

4.3 Vulnerability Assessment

Requirement §201.6(c)(2)(ii): [The risk assessment shall include a] description of the jurisdiction's vulnerability to the hazards described in paragraph (c)(2)(i) of this section. This description shall include an overall summary of each hazard and its impact on the community.

Requirement §201.6(c)(2)(ii)(A): The plan should describe vulnerability in terms of the types and numbers of existing and future buildings, infrastructure, and critical facilities located in the identified hazard areas.

Requirement §201.6(c)(2)(ii)(B): [The plan should describe vulnerability in terms of an] estimate of the potential dollar losses to vulnerable structures identified in paragraph (c)(2)(i)(A) of this section and a description of the methodology used to prepare the estimate.

Requirement §201.6(c)(2)(ii)(C): [The plan should describe vulnerability in terms of] providing a general description of land uses and development trends within the community so that mitigation options can be considered in future land use decisions.

With Sacramento County's hazards identified and profiled, the HMPC conducted a vulnerability assessment to describe the impact that each hazard would have on the Sacramento County Planning Area. The vulnerability assessment quantifies, to the extent feasible using best available data, assets at risk to natural hazards and estimates potential losses. This section focuses on the risks to the County as a whole. Data from the individual participating jurisdictions was also evaluated and is integrated here and in the jurisdictional annexes, and noted where the risk differs for a particular jurisdiction within the Planning Area.

This vulnerability assessment followed the methodology described in the FEMA publication *Understanding Your Risks—Identifying Hazards and Estimating Losses*. The vulnerability assessment first describes the total vulnerability and values at risk and then discusses vulnerability by hazard.

Data Sources

Data used to support this assessment included the following:

- ArkStorm at Tahoe - Stakeholder Perspectives on Vulnerabilities and Preparedness for an Extreme Storm Event in the Greater Lake Tahoe, Reno and Carson City Region. 2014.
- birdnature.com Pacific Flyway
- California Adaptation Planning Guide
- Cal-Adapt
- CAL FIRE GIS datasets
- California Department of Finance, E-1 Report
- California Department of Finance, E-4 Report
- California Department of Finance, P-1 Report
- California Department of Fish and Game's Natural Diversity Database
- California Department of Food and Agriculture

- California Native Plant Society
- California Office of Historic Preservation
- County GIS data (hazards, base layers, and assessor's data)
- Delta Risk Management Strategy. June 2011.
- Existing plans and studies
- Federal Aviation Administration National Wildlife Database
- FEMA's HAZUS-MH 2.2 GIS-based inventory data
- FEMA Digital Flood Insurance Rate Map. June 16, 2015.
- FEMA Sacramento County Flood Insurance Study. June 16, 2015.
- Liu, J.C., Mickley, L.J., Sulprizio, M.P. et al. Climatic Change. 138: 655. doi:10.1007/s10584-016-1762-6. 2016.
- Kenward, Alyson PhD, Adams-Smith, Dennis, and Raja, Urooj. Wildfires and Air Pollution – The Hidden Health Hazards of Climate Change. Climate Central. 2013.
- National Drought Mitigation Center – Drought Impact Reporter
- National Park Service – Historic American Buildings Survey and Historic American Engineering Record
- Personal interviews with planning team members and staff from the County and participating jurisdictions
- Preliminary Draft – Climate Change Vulnerability Assessment for the Sacramento County Climate Adaptation Plan
- Sacramento County 2035 General Plan
- Sacramento County Department of Water Resources
- Sacramento County General Plan Environmental Impact Report
- Sacramento County General Plan Open Space Element Background
- Sacramento County of Governments Population Projections for 2008, 2020, and 2035
- Sacramento General Plan Background Report
- Sacramento Municipal Utility District Dam inundation maps
- South Sacramento Habitat Conservation Plan
- State Department of Water Resource's Delta Atlas
- Statewide GIS datasets compiled by the California Office of Emergency Services to support mitigation planning
- University of California – Integrated Pest Management Program
- US Census Bureau 2010 Household Population Estimates
- US Department of Agriculture Farm Service Agency
- US Fish and Wildlife Service
- US Fish and Wildlife Service's National Wetlands Inventory maps
- Written descriptions of inventory and risks provided by participating jurisdictions

4.3.1. Sacramento County Vulnerability and Assets at Risk

As a starting point for analyzing the Planning Area's vulnerability to identified hazards, the HMPC used a variety of data to define a baseline against which all disaster impacts could be compared. If a catastrophic disaster was to occur in the Planning Area, this section describes significant assets at risk in the Planning Area. Data used in this baseline assessment included:

- Total assets at risk;

- Critical facility inventory;
- Cultural, historical, and natural resources; and
- Growth and development trends.

Total Assets at Risk

The total assets at risk for Sacramento County is intended to capture the values associated with assessed assets located within the Sacramento County Planning Area. The 2016 GIS parcel layer, obtained from Sacramento County GIS and the 2015 Sacramento County Assessor’s Data – Certified Roll obtained from the County Assessor was used for this analysis. This data provided by Sacramento County represents best available data.

Understanding the total assessed value of Sacramento County is a starting point to understanding the overall value of the Planning Area. When the total assessed values are combined with potential values associated with other community assets such as natural resources, cultural and historic resources, and public and private critical infrastructure, the big picture emerges as to what is potentially at risk and vulnerable to the damaging effects of natural hazards within the County Planning Area.

Data Limitations & Notations

Although based on best available data, the resulting information should only be used as an initial guide to overall values in the County.

The County GIS parcel data contained 445,518 records and the County Assessor data contained 474,727 records. Both tables were joined together within the GIS environment, and a total of 444,089 records were linked. In some cases, it is possible that the Assessor data may contain duplicate records under one parcel identification number (APN). For the purpose of this study, 1 Assessor record corresponds to 1 GIS parcel. In total, there were 2,429 Assessor records that are not included in the Total Assets at Risk Tables detailed below and are also excluded from further hazard analyses as these records were not matched to the GIS records.

In the event of a disaster, infrastructure and improvements are at the greatest risk of damage. Depending on the type of hazard and resulting damages, the land itself may not suffer a significant loss. For that reason, the values of infrastructure and improvements are of greatest concern. As such, it is critical to note a specific limitation to the assessed values data within the County, due to Proposition 13. Instead of adjusting property values annually, no adjustments are made until a property transfer occurs. As a result, overall property value information is most likely low and may not reflect current market or true potential loss values for properties within the County.

Methodology

Sacramento County’s 2015 Assessor Data provided by the County Assessor’s office, were used as the basis for the inventory of assessed values for both improved and unimproved parcels within the Planning Area. The source GIS parcel data used for this analysis provides the land and improved values assessed for each parcel, along with information about property use and ownership. The jurisdiction in which the parcel resides is also indicated in the source parcel data.

Sacramento County Use Codes provide detailed descriptive information about how each property is generally used, such as irrigated farm, apartment, restaurant, or industrial warehouse. The many use codes were logically grouped into the following simplified categories for the hazards analysis: Agricultural, Care/Health, Church/Welfare, Industrial, Miscellaneous, Office, Public/Utilities, Recreational, Residential, Retail/Commercial, Vacant, and No Data. Once Use Codes were grouped into categories, the number of total and improved parcels were inventoried by jurisdiction.

Values associated with land, and improved structure values were identified and summed in order to determine total values at risk in the Sacramento County Planning Area, and specific to each jurisdiction. Together, the Land Value and Improved Structure Value make up the total value associated with each identified parcel or asset. Improved parcel counts were based on the assumption that a parcel was improved if a structure value was present.

The Sacramento County Planning Area has a total land value of \$38.87 billion, improved structure value of \$90.9 billion, and a total value of \$129.7 billion. Unincorporated Sacramento County has 157,818 improved parcels with a total value (both land and improvements) of close to \$47.1 billion. Table 4-39 shows the total assets or exposure for the entire Sacramento County Planning Area, by jurisdiction. The values for the Sacramento County Planning Area are broken out by property use and are provided in Table 4-40. The values for unincorporated Sacramento County are broken out by property use type and are provided in Table 4-41. More information on assets at risk for each jurisdiction can be found in their respective annexes.

Table 4-39 Sacramento County Planning Area – Total Assets at Risk by Jurisdiction

| Jurisdiction | Total Parcel Count | Improved Parcel Count | Total Land Value | Improved Structure Value | Total Value |
|-----------------------|--------------------|-----------------------|-------------------------|--------------------------|--------------------------|
| Citrus Heights | 24,479 | 23,505 | \$1,821,701,542 | \$4,048,528,628 | \$5,870,230,170 |
| Elk Grove | 51,367 | 47,402 | \$4,715,438,843 | \$12,083,762,602 | \$16,799,201,445 |
| Folsom | 23,072 | 20,597 | \$3,174,056,439 | \$7,683,643,073 | \$10,857,699,512 |
| Galt | 7,407 | 6,775 | \$458,313,638 | \$1,207,447,807 | \$1,665,761,445 |
| Isleton | 525 | 334 | \$16,873,341 | \$28,552,704 | \$45,426,045 |
| Rancho Cordova | 20,487 | 18,092 | \$1,920,584,312 | \$4,678,740,531 | \$6,599,324,843 |
| City of Sacramento | 145,102 | 131,085 | \$11,595,915,150 | \$29,128,632,405 | \$40,724,547,555 |
| Unincorporated County | 171,650 | 157,818 | \$15,118,073,272 | \$32,019,808,313 | \$47,137,881,585 |
| Total | 444,089 | 405,608 | \$38,820,956,537 | \$90,879,116,063 | \$129,700,072,600 |

Source: Sacramento County 2016 Parcel/2015 Assessor's Data

Table 4-40 Sacramento County Planning Area – Total Assets at Risk by Property Use

| Property Use | Total Parcel Count | Improved Parcel Count | Total Land Value | Improved Structure Value | Total Value |
|--------------|--------------------|-----------------------|------------------|--------------------------|-----------------|
| Agricultural | 2,611 | 1,373 | \$767,692,839 | \$482,974,390 | \$1,250,667,229 |
| Care/Health | 657 | 578 | \$285,193,234 | \$1,868,570,719 | \$2,153,763,953 |

| Property Use | Total Parcel Count | Improved Parcel Count | Total Land Value | Improved Structure Value | Total Value |
|-------------------|--------------------|-----------------------|-------------------------|--------------------------|--------------------------|
| Church/Welfare | 1,152 | 1,000 | \$278,262,900 | \$1,288,936,722 | \$1,567,199,622 |
| Industrial | 4,323 | 3,737 | \$1,453,868,813 | \$3,697,428,752 | \$5,151,297,565 |
| Miscellaneous | 5,066 | 23 | \$10,160,514 | \$441,341 | \$10,601,855 |
| Office | 3,297 | 2,982 | \$1,812,286,238 | \$6,904,196,029 | \$8,716,482,267 |
| Public/Utilities | 8,148 | 27 | \$18,100,245 | \$17,165,874 | \$35,266,119 |
| Recreational | 339 | 247 | \$141,449,975 | \$302,617,324 | \$444,067,299 |
| Residential | 395,142 | 389,263 | \$28,744,320,158 | \$70,213,156,500 | \$98,957,476,658 |
| Retail/Commercial | 6,360 | 5,731 | \$3,189,209,185 | \$6,041,970,640 | \$9,231,179,825 |
| Vacant | 16,969 | 637 | \$2,118,289,106 | \$59,314,963 | \$2,177,604,069 |
| No Data | 25 | 10 | \$2,123,330 | \$2,342,809 | \$4,466,139 |
| Total | 444,089 | 405,608 | \$38,820,956,537 | \$90,879,116,063 | \$129,700,072,600 |

Source: Sacramento County 2016 Parcel/2015 Assessor's Data

Table 4-41 Unincorporated Sacramento County – Total Assets at Risk by Property Use

| Property Use | Total Parcel Count | Improved Parcel Count | Total Land Value | Improved Structure Value | Total Value |
|-------------------|--------------------|-----------------------|-------------------------|--------------------------|-------------------------|
| Agricultural | 2,530 | 1,353 | \$679,920,436 | \$480,921,531 | \$1,160,841,967 |
| Care/Health | 320 | 297 | \$123,738,793 | \$560,655,489 | \$684,394,282 |
| Church/Welfare | 454 | 396 | \$127,584,797 | \$572,325,056 | \$699,909,853 |
| Industrial | 1,431 | 1,158 | \$537,734,087 | \$1,300,231,985 | \$1,837,966,072 |
| Miscellaneous | 1,648 | 13 | \$4,015,960 | \$110,909 | \$4,126,869 |
| Office | 1,114 | 1,019 | \$412,752,708 | \$1,204,253,632 | \$1,617,006,340 |
| Public/Utilities | 3,120 | 19 | \$10,432,623 | \$14,668,775 | \$25,101,398 |
| Recreational | 170 | 129 | \$63,680,892 | \$104,357,747 | \$168,038,639 |
| Residential | 153,070 | 151,060 | \$11,348,721,940 | \$25,812,071,443 | \$37,160,793,383 |
| Retail/Commercial | 2,189 | 2,031 | \$1,074,762,890 | \$1,942,470,967 | \$3,017,233,857 |
| Vacant | 5,592 | 339 | \$733,182,032 | \$26,933,649 | \$760,115,681 |
| No Data | 12 | 4 | \$1,546,114 | \$807,130 | \$2,353,244 |
| Total | 171,650 | 157,818 | \$15,118,073,272 | \$32,019,808,313 | \$47,137,881,585 |

Source: Sacramento County 2016 Parcel/2015 Assessor's Data

Critical Facility Inventory

For purposes of this plan, a critical facility is defined as:

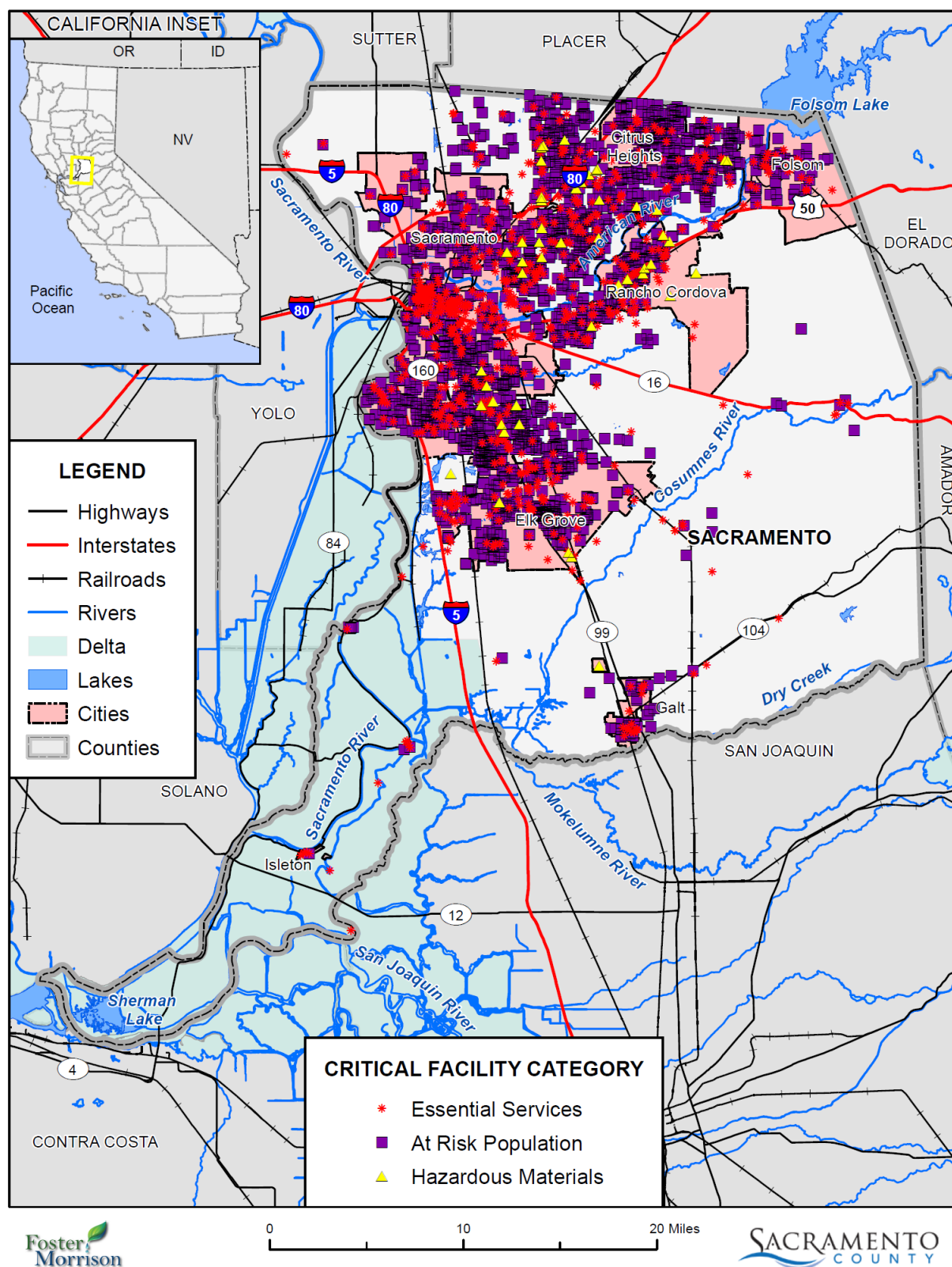
Any facility, including without limitation, a structure, infrastructure, property, equipment or service, that if adversely affected during a hazard event may result in severe consequences to public health and safety or interrupt essential services and operations for the community at any time before,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

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

- Essential Services Facilities include, without limitation, public safety, emergency response, emergency medical, designated emergency shelters, communications, public utility plant facilities and equipment, and government operations. Sub-Categories:
 - ✓ Public Safety - Police stations, fire and rescue stations, emergency operations centers
 - ✓ Emergency Response - Emergency vehicle and equipment storage and essential governmental work centers for continuity of government operations.
 - ✓ Emergency Medical - Hospitals, emergency care, urgent care, ambulance services - EXCLUDING clinics, doctors offices, and non-urgent care medical facilities.
 - ✓ Designated Emergency Shelters
 - ✓ Communications - Main hubs for telephone, main broadcasting equipment for television systems, radio and other emergency warning systems - EXCLUDING towers, poles, lines, cables and conduits.
 - ✓ Public Utility Plant Facilities - including equipment for treatment, generation, storage, pumping and distribution (hubs for water, wastewater, power (EXCLUDING hydroelectric facilities) and gas - EXCLUDING towers, poles, power lines, buried pipelines, transmission lines, distribution lines and service lines.
 - ✓ Essential Government Operations - Public records, courts, jails, building permitting and inspection services, government administration and management, maintenance and equipment centers.
- At Risk Population Facilities include, without limitation, pre-schools, public and private primary and secondary schools, before and after school care centers with 12 or more students, daycare centers with 12 or more children, group homes, and assisted living residential or congregate care facilities with 12 or more residents.
- Hazardous Materials Facilities include, without limitation, any facility that could, if adversely impacted, release of hazardous material(s) in sufficient amounts during a hazard event that would create harm to people, the environment and property.

A fully detailed list of all critical facilities in the planning area can be found in Appendix E. A summary of critical facilities in the County can be found in Figure 4-66 and Table 4-42.

Figure 4-66 Sacramento County Planning Area –Critical Facilities Inventory



Data Source: Sacramento County GIS, Cal-Atlas; Map Date: 05/2016.

Table 4-42 Sacramento County Planning Area –Critical Facilities Inventory

| Critical Facility Category | Facility Type | Facility Count |
|-------------------------------|--|----------------|
| Essential Services Facilities | Airport | 10 |
| | Arena | 1 |
| | Bus Terminal | 8 |
| | Convention Center | 1 |
| | Corporation Yard | 1 |
| | Detention Basin | 45 |
| | Dispatch Center | 2 |
| | Drainage | 6 |
| | Emergency Evacuation Shelter | 233 |
| | Emergency Rooms | 1 |
| | EOC | 2 |
| | Fire Station | 94 |
| | Gas Storage | 1 |
| | General Acute Care Hospital | 9 |
| | Government Facilities | 68 |
| | Hospitals | 1 |
| | Light Rail Stop | 52 |
| | Medical Health Facility | 200 |
| | Police | 22 |
| | Sand Bag | 5 |
| | Stadium | 3 |
| | State and Fed Facilities | 1 |
| | State Facility | 1 |
| | Traffic Operations Center | 1 |
| | Train Station | 1 |
| | Urgent Care Facilities | 2 |
| | Vehicle and Equipment Storage | 2 |
| | Water Treatment Plant | 3 |
| | Essential Services Facilities Total | 776 |
| At Risk Population Facilities | Adult Day Care | 26 |
| | Adult Education School | 12 |
| | Adult Residential | 308 |
| | Alternative Education School | 7 |
| | Assisted Living Centers | 58 |
| | Charter School | 25 |
| | Children's Home | 2 |

| Critical Facility Category | Facility Type | Facility Count |
|--------------------------------|----------------------------------|----------------|
| | College/University | 7 |
| | Community Day School | 9 |
| | Day Care Center | 416 |
| | Detention Center | 3 |
| | Group Home | 96 |
| | Hotel | 50 |
| | Independent Study School | 2 |
| | Infant Center | 33 |
| | JAIL | 1 |
| | Prison | 1 |
| | Private Elementary School | 65 |
| | Private High School | 30 |
| | Private K-12 School | 37 |
| | Public Continuation High School | 22 |
| | Public Elementary School | 230 |
| | Public High School | 35 |
| | Public Middle School | 43 |
| | Residential Care/Elderly | 414 |
| | Residential Facility Chronically | 1 |
| | School | 38 |
| | School-Age Day Care Center | 97 |
| | Senior Center | 1 |
| | Social Rehabilitation Facility | 4 |
| | Special Education School | 10 |
| | Total | 2,083 |
| Hazardous Materials Facilities | Oil Collection Center | 45 |
| | OTHER | 1 |
| | Propane Storage | 1 |
| | Sewer Treatment Plant | 2 |
| | Total | 49 |
| | | |
| Grand Total | | 2,908 |

Source: Sacramento County GIS

Cultural, Historical, and Natural Resources

Assessing Sacramento County's vulnerability to disaster also involves inventorying the cultural, historical, and natural, assets of the area. This step is important for the several reasons:

- The community may decide that these types of resources warrant a greater degree of protection due to their unique and irreplaceable nature and contribution to the overall economy.
- In the event of a disaster, an accurate inventory of natural, historical and cultural resources allows for more prudent care in the disaster's immediate aftermath when the potential for additional impacts is higher.
- The rules for reconstruction, restoration, rehabilitation, and/or replacement are often different for these types of designated resources.
- Natural resources can have beneficial functions that reduce the impacts of natural hazards, for example, wetlands and riparian and sensitive habitat which help absorb and attenuate floodwaters and thus support overall mitigation objectives.

Cultural and Historical Resources

Sacramento County has a large stock of historically significant homes, public buildings, and landmarks. To inventory these resources, the HMPC collected information from a number of sources. The California Department of Parks and Recreation Office of Historic Preservation (OHP) was the primary source of information. The OHP is responsible for the administration of federally and state mandated historic preservation programs to further the identification, evaluation, registration, and protection of California's irreplaceable archaeological and historical resources. OHP administers the National Register of Historic Places, the California Register of Historical Resources, California Historical Landmarks, and the California Points of Historical Interest programs. Each program has different eligibility criteria and procedural requirements.

- The **National Register of Historic Places** is the nation's official list of cultural resources worthy of preservation. The National Register is part of a national program to coordinate and support public and private efforts to identify, evaluate, and protect historic and archeological resources. Properties listed include districts, sites, buildings, structures, and objects that are significant in American history, architecture, archeology, engineering, and culture. The National Register is administered by the National Park Service, which is part of the U.S. Department of the Interior.
- The **California Register of Historical Resources** program encourages public recognition and protection of resources of architectural, historical, archeological, and cultural significance and identifies historical resources for state and local planning purposes; determines eligibility for state historic preservation grant funding; and affords certain protections under the California Environmental Quality Act. The Register is the authoritative guide to the state's significant historical and archeological resources.
- **California Historical Landmarks** are sites, buildings, features, or events that are of statewide significance and have anthropological, cultural, military, political, architectural, economic, scientific or technical, religious, experimental, or other value. Landmarks #770 and above are automatically listed in the California Register of Historical Resources.
- **California Points of Historical Interest** are sites, buildings, features, or events that are of local (city or county) significance and have anthropological, cultural, military, political, architectural, economic, scientific or technical, religious, experimental, or other value. Points designated after December 1997 and recommended by the State Historical Resources Commission are also listed in the California Register.

Historical resources included in the programs above are identified in Table 4-43.

