

Annex O Sacramento Area Sewer District

O.1 Introduction

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

O.2 Planning Process

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

Table O-1 SacSewer – Internal Planning Team

Name	Position/Title	How Participated
Vyomini Upadhyay	Senior Civil Engineer	HMPC: collect data, draft text, review documents, attend meetings
Somnang Sang	Assistant Engineer	HMPC: collect data, draft text, review documents, attend meetings
Bryan Young	Environmental Program Manager I	Natural Resource Updates: collect data, draft text, review documents
Steve Scott	Natural Resource Supervisor	Natural Resources Updates: collect data, draft text, review documents
Anna Johnson	Senior Civil Engineer	Historic Hazard/Existing Hazards: Collect information, review documents
Mai-Tram Le	Senior Civil Engineer	Historic Hazard/Existing Hazards: Collect information, review documents
Cady Martinez	Assistant Engineer	Historic Hazard/Existing Hazards: Collect information
Steven Nebozuk	Senior Civil Engineer	Subject Matter Expert, involved in the previous 2016 and 2021 LHMP updates

Coordination with other community planning efforts is paramount to the successful implementation of this LHMP Update. This section provides information on how the District integrated the previously FEMA-

approved 2021 LHMP into existing planning mechanisms and programs. Specifically, the District incorporated into or implemented the 2021 LHMP through other plans and programs shown in Table O-2.

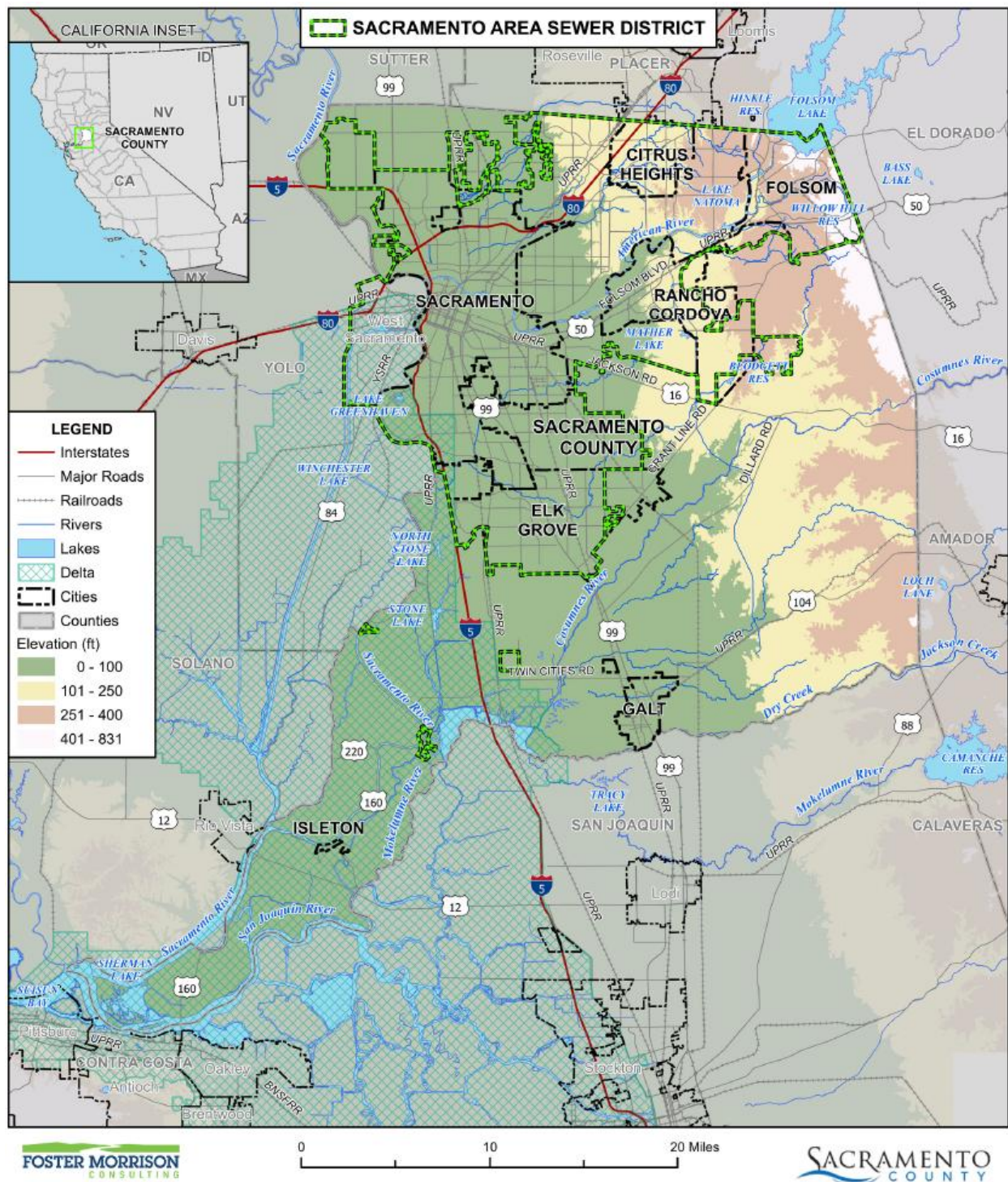
Table O-2 2021 LHMP Incorporation

Planning Mechanism 2021 LHMP Was Incorporated or Implemented Through	Details
Climate Adaptation and Resiliency Plan	The Climate Change Resiliency Plan, now known as the Climate Adaptation and Resiliency Plan (CARP), is in development and expected to be completed in the summer of 2026. This plan serves as a strategic framework for effectively adapting and bolstering SacSewer’s operational and infrastructure resilience to climate change. Priority hazards and critical facilities from the 2021 LHMP were incorporated into the CARP.
Study Telecommute Options and Enhanced Information Technology Needs to Support Workforce	Plans to evaluate a telecommuting policy for employees who can work from home. The telecommuting policy has been completed, and staff are allowed to work from home per the policy.
COVID 19 Prevention and Re-opening Plan	SacSewer created a COVID-19 Prevention and Re-opening Plan to help reduce the spread of the virus among employees and others in the workplace. The plan details essential infection-control practices, procedures for quickly identifying and isolating sick individuals, guidelines for employees returning to work, and communication about workplace flexibility and protective measures. The purpose of the Implementation Plan is to ensure that all action items and activities from the Re-opening Plan are implemented and documented, while also communicating to staff the safety measures in place at all locations and field operations to support the safest work environment possible.

O.3 Community Profile

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

Figure O-1 SacSewer



Data Source: Sacramento County, Cal-Atlas; Map Date: 6/16/2026.

O.3.1. Overview and Background

In the 1960s, recreational interests and water supply needs began to prompt concerns about sewage discharge into local waterways. By the 1970s, more than 20 separate sewage collection and treatment systems were supporting 600,000 people in the region.

In 1973, the County and City of Sacramento joined forces with the City of Folsom to form Regional San (now known as SacSewer), which assumed responsibility for regional sewage treatment. In 1976, SacSewer received major federal and state grants to construct the Sacramento Regional Wastewater Treatment Plant, now known as the EchoWater Resource Recovery Facility, and a vast network of underground pipes to link to each of the area's local sewage collection systems. Over time, SacSewer expanded service to additional communities, including West Sacramento and the Delta communities of Courtland and Walnut Grove.

In 2010, the Central Valley Regional Water Quality Control Board issued new treatment requirements for the Sacramento Regional Wastewater Treatment Plant through the 2010 National Pollution Discharge Elimination System (NPDES) permit. To meet these stricter regulations, SacSewer launched the EchoWater Project, a major upgrade designed to improve water quality and support the health of the Sacramento–San Joaquin Delta downstream of our discharge point in the Sacramento River.

The EchoWater Project was completed in 2023. This effort consisted of 22 individual projects, such as the Biological Nutrient Removal (BNR) facilities and the Tertiary Treatment Facility. In addition to improving downstream water quality, the upgraded facilities created a drought-resistant supply of recycled water for non-potable uses, including agricultural irrigation and habitat restoration.

The Sacramento Area Sewer District (SacSewer) and the Sacramento Regional County Sanitation District (Regional San) legally merged on January 1, 2024, into a single consolidated entity operating under the name Sacramento Area Sewer District. This merger combined California's second-largest sewage collection utility with the state's second-largest water resource recovery facility to streamline policy decisions, solidify unity among workforce and organizational culture, and operate as one cohesive service provider under one Board of Directors. The consolidated utility provides sewage collection, treatment, and resource recovery services to more than 1.6 million people in the Sacramento region, including Sacramento, Elk Grove, Citrus Heights, Rancho Cordova, and parts of Folsom. SacSewer historically managed local sewage collection (approx. 4,600 miles of pipe and over 100 pump stations), while Regional San operated the regional conveyance system and the EchoWater Resource Recovery Facility near Elk Grove.

The climate of the District is the same as Sacramento County as a whole.

O.4 Risk Assessment

As defined by FEMA, risk is a combination of hazard, vulnerability, and exposure. “It is the impact that a hazard would have on people, services, facilities, and structures in a community and refers to the likelihood of a hazard event resulting in an adverse condition that causes injury or damage.”

The SacSewer risk assessment identifies and profiles relevant hazards and assesses the exposure of lives, property, infrastructure, and the environment to these hazards. The process allows for a better

understanding of the District’s potential risk and vulnerability to hazards and provides a framework for developing and prioritizing mitigation actions to reduce risk from future hazard events.

Building on the District Profile above, a risk assessment was performed for the District utilizing the existing District boundaries. This includes the following sections:

- O.4.1 Assets Inventory and Growth and Development Trends
- O.4.2 Hazard Identification
- O.4.3 Hazard Profiles and Vulnerability to Specific Hazards

O.4.1. Assets Inventory and Growth and Development Trends

This section provides an inventory of the SacSewer’s total assets potentially at risk to hazards and an overview of growth and development trends. This section is broken into two parts:

- **Asset Inventory** – The assets inventory identifies the SacSewer’s total assets, including the people and populations; structures; critical facilities and infrastructure; community lifelines; natural, historic, and cultural resources; and economic assets and community activities of value. This data is not hazard specific, but is representative of total assets within the District, potentially at risk to identified hazards as discussed in Section O.4.3 Hazard Profiles and Vulnerability to Specific Hazards.
- **Growth and Development Trends** – A discussion of growth and development trends in the District, both current and future, is presented.

Assets Inventory

The District’s asset inventory is detailed in the following sections:

- People and Populations
- District Assets and Critical Facilities and Infrastructure
- Community Lifelines
- Natural, Historic, and Cultural Resources
- Economic Assets and Community Activities of Value

A discussion of each of these assets follows and serves as the template for the asset discussion for each hazard in Section O.4.3.

People and Populations

The most important asset within any community are the people and populations that reside in the community. This section includes an inventory of past and current populations of the District and also discusses vulnerable populations and underserved communities as a subsection of people and populations located within the District and potentially at risk to hazards. Information from the District and other sources as detailed below form the basis of this discussion.

Historic Population Trends and Current Population

The most important asset within any community are the people and populations that both work and reside in the District. For special districts, this generally includes District staff and contractors as well as those populations located within its boundaries and served by the District. The District has approximately 830 staff that work for the District. The District provides services to 1.6 million people.

SacSewer's service area includes diverse residential communities within Sacramento and portions of Yolo County, some of which contain vulnerable and underserved populations such as the elderly, disabled, low-income, migrant workers, non-English speaking, and the homeless. Hazard-related concerns for these groups include limited access to emergency information and health-associated risks from sewer spills caused by heavy rains and storms.

District Assets and Critical Facilities and Infrastructure

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

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

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

Most of the District assets are considered Category 1 critical facilities, specifically essential services facilities. Table O-3 lists critical facilities and other District assets identified by the District Planning Team as important to protect in the event of a disaster. SacSewer's physical assets, valued at over \$16 billion, consist of structures, critical facilities and infrastructure, and other District assets to support the District's operations.

Table O-3 SacSewer Assets: Structures, Critical Facilities and Infrastructure, and Other Facilities.

Name of Asset	Facility Type	2026 Replacement Value ⁽¹⁾	Which Hazards Pose Risk
Treatment and Resource Recovery Assets			
Underground Pipeline, Structures, Equipment and Appurtenances ⁽²⁾	Essential	\$2,702,985,681	Dam failure, Levee failure, Flood
S94 – EchoWater Resource Recovery Facility	Essential	\$5,138,301,303	Dam failure, Levee failure, Flood, Severe Weather

Name of Asset	Facility Type	2026 Replacement Value ⁽¹⁾	Which Hazards Pose Risk
EchoWater Ring Levee	Essential	\$13,925,014	Dam failure, Levee failure, Flood, Earthquake
X009 - Outfall Facility	Essential	\$20,363,443	Dam failure, Levee failure, Flood, Earthquake
N27 – Sump 55 Facility	Essential	\$22,508,997	Dam failure, Levee failure, Flood, Severe Weather
N28 – Sump 119 Facility	Essential	\$21,629,373	Dam failure, Levee failure, Flood, Severe Weather
N29 – Sump 2/2A Facility	Essential	\$12,292,100	Dam failure, Levee failure, Flood, Severe Weather
N35 – Sump 76 Facility	Essential	\$4,896,666	Dam failure, Levee failure, Flood, Severe Weather
N43 – Roseville/Watt Liquid Waste Disposal Facility	High Potential Loss	\$5,292,660	Dam failure, Levee failure, Flood, Severe Weather
N15, N16 – Northeast Siphon	Essential	\$12,606,605	Dam failure, Levee failure, Flood, Severe Weather
Bufferlands and Environmental Mitigation Lands	Natural Resource	\$14,844,261	Fire, Dam failure, Levee failure, Flood, Severe Weather
Sims Ranch	Historic Resource	\$177,584	Fire, Dam failure, Levee failure, Flood, Severe Weather
Nicolaus Dairy	Historic Resource	\$1,622,609	Fire, Dam failure, Levee failure, Flood, Severe Weather
SacSewer Archaeological Site CA-SAC-83	Cultural Resource	(2)	Fire, Dam failure, Levee failure, Flood, Severe Weather
Real Property, Land and Easements	Essential	\$86,445,288	Fire, Dam failure, Levee failure, Flood, Severe Weather
Buildings	Essential	\$272,515,645	Fire, Dam failure, Levee failure, Flood, Severe Weather
Underground Pipeline, Structures, Equipment and Appurtenances ⁽³⁾	Essential	\$2,702,985,681	
Total		\$8,732,647,558	
Collection System Assets			
South Area Corporation Yard (SACY)	Essential	\$73,729,166	Minimal flood, airplane crash, fire

Name of Asset	Facility Type	2026 Replacement Value ⁽¹⁾	Which Hazards Pose Risk
North Area Corporation Yard (NACY)	Essential	\$32,606,298	Minimal flood, fire
Main Lines	Essential	\$3,565,279,665	Minimal earthquake
Lower Laterals	Essential	\$2,841,800,667	Minimal earthquake
Manholes	Essential	\$788,020,002	Minimal earthquake
S30 – Old Natomas Pump Stn	High Potential Loss	\$5,930,051	Dam failure, Levee failure, Flood, Severe Weather
S33 – Cordova Pump Stn	Essential	\$22,707,447	Dam failure, Levee failure, Flood, Severe Weather
S55 – Northeast Pump Stn	Essential	\$1,617,242	Dam failure, Levee failure, Flood, Severe Weather
Total		\$7,331,690,537	

Source: SacSewer

(1) Asset value includes facility, site structures, site equipment, mobile equipment, miscellaneous items that may have soft cost components, and some associated adjacent pipeline components. Values taken from 2021 LHMP and engineering project reports. Values from the 2021 LHMP have been escalated 4% per year for inflation.

(2) The cost for this site has not been estimated

(3) Pipelines include gravity and force mains ranging in size from 36-inch to 144-inch. Structures and appurtenances include valves, vaults, junction structures, flow meters, and roller gates, etc.

Community Lifelines

Assessing the vulnerability of SacSewer to natural hazards and disasters also involves reviewing and inventorying the community lifelines in place that could be affected. It is important to include these items in hazard discussions as the continuous operation of critical government and business functions is essential to human health and safety, property protection, and economic security. The importance of community lifelines is discussed below:

- Lifelines are the most fundamental services in the community that, when stabilized, enable all other aspects of society to function.
- FEMA has developed a method for objectives-based response that prioritizes the rapid stabilization of Community Lifelines after a disaster.
- The integrated network of assets, services, and capabilities that provide lifeline services are used day-to-day to support the recurring needs of the community and enable all other aspects of society to function.
- When disrupted, decisive intervention (e.g., rapid re-establishment or employment of contingency response solutions) is required to stabilize the incident.

Community lifelines, as defined by FEMA, include the following:

- **Safety and Security** – Law Enforcement/Security, Fire Service, Search and Rescue, Government Service, Community Safety

- **Food, Hydration, Shelter** – Food, Water, Shelter, Agriculture
- **Health and Medical** – Medical Care, Public Health, Patient Movement, Medical Supply Chain, Fatality Management
- **Energy** – Power Grid, Fuel
- **Communications** – Infrastructure, Responder Communications, Alert Warnings and Messages, Finance, 911 and Dispatch
- **Transportation** – Highway/Roadway/Motor Vehicle, Mass Transit, Railway, Aviation, Maritime
- **Hazardous Material** – Facilities, HAZMAT, Pollutants, Contaminants
- **Water Systems** – Potable Water Infrastructure, Wastewater Management

It should be noted that these community lifelines are all in place and functional as part of regular government operations in the Sacramento County Planning Area serving as a partnership between the cities, local special districts and agencies, and Sacramento County. Most all of the District's community lifelines overlap with the Planning Area's and include many of the critical facilities and infrastructure assets inventoried for this LHMP. As such, specific information on these community lifelines in the District and how they may be affected by a hazard event or disaster are discussed collectively for all jurisdictions in the Base Plan.

Natural, Historic, and Cultural Resources

Natural Resources

SacSewer has a variety of natural resources of value to the District. These natural resources parallel that of Sacramento County as a whole. Information can be found in Section 4.2.1 of the Base Plan.

Historic and Cultural Resources

SacSewer has a variety of historic and cultural resources of value to the District. These historic and cultural resources parallel those of Sacramento County as a whole. Information can be found in Section 4.2.1 of the Base Plan.

Economic Assets and Community Activities of Value

Assessing the vulnerability of SacSewer to natural hazards and disasters also involves inventorying the economic assets and community activities of value in the District.

Economic Assets

After a disaster, economic resiliency is one of the major drivers of a speedy recovery. Each community has specific economic drivers. Economic assets for the County were discussed in Section 4.2.1 of the Base Plan and are assumed to be the same or similar for the District.

Community Activities of Value

Inventorying economic assets in the District and their vulnerability to natural hazards and disasters also involves inventorying activities that have value to the community. This includes activities that are important to a community, like long-standing traditions such as a festival or fair or other activities that bring

money into the communities such as sports tournaments and other recreational activities. Community Activities of Value for the County were discussed in Section 4.2.1 of the Base Plan and are assumed to be the same or similar for the District.

Growth and Development Trends

As part of the planning process, the District looked at changes in growth and development, both current 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. This inventory section details future development/redevelopment projects that are likely to occur over the next five years covered by this 2026 LHMP. For Districts, this generally includes the following:

- Construction/development projects related to adding new District facilities, infrastructure, land acquisition, etc.
- Plans for expansion or build out of the District's service area, including new service hookups, and other District functions related to where the District will be expanding services.

Population Trends and Projections

The number of people served by SacSewer has increased. Comparing the population served in the 2021 Report of Waste Discharge (ROWD) with the 2026 ROWD, SacSewer now serves 27,825 more people than in 2021. Growth is expected to continue in a slow and steady pace going forward.

Development since 2021 Plan

SacSewer has added several facilities and assets since 2021:

- EchoWater Facility (2023)
 - ✓ Portions of the EchoWater Facility and its surrounding Bufferlands are located within the moderate-risk CalFire Fire Hazard Severity Zone.
 - ✓ The facility lies within the 200-year and 500-year FEMA floodplains, but the surrounding ring levee system provides flood protection for the facility.
- Septic-to-Sewer Conversion Projects (2026)
 - ✓ Rural Projects (Franklin and Hood):
 - SacSewer service area will expand once the communities of Franklin and Hood are annexed to its jurisdiction.
 - Hood and a portion of Franklin are located within the FEMA 100-year floodplain.
 - Approximately half of both communities lie within moderate-risk CalFire Fire Hazard Severity Zones.
 - ✓ Urban Projects (Linda Manor and Old Florin Town):
 - These communities are located within the FEMA 500-year floodplain
- Harvest Water Project (2026)
 - ✓ Portions of the Harvest Water recycled-water delivery area are located within the FEMA 100-year floodplain.
- BioGeneration Facility (2026)

- ✓ The facility lies within the 200-year and 500-year FEMA floodplains, but the surrounding ring levee system provides flood protection.

Future Development Areas

It is important to review future development plans for the District. Future development should be sited in areas that are away from known hazard risks. If this is not possible, mitigation should be done to ensure that future development is protected against future hazards. Below is a list of new District facilities, land acquisitions, and developments occurring in SacSewer's jurisdiction within the next 5 years.

BioGeneration Facility

SacSewer's Biogen facility project is a significant initiative aimed at enhancing renewable energy generation from biogas. The project involves constructing a 13.4 MW biogas cogeneration facility at the EchoWater Facility. The BioGen facility is anticipated to be operational in 2027.

Primary Sludge Thickening Facility

This facility will mechanically dewater, or 'thicken,' sludge generated during primary sedimentation. By reducing the hydraulic loading to the digesters, the project will increase solids retention time, enhance solids destruction, and delay the need for additional digesters in the future. The current schedule anticipates completing design in 2028, with construction planned from 2029 through 2032.

