

# Delta Annex Chapter 5 Reclamation District 369

## 5.1 Introduction

This new chapter to the Delta Annex details the hazard mitigation planning elements specific to the Reclamation District 369 (RD 369), a new 2016 participating jurisdiction to the Sacramento County Local Hazard Mitigation Plan (LHMP) Update. This chapter of the Delta 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 RD 369. This chapter of the Delta Annex provides additional information specific to RD 369, with a focus on providing additional details on the planning process, risk assessment, and mitigation strategy for this District.

## 5.2 Planning Process

As described above, the District followed the planning process detailed in Section 3 of the Base Plan. In addition to providing representation on the Sacramento County Hazard Mitigation Planning Committee (HMPC), RD 369 formulated its 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 RD 369 representatives are included in Appendix A.

*Table 5-1 RD 369 Planning Team*

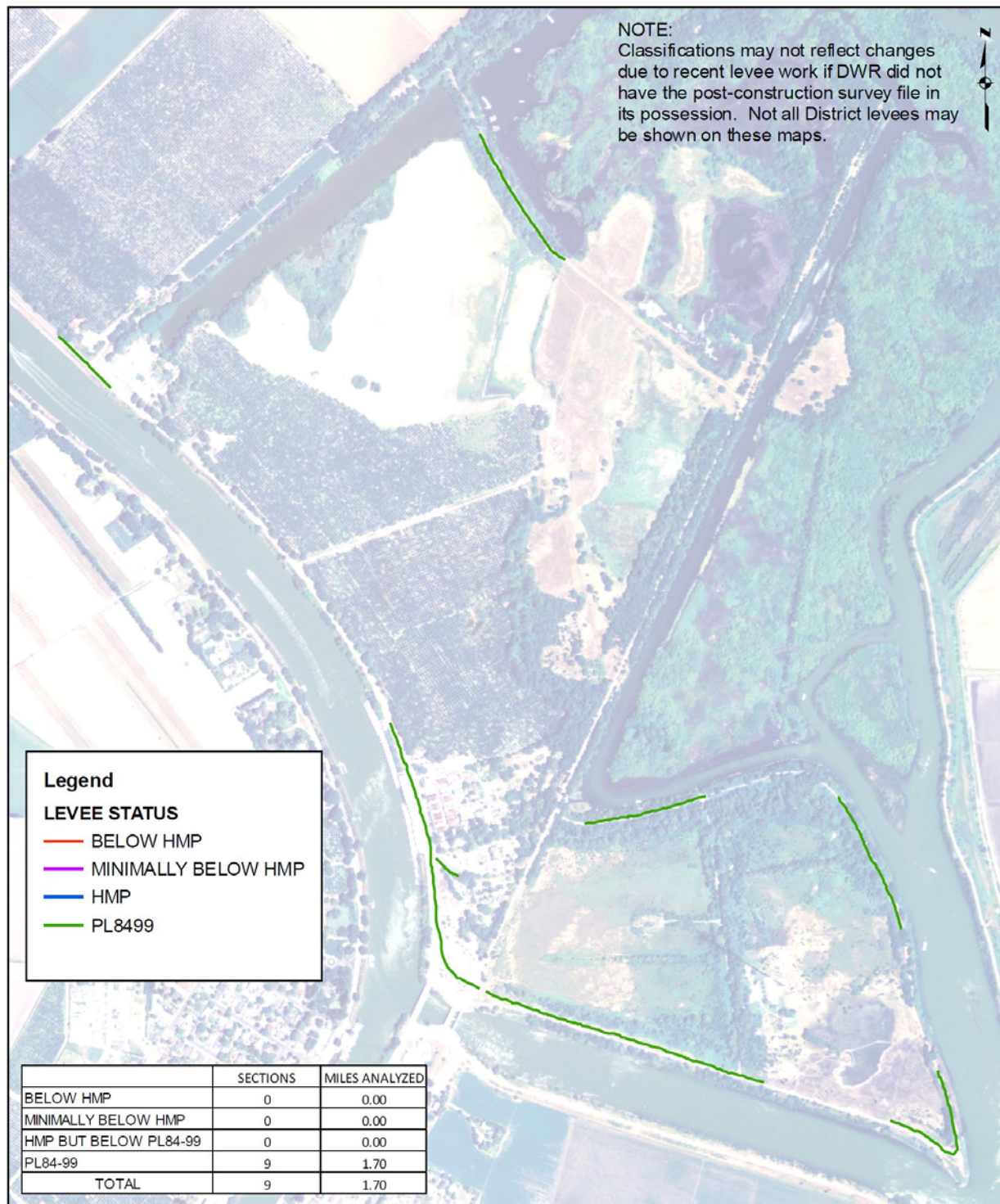
Name	Position/Title	How Participated
Clarence Chu	Landowner/Locke Town Board	Attended meetings, provided data and information, reviewed draft documents
Jeanine Foster	Foster Morrison Consulting, Principal	Interviewed Mr. Chu, developed Annex drafts, coordinated meeting attendance and input on draft documents with Mr. Chu
Chris Ferrari	GEI Consultants, Senior Engineer	Interviewed Mr. Chu for related ESP project, provided input to Annex, including text and maps