Table 4-43 Sacramento County Planning Area Historical Resources

| Name (Landmark Plaque Number) | National Register | State Landmark | California Register | Point of Interest | Date Listed | City/Area |
|--|-------------------|----------------|---------------------|-------------------|-------------|----------------|
| A. W. Clifton House, Compton Mansion (C17) | | | X | | 2/1/2002 | Sacramento |
| Adams And Company Building (607) | | X | | | 5/22/1957 | Sacramento |
| Alkali Flat Central Historic District (N1294) | X | | | | 7/26/1984 | Sacramento |
| Alkali Flat North Historic District (N1279) | X | | | | 4/19/1984 | Sacramento |
| Alkali Flat West Historic District (N1295) | X | | | | 7/26/1984 | Sacramento |
| Alta Mesa Farm Bureau Hall (N1476) | X | | | | 1/7/1987 | Wilton |
| American River Grange Hall #172 (P823) | X | | | X | 5/15/1996 | Rancho Cordova |
| Archway, The (P614) | | | | X | 5/18/1983 | Rio Linda |
| B. F. Hastings Building (606) | | X | | | 5/22/1957 | Sacramento |
| Blue Anchor Building (N1171) | X | | | | 2/3/1983 | Sacramento |
| Brewster Building (N2099) | X | | | | 8/16/2000 | Galt |
| Brewster House (N638) | X | | | | 6/23/1978 | Galt |
| Brighton School (N952) | X | | | | 4/3/1981 | Sacramento |
| Brown, John Stanford, House (N2252) | X | | | | 7/28/2004 | Walnut Grove |
| Business & Professional Building, Consumer Affairs Building (C8) | | | X | | 2/10/2000 | Sacramento |
| California Almond Growers Exchange Processing Facility (967) | | X | | | 10/1/1985 | Sacramento |
| California Governor's Mansion (N60) | X | | | | 11/10/1970 | Sacramento |
| California State Capitol (N222) | X | | | | 4/3/1973 | Sacramento |
| California's Capitol Complex (872) | X | X | | | 5/6/1974 | Sacramento |
| California's First Passenger Railroad (526) | | X | | | 3/7/1955 | Sacramento |
| Calpak Plant No. 11 (N1285) | X | | | | 5/17/1984 | Sacramento |
| Camp Union, Sutterville (666) | | X | | | 11/5/1958 | Sacramento |
| Capitol Extension District (N1288) | X | | | | 5/24/1984 | Sacramento |
| Chevra Kaddisha (Home Of Peace Cemetery) (654) | | X | | | 7/28/1958 | Sacramento |
| Chinese Diggings, Natoma Station Ground Sluice (P712) | | | | X | 11/22/1988 | Folsom |
| Chung Wah Cemetery (N1918) | X | | | | 8/21/1995 | Folsom |

| Name (Landmark Plaque Number) | National Register | State Landmark | California Register | Point of Interest | Date Listed | City/Area |
|---|-------------------|----------------|---------------------|-------------------|-------------|----------------|
| Cohn House (N1001) | X | | | | 1/21/1982 | Folsom |
| Coloma Road at Nimbus Dam (746) | | X | | | 7/5/1960 | Folsom |
| Coloma Road at Sutter's Fort (745) | | X | | | 7/5/1960 | Sacramento |
| Coolot Company Building (N671) | X | | | | 9/20/1978 | Sacramento |
| Cranston--Geary House (N2010) | X | | | | 1/23/1998 | Sacramento |
| Crocker, E. B., Art Gallery (N86) | X | X | | | 5/6/1971 | Sacramento |
| Curran Farmhouse (P666) | | | | X | 12/17/1985 | Sacramento |
| D. O. Mills Bank Building (609) | | X | | | 5/22/1957 | Sacramento |
| Delta Meadows Site (N130) | X | | | | 11/5/1971 | Locke |
| Dunlap's Dining Room (N1764) | X | | | | 4/2/1992 | Sacramento |
| Eagle Theater (595) | | X | | | 5/22/1957 | Sacramento |
| Eastern Star Hall (P754) | X | | | X | 8/8/1991 | Sacramento |
| Ebner's Hotel (602) | | X | | | 5/22/1957 | Sacramento |
| Ehrhardt, William, House (N2209) | X | | | | 7/10/2003 | Elk Grove |
| Elk Grove Grammar School / Elk Grove Unified School Distr (P717) | | | | X | 6/12/1989 | Elk Grove |
| Elk Grove Historic District (N1553) | X | | | | 3/1/1988 | Elk Grove |
| Fifteen Mile House-Overland Pony Express Route in California (698) | | X | | | 9/11/1959 | Rancho Cordova |
| Fire Station No. 6 (N1686) | X | | | | 4/25/1991 | Sacramento |
| Firehouse No. 3 (N1743) | X | | | | 10/29/1991 | Sacramento |
| First Transcontinental Railroad (780) | | X | | | 11/20/1962 | Sacramento |
| First Transcontinental Railroad-Western Base of The Sierra Nevada (780) | | X | | | 11/20/1962 | Sacramento |
| Five Mile House-Overland Pony Express Route in California (697) | | X | | | 9/11/1959 | Sacramento |
| Folsom Depot (N1035) | X | | | | 2/19/1982 | Folsom |
| Folsom Powerhouse (N258) | X | | | | 10/2/1973 | Folsom |
| Folsom-Overland Pony Express Route in California (702) | | X | | | 9/11/1959 | Folsom |
| Galarneaux, Mary Haley, House (N2121) | X | | | | 2/12/2001 | Sacramento |
| George Hack House (P800) | | | | X | 8/5/1994 | Sacramento |
| Goethe House (N1036) | X | | | | 2/19/1982 | Sacramento |
| Governor's Mansion (823) | | X | | | 6/7/1968 | Sacramento |
| Grave of Alexander Hamilton Willard (657) | | X | | | 9/26/1958 | Franklin |

| Name (Landmark Plaque Number) | National Register | State Landmark | California Register | Point of Interest | Date Listed | City/Area |
|---|-------------------|----------------|---------------------|-------------------|-------------|--------------|
| Grave of Elitha Cumi Donner Wilder (719) | | X | | | 12/2/1959 | Elk Grove |
| Greene, John T., House (N1092) | X | | | | 4/15/1982 | Sacramento |
| Headquarters of The Big Four (600) | | X | | | 5/22/1957 | Sacramento |
| Heilbron House (N462) | X | | | | 12/12/1976 | Sacramento |
| Hotel Regis (N1147) | X | | | | 10/29/1982 | Sacramento |
| Hotel Senator (N782) | X | | | | 5/30/1979 | Sacramento |
| Howe, Edward P., Jr., House (N1037) | X | | | | 2/19/1982 | Sacramento |
| Hubbard-Upson House (N543) | X | | | | 12/2/1977 | Sacramento |
| I Street Bridge (N1094) | X | | | | 4/22/1982 | Sacramento |
| Imperial Theatre (N1148) | X | | | | 10/29/1982 | Walnut Grove |
| Indian Stone Corral (N349) | X | | | | 4/16/1975 | Orangevale |
| Isleton Chinese And Japanese Commercial Districts (N1674) | X | | | | 3/14/1991 | Isleton |
| J Street Wreck (N1692) | X | | | | 5/16/1991 | Sacramento |
| Jean Harvie School, Walnut Grove Community Center (P665) | | | | X | 8/20/1985 | Walnut Grove |
| Joe Mound (N121) | X | | | | 10/14/1971 | Sacramento |
| Johnson, J. Neely, House (N438) | X | | | | 9/13/1976 | Sacramento |
| Joseph Hampton Kerr Homesite (P126) | | | | X | 6/6/1969 | Sacramento |
| Judah, Theodore, School (N1985) | X | | | | 7/25/1997 | Sacramento |
| Kuchler Row (N1121) | X | | | | 6/25/1982 | Sacramento |
| Lady Adams Building (603) | | X | | | 5/22/1957 | Sacramento |
| Lais, Charles, House (N1350) | X | | | | 2/28/1985 | Sacramento |
| Libby Mcneil And Libby Fruit and Vegetable Cannery (N1050) | X | | | | 3/2/1982 | Sacramento |
| Liberty Schoolhouse (P579) | | | | X | 12/21/1981 | Galt |
| Locke Historic District (N87) | X | | | | 5/6/1971 | Locke |
| McClatchy, C.K., Senior High School (N2148) | X | | | | 11/2/2001 | Sacramento |
| Merchants National Bank of Sacramento (N1936) | X | | | | 2/16/1996 | Sacramento |
| Merrium Apartments (N1654) | X | | | | 9/13/1990 | Sacramento |
| Mesick House (N1002) | X | | | | 1/21/1982 | Sacramento |
| Michigan (468) | | X | | | 8/30/1950 | Sacramento |
| Motor Vehicle Building, Department of Food & Agriculture (C4) | | | X | | 11/5/1999 | Sacramento |

| Name (Landmark Plaque Number) | National Register | State Landmark | California Register | Point of Interest | Date Listed | City/Area |
|--|-------------------|----------------|---------------------|-------------------|-------------|-----------------|
| Murphy's Ranch (680) | | X | | | 5/11/1959 | Elk Grove |
| Negro Bar (P798) | | | | X | 5/31/1994 | Folsom |
| New Helvetia Cemetery (592) | | X | | | 5/22/1957 | Sacramento |
| Nisenan Village Site (N562) | X | | | | 3/21/1978 | Carmichael |
| Nisipowinan Village Site (900) | X | X | | | 6/16/1976 | Sacramento |
| Old Elk Grove Hotel Site (P532) | | | | X | 6/29/1979 | Sacramento |
| Old Fair Oaks Bridge (N2342) | X | | | | 9/25/2006 | Fair Oaks |
| Old Folsom Powerhouse (633) | | X | | | 3/3/1958 | Folsom |
| Old Folsom Powerhouse-Sacramento Station A (633) | | X | | | 3/3/1958 | Sacramento |
| Old Sacramento (812) | X | X | | | 12/30/1965 | Sacramento |
| Old Tavern (N1242) | X | | | | 9/15/1983 | Sacramento |
| Original Sacramento Bee Building (611) | | X | | | 5/22/1957 | Sacramento |
| Overton Building (610) | | X | | | 5/22/1957 | Sacramento |
| Pioneer Telegraph Station (366) | | X | | | 10/9/1939 | Sacramento |
| Pony Express Terminal (N66000220) | X | | | | 10/15/1966 | Sacramento |
| Prairie City (464) | | X | | | 8/30/1950 | Prairie City |
| Public Works Office Building, Caltrans Building (C5) | | | X | | 11/5/1999 | Sacramento |
| Rae House (P743) | | | | X | 5/8/1991 | Galt |
| River Mansion (P149) | | | | X | 11/3/1969 | Sacramento |
| Rosebud Ranch (N846) | X | | | | 12/31/1979 | Hood |
| Ruhstaller Building (N1003) | X | | | | 1/21/1982 | Sacramento |
| Runyon House (N2109) | X | | | | 10/27/2000 | Courtland |
| Rusch Home (P737) | | | | X | 2/11/1991 | Citrus Heights |
| Sacramento Air Depot Historic District (N1747) | X | | | | 1/21/1992 | North Highlands |
| Sacramento Bank Building (N1004) | X | | | | 1/21/1982 | Sacramento |
| Sacramento City Cemetery (566) | | X | | | 2/25/1957 | Sacramento |
| Sacramento City Library (N1784) | X | | | | 7/30/1992 | Sacramento |
| Sacramento Hall of Justice (N2067) | X | | | | 9/24/1999 | Sacramento |
| Sacramento Junior College Annex and Extensions (N1874) | X | | | | 8/22/1994 | Sacramento |
| Sacramento Masonic Temple (N2131) | X | | | | 5/17/2001 | Sacramento |
| Sacramento Memorial Auditorium (N566) | X | | | | 3/29/1978 | Sacramento |

| Name (Landmark Plaque Number) | National Register | State Landmark | California Register | Point of Interest | Date Listed | City/Area |
|---|-------------------|----------------|---------------------|-------------------|-------------|--------------|
| Site of China Slough (594) | | X | | | 5/22/1957 | Sacramento |
| Site of Congregational Church (613) | | X | | | 5/22/1957 | Sacramento |
| Site of First and Second State Capitols at Sacramento (869) | | X | | | 1/11/1974 | Sacramento |
| Site of First County Free Library Branch in California (817) | | X | | | 6/1/1967 | Elk Grove |
| Site of Grist Mill Built by Jared Dixon Sheldon (439) | | X | | | 6/2/1949 | Slough house |
| Site of Home of Newton Booth (596) | | X | | | 5/22/1957 | Sacramento |
| Site of Orleans Hotel (608) | | X | | | 5/22/1957 | Sacramento |
| Site of Sacramento Union (605) | | X | | | 5/22/1957 | Sacramento |
| Site of Sam Brannan House (604) | | X | | | 5/22/1957 | Sacramento |
| Site of Stage and Railroad (First) (598) | | X | | | 5/22/1957 | Sacramento |
| Site of The First African American Episcopal Church Established on The Pacific Coast (1013) | | X | | | 5/5/1994 | Sacramento |
| Site of The First Jewish Synagogue Owned by A Congregation on The Pacific Coast (654) | | X | | | 7/28/1958 | Sacramento |
| Site of Pioneer Mutual Volunteer Firehouse (612) | | X | | | 5/22/1957 | Sacramento |
| Slocum House (N744) | X | | | | 1/31/1979 | Fair Oaks |
| Sloughhouse (575) | | X | | | 5/17/1957 | Sloughhouse |
| Southern Pacific Railroad Company's Sacramento Depot (N353) | X | | | | 4/21/1975 | Sacramento |
| Southern Pacific Railroad Superintendent House (N2411) | X | | | | 6/13/2008 | Folsom |
| St. Elizabeth's Church (P611) | | | | X | 3/2/1983 | Sacramento |
| Stanford-Lathrop House (614) | | X | | | 5/22/1957 | Sacramento |
| Sutter's Fort (525) | | X | | | 11/1/1954 | Sacramento |
| Sutter's Landing (591) | | X | | | 5/22/1957 | Sacramento |
| Sutterville (593) | | X | | | 5/22/1957 | Sacramento |
| Temporary Detention Camps for Japanese Americans-Sacramento Assembly Center (934) | | X | | | 5/13/1980 | Sacramento |
| Terminal of California's First Passenger Railroad (558) | | X | | | 12/31/1956 | Folsom |
| The Villa (Serve Our Seniors, Incorporated) (P764) | | | | X | 2/14/1992 | Orangevale |

| Name (Landmark Plaque Number) | National Register | State Landmark | California Register | Point of Interest | Date Listed | City/Area |
|---|-------------------|----------------|---------------------|-------------------|-------------|--------------|
| Tower Bridge (N1116) | X | | | | 6/24/1982 | Sacramento |
| Travelers' Hotel (N680) | X | | | | 10/19/1978 | Sacramento |
| U.S. Post Office, Courthouse and Federal Building (N855) | X | | | | 1/25/1980 | Sacramento |
| Utah Condensed Milk Company Plant (N650) | X | | | | 8/3/1978 | Galt |
| Van Voorhies House (N535) | X | | | | 11/17/1977 | Sacramento |
| Wagner, Anton, Duplex (N923) | X | | | | 11/10/1980 | Sacramento |
| Walnut Grove Chinese-American Historic District (N1630) | X | | | | 3/22/1990 | Walnut Grove |
| Walnut Grove Commercial/Residential Historic District (N1634) | X | | | | 4/12/1990 | Walnut Grove |
| Walnut Grove Gakuen Hall (N882) | X | | | | 6/17/1980 | Walnut Grove |
| Walnut Grove Japanese-American Historic District (N1631) | X | | | | 3/22/1990 | Walnut Grove |
| Western Hotel (601) | | X | | | 5/22/1957 | Sacramento |
| Westminster Presbyterian Church (N2203) | X | | | | 5/22/2003 | Sacramento |
| Wetzlar, Julius, House (N1183) | X | | | | 3/31/1983 | Sacramento |
| What Cheer House (597) | | X | | | 5/22/1957 | Sacramento |
| Whitter Ranch (Originally Saylor Ranch), Witter Ranch (P744) | | | | X | 5/8/1991 | Sacramento |
| Winters House (N2046) | X | | | | 1/25/1999 | Sacramento |
| Witter, Edwin, Ranch (N1675) | X | | | | 3/14/1991 | Sacramento |
| Woodlake Site (N88) | X | | | | 5/6/1971 | Sacramento |
| Yeong Wo Cemetery (P810) | | | | X | 5/30/1995 | Folsom |

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

The National Park Service administers two programs that recognize the importance of historic resources, specifically those pertaining to architecture and engineering. While inclusion in these programs does not give these structures any sort of protection, they are valuable historic assets.

The Historic American Buildings Survey (HABS) and Historic American Engineering Record (HAER) document America's architectural and engineering heritage. Table 4-44 lists the HABS and HAER structures in Sacramento County:

Table 4-44 Sacramento County Planning Area HABS and HAER Structures

| Area | Historic Building/Structure |
|------|--|
| | Drew-Sherwood Farm, 7927 Elk Grove Boulevard, Elk Grove vicinity, Sacramento, CA |

| Area | Historic Building/Structure |
|--------------------|--|
| Elk Grove Vicinity | Drew-Sherwood Farm, Barn, 7927 Elk Grove Boulevard, Elk Grove vicinity, Sacramento, CA |
| | Drew-Sherwood Farm, House, 7927 Elk Grove Boulevard, Elk Grove vicinity, Sacramento, CA |
| | Drew-Sherwood Farm, Shed, 7927 Elk Grove Boulevard, Elk Grove vicinity, Sacramento, CA |
| | Drew-Sherwood Farm, Tank House, 7927 Elk Grove Boulevard, Elk Grove vicinity, Sacramento, CA |
| | Nunes Dairy, 9854 Bruceville Road, Elk Grove, Sacramento, CA |
| | Nunes Dairy, Clay Tile Silo, 9854 Bruceville Road, Elk Grove, Sacramento, CA |
| | Nunes Dairy, Worker's Residence No. 2, 9854 Bruceville Road, Elk Grove, Sacramento, CA |
| Folsom Vicinity | Folsom Powerhouse, Adjacent to American River, Folsom vicinity, Sacramento, CA |
| | Keefe-McDerby Mine Ditch, East of East Bidwell Street between Clarksville Road & Highway 50, Folsom vicinity, Sacramento, CA |
| | Natomas Ditch System, Blue Ravine Segment, Juncture of Blue Ravine & Green Valley Roads, Folsom vicinity, Sacramento, CA |
| Folsom | Folsom Powerhouse, Adjacent to American River, Folsom vicinity, Sacramento, CA. |
| | Guiseppe Murer House, 1121 Folsom Boulevard, Folsom, Sacramento, CA |
| | House, Folsom, Sacramento, CA |
| | Keefe-McDerby Mine Ditch, East of East Bidwell Street between Clarksville Road & Highway 50, Folsom vicinity, Sacramento, CA |
| | Methodist Episcopal Church, Folsom, Sacramento, CA |
| | Natomas Ditch System, Blue Ravine Segment, Juncture of Blue Ravine & Green Valley Roads, Folsom vicinity, Sacramento, CA |
| | Natomas Ditch System, Rhodes Ditch, West of Bidwell Street, north of U.S. Highway 50, Folsom, Sacramento, CA |
| | Trinity Episcopal Church, Folsom, Sacramento, CA |
| | Wells Fargo & Company Building, Folsom, Sacramento, CA |
| Isleton | Sacramento River Bridge, Spanning Sacramento River South of Locke, Isleton, Sacramento, CA |
| Locke | Town of Locke, Boat House, River Road, Locke, Sacramento, CA |
| | Town of Locke, Christian Center, 13937 Key Street, Locke, Sacramento, CA |
| | Town of Locke, Commercial Building, 13927 River Road, Locke, Sacramento, CA |
| | Town of Locke, Commercial Building, 13931 River Road, Locke, Sacramento, CA |
| | Town of Locke, Commercial Building, 13943 River Road, Locke, Sacramento, CA |
| | Town of Locke, Commercial Building, 13947 River Road, Locke, Sacramento, CA |
| | Town of Locke, Commercial Building, 13952 Main Street, Locke, Sacramento, CA |
| | Town of Locke, Commercial Building, 13955 River Road, Locke, Sacramento, CA |
| | Town of Locke, Commercial Building, 13959 Main Street, Locke, Sacramento, CA |
| | Town of Locke, Commercial Building, 13963 River Road, Locke, Sacramento, CA |
| | Town of Locke, Commercial-Residential Structure, 13935 Main Street, Locke, Sacramento, CA |
| | Town of Locke, Dai Loy Gambling Museum, 13951 Main Street, Locke, Sacramento, CA |
| | Town of Locke, House, 13915 Main Street, Locke, Sacramento, CA |

| Area | Historic Building/Structure |
|---------------------|---|
| | Town of Locke, House, 13919 Main Street, Locke, Sacramento, CA |
| | Town of Locke, House, 13927 Main Street, Locke, Sacramento, CA |
| | Town of Locke, House, 13936 Main Street, Locke, Sacramento, CA |
| | Town of Locke, House, Key Street, Locke, Sacramento, CA |
| | Town of Locke, House, Main & Levee Roads, Locke, Sacramento, CA |
| | Town of Locke, Jan Ying Association, 13947 Main Street, Locke, Sacramento, CA |
| | Town of Locke, Joe Shoong Chinese School, 13920 Main Street, Locke, Sacramento, CA |
| | Town of Locke, Locke, Sacramento, CA |
| | Town of Locke, Residential Building, 13931 Main Street, Locke, Sacramento, CA |
| | Town of Locke, Residential Building, 13939 Main Street, Locke, Sacramento, CA |
| | Town of Locke, Residential Building, River & Levee Roads, Locke, Sacramento, CA |
| | Town of Locke, Residential Structure, 13955 Main Street, Locke, Sacramento, CA |
| | Town of Locke, Restaurant, 13943 Main Street, Locke, Sacramento, CA |
| | Town of Locke, Star Theatre, 13939 River Road, Locke, Sacramento, CA |
| | Town of Locke, The Tules, River Road, Locke, Sacramento, CA |
| | Town of Locke, Warehouse, 13923 Main Street, Locke, Sacramento, CA |
| | Town of Locke, Yuen Chong Market, 13923 River Road, Locke, Sacramento, CA |
| Michigan Bar | Heath's Store, Michigan Bar (historical), Sacramento, CA |
| Sacramento Vicinity | Reclamation District 1000, Northwest Sacramento County & southwest Sutter County, bisected by State Highway No. 99, Sacramento vicinity, Sacramento, CA |
| | Reclamation District 1000, Pump Plant No. 1, Northwest Sacramento County & southwest Sutter County, bisected by State Highway No. 99, Sacramento vicinity, Sacramento, CA |
| | Reclamation District 1000, Pump Plant No. 2, Northwest Sacramento County & southwest Sutter County, bisected by State Highway No. 99, Sacramento vicinity, Sacramento, CA |
| | Reclamation District 1000, Pump Plant No. 3, Northwest Sacramento County & southwest Sutter County, bisected by State Highway No. 99, Sacramento vicinity, Sacramento, CA |
| Sacramento | Adams & Company Building, 1014 Second Street, Sacramento, Sacramento, CA |
| | Albert Gallatin House, 1527 H Street, Sacramento, Sacramento, CA |
| | Apollo Building, 228-230 K Street, Sacramento, Sacramento, CA |
| | Aschenauer Building, 1022 Third Street, Sacramento, Sacramento, CA |
| | B. F. Hastings Bank Building, 128-132 J Street, Sacramento, Sacramento, CA |
| | Bank Exchange Building, 1030 Second Street, Sacramento, Sacramento, CA |
| | Bee Building, 1016-1020 Third Street, Sacramento, Sacramento, CA |
| | Big Four Building, 220-226 K Street, Sacramento, Sacramento, CA |
| | Blake-Waters Assay Office, 222 J Street, Sacramento, Sacramento, CA |
| | Booth Building, 1019-1021 Front Street, Sacramento, Sacramento, CA |
| | Brannon Building, 106-110 J & Front Streets, Sacramento, Sacramento, CA |
| | California State Library & Courts Building, 914 Capitol Mall, Sacramento, Sacramento, CA |

| Area | Historic Building/Structure |
|------|--|
| | California State Office Building No. 1, 915 Capitol Mall, Sacramento, Sacramento, CA |
| | California State Printing Office, 1020 O Street, Sacramento, Sacramento, CA |
| | Cavert Building, 1207 Front Street, Sacramento, Sacramento, CA |
| | Central Pacific Transcontinental Railroad, Sacramento to Nevada state line, Sacramento, Sacramento, CA |
| | Cienfugo Building, 1119 Second Street, Sacramento, Sacramento, CA |
| | City Market, 118 J Street, Sacramento, Sacramento, CA |
| | Collicott Drug Store, 129 J Street, Sacramento, Sacramento, CA |
| | Coolot Building, 812 J Street, Sacramento, Sacramento, CA |
| | Crocker Art Gallery, 216 O Street, Sacramento, Sacramento, CA |
| | Democratic State Journal Building, Second & K Streets, Sacramento, Sacramento, CA |
| | Diana Saloon, 205 J Street, Sacramento, Sacramento, CA |
| | Dingley Spice Mill, 115 I Street, Sacramento, Sacramento, CA |
| | E. P. Figg Building, 224 J Street, Sacramento, Sacramento, CA |
| | Ebner's Hotel, 116 K Street, Sacramento, Sacramento, CA |
| | Esquire Theater, 1217 K Street, Sacramento, Sacramento, CA |
| | Eureka Swimming Baths, 908-910 Second Street, Sacramento, Sacramento, CA |
| | Fashion Saloon, 209 J Street, Sacramento, Sacramento, CA |
| | Francis William Fratt Building, 1103-1109 Second Street, Sacramento, Sacramento, CA |
| | Gregory-Barnes Store, 126 J Street, Sacramento, Sacramento, CA |
| | Heywood Building, 1001-1009 Second Street, Sacramento, Sacramento, CA |
| | Howard House, 109-111 K Street, Sacramento, Sacramento, CA |
| | Hudson-Cippa-Wolf Ranch, Bunkhouse, Sorento Road, Sacramento, Sacramento, CA |
| | Hudson-Cippa-Wolf Ranch, Granary, Sorento Road, Sacramento, Sacramento, CA |
| | Hudson-Cippa-Wolf Ranch, Hay Barn, Sorento Road, Sacramento, Sacramento, CA |
| | Hudson-Cippa-Wolf Ranch, Main House, Sorento Road, Sacramento, Sacramento, CA |
| | Hudson-Cippa-Wolf Ranch, Milk Barn, Sorento Road, Sacramento, Sacramento, CA |
| | Hudson-Cippa-Wolf Ranch, Sorento Road, Sacramento, Sacramento, CA |
| | I. & S. Wormser Building, 128 J Street, Sacramento, Sacramento, CA |
| | J Street (Commercial Buildings), Sacramento, Sacramento, CA |
| | Lady Adams Building, 113-115 K Street, Sacramento, Sacramento, CA |
| | Latham Building, 221-225 J Street, Sacramento, Sacramento, CA |
| | Leggett Ale House, 1023 Front Street, Sacramento, Sacramento, CA |
| | Leland Stanford House, 800 N Street, Sacramento, Sacramento, CA |
| | Lincoln School, 418 P Street, Sacramento, Sacramento, CA |
| | Luhrs Hall & Company Building, 912-916 Second Street, Sacramento, Sacramento, CA |
| | Mechanics Exchange Hotel, 116-122 I Street, Sacramento, Sacramento, CA |

| Area | Historic Building/Structure |
|------|---|
| | Morse Building, 1025-1031 Second Street, Sacramento, Sacramento, CA |
| | Old U. S. Post Office, K & Seventh Streets, Sacramento, Sacramento, CA |
| | Our House Saloon, 926 Second Street, Sacramento, Sacramento, CA |
| | P. B. Cornwall Building, 1011-1013 Second Street, Sacramento, Sacramento, CA |
| | Pioneer Hall & Bakery, 120-124 J Street, Sacramento, Sacramento, CA |
| | Pioneer Telegraph Building, 1015 Second Street, Sacramento, Sacramento, CA |
| | Reclamation District 1000, Northwest Sacramento County & southwest Sutter County, bisected by State Highway No. 99, Sacramento vicinity, Sacramento, CA |
| | Reclamation District 1000, Pump Plant No. 1, Northwest Sacramento County & southwest Sutter County, bisected by State Highway No. 99, Sacramento vicinity, Sacramento, CA |
| | Reclamation District 1000, Pump Plant No. 2, Northwest Sacramento County & southwest Sutter County, bisected by State Highway No. 99, Sacramento vicinity, Sacramento, CA |
| | Reclamation District 1000, Pump Plant No. 3, Northwest Sacramento County & southwest Sutter County, bisected by State Highway No. 99, Sacramento vicinity, Sacramento, CA |
| | Rialto Building, 225-230 J Street, Sacramento, Sacramento, CA |
| | Rivett-Fuller Building, 128 K Street, Sacramento, Sacramento, CA |
| | Sacramento Army Depot, Fruitridge Road, Sacramento, Sacramento, CA |
| | Sacramento City Hall, 915 I Street, Sacramento, Sacramento, CA |
| | Sacramento Engine Company No. 3, 1112 Second Street, Sacramento, Sacramento, CA |
| | Sacramento Junior College, Library, 3835 Freeport Boulevard, Sacramento, Sacramento, CA |
| | Sacramento River Bridge, Spanning Sacramento River at CA State Highway 275, Sacramento, Sacramento, CA |
| | Sacramento River Water Treatment Plant Intake Pier & Access Bridge, Spanning Sacramento River approximately 175 feet west of eastern levee on river; roughly .5 mile downstream from confluence of Sacramento & American Rivers, Sacramento, Sacramento, CA |
| | Sacramento, General View, Sacramento, Sacramento, CA |
| | Sacramento, General View, 1865, Sacramento, Sacramento, CA |
| | Sacramento, Historic View, Sacramento, Sacramento, CA |
| | Sacramento, Historic View, Sacramento, Sacramento, CA |
| | Sazerac Building, 131 J Street, Sacramento, Sacramento, CA |
| | Southern Pacific Railroad Depot, Railroad Terminal Post Office & Express Building, Fifth & I Streets, Sacramento, Sacramento, CA |
| | Southern Pacific, Sacramento Shops, 111 I Street, Sacramento, Sacramento, CA |
| | Southern Pacific, Sacramento Shops, Blacksmith Shop, 111 I Street, Sacramento, Sacramento, CA |
| | Southern Pacific, Sacramento Shops, Boiler Shop, 111 I Street, Sacramento, Sacramento, CA |
| | Southern Pacific, Sacramento Shops, Car Machine Shop, 111 I Street, Sacramento, Sacramento, CA |
| | Southern Pacific, Sacramento Shops, Car Shop No. 3, 111 I Street, Sacramento, Sacramento, CA |
| | Southern Pacific, Sacramento Shops, Erecting Shop, 111 I Street, Sacramento, Sacramento, CA |
| | Southern Pacific, Sacramento Shops, Paint Shop, 111 I Street, Sacramento, Sacramento, CA |

| Area | Historic Building/Structure |
|------|--|
| | Southern Pacific, Sacramento Shops, Pitless Transfer Table, 111 I Street, Sacramento, Sacramento, CA |
| | Southern Pacific, Sacramento Shops, Planing Mill, 111 I Street, Sacramento, Sacramento, CA |
| | Southern Pacific, Sacramento Shops, Privy, 111 I Street, Sacramento, Sacramento, CA |
| | Southern Pacific, Sacramento Shops, Turntable, 111 I Street, Sacramento, Sacramento, CA |
| | Southern Pacific, Sacramento Shops, Water Tower, 111 I Street, Sacramento, Sacramento, CA |
| | Stanford Brothers Store, 1203 Front Street, Sacramento, Sacramento, CA |
| | Stein Building, 218 J Street, Sacramento, Sacramento, CA |
| | Strub Building, Sacramento, Sacramento, CA |
| | Studio Theater, 1227 K Street, Sacramento, Sacramento, CA |
| | Sutter's Fort, L & Twenty-Seventh Streets, Sacramento, Sacramento, CA |
| | Union Hotel (Annex), 125 K Street, Sacramento, Sacramento, CA |
| | Union Hotel, 1024-1028 Second Street, Sacramento, Sacramento, CA |
| | Vernon-Brannan House, 112-114 J Street, Sacramento, Sacramento, CA |
| | W.I. Elliott Building, 1530 J Street, Sacramento, Sacramento, CA |