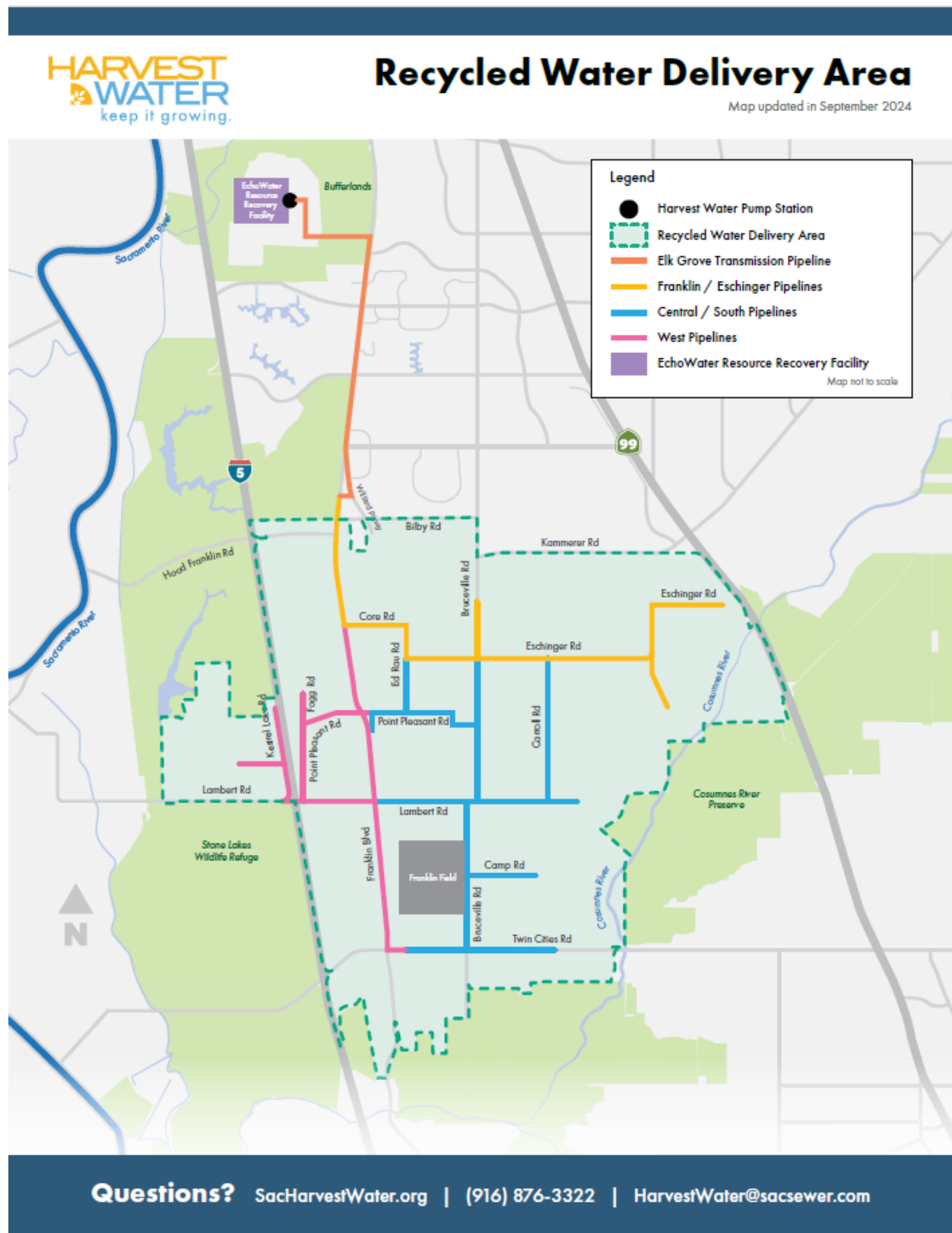
Digested Sludge Dewatering Facility and Warehouse Project

This project will construct facilities that will receive digested sludge directly from the digesters and dewater it before it is applied to the lined dedicated solids disposal units (L DLDs). The design will also include provisions for the seasonal storage of dewatered sludge. The current schedule anticipates completing design in 2028, with construction planned from 2029 through 2032.

Harvest Water

SacSewer's Harvest Water program is California's largest water recycling project providing high-quality recycled water to agricultural lands and existing habitats in southern Sacramento County. The project (shown on Figure O-2) includes the construction of a large, recycled water pump station at the EchoWater Facility, transmission pipelines, and on-farm service connections. Construction is scheduled for completion in 2026, and the system is anticipated to be operational in 2027.

Figure O-2 Harvest Water Delivery Area

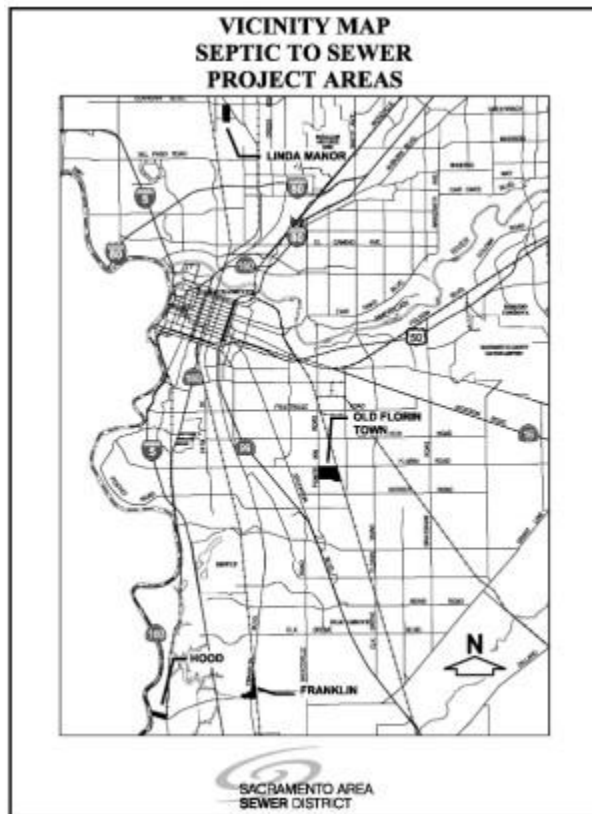


Source: SacSewer

Septic-to-Sewer Conversion projects

Several Septic-to-Sewer conversions in unincorporated Sacramento County communities have been completed in 2025. Franklin, Hood, Linda Manor, and Old Florin Town were the communities that had their aging septic systems converted to a public sewer system. SacSewer is annexing Franklin and Hood into its service area and conducting studies for additional Septic-to-Sewer projects in unincorporated Sacramento County communities (as seen on Figure O-3).

Figure O-3 Septic to Sewer Project Areas



Source: SacSewer

Lakeside at Sutter Pointe

SacSewer and Sutter County are in the process of revising an operating agreement to provide sanitary sewer service to the Sutter Point Specific Plan (SPSP), which can be seen on Figure O-4. The SPSP is a 7,528-acre new growth area in south Sutter County, with the first phase (Lakeside at Sutter Pointe) beginning construction within the next 5 years. SacSewer's service area will not expand with this project. Sutter County will own the sewer facilities; SacSewer will operate and maintain under a service agreement.

Figure O-4 Lakeside at Sutter Point Plan Area

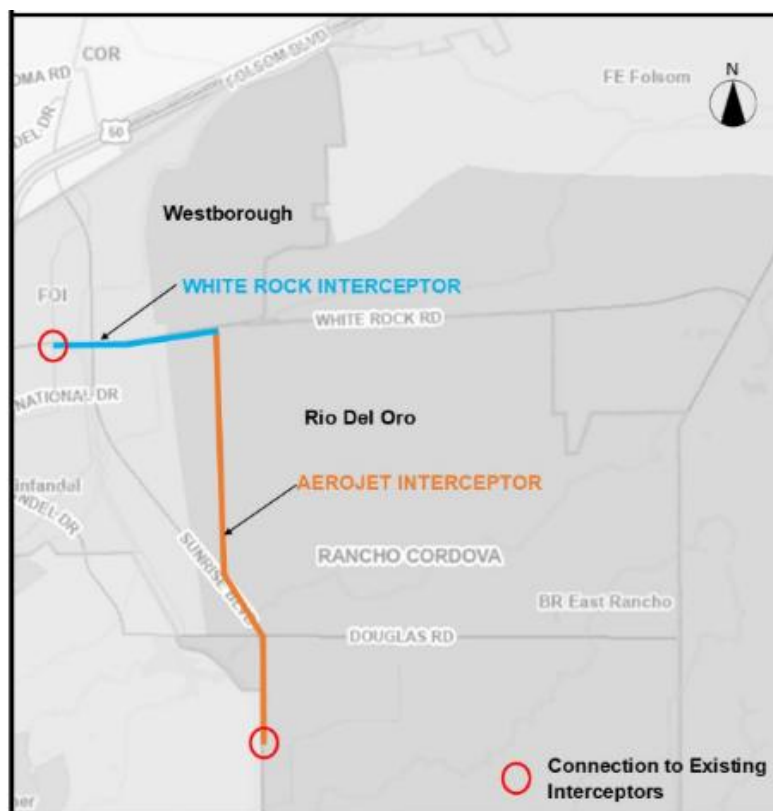


Source: SacSewer

East Rancho Cordova Interceptors Project

The East Rancho Cordova Interceptors (ERCI) project will address long-term capacity needs in the eastern portion of the City of Rancho Cordova to support growing development. Studies since 2000 indicate an increase in development is projected to exceed the existing S132 Chrysanthy Pump Station's capacity within 7-9 years, requiring a new interceptor by 2033. The current schedule anticipates construction completion in 2031.

Figure O-5 East Rancho Cordova Interceptors Project



Source: SacSewer

O.4.2. Hazard Identification

SacSewer identified the hazards that affect the District and summarized their location, extent, likelihood of future occurrence, potential magnitude, and significance (or priority of a hazard) specific to the District (see Table O-4). Those hazards identified as a high or medium significance in Table O-4 are considered District priority hazards for mitigation planning. Those hazards that occur infrequently or have little or no impact in the District were determined to be of low significance and not considered a priority hazard. Significance was determined based on the hazard profile, focusing on key criteria such as frequency, extent, and resulting damage, including deaths/injuries and property, natural and cultural resources, and economic damage. The ability of a jurisdiction to reduce losses through implementation of existing and new mitigation measures was also considered as to the significance of a hazard. This assessment was used to prioritize those hazards of greatest significance, enabling the District to focus resources where they are most needed.

Table O-4 SacSewer—Hazard Identification Assessment

Hazard	Geographic Extent	Likelihood of Future Occurrences	Magnitude/Severity	Significance	Climate Change Influence
Aquatic Nuisance Species (plant/animal)	Limited	Occasional	Limited	Low	Low
Climate Change	Extensive	Likely	Limited	Medium	–
Dam Failure	Significant	Unlikely	Catastrophic	High	Medium
Drought & Water Shortage (w/tree mortality)	Extensive	Likely	Limited	Low	High
Earthquake (w/subhazards)	Extensive	Occasional	Catastrophic	Low	Low
Flood: 1%/0.5%/0.2% annual chance	Significant	Occasional	Critical	High	Medium
Flood: Localized Stormwater	Extensive	Highly Likely	Limited	Low	Medium
Landslides, Mudslides, and Debris Flow	Significant	Unlikely	Limited	Low	Medium
Levee Failure	Extensive	Unlikely	Critical	High	Medium
Sea Level Rise	Extensive	Likely	Limited	Medium	High
Severe Weather: Extreme Cold and Freeze	Extensive	Likely	Limited	Low	Medium
Severe Weather: Extreme Heat	Extensive	Highly Likely	Limited	Low	High
Severe Weather: Heavy Rains and Storms (Hail, Lightning, Wind)	Extensive	Highly Likely	Limited	Low	Medium
Severe Weather: High Winds and Tornadoes	Extensive	Likely	Limited	Low	Low
Subsidence	Significant	Highly Likely	Limited	Low	Medium
Wildfire (w/ smoke and air quality)	Significant	Highly Likely	Limited	Medium	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					

O.4.3. Hazard Profiles and Vulnerability to Specific Hazards

This section includes the hazard profiles and vulnerability assessment for SacSewer’s priority hazards (i.e., those ranked of medium or high significance specific to the District as identified in the Significance column of Table O-4). This section focuses on where and how the District is affected by their priority hazards. Chapter 4 of the Base Plan provides 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 4.2 of the Base Plan.

Hazard Profiles and Vulnerability Assessment

Each hazard is profiled in the following format:

- **Hazard Profile** – A hazard profile is included for each hazard. This includes information on:
 - ✓ **Hazard Overview** – A general discussion of the hazard and related issues is detailed here.
 - ✓ **Location and Extent** – Location is the geographic area within the District that is affected by the hazard. Extent is the expected range of intensity for each hazard. These are discussed in specific detail for mapped hazards, and in more general detail for those hazards that do not have discrete mapped hazard areas.
 - ✓ **Past Occurrences** – Past occurrences are discussed for each hazard. A discussion of disaster declarations is included in each hazard section. NCEM events are also discussed. Other past occurrences data specific to the District follow the disaster declarations and NCEM events for each hazard.
 - ✓ **Climate Change** – This section contains the effects of climate change (as applicable). The possible influence of climate change on the hazard is discussed.

After the hazard profile, a vulnerability assessment is presented. As part of the vulnerability assessment, an estimate of the vulnerability of the District to each identified hazard, in addition to the estimate of risk of future occurrence, is provided in each of the hazard-specific sections. 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.

After this classification, a general discussion of hazard vulnerabilities occurs. This is done in the following format:

- **Vulnerability Overview** – A general discussion of the hazard vulnerability and related issues is detailed here.
- **Local Concerns** – This includes District provided information on how the District is uniquely affected by or vulnerable to each hazard.
- **Assets at Risk** – A discussion of the assets at risk follows, presented in the same order as in Section O.4.1 above, with a few exceptions. This includes sections on: People and Populations; District Assets, Critical Facilities and Infrastructure, and Other Facilities; and Natural, Historic, and Cultural Resources. These are discussed in specific terms for mapped hazards, and in more general terms for those hazards that are unmapped. Sections on Community Lifelines and Economic Assets and Community Activities of Value are not included in the Sections below, as they are common to all jurisdictions and are fully covered in Section O.4.1 above, in Chapter 4 of the Base Plan, and in the City Annexes where the District is located, as applicable.
- **Impacts** – A discussion on hazard impacts follows. Impacts describe how each hazard can affect the District and its assets. The type and severity of impacts reflect both the potential magnitude of the hazard and the vulnerability of the asset.
- **Future Conditions/Future Development** – A discussion of how future conditions and future development may affect the hazard is also included. This considers both new District assets and improvements as well as any changes with the District’s service area.

Power Interruption/Power Failure: A Common Vulnerability of all Hazards

An impact or vulnerability of almost all hazards evaluated as part of this LHMP Update relates to power shortage and/or power failures. There are two major power providers in the Sacramento County Planning Area - Sacramento Municipal Utility District (SMUD) and Pacific Gas and Electric (PG&E). 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 U.S. 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. Much of the Sacramento County Planning Area is served by PG&E and SMUD. More information on types of power disruptions can be found in Section 4.3 of the Base Plan.

Public Safety Power Shutoff (PSPS)

An intentional disruption type of power shortage/failure event has been implemented in California as a result of wildfires starting 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 preparing all Californians for the threat of wildfires and power outages during times of extreme (fire) weather. To help protect customers and communities during extreme fire weather events, electric power may be shut off for public safety in an effort to proactively prevent wildfire. This is called a PSPS. More information on PSPS criteria can be found in Section 4.3 of the Base Plan. PG&E noted no PSPS events in the Sacramento County Planning

Area since the 2021 LHMP. SMUD noted that it has had no PSPS events for its service territories since 2021.

Local Concerns

There have been no intentional (including PSPS events) power outage issues associated with hazard events affecting the District since 2021. There have been a few notable unintentional power outages since the 2021 LHMP.

On **March 10, 2023**, there was damage to S067 Pump Station's electrical panel, MCC, and RTU cabinets. SacSewer Maintenance & Operations crews arrived to find the resident's tree had fallen onto the pump station. Atmospheric storms causing heavy wind and rain had caused the tree to fall onto the pump station, damaging the electrical panel, MCC, and RTU cabinets. S067 lost communications and power, which affected the pump station's ability to pump sewage from the wet well. With the pump unable to operate, a spill occurred. Spill response activities are required to clean and restore the collection system's operation. Category 1 spill resulted in Administrative Civil Liability (ACL) fines with the Regional Water Quality Control Board (RWQCB) in 2025.

Figure O-6 Damage to S067 Pump Station, March 10, 2023



Source: SacSewer

On **December 10, 2022**, there was a power outage. Due to high-speed winds, a tree fell and damaged two SMUD power poles supplying electricity to S013. This caused power to the S013 pump stations to cease, rendering the pump station inoperable. As a result, a spill occurred from a nearby low-elevation manhole. Spill response activities required, including cleaning and restoring the operation of the collection system.

On **August 31, 2022**, in response to the “statewide grid emergency,” EchoWater Facility modified operations in support of Power Shedding Events (PSE). Modified operations were sometimes extended beyond the PSE period until the end of Peak Demand Hours. Power shedding procedures were adjusted based on feedback from Operations Staff. Ultimately, no power outage occurred during this time.

With an increase in climate change related issues (e.g., extreme heat conditions, atmospheric river storms) occurring in the Sacramento County Planning Area, the potential for future hazard related power outages remain a concern. SacSewer has stationary and portable generators to power critical facilities in the event of a power outage, including as necessary a PSPS.

Hazard Profiles and Vulnerability Assessment by Hazards

The following sections provide the hazard profile and vulnerability assessments for each of the hazards identified in Section O.4.2 Hazard Identification.

Climate Change

Likelihood of Future Occurrence–Likely

Vulnerability–Medium

Hazard Profile

Climate change adaptation is a key priority of the State of California. The 2023 State of California Multi-Hazard Mitigation Plan noted that climate change is 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.

California’s Adaptation Planning Guide: Understanding Regional Characteristics (from 2017) has divided California into 11 different regions based on political boundaries, projected climate impacts, existing environmental setting, socioeconomic factors and regional designations. The District falls in the North Central Valley Region. A map and climate projections for this region are shown in Section 4.3.7 of the Base Plan and include an increase in temperatures, moderate changes in rainfall, and increased risk to wildfire.

Location and Extent

Climate change is a global phenomenon. It is expected to affect the whole of the District, the Sacramento County Planning Area, surrounding counties, 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

Disaster Declaration History

Climate change has never been directly linked to any declared disasters.

NCDC Events

NCDC does not track climate change events.

SacSewer Events

During the past drought in 2012-2016, and from 2021 to present, the SacSewer Five Year Strategic Plan noted that the District faced issues related to climate change. Lower flows increase the risk of debris stoppages, odor issues, and root intrusion in the collection system. Additionally, heavy storm cycles can lead to pump station power outages and system surcharges. Both too little and too much water in the sewer system pose challenges that require strategic consideration in long-term planning.

SacSewer requires staff preparedness in advance of severe weather events and may require adjustments to operations' schedules to accommodate weather-related emergencies. More frequent and intense storms driven by climate change increase the number of creek-crossing inspections.

Vulnerability to Climate Change

The District as a whole exhibits some degree of vulnerability to climate change. The District Planning Team has concerns that the District's vulnerability to climate change will continue to increase in the future. An assessment of a community's vulnerability to climate change begins with an understanding of local exposure to climate change. This is included in the Local Concerns section below followed by a discussion of the District's assets at risk and impacts to this hazard.

Local Concerns

The District has specific concerns and unique vulnerabilities regarding this hazard. These concerns form a portion of the basis for the mitigation strategy and mitigation actions that seek to reduce risk and vulnerability to this hazard.

SacSewer is primarily concerned about climate-driven impacts such as extreme heat, flooding, drought, wildfires, and power disruptions, which threaten the reliability and safety of its infrastructure and operations. Rising temperatures, shifting precipitation patterns, and potential sea level rise could intensify these hazards.

Assets at Risk

Assets at risk from climate change include people and populations; District assets and critical facilities and infrastructure); and natural, historic, and cultural resources. These are discussed in the following sections.

People and Populations

Climate change affects District staff, and those served by the District, especially those climate change issues related to increases in temperature over time. This includes District staff and contractors, especially those who work outdoors as well as those more vulnerable populations identified within District boundaries. While all populations can be affected by temperature extremes, populations particularly vulnerable include the elderly, disabled, low-income, migrant workers, non-English speaking, and the homeless. Those the without means of shelter (and air conditioning or heat) or transportation, people who are socially isolated and other vulnerable or underserved populations (as shown in the discussion in Section O.4.1) can be especially vulnerable. Acclimatization to extreme temperatures and other weather extremes may help

reduce impacts from these extreme events, such as from heat waves, in the healthy general population but may not be sufficient to protect those with underlying medical conditions.

District Assets and Critical Facilities and Infrastructure

Climate change, on its own, does not generally impact structures (like District assets and critical facilities and infrastructure). The District noted that its facilities will most likely not be at risk from climate change alone. However, structures in areas of increased flood, drought, extreme heat, or wildfire areas exacerbated by the effects of climate change would be at increased risk, as described throughout this LHMP. Due to the slow onset of climate change, many structures in the District are expected to undergo improvements and adapt over time to a new climate normal.

Natural, Historic, and Cultural Resources

The rivers, streams, agricultural areas, and open space areas of the District support rich biodiversity, including many special-status species and habitat areas. These are all at risk from the effects of climate change. In addition, if heat continues to contribute to changes in wildfire patterns, most areas of the District are at increased risk from fire – including natural, historic, and cultural resources. Furthermore, as climate change exacerbates the extreme heat and drought hazard, areas of wetlands in the District may be reduced or dry up temporarily, which could damage habitat areas for waterfowl and other species that depend on these areas.

Impacts from Climate Change

The California APG: Understanding Regional Characteristics identified the following impacts specific to the North Central Valley Region in which the District is part of:

- Increased temperatures
- Reduced precipitation
- Public health – heat and air pollution
- Reduced agricultural productivity
- Inland flooding
- Reduced tourism

In addition to these sources, the 2023 State of California Hazard Mitigation Plan noted that according to California’s Fourth Climate Change Assessment, the state will experience the following climate impacts:

- Annual average daily high temperatures are expected to rise by 2.7° F by 2040, 5.8°F by 2070, and 8.8°F by 2100 compared to observed and modeled historical conditions. These changes are statewide averages.
- Heat waves are projected to become longer, more intense, and more frequent.
- Warming temperatures are expected to increase soil moisture loss and lead to drier conditions. Summer dryness may become prolonged, with soil drying beginning earlier in the spring and lasting longer into the fall and winter.
- Droughts are likely to become more frequent and persistent through 2100.

- The strength of the most intense precipitation and storm events affecting California is expected to increase.
- Snowpack levels are projected to decline significantly by 2100 due to reduced snowfall and faster snowmelt.
- Marine layer clouds are projected to decrease.
- Extreme wildfires (i.e., fires larger than 24,710 acres) would occur 50 percent more frequently. The maximum area burned statewide may increase 178 percent by the end of the century.

Impacts to identified assets at risk to this hazard and the overall vulnerability of the District may be affected in the future by climate change (which was discussed in the hazard profile section above), changes in population patterns, and changes in land use and development. The influencing effects of these factors on this hazard are discussed further in the Future Conditions/Future Development discussion below.

Future Conditions/Future Development

This section provides a discussion of how future conditions will influence or affect the hazard over time and also discusses future development relative to each hazard.

Future Conditions

Future conditions may be affected by climate change, changes in population patterns (migration, density, or the makeup of socially vulnerable populations), and changes in land use and development. Findings on this for the District include the following:

- As climate change continues to accelerate over time, climate related impacts to the District will continue to increase.
- Population projections within the jurisdictional boundaries of the District show the population to be increasing. It is unknown how population patterns and demographics will change in the near future. The District noted that it has no control over population changes within its jurisdictional boundaries. The District may add staff, but this number would be small. With changes in populations numbers and makeup, the vulnerability of the District to this hazard may increase.
- Changes in land use and development in the District are expected to occur in the near future and thus likely to increase the impacts of climate change on the District. While adherence to protective building codes for new development may assist in limiting future impacts and associated vulnerabilities of the District to this hazard, overtime, new development will likely increase the overall impact of the District to climate change.

Future Development

Future development considerations should be ongoing and proactive. Climate change can influence future development in the District over time. The District 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 District, climate-induced migration was recognized within the 2026 California Fifth Climate Assessment and is expected to be the focus of future studies.

Dam Failure

Likelihood of Future Occurrence–Unlikely

Vulnerability– High

Hazard Profile

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 given 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. In addition, with storms increasing in volume and intensity, as seen with the atmospheric river events of recent years, controlled releases from dams can also impact downstream levees and flood control structures resulting in increased and widespread flooding.