Source: RD 369/FM

## 5.3 Community Profile

The community profile for RD 369 is detailed in the following sections. Figure 5-1 displays a map and the location of RD 369 boundaries within Sacramento County.

Figure 5-1 Reclamation District 369 Map



Levee Assessment - RD 369 - Libby McNeil



Source: RD 369

### 5.3.1. RD 369 Overview

Reclamation District No. 369 (RD 369), also known as Libby McNeil, is located in the Northern Delta, near the town of Walnut Grove and the Delta Cross Channel to the South, route 160 and the Sacramento River to the west, Snodgrass Slough to the east, and the Meadows waterway to the North.

The town of Locke is south on the edge of RD 369 border. The District staff consists of a landowner and a journey worker. The District is responsible for maintenance, repair, and improvements of Snodgrass Slough and Meadow Slough levees; Maintenance Area 9 (MA-9) is responsible for the levee maintenance, repair, and improvements along the left bank of the Sacramento River protecting the land under the District jurisdiction. Maintenance Areas take over in providing the maintenance on federal flood control levees. MA-9 is the only flood control Maintenance Area in the Sacramento County which the CVFPB governs. The district is also responsible for the drainage system providing flood protection. Additionally, the District maintains canals and ditches that provide drainage to the property owners. The levees protect about 586 acres of predominantly agricultural land from flooding; the primary orchard grown on the island is pear; there is also irrigated pasture for cattle and goats. According to the 2000 census, there are 20 households and with a population of 52 people. The island's current assets are estimated to be worth about \$19.3 million.

According to Mr. Chu, the leveed area under the jurisdiction of RD 369 includes an approximate one mile stretch on the Sacramento River side, and a smaller area to the east of the District. RD 369's primary responsibility is to maintain the vegetation along the levee. This consists of using goats to eat down the vegetation and a semi-annual spraying. Cal DWR provides inspections to ensure adequate maintenance of vegetative areas.

### 5.3.2. District History and Background

Mr Clarence Chu, purchased the original 490 acres which housed the Town of Locke and RD 369 in the 1977 from the Locke heirs. Since then, approximately 200 acres was sold to the state for use as the Delta Meadows State Park and another 10 acres comprising the Lock Townsite was sold in 2002 to the Sacramento County Housing and Redevelopment Agency, which later sold the land back to the existing townsite building owners. Mr. Chu currently owns an approximate 280 acres which is primarily used for agricultural purposes, some of which is orchards, farmed by himself and some leased out for farming by others.

The Town of Locke, now the Locke Historic District, was built in 1915 by Chinese immigrants from Heungshan County in Guangdong Province, China. The Locke Historic District is the largest, most complete example of a rural, agricultural Chinese American community in the United States.

## 5.4 Hazard Identification

RD 369's planning team identified the hazards that affect the District and summarized their geographic extent, probability of future occurrences, potential magnitude/severity, and significance specific to RD 369 (see Table 5-2).

