critical Facilities, and sign a Memorandum of Agreement with the County of Sacramento for flood control planning of the South Sacramento County Streams.

Other Alternatives: No Action

Existing Planning Mechanism(s) through which Action Will Be Implemented: Implementation of the Comprehensive Flood Management Plan

Responsible Agency/ Department/Partners: City of Sacramento, Department of Utilities, Community Development Department, Sacramento County and City Office of Emergency Services

Cost Estimate: Projects range from $10,000 to $200,000

Benefits (Losses Avoided): Increased public awareness and preparedness which would decrease the amount of property damage and loss of life. Also, increase awareness of flood risk areas and impacts of development.

Potential Funding: City of Sacramento and Grants

Timeline: 2021 and ongoing

Project Priority (H, M, L): High

Action 58. Trash Racks and Debris Cages

Hazards Addressed: Flood

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

Issue/Background: The City relies heavily on our pumping stations and other drainage facilities to reduce our localized flooding risk. Trash rack and debris cages prevent debris from entering the intake of a pumping station or water conveyance system while still allowing water to flow though.

Project Description: Identify high impact locations in need of trash racks or debris cages. Install devices and develop maintenance schedule.

Other Alternatives: No Improvements to the system

Existing Planning Mechanism(s) through which Action Will Be Implemented: City of Sacramento Department of Utilities Wastewater & Storm Drain Engineering Program

Responsible Agency/ Department/Partners: City of Sacramento Department of Utilities Wastewater & Storm Drain Engineering Program

Cost Estimate: $1,250 to $4,000 per rack or cage

Benefits (Losses Avoided): Loss of life and property avoided. Increased system resiliency and capacity.

Potential Funding: City of Sacramento Department of Utilities and Grants

Timeline: 2021 and ongoing

Project Priority (H, M, L): High

Action 59. Multi-Jurisdictional Modeling for Drainage Watersheds Greater than 10 Square Miles

Hazards Addressed: Flooding and Levee Failure

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

Issue/Background: The City of Sacramento encompasses several streams, creeks and associated watersheds. The majority of these watersheds drain into the City from the County of Sacramento. Some of the major drainage watersheds in the City are identified as Natomas Area Stream Group, American River Stream Group, Sacramento Stream Group, and Natural Stream Groups. These groups are identified in the County of Sacramento Watershed Management Plan (2011).

Project Description: Development of a unified model for each watershed that extends over jurisdictional lines. The model would be maintained to reflect changes to the watershed, including development.

Other Alternatives: No Action

Existing Planning Mechanism(s) through which Action Will Be Implemented: Sacramento Area Flood Control Agency Coordination Group

Responsible Agency/ Department/Partners: Sacramento Area Flood Control Agency, County of Sacramento Department of Water Resources, City of Sacramento Department of Utilities

Cost Estimate: $350,000, plus annual fee to maintain the model

Benefits (Losses Avoided): Accurate modeling of development impacts and flood control planning

Potential Funding: Cost Share Between Sacramento Area Flood Control Agency, County of Sacramento Department of Water Resources, City of Sacramento Department of Utilities

Timeline: 2021 and ongoing

Project Priority (H, M, L): High

Action 60. Post-Flood Water Treatment Facility Recovery

Hazards Addressed: Flood, Local Flooding

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

Issue/Background: Flood waters may impact drinking water system infrastructure such as wells, intakes, and treatment plants by transporting contaminants carried by surface waters or saturated soil. There could be a wide range of contaminants, depending on the severity of the flood and its impacts to the surrounding area. Contaminants may include bacteria, viruses, protozoa, petroleum products from fuel spills, and other known or unknown synthetic chemicals. The contamination may constitute a hazard to public health for regulated and unregulated water quality contaminants.

Project Description: Provide resources for planning and implementing facility cleaning, monitoring, and actions to restore water treatment services.

Other Alternatives: No Action

Existing Planning Mechanism(s) through which Action Will Be Implemented: City of Sacramento Department of Utilities Water Quality Incident Response Planning

Responsible Agency/ Department/Partners: City of Sacramento Department of Utilities, Engineering and Water Resources, Water Quality Laboratory and R&D

Cost Estimate: $100,000 - $900,000,000 (large range includes planning, cleanup, monitoring and potential costs for repair/replacement of facilities for full recovery)

Benefits (Losses Avoided): Protection of public health, reducing cost for continuing emergency or other alternate water supplies.

Potential Funding: Grant, to be determined

Timeline: 1-2 years with updates on a to-be-determined frequency

Project Priority (H, M, L): High

Action 61. Tree Trimming & Debris Removal

Hazards Addressed: Severe Wind

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

Issue/Background: Dead branches fall very easily during high winds or a severe storm. These falling branches are a threat to nearby power lines. Trimming of trees treat diseases that can weaken the tree and make it susceptible to toppling during severe winds and storms.

Project Description: This project includes the year-round pruning of trees throughout the City that can pose a threat to power lines.

Other Alternatives: No Action

Existing Planning Mechanism(s) through which Action Will Be Implemented: Department of Public Works Operations & Maintenance

Responsible Agency/ Department/Partners: Department of Public Works, SMUD, PG&E

Cost Estimate: $80,000 - $100,000

Benefits (Losses Avoided): Reduced power outages, cost savings

Potential Funding: Department of Public Works Maintenance Budget

Timeline: Ongoing

Project Priority (H, M, L): High

Action 62. Install redundancies and Loop Feeds for Power Lines & Infrastructure

Hazards Addressed: Severe Wind

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

Issue/Background: During times of severe wind and weather Sacramento sees an increase in power outages. These outages have at times lasted up to 2-3 days, such as the winter storm of 2008. A need to redundancies and loop feeds is needed to reduce power outages and provide residents a means of communication should they have an emergency during such an event.

