

Delta Annex Chapter 2 Brannan-Andrus Levee Maintenance District; Reclamation Districts 317, 407, 2067

2.1 Introduction

This Annex details the hazard mitigation planning elements specific to Brannan-Andrus Levee Maintenance District (BALMD or District) and Reclamation Districts (RD or District) 317, 407, and 2067, a previously participating jurisdiction to the 2016 Sacramento County Local Hazard Mitigation Plan (LHMP) Update. This Annex is not intended to be a standalone document, but appends to and supplements the information contained in the Base Plan document. As such, all sections of the Base Plan, including the planning process and other procedural requirements apply to and were met by the District. This Annex provides additional information specific to BALMD and RDs 317, 407, and 2067, with a focus on providing additional details on the risk assessment and mitigation strategy for the District.

2.2 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 2-1. Additional details on plan participation and District representatives are included in Appendix A.

Table 2-1 BALMD and RDs 317, 407, and 2067 – Planning Team

Name	Position/Title	How Participated
Andrew Giannini	District Superintendent and Incident Commander	Provided information regarding the annex.
Larry Gardiner	President, Board of Directors	Provided information regarding the annex.
Gilbert Labrie	Contract District Engineer	Attended planning meetings. Provided information regarding the annex.
Barb McGowan	Assistant to District Engineer	Provided information regarding the annex.

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

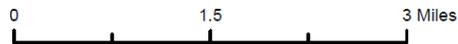
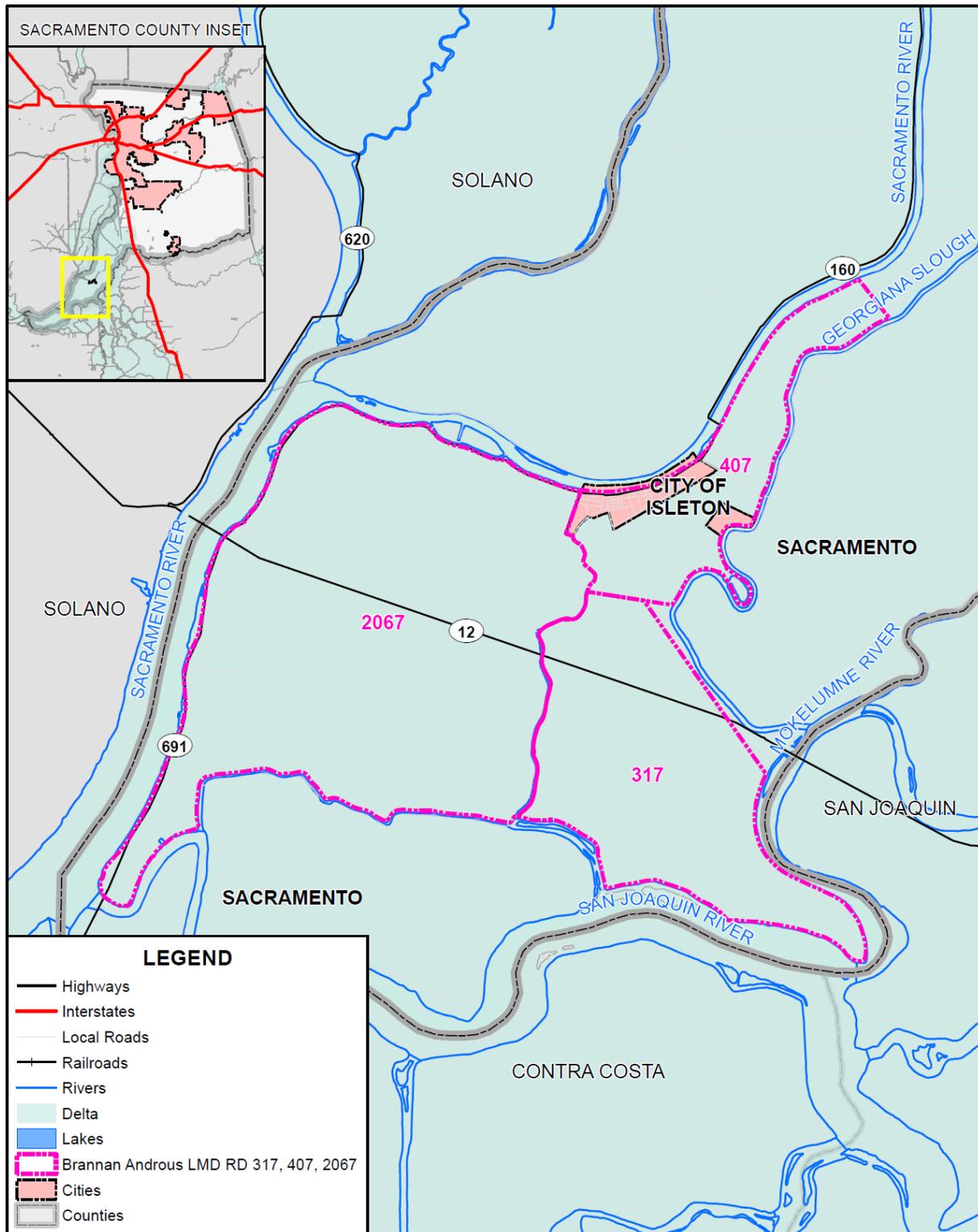
Table 2-2 2016 LHMP Incorporation

Planning Mechanism 2016 LHMP Was Incorporated/Implemented In.	Details: How was it incorporated?
2016 Sacramento County Flood Safety Plan (by GEI). Currently being updated in 2021	The plans include information that sets up SEMS/NIMS processes, identifies critical infrastructure and evacuation routes, and sets up monitoring and levee patrol protocols. The 2021 updates will include Flood Annex Maps that summarize information contained in the plans as well as including any missing protocols to bring them into full compliance with existing codes and any additional information/updates the Districts may have since the plans were originally completed. The updates should be complete by this winter.
2021 Emergency Operations Plan (EOP)	Coordination between BALMD team members to clarify and ensure conformance and focus to prevent duplication efforts when a solution is available and planned.

2.3 District Profile

The District profile for the BALMD and RDs 317, 407, and 2067 is detailed in the following sections. Figure 2-1 displays a map and the location of the District within Sacramento County.

Figure 2-1 BALMD and RDs 317, 407, and 2067



Data Source: Brannan Androus Levee Maintenance District, Sacramento County GIS, Cal-Atlas; Map Date: 09/2020.

2.3.1. Overview and Background

Brannan-Andrus Island is surrounded by 26.2 miles of levee, excluding the Brannan Island State Park, that protects about 13,000 acres of land, which is primarily in agricultural/rural use. It is bordered by the Sacramento River, Georgiana Slough, Mokelumne River, San Joaquin River, and Sevenmile Slough. The levees along the Sacramento River and Georgiana Slough are designated as project levees (16.2 miles). The remaining levees along the Mokelumne River, San Joaquin River and Sevenmile Slough are considered non-project levees (10.0 miles). Out of the 10 miles of non-project levee, 3.3 miles border the non-tidal, controlled section of Sevenmile Slough.

The BALMD monitors and maintains the levees on the island. Reclamation Districts 317, 407, and 2067 maintain and control the operations of the seven pumping stations to keep the island dry. Five pumping stations are located along Sevenmile Slough, another is on Georgiana Slough, and a lift station is located on the main drainage canal in the northern part of the island.

The BALMD levee system protects an island population of approximately 1,837. This figure includes a major recreation contingent and the City of Isleton, with close to 900 residents. Approximately 379 acres are urbanized, with about 187 acres incorporated by the City of Isleton.

2.4 Hazard Identification

BALMD and RDs 317, 407, and 2067 identified the hazards that affect the District and summarized their location, extent, frequency of occurrence, potential magnitude, and significance specific to District (see Table 2-3).

Table 2-3 BALMD and RDs 317, 407, and 2067—Hazard Identification Assessment

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

2.5 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.

2.5.1. Hazard Profiles

Each hazard vulnerability assessment in Section □, includes a hazard profile/problem description as to how each medium or high significant hazard (as shown in Table 2-3) affects the District and includes information on past hazard occurrences and the likelihood of future hazard occurrence. The intent of this section is to provide jurisdictional specific information on hazards and further describes how the hazards and risks differ across the Sacramento County Planning Area.

2.5.2. 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 BALMD and RDs 317, 407, and 2067’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, including without limitation, a structure, infrastructure, property, equipment or service, that if adversely affected during a hazard event may result in severe consequences to public health and safety or interrupt essential services and operations for the community at any time before, during and after the hazard event.

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

Table 2-4 lists critical facilities and other District assets identified by the District Planning Team as important to protect in the event of a disaster. BALMD and RDs 317, 407, and 2067’s physical assets, valued at over \$250 million, consist of the buildings and infrastructure to support the District’s operations.

Table 2-4 BALMD and RDs 317, 407, and 2067 Critical Facilities, Infrastructure, and Other District Assets

Name of Asset	Facility Type	Replacement Value	Which Hazards Pose Risk
BALMD			
District Levees	Infrastructure	\$235,000,000	Flood 1%/0.2%, Subsidence, Levee Failure
District Maintenance Yard	Infrastructure	\$1,000,000	Floods: 1%/0.2%, Levee Failure
RD 317			
150 HP Pump	Infrastructure	\$500,000	Floods: 1%/0.2%, Levee Failure
50 HP Pump	Infrastructure	\$250,000	Floods: 1%/0.2%, Levee Failure
75 HP Pump	Infrastructure	\$250,000	Floods: 1%/0.2%, Levee Failure
RD 407			
60 HP Pump Station	Infrastructure	\$250,000	Floods: 1%/0.2%, Localized Flood, Levee Failure
60 HP Pump Station	Infrastructure	\$250,000	Floods: 1%/0.2%, Localized Flood, Levee Failure
RD 2067			
100 HP Pump	Infrastructure	\$500,000	Floods: 1%/0.2%, Localized Flood, Levee Failure
60 HP Pump	Infrastructure	\$250,000	Floods: 1%/0.2%, Localized Flood, Levee Failure
60 HP Pump	Infrastructure	\$250,000	Floods: 1%/0.2%, Localized Flood, Levee Failure
60 HP Pump	Infrastructure	\$250,000	Floods: 1%/0.2%, Localized Flood, Levee Failure
60 HP Pump	Infrastructure	\$250,000	Floods: 1%/0.2%, Localized Flood, Levee Failure
100 HP Pump	Infrastructure	\$500,000	Floods: 1%/0.2%, Localized Flood, Levee Failure
75 HP Pump	Infrastructure	\$250,000	Floods: 1%/0.2%, Localized Flood, Levee Failure

Name of Asset	Facility Type	Replacement Value	Which Hazards Pose Risk
75 HP Pump	Infrastructure	\$250,000	Floods: 1%/0.2%, Localized Flood, Levee Failure