**Table 5-2 RD 369—Hazard Identification**

Hazard	Geographic Extent	Probability of Future Occurrences	Magnitude/Severity	Significance
Agricultural Hazards	Significant	Highly Likely	Critical	Low
Bird Strike	Limited	Unlikely	Negligible	Low
Climate Change	Extensive	Likely	Limited	Low
Dam Failure	Limited	Unlikely	Negligible	Low
Drought and Water Shortage	Extensive	Occasional	Critical	Medium
Earthquake	Extensive	Occasional	Limited	Low
Earthquake: Liquefaction	Significant	Occasional	Limited	Medium
Flood: 100/200/500-year	Extensive	Occasional/Unlikely	Catastrophic	High
Flood: Localized Stormwater Flooding	Significant	Occasional	Limited	Low
Landslides	Limited	Unlikely	Negligible	Low
Levee Failure	Extensive	Occasional	Catastrophic	High
River/Stream/Creek Bank Erosion	Extensive	Likely	Limited	Medium
Severe Weather: Extreme Temperatures – Cold/Freeze	Significant	Highly Likely	Limited	Low
Severe Weather: Extreme Temperatures – Heat	Extensive	Highly Likely	Negligible	Low
Severe Weather: Fog	Extensive	Likely	Limited	Low
Severe Weather: Heavy Rains and Storms (Thunderstorms, Hail, and Lightning)	Extensive	Highly Likely	Critical	Medium
Severe Weather: Wind and Tornadoes	Extensive	Likely	Limited	Medium
Subsidence	Extensive	Occasional	Limited	Low
Volcano	Limited	Unlikely	Negligible	Low
Wildfire:(Burn Area/Smoke)	Significant	Likely	Critical	Medium
<b>Geographic Extent</b> <b>Limited:</b> Less than 10% of planning area <b>Significant:</b> 10-50% of planning area <b>Extensive:</b> 50-100% of planning area		<b>Magnitude/Severity</b> <b>Catastrophic</b> —More than 50 percent of property severely damaged; shutdown of facilities for more than 30 days; and/or multiple deaths <b>Critical</b> —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 <b>Limited</b> —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 <b>Negligible</b> —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>Probability of Future Occurrences</b> <b>Highly Likely:</b> Near 100% chance of occurrence in next year, or happens every year. <b>Likely:</b> Between 10 and 100% chance of occurrence in next year, or has a recurrence interval of 10 years or less. <b>Occasional:</b> Between 1 and 10% chance of occurrence in the next year, or has a recurrence interval of 11 to 100 years. <b>Unlikely:</b> Less than 1% chance of occurrence in next 100 years, or has a recurrence interval of greater than every 100 years.		<b>Significance</b> <b>Low:</b> minimal potential impact <b>Medium:</b> moderate potential impact <b>High:</b> widespread potential impact		

## 5.5 Hazard Profile and Vulnerability Assessment

The intent of this section is to profile RD 369’s hazards and assess the District’s vulnerability separate from that of the Planning Area as a whole, which has already been assessed in Sections 4.2 and 4.3 Vulnerability Assessment in the main plan. The hazard profiles in the main plan discuss overall impacts to the Planning Area and describes the hazard problem description, hazard extent, magnitude/severity, previous occurrences of hazard events and the likelihood of future occurrences. Hazard profile information specific to RD 369 is included in this Annex. This vulnerability assessment analyzes the property, population, critical facilities, and other assets at risk to hazards ranked of medium or high significance specific to the District. For more information about how hazards affect the County as a whole, see Chapter 4 Risk Assessment in the main plan.

### 5.5.1. Hazard Profiles

Each hazard vulnerability assessment in Section 5.5.3, includes a description as to how the hazard affects RD 369 and information on past occurrences. The intent of this section is to provide jurisdictional specific information on hazards and further describe how the hazards and risks differ across the Planning Area.

### 5.5.2. Vulnerability Assessment

This section identifies RD 369’s assets at risk, including values at risk, critical facilities and infrastructure, economic assets, natural resources, historic and cultural resources, and growth and development trends.

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

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

*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, and (3) Hazardous Materials Facilities.*

Table 5-3 lists particular critical facilities and other District assets identified by RD 369’s planning team as important to protect in the event of a disaster. RD 369’s physical assets consist of the buildings and infrastructure to support RD 369 operations.

*Table 5-3 RD 369’s Critical Facilities, Infrastructure, and Other District Assets*

Name of Asset	Facility Type	Address	Replacement Value	Hazard Info
Locke Ranch Ag Buildings and Infrastructure			\$300K	Most structures built on high ground

Name of Asset	Facility Type	Address	Replacement Value	Hazard Info
3 pumps (drinking water, water from river, water to river)			Unknown	
Locke Property Orchards and Open Farmlands			Unknown	
<b>Assets owned by others</b>				
Levees			Unknown	
Locke Town Assets: Residential and Commercial Buildings			\$1M	

Source: RD 369

### *Natural Resources*

According to the 2014 Lower Sacramento/Delta North Regional Flood Management Plan, this Region, which included RD 369, has significant natural resources such as: aquatic habitats, wetlands, riparian habitats, and wildlife foraging areas. Many of the more than 500 species of native plants and wildlife found in the Central Valley rely, to some extent, on habitat existing within the Region. Examples include the remnant riparian vegetation located along the banks of the Sacramento and American rivers, and along the tributaries of these major rivers. Agricultural areas within the Region also provide valuable habitat including wintering waterfowl within flooded rice fields and Swainson’s hawk foraging habitat within alfalfa fields.

