

# Delta Annex Chapter 5 Reclamation District 349

## 5.1 Introduction

This Annex details the hazard mitigation planning elements specific to Reclamation District 349 (RD 349 or District), a new participating jurisdiction to the 2021 Sacramento County Local Hazard Mitigation Plan (LHMP) Update. This Annex is not intended to be a standalone document, but appends to and supplements the information contained in the Base Plan document. As such, all sections of the Base Plan, including the planning process and other procedural requirements apply to and were met by the District. This Annex provides additional information specific to RD 349, with a focus on providing additional details on the risk assessment and mitigation strategy for the District.

## 5.2 Planning Process

As described above, the District followed the planning process detailed in Chapter 3 of the Base Plan. In addition to providing representation on the Sacramento County Hazard Mitigation Planning Committee (HMPC), the District formulated their own internal planning team to support the broader planning process requirements. Internal planning participants, their positions, and how they participated in the planning process are shown in Table 5-1. Additional details on plan participation and District representatives are included in Appendix A. **FILL OUT TABLE WITH NAMES, TITLES, AND HOW EACH PERSON PARTICIPATED**

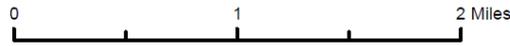
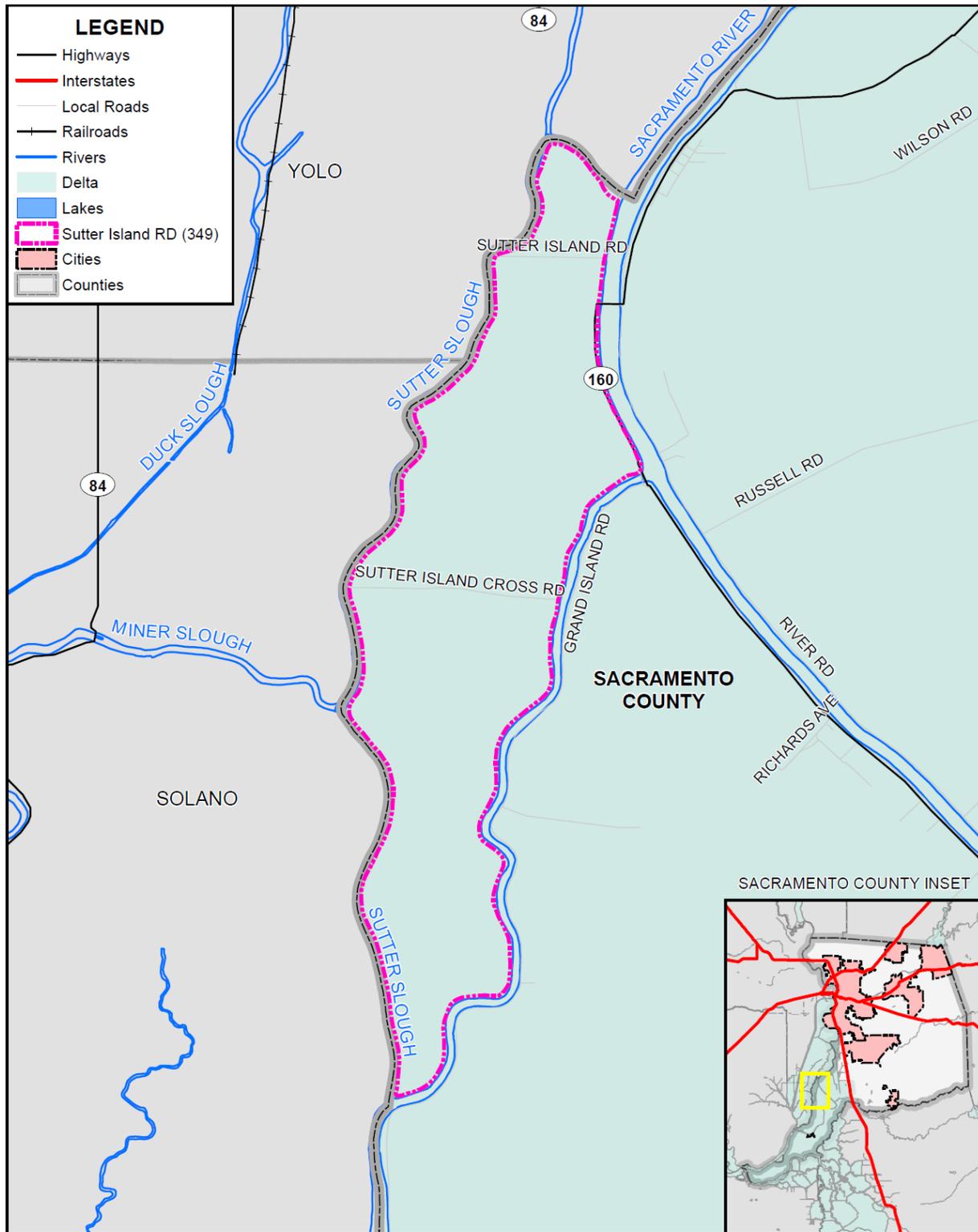
*Table 5-1 RD 349 – Planning Team*

Name	Position/Title	How Participated

## 5.3 District Profile

The District profile for the RD 349 is detailed in the following sections. Figure 5-1 displays a map and the location of the District within Sacramento County.

Figure 5-1 RD 349



Data Source: Sutter Island Reclamation District, Sacramento County GIS, Cal-Atlas; Map Date: 03/2021.

### 5.3.1. Overview and Background

GIVE AN OVERVIEW OF THE DISTRICT AND A BRIEF HISTORY/BACKGROUND.

## 5.4 Hazard Identification

RD 349 identified the hazards that affect the District and summarized their location, extent, frequency of occurrence, potential magnitude, and significance specific to District (see Table 5-2).