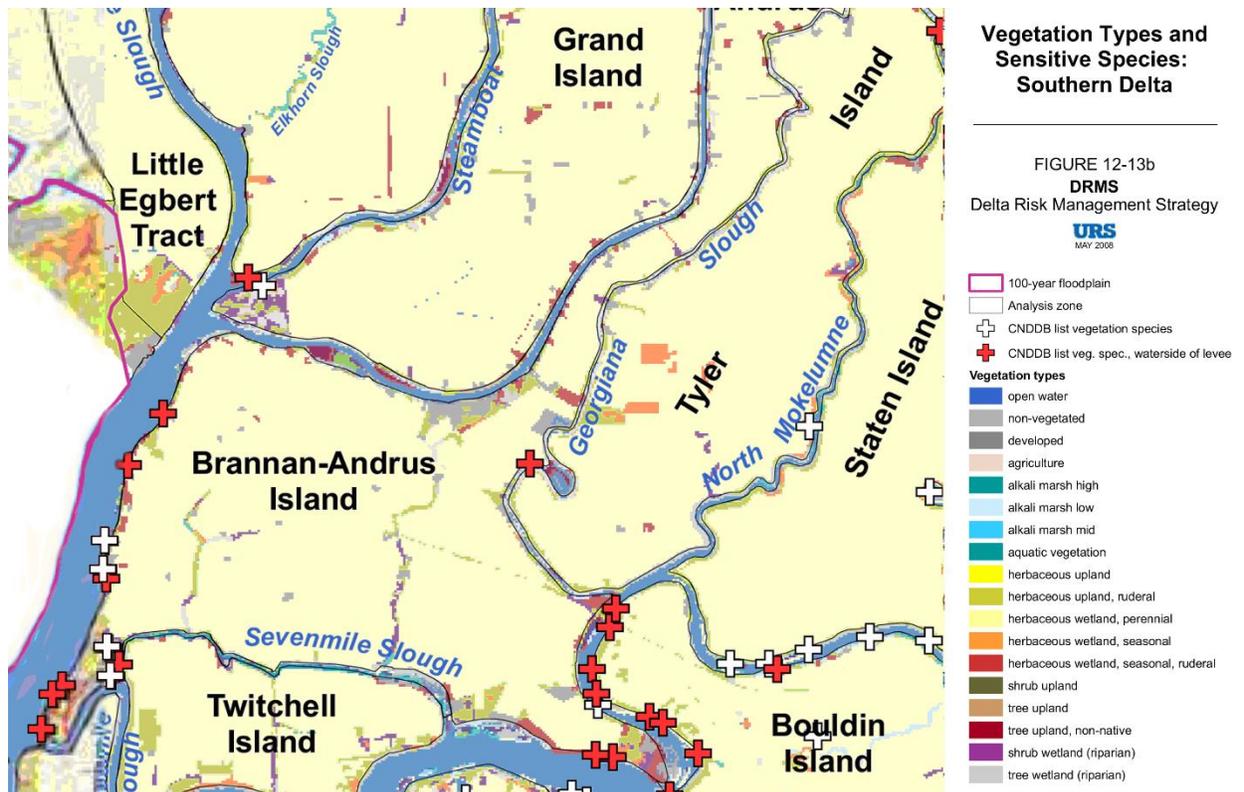
Source: BALMD and RDs 317, 407, and 2067

Natural Resources

BALMD and RDs 317, 407, and 2067 has a variety of natural resources of value to the District. The 5-Year Plan noted that in terms of natural resources, Brannan-Andrus Island has freshwater wetland, upland, and riparian habitats. Within the freshwater wetland category, there are 12.36 acres of herbaceous perennial wetland and 26.63 acres of herbaceous seasonal/ruderal wetland. Upland habitat consists of 724.74 acres of herbaceous ruderal, 10.13 acres of shrub, 47.61 acres of tree, and 292.56 of non-native tree upland. There is also approximately 142.31 acres of riparian habitat, with 96.88 acres of shrub wetland, and 45.43 acres of tree wetland.

Two small sloughs, Tomato Slough and Jackson Slough, in the interior of the island provide some riparian habitat. Refer to Figure 2-2 for specific habitat areas. According to the California Natural Diversity Database the sensitive species found on Brannan-Andrus Island are: Northern California Black Walnut, Swainson Hawk, Northwestern Pond Turtle, Delta Tule Pea, Suisun Marsh Aster, Mason Lilaeopsis, and Delta Mudwort.

Figure 2-2 BALMD and RDs 317, 407, and 2067 Vegetation Types and Sensitive Species



Source: BALMD 2012 5-Year Plan

Historic and Cultural Resources

BALMD and RDs 317, 407, and 2067 has a variety of historic and cultural resources of value to the District. The 5-Year Plan noted that BALMD, RD 317, RD 407, and RD 2067 protect the City of Isleton. The City has two nationally registered historic districts, the Isleton Chinese and the Japanese Commercial Districts.

Growth and Development Trends

The BALMD 2012 5-Year Plan noted that the standard island elevation is about -14' with a minimum elevation of -22' and a maximum of +9' per the 2007-2008 DWR Lidar Survey. With the adoption of the Delta Protection Act in 1992, about 40% of Brannan-Andrus Island was designated as a Secondary Zone of the legal Delta, extending from the northern edge of Highway 12 to Tyler Island Bridge Road, east of Isleton. The remainder of the island is in the Primary Zone, which was established to protect the area for agriculture, wildlife habitat, and recreation uses within the Delta. The BALMD levee system protects an island population of approximately 1,837. This figure includes a major recreation contingent and the City of Isleton, with close to 900 residents. Approximately 379 acres are urbanized, with about 187 acres incorporated by the City of Isleton.

Beyond the city limits of Isleton, Sacramento County zoning designates approximately 1,200 acres to recreational use along the southeast corner of Andrus Island. Scattered around Brannan-Andrus Island are a large contingent of the Delta resorts, including RV parks, boat launches, and marinas for local and public use. A majority of these recreational uses are located along the Delta Loop, a 7.2-mile drive with 40 recreational attractions bordering the Mokelumne and San Joaquin Rivers, and Sevenmile Slough. Overall, there are 5 large marinas (over 200 berths), 5 medium marinas (50 to 200 berths), and 8 small marinas (less than 50 berths) that account for a total of 2400 berths and 6 boat launching facilities. Twelve of the resorts also have RV/camping grounds totaling about 800 sites overall. Five of the resorts have cabins (approx. 300 total). About 40 acres total of dry storage is provided at eleven resorts. Four resorts are on their own island that bridges to Brannan-Andrus and may not be inundated by a flood, but access could be compromised. Including marinas and resorts, there are approximately 148 businesses on the island.

There was a development of approximately 650 homes that failed in the housing crash of 2008. It is still developable land but many projects to revive the development have also failed. Development of that size is possible in the future given Isleton is in the Secondary Zone of the Delta which allows for some development. One hindrance is the levees are not certified by FEMA to protect against the 100-year flood. Thus homes will have to be elevated to protect from flooding. The failed development had accounted for that and designed the homes to be elevated with garages on the first story.

Development since 2016

No District facilities have been constructed since 2016. A maintenance storage building has been improved. As such, vulnerability of District facilities is unchanged.

Future Development

A maintenance vehicle storage building has been proposed and will be located in an identifiable hazard area. Increased levee protection and additional levee improvements in the 5-year plan, include but not limited to:

- Sacramento River Erosion Control / Habitat Enhancement Project near river mile 14.60L to 17.34L. BA-15-1.0-SP. This project is funded and scheduled for construction in 2022.
- Erosion repair upstream of B&W along the Georgina Slough confluence with the Mokelumne River. BA-17-1.0-SP. This project is funded and scheduled for construction in 2023.
- Existing Sevenmile Slough crown raising project from Jackson Slough to Bruno's has been planned and is pending authorization and schedule.
- Stability berm for Sevenmile Slough and Mokelumne River is planned but not scheduled.
- Drainage blankets and French drains are planned for Georgiana Slough, but not scheduled.
- 7702.72: Sacramento Erosion STA510 (HWY 160)

2.5.3. Vulnerability to Specific Hazards

This section provides the vulnerability assessment, including any quantifiable loss estimates, for those hazards identified above in Table 2-3 as high or medium significance hazards. Impacts of past events and vulnerability of the District to specific hazards are further discussed below (see Section 4.1 Hazard Identification in the Base Plan for more detailed information about these hazards and their impacts on the Sacramento County Planning Area). Methodologies for evaluating vulnerabilities and calculating loss estimates are the same as those described in Section 4.3 of the Base Plan.

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

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

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

Power Outage/Power Failure

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

Currently, there is no affect and no backup power is required. This could change if the length of outage is significant. Efforts have been made and RD 2067 was considering an option to add solar capabilities.

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. The Districts' have not been affected by a PSPS event in the past, and given the low potential for a significant wildfire event in the Delta area, a PSPS event, while possible, is unlikely.

Dam Failure

Likelihood of Future Occurrence—Unlikely

Vulnerability—Medium

Hazard Profile and Problem Description

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

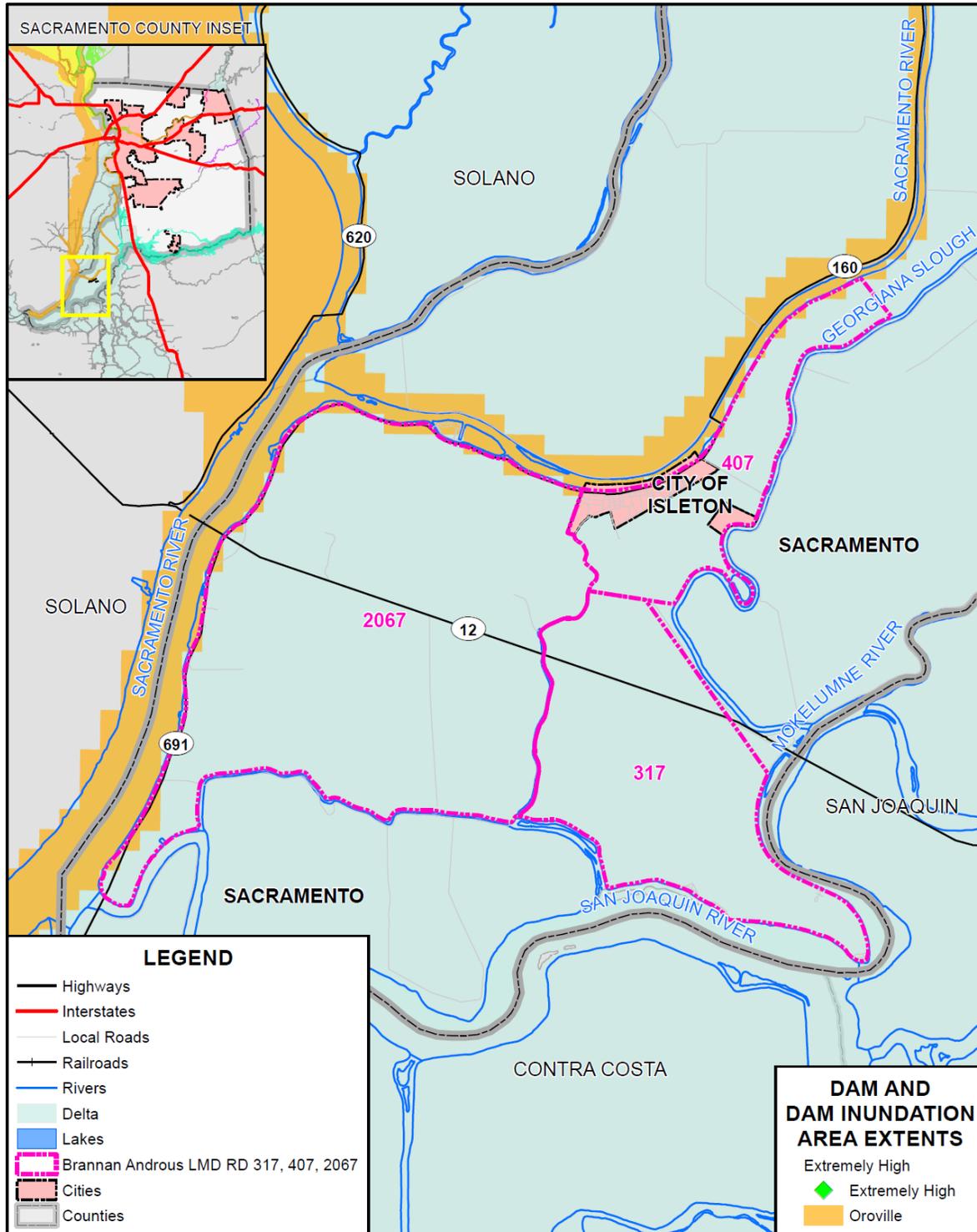
Location and Extent

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

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

There are no dam inundation areas from dams inside the County that can affect the District. Dams outside the County that can affect the District can be seen on Figure 2-3.

Figure 2-3 BALMD and RDs 317, 407, and 2067 – Dam Inundation Areas from Dams Outside the County



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

Past Occurrences

There has been no federal or state disaster declarations for dam failure in the County. The District noted no other dam failure occurrences that have affected the District.

Vulnerability to and Impacts from Dam Failure

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

Riparian habitats that border the channel can be lost due to erosive forces of high flows from dam failure. The City has two nationally registered historic districts, the Isleton Chinese and the Japanese Commercial Districts that could be lost in the event of a flood due to dam failure.