Source: The Library of Congress, American Memory, http://memory.loc.gov/ammem/collections/habs_hacr/

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

Natural Resources

Natural resources are important to include in cost/benefit analyses for future projects and may be used to leverage additional funding for mitigation projects that also contribute to community goals for protecting sensitive natural resources. Awareness of natural assets can lead to opportunities for meeting multiple objectives. For instance, protecting wetlands areas protects sensitive habitat as well as reducing the force of and storing floodwaters.

Sacramento County once supported limited oak savannah and riparian woodland, with an herbaceous layer of perennial grasses and both annual and perennial wildflowers. These woodland areas were centered on the County's three main rivers: Sacramento, American and Cosumnes. Expansive native valley grassland, also referred to as California prairie, stretched out from the edge of these woodlands and blanketed the bulk of the County's landscape. Vernal pools were scattered in both low and high density clusters throughout the valley grassland habitat. After European settlement of the County, many of the native perennial grasses were replaced by Mediterranean annual grasses. However, within the vernal pools native vegetation uniquely suited to spring time inundation survived. Today these vernal pools harbor a number of listed plant and animal species. In addition to vernal pools, other seasonal and emergent wetlands occurred,

mostly in association with the many natural drainage systems that previously flowed through the County, but which are now either channelized or confined within a system of artificial levees.

The County of Sacramento is fortunate to have several locations where vestiges of the once vast and diverse Central Valley natural habitat areas still exist. Habitat areas include riparian zones, riverine habitats, wetlands, woodlands, and grasslands. These are shown in Figure 4-67. This map delineates areas considered primarily natural such as riparian zones, marshlands, and oak woodlands. The boundaries are drawn based on review of reports and maps of public and private agencies including the U.S. Fish and Wildlife Service's National Wetlands Inventory maps, the State Department of Water Resource's Delta Atlas, the California Department of Fish and Game's Natural Diversity Database, and aerial photography.

Figure 3
Important Natural Areas

Prepared by the Sacramento County Planning and Community Development Department

Sacramento County
Local Hazard Mitigation Plan Update
December 2016

Remaining marsh and riparian areas in the County include backwater basins and riparian woodlands along the Sacramento, American, and Cosumnes Rivers and other smaller waterways, and in the Delta. These biologically dynamic areas host thousands of waterfowl migrating along the Central Valley leg of the Pacific Flyway. In addition, numerous other migratory and resident species, some of which are listed as threatened or endangered, inhabit the County's natural areas. Species include majestic colony birds such as the American egret and great blue heron, the opportunistic coyote, the industrious beaver, deer, and elusive grey fox and bobcat.

The wetland and riparian areas are regarded as the County's most important resource. Such habitat becomes all the more significant when viewed against the acreage lost since the time of European settlement. Approximately 95 percent of the Central Valley's wetlands have disappeared in the last 100 years, reducing habitat for millions of migratory waterfowl. Riparian habitat has suffered a similar fate. In the Sacramento River Valley only 25,000 of the estimated 500,000 acres of the riparian habitat existing in 1850 exists today.

The aquatic environment of the County supports tens of thousands of anadromous fish and rears a comparable amount of resident species. Anadromous fish include salmon, bass, shad, and sturgeon. Resident fish include trout, catfish, sunfish, and bullhead. With the development of urban areas and water projects, fisheries have declined. This loss has been generated by habitat destruction, water diversion, and temperature increases.

Extending out from the riparian zone are the distinctive upland habitats of the Central Valley, scattered with oak, blanketed with grazing lands, and dotted with vernal pools. Native oaks, signature trees of the Central Valley have declined in population over the years to accommodate agriculture and development. Concentrated efforts will need to be undertaken if the County is to preserve the isolated groves and diminishing woodlands. Native grasslands have virtually disappeared due to grazing and development. The once prolific and well adapted bunchgrass has been displaced by invasive weeds from the Mediterranean region. The vernal pools which once dotted vast areas of the Central Valley landscape, are found only in concentrations in the southern section of the County (see the discussion in the next section of the South Sacramento Habitat Conservation Plan). The pools sustain flora and fauna adapted to the ephemeral nature of these small yet vibrant habitats.

Wetlands: Natural and Beneficial Functions

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

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

reduction in the velocity of inflowing water as it passes through a wetland helps remove sediment being transported by the water.

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

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

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

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

Natural site features such as wetlands with native plants and hydric soils have long disappeared and they no longer can function as they should. Landowners are encouraged to plant native plants on their property. These plants will assist with absorption and filtration of water. They will help to hold soils to keep erosion and siltation from occurring in the waterway. Landowners are also encouraged to remove any obstructions which might restrict water conveyance during high water events.

The South Sacramento Habitat Conservation Plan (SSHCP) was created to identify and protect natural habitats in the southern portion of Sacramento County. In this plan, floodplains and wetlands were identified, and the inter-relationship between the two is explained in greater detail. Floodplains can have natural and beneficial functions. Two types are described in the SSHCP and summarized in the sections that follow.

Preservation of Wetlands

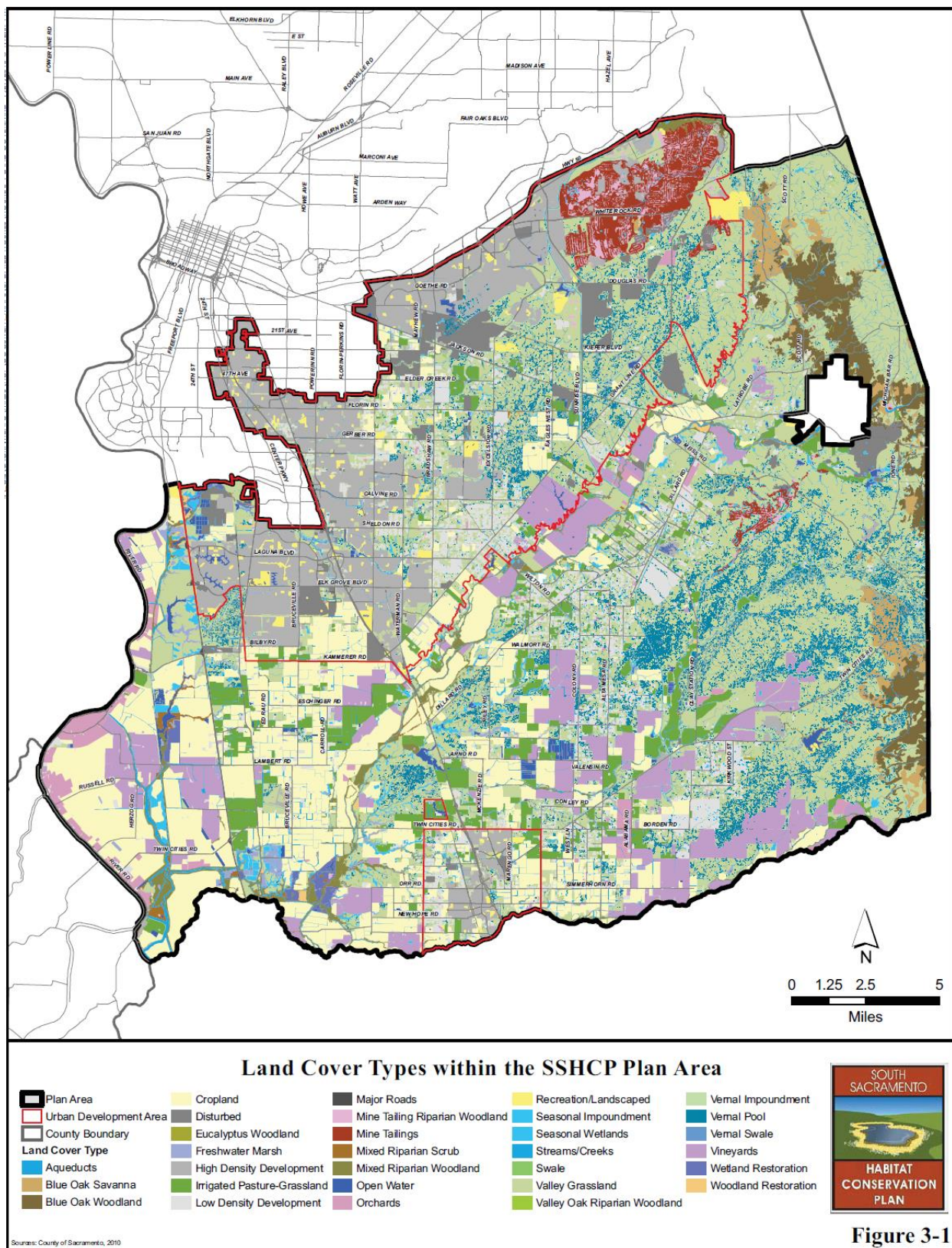
Wetlands function as natural sponges that trap and slowly release surface water, rain, snowmelt, groundwater and flood waters. Trees, root mats, and other wetland vegetation also slow the speed of floodwaters and distribute them more slowly over the floodplain. This combined water storage and braking action lowers flood heights and reduces erosion. Wetlands within and downstream of urban areas are particularly valuable, counteracting the greatly increased rate and volume of surface- water runoff from pavement and buildings. The holding capacity of wetlands helps control floods and prevents water logging

of crops. Preserving and restoring wetlands, together with other water retention, can often provide the level of flood control otherwise provided by expensive dredge operations and levees. In the SSHCP, the following types of wetlands were identified and defined:

- Freshwater Marsh
- Open Water
- Seasonal Impoundment
- Seasonal Swale
- Seasonal Wetlands
- Vernal Pools
- Vernal Swales
- Vernal Impoundments
- Streams and Creeks
- Wetland Restoration

Figure 4-68 shows the wetlands and other land cover types in the SSHCP plan area.

Figure 4-68 Land Cover in the SSHCP



Source: South Sacramento Habitat Conservation Plan

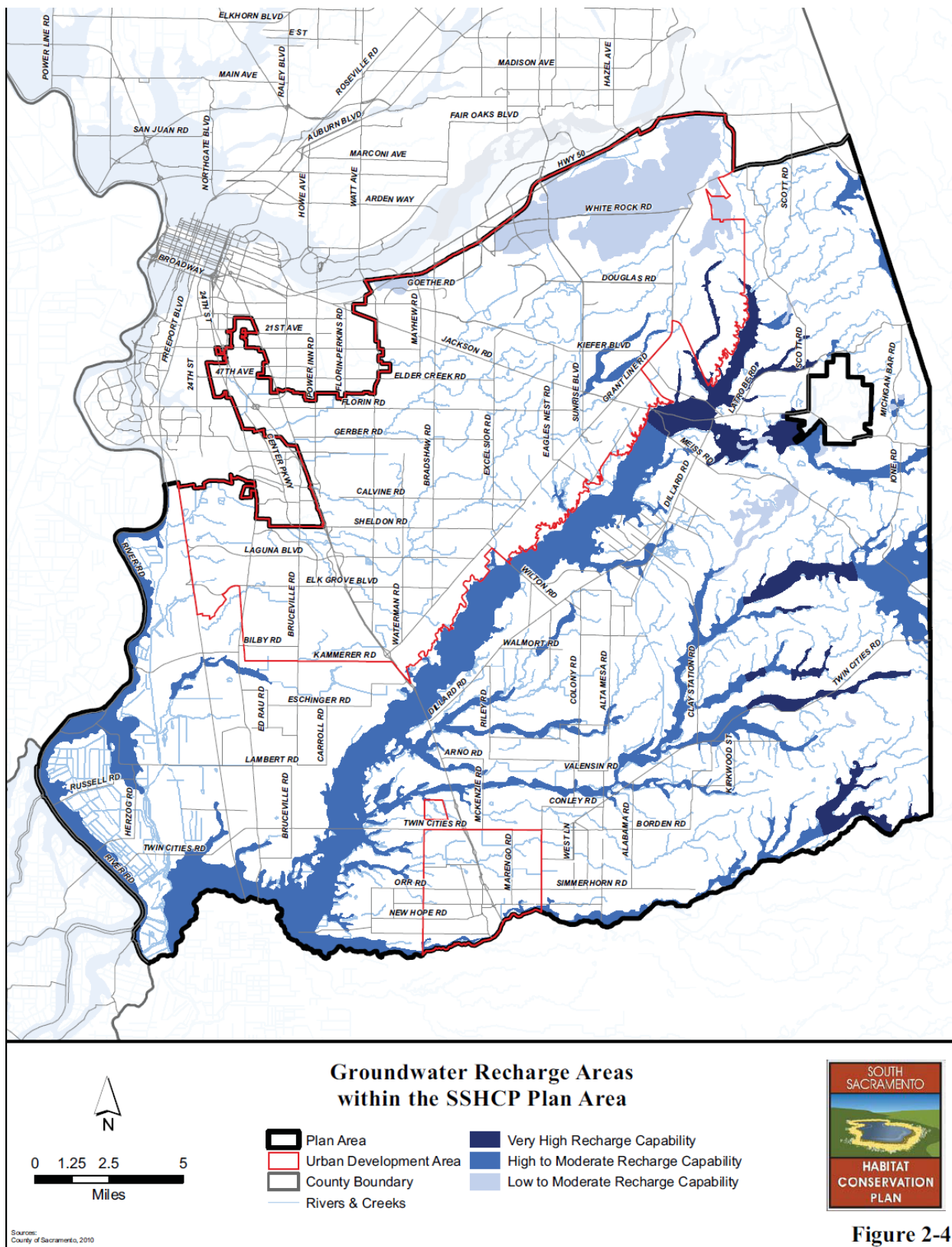
The SSHCP Plan Area includes lands that have already been preserved through past mitigation or conservancy acquisitions. The largest grouping of conservation sites inside the Urban Development Area (UDA) occurs in the Sacramento Valley Vernal Pool Preserve area located south of Jackson Highway between Excelsior and Eagles Nest roads north of Grant Line Road. The preserve area includes lands under conservation easement or owned by the Sacramento Valley Conservancy and three mitigation banks: Klotz, Arroyo Seco, and Bryte Ranch. Outside the UDA, significant preserves and mitigation banks are established at or near the Stone Lakes National Wildlife Refuge, within the Cosumnes River floodplain, and in eastern Sacramento County.

Groundwater Recharge

The SSHCP Plan Area is entirely within the 20,000-square-mile Central Valley Aquifer System, but is split between two basins, the Sacramento Valley Groundwater Basin and the San Joaquin Valley Groundwater Basin. Precipitation that does not run off, or is not lost through evaporation and transpiration, travels beneath the surface as subsurface water. The pattern of movement of water, from the time it enters the ground to the time it emerges either naturally or by pumping from a well, is controlled by the subsurface conditions encountered. Upon entering the ground, water moves downward until it reaches a zone of saturation. This happens whenever water from precipitation, stream flow, applied irrigation, and various other water sources sinks into the ground through the open spaces in permeable materials. The size of these open spaces ranges from minute pores in clays to intergranular openings in deposits of sand and gravel, and open crevices along bedrock fractures. The area over which this is accomplished is called a recharge area.

Within the SSHCP Plan Area, most recharge occurs in locations along river channel deposits where they cross exposures of water-transmitting rocks. Here the channel deposits are very permeable, allowing for rapid infiltration of water down to water-bearing materials. Water flows over these recharge areas during the entire year and affords partial replenishment of the groundwater body (Figure 4-69). In addition to river channel recharge, recharge can occur through percolation of precipitation, percolation of irrigation return flows, and subsurface boundary inflow from adjacent aquifers.

Figure 4-69 Groundwater Recharge in Sacramento County



Source: South Sacramento Habitat Conservation Plan

Special Status Species

To further understand natural resources that may be particularly vulnerable to a hazard event, as well as those that need consideration when implementing mitigation activities, it is important to identify at-risk species (i.e., endangered species) in the Planning Area. The Fish and Game Department maintains a list of threatened and endangered species in California. State and federal laws protect the habitat of these species through the environmental review process. Several additional species are of special concern or candidates to make the protected list. The Department's classification scheme is defined as follows:

- A species is a candidate when the Fish and Game Commission has formally noticed it as being under review by the Department to determine whether listing as threatened or endangered is warranted, or when it is the subject of a proposed rulemaking by the Commission to list as threatened or endangered.
- A species is threatened when although not presently threatened with extinction, it is likely to become an endangered species in the foreseeable future in the absence of special protection and management efforts.
- A species is endangered when it is in serious danger of becoming extinct throughout all, or a significant portion of, its range due to one or more causes, including loss of habitat, change of habitat, overexploitation, predation, competition or disease.

Table 4-45 summarizes Sacramento's special status animal species.

Table 4-45 California Native Plant Society's Threatened and Endangered Plant Classification for Sacramento County

| Scientific Name Common Name | Legal Status (Federal/State) | CNPS | Habitat |
|---|---------------------------------|------|------------------|
| <i>Aster chilensis</i> var <i>lentus</i> Suisun marsh aster | C/- | RE | Brackish marsh |
| <i>Downingia humilis</i> Dwarf downingia | -/- | RE | Vernal pools |
| <i>Gratiola heterosepal</i> Boggs lake hedgehyssop | C/E | RE | Vernal pools |
| <i>Hibiscus californicus</i> California hibiscus | C/- | RE | Freshwater marsh |
| <i>Lathyrus jepsonii</i> var <i>jepsonii</i> Delta tule pea | C/- | RE | Brackish marsh |
| <i>Legenere limosa</i> Green's legenere | C/R | RE | Vernal pools |
| <i>Lilaeopsis masonii</i> Mason's liaeopsis | -/E | RE | Brackish marsh |
| <i>Orcuttia viscida</i> Sacramento orcutt grass | E/E | RE | Vernal pools |
| <i>Orcuttia tenuis</i> Slender orcutt grass | E/E | RE | Vernal pools |
| <i>Oenothera deltoidea bonellii</i> Antioch dunes evening primrose | E/E | RE | Inland dunes |

| Scientific Name Common Name | Legal Status (Federal/State) | CNPS | Habitat |
|--|---------------------------------|------|--------------|
| <i>Plagiobothrys hystrix</i> Bearded popcorn flower | C/- | RE | Vernal pools |

Source: California Native Plant Society

Legal status abbreviations are C = Candidate, R = Rare, E = Endangered

The California Native Plant Society's inventory of rare and endangered vascular plants in California lists 10 species that have been found in Sacramento County, which are characterized as rare or endangered according to either federal, state or California Native Plant Society definitions (Table 4-46). Six species are vernal pool species. California Hibiscus is found along the Sacramento River and is severely threatened by channelization of the river. The Antioch Dunes Evening Primrose is extremely rare and known from only one site in Sacramento County.

Table 4-46 Endangered, Threatened, and Candidate Animal Species in Sacramento County

| Species | Legal Status (Federal/State) | Habitats | Occurrence |
|--|---------------------------------|--|--|
| Valley elderberry longhorn beetle (<i>Desmocerus californicus dimorphus</i>) | T/C | Elderberry shrubs in riparian habitats. | At least 7 reported sites in Sacramento |
| Giant garter snake | C/T | Marshlands, ditches, and adjacent uplands | At least 20 reported sites in Sacramento |
| American white pelican | -/SSC | Feeds in shallow waters | Migrants occur in spring & early summer |
| Double-crested cormorant | -/SSC | Nests in trees; forages in water bodies | Year-round resident Nesting sites reported at North Stone Lake |
| Bald eagle | E/E | Feeds in winter at lakes visitor. | An irregular winter Nesting sites at Folsom Lake just outside County |
| Northern harrier | -/SSC | Dense, tall grasslands or seasonal marsh for nesting; grasslands & marsh for feeding | Beach Lake/Stone Lake & treatment plant breeding areas. |
| Cooper's hawk | -/SSC | Riparian and oak woodland; | Regular migrant and winter resident; breeds in oak woodland of east County and American River. |
| Swainson's hawk | C/T | Large trees for nesting; alfalfa or hay fields for feeding | Common throughout the County |
| Peregrine falcon | E/E | Marsh, grassland | Possible irregular migrant. |
| Prairie falcon | -/SSC | Grassland | Possible irregular migrant and wintering bird. |
| California gull | -/SSC | Water bodies | Non-breeding resident |
| California yellow-billed cuckoo | C/T | Extensive riparian woodland | No records. |
| Burrowing owl | -/SSC | Natural or artificial burrows for nesting; grasslands for foraging | Nests at several locations in Sacramento County. |

| Species | Legal Status (Federal/State) | Habitats | Occurrence |
|-----------------------|------------------------------|--|--|
| Short-eared owl | -/SSC | Dense grasslands and marshlands | Probable irregular winter visitor |
| Willow flycatcher | -/SSC | Willow scrub | Probable migrant |
| Purple martin | -/SSC | Riparian woodland | Reported nesting sites found in or near downtown Sacramento |
| Tricolored blackbird | -/SSC | Emergent wetlands for breeding; marsh and nesting sites in grasslands for feeding. | At least 24 reported in Sacramento |
| Bank swallow | -/T | Riparian river bluffs | Reported nesting site on Cosumnes River near Rancho Murieta. |
| Longeared Owl | -/SSC | Riparian woodland | Known to nest in Sacramento County. |
| Black Shouldered Kite | -/P | Grasslands | Roost in Sacramento County |

Source: US Fish and Wildlife Service

Legal status abbreviations are: E = Endangered, T = Threatened, C = Candidate for listing, and SSC = Species of special concern.
P = Protected

Significant Natural Areas of Sacramento County

From information provided in the Sacramento County General Plan Background Report, Table 4-47 below outlines the location and rationale for listing of significant natural areas in Sacramento County.