Project Description: This project involves reducing the deficiencies in the electrical transmission lines and the electrical transmission system radial feeds to substations. High voltage lines will be installed that allow the energy to travel longer distances and then be dropped for consumption at distribution transformers.

Other Alternatives: Increased inspection and maintenance on the system

Existing Planning Mechanism(s) through which Action Will Be Implemented: SMUD Infrastructure

Responsible Agency/ Department/Partners: Department of Utilities, SMUD, PG&E

Cost Estimate: $175,000/mile

Benefits (Losses Avoided): Reduction of power outages, community resiliency

Potential Funding: Possible Grants, SMUD Capital Improvements

Timeline: 2021 and ongoing

Project Priority (H, M, L): High

Action 63. Stabilization of Erosion Hazard Areas

Hazards Addressed: Streambank Erosion

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

Issue/Background: Bank erosion is a critical concern in Sacramento River because the eroding stream banks threaten levee integrity. Over 50% of the rivers 193 miles have been riprapped in the last 40 years according to the US Fish and Wildlife Service and over a hundred erosion sites have been identified along the river in recent years. It is critical to mitigate these sites to reduce their threats to the integrity of Sacramento's levee system.

Project Description: This project will include the identification and mitigation of erosion sites along the Sacramento river and other rivers in the region that pose a threat to levees and raise flooding concerns.

Other Alternatives: No Action

Existing Planning Mechanism(s) through which Action Will Be Implemented: The US Army Corp of Engineers has headed the Sacramento River Bank protection Project and this mitigation action will be channeled through them as an expansion to their ongoing efforts.

Responsible Agency/ Department/Partners: California Department of Water Resources, Army Corps of Engineers, City and County of Sacramento

Cost Estimate: $1,000,000

Benefits (Losses Avoided): Preventing levee failure and flooding, reduced risk to life and nearby structures

Potential Funding: Grants

Timeline: 2021 and ongoing

Project Priority (H, M, L): High

Action 64. Implement a Fire Education and Information Program

Hazards Addressed: Wildfire

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

Issue/Background: Sacramento is a developed city that has relatively few remaining wildland areas. Areas of the city that have been identified as fairly susceptible to an urban wildfire are generally along the American River Parkway from Watt Avenue to the Sacramento River and along the Garden Highway in the Natomas area. The American River Parkway is a stretch of dense trees and brush on both sides of the American River. The property is owned by the State of California, maintained by the Sacramento County Parks Department, and protected from fire by the Sacramento City Fire Department. The area consists of natural habitat with no fire break areas. Fire equipment access is difficult and limited to the paved stretches of the bicycle path. Some of the potential fire areas are not accessible to vehicular traffic.

Project Description: Implement an urban-wildfire safety program using materials for the community. Train educators and inspectors, identifies high risk neighborhoods and buildings, and develop agreed-upon, area specific solutions to fire issues.

Other Alternatives: No Action

Existing Planning Mechanism(s) through which Action Will Be Implemented: Add to the Sacramento City Fire Department's current outreach activities

Responsible Agency/ Department/Partners: Sacramento City Fire Department

Cost Estimate: $10,000

Benefits (Losses Avoided): Educated and more prepared community, increased defensible space for at risk structures

Potential Funding: FEMA & State Grants, Community Wildfire Planning Grant

Timeline: 2019

Project Priority (H, M, L): High

Action 65. Fuels Reduction on the American River Parkway

Hazards Addressed: Wildfire

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

Issue/Background: The American River Parkway is identified as a State Recognized Fire Hazard. The vegetation along the parkway would be a source of fuel to any fire that could burn due to its wild interface. In addition, an invasive series of plants and weeds growing in the area would allow the fire to burn and spread rapidly.

Project Description: The goal of the project would be to maintain the vegetation growing along the parkway and rid the area of the invasive species which are a greater source of fuel for fires.

Other Alternatives: No Action

Existing Planning Mechanism(s) through which Action Will Be Implemented: The Sacramento Regional Conservation Corp works on fuel reduction projects and their work will be expanded to cover areas at risk along the American River Parkway.

Responsible Agency/ Department/Partners: Sacramento City Fire District

Cost Estimate: $80,000-$100,000

Benefits (Losses Avoided): Reduced risk to nearby homes and structures

Potential Funding: Grants

Timeline: Ongoing

Project Priority (H, M, L): High

Action 66. Outreach on the Effects of Smoke on Air Quality

Hazards Addressed: Wildfire

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

Issue/Background: The Sacramento region is surrounded by a large number to locations that have recently caught ablaze over the last several years. The Northern California fire season has been highly active with large scale wildfires. These fires have affected Sacramento's air quality. Winds will carry the smoke from fires a significant distance into Sacramento.

Project Description: The purpose of the project is to educate Sacramento residents on the effects of smoke in the air and provide resources to check the air quality in their area. This will be carried out via social and network media. The city will utilize its social media pages and radio advertisements to convey knowledge and resources residents can use to know when to use precaution. The project will also provide helpful tips to decrease the impacts of poor air quality in their homes and through the daily routines.

Other Alternatives: No Action

Existing Planning Mechanism(s) through which Action Will Be Implemented: Existing city webpages, Spare the Air Sacramento Region

Responsible Agency/ Department/Partners: Sacramento City Fire Department, City of Sacramento Public Information Office, Spare the Air Sacramento Region

Cost Estimate: $5,000 plus staff time

Benefits (Losses Avoided): Greater public awareness, health risk reduced

Potential Funding: Local Funding

Timeline: Ongoing

Project Priority (H, M, L): High