Assets at Risk

As shown in the figures above, the levees and some District facilities in Table 2-4 could be at risk to dam failure, depending on the dam that fails and the nature of its failure.

Flood: 1%/0.2% Annual Chance

Likelihood of Future Occurrence—Occasional

Vulnerability—High

Hazard Profile and Problem Description

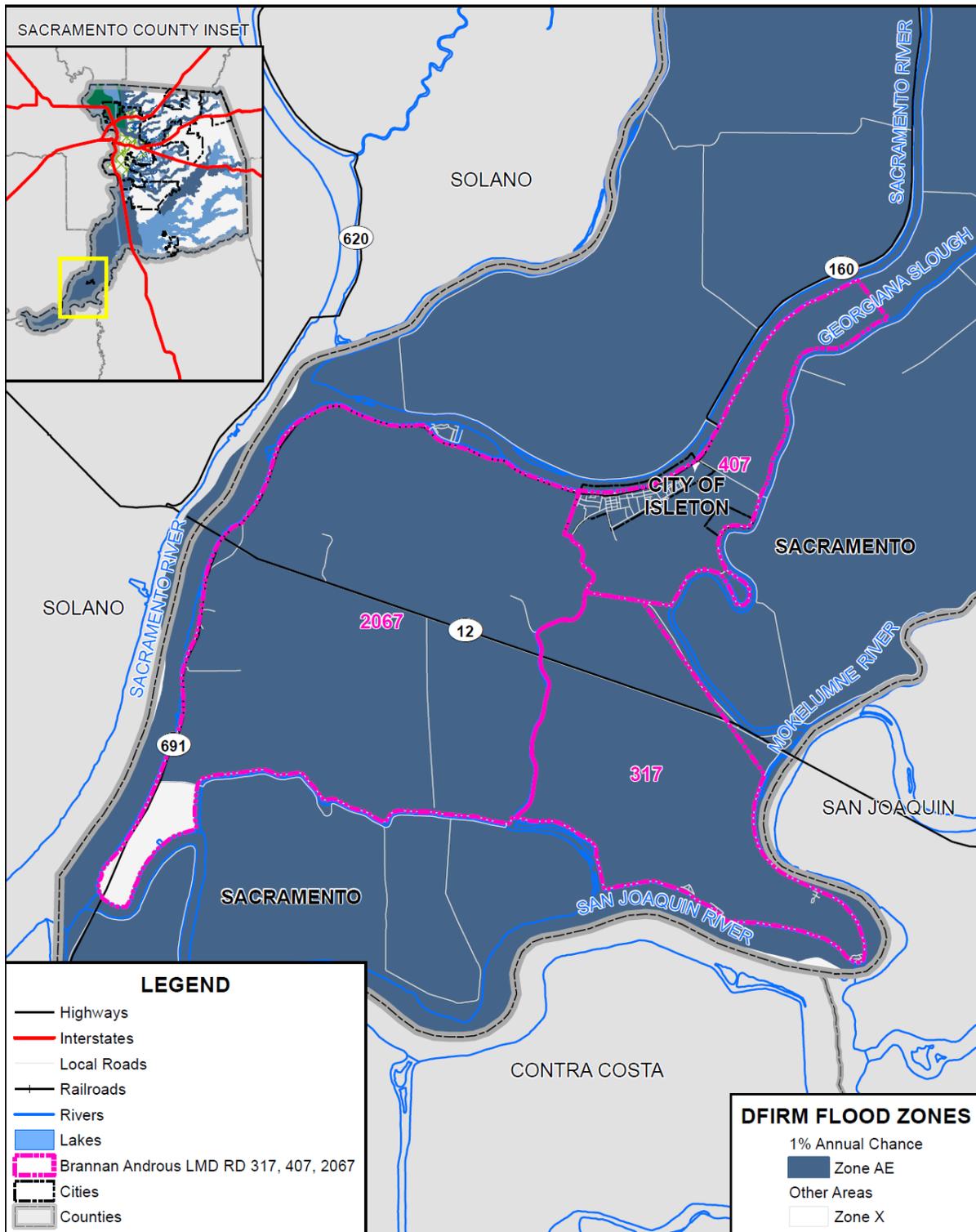
This hazard analyzes the FEMA DFIRM 1% and 0.2% annual chance floods. These tend to be the larger floods that can occur in the County or in the District, and have caused damages in the past. Flooding is a significant problem in Sacramento County and the District. Historically, the District has been at 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 BALMD and RDs 317, 407, and 2067 have been subject to historical flooding.

Location and Extent

The BALMD and RDs 317, 407, and 2067 is mostly located in the 1% annual chance floodplain. This is seen in Figure 2-4.

Figure 2-4 BALMD and RDs 317, 407, and 2067 – FEMA DFIRM Flood Zones



FOSTER MORRISON
CONSULTING

0 1.5 3 Miles

SACRAMENTO
COUNTY

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

Table 2-5 details the DFIRM mapped flood zones within the 1% annual chance flood zone as well as other flood zones located within the District.

Table 2-5 BALMD and RDs 317, 407, and 2067– 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	
X (unshaded)	Areas outside flood zones.	X

Source: FEMA

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

Past Occurrences

A list of state and federal disaster declarations for Sacramento County from flooding is shown on Table 2-6. These events also likely affected the District to some degree.

Table 2-6 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

1986 was the closest the District came to experiencing a 100-year flood. The District has not experienced a 200 or 500-yr flood. Recent high water events (HWE) include:

- 2017 HWE: Initiated Extra monitoring.
- 2017 HWE: Overtopping concerns on Mokelumne River.
- 2017 HWE: Levee stability evidence on the San Joaquin River levee.

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.

A 1%, 0.5%, or 0.2% annual chance flood event could cause flooding within the District. A high water event, depending on the water elevation, could cause failure due to overtopping but more realistically could increase hydraulic gradients within the levee section resulting in landside seepage or boils. Continued seepage, if left unaddressed, could erode the levee and result in failure. Heavy flows could also cause erosion and scour on the waterside bank that could undermine the levee and cause failure.

Riparian habitats that border the channel can be lost due to erosive forces of high flows from 100/200/500-year flows. The District's two nationally registered historic districts, the Isleton Chinese and the Japanese Commercial Districts could be negatively impacted from inundation due to a 100/200/500-year flood. The marinas along the Delta Loop along Georgiana Slough, Mokelumne River and the San Joaquin River could also be damaged and possibly lost as a result of high flows from a 100/200/500 year flood event.

Assets at Risk

The levee system and pumping stations are vulnerable to a 1%, 0.5%, or 0.2% annual chance flood. Higher flows from such events could exceed the capacity of both the levee system and the pumping stations that are needed to drain the island. Assets at risk to flooding, as shown in Table 2-4, include all District facilities.

Flood: Localized Stormwater Flooding

Likelihood of Future Occurrence—Highly Likely

Vulnerability—Medium

Hazard Profile and Problem Description

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

Location and Extent

The BALMD and RDs 317, 407, and 2067 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. One specific area is the Delta Bay site where levee instability and seepage are problem areas.

Past Occurrences

There have been no federal or state disaster declarations in the County due to localized flooding. Some form of localized stormwater flooding occurs during most heavy rains. The most likely time this could have occurred in the past was during the wet year in 2006. Past occurrences that affected the District include:

- 2017 HWE: Initiated extra monitoring. Stormwater resulted in excess electrical cost to pump the excess run off required to prevent localized flooding.
- 2017 HWE: Sandbag management and implementation.

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.

Localized stormwater flooding can occur during heavy rains or seepage events that exceed the District's drainage capabilities. Lower areas around the island may be subject to minor flooding.

Assets at Risk

Localized flooding can overtax the Districts pumping system and create a more hazardous situation involving the levee system by limiting the ability for inspection. District pump stations could be at risk from localized flooding. All RD 407 and 2607 assets, as shown in Table 2-4, are at risk to localized flooding.

Levee Failure

Likelihood of Future Occurrence–Occasional
Vulnerability–High

Hazard Profile and Problem Description

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

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

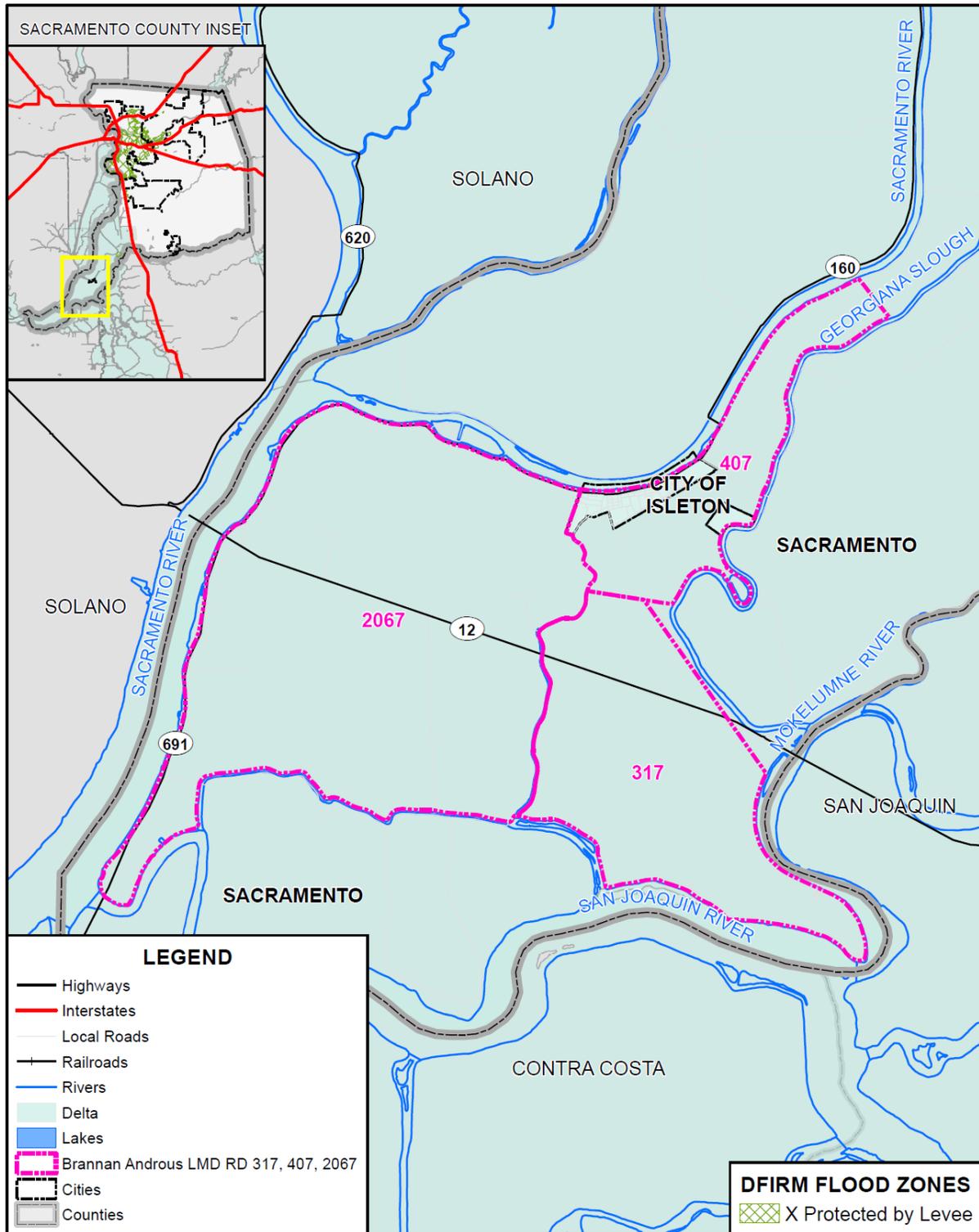
Location and Extent

There is not a scientific scale or measurement system in place for levee failure. Expected flood depths from a levee failure in the District vary by event and location. The speed of onset is slow as the river rises, but if a levee fails the warning times are generally short for those in the inundation area. The duration of levee failure risk times can be hours to weeks, depending on the river flows that the levee holds back. When

northern California dams and reservoirs are nearing maximum capacity, they release water through the river systems, causing additional burdens on County levees. Levee protected areas from the DFIRM in the District are shown on Figure 2-5. As shown, the levees were not certified by FEMA in the 2018 DFIRM as providing 1% annual chance flood protection.