Table 4-47 Description of Significant Natural Areas in Sacramento County

| Location | Comments |
|---|--|
| Mokelumne/Cosumnes Drainage | |
| Lower Cosumnes River | Support more than 100,000 waterfowl; sandhill crane here; important and unique natural area; variety of hydrological conditions in small area at merging of Valley River and Delta systems; undammed, represents unaltered valley ecosystem; system of sloughs and marshes each slightly different in its ecological balance; intermixing of habitats enhances ecological diversity. |
| Deer Creek - Cosumnes Riparian Corridor | Good riparian woodland cover along most of both banks of both water courses; occasional clear spots; generally is narrow band along each watercourse, occasionally widens to hardwood forest in valley portion. |
| Badger Creek | Wetlands, riparian and valley oaks amid valley grassland. Excellent example of historical Sacramento Valley habitat. Especially scenic from Highway 99. |
| Lower Mokelumne, Dry Creek, Grissley and Bear Sloughs | Riparian vegetation along all water courses; excellent grassland, riparian, woodland mix along Bear Slough; some of grassland and woodland along Mokelumne has been leveled since 1973. |
| Mokelumne River | Riparian vegetation on levee side of river. |
| Dry Creek | Riparian corridor occasionally widening to woodland areas. |
| Laguna Creek | Intermittent stream with riparian habitat; two miles of riparian woodland with large trees; lower reaches include seasonal marsh along creek and tributaries. |

| Location | Comments |
|----------------------------------|---|
| Stones Lake/Delta | |
| Beach Lake/ Morrison Creek* | Permanent and seasonal marsh in what used to be Beach Lake; riparian forest along Morrison Creek, essentially intact since 1937, dominated by cottonwood and willow; a riparian area abundantly rich in wildlife and plant communities. |
| Lower Laguna Creek* | Seasonal wetland, ponds and vernal pools with adjacent grassland; channel modifications in conjunction with upstream improvements along Laguna Creek. |
| North Stone Lake* | Morrison Creek levee on north, I-5 on east, Hood-Franklin Road on south and Southern Pacific Railroad on west. |
| South Stone Lake | Includes 93 acres riparian, 446 acres marsh, 186 acres upland, 121 acres water; rest of 3,480 acres is agriculture; supports excellent warm water fishery; supplements North Stone Lake as important wildlife area; part of number one ranked site for new western National Wildlife Refuge; with North Stone Lake, is one of the most important ecological complexes in Delta. |
| Snodgrass Slough | Shrub brush and occasional riparian woodland along northernmost Delta slough in Sacramento. |
| Delta Meadows* | Significant prime natural resource area; remnant of valley oak woodland; in excess of 110 bird species, abounds with small mammals; state park acquisition project. |
| Lost Slough | Waterway and adjacent riparian habitat linking Lower Cosumnes and Delta Meadows, Snodgrass Slough and the Delta river system. |
| Steamboat Slough | Riparian shrub-brush and woodland at south end near Howard Landing and along north portion. |
| Grand Island Tip | Mason's ilaeopsis, Delta tule pea, and Sacramento anthacid beetle found here; state designated significant natural area. |
| Georgiana Slough | Shrub-brush and occasional woodland riparian along open slough. |
| Seven Mile Slough | Riparian trees and shrub-brush along a little-used slough. |
| Brannan Island* | Site of Antioch Dunes evening primrose, very rare plant; state designated significant nature area. |
| Mayberry Slough | Deadend slough, isolated for wildlife habitat. |
| Southwest Tip of County | Upland habitat; blue heron rookery; several rare and endangered species. |
| Chain Island | Isolated island, formerly diked with coastal brackish marsh habitat; Mason's ilaeopsis and Suisun marsh aster; state designated significant natural area. |
| Eastern Sacramento County | |
| Upper Laguna Creek | Dense stand of riparian vegetation listed as one of three most important sections on Laguna Creek (the other two are now urban creek sections). |
| Sloughhouse South | One of best sites of valley elderberry longhorn beetle habitat; state designated significant natural area. |
| Meiss-Ione Road Overlook | Only lesser nighthawks in Sacramento County; vernal pools with unusual dwarf plant. |
| Scott Road Raptor Area | Open shortgrass prairie with sparse to dense valley and blue oak thickets, mostly in southern area; dense cottonwood-willow riparian vegetation along stream courses; habitat for one of largest concentrations of raptorial birds in Sacramento region; grand wildflower displays in spring. |
| Sloughhouse Vernal Pools | Concentrations of vernal pools; very rare Sacramento orcutt grass found near County dump; state designated significant natural area. |
| Rancho Seco Lake* | About 500 plants of Sacramento orcutt grass; state designated significant natural area. |

| Location | Comments |
|-------------------------------|--|
| Jackson Highway Oak Woodland | None |
| Twin Cities Road Oak Woodland | None |
| South Area Vernal Pools | Quality of pools is unknown; may contain rare and endangered plants. |
| North Sacramento | |
| Garden Highway | Greatest concentration of riparian woodland in Sacramento County along Sacramento River; riparian woodlands are seven times greater in extent than disturbed riprap areas to south; coexists with several homes; Swainson's hawk nests. |
| Alder Creek | Excellent riparian area; diverse vegetation and wildlife; spillway and marsh; upstream ponds add diversity; good beaver and muskrat habitat. |
| Fair Oaks Bald Spot* | Excellent examples of vernal pools with Sacramento orcutt grass; state designated significant natural area. |
| Lake Natoma* | American River bluffs, 100 feet high, cut by several small canyons; rich foothill woodland plant community; some of most varied and dense floral displays in Sacramento County; cottonwood dredger tailing riparian at Negro Bar with jungle-like mixture of oak, buckeye, elderberry, et al on higher ground. |
| East Main Drain* | Waterfowl habitat; year round habitat; much disturbance, dumping. |
| Dry Creek* | Dual channel with grassland/farming in between creates good wildlife habitat. Good riparian cover along creek channels. |
| American River Parkway* | Mix of riparian, freshwater marsh, oak woodland, grassland, inhabited by great variety of plant and wildlife species. |

Source: Sacramento General Plan Background Report

* indicates all or a major part of the area is in public or quasi-public ownership

Williamson Act

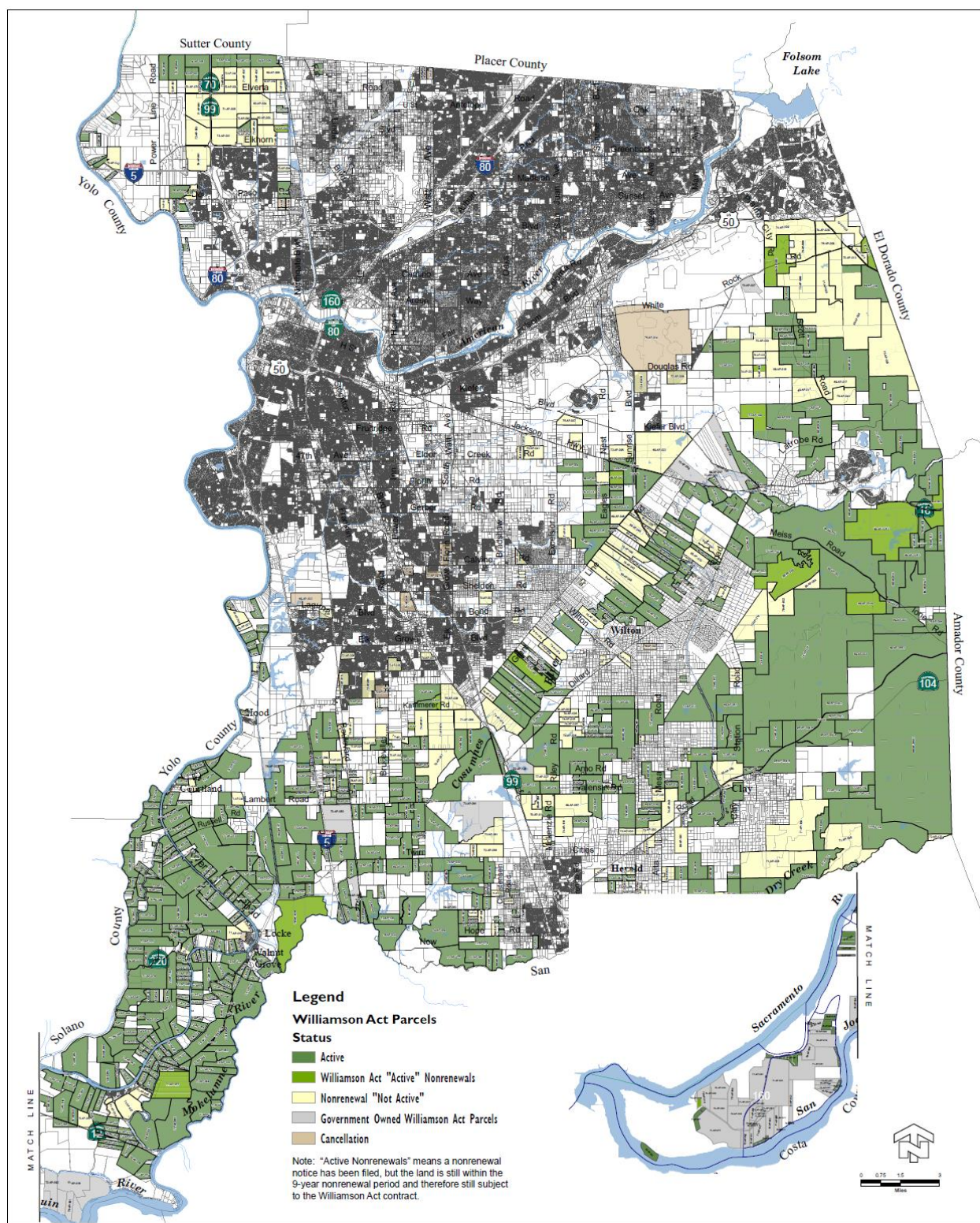
The Williamson Act, also known as the California Land Conservation Act of 1965, enables local governments to enter into contracts with private landowners for the purpose of restricting specific parcels of land to agricultural or related open space use. When the County enters into a contract with the landowners under the Williamson Act, the landowner agrees to limit the use of the land to agriculture and compatible uses for a period of at least ten years and the County agrees to tax the land at a rate based on the agricultural production of the land rather than its real estate market value. The County has designated areas as agricultural preserves within which the county will enter into contracts for the preservation of the land in agriculture. The County has 164,162 acres under Williamson Act Contract as of 2016. This is tabulated in Table 4-48 shown in Figure 4-70.

Table 4-48 Williamson Act Parcels Acreage 2016

| STATUS | ACRES |
|-------------------|------------|
| Active | 164,161.92 |
| Active Nonrenewal | 11,217.58 |
| Cancellation | 5,505.85 |
| Nonrenewal | 62,179.93 |

Source: Sacramento County GIS

Figure 4-70 Williams Act Contracts in Sacramento County as of 2016



Source: Sacramento County

State Inventory of Important Farmland

The Farmland Mapping and Monitoring Program was established in 1984 to document the location, quality, and quantity of agricultural lands and conversion of those lands over time. The program provides impartial analysis of agricultural land use changes throughout California. For inventory purposes, several categories were developed to describe the qualities of land in terms of its suitability for agricultural production. The State Department of Conservation utilizes the following classification system:

- The Prime Farmland category describes farmland with the best combination of physical and chemical features able to sustain long term agricultural production. This land has the soil quality, growing season, and moisture supply needed to produce sustained high yields. Land must have been used for irrigated agricultural production at some time during the four years prior to the mapping date.
- Farmland of Statewide Importance is farmland similar to Prime Farmland but with minor shortcomings, such as greater slopes or less ability to store soil moisture. Land must have been used for irrigated agricultural production at some time during the four years prior to the mapping date.
- Unique Farmland is farmland of lesser quality soils used for the production of the state's leading agricultural crops. This land is usually irrigated, but may include nonirrigated orchards or vineyards as found in some climatic zones in California. Land must have been cropped at some time during the four years prior to the mapping date.
- Farmland of Local Importance is either currently producing crops or has the capability of production. This farmland category is determined by each county's board of supervisors and a local advisory committee.

For Sacramento County, this classification refers to lands which do not qualify as Prime, Statewide, or Unique designation but are currently irrigated crops or pasture or non-irrigated crops; lands that would be Prime or Statewide designation and have been improved for irrigation but are now idle; and lands which currently support confined livestock, poultry operations, and aquaculture.

Growth and Development Trends

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

More specific information on growth and development for each participating jurisdiction can be found in the jurisdictional annexes.

Current Status and Past Development

The estimated population of Sacramento County for January 1, 2015 was 1,470,912, representing a ten-fold increase from just over 141,000 people in 1930. Table 4-49 and Table 4-50 illustrate the pace of population growth in Sacramento County dating back to 1930 along with more recent population trends for each jurisdiction. The data on population and housing growth shows that Sacramento County has seen consistent growth during the last decades, with major periods of growth in the 1950s and 1960s.

Table 4-49 Sacramento County Population Growth 1930-2015

| Year | Population | Percent Change |
|------|------------|----------------|
| 1930 | 141,199 | — |
| 1940 | 170,333 | 20.0% |
| 1950 | 277,140 | 62.7% |
| 1960 | 502,778 | 81.4% |
| 1970 | 631,498 | 25.6% |
| 1980 | 783,381 | 24.1% |
| 1990 | 1,041,219 | 32.9% |
| 2000 | 1,223,499 | 17.5% |
| 2010 | 1,445,327 | 18.1% |
| 2015 | 1,470,912 | 1.8% |

Sources: US Census Bureau, California Department of Finance

Table 4-50 Population Growth for Jurisdictions in Sacramento County, 2000-2015

| Area | 2000 | 2010 | 2015 | % Change 2000 to 2015 |
|-----------------|------------------|------------------|------------------|-----------------------|
| Citrus Heights | 85,071 | 87,752 | 85,147 | 0.1% |
| Elk Grove* | 0 | 121,803 | 162,899 | — |
| Folsom | 51,884 | 66,242 | 74,909 | 44.4% |
| Galt | 19,472 | 22,856 | 24,607 | 26.4% |
| Isleton | 828 | 822 | 820 | -0.9% |
| Rancho Cordova* | 0 | 55,099 | 69,112 | — |
| Sacramento | 407,018 | 453,592 | 480,105 | 18.0% |
| Unincorporated | 659,226 | 560,483 | 573,313 | -13.0%** |
| Total | 1,223,499 | 1,445,327 | 1,470,912 | 20.2% |

Source: US Census Bureau, California Department of Finance

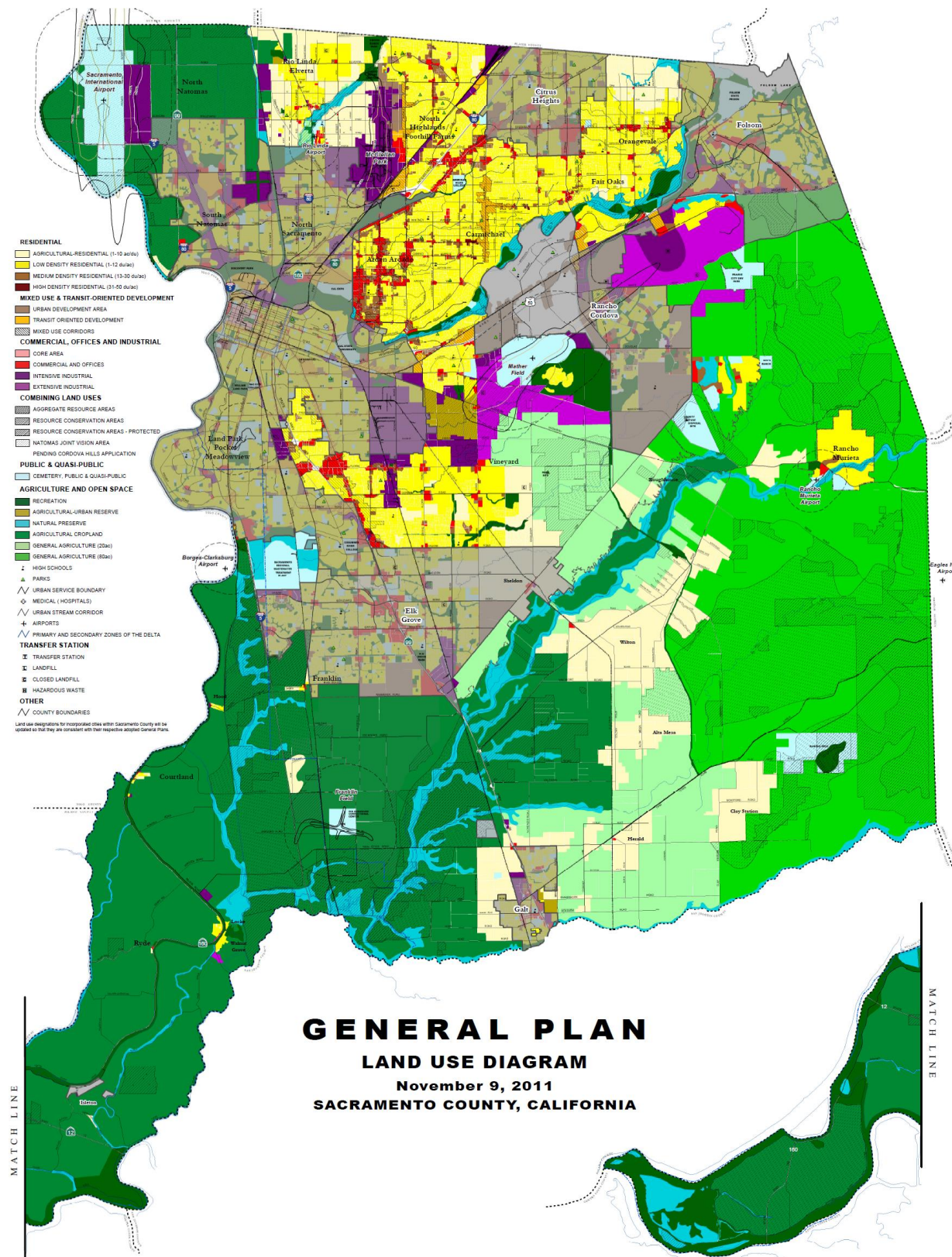
*Elk Grove was incorporated in 2000; Rancho Cordova was incorporated in 2002

**This number is misleading, as two current cities were unincorporated County in 2000.

Current Land Use/Zoning

Future land use and growth management strategies in Sacramento County aim to concentrate future development into and toward existing communities through various policies relating to zoning and minimum development standards and requirements. Zoning designations prescribe allowed land uses and minimum lot sizes for the purpose of supporting efficient infrastructure design, conservation of natural resources, and to avoid conflicting uses. Figure 4-71 shows current land use designations in Sacramento County.

Figure 4-71 Sacramento County Land Use Diagram



Source: Sacramento County General Plan

Development since 2011 Plan

As shown in Table 4-51, the Sacramento County Planning Area has seen a growth of about 2% between 2010 and January 1, 2015.

Table 4-51 Sacramento County Planning Area Population Growth Since 2010

| Year | Population | Population Change | Percent Change |
|------|------------|-------------------|----------------|
| 2010 | 1,445,327 | – | – |
| 2015 | 1,470,912 | 25,585 | 1.8% |

Sources: US Census Bureau California Department of Finance

The Sacramento County Building Department tracked total building permits issued since 2011 for Unincorporated Sacramento County. These are tracked by total development, property use type, and hazard risk area. These are shown in Table 4-52 and Table 4-53. All development in the identified hazard areas, including the 1% annual chance floodplains, areas protected by levees, and high wildfire risk areas, were completed in accordance with all current and applicable development codes and standards and should be adequately protected. Thus, with the exception of more people living in the area potentially exposed to natural hazards, this growth should not cause a significant change in vulnerability of the unincorporated County to identified priority hazards.

Table 4-52 Unincorporated Sacramento County Total Development Since 2011

| Property Use | 2011 | 2012 | 2013 | 2014 | 2015 |
|---------------------------|--------------|--------------|--------------|--------------|--------------|
| Residential | 755 | 732 | 674 | 870 | 1,338 |
| Commercial/ Industrial | 588 | 400 | 464 | 491 | 558 |
| Other | 0 | 0 | 0 | 0 | 0 |
| Total | 1,343 | 1,132 | 1,138 | 1,361 | 1,896 |

Source: Sacramento County Building Department

Table 4-53 Unincorporated Sacramento County Development in Hazard Areas since 2011

| Property Use | 1% Annual Chance Flood | Area Protected by Levee | Wildfire Risk Area ¹ | Other |
|--------------|------------------------|-------------------------|---------------------------------|-------|
| Residential | 38 (SFD only) | N/A | unknown | N/A |
| Commercial | 119 ² | N/A | unknown | N/A |
| Industrial | Included w' commercial | N/A | unknown | N/A |
| Other | N/A | N/A | unknown | N/A |
| Total | | N/A | unknown | N/A |

Source: Sacramento County Building Department

¹Moderate or higher wildfire risk area

²Includes 5 properties in the FEMA A99 zone.

Future Development

As indicated in the previous section, Sacramento County has been steadily growing over the last seven decades. Long term forecasts by the California Department of Finance project population growth in Sacramento County continuing through the 2060. Table 4-54 shows the population projections for the County as a whole through 2060.

Table 4-54 Population Projections for Sacramento County Planning Area, 2010-2060

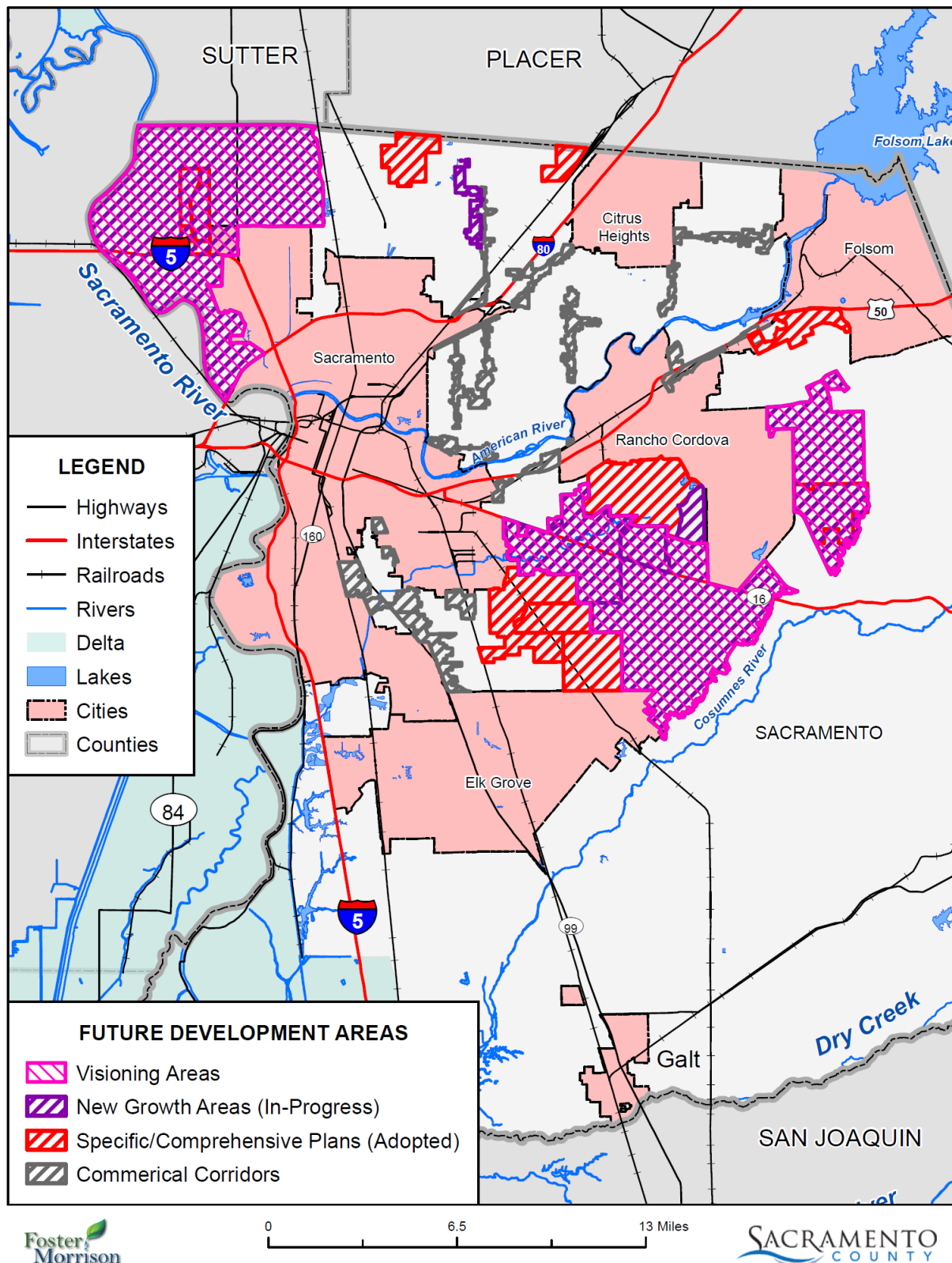
| Year | Sacramento County Population Projection |
|------|---|
| 2010 | 1,421,236 |
| 2015 | 1,475,381 |
| 2020 | 1,554,022 |
| 2025 | 1,639,613 |
| 2030 | 1,730,276 |
| 2035 | 1,823,985 |
| 2040 | 1,912,838 |
| 2045 | 1,989,722 |
| 2050 | 2,047,662 |
| 2055 | 2,100,788 |
| 2060 | 2,153,833 |

Source: California Department of Finance, P-1 Report

Future Development Areas

The Sacramento County planning department identified future development areas for the unincorporated County separated out into four categories which are described further below: Visioning Areas, New Growth Areas, Specific/Comprehensive Plans, and Commercial Corridors. Mapping of these Future Development Areas are included in Figure 4-72

Figure 4-72 Future Development Areas in Sacramento County



Data Source: Sacramento County GIS, Cal-Atlas; Map Date: 05/2016.

New Growth and Visioning Areas

In addition to those areas for which Specific Plans and Comprehensive Plans have been adopted and identified below, the County has also identified one distinct new growth area in the General Plan. Additionally, the County prepared visioning concept maps for the Natomas, Jackson Highway and Grant Line East Visioning Areas. The visioning process is a way of gaging how landowners view the future development of an area. It involves no changes to General Plan designations or zoning, and does not provide any entitlement. It is included here as an indication of potential future development.

Since the adoption of the 2030 General Plan in 2011, the Board of Supervisors has initiated five growth area Master Plans including Mather South, Natomas North Precinct and the Jackson Corridor Master Plans: NewBridge, West Jackson and Jackson Township. No plans have yet been adopted for these identified new growth areas.

Specific Plan and Comprehensive Plan Areas

Specific Plans provide direction for entire communities or other defined new geographic areas. They take different forms depending on the specific needs of our communities and typically set forth policy and implementation strategies for such items as land use, transportation, urban design, parks, school facilities and public services. Comprehensive Plans are very similar in nature to Specific Plans, but may not include a detailed financing plan which is required under state law to be considered a Specific Plan. These plans help implement the County General Plan on area-specific basis. In addition, the County has initiated and implemented special planning programs for projects that are unique and controversial in nature. Specific Plans and Comprehensive Plans are shown in Figure 4-72. Specific Plans and Comprehensive Plans adopted prior to the update of the 2030 General Plan are:

- Specific Plans
 - ✓ Cordova Hills
 - ✓ Easton Project
 - ✓ East Antelope
 - ✓ Elverta
 - ✓ Mather Field
 - ✓ Metro Airpark
 - ✓ North Vineyard Station
- Comprehensive Plans
 - ✓ Florin Vineyard Gap (2010)
 - ✓ Vineyard Springs (2000)

No Specific Plans or Comprehensive Plans have been adopted since the adoption of the 2030 General Plan. Those in process are part of the Master Plan projects, identified above.