**Table 5-2 RD 349—Hazard Identification Assessment**

Hazard	Geographic Extent	Likelihood of Future Occurrences	Magnitude/Severity	Significance	Climate Change Influence
Climate Change	Extensive	Occasional	Limited	Low	–
Dam Failure	Limited	Unlikely	Negligible	Low	Medium
Drought & Water Shortage	Extensive	Occasional	Critical	Low	High
Earthquake	Extensive	Occasional	Limited	Low	Low
Earthquake Liquefaction	Significant	Occasional	Limited	Low	Low
Floods: 1%/0.2% annual chance	Extensive	Occasional	Catastrophic	High	Medium
Floods: Localized Stormwater	Significant	Likely	Critical	High	Medium
Landslides, Mudslides, and Debris Flow	Limited	Unlikely	Negligible	Low	Medium
Levee Failure	Extensive	Occasional	Catastrophic	High	Medium
Pandemic	Extensive	Likely	Limited	Low	Medium
Severe Weather: Extreme Cold and Freeze	Extensive	Likely	Limited	Low	Medium
Severe Weather: Extreme Heat	Extensive	Likely	Limited	Low	High
Severe Weather: Heavy Rains and Storms	Significant	Likely	Critical	Medium	Medium
Severe Weather: Wind and Tornado	Extensive	Likely	Limited	Low	Low
Subsidence	Significant	Likely	Limited	Low	Medium
Volcano	Extensive	Unlikely	Negligible	Low	Low
Wildfire	Limited	Unlikely	Negligible	Low	High
<b>Geographic Extent</b> Limited: Less than 10% of planning area Significant: 10-50% of planning area Extensive: 50-100% of planning area		<b>Magnitude/Severity</b> 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			
<b>Likelihood of Future Occurrences</b> 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.		<b>Significance</b> Low: minimal potential impact Medium: moderate potential impact High: widespread potential impact			
		<b>Climate Change Influence</b> Low: minimal potential impact Medium: moderate potential impact High: widespread potential impact			

## 5.5 Hazard Profile and Vulnerability Assessment

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

### 5.5.1. Hazard Profiles

Each hazard vulnerability assessment in Section 5.5.3, includes a hazard profile/problem description as to how each medium or high significant hazard (as shown in Table 5-2) affects the District and includes information on past hazard occurrences and the likelihood of future hazard occurrence. The intent of this section is to provide jurisdictional specific information on hazards and further describes how the hazards and risks differ across the Sacramento County Planning Area.

### 5.5.2. Vulnerability Assessment and Assets at Risk

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

#### *Assets at Risk and Critical Facilities*

This section considers the RD 349’s assets at risk, with a focus on key District assets such as critical facilities, infrastructure, and other District assets and their values. With respect to District assets, the majority of these assets are considered critical facilities as defined for this LHMP. Critical facilities are defined for this Plan as:

*Any facility (a structure, infrastructure, equipment or service), that is adversely affected during a hazardous event may result in interruption of services and operations for the District 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.*

Table 5-3 lists critical facilities and other District assets identified by the District Planning Team as important to protect in the event of a disaster. RD 349’s physical assets, valued at over \$X million, consist of the buildings and infrastructure to support the District’s operations. **FILL OUT TABLE WITH ASSETS AND THEIR VALUES. FILL OUT LAST COLUMN OF TABLE – WHAT ARE THEY AT RISK FROM?**

*Table 5-3 RD 349 Critical Facilities, Infrastructure, and Other District Assets*

Name of Asset	Facility Type	Replacement Value	Which Hazards Pose Risk
<b>Total</b>		<b>\$ 0</b>	

Source: RD 349

CAN THE DISTRICT ALSO PROVIDE A LIST OR TABLE THAT DETAILS BY LEVEE SEGMENT OR SYSTEM THE CURRENT STATUS OF THE LEVEES AND IF IT IS UNDERGOING ANY IMPROVEMENTS AND WHAT THAT LEVEL OF PROTECTION WILL INCREASE TO?

### *Natural Resources*

RD 349 has a variety of natural resources of value to the District. These natural resources parallels that of Sacramento County as a whole. Information can be found in Section 4.3.1 of the Base Plan. DOES THE DISTRICT HAVE ANY UNIQUE NATURAL RESOURCES TO CONSIDER?

### *Historic and Cultural Resources*

RD 349 has a variety of historic and cultural resources of value to the District. These historic and cultural resources parallels that of Sacramento County as a whole. Information can be found in Section 4.3.1 of the Base Plan. DOES THE DISTRICT HAVE ANY UNIQUE HISTORICAL RESOURCES TO CONSIDER?

### *Growth and Development Trends*

General growth in the District parallels that of the Sacramento County Planning Area as a whole. Information can be found in Section 4.3.1 of the Base Plan. ANYTHING FOR THE DISTRICT TO ADD? IS THERE GROWTH OCCURRING?

### *Future Development*

DOES THE DISTRICT HAVE ANY PLANS FOR DEVELOPMENT OF NEW DISTRICT FACILITIES? INCLUDE ANY INFORMATION ON PLANNED OR ONGOING LEVEE IMPROVEMENTS.

Future development in these areas generally parallels that of the Sacramento County Planning Area. More general information on growth and development in Sacramento County as a whole can be found in “Growth and Development Trends” in Section 4.3.1 Sacramento County Vulnerability and Assets at Risk of the Base Plan.

### 5.5.3. Vulnerability to Specific Hazards

This section provides the vulnerability assessment, including any quantifiable loss estimates, for those hazards identified above in Table 5-2 as high or medium significance hazards. Impacts of past events and vulnerability of the District to specific hazards are further discussed below (see Section 4.1 Hazard Identification in the Base Plan for more detailed information about these hazards and their impacts on the Sacramento County Planning Area). Methodologies for evaluating vulnerabilities and calculating loss estimates are the same as those described in Section 4.3 of the Base Plan.