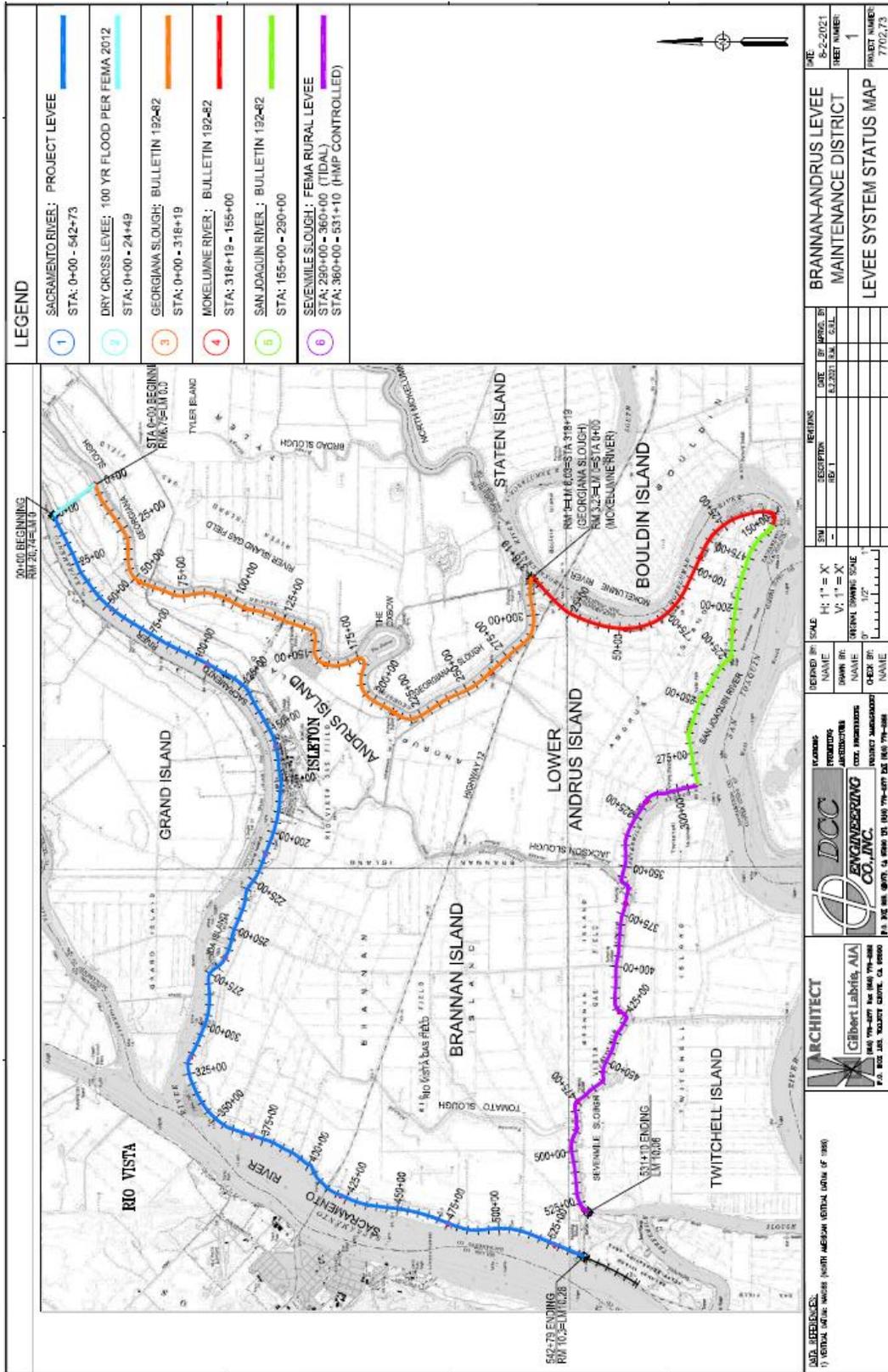
DCC Engineering Co., Inc. has prepared a Levee System Status Map of BALMD. Dated 8/2/2021. This is shown on Figure 2-6.

Figure 2-5 BALMD and RDs 317, 407, and 2067 – Levee Protected Areas



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

Figure 2-6 BALMD – Levee System Status Map



Source: BALMD

Past Occurrences

There have been no federal or state disaster declarations from levee failure. The 2012 5-Year Plan reported that since the creation of the BALMD in 1967, Brannan-Andrus Island has experienced one flood event on June 22, 1972. The levee failed on the southern end of the island along the San Joaquin River. The levee breach occurred after hours during a construction effort to raise the levee and address an instability problem. The elevation of the levee crown at the time was 10.8 feet. The subsequent water level on the inundated island reached 6.2 feet. To protect the town of Isleton, a bow levee was constructed by the US Army Corps of Engineers and volunteers. The bow levee only held for 36 hours. When it failed, 35% of the Isleton community was inundated.

The flood resulted in a “big gulp” effect, where the salt water from Suisun Bay moved into the central and southern Delta, decreasing the Delta’s freshwater outflow. The saltwater intrusion degraded water quality for central Delta farms and forced pumping to be cut back at the Central Valley Project pumping plant in Tracy. In order to push back the salinity gradient, a hydraulic barrier was created by increasing water releases from Folsom, Oroville, and Shasta reservoirs. Still, it took those releases several days to reach the affected Delta areas. After releasing over 150,000 acre feet of water, salinity levels were eventually restored to pre-flood levels. It took eight weeks of pumping to dewater the Brannan-Andrus Island.

The USACE spent \$1.4 million to repair the breach with another \$1.0 million used in federal disaster assistance totaling \$2.4 million. In addition, numerous marinas and restaurants suffered from a loss of business and the flood’s negative publicity. Crops were lost and intrastate commerce was disrupted. When adding up all of the flood's indirect costs, including the diversion of fresh water destined for CVP customers, it was estimated that the total economic impact of the 1972 Brannan-Andrus flood was approximately \$40 million.

The BALMD became concerned about another levee failure during a high water event in 1997, when a section of the landside slope sloughed into a toe ditch along the Georgiana Slough levee. The USACE spent over \$1.1 million to stabilize approximately 6,700 lineal feet of levee. No damages have been reported since 2016.

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.

Levee failure could result in inundation of the Districts and could also result in the flooding of Brannan and lower Andrus islands.

As previously stated, BALMD monitors and maintains the levees on the island. Reclamation Districts 407, 2067, and 317 maintain and control the operations of the seven pumping stations to keep the island dry. Five pumping stations are located along Sevenmile Slough, another is on Georgiana Slough, and a lift station is located on the main drainage canal in the northern part of the island.

The 5-Year Plan noted that to repair a levee breach the average cost has been estimated to be approximately \$25 million. But the total cost truly depends on the accessibility, size and severity of the breach, the size of the island, volume of water to be pumped out, weather conditions, etc. The \$25 million figure assumes costs of \$5/yd³ of on-island replacement fill, \$15/yd³ of off-island fill, 6% per foot of engineering costs, and \$5/foot for rip rap. A summer levee breach occurred on Brannan-Andrus in 1972 (discussed above). The Jones Tract failure in 2004, the most recent levee failure, provides insight into determining what a levee breach could cost today. It has been publicized that this 500 foot breach cost approximately \$90 million for repair, recovery, and associated damage. However, many knowledgeable locals consider that figure inflated by as much as a factor of two.

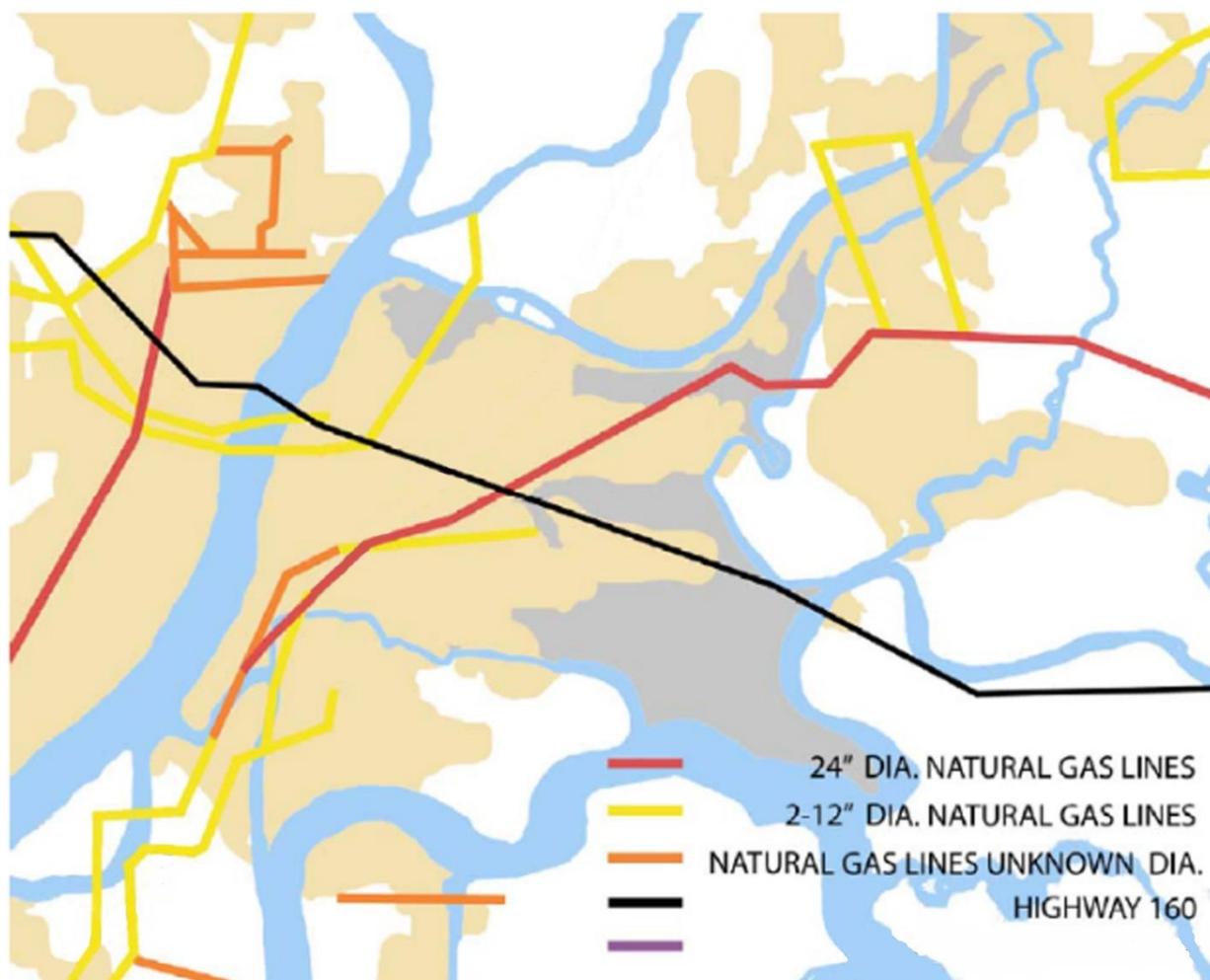
The 5-Year Plan broke down costs by land use type. The District noted that land values have increased because of the changes in crops. The infrastructure exposure related to HWY 12 and HWY 160 has increased significantly due to commuter traffic. Both HWY's are major thoroughfares and would create major economic consequences in all aspects with commercial being impacted the hardest.