Dam failures, for purposes of this Plan, can also result from any one or a combination of the following:

- Earthquake
- Overtopping and uncontrolled releases
- Controlled releases
- Inadequate spillway capacity resulting in excess overtopping flows
- Internal erosion caused by embankment or foundation leakage, or piping or rodent activity
- Improper design
- Improper maintenance
- Negligent operation
- Failure of upstream dams on the same waterway

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 likely result from a natural disaster triggering the event, such as an earthquake.

Location and Extent

Note: The Folsom Dam, a High Hazard Dam located within the Sacramento County Planning Area as shown on the Inventory Map (see Section 4.3.8 of the Base Plan) is owned and operated by the US Bureau of Reclamation (USBUR). In recent years, Folsom Dam has been undergoing a series of improvements, including the Folsom Dam Raise Project, intended to help further reduce flood risk in the Greater Sacramento Area. With respect to the High Hazard dams with an inundation in the Sacramento County Planning Area, it should be noted that a dam inundation layer was not available for use from the USBUR for the High Hazard Folsom Dam. Given its location in the Sacramento County Planning Area, and relying on inundation data from previous Sacramento County LHMPs, the Folsom Dam still poses a threat of flooding to downstream communities should a dam incident occur. This may include both uncontrolled and controlled releases resulting from extreme precipitation events as well as other hazard events contributing to a dam failure such as a significant regional earthquake event.

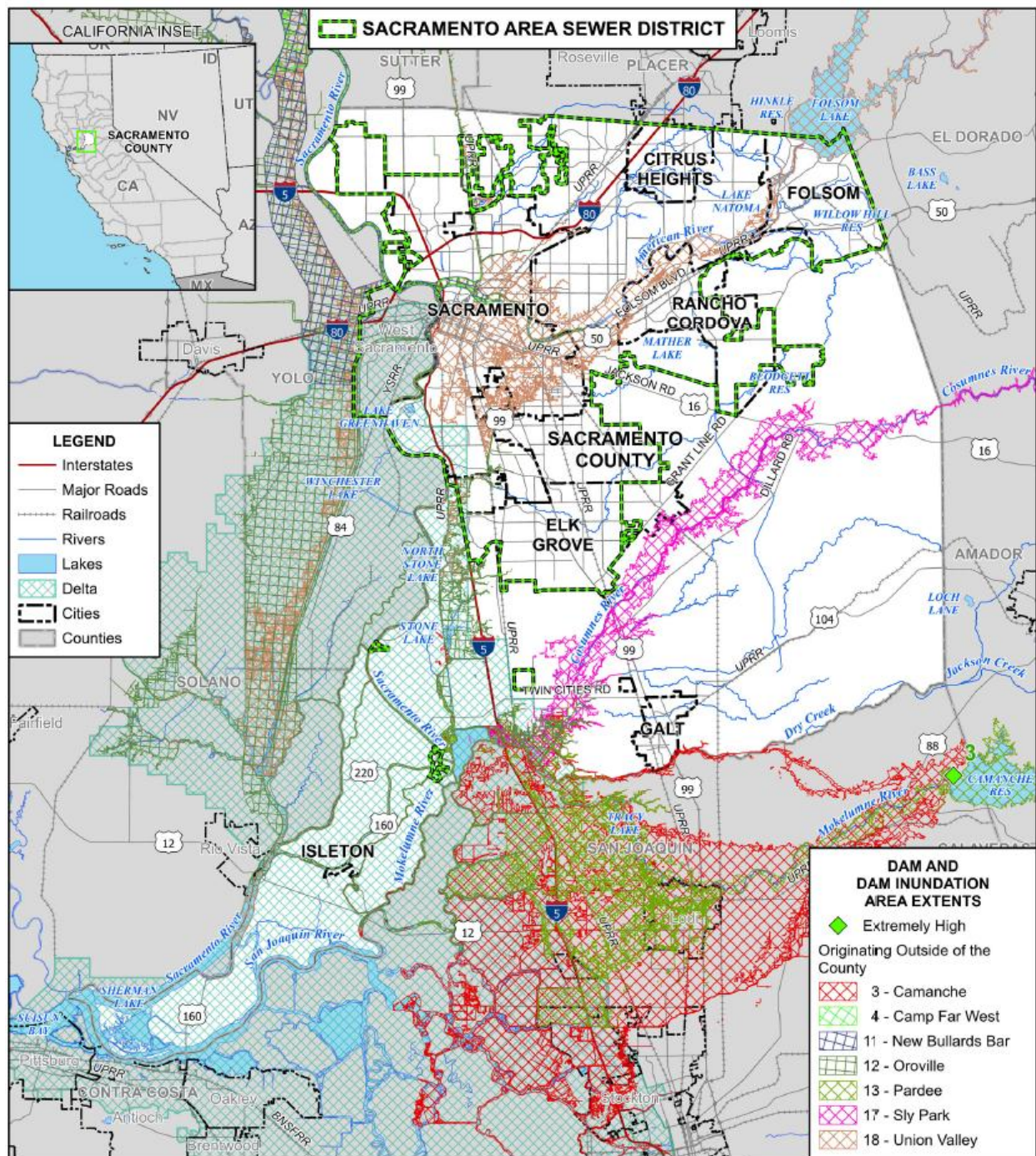
An inventory map of dams located within and around Sacramento County was shown in Section 4.3.8 in the Base Plan. Inundation mapping and analyses were conducted on Extremely High and High Hazard dams with inundation areas located in the Sacramento County Planning Area. Dams with an inundation area within the District are shown on Figure O-7 through Figure O-9. As shown, the District is affected by seven Extremely High Hazard dams originating from outside the County (Camanche, Camp Far West, New Bullards Bar, Oroville, Pardee, Sly Park and Union Valley), two High Hazard dams originating from inside the County (Nimbus and Willow Hill Reservoir), and five High Hazard dams originating from outside the County (Hinkle, L. L. Anderson, Lower Hell Hole, Rollins, Shasta).

There is no scale with which to measure dam failure. However, FEMA and CA DWR Division of Safety of Dams (DSOD) assign hazard potential classifications 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. FEMA categorizes the downstream hazard potential into three categories in increasing severity: Low, Significant, and High. DSOD adds a fourth category of Extremely High. Dams are classified in these four categories that identify the potential hazard to life and property. These were discussed in more detail in Section 4.3.8 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. For dam overtopping, the speed of onset is somewhat slower than that of a dam break, and the duration is longer (as evidenced in the 2017 Oroville Dam spillway event). The District would be affected for as long as the flood waters from the dam failure took to drain downstream.

Geographic flood extent from the DSOD Extremely High Hazard (outside the County) dam inundation areas is shown on Figure O-7 as well as in Table O-5. Geographic flood extent from the DSOD High Hazard (inside the County) dam inundation areas is shown on Figure O-8 as well as in Table O-6. Geographic flood extent from the DSOD High Hazard (outside the County) dam inundation areas is shown on Figure O-9 as well as in Table O-7.

Figure O-7 SacSewer– Extremely High Hazard Dam (Outside the County) Inundation Areas



FOSTER MORRISON
CONSULTING

0 10 20 Miles

SACRAMENTO
COUNTY

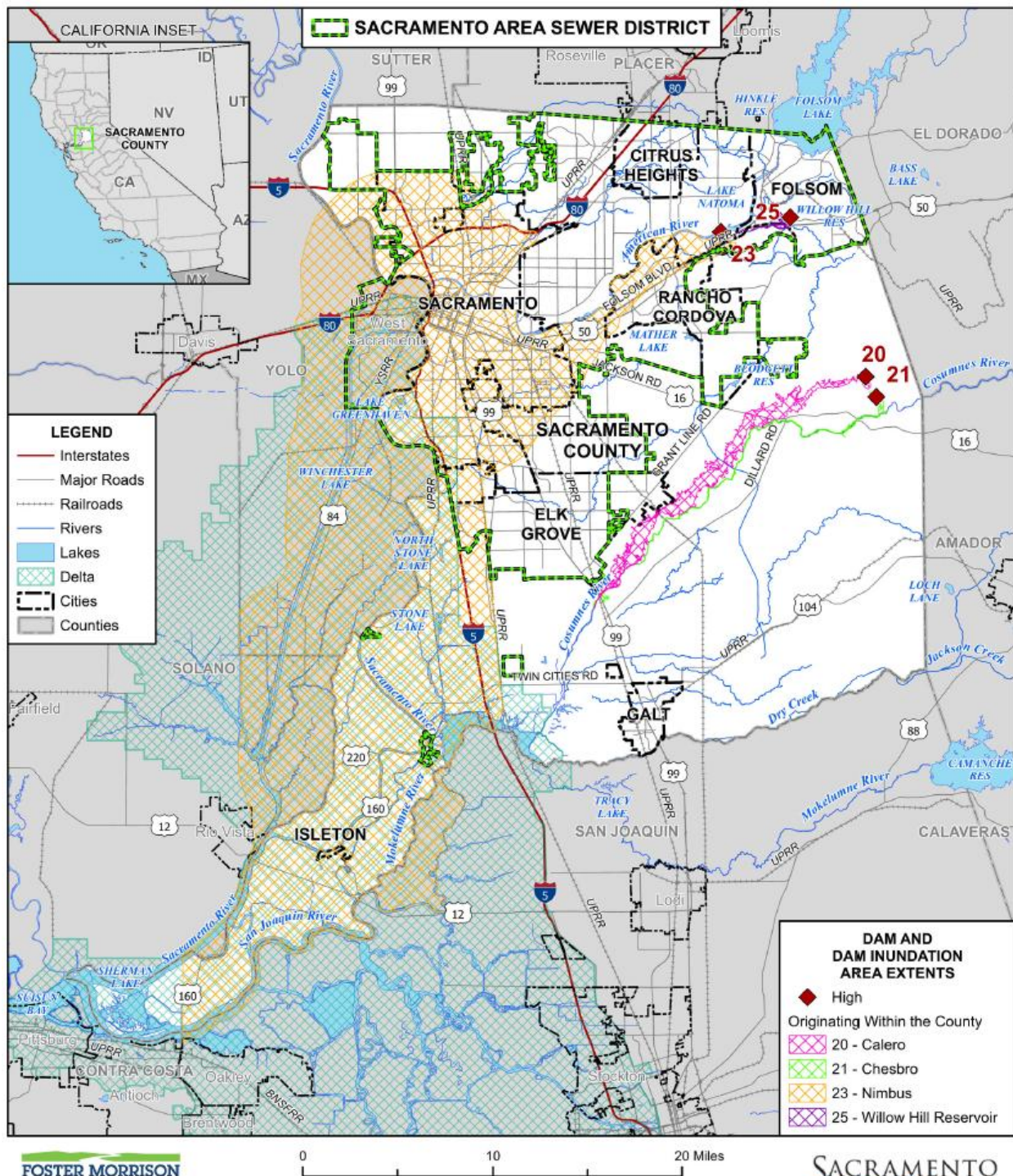
Data Source: DWR DSOD dam inventory and dam inundations (updated 7/2025; data downloaded 10/2025),
Sacramento County, Cal-Atlas; Map Date: 6/16/2026.

Table O-5 SacSewer – Extremely High Hazard Dam (Outside the County) Inundation Areas Geographical Extents

Dam Inundation Area	Total Acres	% of Total Acres	Improved Acres	% of Total Improved Acres	Unimproved Acres	% of Total Unimproved Acres
Camanche	5	0.003%	1	0.001%	5	0.01%
Camp Far West	105	0.1%	2	0.001%	104	0.1%
New Bullards Bar	1,003	0.5%	22	0.02%	981	1%
Oroville	2,438	1%	49	0.04%	2,389	3%
Pardee	4	0.002%	1	0.0005%	4	0.005%
Sly Park	3	0.001%	3	0.002%	0	0%
Union Valley	25,690	13%	13,546	12%	12,144	15%

Source: DSOD, Cal OES, County GIS

Figure O-8 SacSewer– High Hazard Dam (Inside the County) Inundation Areas



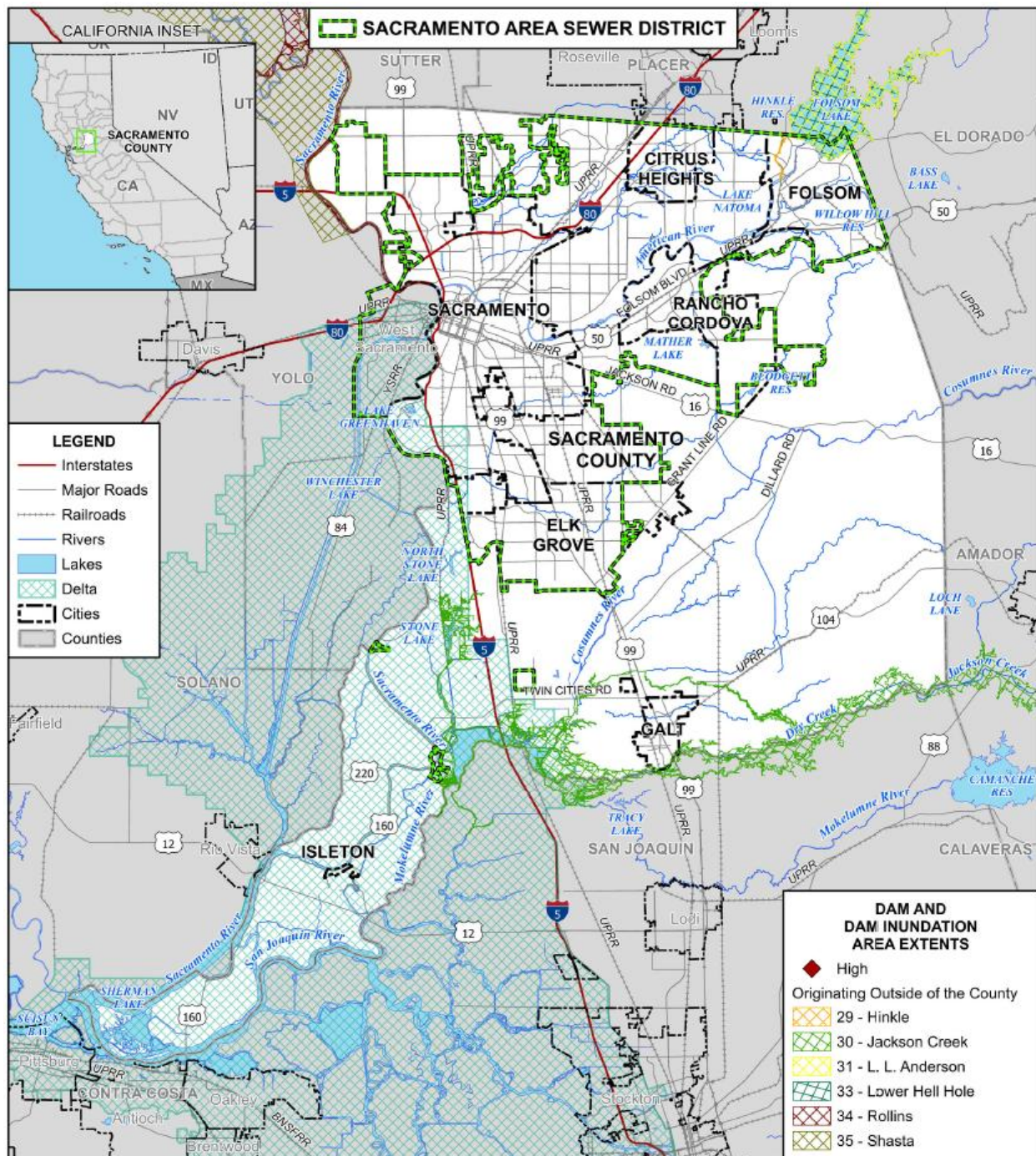
Data Source: DWR DSOD dam inventory and dam inundations (updated 7/2025; data downloaded 10/2025), CalOES CIP dam inundation data (3/2017), Sacramento County, Cal-Atlas; Map Date: 6/16/2026.

Table O-6 SacSewer – High Hazard Dam (Inside the County) Inundation Areas Geographical Extents

Dam Inundation Area	Total Acres	% of Total Acres	Improved Acres	% of Total Improved Acres	Unimproved Acres	% of Total Unimproved Acres
Nimbus	67,089	34%	41,399	35%	25,690	32%
Willow Hill Reservoir	158	0.08%	57	0.05%	101	0.1%

Source: DSOD, Cal OES, County GIS

Figure O-9 SacSewer– High Hazard Dam (Outside the County) Inundation Areas



FOSTER MORRISON
CONSULTING

0 10 20 Miles

SACRAMENTO
COUNTY

Data Source: DWR DSOD dam inventory and dam inundations (updated 7/2025; data downloaded 10/2025),
CalOES CIP dam inundation data (3/2017).
Sacramento County, Cal-Atlas; Map Date: 6/16/2026.

Table O-7 SacSewer – High Hazard Dam (Outside the County) Inundation Areas Geographical Extents

Dam Inundation Area	Total Acres	% of Total Acres	Improved Acres	% of Total Improved Acres	Unimproved Acres	% of Total Unimproved Acres
Hinkle	101	0.05%	69	0.06%	32	0.04%
L. L. Anderson	41	0.02%	0	0%	41	0.05%
Lower Hell Hole	52	0.03%	0	0%	52	0.06%
Rollins	10	0.01%	1	0.001%	9	0.01%
Shasta	39	0.02%	0	0%	39	0.05%

Source: DSOD

Past Occurrences

Disaster Declaration History

There have been no state or federal disaster declarations for dam failure in Sacramento County.

NCDC Events

The NCDC does not contain any dam failure events for Sacramento County.

SacSewer Events

The District Planning Team noted no past occurrences of dam failure of any type to affect the District.

Climate Change and Dam Failure

It is likely that climate change will increase the chance of future occurrence as well as future impacts associated with dam failure. More information on future impacts to the District can be found below and in the Future Conditions/Future Development section of the Vulnerability Assessment below.

The 2023 California State Hazard Mitigation Plan noted that modeling described in California’s Fourth Climate Change Assessment projects less frequent but more extreme daily precipitation. Year-to-year precipitation will become more volatile, and the number of dry years will increase by mid-century. As the climate continues to warm, atmospheric rivers will carry more moisture, and extreme precipitation may increase. Climate model projections show a tendency for the northern part of the State to become wetter. Increases in both precipitation and heat cause snow melt in areas upstream of dams, which could increase the potential for dam failure and uncontrolled (and controlled) releases in Sacramento County. The District could be affected by these changes, especially in areas within dam inundation zones.

The 2024 Sacramento County CAP noted that climate change is likely to lead to changes in the frequency, intensity, and duration of extreme weather events. The County is projected to experience a steady increase in average annual precipitation through the end of the century, with much of that precipitation likely to occur during extreme precipitation events, which can lead to flood impacts. According to Cal-Adapt, the

historic average annual precipitation in Sacramento County is 18.3 inches, and the historic average annual number of extreme precipitation events is four. The average annual precipitation across the County may rise upwards of 22 inches, with the number of extreme precipitation events potentially exceeding 7 per year by the end of the century, depending on the level of current and future GHG emissions.

In general, California exhibits “booms and busts,” which refers to the existence of both very wet years and very dry years. The amount of precipitation that falls in any particular year is largely influenced by occurrences of large, discrete winter storms, also known as atmospheric rivers, which often provide a substantial fraction of the region’s annual precipitation, inclusive of the county. In California, atmospheric rivers vary in intensity; some are beneficial for water supply and replenish snowpack that naturally melts during the summer, serving as the water supply for people and agriculture, while others are responsible for widespread and adverse impacts (NOAA 2023). Extreme precipitation from these atmospheric rivers in the future may prove to be more variable, volatile, and potentially more severe. These extremes are most likely to occur during storm events, leading to more severe damage from waves and floods, thus possibly leading to more dam failure events, including the need for more controlled releases from dams.

Vulnerability to Dam Failure

The vulnerability of the District to dam failure flooding would vary depending on which dam fails and the nature and extent of the dam failure and associated flooding. The primary danger associated with dam failure is the high velocity flooding of those properties downstream of the dam. A dam failure can range from a small, uncontrolled release to a catastrophic failure. Vulnerability to dam failures is generally confined to the areas subject to inundation downstream of the facility. Secondary losses would include loss of the multi-use functions of the facility and associated revenues that accompany those functions. Dam failure flooding would vary by community depending on which dam fails and the nature and extent of the dam failure and associated flooding.

An assessment of a community’s vulnerability to dam failure begins with an understanding of local exposure to dam failure. This is included in the Local Concerns section below followed by a discussion of the District’s Assets at Risk to this hazard.

Local Concerns

The District has specific concerns and unique vulnerabilities regarding this hazard. These concerns form a portion of the basis for the mitigation strategy and mitigation actions that seek to reduce risk and vulnerability to this hazard.

SacSewer is concerned about the impacts from a dam failure flood, which could include loss of life and injury, flooding and damage to property and structures, damage to critical facilities and infrastructure, loss of natural resources, and all other flood-related impacts. Additionally, mass evacuations and associated economic losses can also be significant. SacSewer’s concerns with dam failure have not changed since the last LHMP.

Folsom Dam is the major dam that affects SacSewer and the populations in the inundation areas. Folsom Dam is owned by the US Bureau of Reclamation. The flood waters from a dam failure would likely affect SacSewer’s service area. Flood waters could inundate sewer pump stations, regional collector pipes,

underground structures, and equipment, resulting in the inability to access or operate SacSewer’s facilities within the flooded areas. A severe flood could jeopardize the operation of the EchoWater Facility. Access to the EchoWater Facility, affected pipe systems and pump station facilities to assess and restore operation could be limited until such time that the flood waters receded.

Assets at Risk

Assets at risk from dam failure include people and populations; District assets and critical facilities and infrastructure); and natural, historic, and cultural resources. These are discussed in the following sections.

People and Populations

All people and populations (including both District staff and the population served by the District) located in dam inundation areas are vulnerable to dam failure. Certain vulnerable populations may be at increased risk to dam failure, especially during a large event with minimal advance notice. These vulnerable populations may include: the unhoused, those with limited mobility, and those that lack the resources to leave the area.

District Assets and Critical Facilities and Infrastructure

District assets, including structures, critical facilities and infrastructure, have some measure of risk to dam failure. Dam failure flooding can affect the District’s built environment. Structures in dam inundation areas are at risk and depending on flood depths, can range from slight damage to totally inundated. District assets at risk from this hazard are included in Table O-8.