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

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

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

#### Power Outage/Power Failure

An impact of almost all hazards below relates to power outage and/or power failures. The US power grid crisscrosses the country, bringing electricity to homes, offices, factories, warehouses, farms, traffic lights and even campgrounds. According to statistics gathered by the Department of Energy, major blackouts are on the upswing. Incredibly, over the past two decades, blackouts impacting at least 50,000 customers have increased 124 percent. The electric power industry does not have a universal agreement for classifying disruptions. Nevertheless, it is important to recognize that different types of outages are possible so that plans may be made to handle them effectively. In addition to blackouts, brownouts can occur. A brownout is an intentional or unintentional drop in voltage in an electrical power supply system. Intentional brownouts are used for load reduction in an emergency. Electric power disruptions can be generally grouped into two categories: intentional and unintentional. More information on types of power disruptions can be found in Section 4.3.2 of the Base Plan. **HAS THE DISTRICT BEEN AFFECTED BY POWER OUTAGES IN THE PAST?**

### *Public Safety Power Shutoff (PSPS)*

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

### *Flood: 1%/0.2% Annual Chance*

**Likelihood of Future Occurrence**—Occasional/Unlikely  
**Vulnerability**—High

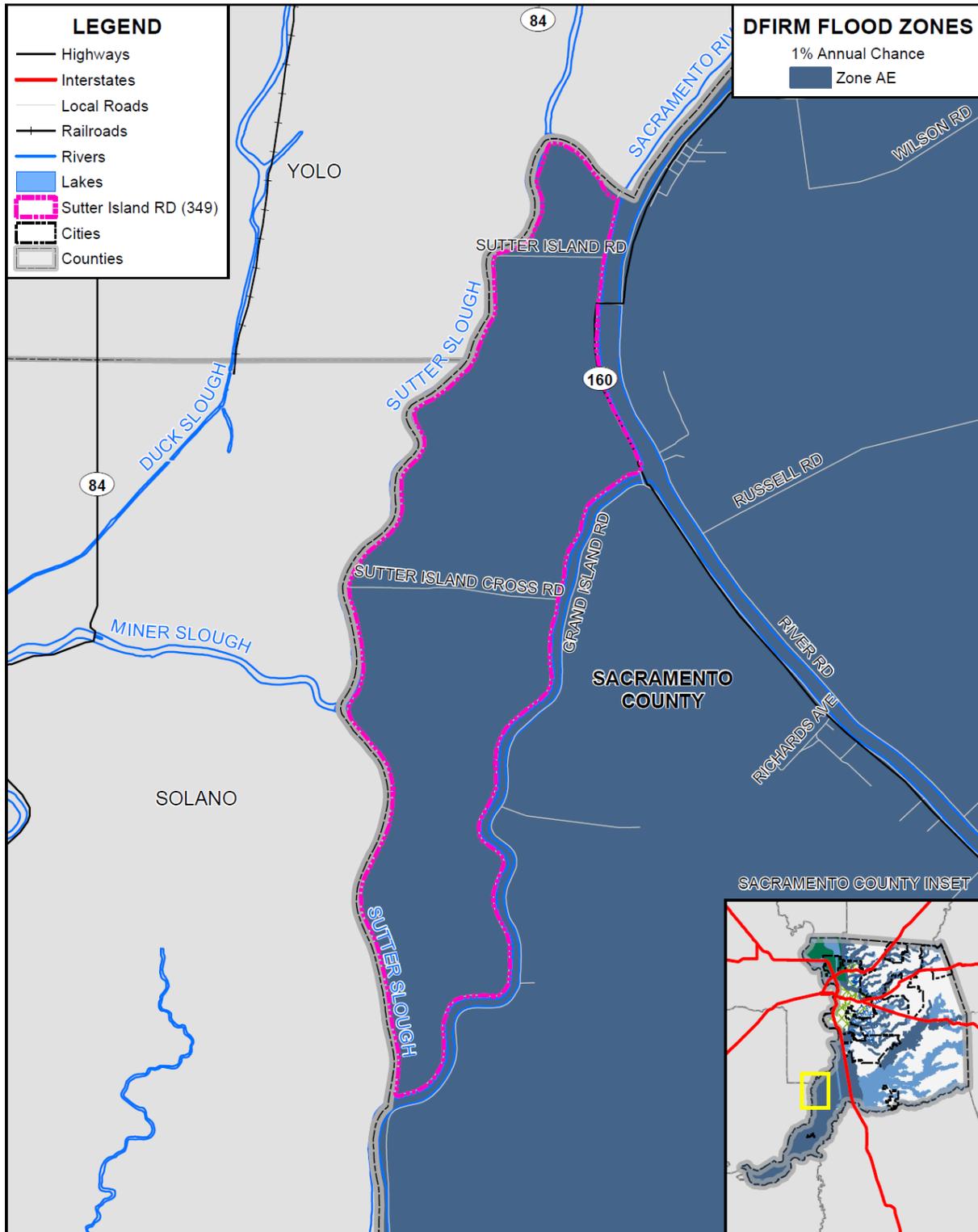
### **Hazard Profile and Problem Description**

This hazard analyzes the FEMA DFIRM 1% and 0.2% annual chance floods. These tend to be the larger floods that can occur in the County or in the District, and have caused damages in the past. Flooding is a significant problem in Sacramento County and the District. Historically, the District has been at risk to flooding primarily during the winter and spring months when river systems in the County swell with heavy rainfall and snowmelt runoff. Normally, storm floodwaters are kept within defined limits by a variety of storm drainage and flood control measures. Occasionally, extended heavy rains result in floodwaters that exceed normal high-water boundaries and cause damage. As previously described in Section 4.3.11 of the Base Plan, the Sacramento County Planning Area and the RD 349 have been subject to historical flooding.

### **Location and Extent**

The RD 349 has areas located in the 1% annual chance floodplain. This is seen in Figure 5-2.