- **Residential** – The costs associated with inundation are taken from FEMA's method for estimating displacement. This includes a one-time cost of \$500 per flooded household, a cost of \$500 per month of inundation per household, and a monthly rental cost of \$747. For Brannan-Andrus, it is estimated that there could be a one-time displacement cost of \$182,400 for all occupied households along with an additional \$15,600 per day to house these residents elsewhere. In addition to the residents, the various resorts on the island generate a transient population. To house this population in emergency shelters it could cost an estimated \$85 per person per day. There are no reliable statistics covering that element of the population to determine a total cost per day for emergency housing, since the population fluctuates with the seasons. Flooding threats usually allow sufficient time to evacuate, so the costs to accommodate this unique group of part-time residents may not be significant.
- **Commercial** – Commercial structures will be adversely impacted from the time they are inundated through the time it takes to repair such damage and damage to surrounding infrastructure. For any business that is flooded FEMA assumes a one-time displacement cost of \$1000, for a total of \$148,000. Upon inundation, the businesses are assumed to have \$77,500 of lost output value, \$3,900 of lost profit, and \$44,000 of lost value added per day on average. "Value added" is the sum of wages and salaries, proprietor's incomes, other property income, and indirect business taxes (URS 67). When a flood occurs, the island businesses could lose \$140 million in sales for that year. Four-hundred seventy-one jobs could be lost per day over the duration of inundation. Overall, a flood could cost Brannan-Andrus Island businesses about \$125,400 per day. Some businesses may be unable to recover from a flood and could possibly be lost as a result of such an event.
- **Agricultural** – Main crops grown on Brannan-Andrus Island are alfalfa, corn, wheat, pears, apples, cherries, and wine grapes. Brannan-Andrus Island has 10,517 acres of crops. Average cost for rehabilitation and field cleanup is \$235 per acre. This involves the removal of debris and sediment deposits after floodwaters have receded. Silt and debris can also clog drainage and irrigation ditches adding a variable cost to rehabilitation. The estimated total one-time cost for clean-up and rehabilitation is estimated to be \$2.0 million. If inundation lasts longer than 14 days, it is assumed that the crops will be permanently lost. In 1972, it took eight weeks to pump out the island. Using that estimate, essentially all crops could be lost in a similar flood event. Any flood event that occurs between planting and

harvest, could completely destroy the crops. Reestablishment of a lost crop dramatically increases economic losses. The inundation period is assumed to be five weeks on lower Tyler Island, meaning all crops on the lower end could potentially be lost in a flood event. However, due to the smaller size of RD 554 and an assumed inundation period of five days, not all crops may be lost. Not including clean-up costs, reestablishment of all crops on the island could total an estimated \$23.9 million. In addition to reestablishment costs, a flood could also result in annual crop production losses. Annual crop production losses are incurred from the time of the flood and depend on how long inundation occurs, cleanup and the time required for the crops to produce a harvestable yield. If a flood occurs between planting and harvest, the crop will be lost for the year. Planting on Brannan-Andrus begins in April and harvest ends by October. This report adds two months onto the planting season since it is estimated to take two months before the soils are dry enough for planting. As a result, the critical flood season for crops really occurs between February and October. If planting cannot occur within the same year as the flood event, annual production losses from orchards and vineyards could amount to about \$17 million. If an event occurs between February and October, pushing planting to the following year, annual production losses will be about \$26.8 million. Degraded water quality from salinity intrusion can also reduce crop yields.

The Brannan-Andrus Island levee system also protects several critical infrastructure components. There is an approximately 18-mile network of roads that include State Highway 12 (4.21 mi.) and Highway 160 (8 mi.) which provide east-west and north-south links with interstate corridors. There are approximately 9,088 acres of underground gas fields and storage areas with a total of 33 natural gas wells and 157 gas/oil wells. The areas in beige represent the natural gas fields. A Lodi Gas' natural gas pipeline (24" diameter) runs west to east across the island feeding two 2-12" diameter pipelines. In total there are about 14.3 miles of PG&E pipeline with natural gas production at about 5,117,858 mcf. These are all shown on Figure 2-7. The District noted that the 230kV transmission line has been removed since the creation of this map.

Figure 2-7 PG&E Natural Gas Pipelines, Gas Fields, Storage Areas, and Transmission Lines



Source: 2012 5-Year Plan

StormReady Flood Scenarios and Evacuation Routes

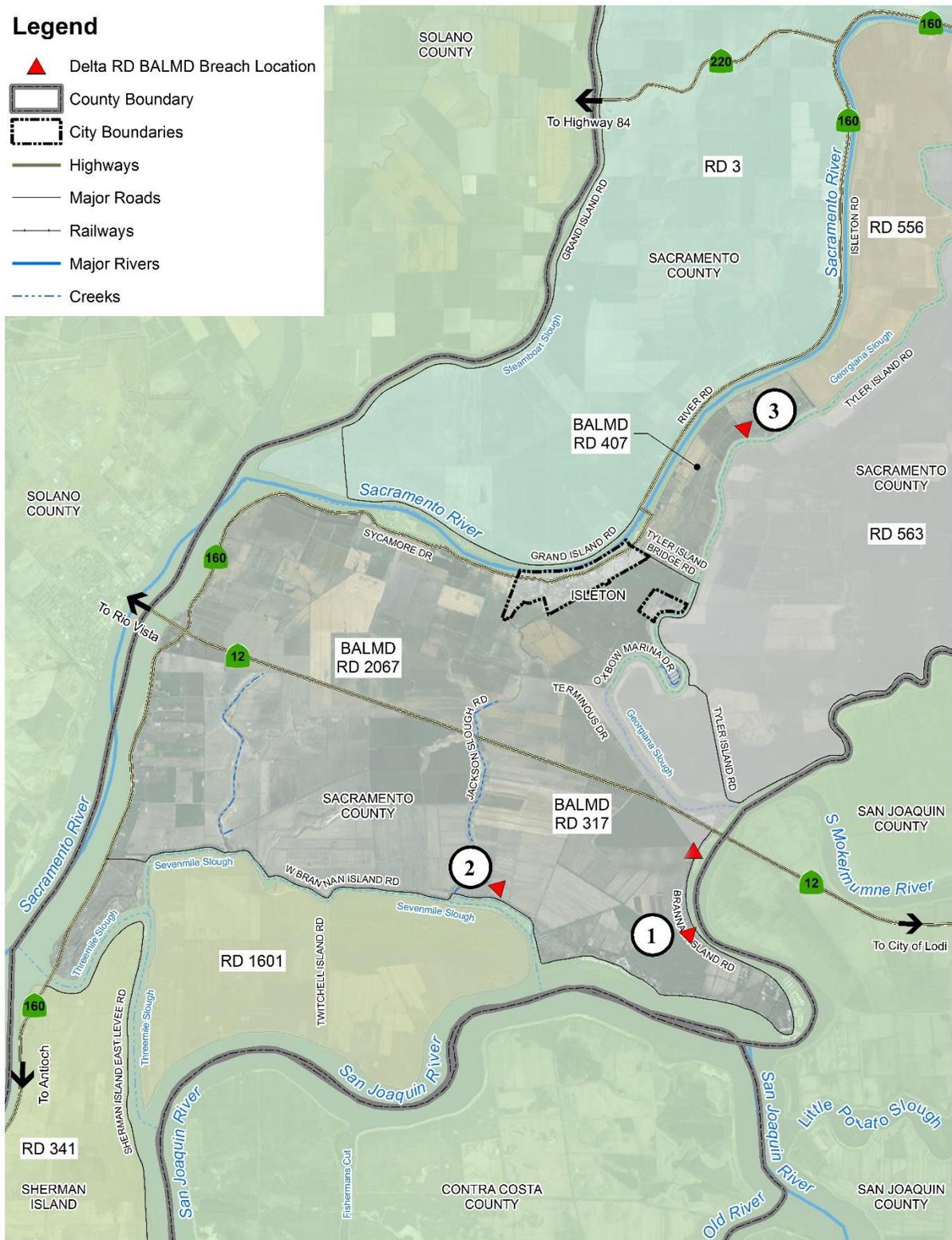
The County of Sacramento and the City of Sacramento have prepared various detailed maps showing hypothetical levee breaks, inundation levels and the time it would take for waters to rise in affected neighborhoods, and rescue and evacuation zones. It is important to note that these maps deal with potential 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 BALMD and RDs 317, 407, and 2067, Figure 2-8 details the locations in the Delta within BALMD and RDs 317, 407, and 2067 where flooding could occur. The red triangles denote potential levee breach locations. BALMD and RDs 317, 407, and 2067 has three potential levee break scenarios. Maps for Scenario 1 regarding time to one foot inundation (Figure 2-9), estimated flood depths (Figure 2-10), and

suggested evacuation routes (Figure 2-11) are displayed below. Maps for Scenario 2 and 3 can be found on the Sacramento County stormready.org website.

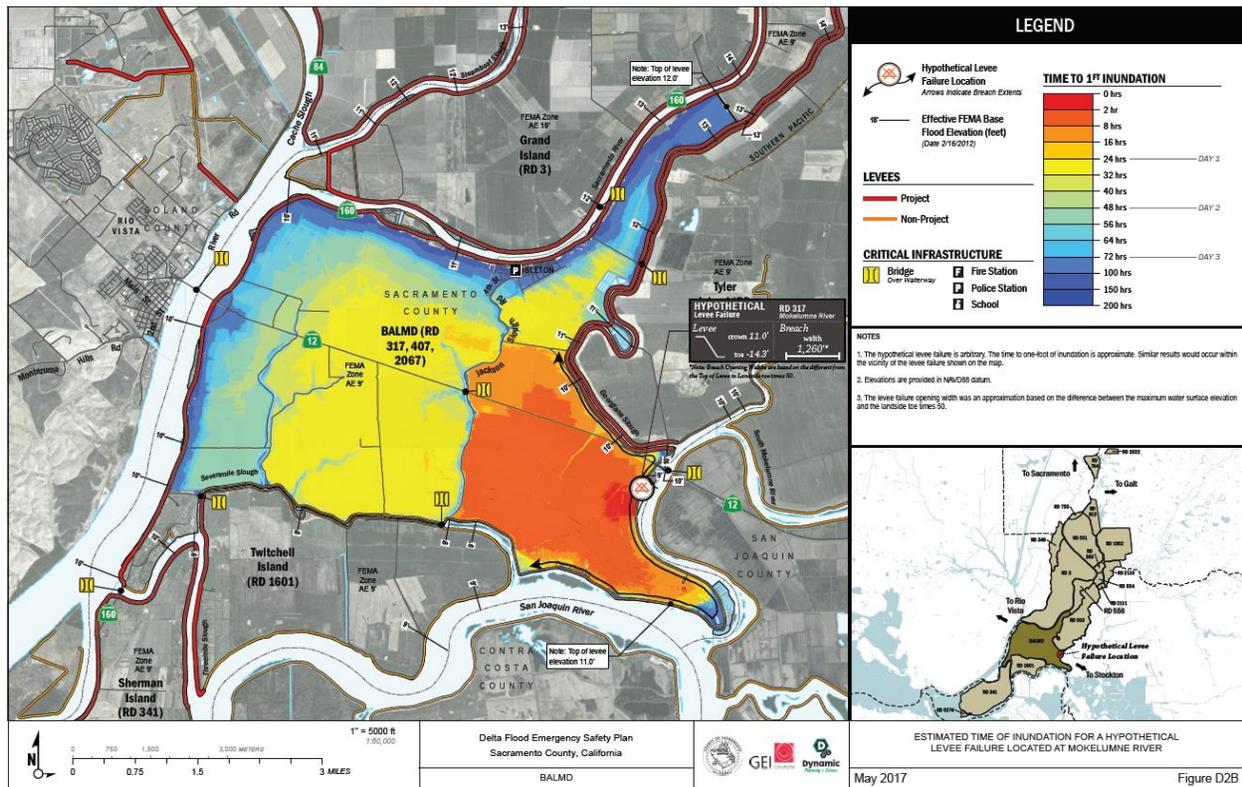
Note: This information is based on assumptions and scenarios developed as part of the flood safety planning done for Delta RDs in 2017; areas of possible flooding depicted in these maps may or may not reflect current conditions and would change depending on the location of breach areas and conditions during any given event. Current conditions should be verified with an LMA representative