Table O-8 SacSewer Assets: Structures, Critical Facilities and Infrastructure, and Other Facilities at Risk from Dam Failure

Name of Asset	Facility Type	2026 Replacement Value
Treatment and Resource Recovery Assets		
Underground Pipeline, Structures, Equipment and Appurtenances ⁽²⁾	Essential	\$2,702,985,681
S94 – EchoWater Resource Recovery Facility	Essential	\$5,138,301,303
EchoWater Ring Levee	Essential	\$13,925,014
X009 - Outfall Facility	Essential	\$20,363,443
N11 – City Interceptor Valve Structure	Essential	\$3,601,887
N12 – City Interceptor Oxygen Structure	Essential	\$3,601,887
N13 – City Interceptor Air Intake Structure	Essential	\$3,701,415
N15, N16 – Northeast Siphon	Essential	\$12,606,605
N19 – Arden Sewage Pump Stn	Essential	\$53,108,081
N20 – Arden Force Main Oxygen Structure	Essential	\$4,142,170
N27 – Sump 55 Facility	Essential	\$22,508,997
N28 – Sump 119 Facility	Essential	\$21,629,373
N29 – Sump 2/2A Facility	Essential	\$12,292,100

Name of Asset	Facility Type	2026 Replacement Value
N35 – Sump 76 Facility	Essential	\$4,896,666
N40 – Iron Point Sewage Pump Stn	Essential	\$19,260,923
N41 – City Water Line to the EchoWater Facility	Essential	\$630,330
N43 – Roseville/Watt Liquid Waste Disposal Facility	High Potential Loss	\$5,292,660
N51 – New Natomas Sewage Pump Stn	Essential	\$132,677,181
N52 – Power Inn Sewage Pump Stn	Essential	\$11,674,488
N53 – Van Maren Pump Stn	Essential	\$32,311,731
Bufferlands and Environmental Mitigation Lands	Natural Resource	\$14,844,261
Sims Ranch	Historic Resource	\$177,584
Nicolaus Dairy	Historic Resource	\$1,622,609
Buildings	Essential	\$272,515,645
Total		\$8,510,056,986
Collection System Assets		
S30 – Old Natomas Pump Stn	High Potential Loss	\$5,930,051
S33 – Cordova Pump Stn	Essential	\$22,707,447
S55 – Northeast Pump Stn	Essential	\$1,617,242
Total		\$30,254,740

Source: SacSewer

Natural, Historic, and Cultural Resources

A major dam failure event and associated flooding could have a devastating impact on the District. Large flood events can affect all natural, historic, and cultural resources that lie in the dam inundation areas. There are a number of ways floodwaters associated with a dam failure event can impact natural resources and the environment: Wildlife habitats can be destroyed by floodwaters. Contaminated floodwater can pollute rivers and habitats. Silt and sediment can destroy natural areas. Riverbanks and natural levées can be eliminated as rivers reach bankfull capacity. Rivers can be widened, and deposition can increase downstream. Trees can be uprooted by high-velocity water flow. Plants that survive the initial flood may die due to being inundated with water. Historic and cultural resources may also be affected. Generally, the impacts are associated with damage to these structures within the inundated areas, but other cultural resources such as those associated with Native Americans and old tribal areas can also be disturbed, damaged, and lost during extreme dam failure flood events.

Impacts from Dam Failure

Impacts to the District from dam failure flooding could be extensive and widespread and 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 may be necessary and compounded by impacts to transportation systems and infrastructure. Economic losses to the District and Sacramento County Planning Area can also be significant.

Other impacts associated with dam failure include landslides, bank erosion, and destruction of habitat. Dam failures can cause downstream flooding and can transport large volumes of sediment and debris and contaminants from the floodwaters. Other environmental impacts can include contamination from septic system failures and releases of contaminants from hazardous materials facilities, contamination of potable water supplies; changes in configurations of streams; loss of wildlife habitats; and degradation of wetlands. A large dam failure event could have significant and catastrophic impacts.

Impacts to identified assets at risk to this hazard and the overall vulnerability of the District may be affected in the future by climate change (which was discussed in the Climate Change and Dam Failure discussion above), changes in population patterns (migration, density, or the makeup of socially vulnerable populations), and changes in land use and development. These are discussed in the Future Conditions/Future Development discussion below.

Future Conditions/Future Development

This section provides a discussion of how future conditions will influence or affect the hazard over time and also discusses future development relative to each hazard.

Future Conditions

Future conditions may be affected by climate change, changes in population patterns (migration, density, or the makeup of socially vulnerable populations), and changes in land use and development. Findings on this for the District include the following:

- Climate change is likely to exacerbate future rain and storm conditions and associated impacts and vulnerability of the District to dam failure. This was discussed in greater detail in the Climate Change and Dam Failure section of the Hazard Profile above.
- Population projections within the jurisdictional boundaries of the District show the population to be increasing. It is unknown how population patterns and demographics will change in the near future. The District noted that it has no control over population changes within its jurisdictional boundaries. The District may add staff, but this number would be small. With some changes in populations numbers and makeup, the vulnerability of the District to this hazard may increase.
- Changes in land use and development in the District are expected to occur in the near future and thus may increase the vulnerability and impacts of future dam incidents on the District. Locating new development, structures, and critical facilities and infrastructure downstream of dams of concern will put additional development at risk.

Future Development

Future dam incidents may occur in the District. Although new growth and development may fall in the area flooded by a dam failure, given the limited potential of total dam failure and the large area that a dam failure would affect, development in the dam inundation area will continue to occur.

Flood: 1%/0.5%/0.2% Annual Chance

Likelihood of Future Occurrence—Occasional (1%)/Unlikely (0.5/0.2%)

Vulnerability—High

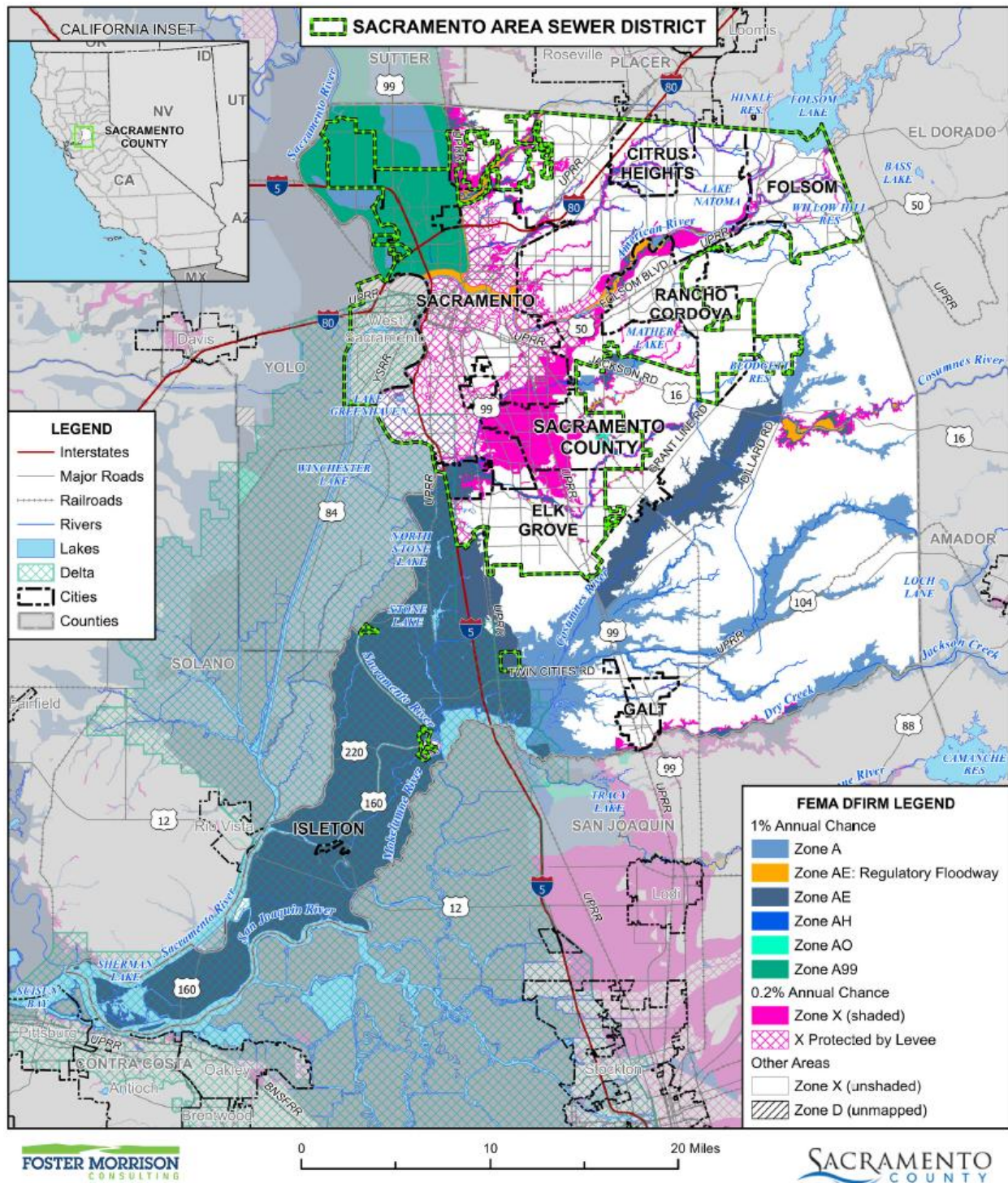
Hazard Profile

This hazard discusses the FEMA DFIRM 1%, 0.5%, and 0.2% annual chance floods. These tend to be the larger floods that can occur in the District and have caused damage in the past. Flooding can be a significant problem in the District. Historically, the District has been at risk to flooding primarily during the winter and spring months when river systems in the District swell with heavy rainfall and snowmelt runoff. The District has also been at risk during atmospheric river flood events. Normally, storm floodwaters are kept within defined limits by a variety of storm drainage and flood control measures located throughout the Sacramento County Planning Area and the SacSewer. Occasionally, extended heavy rains result in floodwaters that exceed normal high-water boundaries and cause damage. Flooding has occurred within the 1% and 0.2% annual chance floodplains and in other localized areas in the District. The District has also been at risk during atmospheric river flood events. Rain on snow events occurring in upper elevations during the spring months can also be significant and contribute to greater downstream runoff and flooding during large storm events.

Location and Extent

The SacSewer has areas located in the 1% and 0.2% annual chance flood zones. This is seen in Figure O-10. In accordance with the Central Valley Flood Protection Project, a 0.5% annual chance flood zone (i.e., 200-year) map is shown for the Sacramento County Planning Area in section 4.3.11 of the Base Plan and includes areas in the 200-year floodplain for the cities of Elk Grove, Isleton, Rancho Cordova, and Sacramento and Unincorporated Sacramento County. Utilizing the 200-year map for the Planning Area, portions of SacSewer fall within the 0.5% annual chance flood zone. No additional analysis was conducted on the 0.5% annual chance flood zones as part of this LHMP.

Figure O-10 SacSewer – FEMA DFIRM Flood Zones



Data Source: FEMA Effective DFIRM 02/22/2024 (NFHL 10/13/2025 database),
Sacramento County, Cal-Atlas; Map Date: 6/16/2026.

Table O-9 details the DFIRM mapped flood zones located within the District.

Table O-9 SacSewer– DFIRM Flood Hazard Zones

Flood Zone	Description	Present in District
A	1% annual chance flooding; No base flood elevations provided	X
AE Regulatory Floodway	1% annual chance flood: Regulatory floodway; Base flood elevations provided	X
AE	1% annual chance flooding; Base flood elevations provided	X
AH	1% annual chance flood areas of shallow flooding between one to three feet deep. Regulatory floodway; Base flood elevations provided	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.	X
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.. No Base Flood Elevations (BFEs) or depths are shown.	X
X (shaded)	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	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)	Areas of minimal flood hazard	X
D	Unmapped areas	

Source: FEMA DFIRM 02/22/2024

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

Geographical flood extents for the District from the FEMA DFIRMs are shown in Table O-10.

Table O-10 SacSewer – 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 Flood Hazard						
Zone A	806	0.4%	33	0.03%	773	1%
Zone AE	8,414	4%	1,689	1%	6,725	8%
Zone AE: Regulatory Floodway	5,609	3%	576	0.5%	5,033	6%
Zone AH	305	0.2%	113	0.1%	192	0.2%

Flood Zone	Total Acres	% of Total Acres	Improved Acres	% of Total Improved Acres	Unimproved Acres	% of Total Unimproved Acres
Zone AO	423	0.2%	296	0.3%	126	0.2%
Zone A99	16,670	8%	7,536	6%	9,134	11%
1% Annual Chance Flood Hazard Total	32,226	16%	10,243	9%	21,983	27%
0.2% Annual Chance Flood Hazard						
Zone X (shaded)	17,202	9%	11,764	10%	5,437	7%
X Protected by Levee	28,381	14%	19,656	17%	8,725	11%
0.2% Annual Chance Flood Hazard Total	45,583	23%	31,420	27%	14,163	17%
Other Areas						
Zone X (unshaded)	120,303	61%	75,004	64%	45,299	56%
Zone D (unmapped)	2	0.001%	0	0%	2	0.002%
Other Areas Total	120,305	61%	75,004	64%	45,301	56%
Grand Total	198,115	100%	116,668	100%	81,447	100%

Source: FEMA DFIRM 02/22/2024

Past Occurrences

Disaster Declaration History

A list of state and federal disaster declarations for Sacramento County from flooding is shown on Table O-11. These events also likely affected the District to some degree.

Table O-11 Sacramento County – State and Federal Disaster Declarations from Flood 1950-2025

Disaster Type	State Declarations		Federal Declarations	
	Count	Years	Count	Years
Flood (including heavy rains and storms)	26	1950, 1955, 1958 (twice), 1963, 1969, 1982 (twice), 1983, 1986, 1995 (twice), 1996, 1997, 1998, 2008, 2017 (three times), 2022*, 2023 (three), 2024 (twice)	18	1955, 1958, 1964, 1969, 1983, 1986, 1995 (twice), 1997, 1998, 2006, 2017 (three times), 2023 (three times)*, 2024*

Source: Cal OES, FEMA

*included a landslide component.

NCDC Events

The NCDC tracks flood events for the County. Events have been tracked for flooding since 1993. Sacramento County has seen 174 events. These events most likely had some impact on the District.

SacSewer Events

SacSewer has experienced several significant storm and flood events that affected its operations and assets. During major storm events in **October 2021, December 2022, and January 2023**, SacSewer recorded 20 sanitary sewer spills caused by rainfall volumes exceeding the collection system's design capacity. These included 5 spills in **October 2021** (three Category 1 and two Category 3), 2 Category 1 spills in **December 2022**, and 13 Category 1 spills in **January 2023**. During this event, the N40 Pump Station lost power and its ability to pump sewage, resulting in an estimated spill of 4,680 gallons. The spills that occurred during **2022 and 2023** were associated with the intense storms and flooding conditions, which were declared as State disasters. Although these events resulted in operational impacts, no long-term damage to major SacSewer assets, facility closures, or permanent losses were identified.

Climate Change and Flood

It is likely that climate change will increase the chance of future occurrence as well as future impacts associated with flood. More information on future impacts to the District can be found in the Future Conditions/Future Development section of the Vulnerability Assessment below.

According to the 2024 CAS, climate change may affect flooding in California, the Sacramento County Planning Area, and the District. While average annual rainfall may increase or decrease slightly, the intensity of individual rainfall events is likely to increase during the 21st century. It is possible that average soil moisture and runoff could decline, however, due to increasing temperature, evapotranspiration rates, and spacing between rainfall events. Reduced snowpack and increased number of intense rainfall events are likely to put additional pressure on water infrastructure which could increase the chance of flooding associated with breaches or failures of flood control structures such as levees and dams.

Cal Adapt future precipitation projections were shown in Section 4.3.4.

The 2024 Sacramento County CAP noted that climate change is likely to lead to changes in the frequency, intensity, and duration of extreme weather events, such as sustained periods of heavy precipitation, increased rainfall intensity during precipitation events, and increased risk of rain-on-snow events. Further, more winter-time precipitation that falls as rain instead of snow, and higher temperatures that will cause earlier snowmelt, which could produce substantial surface water flows over a short period of time and may potentially affect dams and spillways and overwhelm levee systems designed for historical precipitation patterns. Historically, the County experienced an average of four extreme precipitation events per year (as shown in Section 4.3.4 of the Base Plan). Under the medium and high emissions scenarios, the County is expected to experience five to six extreme precipitation events per year by mid-century and six to seven extreme precipitation events per year by the late century.

The 2026 American, Bear, and Cosumnes Watersheds Resilience Plan noted that a key driver of climate vulnerability, adaptive capacity, and implementation readiness in the watershed group is flooding. An

equity analysis was performed as part of this Plan. An Equity Analysis Technical Appendix demonstrates how social vulnerability aligns with the physical hazard environment across the watershed. It noted that flooding impacts are most severe downstream, where rising flows increasingly stress Sacramento's levee system; a modeled levee-breach scenario affects 12.5% of the watershed population, and 59% of those affected fall into the highest flood-sensitivity category.

Future flooding exacerbated by climate change will result in a range of potential impacts across the County and District. For populations, there is an array of social vulnerability factors that exacerbate flood-related risks, and those residing in floodplains are especially vulnerable to the direct impacts of flooding. Floodwaters can interact with sources of pollution and distribute hazardous pollutants locally and regionally, which may result in water contamination and a range of human health impacts. Additionally, flooding can disrupt transportation networks, cause economic losses through business and government facility closures, disrupt communications, disrupt the provision of utilities, and cause significant damage to buildings and critical infrastructure. Further, flooding may also threaten ecosystems and agricultural resources; unlike natural flooding regimes that deposit useful sediment resulting in increased soil fertility as well as groundwater recharge, catastrophic flooding from levee overtopping could lead to soil erosion and loss of viable cropland. It could also release sewage and hazardous materials into the environment if wastewater treatment plants are inundated, storage tanks are damaged, and pipelines are severed.

Vulnerability to Flood: 1%, 0.5%, and 0.2% Annual Chance

Floods have been a part of the District's history 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 flooding, and these characteristics further dictate the potential for widespread structural and property damage and potential loss of life and injury. Predominantly, the effects of 1%, 0.5%, and 0.2% annual chance flooding are generally confined to areas near the waterways of the District. As waterways grow in size from local drainages, so grows the threat of flood and dimensions of the threat.

The whole of the District is at some measure of vulnerability to floods. An assessment of a community's vulnerability to flood begins with an understanding of local exposure to flood. This is included in the Local Concerns section below followed by a discussion of the District's Assets at Risk to this hazard.

Local Concerns

The District has specific concerns and unique vulnerabilities regarding this hazard. These concerns form a portion of the basis for the mitigation strategy and mitigation actions that seek to reduce risk and vulnerability to this hazard.

SacSewer's primary local concerns related to flooding involve maintaining access to critical facilities, documenting access routes, uninterrupted operations of the collection and interceptor systems, identifying potential isolation points, and protecting infrastructure from flood-related impacts. SacSewer staff actively incorporate flood-resilience measures into facility design.

Some areas that lack FEMA flood mapping may still face pluvial flooding risks during localized, high-intensity storm events. To better understand potential site-specific hazards, more detailed flood information should be collected or new studies conducted. Hydrologic and hydraulic modeling can help

evaluate rainfall-runoff dynamics, identify overland flow routes, and map possible inundation zones. Additional data may be available through coordination with partner agencies, including local cities and the Sacramento County Office of Emergency Services (SacOES). The Climate Adaptation and Resiliency Plan identifies a strategy to develop models that represent projected risks of pluvial and urban flooding to SacSewer’s assets.

Assets at Risk

Assets at risk from flood include people and populations; District assets and critical facilities and infrastructure); and natural, historic, and cultural resources. These are discussed in the following sections.

People and Populations

All people and populations located in the 1%, 0.5%, and 0.2% annual chance floodplains within the District (including both District staff and the population served by the District) are at some risk to flooding. Certain vulnerable populations located within areas prone to flooding may be at increased risk to this hazard, especially during a large event with minimal advance notice. These vulnerable populations include: the unsheltered, those with limited mobility, and those who lack the resources to leave the area.

Populations served by the District can be the most vulnerable. Not only are the residents at risk, but their homes and contents are all at risk, compounding the impacts associated with significant hazard events.

District Assets and Critical Facilities and Infrastructure

Flooding presents a threat to District assets, including structures and critical facilities and infrastructure, as well as community lifelines. Critical infrastructure plays an immensely important role in communities served by the District. As previously noted, communities rely on roads, rail corridors, and related biking and pedestrian routes for transportation, and on water infrastructure for drinking water, wastewater service, and draining streets of rainwater. Damage to any one of these systems can threaten public safety, wreak havoc on daily life, impact properties far from flood zones, and result in economic impacts that cascade throughout California.

Certain District structures are at risk of DFIRM flooding and primarily include those structures located within the 1%, 0.5%, and 0.2% annual chance floodplains. District assets listed in Table O-12 would be at risk to flooding.

Table O-12 SacSewer Assets: Structures, Critical Facilities and Infrastructure, and Other Facilities at Risk from Flooding.

Name of Asset	Facility Type	2026 Replacement Value
Treatment and Resource Recovery Assets		
Underground Pipeline, Structures, Equipment and Appurtenances ⁽²⁾	Essential	\$2,702,985,681
S94 – EchoWater Resource Recovery Facility	Essential	\$5,138,301,303
EchoWater Ring Levee	Essential	\$13,925,014
X009 - Outfall Facility	Essential	\$20,363,443

Name of Asset	Facility Type	2026 Replacement Value
N27 – Sump 55 Facility	Essential	\$22,508,997
N11 – City Interceptor Valve Structure	Essential	\$3,601,887
N12 – City Interceptor Oxygen Structure	Essential	\$3,601,887
N13 – City Interceptor Air Intake Structure	Essential	\$3,701,415
N15, N16 – Northeast Siphon	Essential	\$12,606,605
N19 – Arden Sewage Pump Stn	Essential	\$53,108,081
N20 – Arden Force Main Oxygen Structure	Essential	\$4,142,170
N27 – Sump 55 Facility	Essential	\$22,508,997
N28 – Sump 119 Facility	Essential	\$21,629,373
N29 – Sump 2/2A Facility	Essential	\$12,292,100
N35 – Sump 76 Facility	Essential	\$4,896,666
N40 – Iron Point Sewage Pump Stn	Essential	\$19,260,923
N41 – City Water Line to the EchoWater Facility	Essential	\$630,330
N43 – Roseville/Watt Liquid Waste Disposal Facility	High Potential Loss	\$5,292,660
N51 – New Natomas Sewage Pump Stn	Essential	\$132,677,181
N52 – Power Inn Sewage Pump Stn	Essential	\$11,674,488
N53 – Van Maren Pump Stn	Essential	\$32,311,731
Bufferlands and Environmental Mitigation Lands	Natural Resource	\$14,844,261
Sims Ranch	Historic Resource	\$177,584
Nicolaus Dairy	Historic Resource	\$1,622,609
Buildings	Essential	\$272,515,645
Total		\$8,510,056,986
Collection System Assets		
South Area Corporation Yard (SACY)	Essential	\$73,729,166
North Area Corporation Yard (NACY)	Essential	\$32,606,298
S30 – Old Natomas Pump Stn	High Potential Loss	\$5,930,051
S33 – Cordova Pump Stn	Essential	\$22,707,447
S55 – Northeast Pump Stn	Essential	\$1,617,242
Total		\$136,590,204

Source: SacSewer

Natural, Historic, and Cultural Resources

Large flood events can affect natural, historic, and cultural resources. There are a number of ways floodwaters can impact natural resources and the environment. Wildlife habitats can be destroyed by floodwaters. Contaminated floodwater can pollute rivers and habitats. Silt and sediment can destroy natural areas. Riverbanks and natural levees can be eliminated as rivers reach bankfull capacity. Rivers can be widened, and deposition can increase downstream. Trees can be uprooted by high-velocity water flow.

Plants that survived the initial flood may die due to being inundated with water. Historic and cultural resources may also be affected. Generally, the impacts are associated with damage to structures within the flooded areas, but other cultural resources such as those associated with Native Americans and old tribal areas can also be disturbed, damaged and lost during extreme flood events. Any of these that fall in the 1%, 0.5%, and 0.2% floodplains would be vulnerable.