Figure 5-2 RD 349 – FEMA DFIRM Flood Zones



Data Source: FEMA NFHL 07/19/2018, Sutter Island Reclamation District, Sacramento County GIS, Cal-Atlas; Map Date: 03/2021.

Table 5-4 details the DFIRM mapped flood zones within the 1% annual chance flood zone as well as other flood zones located within the District.

*Table 5-4 RD 349– DFIRM Flood Hazard Zones*

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

Source: FEMA

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

### Past Occurrences

A list of state and federal disaster declarations for Sacramento County from flooding is shown on Table 5-5. These events also likely affected the District to some degree.

*Table 5-5 Sacramento County – State and Federal Disaster Declarations from Flood 1950-2020*

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

Source: Cal OES, FEMA

**WHAT FLOOD EVENTS HAVE AFFECTED THE DISTRICT? CAN THE DISTRICT PROVIDE DAMAGE AND IMPACT INFORMATION FROM THE PA WORKSHEETS ASSOCIATED WITH THE RECENT DISASTER DECLARATIONS SINCE THE 2016 LHMP OR OTHER SOURCES?**

**Vulnerability to and Impacts from Flood**

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

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

**OTHER DISTRICT SPECIFIC VULNERABILITIES/IMPACTS/CONCERNS?**

**Assets at Risk**

**WHAT DISTRICT ASSETS (FROM Table 5-3) ARE AT RISK FROM THIS HAZARD?**

***Flood: Localized Stormwater Flooding***

**Likelihood of Future Occurrence**–Likely

**Vulnerability**–High

**Hazard Profile and Problem Description**

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

## Location and Extent

The RD 349 is subject to localized flooding throughout the District. Flood extents are usually measured in areas affected, velocity of flooding, and depths of flooding. Expected flood depths in the District vary by location. Flood durations in the District tend to be short to medium term, or until either the storm drainage system can catch up or flood waters move downstream. Localized flooding in the District tends to have a shorter speed of onset, especially when antecedent rainfall has soaked the ground and reduced its capacity to absorb additional moisture. **CAN THE DISTRICT PROVIDE INFORMATION ON SPECIFIC LOCALIZED FLOODING PROBLEM AREAS?**

## Past Occurrences

There have been no federal or state disaster declarations in the County due to localized flooding. The District noted the following past occurrences of localized flooding:

➤ **RD 349 PAST OCCURRENCES OF LOCALIZED FLOODING. GIVE DATES, DAMAGES, ETC.**

## Vulnerability to and Impacts from Localized Flooding

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

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

**PROVIDE SPECIFIC IMPACTS OF CONCERN TO THE DISTRICT**

## Assets at Risk

**WHAT DISTRICT ASSETS (FROM Table 5-3) ARE AT RISK FROM THIS HAZARD?**

## *Levee Failure*

**Likelihood of Future Occurrence**—Occasional

**Vulnerability**—Extremely High

## Hazard Profile and Problem Description

A levee is a raised area that runs along the banks of a stream or canal. Levees reinforce the banks and help prevent flooding by containing higher flow events to the main stream channel. By confining the flow to a

narrower stream channel, levees can also increase the speed of the water. Levees can be natural or man-made.

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

### **Location and Extent**

There is not a scientific scale or measurement system in place for levee failure. Expected flood depths from a levee failure in the District vary by event and location. The speed of onset is slow as the river rises, but if a levee fails the warning times are generally short for those in the inundation area. The duration of levee failure risk times can be hours to weeks, depending on the river flows that the levee holds back. When northern California dams and reservoirs are nearing maximum capacity, they release water through the river systems, causing additional burdens on County levees. Levees in the District are shown on Figure 5-3.



**IS THERE A MAP AND TABLE OF LEVEES AND THE LOP THEY PROVIDE FOR THE DISTRICT?  
CAN WE ALSO GET INFORMATION ON ANY ONGOING LEVEE IMPROVEMENT PROJECTS?**

### **Past Occurrences**

There have been no federal or state disaster declarations from levee failure. The District Planning Team noted no past occurrences of levee failures. **TRUE? IF NOT PROVIDE DATES AND DAMAGES**