Figure 2-8 BALMD and RDs 317, 407, and 2067 – Potential Levee Breach Location



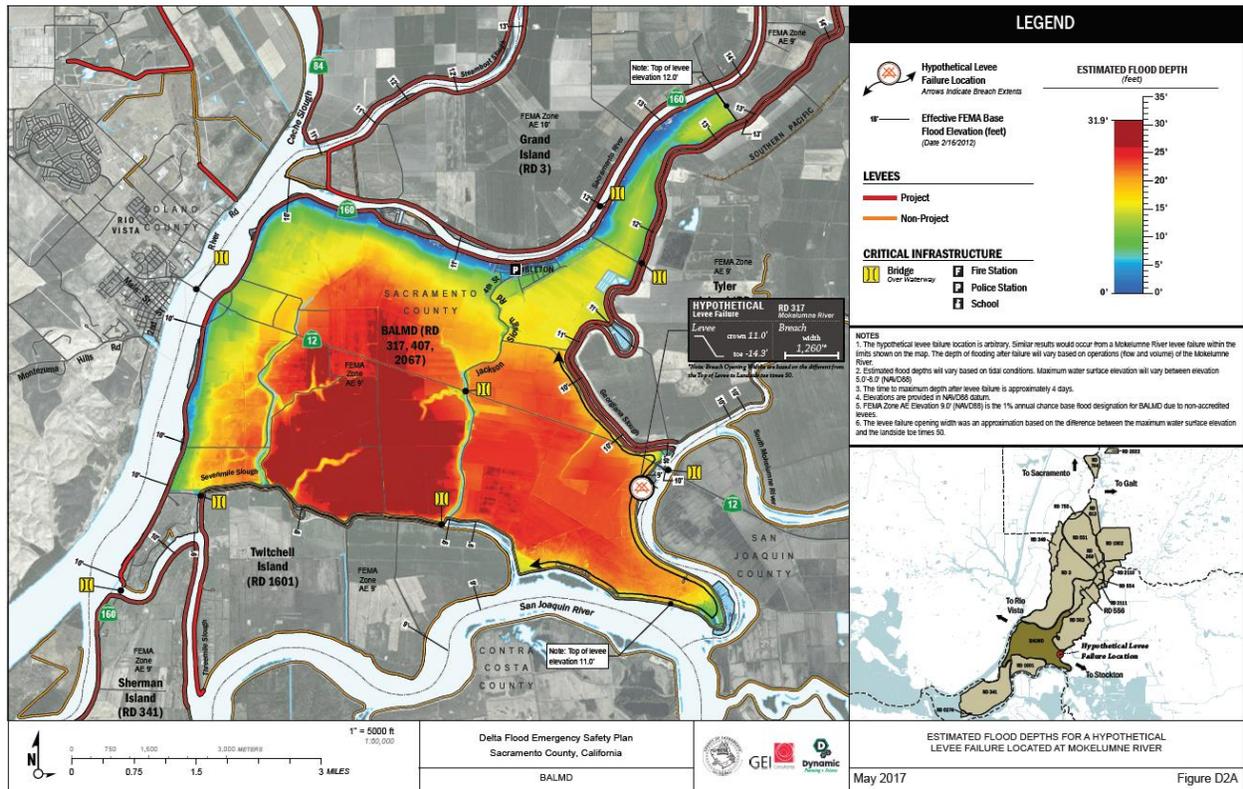
Source: BALMD, DCC Engineering

Figure 2-9 BALMD and RDs 317, 407, and 2067 – Time to One Foot Inundation after Levee Breach



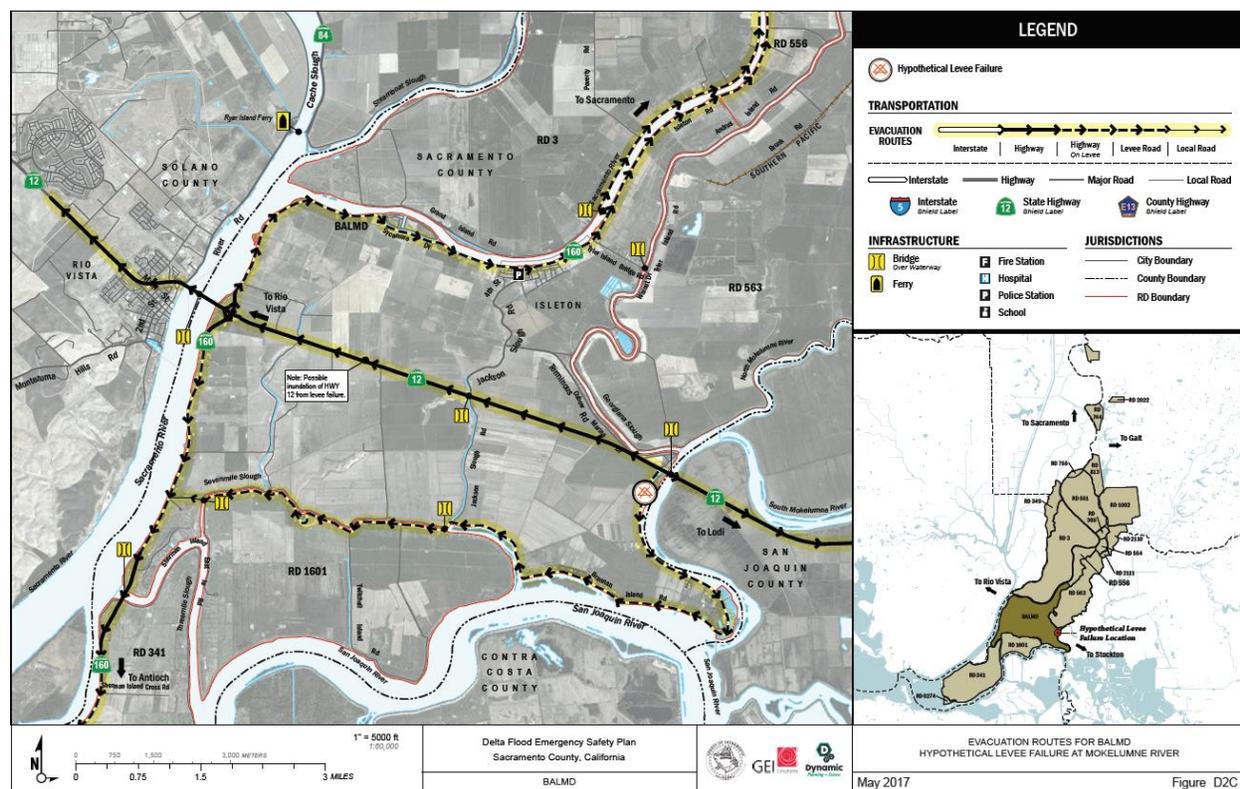
Source: Sacramento County Storm Ready – retrieved March 25, 2021

Figure 2-10 BALMD and RDs 317, 407, and 2067 – Estimated Flood Depth from Levee Breach Scenario



Source: Sacramento County Storm Ready – retrieved March 25, 2021

Figure 2-11 BALMD and RDs 317, 407, and 2067 – Levee Breach Scenario Evacuation Routes



Source: Sacramento County Storm Ready – retrieved March 25, 2021

Assets at Risk

Levees and district pumping plant. On island inundation can create an open water situation where a large fetch could develop and erode the interior of other levees within the District. Inundation of the drainage pumps and system can make them inoperable and require replacement. Other critical facilities at risk include two fire departments, Isleton city offices and an elementary school.

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

Likelihood of Future Occurrence–Highly 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 occasional occurrence in the District. This is the cause of many of the federal disaster declarations related to flooding.

There are heavy storms that occur sporadically. The last heavy rain and storm event that raised river levels the District experienced was in 2006, 1997 and 1986. No significant damages occurred due to these high water events. Events since 2016 include:

- 2017 HWE: Initiated extra monitoring. Severe weather resulted in excess electrical cost to pump the excess run off required to prevent localized flooding.
- 2017 HWE: Overtopping concerns on Mokelumne River.
- 2017 HWE: Levee instability evidence on the San Joaquin River.

Vulnerability to and Impacts from Heavy Rain and Storms

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

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

During periods of heavy rains and storms, power outages can occur. These power outages can affect pumping stations and lift stations that help alleviate flooding. More information on power shortage and failure can be found in the Severe Weather: Extreme Heat Section above, as well as in Section 4.3.3 of the Base Plan.

Heavy rains and storms can result in higher flood flows that could increase the hydraulic gradients within the levee section and result in seepage and boils or if great enough, possibly overtopping. They can also increase flows and result in erosion of the waterside bank.

Assets at Risk

The Planning Team for the District noted that the District levees and pumping plant are at risk of damage from heavy rains and storms.

Subsidence

Likelihood of Future Occurrence–Likely

Vulnerability–Medium

Hazard Profile and Problem Description

Subsidence is the gradual settling or sinking of the earth’s surface over manmade or natural underground voids with little or no horizontal motion. Subsidence occurs naturally and also through man-driven or technologically exacerbated circumstances. Subsidence is worsened when groundwater drawdown exceeds the ability of the ground to naturally recharge. This is more common during periods of drought.

Location and Extent

There is no scientific scale to measure subsidence. Subsidence is measured in inches or feet of elevation change over time. Subsidence has a long speed of onset, as it occurs over many years. The duration of subsidence is long, as it is rare for subsidence to be reversed. In Sacramento County, the Delta in the southeast portion of the County is highly at risk to subsidence. In the Delta, subsidence affects the islands as well as the levees.

Past Occurrences

There have been no state or federal disasters in the County related to subsidence. No events of past subsidence have affected the District. The District noted that subsidence occurs over time, so pinning a past occurrence is difficult.

Vulnerability to and Impacts from Subsidence

Historically, the County has been at risk from subsidence. Vulnerability in the County from subsidence comes from several different causes:

- Compaction of Unconsolidated Soils by Earthquake Shaking (Liquefaction)
- Compaction by Heavy Structures
- The Erosion of Peat Soils
- Fluid Withdrawal

These were discussed in detail in Section 4.3.16 of the Base Plan. The District is concerned with all four causes. Subsidence will cause the District levees additional stress.

Assets at Risk

The District levees are most at risk from this hazard.

2.6 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.

2.6.1. Regulatory Mitigation Capabilities

Table 2-7 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 BALMD and RDs 317, 407, and 2067.

Table 2-7 BALMD and RDs 317, 407, and 2067 Regulatory Mitigation Capabilities

Plans	Y/N Year	Does the plan/program address hazards? Does the plan identify projects to include in the mitigation strategy? Can the plan be used to implement mitigation actions?
Comprehensive/Master Plan/General Plan	Y	<p>1. Current 5-year plan is under review and being updated. It describes past, present, and future hazards. These hazards are managed and implemented using the standard operating plan strategies.</p> <p>2. At this time, an Emergency Operations Plan Update is still in development. Expected process to the finalized during the next 2 years.</p> <p>3. 2016 Sacramento County Flood Safety Plan is in place. As well, as a Hazard Plan concerted with Sacramento County with GEI as the interface.</p> <p>The plans include information that sets up SEMS/NIMS processes, identifies critical infrastructure and evacuation routes, and sets up monitoring and levee patrol protocols. The 2021 updates will include Flood Annex Maps that summarize information contained in the plans as well as including any missing protocols to bring them into full compliance with existing codes and any additional information/updates the Districts may have since the plans were originally completed. The updates should be complete by this winter.</p> <p>4. Small Communities Program for flood protection and structural and nonstructural mitigation. This Legacy grant is interfaced through GEI/MBK in conjunction with agencies and BALMD to improve levee integrity, operations, and management to reduce flood related losses. The benefit as a participant in SCP is to reduce risk to people, property, and environmental resources. Flood risk reduction can be implemented through this program.</p> <p>5. Update of the 2016 LHMP continues to include valuable information about the priority of hazards BALMD faces. Once accepted this data and information can be used to the highest and best protection of the District and its communities.</p>
Capital Improvements Plan	N	
Economic Development Plan	N	
Local Emergency Operations Plan	Y	The plan addresses flooding hazards and can be used to implement mitigation actions. While EOP is in development, there is unofficial protocol of those that live and work on the island. They have used this protocol over a long time to respond to flood and other related hazards.
Continuity of Operations Plan	Y	While EOP is in development, there is unofficial protocol of those that live and work on the island. They have used this protocol over long period of time to respond to flood and other related hazards. The EOP provides continuity for the District and the expected process is to finalize during the next 2 years.
Transportation Plan	N	