Commercial Corridors

The General Plan Update Land Use Element identifies the following fourteen commercial corridors for redevelopment, reinvestment, and/or intensification.

- North Watt Area
- Florin Road Area
- Auburn Blvd. North
- Fair Oaks Blvd. Central
- Franklin Blvd.
- Greenback Lane
- Stockton Blvd South
- Auburn Blvd. Central
- Fair Oaks Blvd. East
- Fair Oaks Blvd. West
- Fulton Avenue
- Stockton Blvd. Central
- Watt Avenue Central
- Folsom Blvd.

These corridors, shown in green on Figure 4-72, were identified as having substantial vacant and underutilized land, which could accommodate additional commercial and mixed use growth. Potential scenic resources on some of these properties may include landmark trees, native trees, heritage oak trees, urban streams, and/or historic structures of local interest.

Data for these Visioning areas, New growth areas, specific plan and comprehensive plan areas, and commercial corridors is maintained by Sacramento County and was made available for this plan. An analysis was performed to inventory and quantify parcels within these development areas in total as well as those that fall within mapped hazard areas. Mapping of these areas, including hazard overlays, can serve as a guide for how and where to grow in the future.

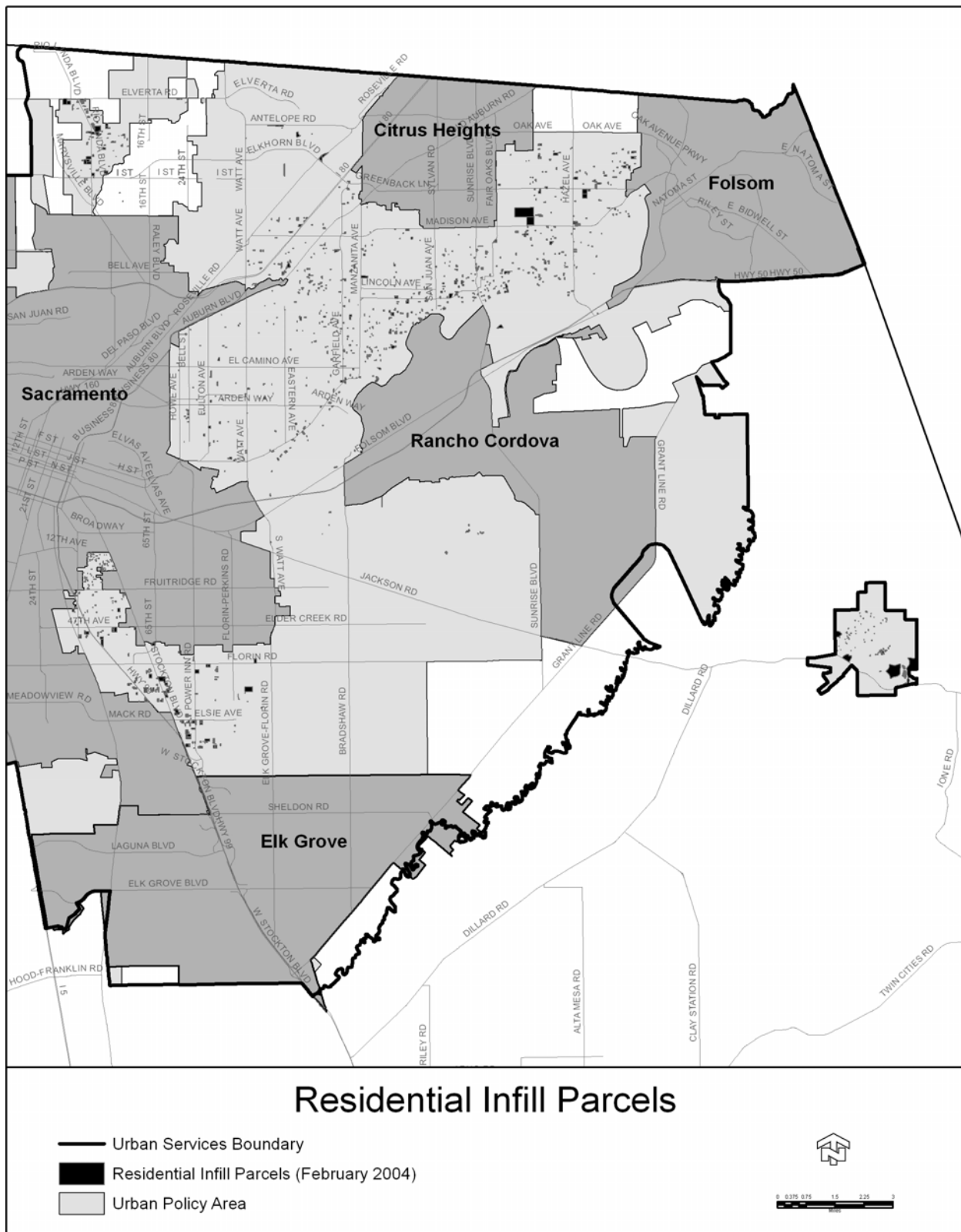
Methodology and analysis of vulnerability of these future development areas to dam, flood, levee failure, and wildfire can be found in their respective hazard vulnerability assessments:

- Dam Failure (Section 4.3.6)
- Flood (Section 4.3.10)
- Levee Failure (Section 4.3.12)
- Wildfire (Section 4.3.16)

Infill

Finally, the County has developed an infill strategy. The County's infill strategy is comprised of four components: 1) maximize residential development opportunity on vacant lands planned for residential use in the established urban community; 2) reuse or redevelop abandoned, unsafe or blighted structures; 3) when appropriate, support rezoning of excess commercial and/or industrial lands to residential uses; 4) increase intensity and density of development on underutilized lands when found to be appropriate. The residential infill parcels identified in the 2030 General Plan Update Land Use Element (Figure 4-73) are scattered throughout established urban communities within Urban Policy Area (UPA) of the unincorporated County. The UPA is intended to provide an adequate supply of developable land sufficient to accommodate projected growth.

Figure 4-73 Sacramento County Infill Parcels



Source: Sacramento County General Plan Environmental Impact Report

4.3.2. Sacramento County Vulnerability to Specific Hazards

DMA regulations require that the HMPC evaluate the risks associated with each of the hazards identified in the planning process. This section summarizes the possible impacts and quantifies, where data permits, the Sacramento County Planning Area's and unincorporated Sacramento County's vulnerability to each of the hazards identified as a priority hazard in Section 4.2.22 Natural Hazards Summary. Where specific hazards vary across the County, additional information can be found in the jurisdictional annexes. Based on information developed for the hazard profiles, the priority hazards evaluated further as part of this vulnerability assessment include:

- Agricultural Hazards
- Bird Strike
- Climate Change
- Dam Failure
- Drought and Water Shortage
- Earthquake
- Earthquake: Liquefaction
- Flood: 100/200/500-year
- Flood: Localized/Stormwater Flooding
- Levee Failure
- River/Stream/Creek Bank Erosion
- Severe Weather: Extreme Temperatures – Heat
- Severe Weather: Heavy Rain and Storms
- Wildfire

An estimate of the vulnerability of the Planning Area and unincorporated County to each identified hazard, in addition to the estimate of risk 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.

Vulnerability can be quantified in those instances where there is a known, identified hazard area, such as a mapped floodplain. In these instances, the numbers and types of buildings subject to the identified hazard can be counted and their values tabulated. Other information can be collected in regard to the hazard area,

such as the location of critical community facilities, historic structures, and valued natural resources. Together, this information conveys the impact, or vulnerability, of that area to each hazard.

The HMPC identified five hazards in the Planning Area for which specific geographical hazard areas have been defined and for which sufficient data exists to support a quantifiable vulnerability analysis. These five hazards are dam failure, earthquake, flood, levee failure, and wildfire. Because these hazards have discrete hazard risk areas, their risk varies by jurisdiction. The vulnerability of the dam failure, flood (100/500-year), levee failure, and wildfire were analyzed using GIS and County parcel and assessor data. For these four hazards, HMPC inventoried the following for each community, to the extent possible, to quantify vulnerability in identified hazard areas:

- General hazard-related impacts, including impacts to life, safety, and health
- Assets at risk (i.e., types, numbers, and value of land and improvements)
- Identification of population at risk
- Identification of cultural and natural resources at risk
- Identification of critical facilities at risk
- Overall community impact
- Future development/development trends within the identified hazard area

The HMPC used FEMA's loss estimation software, HAZUS-MH, to analyze the County's vulnerability to earthquakes. Though not fully mapped, a limited analysis was performed on the localized flood hazard to estimate possible damages to localized flooding.

The vulnerability and potential impacts from priority hazards that do not have specific mapped areas nor the data to support additional vulnerability analysis are discussed in more general terms. These include:

- Bird Strike
- Climate Change
- Drought and Water Shortage
- Earthquake: Liquefaction
- River/Stream/Creek Bank Erosion
- Severe Weather: Extreme Temperatures – Heat
- Severe Weather: Heavy Rain and Storms

The vulnerability sections below are presented alphabetically.

4.3.3. Agricultural Hazard Vulnerability Assessment

Likelihood of Future Occurrence—Highly Likely

Vulnerability—Medium

According to the USDA, every year natural disasters, such as droughts, earthquakes, extreme heat and cold, floods, fires, earthquakes, hail, landslides, and tornadoes, challenge agricultural production. Because agriculture relies on the weather, climate, and water availability to thrive, it is easily impacted by natural events and disasters. Agricultural impacts from natural events and disasters most commonly include: contamination of water bodies, loss of harvest or livestock, increased susceptibility to disease, and

destruction of irrigation systems and other agricultural infrastructure. These impacts can have long lasting effects on agricultural production including crops, forest growth, and arable lands, which require time to mature. Specific impacts by hazard are listed below:

- Drought's most severe effects on agriculture include water quality and quantity issues. Other impacts include decreased crop yields, impact to feed and forage, and altered plant populations.
 - ✓ The County has been in a drought for the last 5 years. The County Agricultural Commissioner has written a "Letter of Loss" to the USDA/FSA (USDA/Farm Services Agency) for the Livestock Forage Disaster Program, every year since 2011 due to losses in pasture or forage areas. The FSA has various ag insurance programs to assist growers. Growers can enroll in crop insurance programs for all natural causes of loss listed in their policies (such as fire, flood, extreme temperatures). For those without insurance, NAP (the Non-insured Crop Disaster Assistance Program) managed by USDA's Farm Service Agency provides financial assistance to producers of non-insurable crops when low yields, loss of inventory or due to natural disasters. The county agricultural commissioners can write a "Letter of Ag Loss", identifying the crop & % of loss, to allow growers to receive either low cost loans or monetary compensation.
- Earthquakes can strike without warning and cause dramatic changes to the landscape of an area that can have devastating impacts on agricultural production and the environment. These impacts could include loss of harvest or livestock and destruction of irrigation systems and other agricultural infrastructure.
- Extreme cold may result in loss of crops, livestock, increased deicing, downed power lines, and increased use of generators. Deicing can impact agriculture by damaging local ecosystems and contaminating water bodies.
- Hot weather and extreme heat can worsen ozone levels and air quality as well as leading to drought conditions. Excessive heat and prolonged dry or drought conditions can impact agriculture by creating worker safety issues for farm field workers, severely damaging crops, and reducing availability of water and food supply for livestock.
- Wildfires can spread quickly and devastate thousands of acres of land, which may include agricultural lands. This devastation could lead to large losses in crops, forestry, livestock, and agricultural infrastructure.
- Flooding causes many impacts to agricultural production, including water contamination, damage to crops, loss of livestock, increased susceptibility of livestock to disease, flooded farm machinery, and environmental damage to and from agricultural chemicals.
 - ✓ Reclamation Districts and Flood Control Districts are responsible for maintenance of levees. There are also private levees maintained by the landowners. Vegetation and vertebrates (ground squirrels) are controlled to maintain the integrity of the levees. There are permanent crops and winter crops which may be affected during the times of year when flooding is most likely to occur. Permanent crops such as vineyards and orchards can withstand temporary flooding, such as 1-2 days, before permanent damage may begin to occur. Winter wheat and young plantings may be washed away in a flood event.
- Landslides and debris flows occur in all 50 states and commonly occur in connection with other major natural disasters such as earthquakes, volcanoes, wildfires, and floods. Some of the threats from landslides and debris flow include rapidly moving water and debris that can cause trauma; broken electrical, water, gas, and sewage lines; and disrupted roadways and railways. This can lead to

agricultural impacts including contamination of water, change in vegetation, and harvest and livestock losses.

- High Winds and microbursts can appear without much warning and have the potential to devastate an area very quickly. This devastation can impact agriculture by contaminating water and destroying crops, livestock, and other farm property.

In addition to impacts from natural hazards, the County noted that invasive pests can cause economic damage, affecting the ability to ship agricultural commodities overseas, inter-state and intra-state. Trade can be impacted significantly. The CDFA is responsible for managing invasive pests statewide. CDFA works closely with the CAC's to manage the pests through quarantines, detection and eradication programs. USDA is also responsible for managing invasive pests which have the potential to impact agriculture nationally. USDA works in partnership with CDFA and the CACs to manage pests.

The County also noted that there are possible threats of bioterrorism. Bioterrorism threats to agriculture would be handled by the USDA, in cooperation with CDFA and the CAC's.

Future Development

Future development in the County is not likely to have an impact on agricultural hazards in Sacramento County.

4.3.4. Bird Strike Vulnerability Assessment

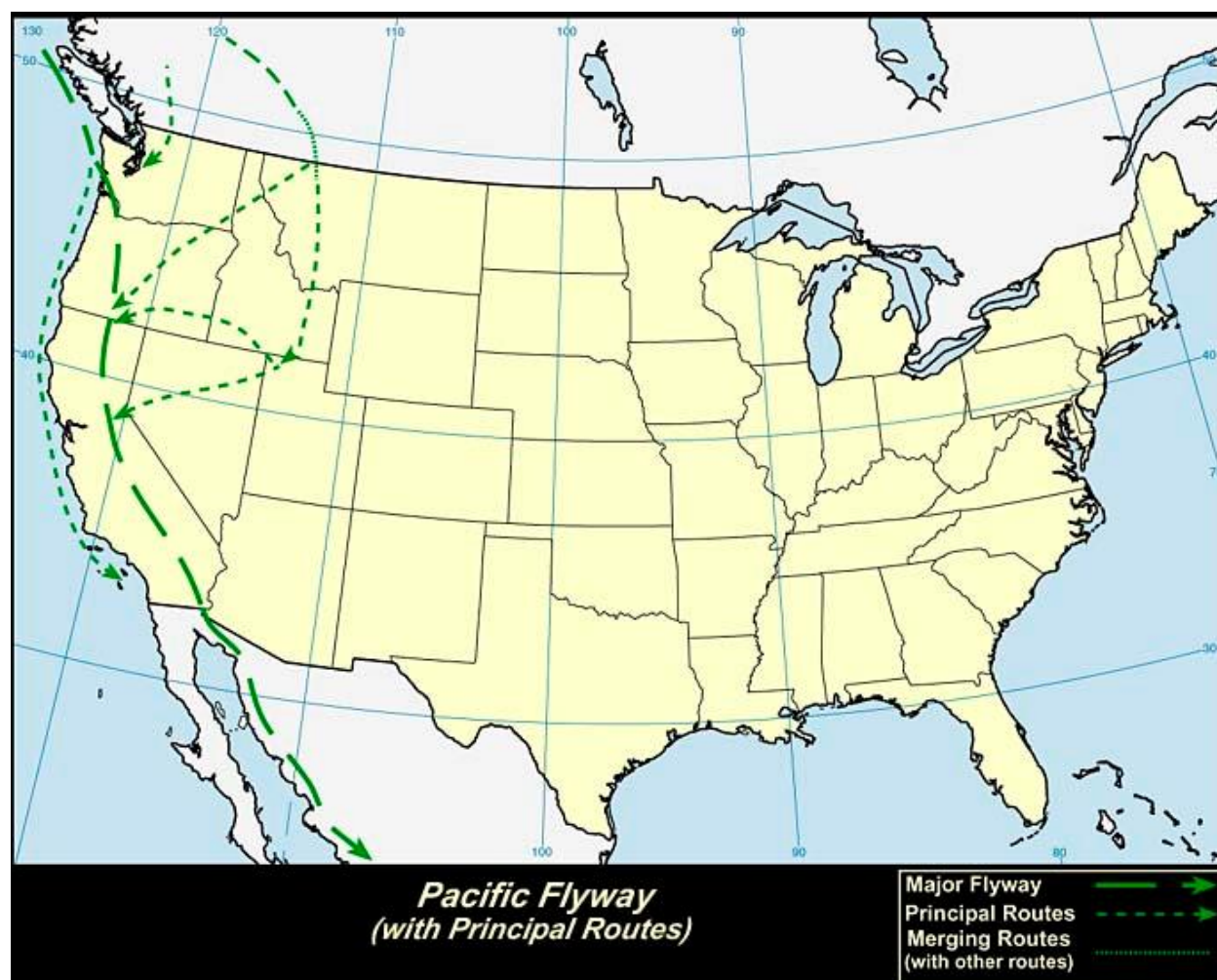
Likelihood of Future Occurrence—Highly Likely

Vulnerability—Medium

Collisions between wildlife and aircraft (wildlife strikes) are a threat to civil and military aircraft, causing billions of dollars in aircraft damage. Globally, wildlife strikes killed 229 people and destroyed over 210 aircraft between 1988 and 2008. According to the FAA National Wildlife Database (Wildlife Database), almost 90,000 reported wildlife strikes occurred in the United States (U.S.) 1990 through 2008, with 7,516 strikes in 2008 alone. Birds account for more than 97 percent of wildlife strikes. Most bird strikes happen fairly close to the ground, with sixty percent occurring within 100 feet or less above ground level (AGL), 73 percent at 500 feet AGL or less, and 92 percent at 3,000 feet AGL or less.

In Sacramento County, there are five public, and 17 private airports. The Sacramento airports are in the Pacific flyway for migratory birds and reports more bird strikes annually than any other airport in the Western U.S. (see Figure 4-74).

Figure 4-74 Pacific Flyway Routes



Source: birdnature.com. <http://www.birdnature.com/pacific.html>

Not only are airplane passengers and crew vulnerable to bird strike, downed aircraft can cause possible death and damage to property should the plane not be able to return to the airport runway. Most vulnerable are those who live or work within the direction of the takeoff or landing zones under 3,000 feet above ground level, as 92 percent of bird strikes occur in that zone.

The California State Aeronautics Act (codified in the CA Public Utilities Code) provides guidance for conducting airport land use compatibility planning. Thus, even though on a national average 92 percent of strikes occur below 3,000 feet AGL, in California there is a mechanism for minimizing incompatible land uses, such as residential housing, within the area where aircraft would operate at this elevation.

In the case of SMF, the airport is comprised of about 6,000 acres, about half of which comprises the airport itself. The remaining acreage, located north and south of the airport in alignment with approaching and departing aircraft, is undeveloped land under the operational control of the Sacramento County Airport System. No incompatible land uses occur in this area. It is managed exclusively for safe aircraft approach, departure, and circling operations.

The area adjacent to SMF is rural, consisting primarily of agriculture. Thus, if an unfortunate combination of circumstances were to occur, an aircraft experiencing a damaging bird strike below 3,000 AGL would be unlikely to have an uncontrolled landing in a developed area. In all likelihood, damage to property and people on the ground would be minimal, with most or all of the damage occurring to the aircraft.

Unlike other some other airports like JFK or LAX, SMF is surrounded by neither large bodies of water nor dense urban development. The area encompassed within aircraft overflights below 3,000 AGL is therefore quite different here than at those airports.

Future Development

Future development is not expected to be affected by the bird strike hazard in Sacramento County.

4.3.5. Climate Change Vulnerability Assessment

Likelihood of Future Occurrence—Highly Likely

Vulnerability—Low

The California Adaptation Planning Guide (APG) prepared by California OES and CNRA was developed to provide guidance and support for local governments and regional collaboratives to address the unavoidable consequences of climate change.

The APG: Defining Local and Regional Impacts focuses on understanding the ways in which climate change can affect a community. According to this APG, climate change impacts (temperature, precipitation, sea level rise, ocean acidification, and wind) affect a wide range of community structures, functions and populations. These impacts further defined by regional and local characteristics are discussed by secondary impacts and seven sectors found in local communities: Public Health, Socioeconomic, and equity impacts; Ocean and Coastal Resources; Water Management; Forest and Rangeland; Biodiversity and Habitat; Agriculture; and Infrastructure.

Sacramento County Climate Change Impacts

The APG: Understanding Regional Characteristics identified the following impacts specific to the Bay-Delta region in which the Sacramento County Planning Area is part of:

- Temperature increases
- Reduced precipitation
- Sea level rise
- Flooding – increased flows in areas below sea level, exacerbated by levee failure
- Reduced agricultural productivity
- Reduced water supply
- Public health – heat & air pollution
- Decline in Biodiversity

Ascent Environmental Climate Change Vulnerability Assessment

According to the Preliminary Draft – Climate Change Vulnerability Assessment for the Sacramento County Climate Adaptation Plan (CAP) prepared by Ascent Environmental (Ascent), climate change is already affecting and will continue to alter the physical environment throughout the Central Valley and Sacramento County; however, specific implications of climate change effects vary with differing physical, social, and economic characteristics within the County. Their report followed the nine-phase APG process for local and regional climate vulnerability assessment and adaption strategy development. The APG vulnerability assessment is a five step process of determining: Exposure, Sensitivity, Potential Impacts, Adaptive Capacity, and Risk and Onset.

At the time of this LHMP Update, Ascent had completed the initial exposure assessment for Sacramento County. The methodology for the exposure assessment is described below and Information specific to the exposure assessment is included in each of the affected natural hazard profiles. Additional County-specific vulnerability assessment data developed through preparation of Sacramento County’s CAP will be included in the next five-year update to this LHMP.

CAP Exposure Methodology

Where predictive data exists, climate change effects are characterized by two milestone years: midcentury (2050) and end of century (2100). Historical data are used to set the baseline for describing the degree of change occurring by these two future dates. This exposure assessment evaluated the direct, or primary, effects of climate change in Sacramento to include deviations in average temperature, annual precipitation and sea-level rise. Secondary impacts, which could occur as result of one or more of these effects are also analyzed and include extreme heat and its frequency, wildfire risk, flooding, and snowpack amount and retention. Ascent utilized Cal-Adapt to forecast potential climate change impacts over time. Cal-Adapt is a climate change scenario planning tool developed by the California Energy Commission and the University of California Berkeley Geospatial Innovation Facility. Cal-Adapt downscales global climate simulation model data to local and regional resolution under two emissions scenarios: the A-2 scenario represents a higher, future GHG emissions scenario, and the B-1 scenario represents a lower future GHG emissions scenario. Which scenario occurs in the future depends on the effectiveness of programs implemented to reduce GHG emissions. Because the degree of effectiveness is not yet known, results from both emissions scenarios are considered in this vulnerability assessment and distinguished, where possible.

Future Development

Sacramento County in general could see population fluctuations as a result of climate impacts relative to those experienced in other regions, and these fluctuations are expected to impact demand for housing and other development. For example, sea level rise may disrupt economic activity and housing in coastal communities, resulting in migration to inland urban areas like the Sacramento region. Other interior western states may experience an exodus of population due to challenges in adapting to heat even more extreme than that which is projected to occur here. While there are currently no formal studies of specific migration patterns expected to impact the Sacramento region, climate-induced migration was recognized within the UNFCCC Conference of Parties Paris Agreement of 2015 and is expected to be the focus of future studies.

Climate change, coupled with shifting demographics and market conditions, could impact both the location of desired developments and the nature of development. Demand may increase for smaller dwellings that are less resource intensive, more energy efficient, easier to maintain and can be more readily adapted or even moved in response to changing conditions. Compact, mixed-use and infill developments that can help residents avoid long commutes and vulnerabilities associated with the transportation system will likely continue to grow in popularity. The value of open space and pressure to preserve it will likely increase, due in part to its restorative, recreational, environmental and habitat benefits but also for its ability to sequester carbon, help mitigate the accumulation of greenhouse gas in the atmosphere and slow down the global warming trend. Higher flood risks, especially if coupled with increased federal flood insurance rates, may decrease market demand for housing and other types of development in floodplains, while increased risk of wildfires may do the same for new developments in the urban-wildland interface. Flood risks may also inspire new development and building codes that elevate structures while maintaining streetscapes and neighborhood characteristics.

Climate change will stress water resources. Water is an issue in every region, but the nature of the potential impacts varies. Drought, related to reduced precipitation, increased evaporation, and increased water loss from plants, is an important issue in many U.S. regions, especially in the West. Floods, water quality problems, and impacts on aquatic ecosystems and species are likely to be amplified by climate change. Declines in mountain snowpack are important in Sacramento County the Sierra Nevada Mountains and across the state, where snowpack provides vital natural water storage and supply. The ability to secure and provide water for new development requires on-going monitoring and assurances. It is recommended that the ability to provide a reliable water supply from the appropriate water purveyor, continue to be in the conditions for project approval, and such assurances shall be verified and in place prior to issuing building permits.

Similarly, protecting and enhancing water supply will also need to be addressed. California's Sustainable Groundwater Management Act (SGMA) will contribute to addressing groundwater and aquifer recharge needs. Good groundwater management will provide a buffer against drought and climate change, and contribute to reliable water supplies regardless of weather patterns. California depends on groundwater for a major portion of its annual water supply, and sustainable groundwater management is essential to a reliable and resilient water system. Protection of critical recharge areas should be addressed across the County in the respective Groundwater Management Plans. Further, these plans should include provisions that guide development or curtail development in areas that would harm or compromise recharge areas. In South Sacramento County the South Sacramento Habitat Conservation Plan (SSHCP) covers a significant area of prime groundwater recharge areas. Including SGMA Plans that overlap with SSHCP for purposes of protecting these areas and having a robust mitigation program makes sense and should be further explored.

Climate change will affect transportation. The transportation network is vital to the county and the region's economy, safety, and quality of life. While it is widely recognized that emissions from transportation have impacts on climate change, climate will also likely have significant impacts on transportation infrastructure and operations. Examples of specific types of impacts include softening of asphalt roads and warping of railroad rails; damage to roads; flooding of roadways, rail routes, and airports from extreme events; and interruptions to flight plans due to severe weather. Sacramento Area Council of Governments (SACOG) adopted a Transportation Climate Adaptation Plan that discusses the

vulnerabilities associated with climate. Climate change impacts considered in the plan include: extreme temperatures; increased precipitation, runoff and flooding; increased wildfires; and landslides. Although landslides are not a direct result of climate change, these events are expected to increase in frequency due to increased rainfall, runoff, and wildfire. These events have the potential to cause injuries or fatalities, environmental damage, property damage, infrastructure damage, and interruption of operations. Separately, new communities currently being master planned are including amenities such as bike and walking trails, separated facilities from roadways. During flood events, these trails serve as secondary transportation facilities when roadways are blocked or otherwise impassible. During Hurricane Sandy, bicycles were one of the primary modes used to deliver food and water to residents stranded in their homes due to flood. Including dual or multi-purpose facilities and amenities as part of all new development provides not just desirable community amenities but critical infrastructure for climate resiliency.