### **Vulnerability to and Impacts from Levee Failure**

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

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

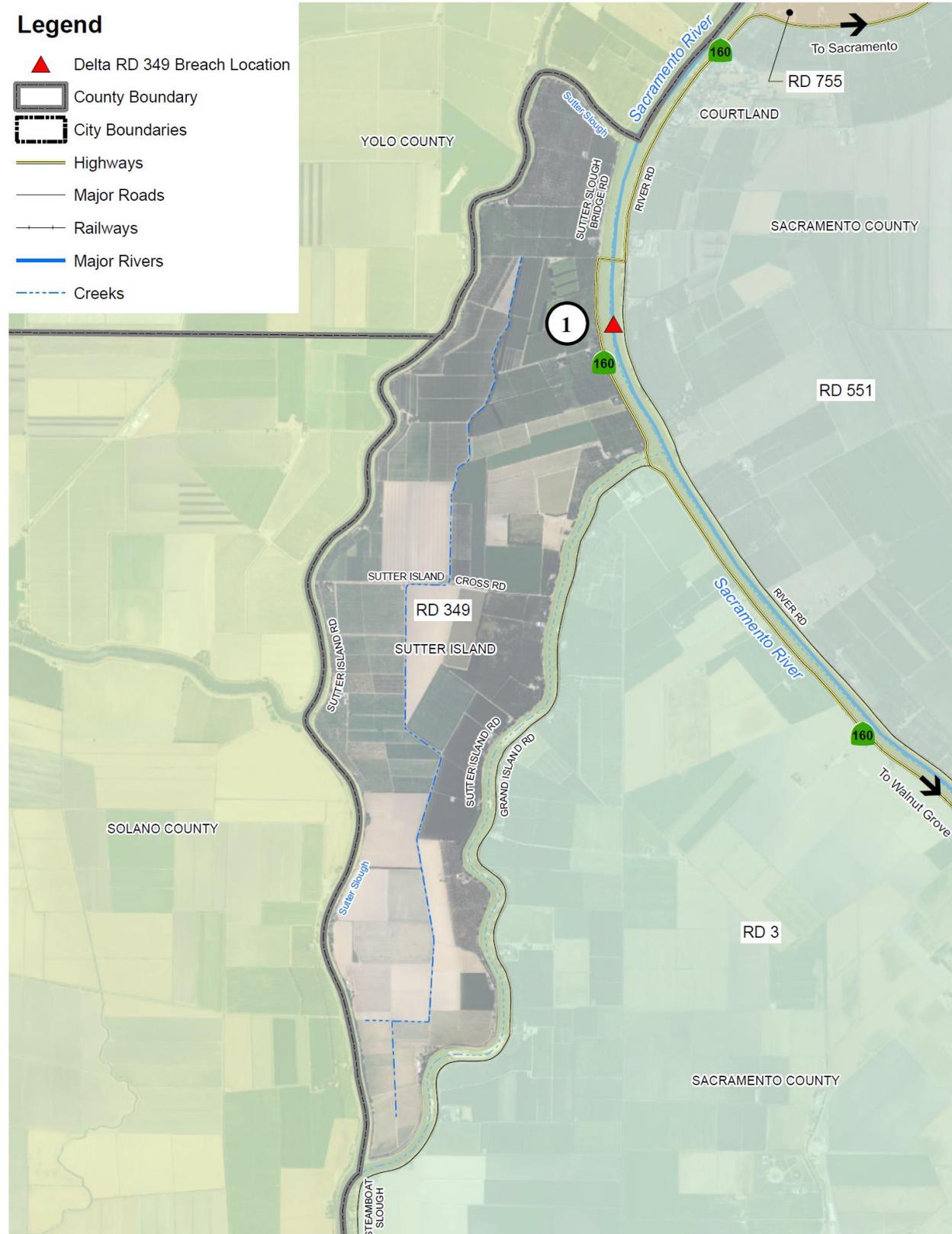
**HOW WOULD THE DISTRICT BE AFFECTED BY A LEVEE FAILURE? KEY AREAS  
ISSUES/CONCERNS/IMPACTS?**

### **StormReady Flood Scenarios and Evacuation Routes**

The County of Sacramento and the City of Sacramento have prepared various detailed maps showing hypothetical levee breaks, inundation levels and the time it would take for waters to rise in affected neighborhoods, and rescue and evacuation zones. It is important to note that these maps deal with potential scenarios. These are to help Sacramento County citizens think of how to escape before an emergency occurs. It should be noted that it would be incorrect to assume that the evacuation routes shown on the maps will necessarily be citizens only way out in a flood. Escape routes could be affected by localized flooding, traffic accidents, and different flooding situations occurring at the time. Emergency officials will monitor roads and let the public know through radio stations and other media if alternate routes should be taken.

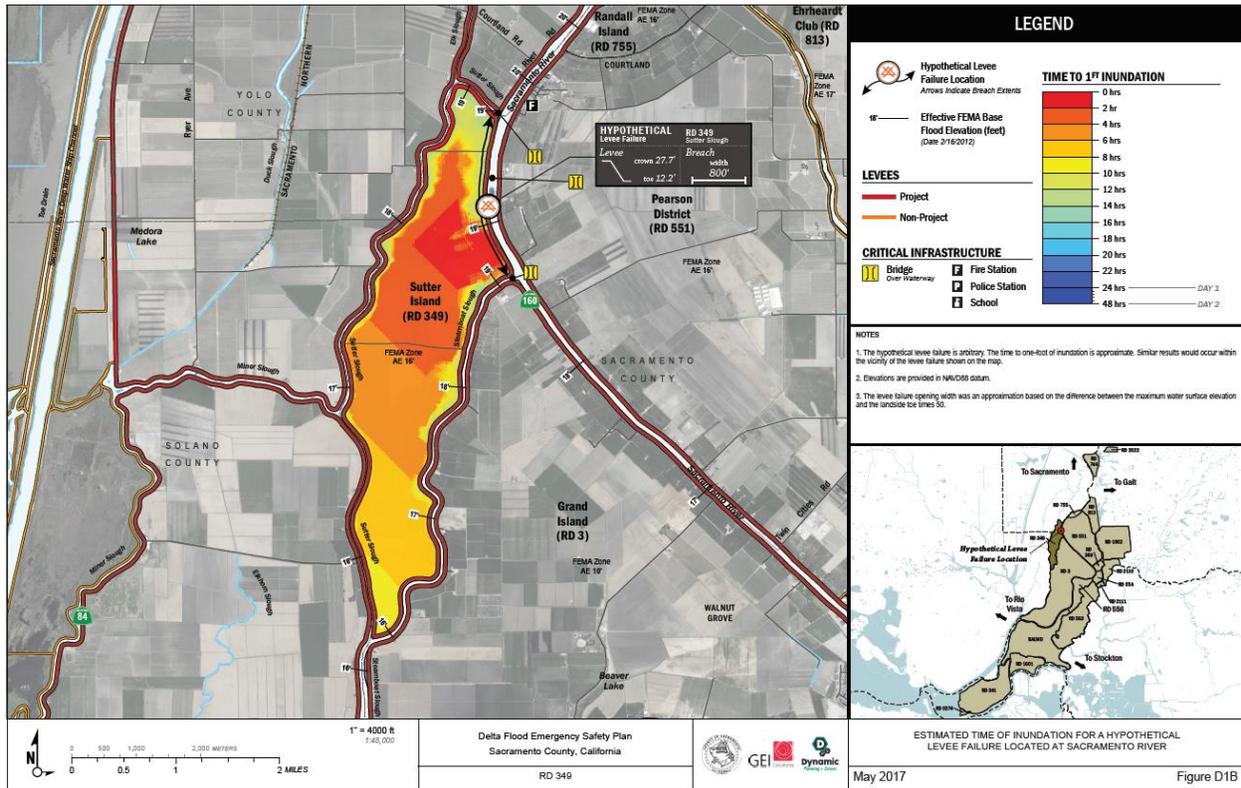
For RD 349, Figure 5-4 details the locations in the Delta within RD 349 where flooding could occur. The red triangles denote potential levee breach locations. RD 349 has a potential levee break scenario. Maps regarding time to one foot inundation (Figure 5-5), estimated flood depths (Figure 5-6), and suggested evacuation routes (Figure 5-7) are displayed below.