Also, within RD 369, the State of California operates the approximately 200 acre Delta Meadows State Park which contains valuable natural and habitat areas essential for many plant and wildlife species.

### *Historic and Cultural Resources*

The Locke Historic District, which is comprised of the Town of Locke, was listed on the National Register of Historic Places on May 6, 1971 and was further designated a National Historic Landmark District on December 14, 1990 due to its unique example of a historic Chinese American rural community.

### *Growth and Development Trends*

From its purchase in 1977, RD 369 was predominantly owned by one landowner, until its sell of the Town of Lock to the County in 2002 and its sale of approximately 200 acres to the State for the Delta Meadows State Park. The Town was later sold by the County to the residents that had been living in the town. . Due to Lock’s designation as a historic district, new development is not allowed. The District Planning Team notes that there has been no growth and/or development in the District in recent years with no planned development in the near future.

### 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 RD 369 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 calculating loss estimates are similar to those described in Section 4.3 of the Base Plan and are based on data provided by the District as described further below. In general, the most vulnerable District assets include the pump stations that the District owns. Other important assets include the Town of Locke and the agricultural lands and structures.

An estimate of the vulnerability of RD 369 to each identified priority hazard, in addition to the estimate of probability 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.

#### *Drought and Water Supply*

**Likelihood of Future Occurrence**—Occasional

**Vulnerability**—Medium

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

Severe and extended drought conditions could impact irrigation for agricultural operations which could affect the District's ability to finance the ongoing maintenance of District Levees. The residents and businesses could be impacted by drought but it is unlikely due to senior water rights and a prioritization system that puts municipal water at a higher priority than agriculture.

## Past Occurrences

Although California did recently experience an extended drought, agriculture in this District remained largely unaffected due to senior water rights and riparian water rights. The District Planning Team also noted that even with recent drought conditions, no water conservation restrictions were implemented; water supply within the District has remained constant.

## Vulnerability to Drought and Water Supply

### Assets/Critical Facilities at Risk

The agricultural operations and orchards are at risk to a prolonged drought; however as mentioned water supply for all uses has not been an issue in the District

### Natural Resources at Risk

All natural resources could be affected by severe drought conditions. Extended droughts can destroy habitat areas within the District.

### Historic and Cultural Resources at Risk

The residents and businesses of the Locke Historic District is at potentially at risk to extended drought conditions. However, it is unlikely due to senior water rights and a prioritization system that puts municipal water at a higher priority than agriculture.

### Future Development

No future development is planned for RD 361. Development in the Town of Lock is limited due to its historic district designation. There are no known development plans for the remaining agricultural land and operations and state park.

## *Earthquake Liquefaction*

**Likelihood of Future Occurrence**—Occasional

**Vulnerability**—Medium

## Hazard Profile and Problem Description

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

Ground shaking is the primary earthquake hazard. Many factors affect the survivability of structures and systems from earthquake-caused ground motions. These factors include proximity to the fault, direction of rupture, epicenter location and depth, magnitude, local geologic and soils conditions, types and quality of construction, building configurations and heights, and comparable factors that relate to utility, transportation, and other network systems. Ground motions become structurally damaging when average peak accelerations reach 10 to 15 percent of gravity, average peak velocities reach 8 to 12 centimeters per



second, and when the Modified Mercalli Intensity Scale is about VII (18-34 percent peak ground acceleration), which is considered to be very strong (general alarm; walls crack; plaster falls).

In the event an earthquake is intense enough to result in shaking that could cause the sandy soils to liquefy, the levees could resettle, move off their foundations and possibly fail. Failure could compromise the levee system and result in flooding.

### Past Occurrences

There is no known history of earthquake liquefaction in the District. The most recent Napa Earthquake in 2014 did not result in any damages to District Assets.

### Vulnerability to Earthquake Liquefaction

#### Assets/Critical Facilities at Risk

The levees, pump stations and residential and commercial structures in the Town of Locke are potentially at risk to an earthquake.

#### Natural Resources at Risk

All natural resources could be affected by flooding resulting from an earthquake event that caused failure of the levees or pump stations. Flooding destroys habitat and kills most terrestrial species present.

#### Historic and Cultural Resources at Risk

The entire Locke Historic District is at risk to a damaging earthquake whether resulting from ground shaking alone or ground shaking combined with liquefaction. With much of the town being constructed in the early 1900's, there is little protection against a damaging earthquake event.

### Future Development

No future development is planned for RD 361. Development in the Town of Lock is limited due to its historic district designation. There are no known development plans for the remaining agricultural land and operations and state park.