Climate change will affect land uses and planning. Climate change coupled with shifting demographics and market conditions, could impact both the location of desired developments and the nature of development. Demand may increase for smaller dwellings that are less resource intensive, more energy efficient, easier to maintain and can be more readily adapted or even moved in response to changing conditions. Compact, mixed-use and infill developments that can help residents avoid long commutes and vulnerabilities associated with the transportation system will likely continue to grow in popularity. The value of open space, urban greening, green infrastructure, tree canopy expansion and pressure to preserve it will likely increase, due in part to its restorative, recreational, environmental, and habitat, and physical and mental health benefits but also for its ability to sequester carbon and cool the surrounding environment.

Climate change will affect Utilities. California is already experiencing impacts from climate change such as an increased number of wildfires, sea level rise and severe drought¹. Utility efforts to deal with these impacts range from emergency and risk management protocols to new standards for infrastructure design and new resource management techniques. Utilities are just beginning to build additional resilience and redundancy into their infrastructure investments from a climate adaptation perspective, but have been doing so from an overall safety and reliability perspective for decades. Significant efforts are also being made in those areas that overlap with climate change mitigation² such as diversification of resources, specifically the addition of more renewables to the portfolio mix, as well as implementation of demand response efforts to curb peak demand. Efforts are also under way to upgrade the distribution grid infrastructure, which should add significant resilience to the grid as well. Through the DOE Partnership for Energy Sector Climate Resilience member utilities including SMUD and PG&E are preparing Vulnerability Assessments to identify priority climate and weather-related vulnerabilities. Next, they will issue a guidance document that expands upon the vulnerability assessments phase and includes plans for resilience solutions including cost/benefit analysis methodologies. The outcomes of this work will help to inform next steps on how infrastructure, the grid and other related operations will be modified to address climate change. New development will have to adapt and incorporate these new approaches as they evolve. Existing and new development will be affected from impacts that includes not only diminished capacity from all of the utility assets from generation to transmission and distribution, but also the cost consequences resulting from prevention, replacement, outage, and energy loss. These have the potential for greatly impacting not just residential development but commercial and industrial and all utility users.

Addressing Urban Heat Islands and Heat Events. New development will contribute to urban heat island (UHI) impacts and will need to incorporate urban greening methods into all aspects of development; interior

and exterior of buildings, surrounding environment and beyond. The Sacramento County Phase 1 Vulnerability Assessment already described that heat generated from the developed and urbanized areas of Sacramento moves across the county and region, settling and impacting the lower foothill communities. New development will need to reduce its impacts to the overall UHI impacts affecting the county and surrounding region. On-going and expanding heat wave awareness and assistance will also affect new development. During heat waves in Sacramento, a heat alert is issued and news organizations are provided with tips on how vulnerable people can protect themselves. Programs used by health departments to engage with thousands of block captains to check on elderly and other vulnerable residents, along with public cooling places extending their hours, or local businesses welcoming residents into their businesses for purposes of staying cool are examples of programs and services that will be necessary. Other programs to consider that could further involve hospitals and clinics are operating a “heatline” with nurses or other healthcare professionals ready to assist callers with heat-related health problems. In addition, continued funding for weatherization, reduced utility rates and similar programs that offers assistance to elderly, low-income residents to install roof insulation, solar, trees and cool surfaces to save energy and lower indoor temperatures.

4.3.6. Dam Failure Vulnerability Assessment

Likelihood of Future Occurrence—Unlikely

Vulnerability—Medium

Dam failure flooding can occur as the result of partial or complete collapse of an impoundment. Dam failures often result from prolonged rainfall and flooding. The primary danger associated with dam failure is the high velocity flooding of those properties downstream of the dam.

A dam failure can range from a small, uncontrolled release to a catastrophic failure. Vulnerability to dam failures is confined to the areas subject to inundation downstream of the facility. Secondary losses would include loss of the multi-use functions of the facility and associated revenues that accompany those functions.

Dam failure flooding would vary by community depending on which dam fails and the nature and extent of the dam failure and associated flooding. Based on the risk assessment, it is apparent that a major dam failure could have a devastating impact on the Planning Area. Dam failure flooding presents a threat to life and property, including buildings, their contents, and their use. Large flood events can affect crops and livestock as well as lifeline utilities (e.g., water, sewerage, and power), transportation, jobs, tourism, the environment, and the local and regional economies.

According to the Sacramento County General Plan Background report, there are four major and two minor dams which, if they fail, may impact the people and resources of this jurisdiction. The major dams are comprised of Shasta on the Sacramento, Oroville on the Feather, Comanche on the Mokelumne and Folsom on the American. The minor dams include Nimbus and Rancho Seco. All of these 6 dams are high hazard dams. More specific information about these dams can be found in Figure 4-22 and Table 4-25 in Section 4.2.9. According to the report, a catastrophic failure of any of these dams could have a significant impact on the County. The failure of any of these dams would cause downstream flooding and would likely result in loss of life and property. The potential magnitude of a dam failure depends on the time of year and the

base flow of the river when the failure occurs. During the winter months, when river flows are higher, the impact to the area would be much greater and evacuation times much less.

Folsom Dam (including the earth-filled dikes) would have the greatest impact on Sacramento County should it fail. The flood waters from this system would affect the cities of Sacramento and Folsom and the surrounding unincorporated area. Due to limited availability of data of these six dams with the potential to impact the County, further vulnerability analyses was limited to a catastrophic failure of Folsom Dam.

The earthen dikes to the north of Folsom Dam would impact those people in the relatively low areas of Sacramento County leading to Roseville. The water would then flow into the Natomas Area of the City of Sacramento and then, depending on which levees held, this water could fill the old Lake Natomas bed and possibly flood the North Highlands and Rio Linda areas. Failure of the earthen dikes to the south of Folsom Dam would impact the City of Folsom immediately. Water would then flow into the American River basin, eventually arriving in downtown Sacramento.

Nimbus Dam has a capacity of 8,760 acre-feet. The Flood Operations Branch, Department of Water Resources, State of California, believes that the American River Channel will not flood unless the levees fail or there is a catastrophic release. SMUD inundation map indicates that a failure of the Rancho Seco Dam would flow to the Laguna Creek Basin and stop approximately at Stockton Boulevard. Failure of Shasta Dam would affect populations south along the Sacramento River basin to about Knights Landing where it would lose momentum. An Oroville Dam failure would impact populations southwest along the Feather River basin to about the Yolo Bypass. Sacramento County would not be affected unless all dams fail at once. A failure at Comanche Dam would affect the Delta and possibly slow the flow of other rivers through the Delta. The Bureau of Reclamation indicated the water would stop short of the Sacramento-San Joaquin County line at Interstate 5.

Assets at Risk

As described above, Folsom Dam would have the greatest impact on the Planning Area should a failure occur. Sacramento County provided a GIS inundation layer to determine the possible impacts of a Folsom Dam failure within the County and how the risk varies across the Planning Area. The methodology detailed below was followed in determining assets at risk to a dam failure. Analysis on assets at risk is provided for two different areas in this Base Plan:

- Sacramento County Planning Area
- Unincorporated Sacramento County

The Sacramento County Planning Area includes both the unincorporated County and each jurisdiction, essentially the entire geographical area of Sacramento County. Summary tables for the Planning Area are presented below. For the unincorporated County, both summary and detail tables are shown and discussed below. Detail tables for the participating jurisdictions are included in their respective annexes to this plan.

Folsom Dam and Inundation Mapping

The Folsom Dam and Reservoir Project is located on the American River, about 20 miles upstream of the City of Sacramento, California. It was designed and built by the Corps of Engineers during the period 1948

to 1956, and is now owned and operated by the U.S. Bureau of Reclamation. The reservoir has a storage capacity of 1 million acre-ft at gross pool. The project includes about 4.5 miles of man-made water retaining structure that have a crest elevation of 480.5ft above sea level. Although flood control improvements to the Folsom Dam are ongoing, this Folsom Dam inundation study still represents a worst case scenario for the Planning Area.

The Bureau of Reclamation performed an inundation study in an attempt to determine the magnitude of flooding that would result from various breach scenarios of structures located around the reservoir. The structures are Folsom Dam itself, its right wing dam, dikes 4, 5, 6, 7, 8, and Mormon Island. The results of these hydrodynamic simulations are used to generate potential inundation maps that can aid in the development of emergency actions plans and other plans such as this LHMP

Methodology

GIS was used to quantify assets at risk to a Folsom Dam failure in the County. Sacramento County provided the inundation mapping as a GIS layer for the Folsom Dam system, as part of the following breaks:

- Folsom Right Wing
- Folsom Mormon
- Folsom Dike 4
- Folsom Dike 5
- Folsom Dike 6
- Folsom Dike 7
- Folsom Dike 8
- Folsom Dam

Sacramento's parcel and associated secured roll assessor 2015 data was used as the basis for the countywide inventory of parcels and structure value. GIS was used to create a centroid, or point representing the center of the parcel polygon. The Folsom Inundation data was then overlaid on the parcel centroids to determine how much value is at risk to this worst case scenario dam failure.

The model assumes that every parcel with a structure or other improved value greater than zero is improved in some way. This approach was used to support the parcel layer analysis as there was no associated building layer available for this analysis. Once completed, the parcel boundary layer was joined to the centroid layer and values were transferred based on the identification number in the Assessors database and the GIS parcel layer.

The property use summary categories (derived from the Use Code categories) previously assigned to the detailed assessor database were used to develop content value and show potential loss from hazards. These are shown in Table 4-55.

Table 4-55 Sacramento County Property Use Type Hazus Assignments

| Hazus Property Use Category | Sacramento County Property Use Types |
|-----------------------------|--------------------------------------|
| Residential | Residential |
| Agricultural | Agricultural |

| Hazus Property Use Category | Sacramento County Property Use Types |
|-----------------------------|--|
| Commercial | Office Retail / Commercial |
| Institutional | Care / Health Church / Welfare |
| Other | Miscellaneous No Data Public / Utilities Recreational |
| Industrial | Industrial |
| Vacant Land | Vacant |

Content values estimations are based on FEMA Hazus methodologies, which estimates value as a percent of improved structure values by property type/use. Table 4-68 shows the breakdown of the different property types in Sacramento County and their estimated content replacement value percentages.

Table 4-56 Content Replacement Factors

| Property Use | Content Replacement Values |
|---------------|----------------------------|
| Residential | 50% |
| Agricultural | 100% |
| Commercial | 100% |
| Institutional | 100% |
| Other | 100% |
| Industrial | 150% |
| Vacant Land | 0% |

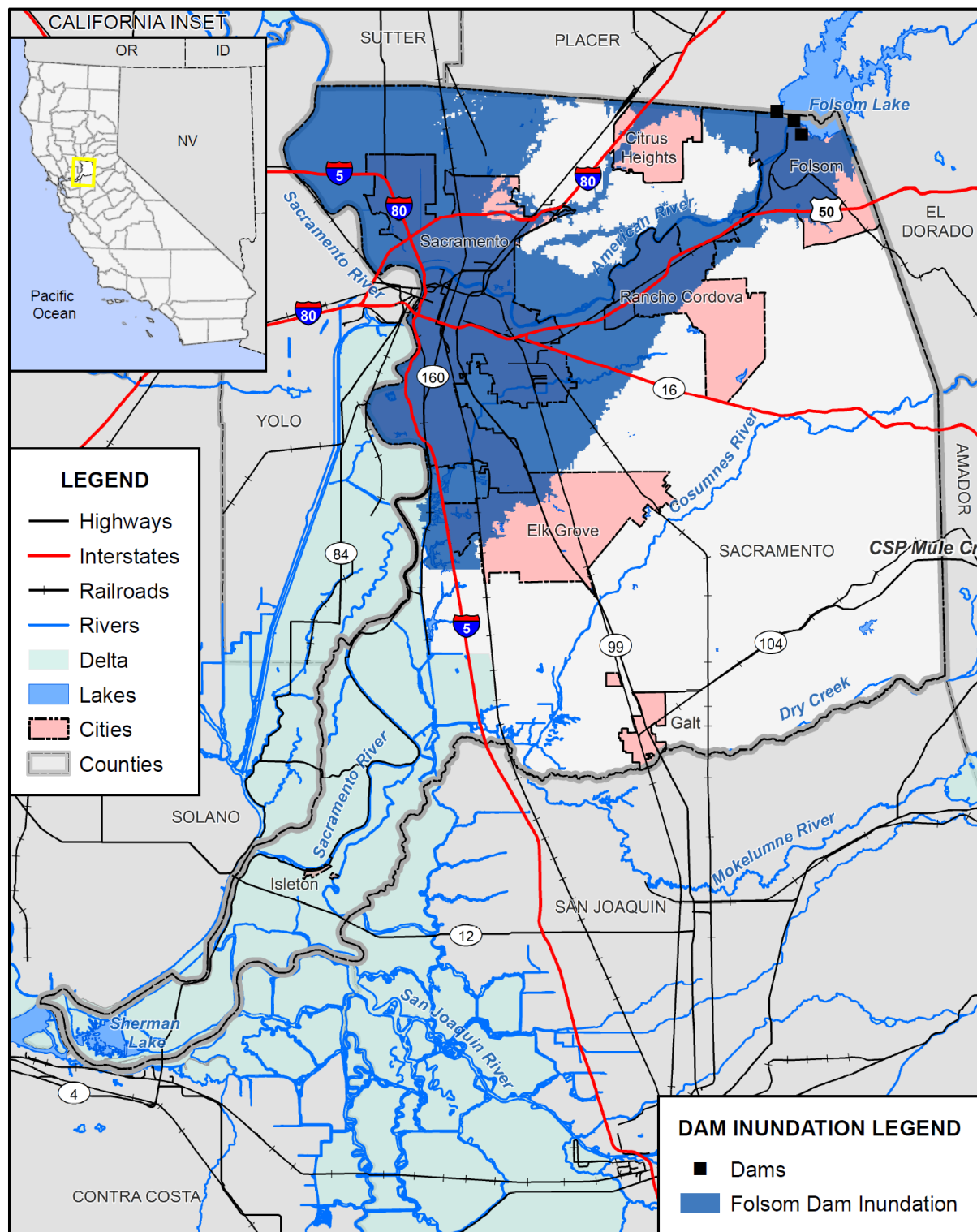
Source: Hazus

Values at Risk

Losses are related to a number of potential factors including inundation depth, velocity, and building type and construction. The loss estimate for dam inundation is based on the total of improved and contents value. Improved parcels include those with structures as well as other improvements identified in the Assessor's database. Only improved parcels and the value of their improvements were included in this dam inundation analysis.

The end result of the Folsom dam inundation analysis is an inventory of the numbers, types and values of parcels subject to the flood hazard. Figure 4-75 depicts possible dam inundation areas in the County from a failure of the Folsom Dam.

Figure 4-75 Sacramento County Planning Area Folsom Dam Inundation Scenario



0 10 20 Miles



Data Source: Sacramento County GIS, Cal-Atlas, National Inventory of Dams; Map Date: 05/2016.

Sacramento County Planning Area

Table 4-57 contains dam inundation analysis results for the entire Sacramento County Planning Area. This includes unincorporated Sacramento County and the incorporated jurisdictions. This table shows the number of parcels and assets at risk to dam inundation from a Folsom Dam failure event. Table 4-57 shows the value of improved parcels by jurisdiction. Results of this analysis are presented for the Sacramento County Planning Area.

Table 4-57 Sacramento County Planning Area – Parcel Count and Values at Risk in Folsom Dam Break Inundation Area by Jurisdiction

| Jurisdiction | Total Parcel Count | Imp. Parcel Count | Total Land Value | Improved Structure Value | Total Value |
|----------------------------------|--------------------|-------------------|-------------------------|--------------------------|-------------------------|
| Citrus Heights | 4,555 | 4,287 | \$290,331,369 | \$618,773,206 | \$909,104,575 |
| Elk Grove | 16,339 | 15,626 | \$1,373,897,822 | \$3,812,723,768 | \$5,186,621,590 |
| Folsom | 17,081 | 15,661 | \$2,174,391,545 | \$5,660,120,896 | \$7,834,512,441 |
| Galt | 0 | 0 | \$0 | \$0 | \$0 |
| Isleton | 0 | 0 | \$0 | \$0 | \$0 |
| Rancho Cordova | 15,601 | 14,480 | \$1,417,291,859 | \$3,788,739,950 | \$5,206,031,809 |
| City of Sacramento | 140,666 | 127,533 | \$11,337,851,499 | \$28,474,069,514 | \$39,811,921,013 |
| Unincorporated Sacramento County | 69,494 | 63,782 | \$6,106,346,512 | \$13,467,145,529 | \$19,573,492,041 |
| Total | 263,736 | 241,369 | \$22,700,110,606 | \$55,821,572,863 | \$78,521,683,469 |

Source: Sacramento County GIS, Sacramento County 2016 Parcel/2015 Assessor's Data

Table 4-58 shows potential losses from a Folsom Dam failure with loss estimate and loss ratios for the Sacramento County Planning Area. The loss ratio is the loss estimate divided by the total potential exposure (i.e., total of improved and contents value for all parcels located in the unincorporated County) and displayed as a percentage of loss. Due to the varying flood depths that may occur during flooding, the loss estimate uses 3 scenarios: 3-foot flood depth (30% damage), 6-foot flood depth (60% damage to structure and contents), and total loss (all structure and contents are lost). Land values are not included in the loss estimates, as the land itself is usually not a loss. FEMA considers loss ratios greater than 10% to be significant and an indicator that a community may have more difficulties recovering from a dam failure.

Table 4-58 Sacramento County Planning Area – Dam Inundation Loss Estimates

| Flood Zone | Improved Parcel Count* | Improved Structure Value | Estimated Contents Value | Total Value | Loss Estimate* | Loss Ratio |
|-----------------------|------------------------|--------------------------|--------------------------|------------------|---|-------------------------|
| Folsom Dam Inundation | 241,369 | \$55,821,572,863 | \$36,931,038,925 | \$92,752,611,788 | \$27,825,783,536.40 \$55,651,567,072.80 \$92,752,611,788.00 | 21.4% 42.9% 71.5% |

Source: Sacramento County GIS, Sacramento County 2016 Parcel/2015 Assessor's Data

*Three values are shown here due to varying flood depths expected – 3 foot, 6 foot, and total loss.

According to the information in Table 4-57 and Table 4-58, the Sacramento County Planning Area has 241,369 improved parcels and roughly \$92.8 billion of structure and contents value in the Folsom Dam inundation area. The 3-foot loss ratio of 21.4%, the 6-foot loss ratio of 42.9%, and the total loss ratio of 71.5% indicates that the Sacramento County Planning Area has large amounts of assets at risk to a possible Folsom Dam failure.

Unincorporated Sacramento County

Table 4-59 contains dam inundation analysis results for unincorporated Sacramento County. These tables show the number of parcels and assets at risk to dam inundation from a Folsom Dam failure event. Table 4-59 shows the value of improved parcels by land use. Results of this analysis are presented for the unincorporated Sacramento County.

Table 4-59 Unincorporated Sacramento County – Parcel Count and Structure Value in Folsom Dam Break Inundation Area

| Property Use | Total Parcel Count | Improved Parcel Count | Total Land Value | Improved Structure Value | Total Value |
|---------------------|--------------------|-----------------------|------------------------|--------------------------|-------------------------|
| Agricultural | 190 | 44 | \$70,372,280 | \$5,367,678 | \$75,739,958 |
| Care / Health | 119 | 110 | \$35,649,284 | \$207,960,127 | \$243,609,411 |
| Church / Welfare | 216 | 189 | \$67,899,492 | \$277,779,355 | \$345,678,847 |
| Industrial | 898 | 756 | \$344,047,576 | \$907,010,158 | \$1,251,057,734 |
| Miscellaneous | 535 | 3 | \$2,424,367 | \$33,114 | \$2,457,481 |
| Office | 564 | 509 | \$267,400,116 | \$842,663,098 | \$1,110,063,214 |
| Public / Utilities | 1,394 | 13 | \$6,055,285 | \$3,390,584 | \$9,445,869 |
| Recreational | 49 | 39 | \$24,751,939 | \$33,940,139 | \$58,692,078 |
| Residential | 61,968 | 61,049 | \$4,382,324,854 | \$10,184,187,333 | \$14,566,512,187 |
| Retail / Commercial | 1,038 | 963 | \$537,962,843 | \$996,790,236 | \$1,534,753,079 |
| Vacant | 2,519 | 107 | \$367,379,968 | \$8,023,707 | \$375,403,675 |
| No Data | 4 | 0 | \$78,508 | \$0 | \$78,508 |
| Total | 69,494 | 63,782 | \$6,106,346,512 | \$13,467,145,529 | \$19,573,492,041 |

Source: Sacramento County 2016 Parcel/2015 Assessor's Data

Table 4-60 shows potential losses from a Folsom Dam failure with loss estimate and loss ratios for the unincorporated County. The loss ratio is the loss estimate divided by the total potential exposure (i.e., total of improved and contents value for all parcels located in the unincorporated County) and displayed as a percentage of loss. Due to the varying flood depths that may occur during flooding, the loss estimate uses 3 scenarios: 3-foot flood depth (30% damage), 6-foot flood depth (60% damage to structure and contents), and total loss (all structure and contents are lost). Land values are not included in the loss estimates, as the land itself is usually not a loss. FEMA considers loss ratios greater than 10% to be significant and an indicator that a community may have more difficulties recovering from a dam failure.

Table 4-60 Unincorporated Sacramento County – Dam Inundation Loss Estimates

| Flood Zone | Improved Parcel Count* | Improved Structure Value | Estimated Contents Value | Total Value | Loss Estimate* | Loss Ratio |
|-----------------------|------------------------|--------------------------|--------------------------|------------------|--|-------------------------|
| Folsom Dam Inundation | 63,782 | \$13,467,145,529 | \$8,820,533,235 | \$22,287,678,764 | \$6,686,303,629.20 13,372,607,258.40 \$22,287,678,764.00 | 14.2% 28.4% 47.3% |

Source: Sacramento County GIS, Sacramento County 2016 Parcel/2015 Assessor's Data

*Three values are shown here due to varying flood depths expected – 3 foot, 6 foot, and total loss.

According to the information in Table 4-59 and Table 4-60, the unincorporated Sacramento County has 63,872 improved parcels and roughly \$22.3 billion of structure and contents value in the Folsom Dam inundation area. The 3-foot loss ratio of 14.2%, the 6-foot loss ratio of 28.4%, and the total loss ratio of 47.3% indicates that while the County has large amounts of assets at risk to a possible Folsom Dam failure.

Population at Risk

As part of this Folsom Dam Inundation analysis, the population at risk to a Folsom Dam failure was determined. Using GIS, the Folsom Dam Inundation Zone was overlaid on the improved residential parcel data. Those residential parcel centroids that intersect the dam inundation area were counted and multiplied by the Census Bureau Sacramento County household factor for each jurisdiction; results were tabulated by jurisdiction (see Table 4-61). According to this analysis, there is a total population of 622,929 in the Folsom Dam Inundation Zone for the entire Sacramento County Planning Area. There are 165,443 people in the unincorporated County in the Folsom Dam Inundation Zone.

Table 4-61 Population in the Folsom Dam Inundation Area

| Jurisdiction | Improved Residential Parcels | Total Population* |
|----------------|------------------------------|-------------------|
| Citrus Heights | 5,221 | 13,209 |
| Elk Grove | 15,475 | 49,211 |
| Folsom | 15,082 | 39,364 |
| Galt | 0 | 0 |
| Isleton | 0 | 0 |
| Rancho Cordova | 13,548 | 37,257 |
| Sacramento | 121,544 | 318,445 |
| Unincorporated | 61,049 | 165,443 |
| Total | 231,919 | 622,929 |

Source: Sacramento County 2016 Parcel/2015 Assessor's Data, US Census Bureau

*Census Bureau 2010 average household sizes are: Citrus Heights – 2.53; Elk Grove – 3.18; Folsom – 2.61; Galt – 3.24; Isleton – 2.43; Rancho Cordova – 2.75; City of Sacramento – 2.62; Unincorporated County – 2.71

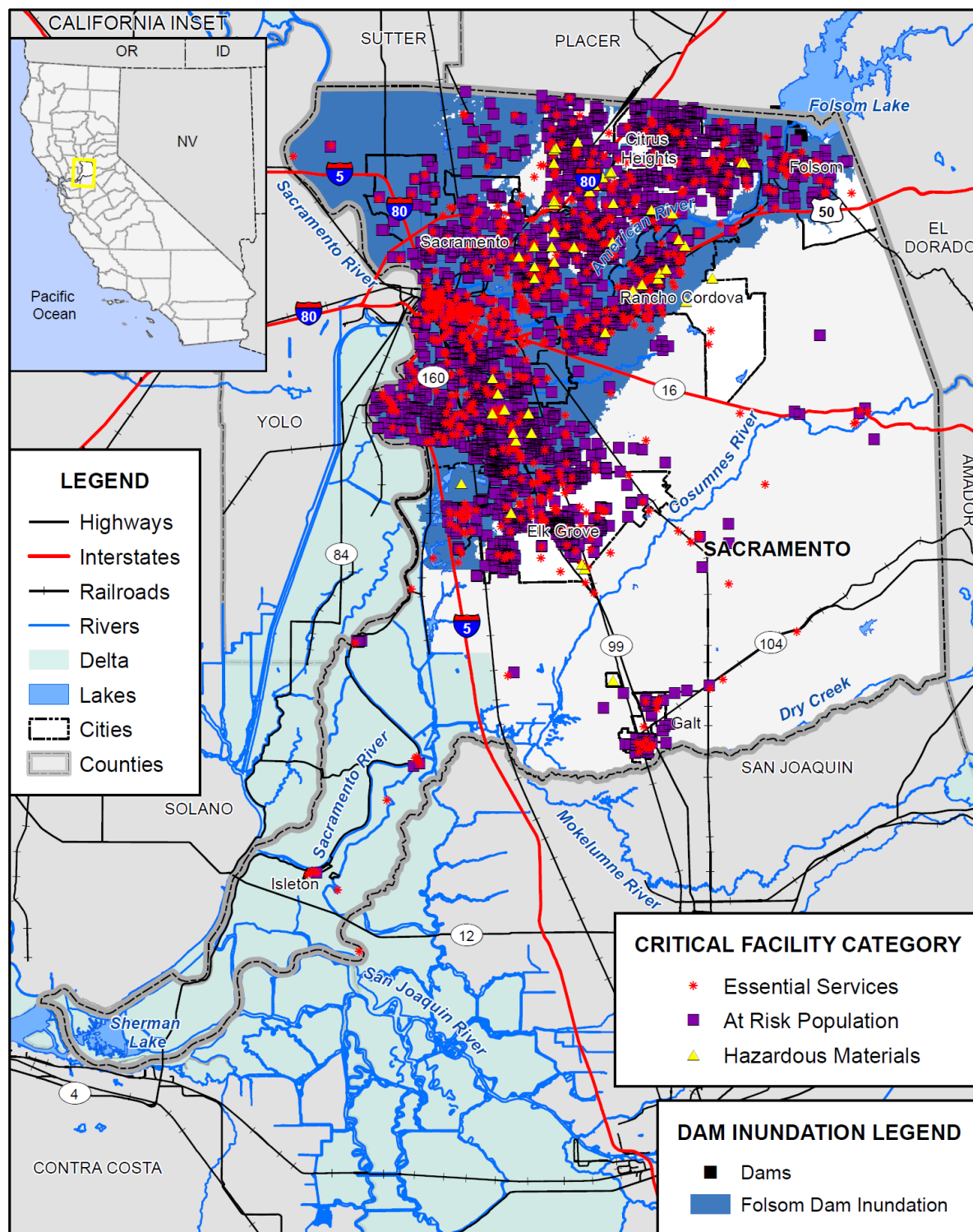
Cultural and Natural Resources at Risk

The Sacramento County Planning Area has significant cultural and natural resources located throughout the County as previously described. Vulnerability analysis of these resources specific to dam failure was not possible due to data limitations.