Figure 5-4 RD 349 – Potential Levee Breach Location



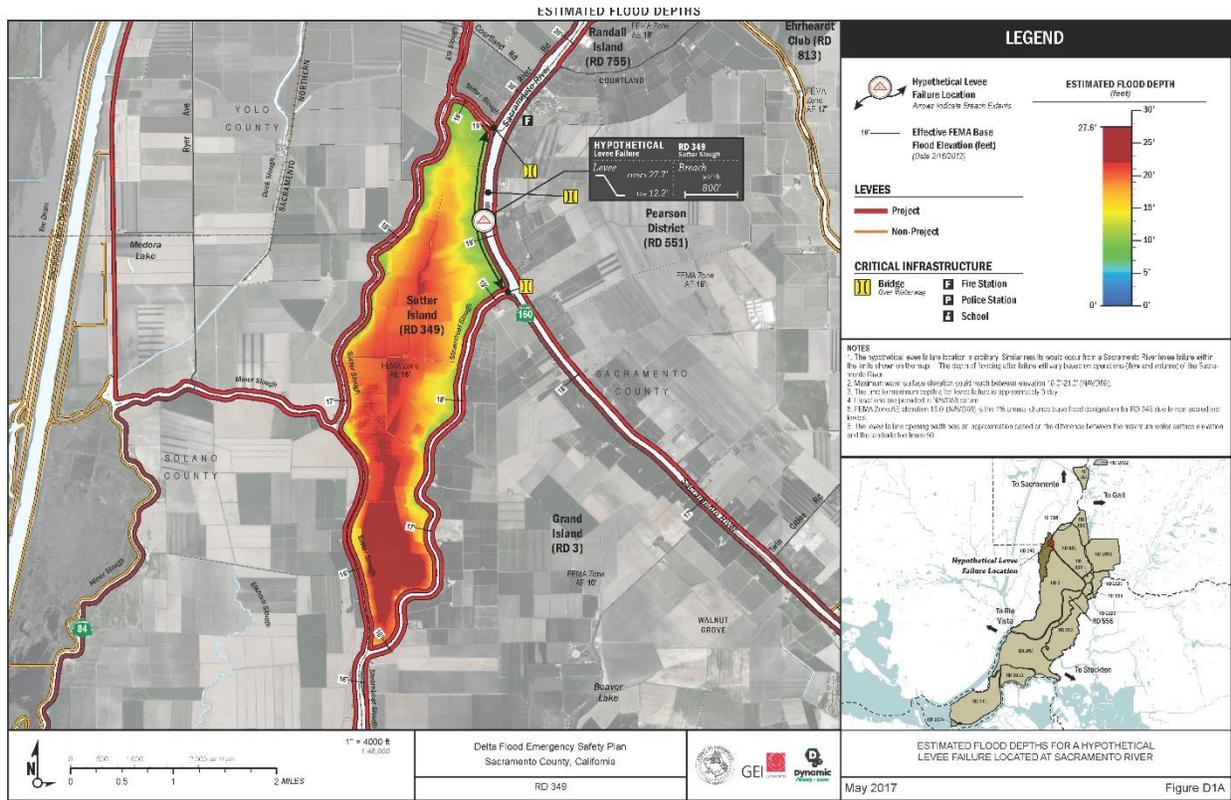
Source: Sacramento County Storm Ready – retrieved April 29, 2021

Figure 5-5 RD 349 – Time to One Foot Inundation after Levee Breach



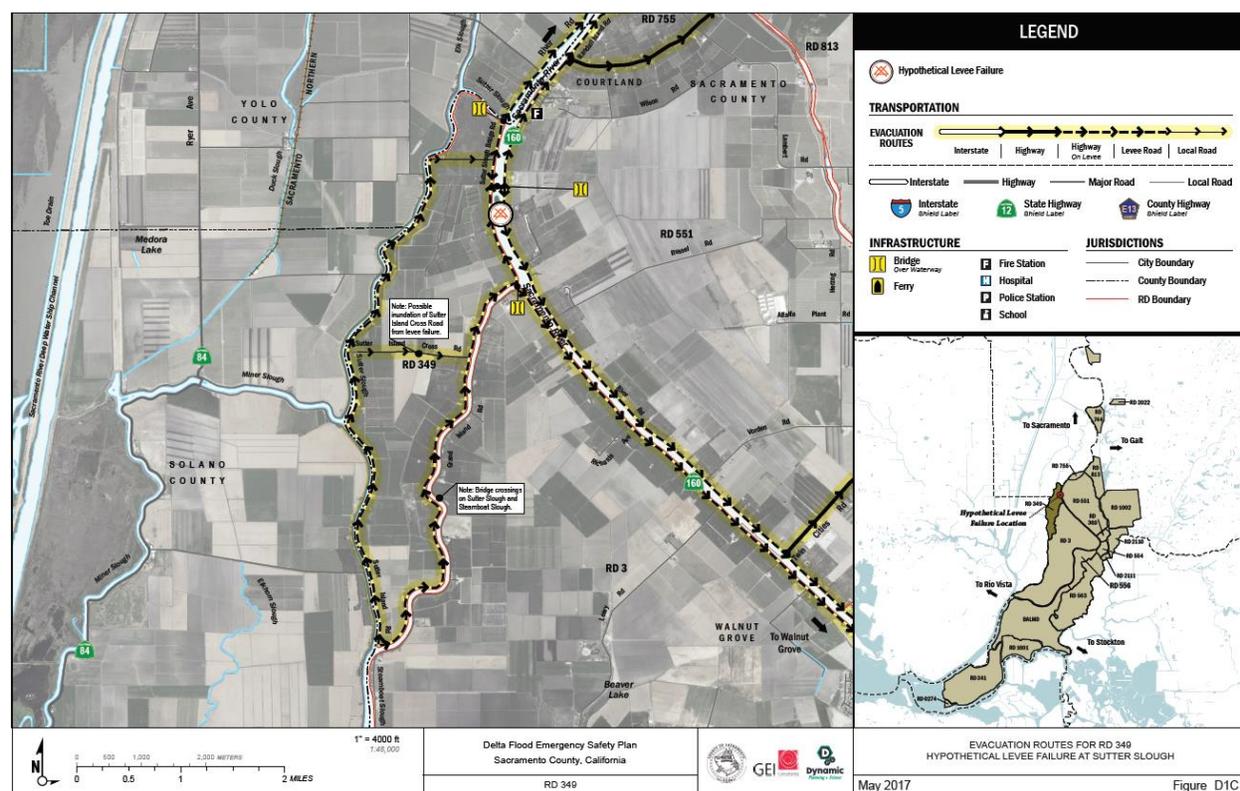
Source: Sacramento County Storm Ready – retrieved April 29, 2021