#### *Flood: 100/200/500-year*

**Likelihood of Future Occurrence**—100-year: Occasional; 200-/500-year: Unlikely

**Vulnerability**—High

### Hazard Profile and Problem Description

RD 369 is surrounded by numerous waterways, including the Sacramento River, the Delta Cross Channel, Snodgrass Slough and the Meadows waterway. Flooding of any of these waterways could cause problems for the District.

## Past Occurrences

The District Planning Team noted that there has been no historic flooding to District lands. The closest the District came to flooding was during the 1995/96 floods when nearby areas were impacted, but the District was spared.

## Vulnerability to Flood

### Assets/Critical Facilities at Risk

All of RD 369 is at risk to a significant flood event. Flooding of RD 369 could potentially impact the District owned assets, including agricultural operations, and the residential and commercial structures comprising the Town of Locke. Levee structures could also be damaged from flood waters and extensive flooding could create a life safety issue to area residents and visitors. The District Planning Team noted that if their pumps were damaged or failed during a flood, it would put the District at significant risk of substantial flooding.

Flooding of Delta islands also has the potential to negatively impact water quality both locally and statewide. The largest of California's drinking water sources is the Sacramento-San Joaquin Delta and its tributaries. The Delta provides water throughout the state via the State and Federal water projects. During a flood, there is a higher potential for the waters in the Delta to be exposed to chemicals, fuel, oil, and multiple other constituents of concern that can quickly degrade water quality. Flooding can also disturb soil and soil-borne materials such as mercury and organic matter that can degrade water quality.

Should a flood breach the levees, the entirety of the assets of RD 369 would be at risk. Levee failure is discussed later in this section. Flooding also causes erosion, which is also discussed later in this section.

### Natural Resources at Risk

Flooding of the Delta region can destroy habitat, kill terrestrial animals caught in the flood zones, and can entrain and strand large populations of fish species.

### Historic and Cultural Resources at Risk

The entire Locke Historic District is at risk to damaging floods.

### Future Development

No future development is planned for RD 361. Development in the Town of Lock is limited due to its historic district designation. There are no known development plans for the remaining agricultural land and operations and state park.

## *Levee Failure*

**Likelihood of Future Occurrence**—Occasional

**Vulnerability**—Extremely High

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

Floods can threaten the District from several sources. Usually, the possibility of flooding can be anticipated from eight to twenty hours before the “Emergency Period” is reached. However, as demonstrated in Linda, California, in February 1986, it is possible for a levee to collapse with little or no warning when there are still four or more feet of freeboard available.

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

A major overtopping of a levee, if flow persists, will result in severe erosion of the levee crowns on the landward side and cause levee failure over a period of minutes to several hours. A severe levee overtopping can, therefore, be considered as a levee break for the purpose of determining the extent of flooding that any area will suffer. Generally, overtopping can be predicted based on river stages and the warning given depending on the source of the flood waters

### **Past Occurrences**

Historically, flooding in the Delta has resulted from levee failures caused by the separate or coincidental occurrence of very high tides and high stream outflow through the delta region. Strong onshore winds associated with low pressure storms aggravate flood potential by causing an additional rise of the water surface elevations, and can cause severe erosion on levees in a short period of time. Flood events resulting from high tides and/or high stream outflow cannot be reliably predicted, but should be expected to occur in the future. Levee failures from collapse of rodent dens, seepage, falling trees, or some other mechanical failure are unpredictable and relatively uncommon. Routine levee inspections are the primary protection against these types of levee failure events. It should be noted that since 1986, significant portions of the levee system within the Legal Delta have been rehabilitated and improved, which has resulted in an overall reduction in the number of flooded islands during post-1986 Delta flood threats.

The District Planning Team noted that there have been no levee failures of RD 369 during his ownership since 1977.

## Vulnerability to Levee Failure

The primary threats to Delta levees are high water surface elevations from floods or high tides, wave action due to high winds or boat wakes, and rodent damage, either as individual actions or in combination. Levees that may have structural issues involving poor foundations, inadequate geometry or other geotechnical issues can be at a higher risk of failure from any of the primary threats. Subsidence of Delta lands has been reported to be a major risk to Delta levees, however, subsidence is limited or non-existent under and adjacent to the levees as those areas have consolidated over the last fifty years and oxidation of the peat foundations is limited because it is not farmed. Subsidence in general is limited to a very small percentage of the delta. Seismic risk is always a factor for California, but it is generally thought by Delta engineers to have been overstated in the DRMS study, and therefore is not something that is currently designed for, although, any levee improvements will help to mitigate that risk. Climate change and sea level rise have also been identified as issues for levee vulnerability. Because these impacts will occur over long periods of time, it should not be an overwhelming problem to address them as they occur.