Impacts from Flood: 1%, 0.5%, and 0.2% Annual Chance

Floods are among the costliest natural disasters in terms of human hardship and economic loss nationwide. Large flood events, including those associated with 1%, 0.5%, and 0.2% annual chance floods, can cause substantial damage to structures, landscapes, and utilities as well as life safety issues. People may be swept away in floodwaters, causing injuries or deaths. 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. Direct impacts, such as drowning, can be limited with adequate warning and public education about what to do during floods. Floodwaters can transport large objects downstream which can damage or remove stationary structures. Structures can be damaged directly from floodwaters and can also be damaged from trees falling as a result of water-saturated soils. 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 causing power outages. Power interruption causes major problems and can result in the 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.

Standing water can cause damage to crops, roads, foundations, and electrical circuits. Other problems connected with flooding and stormwater runoff include erosion, sedimentation, degradation of water quality, loss of environmental resources, and economic impacts.

Impacts to identified assets at risk to this hazard and the overall vulnerability of the District may be affected in the future by climate change (which was discussed in the hazard profile discussion above), changes in population patterns (migration, density, or the makeup of socially vulnerable populations), and changes in land use and development. These are discussed below.

Future Conditions/Future Development

This section provides a discussion of how future conditions will influence or affect the hazard over time and also discusses future development relative to each hazard.

Future Conditions

Future conditions may be affected by climate change, changes in population patterns (migration, density, or the makeup of socially vulnerable populations), and changes in land use and development. Findings on this for the SacSewer include the following:

- Climate change is likely to exacerbate future flood conditions and associated impacts and vulnerability of the District to 1%, 0.5%, and 0.2% annual chance flooding. This was discussed in greater detail in the Climate Change and Flood section of the Hazard Profile above.

- Population projections within the jurisdictional boundaries of the District show the population to be increasing. It is unknown how population patterns and demographics will change in the near future. The District noted that it has no control over population changes within its jurisdictional boundaries. The District may add staff, but this number would be small. With changes in populations numbers and makeup, the vulnerability of the District to this hazard may increase.
- Changes in land use and development in the District are expected to occur in the near future and thus is likely to increase the vulnerability and impacts of future flooding on the District. Additional development traditionally leads to additional flooding. Adherence to protective building codes for new development can assist in limiting future impacts of the District to this hazard.

Future Development

Future development in the District may be built in the floodplain, as long as it conforms to the standards of the floodplain ordinance of the applicable jurisdiction. The County and cities enforce their floodplain management ordinance on areas inside the District. More detail on the specifics of the floodplain ordinance can be found in Section 4.4.1 of the Base Plan and in the City of Citrus Heights, Elk Grove, Folsom, Rancho Cordova, and Sacramento annexes. New District facilities and assets will be sited and constructed in such a way as to reduce the risk from future flooding to District structures and assets.

Levee Failure

Likelihood of Future Occurrence–Unlikely

Vulnerability–High

Hazard Profile

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 within the main stream channel. By confining the flow to a narrower stream channel, levees can also increase the speed of the water. Levees can be natural or man-made. A natural levee is formed when sediment settles on the streambank, raising the level of the land around the stream.

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 a release from or failure of a dam. 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. It is important to remember that 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.

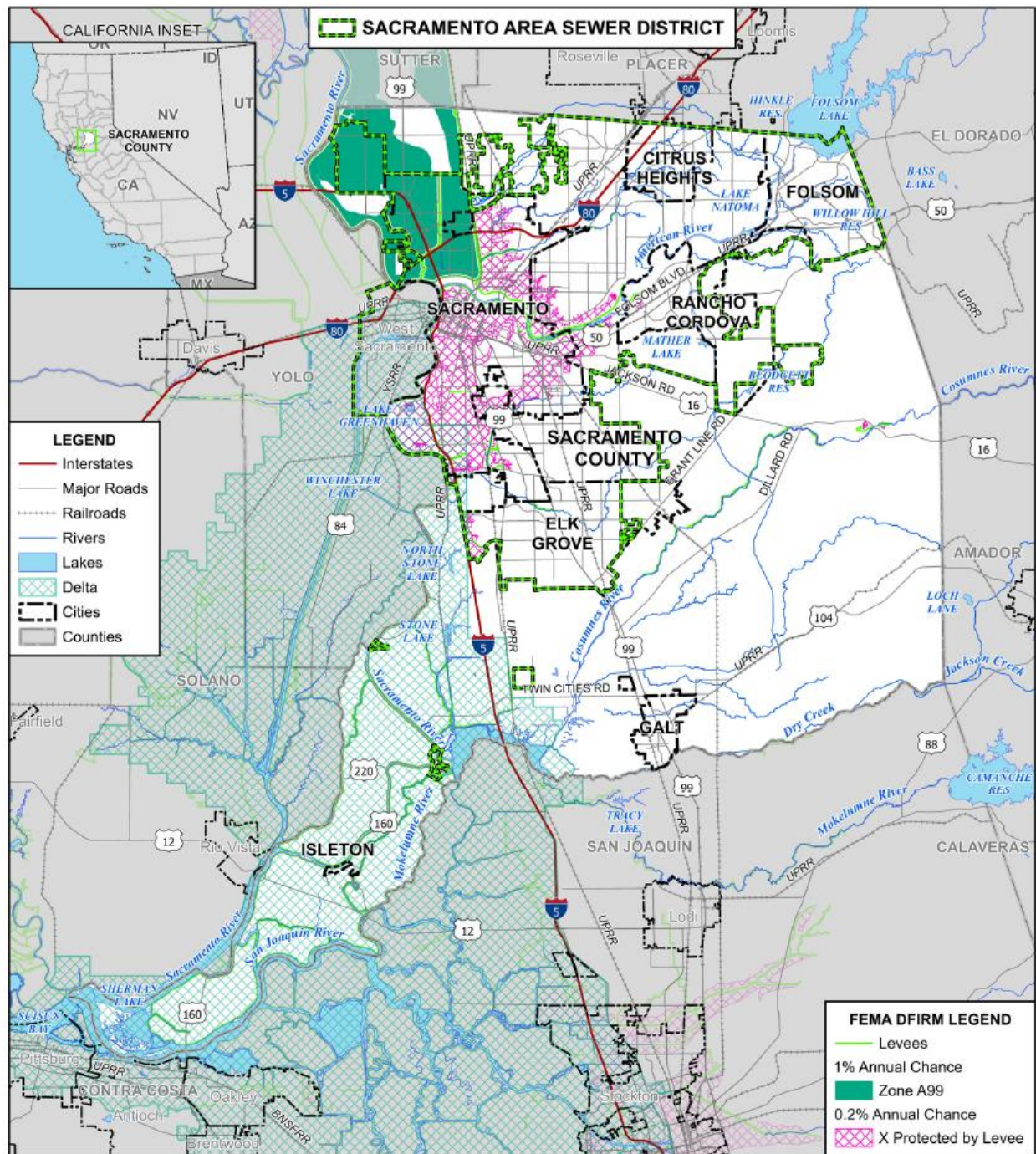
Over 518 miles of levees are located throughout the Sacramento County Planning Area. These include both accredited and unaccredited levees, as discussed in Section 4.3.14 of the Base Plan, all of which pose a risk to adjacent communities should a levee fail or overtop. While the levee analysis included in this section focuses on the accredited levees and those with improvements in process based on the DFIRM A99 and X-Protected by Levee Flood Zones, there are many older, unaccredited levees located throughout the County Planning Area, including the District, that may have a greater potential for overtopping or breaching and pose a significant risk to communities should they fail.

Location and Extent

Certain areas of the District are at risk to levee failure flooding. There is no scientific scale or measurement system in place for levee failure. It is usually measured in area covered and depth of flooding. A map of levees located in the Sacramento County Planning Area is shown in Section 4.3.14 of the Base Plan. The speed of onset is slow as the river rises, but if a levee fails the warning times are short for those in the inundation area. The duration of levee failure risk can range from hours to weeks, depending on the river flows that the levee holds back. Those levees accredited as providing protection against the 1% or greater annual chance flood and those in levees in the certification process are identified in the FEMA DFIRMs which also include those areas protected by the levees. Geographical DFIRM A99 and X Protected by Levee flood zone extent from the FEMA DFIRMs is shown on Figure O-11 and included in Table O-13.

Note: Many more unaccredited levees are also located throughout the County, with many of these concentrated in the Delta area. It should be noted that these unaccredited levees may have a greater potential for failure or breach and can pose an even greater risk to those communities in which they are located.

Figure O-11 SacSewer – FEMA DFIRM A99 and X Protected by Levee Zones



Data Source: FEMA Effective DFIRM 02/22/2024 (NFHL 10/13/2025 database),
Sacramento County, Cal-Atlas; Map Date: 6/16/2026.

Table O-13 SacSewer – Geographical Flood Hazard Extents in FEMA X Protected by Levee DFIRM Flood Zones

Flood Zone	Total Acres	% of Total Acres	Improved Acres	% of Total Improved Acres	Unimproved Acres	% of Total Unimproved Acres
1% Annual Chance Flood Hazard						
Zone A99	16,670	8%	7,536	6%	9,134	11%
0.2% Annual Chance Flood Hazard						
X Protected by Levee	28,381	14.3%	19,656	16.8%	8,725	10.7%

Source: FEMA 02/2024 DFIRM

Past Occurrences

Disaster Declaration History

There have been two state and two federal disasters declarations directly related to levee failure in Sacramento County, as shown on Table O-14. Also, it is important to note that many of the flood disaster declarations included in Section 4.3.11 of the Base Plan (like the December 31, 2022 event near Wilton) also may include flooding associated with levee breach or failure events.

Table O-14 Sacramento County – State and Federal Disaster Declarations Summary 1950-2025

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

Source: Cal OES, FEMA

NCDC Events

There have been no NCDC levee failure events in Sacramento County, as the NCDC does not track levee failure flooding as a stand-alone hazard.

SacSewer Events

SacSewer does not have a documented history of impacts, damages, or costs associated with previous levee failure in the Sacramento region. Since 2021, SacSewer has not experienced any levee failures, levee breaches, or other significant levee related issues that have impacted SacSewer's facilities, operations, populations served, or infrastructure.

Climate Change and Levee Failure

The 2024 Sacramento County CAP noted that climate change is likely to lead to changes in the frequency, intensity, and duration of extreme weather events. The County is projected to experience a steady increase in average annual precipitation through the end of the century, with much of that precipitation likely to occur during extreme precipitation events, which can lead to flood impacts. According to Cal-Adapt, the historic average annual precipitation in Sacramento County is 18.3 inches, and the historic average annual

number of extreme precipitation events is four. The average annual precipitation across the County may rise upwards of 22 inches, with the number of extreme precipitation events potentially exceeding 7 per year by the end of the century, depending on the level of current and future GHG emissions.

In general, California exhibits “booms and busts,” which refers to the existence of both very wet years and very dry years. The amount of precipitation that falls in any particular year is largely influenced by occurrences of large, discrete winter storms, also known as atmospheric rivers, which often provide a substantial fraction of the region’s annual precipitation, inclusive of the county. In California, atmospheric rivers vary in intensity; some are beneficial for water supply and replenish snowpack that naturally melts during the summer, serving as the water supply for people and agriculture, while others are responsible for widespread and adverse impacts (NOAA 2023). Extreme precipitation from these atmospheric rivers in the future may prove to be more variable, volatile, and potentially more severe. These extremes are most likely to occur during storm events, leading to more severe damage from waves and floods, thus possibly leading to more levee failure events.

Vulnerability to Levee Failure

According to historical hazard data and levee mapping, levee failures can occur in or near the District. Portions of the District are at some measure of vulnerability to levee failure floods, including failure or breach of accredited levees, those in the certification process, and unaccredited levees. An assessment of a community’s vulnerability to levee failure flooding begins with an understanding of local exposure to levees. This is included in the Local Concerns section below followed by a discussion of the District’s Assets at Risk to this hazard.

Local Concerns

The District has specific concerns and unique vulnerabilities regarding this hazard. These concerns form a portion of the basis for the mitigation strategy and mitigation actions that seek to reduce risk and vulnerability to this hazard.

SacSewer has facilities behind levees where potential vulnerabilities have been identified. The levees are not at risk in these locations; however, they should be recognized in the LHMP as areas where levee-related impacts could affect SacSewer’s operations and assets. Across all facilities, SacSewer’s primary concerns include loss of operational access, damage to pump stations, structural vulnerabilities, equipment downtime, and extended recovery times.

Below is a list of SacSewer facilities that have identified potential vulnerabilities near levees.

- EchoWater Facility – Ring Levee
 - ✓ Stop log system, which creates a temporary gap in the ring levee, and represents a potential weakness
 - ✓ Erosion, rodent burrows, and vegetation impacting levee integrity
 - ✓ Limited access during major wet weather events due to flooding.
- N50 – South River Pump Station
 - ✓ A potential vulnerability arises from its proximity to the Sacramento River levee.

- ✓ If the levee were to be overtopped, floodwater could reach the site and damage pumps, electrical equipment, and controls.
- ✓ Address: 30030 South River Road, West Sacramento, CA
- N51 – New Natomas Pump Station
 - ✓ A potential vulnerability comes from its proximity to the Natomas East Drainage Canal levee.
 - ✓ If the levee were to overtop or fail, floodwater could reach the site and damage pumps, electrical equipment, and controls.
 - ✓ Address: 3350 Airport Road, Sacramento, CA
- S055 – Northeast Pump Station
 - ✓ A potential vulnerability comes from the facility’s location within the American River Parkway.
 - ✓ Limited access during major wet weather events due to flooding.
 - ✓ Address: 1000 River Walk Way, Carmichael, CA
- N15 & N16 – Northeast Siphon
 - ✓ A potential vulnerability comes from the facility’s location within the American River Parkway.
 - ✓ Limited access during major wet weather events due to flooding.
 - ✓ Address: 1000 River Walk Way, Carmichael, CA
- N19 – Arden Pump Station
 - ✓ Surrounded by a 100-year flood hazard; sites may become inaccessible during a flood.
 - ✓ Partial flooding exposure to assets in the 100-year floodplain could overwhelm the interceptor’s system.
 - ✓ Address: 1021 Howe Avenue, Sacramento, CA

The EchoWater facility’s ring levee and the levee at the N50 South River Pump are not FEMA accredited; however, both still provide significant flood protection. The ring levee and the levee at the N50 South River Pump Station are designed to provide protection against 100-, 200-, and 500-year floods.

SacSewer pump stations may be offline and unable to function when flooded. Once flood waters recede, pump stations will be evaluated and returned to service.

Assets at Risk

Assets at risk from levee failure include people and populations; District assets and critical facilities and infrastructure; and natural, historic, and cultural resources. These are discussed in the following sections.

People and Populations

All people and populations (including both District staff and the population served by the District) located in leveed areas are at some risk to levee failure flooding. Certain vulnerable populations located within areas prone to levee failure flooding may be at increased risk to this hazard, especially during a large event with minimal advance notice. These vulnerable populations include: the unsheltered, those with limited mobility, and those who lack the resources to leave the area.

District Assets and Critical Facilities and Infrastructure

Certain District assets, including structures and critical facilities and infrastructure, are at risk of levee failure flooding and primarily include those structures located adjacent to levee protected areas. District assets listed in Table O-15 would be at risk to flooding.

Table O-15 SacSewer Assets: Structures, Critical Facilities and Infrastructure, and Other Facilities at Risk from Levee Failure Flooding

Name of Asset	Facility Type	2026 Replacement Value
Treatment and Resource Recovery Assets		
Underground Pipeline, Structures, Equipment and Appurtenances ⁽²⁾	Essential	\$2,702,985,681
S94 – EchoWater Resource Recovery Facility	Essential	\$5,138,301,303
EchoWater Ring Levee	Essential	\$13,925,014
X009 - Outfall Facility	Essential	\$20,363,443
N15, N16 – Northeast Siphon	Essential	\$12,606,605
N19 – Arden Sewage Pump Stn	Essential	\$53,108,081
N29 – Sump 2/2A Facility	Essential	\$12,292,100
N50 – South River Pump Stn	Essential	\$132,677,181
N51 – New Natomas Sewage Pump Stn	Essential	\$132,677,181
Bufferlands and Environmental Mitigation Lands	Natural Resource	\$14,844,261
Sims Ranch	Historic Resource	\$177,584
Nicolaus Dairy	Historic Resource	\$1,622,609
SacSewer Archeological Site CA-SAC-83	Cultural Resource	\$0
Real Property, Land and Easements	Essential	\$86,445,288
Buildings	Essential	\$272,515,645
Total		\$8,594,541,976
Collection System Assets		
South Area Corporation Yard (SACY)	Essential	\$73,729,166
North Area Corporation Yard (NACY)	Essential	\$32,606,298
S30 – Old Natomas Pump Stn	High Potential Loss	\$5,930,051
S33 – Cordova Pump Stn	Essential	\$22,707,447
S055 – Northeast Pump Stn	Essential	\$1,617,242
Total		\$136,590,204

Source: SacSewer

Natural, Historic, and Cultural Resources

Large flood events, such as those occurring as a result of a levee failure, can affect natural, historic, and cultural resources. There are a number of ways floodwaters can impact natural resources and the environment. Wildlife habitats can be destroyed by floodwaters. Contaminated floodwater can pollute rivers and habitats. Silt and sediment can destroy natural areas. Riverbanks and natural levees can be eliminated as rivers reach bankfull capacity. Rivers can be widened, and deposition can increase downstream. Trees can be uprooted by high-velocity water flow. Plants that survived the initial flood may die due to being inundated with water. Historic and cultural resources may also be affected. Generally, the impacts are associated with damage to structures within the flooded areas, but other cultural resources such

as those associated with Native Americans and old tribal areas can also be disturbed, damaged and lost during extreme flood events. Any of these that fall in the A99 or X Protected by Levee flood zones shown on Figure O-11 as well as those resources located in areas adjacent to or downstream of unaccredited levees would be vulnerable.

Impacts from Levee Failure

Floods and their impacts vary by location, including impacts associated with a levee failure flood event, and will only affect certain areas of the District that are in areas protected by levees. Based on the areas of the District surrounded by levees, it is evident that levee failure floods could potentially have significant impacts to the District, depending on the location, timing, and severity of the event. Impacts that are not quantified, but could be anticipated in large levee failure event, include:

- Injury and loss of life
- Structural and property damage
- Crop damage
- Disruption of and damage to public critical infrastructure and services
- Health hazards associated with mold and mildew, contamination of drinking water, etc.
- Impacts to natural resource areas, including stream bank erosion
- Damage to roads/bridges resulting in loss of mobility

In addition to flood related levee failures, the levees in the District are potentially at risk to failure during an earthquake event. Levee failure flooding could accompany an earthquake and could be compounded further if a dam or storage reservoir fails. Channels and water courses with earthen banks and levees are particularly vulnerable and could collapse in a major earthquake resulting in partial or complete blockage of channels causing flooding upstream of the impoundment. Levees are especially susceptible to rapid settlement due to liquefaction or horizontal spreading of underlying soils.

Impacts to identified assets at risk to this hazard and the overall vulnerability of the District may be affected in the future by climate change (which was discussed in the hazard profile section above), changes in population patterns, and changes in land use and development. The influencing effects of these factors on this hazard are discussed further in the Future Conditions/Future Development discussion below.

Future Conditions/Future Development

This section provides a discussion of how future conditions will influence or affect the hazard over time and also discusses future development relative to each hazard.

Future Conditions

Future conditions may be affected by climate change, changes in population patterns (migration, density, or the makeup of socially vulnerable populations), and changes in land use and development. Findings on this for the SacSewer include the following:

- Climate change is likely to exacerbate future flood and levee failure conditions and associated impacts and vulnerability of the District to levee failure flooding. This was discussed in greater detail in the Climate Change and Levee Failure section of the Hazard Profile above.
- Population projections within the jurisdictional boundaries of the District show the population to be increasing. It is unknown how population patterns and demographics will change in the near future. The District noted that it has no control over population changes within its jurisdictional boundaries. The District may add staff, but this number would be small. With changes in populations numbers and makeup, the vulnerability of the District to this hazard may increase.
- Changes in land use and development in the District are expected to occur in the near future which is likely to increase the vulnerability and associated impacts to the District to levee failure flooding. Additional development traditionally leads to additional flooding. Adherence to protective building codes for new development can assist in limiting future impacts and associated vulnerabilities of the District to this hazard.

Future Development

Future development considerations should be ongoing and proactive. Ensuring that comprehensive land use planning is conducted, regulatory requirements, such as building codes and the floodplain ordinance, are followed, and levee improvements, inspections, and maintenance is ongoing will help reduce impacts to future development.

Sea Level Rise

Likelihood of Future Occurrence–Likely

Vulnerability–Medium

Hazard Profile

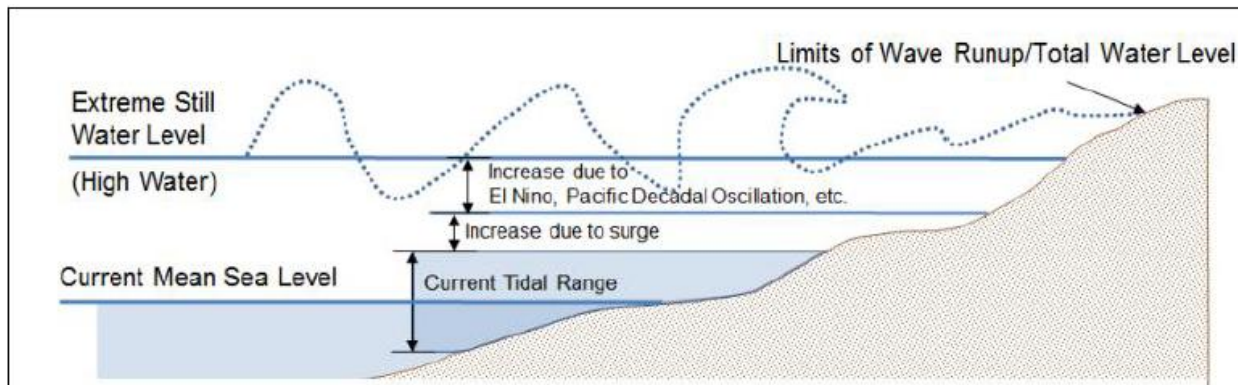
Historically, cities, towns and villages were often settled around ports and waterways along the nation's coastlines, providing individuals and families opportunities for trade, jobs and transportation, and recreation. These areas are extremely important to our nation, with great economic, historic and cultural significance. Although the coastal areas of the United States comprise only one-fifth of the land area of the contiguous 48 states, they account for more than half of the nation's population and housing supply. In 1990, over 133 million Americans lived in the 673 counties along the Atlantic and Pacific Oceans, the Gulf of Mexico and the Great Lakes. Since 1960, population in these areas have increased by 41 percent. The continued increase in coastal population leads to increased coastal development, which places greater numbers of people and structures at risk from coastal hazards including sea level rise.

While Sacramento is not typically considered a coastal community, the southwestern portion of the County follows the course of the Sacramento River as it flows into the Sacramento-San Joaquin Delta. The area of Sacramento County near the Delta is vulnerable to the influences of sea-level rise.