Figure 5-6 RD 349 – Estimated Flood Depth from Levee Breach Scenario



Source: Sacramento County Storm Ready – retrieved April 29, 2021

Figure 5-7 RD 349 – Levee Breach Scenario Evacuation Routes



Source: Sacramento County Storm Ready – retrieved April 29, 2021

## Assets at Risk

### WHAT DISTRICT ASSETS (FROM Table 5-3) ARE AT RISK FROM THIS HAZARD?

### Severe Weather: Heavy Rains and Storms (Hail, Lightning)

**Likelihood of Future Occurrence**–Likely

**Vulnerability**–Medium

### Hazard Profile and Problem Description

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

### Location and Extent

Heavy rain events occur on a regional basis. Rains and storms can occur in any location of the District. All portions of the District are at risk to heavy rains. Most of the severe rains occur during the fall, winter,

and spring months. There is no scale by which heavy rains and severe storms are measured. Magnitude of storms is measured often in rainfall and damages. The speed of onset of heavy rains can be short, but accurate weather prediction mechanisms often let the public know of upcoming events. Duration of severe storms in California, Sacramento County, and the District can range from minutes to hours to days. Information on precipitation extremes can be found in Section 4.3.4 of the Base Plan.

### Past Occurrences

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

**PROVIDE INFORMATION ON SPECIFIC EVENTS? PROVIDE DAMAGE AND IMPACTS FROM SIGNIFICANT EVENTS SINCE 2016**

### Vulnerability to and Impacts from Heavy Rain and Storms

Heavy rain and severe storms are the most frequent type of severe weather occurrences in the District. These events can cause localized flooding. Elongated events, or events that occur during times where the ground is already saturated can cause 1% and 0.2% annual chance flooding. Wind often accompanies these storms and has caused damage in the past. Hail and lightning are rare in the District.

Actual damage associated with the effects of severe weather include impacts to property, critical facilities (such as utilities), and life safety. Heavy rains and storms often result in localized flooding creating significant issues. Roads can become impassable and ground saturation can result in instability, collapse, or other damage to trees, structures, roadways and other critical infrastructure. Floodwaters and downed trees can break utilities and interrupt services. During periods of heavy rains and storms, power outages can also occur. These power outages can affect pumping stations that help alleviate flooding.

Problems associated with the primary effects of severe weather include erosion, flooding, pavement deterioration, washouts, landslide/mudslides, and downed trees. However, it is the secondary effects of heavy rain and storms that are of concern to RD 349. Heavy rains can cause flooding, levee failure, and stream bank erosion. Flooding, levee failure, and stream bank erosion can cost RD 349 millions in damages. Although water surface elevation is a major factor to levee seepage and overtopping, severe weather can cause significant damage, such as erosion, that puts the integrity of the Grand Island levee system at risk.

### Assets at Risk

**WHAT DISTRICT ASSETS (FROM Table 5-3) ARE AT RISK FROM THIS HAZARD?**

## 5.6 Capability Assessment

Capabilities are the programs and policies currently in use to reduce hazard impacts or that could be used to implement hazard mitigation activities. This capabilities assessment is divided into five sections:

regulatory mitigation capabilities, administrative and technical mitigation capabilities, fiscal mitigation capabilities, mitigation education, outreach, and partnerships, and other mitigation efforts.

### 5.6.1. Regulatory Mitigation Capabilities

Table 5-6 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 RD 349. **FILL OUT TABLE – MUCH WILL NOT APPLY TO YOU. FILL OUT WHAT DOES. TRY TO FILL OUT THE LAST COLUMN AS YOU ARE ABLE. MAKE SURE TO FILL OUT THE LAST CELL.**

*Table 5-6 RD 349 Regulatory Mitigation Capabilities*

Plans	Y/N Year	Does the plan/program address hazards? Does the plan identify projects to include in the mitigation strategy? Can the plan be used to implement mitigation actions?
Comprehensive/Master Plan/General Plan		
Capital Improvements Plan		
Economic Development Plan		
Local Emergency Operations Plan		
Continuity of Operations Plan		
Transportation Plan		
Stormwater Management Plan/Program		
Engineering Studies for Streams		
Community Wildfire Protection Plan		
Other special plans (e.g., brownfields redevelopment, disaster recovery, coastal zone management, climate change adaptation)		
<b>Building Code, Permitting, and Inspections</b>	<b>Y/N</b>	<b>Are codes adequately enforced?</b>
Building Code		Version/Year:
Building Code Effectiveness Grading Schedule (BCEGS) Score		Score:
Fire department ISO rating:		Rating:
Site plan review requirements		
<b>Land Use Planning and Ordinances</b>	<b>Y/N</b>	<b>Is the ordinance an effective measure for reducing hazard impacts? Is the ordinance adequately administered and enforced?</b>
Zoning ordinance		
Subdivision ordinance		
Floodplain ordinance		