### Assets/Critical Facilities at Risk

Should the levees fail, all District assets would be at risk.

### Natural Resources at Risk

Flooding of Delta islands destroys habitat, kills most species present, and can entrain and strand large populations of native and non-native fish species.

### Historic and Cultural Resources at Risk

Should a levee failure occur, the Locke Historic District would be at risk.

### Future Development

No future development is planned for RD 361. Development in the Town of Lock is limited due to its historic district designation. There are no known development plans for the remaining agricultural land and operations and state park.

## *River/Stream/Creek Bank Erosion*

**Likelihood of Future Occurrence**–Likely

**Vulnerability**–Medium

## Hazard Profile and Problem Description

Stream bank erosion is a natural process, but acceleration of this natural process leads to a disproportionate sediment supply, stream channel instability, land loss, habitat loss and other adverse effects. As farmers settled the valleys in the 1800s, the Gold Rush drew prospectors to the hills. As mining in the Sierra Nevada turned to the more “efficient” methods of hydraulic mining, the use of environmentally destructive high-pressure water jets washed entire mountainsides into local streams and rivers. As a result, the enormous

amounts of silt deposited in the riverbeds of the Central Valley increased flood risk. As a remedy to these rising riverbeds, levees were built very close to the river channels to keep water velocity high and thereby scour away the sediment. However, the design of these narrow channels has been too successful. While the Gold Rush silt is long gone, the erosive force of the constrained river continues to eat away at the levee system and stream banks within the District.

### Past Occurrences

The District Planning Team was unaware of specific instances of erosion. However, it was noted that erosion is an ongoing occurrence and that repairs to the levee's rock slope protection areas are periodically made.

### Vulnerability to Erosion

#### Assets/Critical Facilities at Risk

The entirety of the levee system in RD 369 is at risk to erosion.

#### Natural Resources at Risk

Erosion within RD 369 should not have significant impacts to natural resources, except to the extent erosion leads to significant flooding.

#### Historic and Cultural Resources at Risk

The Locke Historic District should not be affected by erosion of the leveed areas, except to the extent erosion leads to significant flooding.

### Future Development

No future development is planned for RD 361. Development in the Town of Lock is limited due to its historic district designation. There are no known development plans for the remaining agricultural land and operations and state park.

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

**Likelihood of Future Occurrence**—Highly Likely

**Vulnerability**—Medium

### Hazard Profile and Problem Description

According to historical hazard data, severe weather is an annual occurrence in the District. Damage and disaster declarations related to severe weather for the Sacramento County Planning Area have occurred and will continue to occur in the future.

## Past Occurrences

The following severe weather events in the Delta area were noted:

- 1986 – Due to the extreme storm event, multiple days of heavy rain, strong winds from extreme low pressure gradients, high tides and runoff affecting the entire Sacramento-San Joaquin Delta.
- 1997 – A series of large storms that produced heavy rain and high winds caused heavy runoff and high tide conditions that impacted the entire Sacramento – San Joaquin Delta region.

However, there were no identified damages to RD 369 from these events.

## Vulnerability to Heavy Rains and Storms

### Assets/Critical Facilities at Risk

Heavy rain and thunderstorms are the most frequent type of severe weather occurrence in the area. Wind and lightning often accompany these storms and have caused damage in the past. Problems associated with the primary effects of severe weather include flooding, pavement deterioration, washouts, high water crossings, landslide/mudslides, and downed trees. However, it is the secondary effects of heavy rain and storms that are of concern to RD 369. Heavy rains can cause flooding, levee failure, and stream bank erosion. The District noted that in the past when the system starts to become overwhelmed due to heavy rains, additional, temporary pumps have been brought in to assist.

### Natural Resources at Risk

The District Planning Team noted that any resulting flooding of Delta islands destroys habitat, kills most species present, and can entrain and strand large populations of native and non-native fish species.

### Historic and Cultural Resources at Risk

The entire Locke Historic District is at risk to damaging floods resulting from heavy rains.

### Future Development

No future development is planned for RD 361. Development in the Town of Lock is limited due to its historic district designation. There are no known development plans for the remaining agricultural land and operations and state park.