The 2023 California State Hazard Mitigation Plan noted that sea-level rise generally progressively worsens the impact of high tides and wind-driven waves associated with severe storms. Coupled with increased frequency, severity, and duration of high tide and storm events related to climate change, sea-level rise will exacerbate these extreme events along the coast and other affected areas. El Niño events exacerbate storms

and coastal inundation that is already occurring due to sea-level rise and normal coastal weather and tidal patterns. The additive effects of high tides, storm surge, atmospheric patterns (e.g., El Niño) and sea-level rise are shown in Figure O-12.

Figure O-12 Additive Effects of Sea-Level Rise



Source: 2023 California State Hazard Mitigation Plan

King tides may also affect sea level rise. This was discussed in detail in Section 4.3.15 of the Base Plan.

Location and Extent

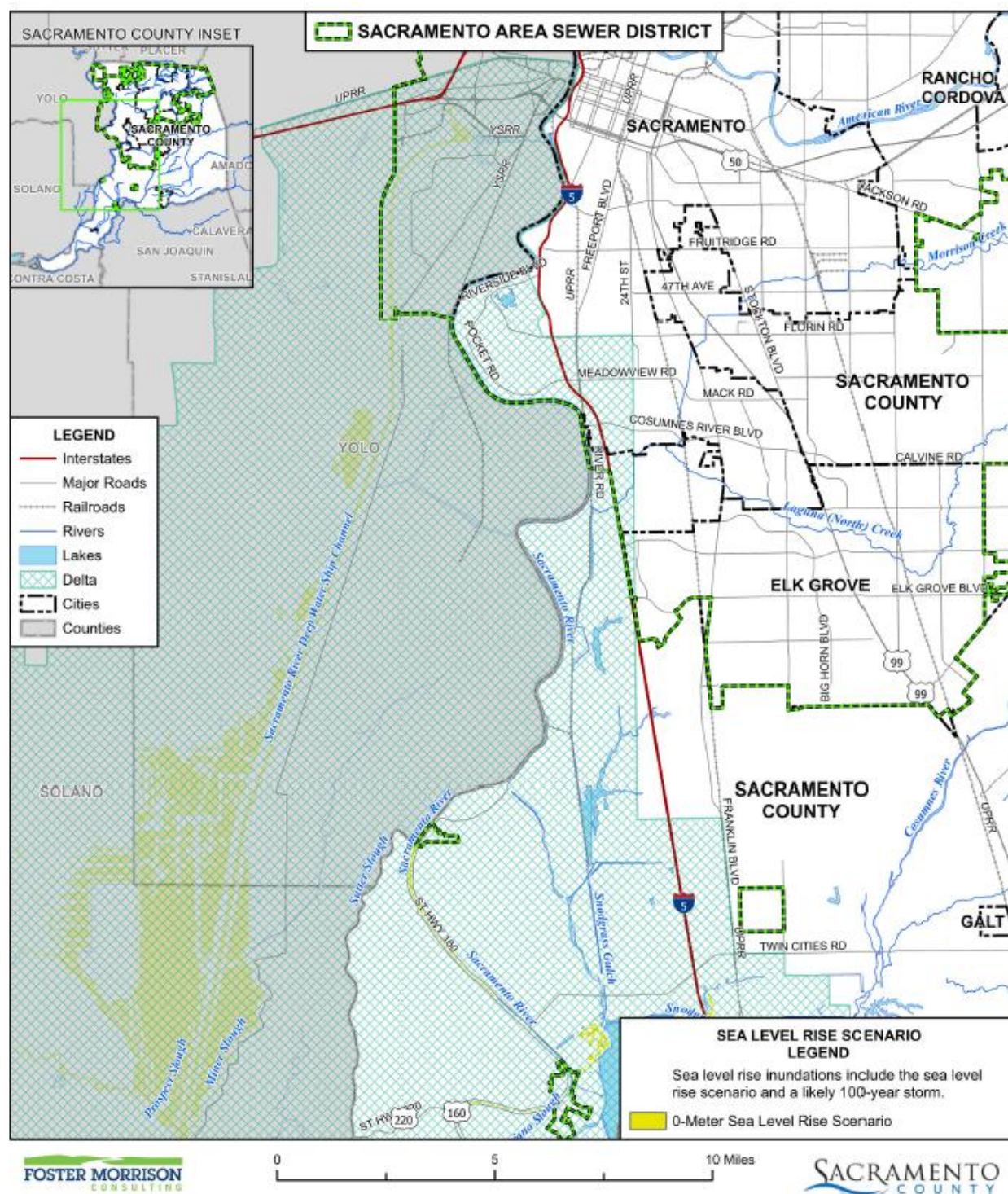
The coastally influenced areas of the Sacramento Planning Area are at risk from sea level rise (especially during periods of extreme tides and as compounded by storm events). Sacramento County is located inland within the Central Valley of California. The southwestern portion of the County follows the course of the Sacramento River as it flows into the Sacramento-San Joaquin Delta. The area of Sacramento County near the Delta is vulnerable to the influences of sea-level rise. Duration of sea level rise is thought to be long. The speed of onset is slow. There is no scientific scale for sea level rise, other than the actual physical measurement of sea level and depth.

Sea level rise scenarios identified in the Sacramento County Climate Action Plan (2024) and the Sacramento County Climate Change Vulnerability Assessment (2017) based on SLR GIS mapping from Cal-Adapt, and California Coastal Inundation Depth Layer Mosaics (2016) were utilized for this assessment. Three sea level rise scenarios were selected based on guidance from the State of California Sea Level Rise Guidance 2024 Science and Policy Update that includes available Cal-Adapt SLR GIS data providing coverage for the Sacramento County area. It should be noted that the SLR scenarios include both the SLR combined with a likely 100-year storm. The scenarios are:

- 0-meter scenario – reflects existing conditions (no SLR) with a 100-year storm
- 0.5-meter scenario – with a 100-year storm is roughly equal to the median projection for 2060 (mid century) and was selected to be representative of plausible 2060 intermediate to high conditions
- 1.41-meter scenario– with a 100-year storm is roughly equal to the median projection for 2100 (end of century) and was selected to be representative of plausible 2100 intermediate to high conditions

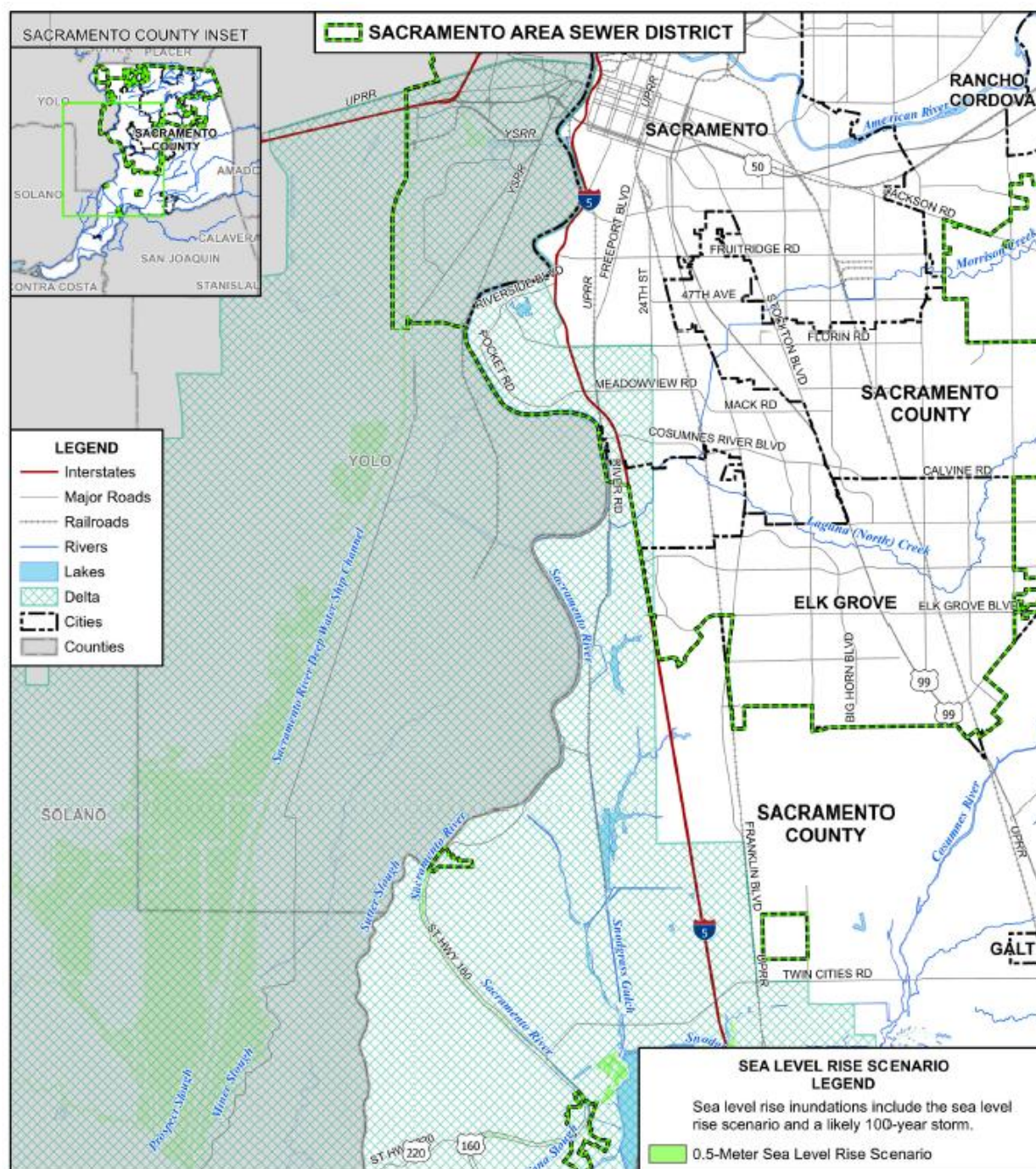
Inundations for these three scenarios are shown on the three maps below. They are broken out for the 0-meter (Figure O-13), 0.5-meter (Figure O-14), and 1.41-meter (Figure O-15) scenarios individually. Geographical extents by scenario for the District are detailed in Table O-16.

Figure O-13 SacSewer – Sea Level Rise 0-meter Scenario



Data Source: Sacramento County Climate Action Plan 2024,
 Climate Change Vulnerability Assessment 2017.
 Cal-Adapt Sea Level Rise <https://cmip5.cal-adapt.org/tools/slr-caiflod-3d/>,
 San Francisco Bay, Sacramento-San Joaquin Delta and California Coastal Inundation Depth Layer Mosaics 2016
 (Datasets: Bay_0m, 0.5m, 1.41m)slr_max_bilinear_snap_float)
 Sacramento County, Cal-Atlas; Map Date: 6/7/2026.

Figure O-14 SacSewer – Sea Level Rise 0.5-meter Scenario



FOSTER MORRISON
CONSULTING

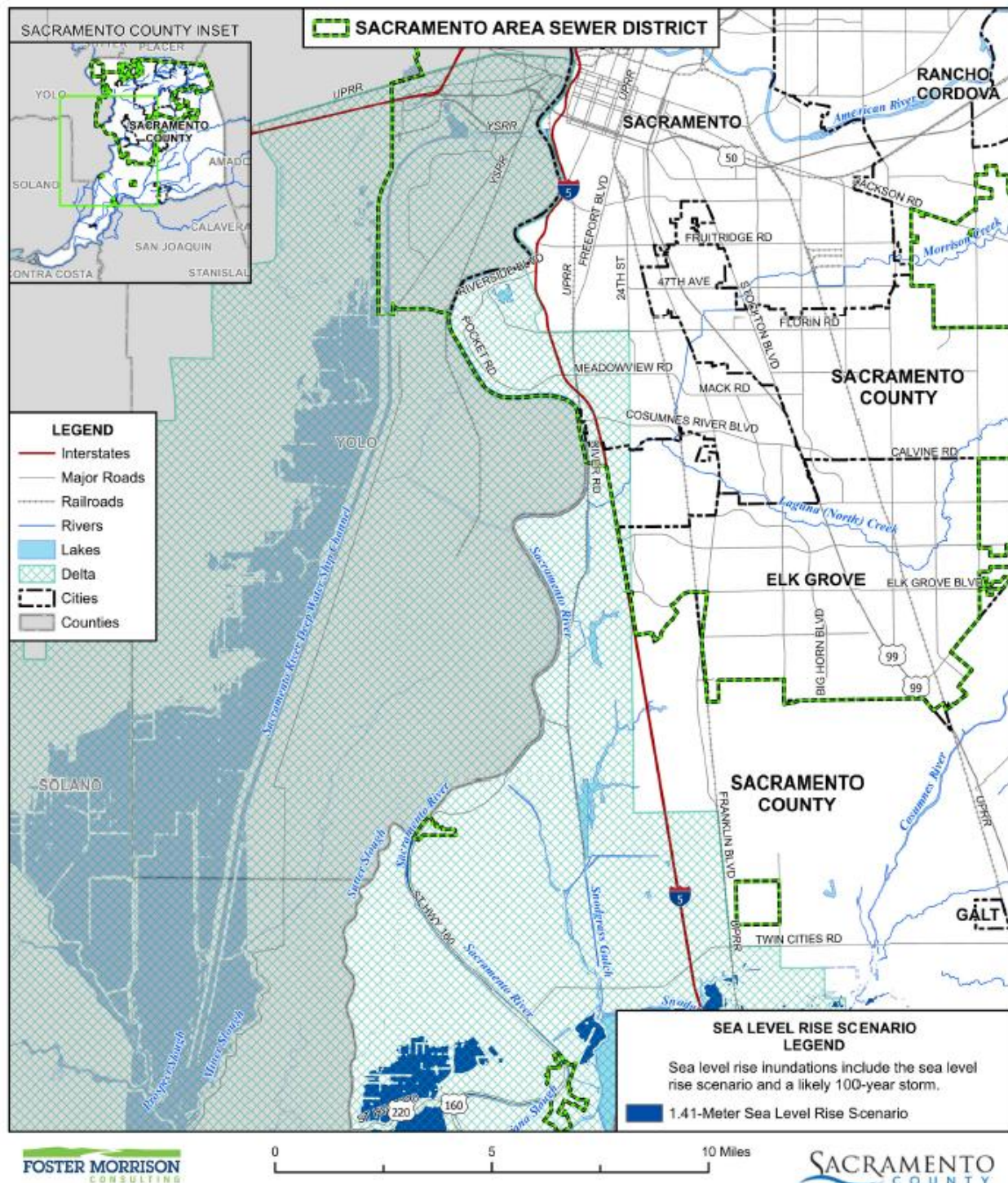
A horizontal number line representing distance in miles. It has major tick marks at 0, 5, and 10, labeled "0", "5", and "10 Miles" respectively. There are also minor tick marks at every 1-mile interval, but they are not labeled.



SACRAMENTO
COUNTY

Data Source: Sacramento County Climate Action Plan 2024,
Climate Change Vulnerability Assessment 2017.
Cal-Adapt Sea Level Rise <https://cmip5.cal-adapt.org/tools/slr-caiflod-3d/>,
San Francisco Bay, Sacramento-San Joaquin Delta and California Coastal Inundation Depth Layer Mosaics 2016
(Datasets: Bay [0m, 0.5m, 1.41m]slr_max_bilinear_snap_float)
Sacramento County, Cal-Atlas; Map Date: 6/7/2026.

Figure O-15 SacSewer – Sea Level Rise 1.41-meter Scenario



Data Source: Sacramento County Climate Action Plan 2024,
 Climate Change Vulnerability Assessment 2017.
 Cal-Adapt Sea Level Rise <https://cmip5.cal-adapt.org/tools/slr-califlod-3d/>,
 San Francisco Bay, Sacramento-San Joaquin Delta and California Coastal Inundation Depth Layer Mosaics 2016
 (Datasets: Bay_[0m, 0.5m, 1.41m]slr_max_bilinear_snap_float)
 Sacramento County, Cal-Atlas; Map Date: 6/7/2026.

Table O-16 SacSewer – Sea Level Rise Scenario Geographical Extents by Scenario

Sea Level Rise Scenario	Total Acres	% of Total Acres	Improved Acres	% of Total Improved Acres	Unimproved Acres	% of Total Unimproved Acres
0-Meter Sea Level Rise Scenario	3	0.001%	0.5	0.0004%	2	0.003%
0.5-Meter Sea Level Rise Scenario	4	0.002%	1	0.001%	3	0.003%
1.41-Meter Sea Level Rise Scenario	6	0.003%	3	0.002%	4	0.004%

Source: Sacramento County Climate Action Plan (CAP) 2024, Climate Change Vulnerability Assessment 2017, Cal-Adapt Sea Level Rise, UC Berkeley, San Francisco Bay, Sacramento-San Joaquin Delta and California Coastal Inundation Depth Layer Mosaics 2016

Past Occurrences

Disaster Declaration History

No disaster declarations have occurred specific to sea level rise.

NCDC Events

The NCDC does not track sea level rise.

SacSewer Events

The District noted that no standalone sea level flood rise events have been documented in the District. Instead, sea level rise has acted as a background amplifier during other flood related hazards. These were discussed in Section 4.3.15 of the Base Plan. However, while no impacts have occurred to date, regional studies indicate potential long-term future risks as sea levels continue to rise in the Delta. SacSewer will continue to monitor these conditions.

Climate Change and Sea Level Rise

The 2023 California State Hazard Mitigation Plan noted that coastal areas may be impacted by climate change in different ways. A warmer atmosphere means storms have the potential to be more intense and occur more often. Sea level rise is driven by climate change. As the planet warms, land ice melts and flows into the ocean. Ocean temperatures rise and thermal expansion takes place.

The 2017 Sacramento County Climate Vulnerability Assessment noted that an effect of global climate change is sea level rise. The average global sea level rose approximately seven inches during the last century. Assuming that it continues to reflect global trends, sea levels along the California coastline, and other areas affected by sea level rise, could be 10-18 inches higher in 2050 than 2000 levels, and 31-55 inches higher than 2000 levels by the end of this century.

Vulnerability to Sea Level Rise

According to historical hazard data and hazard mapping, sea level rise is occurring in the Sacramento County Planning Area. The whole of the District is at some measure of vulnerability to increased flooding and inundation of land areas from sea level rise.

The 2024 Sacramento County CAP noted that while many of the potential impacts associated with sea level rise are similar to those with flooding, sea level rise presents additional potential impacts, such as saltwater intrusion, which can affect the quality of the region's water supplies, especially when coupled with increased municipal and agricultural demand for freshwater.

Sea level rise can be exacerbated during king tides. King tides are simply the very highest tides. They are naturally occurring, predictable events. King tides of today may give an idea of future normal conditions that may occur due to sea level rise. High tides may coincide with heavy rain causing increased flooding, bluff erosion, and landslides, such as were experienced during the 1998 and 2016 El Niño storms. The 2023 California State Hazard Mitigation Plan noted that coupled with increased frequency, severity, and duration of high tide and storm events related to climate change, sea level rise will exacerbate these extreme events along the coast and other affected areas. These events may expose coastal and other areas to severe flooding and erosion; damage to structures, real estate, public access, and habitat areas; and seawater intrusion into Delta areas and coastal aquifers. El Niño events exacerbate storms and sea level rise inundation above that already occurring due to sea-level rise and normal coastal weather and tidal patterns.

An assessment of a community's vulnerability to levee failure flooding begins with an understanding of local exposure to sea level rise. This is included in the Local Concerns section below, followed by a discussion of the District's Assets at Risk to this hazard.

Local Concerns

The District has specific concerns and unique vulnerabilities regarding this hazard. These concerns form a portion of the basis for the mitigation strategy and mitigation actions that seek to reduce risk and vulnerability to this hazard.

SacSewer's service area is hydrologically connected to the Sacramento-San Joaquin Delta. This connection means sea level rise could impact Delta water levels and levee integrity, increasing flood risk and potentially affecting SacSewer's operations and infrastructure.

Assets at Risk

Assets at risk from sea level rise include people and populations; District assets and critical facilities and infrastructure); and natural, historic, and cultural resources. These are discussed in the following sections.

People and Populations

All people and populations (including both District staff and the population served by the District) that live or work in areas prone to sea level rise are often the most vulnerable to future impacts from this hazard. Not only are the residents at risk, but their homes and contents are all at risk, compounding the impacts

associated with this hazard. Certain vulnerable populations might be at greater risk to this hazard and include low-income populations that cannot afford to relocate. Due to the very slow progression of this hazard, most populations located within sea level rise inundation areas should have sufficient advance notice to relocate to other areas, but not without economic impact.

District Assets and Critical Facilities and Infrastructure

Certain District assets, including structures and critical facilities and infrastructure in the District are at risk to sea level rise and primarily include those structures located in areas in and around the Delta area. Sea level rise presents a threat to critical facilities and infrastructure. Critical infrastructure plays an immensely important role in our communities. Damage to any one of these systems can threaten public safety, wreak havoc on daily life, impact properties far from flood zones, and result in economic impacts that cascade throughout California. No District facilities are currently at risk to sea level rise.

Natural, Historic, and Cultural Resources

According to the 2024 CAP, rising sea levels can disrupt coastal wetlands by drowning plant species, increasing salt levels in the soil and water, and outpacing the wetland's migration further inland. This puts important ecosystems in danger, threatens habitats, and leaves communities exposed to dangerous storm surge. Without wetlands and other critical ecosystems, many species could lose their homes or become extinct. Large flood events exacerbated by sea level rise can affect natural, historic, and cultural resources. Any of these resources that fall in the sea level rise scenarios shown on Figure O-13, Figure O-14, or Figure O-15 would be vulnerable.

Future Conditions/Future Development

This section provides a discussion of how future conditions will influence or affect the hazard over time and also discusses future development relative to each hazard.

Future Conditions

Future conditions may be affected by climate change, changes in population patterns (migration, density, or the makeup of socially vulnerable populations), and changes in land use and development. Findings on this for the District include the following:

- Climate change is likely to exacerbate future sea level rise conditions and associated impacts and vulnerability of the County. This was discussed in greater detail in the Climate Change and Sea Level Rise section of the Hazard Profile above
- Population projections within the jurisdictional boundaries of the District show the population to be increasing. It is unknown how population patterns and demographics will change in the near future. The District noted that it has no control over population changes within its jurisdictional boundaries. The District may add staff, but this number would be small. With changes in population numbers and makeup, the vulnerability of the District to this hazard may increase.
- Changes in land use and development in the District are expected to occur in the near future which is likely to increase the vulnerability and associated impacts to the District from sea level rise flooding. Additional development in coastally influenced areas traditionally leads to additional flooding.

Adherence to protective building codes for new development can assist in limiting future impacts and associated vulnerabilities of the District to this hazard.

Future Development

The 2024 CAP noted that guiding development out of areas vulnerable to sea level rise will reduce future flooding impacts to people and property. The District should work closely with the County and cities in which it is located to determine how and where to expand District assets to avoid placing future development in harms way.

Wildfire (w/ smoke and air quality)

Likelihood of Future Occurrence–Highly Likely

Vulnerability–High

Hazard Profile

Wildland fire and the risk of a conflagration is an ongoing concern for the SacSewer. Throughout California, communities are increasingly concerned about wildfire safety as increased development in the foothills and more forested areas and subsequent fire control practices have affected the natural cycle of fire regimes. Wildland fires affect grass, forest, and brushlands, as well as structures. Where there is human access to wildland areas the risk of fire increases due to a greater chance of human carelessness and historical fire management practices. Historically, the fire season extends from early spring through late fall of each year during the hotter, drier months; however, in recent years, the risk of wildfire and conflagration has become a year-round 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 weather conditions can result in red flag (e.g., fire weather) days, and can (rarely) result in PSPS events in the District. 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, urbanized areas. There is also the concern of wildfires occurring in these more remote, forested areas that under certain weather conditions, can extend into areas not generally considered at a high risk to wildfire. Smoke and air quality also become an issue, both from fires occurring inside and outside of the Sacramento County Planning Area and the District.