Critical Facilities at Risk

A separate analysis was performed on the critical facility inventory in Sacramento County and all jurisdictions. GIS was used to determine whether the facility locations intersect the dam inundation hazard area. There are 1,845 facilities in the inundation area, as shown in Figure 4-76, Table 4-62 (for the Planning area), and Table 4-63 (for the unincorporated County). Details of critical facility definition, type, name and address and jurisdiction in the Folsom dam inundation area are listed in Appendix E.

Figure 4-76 Sacramento County Planning Area Critical Facilities in the Folsom Dam Inundation Area



Data Source: Sacramento County GIS, Cal-Atlas, National Inventory of Dams; Map Date: 05/2016.

Table 4-62 Sacramento County Planning Area – Critical Facilities in the Folsom Dam Inundation Area

| Critical Facility Category | Facility Type | Facility Count |
|-------------------------------|-------------------------------|----------------|
| Essential Services Facilities | Airport | 5 |
| | Arena | 1 |
| | Bus Terminal | 7 |
| | Convention Center | 1 |
| | Detention Basin | 25 |
| | Dispatch Center | 1 |
| | Drainage | 6 |
| | Emergency Evacuation Shelter | 150 |
| | Emergency Rooms | 1 |
| | EOC | 1 |
| | Fire Station | 54 |
| | Gas Storage | 1 |
| | General Acute Care Hospital | 9 |
| | Government Facilities | 48 |
| | Hospitals | 1 |
| | Light Rail Stop | 52 |
| | Medical Health Facility | 156 |
| | Police | 9 |
| | Sand Bag | 2 |
| | Stadium | 3 |
| | State Facility | 1 |
| | Traffic Operations Center | 1 |
| | Train Station | 1 |
| | Vehicle and Equipment Storage | 1 |
| | Water Treatment Plant | 3 |
| | Total | 540 |
| At Risk Population Facilities | Adult Day Care | 16 |
| | Adult Education School | 8 |
| | Adult Residential | 222 |
| | Alternative Education School | 2 |
| | Assisted Living Centers | 14 |
| | Charter School | 18 |
| | Children's Home | 1 |
| | College/University | 7 |
| | Community Day School | 5 |

| Critical Facility Category | Facility Type | Facility Count |
|--------------------------------|---------------------------------|----------------|
| | Day Care Center | 291 |
| | Detention Center | 1 |
| | Group Home | 53 |
| | Hotel | 44 |
| | Independent Study School | 2 |
| | Infant Center | 25 |
| | JAIL | 1 |
| | Prison | 1 |
| | Private Elementary School | 36 |
| | Private High School | 20 |
| | Private K-12 School | 18 |
| | Public Continuation High School | 12 |
| | Public Elementary School | 147 |
| | Public High School | 20 |
| | Public Middle School | 27 |
| | Residential Care/Elderly | 210 |
| | School | 10 |
| | School-Age Day Care Center | 62 |
| | Social Rehabilitation Facility | 2 |
| | Special Education School | 4 |
| | Total | 1,279 |
| Hazardous Materials Facilities | Oil Collection Center | 25 |
| | Sewer Treatment Plant | 1 |
| | Total | 26 |
| | | |
| Total | | 1,845 |

Source: Sacramento County GIS

Table 4-63 Unincorporated Sacramento County – Critical Facilities in the Folsom Dam Inundation Area

| Critical Facility Category | Facility Type | Facility Count |
|-------------------------------------|------------------------------|----------------|
| Essential Services Facilities Total | Airport | 4 |
| | Bus Terminal | 1 |
| | Detention Basin | 3 |
| | Emergency Evacuation Shelter | 48 |
| | Fire Station | 23 |
| | General Acute Care Hospital | 1 |

| Critical Facility Category | Facility Type | Facility Count |
|-------------------------------------|---------------------------------|----------------|
| | Government Facilities | 12 |
| | Light Rail Stop | 6 |
| | Medical Health Facility | 37 |
| | Police | 3 |
| | Stadium | 1 |
| | Traffic Operations Center | 1 |
| | Vehicle and Equipment Storage | 1 |
| | Total | 141 |
| At Risk Population Facilities Total | Adult Day Care | 4 |
| | Adult Education School | 3 |
| | Adult Residential | 83 |
| | Charter School | 4 |
| | College/University | 1 |
| | Community Day School | 3 |
| | Day Care Center | 77 |
| | Detention Center | 1 |
| | Group Home | 28 |
| | Hotel | 4 |
| | Infant Center | 9 |
| | Private Elementary School | 6 |
| | Private High School | 9 |
| | Private K-12 School | 8 |
| | Public Continuation High School | 7 |
| | Public Elementary School | 37 |
| | Public High School | 5 |
| | Public Middle School | 9 |
| | Residential Care/Elderly | 82 |
| | School-Age Day Care Center | 14 |
| | Social Rehabilitation Facility | 1 |
| | Special Education School | 1 |
| | Total | 396 |
| Hazardous Materials Facilities | Oil Collection Center | 14 |
| | Sewer Treatment Plant | 1 |
| | Total | 15 |
| | | |
| Total | | 552 |

Source: Sacramento County GIS

Overall Community Impact

Dam failure floods and their impacts vary by location, antecedent rainfall, type of dam failure, and will likely only affect certain areas of the County during specific times. Based on the risk assessment, it is evident that a dam failure flood could have potentially devastating economic impacts to certain areas of the County. Impacts that are not quantified, but can be anticipated in large future events, include:

- Injury and loss of life;
- Commercial and residential structural and property damage;
- Disruption of and damage to public infrastructure and services;
- Health hazards associated with mold and mildew, contamination of drinking water, etc.;
- Damage to roads/bridges resulting in loss of mobility;
- Significant economic impact (jobs, sales, tax revenue) to the community;
- Negative impact on commercial and residential property values; and
- Significant disruption to students and teachers as temporary facilities and relocations would likely be needed.
- Impact on the overall mental health of the community.

Future Development

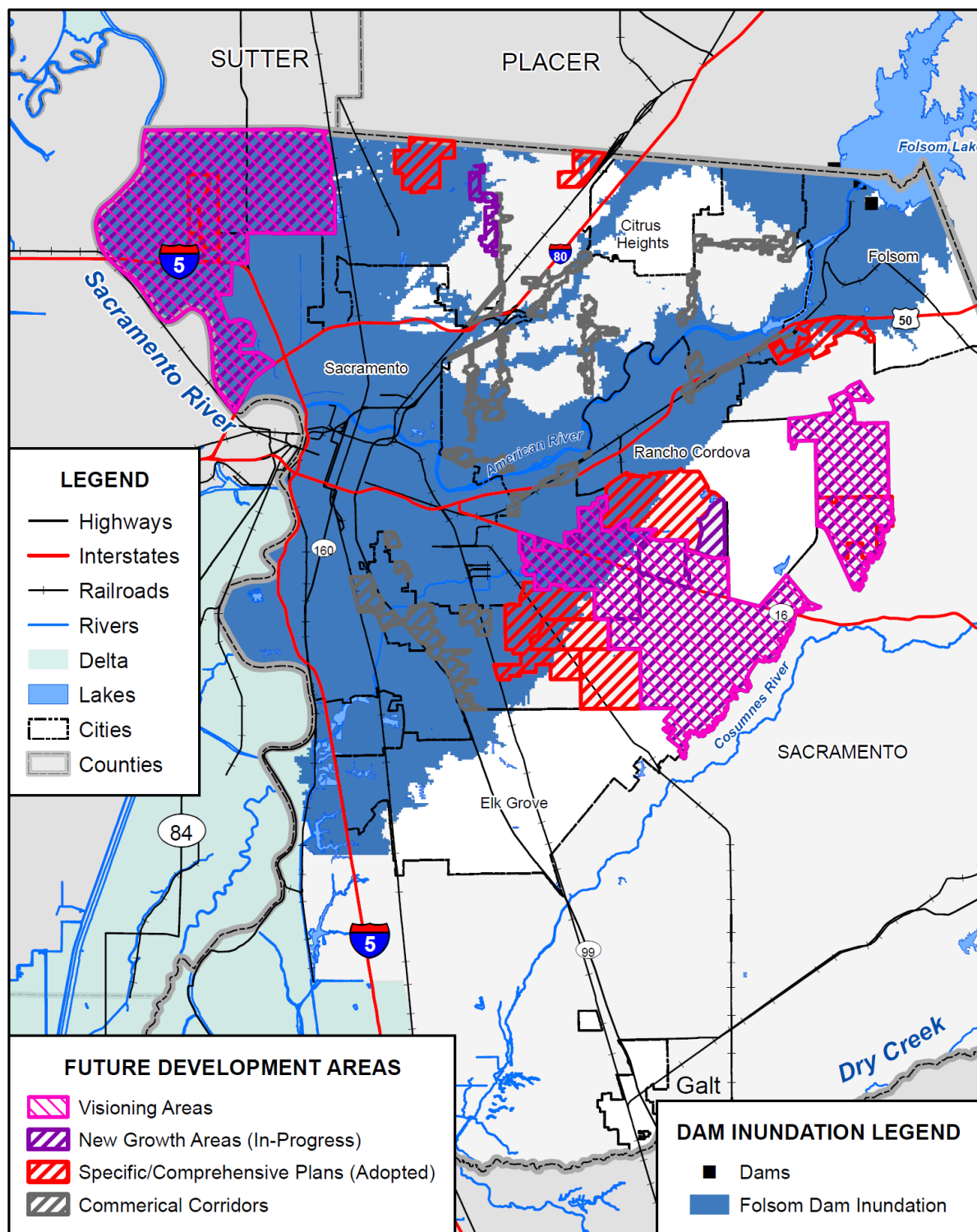
Although new growth and development corridors would fall in the area flooded by a dam failure, given the limited potential of total dam failure and the large area that a dam failure would affect, development in the dam inundation area will continue to occur.

Future Development: Inundation Analysis

Future development areas for unincorporated Sacramento County, which are broken out by visioning areas, new growth areas, specific/comprehensive plan areas, and commercial corridors, is maintained by Sacramento County and was made available for this Plan Update. An analysis was performed to quantify parcels within these future development areas that fall within dam inundation areas. This analysis provides information on how and where to grow in the future.

GIS was used to determine the number of parcels in the dam inundation zones within the four categories of future development areas. GIS was used to create a centroid, or point representing the center of the parcel polygon. Those parcels centroids that fall inside the future development areas and within the dam inundation zone are shown on Figure 4-77 and tabulated in Table 4-64.

Figure 4-77 Unincorporated Sacramento County– Future Development in Folsom Dam Inundation Area



Foster
Morrison

0 6.5 13 Miles

SACRAMENTO
COUNTY

Data Source: Sacramento County GIS, Cal-Atlas, National Inventory of Dams; Map Date: 05/2016.

Table 4-64 Unincorporated Sacramento County– Future Development in Folsom Dam Inundation Area

| Future Development Area | Parcels | Acres | Dam Inundation Area |
|---------------------------------------|---------|--------|---------------------|
| Visioning Areas | | | |
| Jackson | 1,099 | 21,670 | Yes |
| Natomas | 907 | 24,504 | Yes |
| Grantline East | 48 | 8,198 | No |
| New Growth Areas | | | |
| Mather South Master Plan | 12 | 1,299 | No |
| Natomas North | 907 | 24,504 | Yes |
| Jackson Township | 61 | 1,909 | Yes |
| West Jackson Highway | 455 | 6,181 | Yes |
| New Bridge | 27 | 1,339 | No |
| West of Watt | 383 | 609 | Yes |
| Specific/Commercial Plan Areas | | | |
| Cordova Hills Master Plan | 26 | 2,436 | No |
| East Antelope Specific Plan | 1,425 | 601 | Yes |
| Easton Project | 19 | 1,409 | Yes |
| Elverta Specific Plan | 158 | 1,581 | Yes |
| Florin-Vineyard Gap Community Plan | 827 | 3,875 | Yes |
| Jackson Township Master Plan | 61 | 1,909 | Yes |
| Mather Field | 1,421 | 5,493 | Yes |
| Mather South Master Plan | 12 | 1,299 | No |
| Metro Airpark | 78 | 1,810 | Yes |
| New Bridge Master Plan | 27 | 1,339 | No |
| North Vineyard Station Specific Plan | 1,320 | 1,553 | Yes |
| Vineyard Springs Comprehensive Plan | 2,732 | 2,344 | No |
| West Jackson Highway Master Plan | 455 | 6,181 | Yes |
| West of Watt | 383 | 609 | Yes |
| Commercial Corridor Areas | | | |
| Corridor 1 | 1,277 | 554 | Yes |
| Corridor 2 | 533 | 226 | Yes |
| Corridor 3 | 1,033 | 625 | Yes |
| Corridor 4 | 626 | 532 | Yes |
| Corridor 5 | 516 | 621 | Yes |
| Corridor 6 | 579 | 311 | Yes |
| Corridor 7 | 722 | 460 | Yes |
| Corridor 8 | 126 | 136 | Yes |

| Future Development Area | Parcels | Acres | Dam Inundation Area |
|-------------------------|---------|-------|---------------------|
| Corridor 9 | 946 | 290 | Yes |
| Corridor 10 | 593 | 101 | Yes |
| Corridor 11 | 266 | 76 | Yes |
| Corridor 12 | 2,537 | 1,929 | Yes |
| Corridor 13 | 325 | 402 | Yes |
| Corridor 14 | 30 | 155 | Yes |
| Corridor 15 | 224 | 465 | Yes |
| Corridor 16 | 31 | 11 | Yes |
| Corridor 17 | 203 | 254 | Yes |
| Corridor 18 | 3 | 1 | Yes |
| Corridor 19 | 48 | 130 | Yes |

Source: Sacramento County GIS

4.3.7. Drought and Water Shortage Vulnerability Assessment

Likelihood of Future Occurrence—Likely

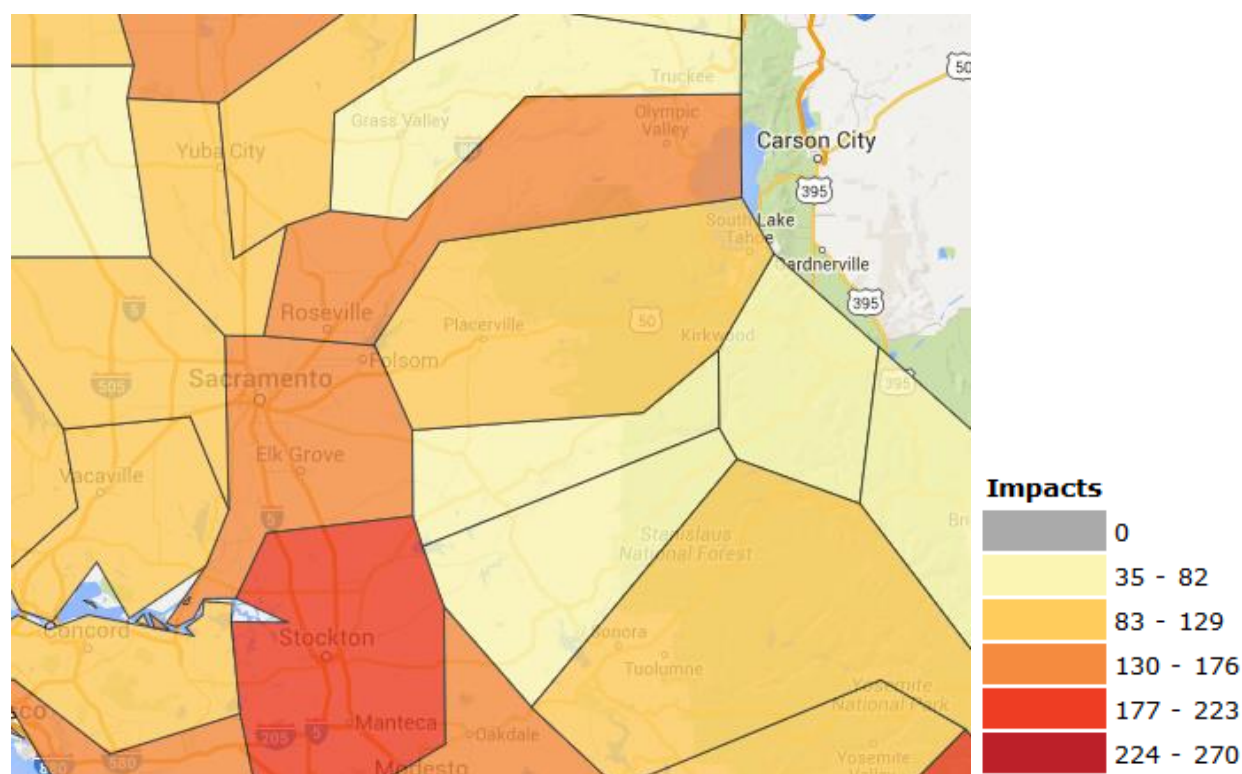
Vulnerability—Medium

Drought is different than many of the other natural hazards in that it is not a distinct event and usually has a slow onset. Drought can severely impact a region both physically and economically. Drought affects different sectors in different ways and with varying intensities. Adequate water is the most critical issue for agricultural, manufacturing, tourism, recreation, and commercial and domestic use. As the population in the area continues to grow, so will the demand for water.

Based on historical information, the occurrence of drought in California, including Sacramento County, is cyclical, driven by weather patterns. Drought has occurred in the past and will occur in the future. Periods of actual drought with adverse impacts can vary in duration, and the period between droughts is often extended. Although an area may be under an extended dry period, determining when it becomes a drought is based on impacts to individual water users. The vulnerability of Sacramento County to drought is countywide, but impacts may vary and include reduction in water supply, agricultural losses, and an increase in dry fuels.

Drought impacts are wide-reaching and may be economic, environmental, and/or societal. Tracking drought impacts can be difficult. The Drought Impact Reporter from the NDMC is a useful reference tool that compiles reported drought impacts nationwide. Figure 4-78 and Table 4-65 show drought impacts for the Sacramento County Planning Area from 1850 to June 2016. The data represented is skewed, with the majority of these impacts from records within the past 15 years.

Figure 4-78 Drought Impact Monitor for Sacramento County, 1850 to 2016



Source: National Drought Mitigation Center

Table 4-65 Sacramento County Drought Impacts

| Category | Number of Impacts |
|------------------------------------|-------------------|
| Agriculture | 43 |
| Business and Industry | 8 |
| Energy | 3 |
| Fire | 14 |
| Plants & Wildlife | 49 |
| Relief, Response, and Restrictions | 84 |
| Society and Public Health | 41 |
| Tourism and Recreation | 12 |
| Water Supply and Quality | 95 |
| Total | 349 |

Source: National Drought Mitigation Center

The most significant qualitative impacts associated with drought in the Planning Area are those related to water intensive activities such as agriculture, wildfire protection, municipal usage, commerce, tourism, recreation, and wildlife preservation. Mandatory conservation measures are typically implemented during extended droughts. A reduction of electric power generation and water quality deterioration are also

potential problems. Drought conditions can also cause soil to compact and not absorb water well, potentially making an area more susceptible to flooding.

It is difficult to quantitatively assess drought impacts to Sacramento County because not many county-specific studies have been conducted. Some factors to consider include: the impacts of fallowed agricultural land, habitat loss and associated effects on wildlife, and the drawdown of the groundwater table. The most direct and likely most difficult drought impact to quantify is to local economies, especially agricultural economies. The State has conducted some empirical studies on the economic effects of fallowed lands with regard to water purchased by the State's Water Bank; but these studies do not quantitatively address the situation in Sacramento County. It can be assumed, however, that the loss of production in one sector of the economy would affect other sectors.

The drawdown of the groundwater table is one factor that has been recognized to occur during repeated dry years. Lowering of groundwater levels results in the need to deepen wells, which subsequently lead to increased pumping costs. These costs are a major consideration for residents relying on domestic wells and agricultural producers that irrigate with groundwater and/or use it for frost protection. Land subsidence can also occur when the groundwater table is depleted.

Drought and Bark Beetles

One of the specific vulnerabilities of drought in Sacramento County is the increased risk to trees from beetle kill. Bark beetles mine the inner bark (the phloem-cambial region) on twigs, branches, or trunks of trees and shrubs. This activity often starts a flow of tree sap in conifers, but sometimes even in hardwoods like elm and walnut. Bark beetles frequently attack trees weakened by drought, disease, injuries, or other factors that may stress the tree. Bark beetles can contribute to the decline and eventual death of trees; however only a few aggressive species are known to be the sole cause of tree mortality (see Figure 4-79).

Figure 4-79 Monterey Pine Killed by Engraver Beetles



Source: University of California

In addition to attacking larger limbs, some species such as cedar and cypress bark beetles feed by mining twigs up to 6 inches back from the end of the branch, resulting in dead tips. These discolored shoots hanging on the tree are often referred to as “flagging” or “flags.” (see Figure 4-80) Adult elm bark beetles feed on the inner bark of twigs before laying eggs. If an adult has emerged from cut logs or a portion of a tree that is infected by Dutch elm disease, the beetle’s body will be contaminated with fungal spores. When the adult beetle feeds on twigs, the beetle infects healthy elms with the fungi that cause Dutch elm disease. Elms showing yellowing or wilting branches in spring may be infected with Dutch elm disease.

Figure 4-80 Flag Tips from Cypress Bark Beetle Feeding



Source: University of California

More information regarding tree mortality is discussed in the wildfire vulnerability in Section 4.3.16.

Future Development

According to the 2010 Urban Water Management Plan, Sacramento County, through the Sacramento County Water Agency, has access to large quantities of water through surface water, groundwater, and recycled water. However, population growth in the County will add additional pressure to water companies during periods of drought and water shortage. Water companies will need to continue to plan for and add infrastructure capacity for population growth.

4.3.8. Earthquake Vulnerability Assessment

Likelihood of Future Occurrence—Occasional

Vulnerability—Medium

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

Ground shaking is the primary earthquake hazard. Many factors affect the survivability of structures and systems from earthquake-caused ground motions. These factors include proximity to the fault, direction of rupture, epicentral location and depth, magnitude, local geologic and soils conditions, types and quality of construction, building configurations and heights, and comparable factors that relate to utility, transportation, and other network systems. Ground motions become structurally damaging when average peak accelerations reach 10 to 15 percent of gravity, average peak velocities reach 8 to 12 centimeters per second, and when the Modified Mercalli Intensity Scale is about VII (18-34 percent peak ground acceleration), which is considered to be very strong (general alarm; walls crack; plaster falls).

Fault ruptures itself contributes very little to damage unless the structure or system element crosses the active fault. In general, newer construction is more earthquake resistant than older construction because of improved building codes and their enforcement. Manufactured housing is very susceptible to damage because their foundation systems are rarely braced for earthquake motions. Locally generated earthquake motions, even from very moderate events, tend to be more damaging to smaller buildings, especially those constructed of unreinforced masonry, as was seen in the Oroville, Coalinga, Santa Cruz, and Paso Robles earthquakes.

Common impacts from earthquakes include damage to infrastructure and buildings (e.g., crumbling of unreinforced masonry, failure of architectural facades, rupturing of underground utilities, and road closures). Earthquakes also frequently trigger secondary hazards, such as dam failures, levee failures, explosions, and fires that can become disasters themselves.

A Hazus earthquake scenarios was developed for the Planning Area as presented in the 2011 LHMP. This scenario still provides a valid representation of potential impacts to the Planning Area and is captured below.

Estimating Potential Losses

Earthquake losses will vary across the Sacramento County Planning Area depending on the source and magnitude of the event. The earthquake scenarios run for the 2011 LHMP for the County provides a good estimate of loss to the Planning Area based on a realistic earthquake scenario. The results of these scenarios are reproduced below.

2011 Earthquake Scenario: Methodology

HAZUS-MH MR-4 was utilized to model earthquake losses for Sacramento County. Specifically, the probable magnitude used for Sacramento County utilized a 7.0 magnitude earthquake. Level 1 analyses were run, meaning that only the default data was used and not supplemented with local building inventory or hazard data. There are certain data limitations when using the default data, so the results should be interpreted accordingly; this is a planning level analysis.

The methodology for running the probabilistic earthquake scenario used probabilistic seismic hazard contour maps developed by the USGS for the 2002 update of the National Seismic Hazard Maps that are included with HAZUS-MH. The USGS maps provide estimates of potential ground acceleration and spectral acceleration at periods of 0.3 second and 1.0 second, respectively. The 2,500-year return period analyzes ground shaking estimates with a 2 percent probability of being exceeded in 50 years, from the

various seismic sources in the area. The International Building Code uses this level of ground shaking for building design in seismic areas and is more of a worst case scenario.