## *Severe Weather: Wind and Tornadoes*

**Likelihood of Future Occurrence**–Likely

**Vulnerability**–Medium

## Hazard Profile and Problem Description

According to historical hazard data, severe weather (including high winds) is an annual occurrence in the District. Tornadoes occur much less frequently. Damage related to high winds have occurred in the District

and will continue to occur in the future. Primarily, within the District, high winds cause increased wave action which act to erode the levees.

### **Past Occurrences**

The following high wind events were noted within the Delta area:

- 1986 – Due to the extreme storm event, multiple days of heavy rain, strong winds from extreme low pressure gradients, high tides and runoff affecting the entire Sacramento-San Joaquin Delta.
- 1997 – A series of large storms that produced heavy rain and high winds caused heavy runoff and high tide conditions that impacted the entire Sacramento – San Joaquin Delta region.

### **Vulnerability to Wind and Tornadoes**

#### **Assets/Critical Facilities at Risk**

The District Planning Team noted that the entire levee structures are at risk from wind. Other district assets may also be at risk depending on severity of wind event.

#### **Natural Resources at Risk**

The District Planning Team noted that all natural resources are at risk if wind caused levee failure in the District.

#### **Historic and Cultural Resources at Risk**

The entire Locke Historic District is potentially at risk to damaging winds.

#### **Future Development**

No future development is planned for RD 361. Development in the Town of Lock is limited due to its historic district designation. There are no known development plans for the remaining agricultural land and operations and state park.

## *Wildfire*

**Likelihood of Future Occurrence**–Likely

**Vulnerability**–Medium

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

Wildfire and urban wildfire are an ongoing concern for Sacramento County. Generally, the fire season extends from early spring to late fall. Fire conditions arise from a combination of hot weather, an accumulation of vegetation, and low moisture content in the air. These conditions when combined with high winds and years of drought increase the potential for a wildfire to occur. The Delta area can be extremely vulnerable to fires as a result of dense grassy vegetation combined with a growing number of structures and human activity in the region. RD 369 contains large areas of open grasslands that are a potential fuel source. The wooden construction of much of the town also contributes to the potential for a damaging fire. Any ignition has the chance to become an out of control wildfire.

### **Past Occurrences**

Although not specifically a wildfire, on July 3, 2016, a fire erupted on the second floor of the Locke Country Store and two adjacent apartments located on Main Street. The fire resulted in the complete destruction of the second floor of the building and a building behind the store. There were no injuries. It should be noted that in 2004, when the County sold the land to the residents of Locke, numerous upgrades were made that include upgrades to water and sewer systems and the installation of overhead sprinklers which prevented the fire from spreading to other structures.

### **Vulnerability to Wildfire**

#### **Assets/Critical Facilities at Risk**

All District owned and non-owned assets are at risk from wildfire.

#### **Natural Resources at Risk**

All natural resources are at risk from wildfire.

#### **Historic and Cultural Resources at Risk**

The Locke Historic District is at risk from wildfire.

### **Future Development**

No future development is planned for RD 361. Development in the Town of Lock is limited due to its historic district designation. There are no known development plans for the remaining agricultural land and operations and state park.



## 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 5-4 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 369.

*Table 5-4 RD 369's 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	N		
Capital Improvements Plan	N		
Economic Development Plan	N		
Local Emergency Operations Plan	Y	An Emergency Safety Plan is under development for this District.	
Continuity of Operations Plan	N		
Transportation Plan	N		
Stormwater Management Plan/Program	N		
Engineering Studies for Streams	N		
Community Wildfire Protection Plan	N		
Other special plans (e.g., brownfields redevelopment, disaster recovery, coastal zone management, climate change adaptation)	N		
<b>Building Code, Permitting, and Inspections</b>	Y/N	<b>Are codes adequately enforced?</b>	
Building Code	Y	Version/Year: County Code	
Building Code Effectiveness Grading Schedule (BCEGS) Score	N	Score:	
Fire department ISO rating:	N	Rating:	
Site plan review requirements	N		

Land Use Planning and Ordinances	Y/N	Is the ordinance an effective measure for reducing hazard impacts? Is the ordinance adequately administered and enforced?
Zoning ordinance	N	
Subdivision ordinance	N	
Floodplain ordinance	N	
Natural hazard specific ordinance (stormwater, steep slope, wildfire)	N	
Flood insurance rate maps	N	
Elevation Certificates	N	
Acquisition of land for open space and public recreation uses	N	
Erosion or sediment control program	N	
Other	N	
How can these capabilities be expanded and improved to reduce risk?		

Source: RD 369

## 5.6.2. Administrative/Technical Mitigation Capabilities

Table 5-5 identifies the department(s) responsible for activities related to mitigation and loss prevention for RD 369.