Wildfire Smoke and Air Quality

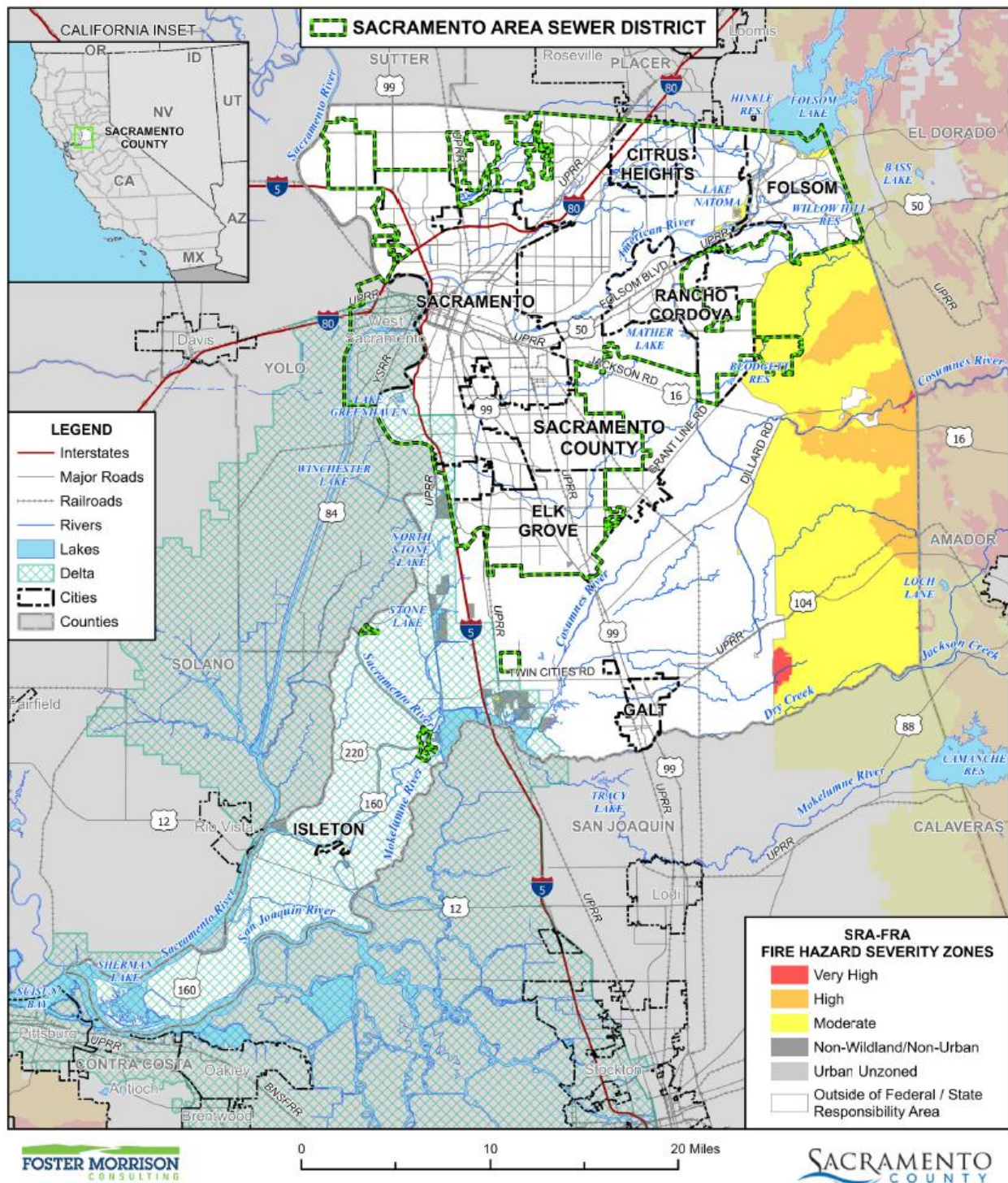
Smoke from wildfires consists of gas and particulate matter, which can be easily observed in the air. Air quality standards have been established to protect human health with the pollutant referred to as PM2.5 which consists of particles 2.5 microns or less in diameter. These smaller sizes of particles are responsible for adverse health effects because of their ability to reach the lower regions of the respiratory tract.

Wildfire smoke can have negative effects to those who live in or near a fire burn area. Smoke and air pollution from wildfires can be a severe health hazard. Significant wildfires occurring in both Sacramento County and nearby northern California communities since the 2021 LHMP Update have created significant air pollution affecting area residents. These were discussed in Section 4.3.17 of the Base Plan.

Location and Extent

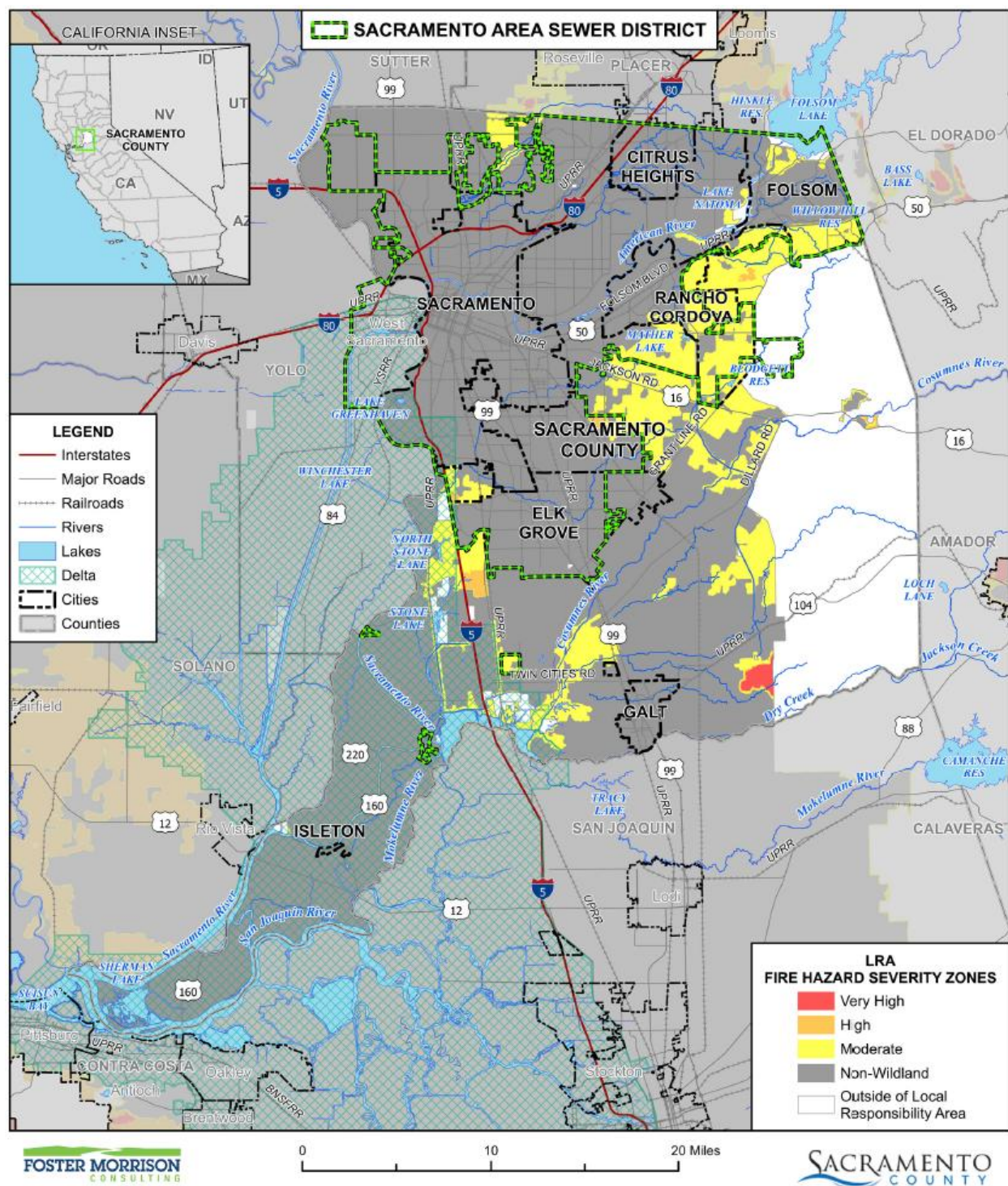
Wildfire can affect all areas of the District. CAL FIRE has estimated that the risk varies across the District and has created updated wildfire maps showing risk variance across the District and the Sacramento County Planning Area. Following the methodology described in Section 4.3.15 of the Base Plan, wildfire maps for the SacSewer were created. Figure O-16 shows the CAL FIRE State Responsibility Areas (SRA) and Federal Responsibility Areas (FRA) and their associated Fire Hazard Severity Zones (FHSZ) in the District. Figure O-17 shows the CAL FIRE Local Responsibility Areas (LRA) and their associated Fire Hazard Severity Zones (FHSZ) in the District. As shown on the maps, the District falls both in the SRA/FRA and in the LRA.

Figure O-16 SacSewer – CAL FIRE SRA/FRA Fire Hazard Severity Zones



Data Source: CAL FIRE (State Responsibility Area: FHSZSRA_23_3) April 2024,
 CAL FIRE (Federal Responsibility Area: Draft c20fhszl06_1), September 2007,
 Sacramento County, Cal-Atlas; Map Date: 6/16/2026.

Figure O-17 SacSewer – CAL FIRE LRA Fire Hazard Severity Zones



Data Source: CAL FIRE (Local Responsibility Area FHSZ 3/2025 FHSZLRA25_v1_All), Sacramento County, Cal-Atlas; Map Date: 6/16/2026.

Wildfires tend to be measured in structural damages, injuries, and loss of life as well as 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 extents in the SRA/FRA are shown in Table O-17, while extents in the LRA are shown on Table O-18. As shown, the District sits inside both the SRA/FRA and the LRA. In the District, FHSZs range from Non-Wildland to High.

Table O-17 SacSewer – CAL FIRE SRA/FRA Fire Hazard Severity Zone Geographical 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%	0	0%	0	0%
High	71	0.04%	0	0%	71	0.1%
Moderate	3,596	2%	1	0.001%	3,595	4.4%
Non-Wildland/Non-Urban	263	0.1%	0	0%	263	0.3%
Urban Unzoned	461	0.2%	5	0.004%	456	1%
Outside of Federal / State Responsibility Area	193,719	98%	116,659	100%	77,060	95%
Grand Total	198,110	100%	116,665	100%	81,444	100%

Source: CAL FIRE

Table O-18 SacSewer – CAL FIRE LRA Fire Hazard Severity Zone Geographical Extents

Fire Hazard Severity Zone	Total Acres	% of Total Acres	Improved Acres	% of Total Improved Acres	Unimproved Acres	% of Total Unimproved Acres
High	429	0.2%	119	0.1%	310	0.4%
Moderate	21,762	11%	3,309	3%	18,453	23%
Non-Wildland	171,528	87%	113,232	97%	58,296	72%
Outside of Local Responsibility Area	4,474	2%	33	0.03%	4,441	5%
Grand Total	198,193	100%	116,693	100%	81,500	100%

Source: CAL FIRE

Past Occurrences

Disaster Declaration History

There has been four state and three federal disaster declarations due to fire, as shown in Table O-19.

Table O-19 Sacramento County – State and Federal Wildfire Disaster Declarations 1950-2025

Disaster Type	State Declarations		Federal Declarations	
	Count	Years	Count	Years
Fire	4	1973, 2020 (twice), 2024	3	2020 (twice), 2025

Source: Cal OES, FEMA

NCDC Events

The NCDC has tracked 15 wildfire events in the County dating back to 1993.

SacSewer Events

SacSewer has no documented history of impacts, damages, or costs associated with wildfire, smoke, or air quality issues. Since 2021, SacSewer has not experienced any wildfires, smoke, or air quality issues that have impacted SacSewer’s facilities, operations, staff, populations served, or infrastructure.

Climate Change and Wildfire

It is likely that climate change will increase the chance of future occurrence as well as future impacts from wildfire. More information on future impacts to the District can be found in the Future Conditions/Future Development section of the Vulnerability Assessment below.

Warmer temperatures can exacerbate drought conditions. Drought often kills plants and trees, which serve as fuel for wildfires. Warmer temperatures could increase the number of wildfires and pest outbreaks, such as the western pine beetle. Cal-Adapt’s wildfire tool predicts the potential increase in the amount of burned areas for the year 2090-2099, as compared to recent (2010) conditions. This is shown in Section 4.3.17 of the Base Plan. Based on this model, Cal-Adapt predicts that wildfire risk in Sacramento County will increase moderately at the end of the century. However, wildfire models can vary depending on the parameters used. Cal-Adapt does not take landscape and fuel sources into account in their model. In all likelihood, in the Sacramento County Planning Area, precipitation patterns, high levels of heat, topography, and fuel load will determine the frequency and intensity of future wildfire.

The 2024 CAP noted issues with climate change and wildfire. Historically, attention to wildfire in California has mostly focused on the Sierra Nevada region and Southern California, but recent large and destructive wildfires in other portions of the state have rapidly shifted attention to the ongoing risks statewide. Climate change is exacerbating many of the factors that contribute to wildfire risk. Increased variability in precipitation may lead to wetter winters and increased vegetative growth in the spring. Potentially longer and hotter summer periods will lead to the drying of vegetative growth, which may ultimately result in a greater amount of fuel for wildfire ignition and spread.

The 2026 American, Bear, and Cosumnes Watersheds Resilience Plan noted that a key driver of climate vulnerability, adaptive capacity, and implementation readiness in the watershed group is wildfire. An equity analysis was performed as part of this Plan. An Equity Analysis Technical Appendix demonstrates how social vulnerability aligns with the physical hazard environment across the watershed. It noted that wildfire exposure grows sharply under mid-century climate conditions, with the population exposed to high

burn probability increasing from 14% today to 34% in the future, and the number of people in the highest sensitivity category increasing five-fold.

Vulnerability to Wildfire

Risk and vulnerability to the District from wildfire is of significant concern. Wildfires that occur in the District occur from a variety of both natural and manmade causes. The District can be affected both by fires that start on or near District lands as well as those that start elsewhere and move into the District. In addition to burning large areas of land, air quality can be affected in the District by smoke from fires occurring inside the District as well as those from many miles away. As growth continues and populations increase in the District, the potential for wildfires will also increase.

The whole of the District is at some measure of vulnerability to wildfire. An assessment of a community's vulnerability to wildfire begins with an understanding of local exposure to wildfire. This is included in the Local Concerns section below. After that section, assets at risk are discussed.

Local Concerns

The District has specific concerns and unique vulnerabilities regarding this hazard. These concerns form a portion of the basis for the mitigation strategy and mitigation actions that seek to reduce risk and vulnerability to this hazard.

Wildfire risk varies significantly across SacSewer's service area. Although most assets are not located within mapped Fire Hazard Severity Zones, major assets could still experience wildfire-related impacts, including infrastructure damage, reduced site accessibility, and degraded air quality.

Assets at Risk

Assets at risk from wildfire include people and populations; District assets and critical facilities and infrastructure; and natural, historic, and cultural resources. These are discussed in the following sections.

People and Populations

All populations are vulnerable to wildfire. Certain vulnerable populations are at greater risk to the effects of wildfire as well as smoke and air quality issues that wildfires bring. Vulnerable populations include: the unhoused, infants and children under age five and their caregivers, seniors (65 and older), individuals with disabilities or dependent on medical equipment, and individuals who exercise, recreate, or work outdoors.

District Assets and Critical Facilities and Infrastructure

All District assets, including structures and critical facilities and infrastructure, have some risk to wildfire. Wildfire also present a threat to critical facilities and infrastructure. Should a wildfire occur, structural damage could cause District facilities to go offline until repairs are made. Assets at risk in the District from wildfire are included on Table O-20.

Table O-20 SacSewer Assets: Structures, Critical Facilities and Infrastructure, and Other Facilities Risk from Wildfire

Name of Asset	Facility Type	2026 Replacement Value
Treatment Assets		
Bufferlands and Environmental Mitigation Lands	Natural Resource	\$14,844,261
Sims Ranch	Historic Resource	\$177,584
Nicolaus Dairy	Historic Resource	\$1,622,609
SacSewer Archeological Site CA-SAC-83	Cultural Resource	\$0
Real Property, Land and Easements	Essential	\$86,445,288
Buildings	Essential	\$272,515,645
Total		\$375,605,387
Collection System Assets		
South Area Corporation Yard (SACY)	Essential	\$73,729,166
North Area Corporation Yard (NACY)	Essential	\$32,606,298
Total		\$106,335,464

Source: SacSewer

Natural, Historic, and Cultural Resources

Natural, historic, and cultural resources located within areas at risk to wildfire would be vulnerable. Should a wildfire occur in the District, the impacts to natural, historic and cultural resources could be extensive and include air pollution, contamination from water runoff containing toxic products, and other environmental discharges or releases from burned materials affecting soils, habitat areas, wildlife, and aquatic resources. Historic and cultural resources can be damaged or destroyed and are often more vulnerable due to their older age, construction type, and lack of fire prevention infrastructure such as sprinklers.

Impacts from Wildfire

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. Out of control wildfires can have catastrophic impacts. Wildfires can cause short-term and long-term disruption to the District. Fires can have devastating effects on watersheds through loss of vegetation and soil erosion, which may impact the District by changing runoff patterns, increasing sedimentation, reducing natural and reservoir water storage capacity, and degrading water quality. Fires can also affect air quality in the District; smoke and air pollution from wildfires can be a severe health hazard. Smoke impacts may come from wildfires outside the District, as well as from within.

Although the physical damages and casualties arising from wildland-urban interface or conflagration 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.

In addition, catastrophic wildfire can create favorable conditions for other hazards such as flooding, landslides, and erosion during the rainy season.

The impacts of a fire are felt long after the fire is extinguished. In addition to the loss of property in fires, the loss in vegetation and changes in surface soils alters the environment. When supporting vegetation is burned, hillsides become destabilized and prone to erosion. The burnt surface soils are harder and absorb less water. When winter rains come, this leads to increased runoff, erosion, and landslides in hilly areas.

Impacts that are not quantified, but can be anticipated in large future events, include:

- Injury and loss of life;
- Commercial and residential structural and property damage;
- Disruption of and damage to public infrastructure, utilities, and services;
- Damage to roads/bridges resulting in loss of mobility;
- Significant economic impact (jobs, sales, tax revenue) to the community; and
- Negative impact on commercial and residential property values

Impacts to identified assets at risk to this hazard and the overall vulnerability of the District may be affected in the future by climate change (which was discussed in the hazard profile above), changes in population patterns (migration, density, or the makeup of socially vulnerable populations), and changes in land use and development. These are discussed in the Future Conditions/Future Development discussion below.

Future Conditions/Future Development

This section provides a discussion of how future conditions will influence or affect the hazard over time and also discusses future development relative to each hazard.

Future Conditions

Future conditions may be affected by climate change, changes in population patterns (migration, density, or the makeup of socially vulnerable populations), and changes in land use and development. Findings on this for the SacSewer include the following:

- Climate change is likely to exacerbate future wildfire conditions and associated impacts and vulnerability of the District to wildfire. This was discussed in greater detail in the Climate Change and Wildfire section of the Hazard Profile above.
- Population projections within the jurisdictional boundaries of the District show the population to be increasing. It is unknown how population patterns and demographics will change in the near future. The District noted that it has no control over population changes within its jurisdictional boundaries. The District may add staff, but this number would be small. With changes in population numbers and makeup, the vulnerability of the District to this hazard may increase. Wildfire smoke and air quality from regional events will likely continue to contribute to an increase in vulnerability to District populations.
- Changes in land use and development in the District are expected occur in the near future which is likely to increase the vulnerability and associated impacts to the District from Wildfire. Additional development may also contribute to an increase in wildfire ignitions. Adherence to protective building

codes for new development will assist in limiting future impacts and associated vulnerabilities of the District to this hazard.

Future Development

Additional growth and development within moderate or higher fire hazard severity zones in the District would place additional values at risk to wildfire. District building codes are in effect and should continue to be updated as appropriate to reduce future impacts.

O.5 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.

O.5.1. Regulatory Mitigation Capabilities

Table O-21 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 SacSewer.

Note: The District does not have the authority to regulate land use and development within its jurisdiction. Authority for promulgating and enforcing zoning, land use, and development requirements falls to counties and incorporated communities. As such development within the District’s jurisdictional boundaries will conform to the zoning and land use development ordinances and building codes of the county or incorporated community in which the District is located.

Table O-21 SacSewer’s Regulatory Mitigation Capabilities

Plans	In Place Y/N	Does the plan address hazards? Can the plan be used to carry out mitigation actions? When was it last updated??
Capital Improvements Plan	Y	Rate and Fee Study (2009, 2011, 2024) Long Term Financial Plan (Annual) System Capacity Plan (2020) 2013 Interceptor Sequencing Study
Climate Change Adaptation Plan	Y	Climate Adaptation and Resiliency Plan (2026)
Community Wildfire Protection Plan	N	
Comprehensive/Master Plan	Y	SacSewer Collection System Sanitary Sewer Spill Emergency Response Plan (September 2024) SacSewer Interceptor System Sanitary Sewer Spill Emergency Response Plan (March 2025) EchoWater Facility Flood Response Manual (January 2019)
Continuity of Operations Plan	Y	SacSewer Continuity of Operations Plan (COOP) (November 2017)
Economic Development Plan	N	

Land Use Plan	N	
Local Emergency Operations Plan	Y	EchoWater Facility Administrative Operating Procedures (2011)
Stormwater Management Plan	Y	SacSewer requires compliance with Sacramento County Standard Construction Specifications, Stormwater Compliance sections, and State Water Resources Control Board Construction General Permit, Order 2009-0009-DWQ, and Industrial General Permit, State Water Board Order No. 97-03-DWQ
Transportation Plan	N/A	
Other	Y	SacSewer Flood Risk Evaluation for the South River Pump Station South River Pump Station Emergency Response Plan Pump Station Protection Plan for the South River Pump Station Flood Protection Project Draft Report
Is the ordinance an effective way to reduce hazard impacts?		
Land Use Planning and Ordinances	Y/N	Is the ordinance adequately administered and enforced?
Acquisition of land for open space and public recreation use	N/A	
Building code	N/A	
Flood insurance rate maps	N	
Floodplain ordinance	N	
Natural hazard-specific ordinance (stormwater, steep slope, wildfire)	N	
Subdivision ordinance	N	
Zoning ordinance	Y	The ordinance is an effective measure for reducing the impacts of hazards. The ordinance is adequately administered and enforced.
Other	Y	Use design standards for facilities. These standards include items such as fire protection systems, building alarms, etc. These standards are shown in Sewage Pump Station Design Manual (Feb 2025); Interceptor Design Manual (October 2003); and EchoWater Facility Guide Specifications (2006/07)
How can these capabilities be expanded and improved to reduce risk?		
SacSewer's capabilities can be strengthened by regularly updating its plans to address hazards that may impact its operations.		