Stormwater Management Plan/Program	Y	Included in the District standard operations and maintenance procedures is management for Stormwater. Patrols are dispatched at critical times. Before and after storms, patrols know where to look, inspect and take action to proactively provide flood risk reduction. Procedures are in place to keep water flow moving.
Engineering Studies for Streams	Y	District is contracted with local engineering company who provides counseling and advice of Operations and Management for risk reduction, levee integrity, and mitigation relating to water/flood flows. Engineer provides and satisfies agency interface as well as Fiscal advice.
Community Wildfire Protection Plan	Y	In the event of such hazard, the community Reverse 911 and phone tree would be initiated. Detailed communication from RDFD command center would be put into action.
Other special plans (e.g., brownfields redevelopment, disaster recovery, coastal zone management, climate change adaptation) Research and Development of burrowing animals	N	BALMD is constantly reviewing or studying data for reduction of hazards and improvements to current plans to provide a safer environment to its community. Assist in research and develop plan for preparedness, management and control of burrowing animals. In very recent years, burrowing animals have become a hazard. Burrowing causes extensive damage to water infrastructure, banks, and levees, and creates a hazard for people, livestock, and machine operators. Potential levee and dike failures due to nutria burrowing have serious implications for flood protection, water delivery, and agricultural irrigation in California.
Building Code, Permitting, and Inspections		
	Y/N	Are codes adequately enforced?
Building Code	Y	Version/Year: CBC 2019
Building Code Effectiveness Grading Schedule (BCEGS) Score	N	Score:
Fire department ISO rating:	N	Rating:
Site plan review requirements	Y	The District has granted the authorization for limited development adjacent to levees.
Is the ordinance an effective measure for reducing hazard impacts?		
Land Use Planning and Ordinances		
	Y/N	Is the ordinance adequately administered and enforced?
Zoning ordinance	Y	Sacramento County Zoning Code reduces both hazard and growth and development. The District is a mixture of zoned agriculture and residential property which, in itself also limits development. The City of Isleton has attempted residential development in the past (failed developments is contributed to economics).
Subdivision ordinance	N	
Floodplain ordinance	Y	Yes, Sacramento County Floodplain Ordinance restricts development in the floodplain
Natural hazard specific ordinance (stormwater, steep slope, wildfire)	N	
Flood insurance rate maps	Y	AE Zone

Elevation Certificates	Y	Sacramento County requires Elevation Certificates for new construction. Other outside resources such as insurance companies and mortgage companies may choose to require EC also. There is emphasis and funding from FEMA to raise existing homes to provide safer residential properties against hazards. Thereby reducing risk.
Acquisition of land for open space and public recreation uses	N	
Erosion or sediment control program	Y	5-Year Plan continues to include monitoring for such hazards. Through the Districts standard operating plan, patrols are dispatched at critical times. Special attention is given to inspection of critical erosion sites. The District is responsible for its own main levee repair and maintenance in which procedures are outlined in the general patrol guidelines. Patrols act to proactively provide erosion or sediment reports. The results are reduced risk for the District and Community.
Other	Y	The District has granted the authorization for limited development adjacent to levees. Pre permit submissions requires an owner to receive RD approval before proceeding forward with permits. This procedure prepares new developers or owners for the risk reduction measure to include in their projects.
How can these capabilities be expanded and improved to reduce risk?		
<p>Pursuant to Sacramento County General Plan Safety Element Policies, SA-18a&b, written approval must be obtained from the applicable Reclamation District to build any structure or grade any soil within 300 feet of the land side toe of levee. This applies to anyone who wants to fill, excavate, or construct a structure within 50 feet of the toe of a Sacramento County river levee and anyone who wants to develop land within 300 feet of the toe. To ensure this requirement is met, every parcel located near a levee is tagged in the building department database.</p> <p>BALMD would like to expand and improve to reduce risk by implementing:</p> <ol style="list-style-type: none"> 1. Research and develop a plan to improve the Delta Bay site where landslide and seepage are potential risks. BALMD can further reduce risk at this site by stabilizing berms and improved seepage and drainage management. 2. Research the continuity of multiple hazard plans and identify the projects that include mitigation strategies. Therefore, implementing mitigation strategies to improve District LOP for its communities. Thus, reducing risk to life and property. 3. Increase a more centralized vehicle coverage area on BALMD. By doing so and having a vehicle command center, service to the District can be more efficient therefore reducing risk to hazards. <p>These capabilities to expand and improve upon are a District priority, but expenditures and allowances of financial resources slow or stall efforts to implement preventive maintenance plans.</p>		

Source: BALMD and RDs 317, 407, and 2067

2.6.2. Administrative/Technical Mitigation Capabilities

Table 2-8 identifies the District department(s) responsible for activities related to mitigation and loss prevention in BALMD and RDs 317, 407, and 2067.

Table 2-8 BALMD and RDs 317, 407, and 2067's Administrative and Technical Mitigation Capabilities

Administration	Y/N	Describe capability Is coordination effective?
Planning Commission	N	
Mitigation Planning Committee	N	
Maintenance programs to reduce risk (e.g., tree trimming, clearing drainage systems)	Y	BALMD has planned maintenance programs that include vegetation management. Levees are mowed (or goat grazing practices), vegetation is trimmed, and roadways are clear for patrol and emergency vehicles to have access.
Mutual aid agreements	N	BALMD is contracted with a local engineering company who provides counseling, review, and implementation on risk reduction, levee integrity, and mitigation related to mitigation capabilities. Official contracts are in place with local Contractors, equipment rental resources and supply companies. BALMD has purchased hazard relief supplies which are stored and on-hand at local supply yards available to barge where needed on a moment's notice. Unofficial coordination between many community members and local residents responding to their respective duties during a hazard is in place. This is a very effective risk reduction coordination.
Other	N	
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	Y	Determined via the Sacramento County Flood Safety Plan and Emergency Operations Plan that is in development
Emergency Manager	Y	Determined by the District Board.
Community Planner	N	County Board of Supervisors through town meetings, Board of Directors, and interface with District Engineer.
Civil Engineer	Y, FT	Staff is trained to coordinate with agencies and perform tasks in an emergency situation. The staff and Engineer provides interface with agencies and their staff.
GIS Coordinator	N	
Other	N	Funding for additional staff would be very effective to improve upon agency task assignments, improvement with interface to the community, and be more effective throughout the District.
Technical		
Warning systems/services (Reverse 911, outdoor warning signals)	Y	Phone tree, Reverse 911, Isleton siren, and organized communication from the RDFD command center would be put into action.

Hazard data and information	Y	<p>1. Current 5-year plan is under review and being updated. It describes past, present, and future hazards. These hazards are managed and implemented using the standard operating plan strategies.</p> <p>2. At this time, an Emergency Operations Plan Update is still in development. Expected process to the finalized during the next 2 years.</p> <p>3. 2016 Sacramento County Flood Safety Plan is in place. As well, as a Hazard Plan concerted with Sacramento County with GEI as the interface. The plans include information that sets up SEMS/NIMS processes, identifies critical infrastructure and evacuation routes, and sets up monitoring and levee patrol protocols. The 2021 updates will include Flood Annex Maps that summarize information contained in the plans as well as including any missing protocols to bring them into full compliance with existing codes and any additional information/updates the Districts may have since the plans were originally completed. The updates should be complete by this winter.</p> <p>4. Small Communities Program for flood protection and structural and nonstructural mitigation. This Legacy grant is interfaced through GEI/MBK in conjunction with agencies and BALMD to improve levee integrity, operations, and management to reduce flood related losses. The benefit as a participant in SCP is to reduce risk to people, property, and environmental resources. Flood risk reduction can be implemented through this program.</p> <p>5. Update of the 2016 LHMP continues to include valuable information about the priority of hazards BALMD faces. Once accepted this data and information can be used to the highest and best interest of the District and the protected community.</p>
Grant writing	N	
Hazus analysis	N	
Other	N	
How can these capabilities be expanded and improved to reduce risk?		
<p>BALMD would like to expand and improve to reduce risk by implementing:</p> <ol style="list-style-type: none"> 1. Research and develop a plan to improve the Delta Bay site where landslide and seepage are potential risks. BALMD can further reduce risk at this site by stabilizing berms and improved seepage and drainage management. 2. Increase a more centralized vehicle coverage area on BALMD. By doing so and having a vehicle command center, service to the District can be more efficient therefore reducing risk to hazards. <p>Both of these capabilities to expand and improve upon are a District priority, but expenditures and allowances of financial resources slow or stall efforts to implement preventive maintenance plans.</p>		

Source: BALMD and RDs 317, 407, and 2067

2.6.3. Fiscal Mitigation Capabilities

Table 2-9 identifies financial tools or resources that the District could potentially use to help fund mitigation activities.

Table 2-9 BALMD and RDs 317, 407, and 2067's Fiscal Mitigation Capabilities

Funding Resource	Access/ Eligibility (Y/N)	Has the funding resource been used in past and for what type of activities? Could the resource be used to fund future mitigation actions?
Capital improvements project funding	Y	Delta Levees Subventions program to maintain levee system.
Authority to levy taxes for specific purposes	Y	Proposition 218 provides the District with the limited ability to raise benefit assessments through a vote of property owners.
Fees for water, sewer, gas, or electric services	N	
Impact fees for new development	N	Unknown, would be dictated by Sacramento County and the City of Isleton, but development is limited.
Storm water utility fee	Y	Benefit Assessments are applied for drainage
Incur debt through general obligation bonds and/or special tax bonds	N	
Incur debt through private activities	Y	Districts may borrow from a financial institution over an extended period and repay from assessment revenue.
Community Development Block Grant	N	
Other federal funding programs	N	
State funding programs	Y	State or local approved grants would be another financial resource for expenditure on top priority hazards that have been identified. Such funding would offer expenses on operations and maintenance to improve levee rehabilitation and vegetation management. Delta Levee Subventions Program Delta Levee Special Projects Proposition 84 and 1E
Other	N	Additional funding would allow more projects to be completed per year adding staff to better reduce the risk in the District and provide improved protection for our communities. Research and develop a plan to improve the Delta Bay Resort site where landslide and seepage are potential risks. BALMD can further reduce risk at this site by stabilizing berms and improved seepage and drainage management.

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?
How can these capabilities be expanded and improved to reduce risk?		
<p>The involvement of Federal agencies funds would help in reducing risk. BALMD is in the Subventions Program.</p> <p>BALMD would benefit from improvement in the guidelines, process, and timelines with agencies. Some improvements are included in the Flood Safety Plan, the Small Community Plan, and the 2021 EOS Update that is currently in development. These improvements also require additional funding which could be accessed with better staffing. All of these together, reduce risk and provide improved protection for our communities.</p> <p>In addition, additional funding would:</p> <ol style="list-style-type: none"> 1. Assist in a research and develop plan for preparedness and control of burrowing animals. In very recent years, burrowing animals have become a hazard. Burrowing causes extensive damage to water infrastructure, banks, and levees, and creates a hazard for people, livestock, and machine operators. Potential levee and dike failures due to nutria burrowing have serious implications for flood protection, water delivery, and agricultural irrigation in California. 2. Research and develop a plan to improve the Delta Bay site where landslide and seepage are potential risks. BALMD can further reduce risk at this site by stabilizing berms and improved seepage and drainage management. 		

Source: BALMD and RDs 317, 407, and 2067

2.6.4. Mitigation Education, Outreach, and Partnerships

Table 2-10 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 2-10 BALMD and RDs 317, 407, and 2067’s Mitigation Education, Outreach, and Partnerships

Program/Organization	Yes/No	Describe program/organization and how relates to disaster resilience and mitigation. Could the program/organization help implement future mitigation activities?
Local citizen groups or non-profit organizations focused on environmental protection, emergency preparedness, access and functional needs populations, etc.	Y	Fish and Wildlife – Preparedness of burrowing animals, Eradication of Nutria Department of Water Resources Delta Flood Emergency Preparedness, Cal OES Financial Assistance River Delta Unified School District. River Delta Fire District
Ongoing public education or information program (e.g., responsible water use, fire safety, household preparedness, environmental education)	Y	Local schools provide a small amount of public education to students for their general school safety. Multiple agencies hold town meetings to distribute topic specific information.
Natural disaster or safety related school programs	N	
StormReady certification	N	
Firewise Communities certification	N	
Public-private partnership initiatives addressing disaster-related issues	Y	Through neighboring RD’s, unofficial partnerships are in place for assistance in the event of a hazard.