Natural hazard specific ordinance (stormwater, steep slope, wildfire)
Flood insurance rate maps
Elevation Certificates
Acquisition of land for open space and public recreation uses
Erosion or sediment control program
Other
How can these capabilities be expanded and improved to reduce risk?
<b>PROVIDE SPECIFIC DETAILS OF AREAS FOR IMPROVEMENT OF THESE TYPES OF CAPABILITIES AND HOW/WHY IT WILL HELP THE DISTRICT</b>

Source: RD 349

### 5.6.2. Administrative/Technical Mitigation Capabilities

Table 5-7 identifies the District department(s) responsible for activities related to mitigation and loss prevention in RD 349. **FILL OUT TABLE – MUCH WILL NOT APPLY TO YOU. FILL OUT WHAT DOES. TRY TO FILL OUT THE LAST COLUMN AS YOU ARE ABLE. MAKE SURE TO FILL OUT THE LAST CELL.**

*Table 5-7 RD 349's Administrative and Technical Mitigation Capabilities*

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

Warning systems/services (Reverse 911, outdoor warning signals)
Hazard data and information
Grant writing
Hazus analysis
Other
How can these capabilities be expanded and improved to reduce risk?
PROVIDE SPECIFIC DETAILS OF AREAS FOR IMPROVEMENT OF THESE TYPES OF CAPABILITIES AND HOW/WHY IT WILL HELP THE DISTRICT

Source: RD 349

### 5.6.3. Fiscal Mitigation Capabilities

Table 5-8 identifies financial tools or resources that the District could potentially use to help fund mitigation activities. **FILL OUT TABLE – MUCH WILL NOT APPLY TO YOU. FILL OUT WHAT DOES. TRY TO FILL OUT THE LAST COLUMN AS YOU ARE ABLE. MAKE SURE TO FILL OUT THE LAST CELL.**

*Table 5-8 RD 349's Fiscal Mitigation Capabilities*

Funding Resource	Access/ Eligibility (Y/N)	Has the funding resource been used in past and for what type of activities? Could the resource be used to fund future mitigation actions?
Capital improvements project funding		
Authority to levy taxes for specific purposes		
Fees for water, sewer, gas, or electric services		
Impact fees for new development		
Storm water utility fee		
Incur debt through general obligation bonds and/or special tax bonds		
Incur debt through private activities		
Community Development Block Grant		
Other federal funding programs		
State funding programs		
Other		
How can these capabilities be expanded and improved to reduce risk?		
PROVIDE SPECIFIC DETAILS OF AREAS FOR IMPROVEMENT OF THESE TYPES OF CAPABILITIES AND HOW/WHY IT WILL HELP THE DISTRICT		

Source: RD 349

### 5.6.4. Mitigation Education, Outreach, and Partnerships

Table 5-9 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. **FILL OUT TABLE – MUCH WILL NOT APPLY TO YOU. FILL OUT WHAT DOES. TRY TO FILL OUT THE LAST COLUMN AS YOU ARE ABLE. MAKE SURE TO FILL OUT THE LAST CELL.**

*Table 5-9 RD 349’s Mitigation Education, Outreach, and Partnerships*

Program/Organization	Yes/No	Describe program/organization and how relates to disaster resilience and mitigation. Could the program/organization help implement future mitigation activities?
Local citizen groups or non-profit organizations focused on environmental protection, emergency preparedness, access and functional needs populations, etc.		
Ongoing public education or information program (e.g., responsible water use, fire safety, household preparedness, environmental education)		
Natural disaster or safety related school programs		
StormReady certification		
Firewise Communities certification		
Public-private partnership initiatives addressing disaster-related issues		
Other		
<b>How can these capabilities be expanded and improved to reduce risk?</b>		
<b>PROVIDE SPECIFIC DETAILS OF AREAS FOR IMPROVEMENT OF THESE TYPES OF CAPABILITIES AND HOW/WHY IT WILL HELP THE DISTRICT</b>		

Source: RD 349

### 5.6.5. Other Mitigation Efforts

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

- **ANYTHING NOT CAPTURED ABOVE? PLEASE INCLUDE ALL LEVEE RELATED IMPROVEMENT PROJECTS AND OTHER DISTRICT MITIGATION PROJECTS**

## 5.7 Mitigation Strategy

### 5.7.1. Mitigation Goals and Objectives

The RD 349 adopts the hazard mitigation goals and objectives developed by the HMPC and described in Chapter 5 Mitigation Strategy.

## 5.7.2. Mitigation Actions

The planning team for the RD 349 identified and prioritized the following mitigation actions based on the risk assessment. Background information and information on how each action will be implemented and administered, such as ideas for implementation, responsible office, potential funding, estimated cost, and timeline are also included. The following hazards were considered a priority for purposes of mitigation action planning:

- Floods: 1%/0.2% annual chance
- Floods: Localized Stormwater
- Levee Failure
- Severe Weather: Heavy Rains and Storms

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

**NEED ACTIONS FOR THE BULLETED LIST ABOVE. REMEMBER THAT ONE ACTION MAY ADDRESS MORE THAN ONE HAZARD.**

### *Multi-Hazard Actions*

#### *Action 1.*

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**Hazards Addressed:**

**Goals Addressed:**

**Issue/Background:**

**Other Alternatives:**

**Existing Planning Mechanisms through which Action will be Implemented:**

**Responsible Office:**

**Priority (H, M, L):**

**Cost Estimate:**

**Potential Funding:**

**Benefits (avoided Losses):**

**Schedule:**