Source: SacSewer

O.5.2. Administrative/Technical Mitigation Capabilities

Table O-22 identifies the District department(s) responsible for activities related to mitigation and loss prevention in the SacSewer.

Table O-22 SacSewer's Administrative and Technical Mitigation Capabilities

Administration	In Place Y/N	Describe capability Is coordination effective?
Staff		Is staffing adequate to enforce regulations?
		Is staff trained on hazards and mitigation?
		Is coordination between agencies and staff effective?
Chief Building Official	N	
Civil Engineer, including dam and levee safety	Y	Staff is adequate to enforce regulations. Staff are trained on hazards and mitigation. Coordination is effective.
Community Planner	Y	Staff is adequate to enforce regulations. Staff are trained on hazards and mitigation. Coordination is effective.
Emergency Manager	Y	Staff is adequate to enforce regulations. Staff are trained on hazards and mitigation. Coordination is effective.
Floodplain Administrator	Y	Staff is adequate to enforce regulations. Staff are trained on hazards and mitigation. Coordination is effective.
GIS Coordinator	Y	Staff is adequate to enforce regulations. Staff are trained on hazards and mitigation. Coordination is effective.
Planning Commission	N	
Other		
Technical	Y/N	Has capability been used to assess/mitigate risk in the past?
Grant writing	Y	Staff is adequate to enforce regulations. Staff are trained on hazards and mitigation. Coordination is effective.
Hazard data and information	Y	This funding resource has been used in the past and could be used to fund future mitigation actions.
GIS analysis	Y	This funding resource has been used in the past and could be used to fund future mitigation actions.
Mutual aid agreements	Y	This funding resource has been used in the past and could be used to fund future mitigation actions. CalWARN
Other	N	
How can these capabilities be expanded and improved to reduce risk?		
SacSewer can strengthen its capabilities by reviewing and updating the Continuity of Operations Plan (COOP) annually and conducting additional tabletop exercises to expand operational readiness further and reduce risk. Regular staff meetings can also help ensure employees are aware of identified mitigation risks and hazards, promoting consistent and proper response procedures.		

Source: SacSewer

O.5.3. Fiscal Mitigation Capabilities

Table O-23 identifies financial tools or resources that the District could potentially use to help fund mitigation activities.

Table O-23 SacSewer’s Fiscal Mitigation Capabilities

Funding Resource	In Place 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	This funding resource has been used in the past and could be used to fund future mitigation actions.
Community Development Block Grant	N	
Federal funding programs (non-FEMA)	Y	This funding resource has been used in the past and could be used to fund future mitigation actions.
Fees for water, sewer, gas, or electric services	Y	This funding resource has been used in the past and could be used to fund future mitigation actions.
Impact fees for new development	Y	This funding resource has been used in the past and could be used to fund future mitigation actions.
State funding programs	Y	This funding resource has been used in the past and could be used to fund future mitigation actions.
Stormwater utility fee	N	
Other		
How can these capabilities be expanded and improved to reduce risk?		
SacSewer’s capabilities can be strengthened by providing ongoing staff training and allocating resources toward reducing hazard risks. Further improvement can be supported by researching additional funding sources to help finance future mitigation actions.		

Source: SacSewer

O.5.4. Mitigation Education, Outreach, and Partnerships

Table O-24 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 O-24 SacSewer’s Mitigation Education, Outreach, and Partnerships

Program/Organization	In Place Y/N	How widespread are each of these in your community?
Community newsletters	N	While SacSewer does not produce a dedicated, public-facing community newsletter, we utilize a range of communication tools to reach customers and the broader community. These include bill inserts, social media, website content, and targeted outreach campaigns. We also coordinate closely with Sacramento and Yolo counties, as well as partner agencies, to share and amplify information through their established newsletters and communication channels when appropriate. This approach allows us to support community-wide awareness efforts and ensure consistent, regionally aligned messaging.
Hazard awareness campaigns (such as Firewise, Storm Ready, Severe Weather Awareness Week, school programs, public events)	N	Hazard awareness campaigns are present in our region, but their implementation is largely driven at the county and regional level rather than by any single agency. We closely coordinate with Sacramento and Yolo counties to support major initiatives—such as seasonal awareness campaigns, public outreach efforts, and emergency preparedness programs—particularly when they may impact our operations or service area. Through this coordination, we help amplify messaging and ensure alignment with broader regional efforts, rather than leading standalone campaigns. SacSewer also has an established Sewer System Management Plan that outlines key tactics and protocols as part of an overarching communications strategy for critical incidents. In situations that escalate to a higher level of response, SacSewer is actively engaged in the Sacramento County Emergency Operations Center, ensuring coordination and real-time information sharing with regional partners.
Local news	Y	SacSewer conducts a variety of media relations efforts—including press releases, media briefings, and proactive outreach—to help inform the public about a variety of initiatives. In addition, we collaborate closely with Sacramento and Yolo counties to align messaging and support broader regional communications efforts, ensuring consistency and reinforcing key public safety information across jurisdictions.

Program/Organization	In Place Y/N	How widespread are each of these in your community?
Organizations that interact with underserved and vulnerable communities	N	While SacSewer does not operate direct programs specifically targeting underserved and vulnerable communities, these types of outreach efforts are widespread across our region and are largely led by county and community-based organizations. In both Sacramento and Yolo counties, there is a strong emphasis on partnering with trusted, community-based organizations to reach historically underrepresented populations through culturally responsive and multilingual engagement. Sacramento County, in particular, is highly diverse, with a significant portion of residents speaking languages other than English at home—including Spanish and Russian—highlighting the importance of accessible, in-language communication. Within this broader landscape, our role is to support these efforts by ensuring key public information is accessible. We provide educational content on priority topics in Spanish and Russian and closely collaborate with Sacramento and Yolo counties to align messaging and extend the reach of regional outreach efforts. This coordinated approach helps ensure that critical information is reinforced through multiple trusted channels and reaches communities that may otherwise be harder to engage.

Program/Organization	In Place Y/N	How widespread are each of these in your community?
Social media	Y	SacSewer’s social media accounts are an important tool for sharing sewer-related information and public service announcements with ratepayers. These messages include sewer-friendly practices, industry-related updates, helpful at-home tips, and information about major construction projects that may impact the community. When appropriate, we also use our platforms to amplify hazard awareness and emergency preparedness messaging—particularly when it may affect our operations or service area. We coordinate closely with Sacramento and Yolo counties to align and share relevant social media content, helping to reinforce broader regional campaigns and ensure consistent, accurate information is reaching the public. Through this collaborative approach, we are able to support larger awareness efforts while continuing to provide timely, service-specific updates to our customers.
How can these capabilities be expanded and improved to reduce risk?		
SacSewer can conduct additional community outreach focused on topics such as pipe clogging prevention and pest prevention and distribute them directly to its ratepayers. This outreach could be shared on community bulletin boards and with organizations that work with underserved and vulnerable populations. In addition, disaster related notifications can be shared with ratepayers through SacSewer’s social media accounts.		

Source: SacSewer

O.5.5. Other Mitigation Efforts

SacSewer is developing a Climate Adaptation and Resiliency Plan (CARP), which is expected to be completed in 2026. A Vulnerability Assessment is a supplemental document that will be completed under the scope of the CARP.

SacSewer developed the EchoWater Facility Flood Response Manual. Additionally, SacSewer’s flood preparedness is incorporated into several planning and response documents. Flood risk, facility exposure, and mitigation strategies are addressed in operational procedures within the SacSewer’s Spill Emergency Response Plan for the Collection System and Interceptor System.

The District also has multiple plans that are related to mitigation:

- Prevention and Re-Opening Plan (2022)
- Flood Response Manual (2019)
- Collections Systems Operation Emergency Response Plan (2024)
- Sanitary Sewer Spill Emergency Response Plan (2025)
- SacSewer Rate Study Report (2024)

- Continuity of Operations Plan (2017)
- Interceptor System Sanitary Sewer Management Plan (2025)
- Local Collection System Sanitary Sewer Management Plan (2025)

O.6 Mitigation Strategy

O.6.1. Mitigation Goals and Objectives

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

O.6.2. NFIP Mitigation Strategy

The District does not participate in the NFIP, as it is not an eligible participant. Some of the District's projects work to reduce impacts from flooding thus furthering the objectives of the NFIP.

O.6.3. Mitigation Actions

The Planning Team for the SacSewer 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, and timeline are also included. The following hazards were considered a priority for purposes of mitigation action planning:

- Climate Change
- Dam Failure
- Earthquake (w/subhazards)
- Flood: 1%/0.5%/0.2% annual chance
- Levee Failure
- Sea Level Rise
- Wildfire (w/ smoke and air quality)

Low priority hazards for mitigation planning include:

- Aquatic Nuisance Species (plant/animal)
- Drought & Water Shortage (w/tree mortality)
- Flood: Localized Stormwater
- Landslide, Mudslide, Debris Flow
- Severe Weather: Extreme Cold and Freeze
- Severe Weather: Extreme Heat
- Severe Weather: Heavy Rains and Storms (Hail, Lightning, Wind)
- Severe Weather: High Winds and Tornadoes
- Subsidence

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 and jurisdictions regardless of hazard priority. Collectively, this LHMP's 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 each jurisdiction has focused on identifying those mitigation actions and projects to address their priority hazards, which are both realistic and reasonable for them to implement for this 5-year planning process, and would like to preserve their right to modify hazard priorities should future projects be identified where the implementing jurisdiction has the future capacity to implement. The participating jurisdictions are not obligated by this document to implement any or all of these projects. Rather this mitigation strategy represents the desires of the jurisdictions to mitigate the risks and vulnerabilities from identified hazards. The actual selection, prioritization, and implementation of these actions will also be further evaluated in accordance with the mitigation categories and criteria contained in Appendix C.

Mitigation Actions

The District has put forward the actions as shown in Table O-25. Details of the actions can be found below the table.

Table O-25 SacSewer Mitigation Actions

Action Title	New Action/ Previous Action	Address Current Development	Address Future Development	Continued NFIP Compliance	Mitigation Type
Action 1. Complete and Implement I&I Policy	Previous Action	X	X	X	Prevention Property Protection
Action 2. EchoWater BioGeneration Facility	Previous Action	X	X		Prevention Property Protection Structural Projects
Action 3. Reduction of Fire Hazard of the Bufferlands	Previous Action	X	X		Prevention Property Protection Natural Resource Protection
Action 4. Update GHG Emissions Inventory	Previous Action	X	X		Prevention Property Protection
Action 5. Energy Management Plan	New Action	X	X		Prevention Property Protection
Action 6. Evaluate the Adaptation Strategies Suggested within the Climate Adaptation and Resiliency Plan	New Action	X	X	X	Prevention Property Protection Natural Resource Protection
Action 7. Installation of Backup Generators for Collection System Pump Stations (where applicable and feasible)	New Action	X	X	X	Prevention Property Protection Structural Projects

Action Title	New Action/ Previous Action	Address Current Development	Address Future Development	Continued NFIP Compliance	Mitigation Type
Action 8. Decommissioned Pipeline Abandonment Removal	New Action	X	X		Prevention Property Protection Structural Projects

Action 1. Complete and Implement I&I Policy

Hazards Addressed: Dam Failure, Floods, 1%/0.5%/0.2% annual chance, Flood: Localized Stormwater, Severe Weather: Heavy Rains and Storms

Goals Addressed: 1, 2, 3, 5

Issue/Background (Problem Statement): The EchoWater Facility has experienced increases in Peak Wet Weather Flow (PWWF) due to suspected inflow and infiltration (I&I) during peak storm events. I&I is problematic for the EchoWater Facility because it creates inconsistent flow patterns, increases sanitary sewer overflows, alters influent quality, and adversely impacts operational efforts.

Project Description: The proposed I&I Policy is intended to serve as a guide for SacSewer and its Contributing Agencies to work cooperatively to address I&I in SacSewer's Treatment and Resource Recovery service area. It is envisioned that this policy will lead to the development and implementation of a regional I&I program to reduce the impacts of excessive I&I on the EchoWater Facility and the interceptor systems. Thereby minimizing environmental health risks by reducing the frequency of spills.

Other Alternatives: No action

Existing Planning Mechanism(s) through which Action Will Be Implemented: I&I Study

Responsible Office/Partners: SacSewer Engineering, City of Sacramento, City of West Sacramento, City of Folsom,

Project Benefits (Losses Avoided): Minimizing environmental health risk, reducing spill occurrences, avoiding inconsistent flow patterns, unsafe sewage discharge, and impacts to EchoWater Treatment Operations.

Potential Funding (Local Budgets, Grant Funds, etc. by specific type): SacSewer Treatment and Resource Recovery Operating Fund, Staff Time

Timeline: Within 1 year and ongoing

Project Priority (High, Medium, Low): Medium

Action 2. EchoWater BioGeneration Facility

Hazards Addressed: Climate Change, Severe Weather: Extreme Heat

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

Issue/Background (Problem Statement): SacSewer has a long standing Commodity Agreement with the Sacramento Municipal Utility District (SMUD), under which SacSewer provides renewable biogas from the EchoWater Facility and receives reliable utility power, backup generation, and steam for digester heating. The BioGeneration Facility will generate electricity and heat through a 13.4 MW cogeneration system that integrates fuel cell and engine technologies. This facility will increase biogas production, expand renewable power generation, reduce purchased utility power, and lower greenhouse gas emissions.

Project Description: SacSewer is working with the Design-Build contractor to construct the BioGeneration Facility.

Other Alternatives: No other alternatives

Existing Planning Mechanism(s) through which Action Will Be Implemented: Ongoing construction and operation contract

Responsible Office/Partners: SacSewer Engineering

Project Benefits (Losses Avoided): Utilizing biogas from the EchoWater Facility's solids treatment process to generate electricity, helping reduce SacSewer's overall energy needs (and carbon footprint).

Potential Funding (Local Budgets, Grant Funds, etc. by specific type): SacSewer Capital Outlay Fund, Inflation Reduction Act of 2022, Grants (FEMA HMGP, BRIC) and others

Timeline: 1 year

Project Priority (High, Medium, Low): High

Action 3. *Reduction of Fire Hazard of the Bufferlands*

Hazards Addressed: Drought and Water Shortage, Severe Weather: Extreme Heat, Wildfires

Goals Addressed: 1, 2, 3, 5

Issue/Background (Problem Statement): A hot, dry summer increases the likelihood of wildfires in the Bufferlands area surrounding the EchoWater Facility. While much of the Bufferlands' habitat is fire-adapted, the high fuel loads associated with the prevalent annual herbaceous vegetation on the property put some habitats, crops, and infrastructure at risk.

Project Description: To minimize wildfire risk in the Bufferlands, SacSewer annually establishes firebreaks between public roads and sensitive resources. Firebreaks are either disked to bare ground at a width of 30 feet or mowed to a height of 4 inches or less at a width of 100 feet. Grazing leases are utilized to reduce summer fuel loads on a large portion of SacSewer's upland habitat.

Other Alternatives: No other alternatives

Existing Planning Mechanism(s) through which Action Will Be Implemented: Annual Operations & Maintenance Planning, Bufferlands Master Plan

Responsible Office/Partners: SacSewer Engineering

Project Benefits (Losses Avoided): Avoid fire damage to grasslands, tree mitigation lands, sensitive habitat areas, crops, and infrastructure.

Potential Funding (Local Budgets, Grant Funds, etc. by specific type): SacSewer Treatment and Resource Recovery Operating Fund. Tenants are required to fund mitigation on tenant-occupied land.

Timeline: Within 1 year and annually

Project Priority (High, Medium, Low): Low

Action 4. Update GHG Emissions Inventory

Hazards Addressed: Climate Change, Sea Level Rise

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

Issue/Background (Problem Statement): SacSewer’s Environmental Sustainability Program Action Plan identifies Climate Adaptation and Resilience Planning as a focus area. Within this focus area, updating the GHG inventory is a prioritized action. The 2025–2035 Strategic Plan calls for strategic investment in environmental sustainability, including an initiative to responsibly manage Scope 1 and Scope 2 emissions. SacSewer is recommended to conduct a GHG emissions inventory every three calendar years

Project Description: SacSewer will use the California Air Resources Board’s Local Government Operations Protocol (LGOP) to conduct a GHG emissions inventory review every 3 years. Staff will continue to pursue complete and accurate data for Scope 1 and Scope 2 emissions.

Other Alternatives: No action

Existing Planning Mechanism(s) through which Action Will Be Implemented: Collect data from the EchoWater Facility, Fleet, South Area Courtyard, and North Area Courtyard.

Responsible Office/Partners: SacSewer Engineering

Project Benefits (Losses Avoided): Track emissions for SacSewer.

Potential Funding (Local Budgets, Grant Funds, etc. by specific type): SacSewer Staff Time

Timeline: Within 1-5 years and once every three years

Project Priority (High, Medium, Low): Medium

Action 5. Energy Management Plan

Hazards Addressed: Climate Change, Severe Weather: Extreme Heat

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

Issue/Background (Problem Statement): SacSewer’s 2025-2035 Strategic Plan aims to formalize an energy management program to identify opportunities for conservation, efficiency, and renewable energy generation with the goal of becoming a net energy producer. The effects of climate change threaten regional energy reliability, increase peak load stress, and heighten the likelihood of power disruptions that could impact SacSewer’s operations. The Energy Management Plan identifies energy optimization opportunities, enhances operational sustainability, and increases net energy production across SacSewer’s facilities.

Project Description: SacSewer has selected a consultant to develop an energy management plan to establish the foundational elements of an ongoing Energy Management Program for SacSewer staff to administrate. The Energy Management Plan will focus on three primary objectives: becoming a net energy producer, initiating a comprehensive energy program, and developing an energy data dashboard.

Other Alternatives: No action

Existing Planning Mechanism(s) through which Action Will Be Implemented: Ongoing operations.

Responsible Office/Partners: SacSewer Engineering, Sacramento Municipal Utility District

Project Benefits (Losses Avoided): Establishes the foundational elements of an energy management program and provides an opportunity to invest in upgrades to energy improvement.

Potential Funding (Local Budgets, Grant Funds, etc. by specific type): SacSewer Treatment and Resource Recovery Operating Fund and Collection System Operating Fund.

Timeline: 1-2 years

Project Priority (High, Medium, Low): High

Action 6. Evaluate the Adaptation Strategies Suggested within the Climate Adaptation and Resiliency Plan

Hazards Addressed: Climate Change, Dam Failure, Drought & Water Shortage, Flood: 1%/0.5%/0.2% annual chance, Localized Stormwater, Levee Failure, Extreme Heat, Heavy Rains and Storms, Wildfire, Sea Level Rise

Goals Addressed: 1, 2, 3, 5, 6, 7

Issue/Background (Problem Statement): As part of developing the Climate Adaptation and Resilience Plan (CARP), a vulnerability assessment was prepared to identify where critical assets and operations may be exposed to future climate hazards and to evaluate the potential impacts of those exposures. Once the CARP is completed in 2026, SacSewer will begin implementing the recommended adaptation strategies.

Project Description: The following list includes the recommended adaptation strategies for implementing the CARP.

1. Create Flood prevention partnerships
2. Evaluate pluvial and urban flooding risk
3. Monitor and study flow diversions
4. Incorporate and mainstream the use of climate hazard data
5. Develop climate-informed design standards
6. Implement climate-informed design standards
7. Manage wildfire fuel loads
8. Identify projected wildfire risk data
9. Access enhancements
10. Evaluate the condition of the ring levee
11. Improve the collection system pump station power disruption resilience

Other Alternatives: No other alternatives

Existing Planning Mechanism(s) through which Action Will Be Implemented: Climate Adaptation and Resilience Plan

Responsible Office/Partners: SacSewer Engineering

Project Benefits (Losses Avoided): The recommended adaptation strategies strengthen SacSewer's resilience by improving flood protection, enhancing wildfire preparedness, ensuring climate-informed planning, supporting reliable access to critical facilities, and increasing system reliability during power disruptions.

Potential Funding (Local Budgets, Grant Funds, etc. by specific type): SacSewer Treatment and Resource Recovery Operating Fund and Collection System Operating Fund.

Timeline: Within 1-5 years and ongoing

Project Priority (High, Medium, Low): High

Action 7. Installation of Backup Generators for Collection System Pump Stations (where applicable and feasible)

Hazards Addressed: Climate Change, Severe Weather: Extreme Heat, Heavy Rain, and Storms, Sea Level Rise

Goals Addressed: 1, 2, 3, 5

Issue/Background (Problem Statement): Power disruptions present a risk to collection system facilities. Of 108 pump stations, 88 do not have onsite backup generators. Four pump stations have experienced multiple extended outages lasting longer than six hours.

Project Description: To improve the infrastructure's resilience to power disruptions, it is recommended that SacSewer consider installing backup generators at the four pump stations that most frequently experienced multiple, prolonged power disruptions. It is recommended that SacSewer obtain the appropriate air permit for each newly installed generator.

Other Alternatives: Review various diversions and bypassing practices to prevent sewer spills.

Existing Planning Mechanism(s) through which Action Will Be Implemented: Climate Adaptation and Resilience Plan, Annual Operations Plan

Responsible Office/Partners: SacSewer

Project Benefits (Losses Avoided): Installing backup generators increases system reliability during power outages.

Potential Funding (Local Budgets, Grant Funds, etc. by specific type): SacSewer Treatment and Resource Recovery Operating Fund and Collection System Operating Fund, FEMA Hazard Mitigation Grant Program

Timeline: To be initiated in 5 years.

Project Priority (High, Medium, Low): Medium

Action 8. Decommissioned Pipeline Abandonment Removal

Hazards Addressed: Levee Failure, Sea Level Rise

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

Issue/Background (Problem Statement): The 10 inch sludge line and the 17 inch force main are abandoned lines that could act as potential leak paths beneath the American River Parkway levee. Removing the full length of the 10 inch sludge line would disrupt adjacent residential properties and affect surface and structural features. Removing the entire 17 inch pipeline would have major environmental impacts on both terrestrial and river areas, including extensive vegetation removal, excavation, turbidity concerns, and backfill activities.

Project Description: SacSewer is decommissioning a 10-inch sludge line and a 17-inch force main, two inactive pipelines crossing the American River. The project will consist of slurry filling and abandoning in place a portion of the 10-inch diameter pipeline and fully removing the remainder. The other half of the project involves filling the entire 17-inch diameter pipeline with cement slurry and abandoning it in place. Pre-application meetings with regulatory agencies are planned to solicit agency feedback regarding preliminary project design and identify potential environmental concerns. The Agency pre-application meetings will help facilitate the preparation of a permit application package and the evaluation of environmental impacts.

Other Alternatives: No alternatives

Existing Planning Mechanism(s) through which Action Will Be Implemented: 10-inch Sludge Line and 17-inch Force Main Technical Reports

Responsible Office/Partners: SacSewer, California State Lands Commission (CSLC), U.S. Army Corps of Engineers (USACE)

Project Benefits (Losses Avoided): Decommissioning both pipelines eliminates the potential leak path beneath the levee.

Potential Funding (Local Budgets, Grant Funds, etc. by specific type): SacSewer Treatment and Resource Recovery Operations Fund, FEMA Hazard Mitigation Grant Program

Timeline: To be initiated within 5 years and ongoing.

Project Priority (High, Medium, Low): Medium