Program/Organization	Yes/No	Describe program/organization and how relates to disaster resilience and mitigation. Could the program/organization help implement future mitigation activities?
Other	Y	<p>BALMD is contracted with a local engineering company who provides counseling, review, and implementation on risk reduction, levee integrity, and mitigation related to mitigation capabilities.</p> <p>Official contracts are in place with local Contractors, equipment rental resources and supply companies. BALMD has purchased emergency response supplies which are stored and on-hand at local supply yards available to barge where needed on short notice.</p> <p>Unofficial coordination between many community members and local residents responding to their respective duties during a hazard is in place. This is a very effective risk reduction coordination.</p>
How can these capabilities be expanded and improved to reduce risk?		
<p>As a small number of people district, current planned coordination for BALMD is consistently reviewed, implemented, and quite effective. Continuation of improving outreach programs in coordination with State agencies and neighboring RD's may be helpful in community education about disaster related issued. Assist in research and develop plan for preparedness, management, and control of burrowing animals. In very recent years, burrowing animals have become a hazard. Burrowing causes extensive damage to water infrastructure, banks, and levees, and creates a hazard for people, livestock, and machine operators. Potential levee and dike failures due to nutria burrowing have serious implications for flood protection, water delivery, and agricultural irrigation in California.</p>		

Source: BALMD and RDs 317, 407, and 2067

2.6.5. Other Mitigation Efforts

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

- The Districts do annual erosion repair and seepage abatement projects. There are currently two large projects in the planning stages that will address critical erosion sites on the Sacramento River and Georgiana Slough. The Districts are also updating their Five Year Plan with levee repair and enhancement projects to continue to maintain and improve the levee system.

2.7 Mitigation Strategy

2.7.1. Mitigation Goals and Objectives

The BALMD and RDs 317, 407, and 2067 adopts the hazard mitigation goals and objectives developed by the HMPC and described in Chapter 5 Mitigation Strategy.

2.7.2. Mitigation Actions

The planning team for the BALMD and RDs 317, 407, and 2067 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:

- Dam Failure
- Floods: 1%/0.2% annual chance
- Floods: Localized Stormwater
- Levee Failure
- Severe Weather: Heavy Rains and Storms
- 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 regardless of hazard priority. Collectively, this multi-jurisdictional mitigation strategy includes only those actions and projects which reflect the actual priorities and capacity of each jurisdiction to implement over the next 5-years covered by this plan. It should further be noted, that although a jurisdiction may not have specific projects identified for each priority hazard for the five year coverage of this planning process, each jurisdiction has focused on identifying those projects which are realistic and reasonable for them to implement and would like to preserve their hazard priorities should future projects be identified where the implementing jurisdiction has the future capacity to implement.

Multi-Hazard Actions

Action 1. 2016 Sacramento County Flood Safety Plan (by GEI) and subsequent updating in 2021.

Hazards Addressed: Floods, Subsidence, Levee Failure, Heavy Rain and Storms, Dam Failure, Burrowing Animals, Erosion/Bank/Slope

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

Issue/Background: Levee and flood management, operations, and improvements are all integral necessities for continued levee and flood protection. Projects need to be undertaken at various locations in the District, including BALMD. The plans include information that sets up SEMS/NIMS processes, identifies critical infrastructure and evacuation routes, and sets up monitoring and levee patrol protocols. The 2021 updates will include Flood Annex Maps that summarize information contained in the plans as well as including any missing protocols to bring them into full compliance with existing codes and any additional information/updates the Districts may have since the plans were originally completed. The updates should be complete by this winter.

Project Description: Multiple agencies will work in conjunction with the County to implement the mitigation projects contained in the Regional Flood Management Plan. The agencies will work to improve levee integrity to manage flood risk and provide safer systems for the community. These projects will contain many levee and flood management improvements including but not limited to environmental projects such as burrowing animal mitigations, levee repairs, erosion control, riparian bench restorations,

crown raising to address subsidence, vegetation management and removal, proactive levee improvements, operations and maintenance improvements, structure rising, seepage repair and protection, encroachment modifications and fixes and repairs to the levee perimeters, bank and slope protections, encroachment modifications, and others.

Other Alternatives: No Action

Existing Planning Mechanism(s) through which Action Will Be Implemented: 2016 Sacramento County Flood Safety Plan (by GEI) and subsequent updating in 2021. Regional Flood Management Plan; Small Communities Program Projects; 2021 Emergency Operations Plan (EOP) – Currently in development; and HMA 2021 BRIC and FMA Programs and subsequent mitigations.

Responsible Agency/ Department/Partners: County DWR and Reclamation Districts; FEMA hazard mitigations, the Army Corps of Engineers; State DWR, SAFECA, USACE, and others.

Cost Estimate: Estimated cost varies by nature and extent of each project.

Benefits (Losses Avoided): Proactive levee integrity management is to reduce risk to people in the communities, property, and environmental resources from a possible levee failure or other flood events.

Potential Funding: CA DWR grants, County, Reclamation Districts, FEMA, and HMA 2021 BRIC and FMA Programs and subsequent mitigations and others

Timeline: 2021 and ongoing, subject to funding, planning, permitting, and construction windows.

Project Priority (H, M, L): High

Action 2. Regional Flood Management Plan Projects

Hazards Addressed: Floods, Subsidence, Levee Failure, Heavy Rain and Storms, Dam Failure, Burrowing Animals, Erosion/Bank/Slope

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

Issue/Background: Levee and flood management, operations, and improvements are all integral necessities for continued levee and flood protection. Projects need to be undertaken at various locations in the District, including BALMD.

Project Description: Multiple agencies will work in conjunction with the County to implement the mitigation projects contained in the Regional Flood Management Plan. The agencies will work to improve levee integrity to manage flood risk and provide safer systems for the community. These projects will contain many levee and flood management improvements including but not limited to environmental projects such as burrowing animal mitigations, levee repairs, erosion control, riparian bench restorations, crown raising to address subsidence, vegetation management and removal, proactive levee improvements, operations and maintenance improvements, structure rising, seepage repair and protection, encroachment

modifications and fixes and repairs to the levee perimeters, bank and slope protections, encroachment modifications, and others.

Other Alternatives: No Action

Existing Planning Mechanism(s) through which Action Will Be Implemented: 2016 Sacramento County Flood Safety Plan (by GEI) and subsequent updating in 2021. Regional Flood Management Plan; Small Communities Program Projects; and 2021 Emergency Operations Plan (EOP) – Currently in development; and HMA 2021 BRIC and FMA Programs and subsequent mitigations.

Responsible Agency/ Department/Partners: County DWR and Reclamation Districts; State DWR, SAFECA, USACE, and others.

Cost Estimate: Estimated cost varies by nature and extent of each project.

Benefits (Losses Avoided): Proactive levee integrity management is to reduce risk to people in the communities, property, and environmental resources from a possible levee failure or other flood events.

Potential Funding: CA DWR grants, County, Reclamation Districts, FEMA, and HMA 2021 BRIC and FMA Programs and subsequent mitigations and others

Timeline: 2021 and ongoing, subject to funding, planning, permitting, and construction windows.

Project Priority (H, M, L): High

Action 3. Small Communities Plans – Flood Protection – Structural and Nonstructural Mitigation

Hazards Addressed: Floods, Subsidence, Levee Failure, Heavy Rain and Storms, Dam Failure

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

Issue/Background: BALMD and RD#554 Walnut Grove East, Sacramento County, are included in the Small Communities Plans. These and other communities obtained grants under the CA DWR flood protection programs. Phase 1 provided the resourced to access and evaluate levee and flood risks. The upcoming Phase 2 of the program will involve implementation and construction of mitigation projects identified in Phase 1.

Project Description: Multiple agencies will work in conjunction with the County to implement the mitigation projects brought to light in the Small Communities Plans. The agencies will work to improve levee integrity to manage flood risk and provide safer systems for the communities. These projects will contain many levee and flood management improvements including but not limited to environmental projects such as burrowing animal mitigations, levee repairs, erosion control, riparian bench restorations, crown raising to address subsidence, vegetation management and removal, proactive levee improvements, operations and maintenance improvements, structure rising, seepage repair and protection, encroachment modifications and fixes and repairs to the levee perimeters, bank and slope protections, encroachment modifications, and others.

Other Alternatives: No Action

Existing Planning Mechanism(s) through which Action Will Be Implemented: Small Communities Projects. 2016 Sacramento County Flood Safety Plan (by GEI) and subsequent updating in 2021. Regional Flood Management Plan; and 2021 Emergency Operations Plan (EOP) – Currently in development; and HMA 2021 BRIC and FMA Programs and subsequent mitigations.

Responsible Agency/ Department/Partners:

1. Isleton – BALMD (RD 317, RD 407)
2. Walnut Grove East – RED 554 Walnut Grove
3. Walnut Grove West – RD 3 Grand Island
4. Locke – RD 369 Libby McNeil
5. Courtland – RD 551 Courtland

Cost Estimate: Phase 1 of the Small Communities projects were \$500,000 per community. Phase 2 Construction Costs will be determined upon the completion of Phase 1

Benefits (Losses Avoided): Proactive levee integrity management is to reduce risk to people in the communities, property, and environmental resources from a possible levee failure or other flood events.

Potential Funding: CA DWR, FEMA hazard mitigation, the Army Corps of Engineers, and HMA 2021 BRIC and FMA Programs and subsequent mitigations.

Timeline: Upon completion of Phase 1 and moving into Phase 2 Construction a timeline would be included.

Project Priority (H, M, L): High

Action 4. 2021 Emergency Operations Plan (EOP) – Currently in development

Hazards Addressed: Floods, Subsidence, Levee Failure, Heavy Rain and Storms, Dam Failure, Burrowing Animals, Erosion/Bank/Slope

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

Issue/Background: Levee and flood management, operations, and improvements are all integral necessities for continued levee and flood protection. Projects need to be undertaken at various locations in the District, including BALMD. The EOP is coordination between BALMD team members to clarify and ensure conformance and focus to prevent duplication efforts when a solution is available and planned.

Project Description: Multiple agencies will work in conjunction with the County to implement the mitigation projects contained in the Regional Flood Management Plan. The agencies will work to improve levee integrity to manage flood risk and provide safer systems for the community. These projects will

contain many levee and flood management improvements including but not limited to environmental projects such as burrowing animal mitigations, levee repairs, erosion control, riparian bench restorations, crown raising to address subsidence, vegetation management and removal, proactive levee improvements, operations and maintenance improvements, structure rising, seepage repair and protection, encroachment modifications and fixes and repairs to the levee perimeters, bank and slope protections, encroachment modifications, and others.

Other Alternatives: No Action

Existing Planning Mechanism(s) through which Action Will Be Implemented: 2021 Emergency Operations Plan (EOP) – Currently in development; 2016 Sacramento County Flood Safety Plan (by GEI) and subsequent updating in 2021; Regional Flood Management Plan; the Small Communities Program Projects; and HMA 2021 BRIC and FMA Programs and subsequent mitigations.

Responsible Agency/ Department/Partners: County DWR and Reclamation Districts; FEMA hazard mitigations, the Army Corps of Engineers; State DWR, SAFECA, USACE, and others.

Cost Estimate: Estimated cost varies by nature and extent of each project.

Benefits (Losses Avoided): Proactive levee integrity management is to reduce risk to people in the communities, property, and environmental resources from a possible levee failure or other flood events.

Potential Funding: CA DWR grants, County, Reclamation Districts, FEMA, and HMA 2021 BRIC and FMA Programs and subsequent mitigations and others

Timeline: 2021 and ongoing, subject to funding, planning, permitting, and construction windows.

Project Priority (H, M, L): High