*Table 5-5 RD 369's Administrative and Technical Mitigation Capabilities*

Administration	Y/N	Describe capability Is coordination effective?
Planning Commission	N	
Mitigation Planning Committee	Y	Established for this plan
Maintenance programs to reduce risk (e.g., tree trimming, clearing drainage systems)	Y	A vegetation maintenance program is in place for the levees. This involves using goats to eat down the weeds and spraying the vegetation twice annually.
Mutual aid agreements	Y	
Other		
Staff	Y/N FT/PT	Is staffing adequate to enforce regulations? Is staff trained on hazards and mitigation? Is coordination between agencies and staff effective?
Chief Building Official	N	
Floodplain Administrator	N	
Emergency Manager	N	
Community Planner	N	
Civil Engineer	N	
GIS Coordinator	N	

Other	
<b>Technical</b>	
Warning systems/services (Reverse 911, outdoor warning signals)	N
Hazard data and information	N
Grant writing	N
Hazus analysis	N
Other	
<b>How can these capabilities be expanded and improved to reduce risk?</b>	

Source: RD 369

### 5.6.3. Fiscal Mitigation Capabilities

Table 5-6 identifies financial tools or resources that the RD 369 could potentially use to help fund mitigation activities.

*Table 5-6 RD 369's Fiscal Mitigation Capabilities*

<b>Funding Resource</b>	<b>Access/ Eligibility (Y/N)</b>	<b>Has the funding resource been used in past and for what type of activities? Could the resource be used to fund future mitigation actions?</b>
Capital improvements project funding	N	
Authority to levy taxes for specific purposes	N	
Fees for water, sewer, gas, or electric services	N	
Impact fees for new development	N	
Storm water utility fee	N	
Incur debt through general obligation bonds and/or special tax bonds	N	
Incur debt through private activities	N	
Community Development Block Grant	N	
Other federal funding programs	N	
State funding programs	N	
Other		
<b>How can these capabilities be expanded and improved to reduce risk?</b>		

Source: RD 369

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

Table 5-7 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 5-7 RD 369'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.	N	
Ongoing public education or information program (e.g., responsible water use, fire safety, household preparedness, environmental education)	N	
Natural disaster or safety related school programs	N	
StormReady certification	N	
Firewise Communities certification	N	
Public-private partnership initiatives addressing disaster-related issues	N	
Other		
<b>How can these capabilities be expanded and improved to reduce risk?</b>		

### 5.6.5. Other Mitigation Efforts

The District is responsible for levee maintenance. The District uses goats to maintain the vegetation on the levees. The District also sprays the vegetation semi-annually for additional vegetation control.

## 5.7 Mitigation Strategy

### 5.7.1. Mitigation Goals and Objectives

RD 369 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 RD 369 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.

#### *Action 1. Pump Station Upgrades and Backup Generators*

**Hazards Addressed:** Flooding, Levee Failure, Heavy Rains and Storms

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

**Issue/Background:** The District maintains three pump stations: one for drinking water, one to pump water out of the land area, and one to pump from the waterway. In times of heavy storms, additional pumps have been brought in in order to effectively pump the large volumes of water. New pumps of increased capacity/power would be more effective when the current system is stressed and limit the need for temporary pumps. Backup generators would also be effective in establishing a constant power source to prevent flooding resulting from a failure of the current system.

**Other Alternatives:** Maintain status quo

**Existing Planning Mechanisms through which Action will be Implemented:** none

**Responsible Office:** RD 369 owner

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

**Cost Estimate:** To be determined

**Potential Funding:** HMGP, PDM

**Benefits (avoided Losses):** Property and Natural Resource Protection and Life Safety. New pumps and backup generators would improve the ability to pump during periods of heavy rain to limit any flood related damages to property and natural and historic resources and better protect local residents.

**Schedule:** 1-3 years

*Action 2. Levee Maintenance Program Improvements*

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**Hazards Addressed:** Flooding, Levee Failure, Heavy Rains and Storms

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

**Issue/Background:** According to the Lower Sacramento/Delta North Regional Flood Management Plan, their primary District issues are related to maintenance activities. It is recommended that RD 369 focus on vegetation and rodent control, seepage control, bank protection/erosion control, access road maintenance, and encroachment repairs and modifications.

**Other Alternatives:** Maintain status quo

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

**Responsible Office:** RD 369 owner

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

**Cost Estimate:** To be determined

**Potential Funding:** HMGP, PDM, DWR grants

**Benefits (avoided Losses):** Property and Natural Resource Protection and Life Safety.

**Schedule:** 1-3 years