The results of the probabilistic scenario are captured in Table 4-66. Key losses included the following:

- Total economic loss estimated for the earthquake was \$8.3 billion, which includes building losses and lifeline losses based on the HAZUS-MH inventory.
- Building-related losses, including direct building losses and business interruption losses, totaled \$8.0 billion.
- Over 17 percent of the buildings in the County were at least moderately damaged. 3,041 buildings were completely destroyed.
- Over 57 percent of the building- and income-related losses were residential structures.
- 4 percent of the estimated losses were related to business interruptions.
- The mid-day earthquake caused the most casualties: 179.
- 48 percent of the households experienced a loss of potable water the first day after the earthquake.

Table 4-66 HAZUS-MH Earthquake Loss Estimation 2,500-Year Scenario Results

| Type of Impact | Impacts to County | |
|---|--|---|
| Total Buildings Damaged | Slight: 133,703 Moderate: 57,825 Extensive: 11,039 Complete: 3,041 | |
| Building Related Losses | \$8,001,220,000 | |
| Total Economic Losses (Includes building, income and lifeline losses) | \$8,322,590,000 | |
| Casualties (Based on 2 a.m. time of occurrence) | Without requiring hospitalization: 1,345 Requiring hospitalization: 228 Life Threatening: 21 Fatalities: 39 | |
| Casualties (Based on 2 p.m. time of occurrence) | Without requiring hospitalization: 2,595 Requiring hospitalization: 626 Life Threatening: 95 Fatalities: 179 | |
| Casualties (Based on 5 p.m. time of occurrence) | Without requiring hospitalization: 1,995 Requiring hospitalization: 494 Life Threatening: 154 Fatalities: 135 | |
| Transportation and Utility Lifeline Damage | One bridge and one ferry with at least moderate damage | |
| Households without Power/Water Service (Based on 252,940 total households) | Power loss @ Day 1: 1,159 Power loss @ Day 3: 647 Power loss @ Day 7: 227 Power loss @ Day 30: 36 | Water loss @ Day 1: 217,486 Water loss @ Day 3: 204,011 Water loss @ Day 7: 174,736 Water loss @ Day 30: 1,705 |
| Displaced Households | 6,081 | |
| Shelter Requirements | 4,176 | |
| Debris Generation | 2.0 million tons | |

Source: HAZUS-MH MR4

Fires often occur after an earthquake. Because of the number of fires and the lack of water to fight the fires, they can often burn out of control. HAZUS uses a Monte Carlo simulation model to estimate the number of ignitions and the amount of burnt area. For this scenario, the model estimates that there will be 51,500 ignitions that will burn about 1.36 sq. mi (0.14 % of the region's total area.) The model also estimates that the fires will displace about 6,142 people and burn about \$481 million of building value.

Future Development

Although new growth and development corridors would fall in the area affected by earthquake, given the small chance of major earthquake and the building codes in effect, development in the earthquake area will continue to occur.

4.3.9. Earthquake: Liquefaction

Likelihood of Future Occurrence—Occasional

Vulnerability—Medium

Earthquake is discussed in the Section 4.3.8, but is primarily focused on the vulnerability of buildings and people from earthquake shaking. This section deals with a secondary hazard associated with earthquake – the possible collapse of structural integrity of the ground underneath liquefaction prone areas. In Sacramento County, the HMPC identified two of these areas: downtown Sacramento and the Delta area, which could lead to a possible collapse of delta levees. This levee failure differs from the levee failure discussion in Section 4.3.12 which generally focuses on levee failure due to high water conditions or other types of structural failure. These two areas are described further below.

Downtown

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

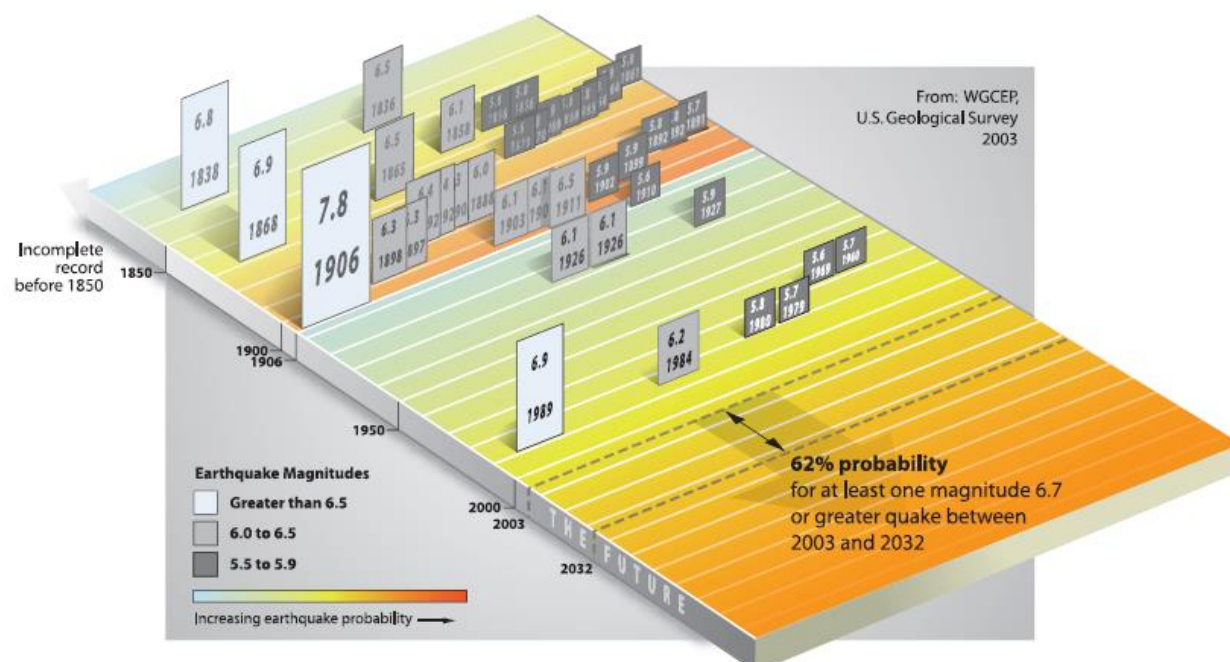
Delta

Historically, there have been 165 Delta and Suisun Marsh flood-induced levee failures leading to island inundations since 1900. Most of these failures occurred prior to 1990. Also, many of these failures were outside of Sacramento County. Since that time, there have been few levee failures due to improvements on the levee system in Sacramento as a whole.

No reports could be found to indicate that seismic shaking had ever induced significant damage or were the cause of the levee failures mentioned above. However, the lack of historical damage is not a reliable indicator that Delta levees are not vulnerable to earthquake shaking. Furthermore, the present-day Delta levees, at their current size, have not been significantly tested by moderate to high seismic shaking.

The USGS estimates that an earthquake of magnitude 6.7 or greater has a 62 percent probability of occurring in the San Francisco Bay Area between 2003 and 2032 (see Figure 4-81). Such an earthquake is capable of causing multiple levee failures in the Delta Region which could result in fatalities, extensive property damage and the interruption of water exports from the Delta for an extended period of time. Potential earthquakes on the Hayward, Calaveras or San Andreas faults pose the highest risk to Delta Region levees.

Figure 4-81 Past and Future Earthquakes in the San Francisco Bay Area and the Delta



Source: DRMS Risk Report (URS/JBA 2008c) Figure 13-8

The largest earthquakes experienced in recent history in the region include the 1906 Great San Francisco Earthquake and the 1989 Loma Prieta Earthquake. The 1906 earthquake occurred while the levees were in their early stages of construction. They were much smaller than they are today, and were not representative of the current configuration. The epicenter of the 1989 Loma Prieta earthquake was too distant and registered levels of shaking in the Delta too small to cause perceptible damage to the levees. In 2009, the California Department of Water Resources, in their document titled Delta Risk Management Strategy, performed a special simulation analysis of the 1906 Great San Francisco Earthquake to evaluate the potential effects of that event on the current levees.

In addition to the simulation of these largest regional earthquakes, recent smaller and closer earthquakes were also evaluated. They include: the 1980 Livermore Earthquake (M 5.8) and the 1984 Morgan Hill Earthquake (M 6.2). Except for the 1906 earthquake, which would have caused deformations of some of the weakest levees, the other earthquakes were either too small or too distant to cause any significant damage to the Delta levees. These results are consistent with the seismic vulnerability prediction model developed for this study.

General seismic performance observations were:

- The areas most prone to liquefaction potential are in the northern region and the southeastern region of the Delta. The central and western regions of the Delta and Suisun Marsh show discontinuous areas of moderate to low liquefaction potential.
- The vulnerability classes 1 through 4 are the most vulnerable levees to seismic loading. These include islands with liquefiable levee fill, and peat/organic soil deposits and potentially liquefiable sand deposits in the foundation. Such islands include but are not limited to Sherman, Brannan-Andrus, Twitchel, Webb, Venice, Bouldin, and many others.
- The majority of the islands have at least one levee reach in vulnerability classes 1 to 4,
- Levees composed of liquefiable fill are likely to undergo extensive damage as a result of a moderate to large earthquake in the region.
- The median probabilities of failure for classes with no liquefiable foundation sand and no liquefiable levee fill increase with peat thickness under the levee. When peat is absent, generally the probabilities of failure are small (less than 22 percent) for the largest ground motions of 0.5g. However, the probabilities of failure at the locations of the thickest peat (more than 25 feet) range from 30 percent to 60 percent for a PGA of 0.5g.
- Levees founded on liquefiable foundations are expected to experience large deformations (in excess of 10 feet) under a moderate to large earthquake in the region.

Assets at Risk – Flooding

A major earthquake can cause extensive damage to large sections of levees on multiple islands at the same time. As a result, many islands could be flooded simultaneously. For example, the DRMS report indicated that there is a 40 percent probability of a major earthquake causing 27 or more islands to flood at the same time in the 25-year period from 2005 to 2030. It is not specified which islands in Sacramento County would be included in this flooding.

The duration and cost of levee repairs increases with the number of islands that are flooded due to an earthquake, as shown in Table 4-67. This is not only due to the extensive amount of repairs required, but also to the availability of labor and materials to make the repairs. These numbers from the DRMS report are applicable to Sacramento County.

Table 4-67 Duration and Cost of Repairs for Earthquake-Induced Levee Failures

| Number of flooded islands | Estimated range of cost of repair and dewatering | Estimated range of time to repair breaches and dewater [days] |
|---------------------------|--|---|
| 1 | \$43,000,000 – \$240,000,000 | 136 – 276 |
| 3 | \$204,000,000 – \$490,000,000 | 270 – 466 |
| 10 | \$620,000,000 – \$1,260,000,000 | 460 – 700 |
| 20 | \$1,400,000,000 – \$2,300,000,000 | 750 – 1,020 |
| 30 | \$3,000,000,000 – \$4,200,000,000 | 1,240 – 1,660 |

Source: DRMS Risk Report [URS/JBA 2008c], Table 13-9

In addition to dewatering costs, the Delta contains improved parcels at risk to flooding. More information about the Delta and its risk may be found in the Delta annex to this plan.

Water Quality Risk

Earthquake damage to levees and to the islands they protect could take years to repair following a major earthquake. One significant impact of levee failures would be to the state's water supply. For example, if 20 islands were flooded as a result of a major earthquake, the export of fresh water from the Delta could be interrupted for about a year and a half. Water supply losses of up to 8 million acre-feet would be incurred by State and federal water contractors and local water districts.

If subsided Delta islands are flooded due to levee breaches, significant amounts of dissolved organic carbon [DOC] would be released into Delta waters from the highly organic peat soils on these islands. Disinfectants used during the drinking water treatment process react with DOC to produce disinfection byproducts in treated water. Many of these chemical byproducts can increase cancer risks or cause other health effects.

Other water quality problems resulting from island flooding include increased algae blooms. Algae blooms can complicate drinking water treatment processes and can adversely affect some aquatic species.

Some soils in the Delta Region contain moderate levels of mercury due, among other things, to historical gold mining activities that occurred upstream of the Delta during the Gold Rush. Mercury in soils can, under certain circumstances, be converted to the highly toxic methylated form when islands are flooded. Methylated mercury can accumulate in the food chain potentially affecting fish. Humans and animals that consume fish contaminated with methylated mercury are at risk of poisoning.

Population at Risk

The Delta levees most likely to fail due to earthquakes and earthquake liquefaction are generally located in the central-west area of the Delta, some of which is likely to be in the Sacramento County portion of the Delta. Their failure will cause rapid flooding and leave little time for evacuation.

The greatest immediate public safety concern is for the people working and living on Delta islands, and for people traveling through the Delta on various roads and highways. According to the DRMS report, there is a 40 percent probability of 90 or more fatalities in the Delta from levee failures due to a seismic event in the 25-year period from 2005 through 2030. The expected fatalities from earthquake-related island flooding is high due to the lack of warning for earthquakes and because of the rapid rate of flooding likely to occur after an earthquake. It should be noted that these fatality figures are for the Delta as a whole, and not limited to those areas of the Delta lying within Sacramento County.

Natural Resources at Risk

In all seismic levee failure scenarios, the area of vegetation impacted increases with the area flooded. The degree of impact depends on the type of vegetation flooded. Results of the DRMS Project indicate potential losses of up to 39 percent of herbaceous wetland, seasonal grasses and low-lying vegetation, 29 percent of non-native trees, and 24 percent of shrub wetland due to an event where multiple islands are flooded. In addition, in Sacramento County, the Delta area at risk to liquefaction contains highly productive farmland. Should a levee fail, loss of crops would have a large economic impact. Information specific to the losses in Sacramento County were not available.

Future Development

The consequences of a major earthquake in the Delta Region will also increase with time. Because of increasing water demand and the state's growing population and economy, the economic consequences of an interruption in Delta water supply operations due to an earthquake will increase. Consequences to the Delta Region will also increase due to additional development. According to the DRMS report, total expected economic losses are anticipated to increase by about 200 percent by 2050 and by about 500 percent by 2100. The risk of fatalities is expected to increase, on average, by about 250 percent from 2005 to 2050. It should be noted that these economic figures are for the Delta as a whole, and not limited to those areas of the Delta lying within Sacramento County.

4.3.10. Flood: 100/200/500-year Vulnerability Assessment

Likelihood of Future Occurrence—100-year – Occasional; 200-/500-year – Unlikely
Vulnerability—Extremely High

Historically, Sacramento County has always been vulnerable to flooding because of its relatively flat terrain and the number of water courses that traverse the County. Flood zones in Sacramento County are quite extensive. High water levels are a common occurrence in winter and spring months due to increased flow from stormwater runoff and snowmelt. Several areas of the County are subject to flooding by the overtopping of rivers and creeks, levee failures, and the failure of urban drainage systems that cannot accommodate large volumes of water during severe rainstorms.

River flooding is the most significant natural hazard that Sacramento County faces. The Sacramento area has a good working knowledge of the 100-year flood, however, the statistical outlier flood is not well quantified. Sacramento is not just at high risk of flooding, but is at low risk of catastrophic flooding. When the 100-year event is exceeded, the consequences could be great as flood depths behind levees can range up to many feet deep in some urban areas.

In addition to the major rivers, there are many streams, channels, canals, and creeks that serve the drainage needs of the County. There is significant threat of flooding in large areas of the county from several of these streams. Many of these streams are prone to rapid flooding with little notice.

According to SAFCA, Sacramento's risk of flooding is the greatest of any major city in the country. Sacramento's flood risk is exceptionally high for two reasons:

1. The cores of today's levees are often the levees built by farmers and settlers as much as 150 years ago. Early levees were not constructed to current engineering standards, and little care was given to the suitability of foundation soils. It was believed prior to 1986 that the levees containing the Sacramento River and the American River were of sufficient height and stability to protect the county from 100-year or greater storms. The storms that occurred in February 1986 demonstrated that those levees are not always sufficient.
2. The quantity of water flowing out of the Sierra Nevada Mountains during large floods appears to be increasing. Folsom Dam was designed, based on historical data, to reduce flood flows in the American River to a flow rate that could be safely contained by the downstream levees. The first storm that

occurred after beginning the construction of Folsom Dam was larger than any occurring in the prior 45 years. Since that 1951 storm, Sacramento has experienced four more ‘record floods’ each somewhat larger than the previous. A comparative analysis run on the two periods (1905 to 1950 and 1950 to 2000) shows that a storm with one chance in 500 of occurring in any year based on the earlier period is approximately the same size as a storm with one chance in 50 of occurring using the entire 95-year period.

Historically, much of the growth in the 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. Other problems connected with flooding and stormwater runoff include erosion, sedimentation, degradation of water quality, losses of environmental resources, and certain health hazards.

Flooding has been frequent in the Sacramento County Planning Area and the vulnerability to flood damages is high to extremely high. This section quantifies the vulnerability of the Planning Area to floods.

Flood Hazard Assessment

This risk assessment for the Sacramento County LHMP Update assessed the flood hazard specific to Sacramento County. This included an evaluation of multiple flood hazards including the SFHA shown on the DFIRM; Repetitive Loss (RL) Areas; localized, stormwater flooding areas; other areas that have flooded in the past, but not identified on the DFIRM; other areas of shallow flooding identified through other studies and sources; levee failure flooding; dam failure flooding; erosion based flooding, and flooding caused by land subsidence especially in the Delta areas. This comprehensive flood risk assessment included an assessment of less-frequent flood hazards, areas likely to be flooded, and flood problems that are likely to get worse in the future as a result of changes in floodplain development and demographics, development in the watershed, and climate change or sea level rise. Existing studies, maps, historical data, and federal, state, and local community expertise and knowledge contributed to this current flood assessment for Sacramento County. An evaluation of the success of completed and ongoing flood control projects and associated maintenance aspects contributed to this flood hazard assessment and the resulting flood mitigation strategy for the Sacramento County Planning Area. This flood risk assessment for this LHMP Update includes an assessment of future flooding conditions based on historic development in the floodplains, proposed future development, climate change influences, and worst case flood scenarios such as the ARkStorm as further described throughout this plan. Due to GIS mapping constraints, the remainder of this flood vulnerability assessment focuses on the flood hazard based on the updated FEMA DFIRMs.

Assets at Risk

Unincorporated Sacramento County and its incorporated jurisdictions have mapped FEMA flood hazard areas. GIS was used to determine the possible impacts of flooding within the County and how the risk varies across the Planning Area. The following methodology was followed in determining improved parcel counts and assets at risk to the 1% annual chance flood event and 0.2% annual chance flood events. Analysis on assets at risk to floods in the County is provided for two different areas in this Base Plan:

- Sacramento County Planning Area
- Unincorporated Sacramento County

The Sacramento County Planning Area includes both the unincorporated County and each jurisdiction, essentially the entire geographical area of Sacramento County. Summary tables for the Planning Area are presented below. For the unincorporated County, both summary and detail tables are shown and discussed below. Detail tables for the participating jurisdictions are included in their respective annexes to this plan.

Note: For the Base Plan, the 2015 DFIRM was used for analysis. The City of Elk Grove Planning Team noted that many of the LOMRs that exist in the City were not considered in the creation of the new DFIRM. The Planning Team noted that the data from the previous plan was better represented the flood risk for the City than that provided for the Base Plan. As such, the 2011 methodology is carried forward into the City of Elk Grove’s Annex only. This affects the flood zone, values at risk, population at risk, and critical facilities at risk sections in their annex and for those sections below..

Methodology

Sacramento County’s 2016 parcel layer and 2015 Assessor’s data were used as the basis for the countywide inventory of developed parcels, acres, and values. Sacramento County has a FEMA DFIRM dated June 16, 2015 which was utilized to perform the flood analysis.

In some cases there are parcels in multiple flood zones, such as Zone A, Zone X, or Shaded X. GIS was used to create a centroid, or point representing the center of the parcel polygon. DFIRM flood data was then overlaid on the parcel layer. For the purposes of this analysis, the flood zone that intersected a parcel centroid was assigned the flood zone for the entire parcel. The parcels were segregated and analyzed in this fashion for the entire Sacramento County Planning Area.

The model assumes that every parcel with a structure or other improved value greater than zero is improved in some way. This approach was used to support the parcel layer analysis as there was no associated building layer available for this analysis. Once completed, the parcel boundary layer was joined to the centroid layer and values were transferred based on the identification number in the Assessors database and the GIS parcel layer.

The property use summary categories (derived from the Use Code categories) previously assigned to the detailed assessor database were used to develop content value and show potential loss from hazards. Content values estimations are based on FEMA Hazus methodologies, which estimates value as a percent of improved structure values by property type/use. Table 4-68 shows the breakdown of the different property types in Sacramento County and their estimated content replacement value percentages.

Table 4-68 Content Replacement Factors

| Property Use | Content Replacement Values |
|--------------|----------------------------|
| Residential | 50% |
| Agricultural | 100% |
| Commercial | 100% |

| Property Use | Content Replacement Values |
|---------------|----------------------------|
| Institutional | 100% |
| Other | 100% |
| Industrial | 150% |
| Vacant Land | 0% |

Source: Hazus

The loss estimate for flood is based on the total of improved and contents value. Improved parcels include those with structures as well as other improvements identified in the Assessor's database such as mobile homes and winery equipment. Only improved parcels and the value of their improvements were included in the flood loss analysis. The value of land is not included in the loss estimates as generally the land is not at loss to floods, just the value of improvements and structure contents. The land value is represented in the detailed flood tables, but are only present to show the value of the land associated with each flood zone.

Once the potential value of affected parcels was calculated, a damage factor was applied to obtain loss estimates by flood zone. When a flood occurs, seldom does the event cause total destruction of an area. Potential losses from flooding are related to a variety of factors including flood depth, flood velocity, building type, and construction. The percent of damage is primarily related to the flood depth. FEMA's flood benefit/cost module uses a simplified approach to model flood damage based on building type and flood depth. The assets at risk in the flood analysis tables were refined by applying an average damage estimation of 20% of the total building value. The 20% damage estimate utilized FEMA's Flood Building Loss Table based on an average flood depth of 2 feet.

It also should be noted that the resulting flood loss estimates may actually be more or less than that presented in the below tables as the Planning Area may include structures located on parcels within the 100-year floodplain that are actually outside the floodplain boundaries or otherwise elevated at or above the level of the base flood elevation, according to local floodplain development requirements. Also, any recent or pending Physical Map Revisions (PMRs) or Letter of Map Revisions (LOMRs) are not reflected in this data and will change the analysis accordingly. In addition, it is important to keep in mind that these assessed values may be well below the actual market value of improved parcels located within the 100-year floodplain.

Each of the DFIRM flood zones that begins with the letter 'A' depict the Special Flood Hazard Area, or the 1% annual chance flood event (commonly referred to as the 100-year flood). Table 4-69 explains the difference between DFIRM mapped flood zones within the 1% annual chance flood zone as well as other flood zones located within the Planning Area. The effective DFIRM maps for the Sacramento County Planning Area are shown on Figure 4-82.

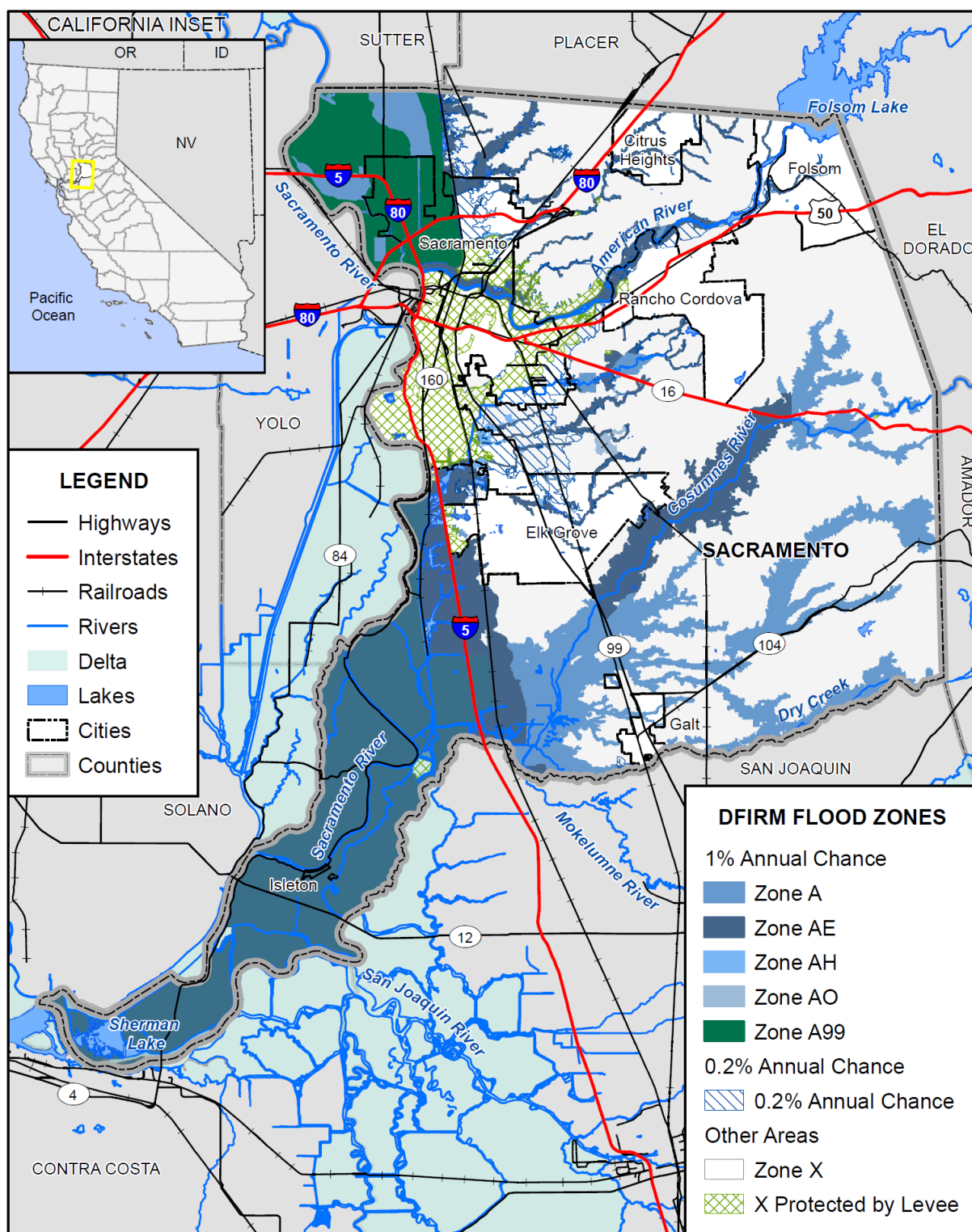
Table 4-69 Sacramento County Planning Area – DFIRM Flood Hazard Zones

| Flood Zone | Description |
|------------|---|
| A | 100-year Flood: No base flood elevations provided |
| AE | 100-year Flood: Base flood elevations provided |

| Flood Zone | Description |
|----------------------|---|
| 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 | No flood hazard |

Source: FEMA

Figure 4-82 Sacramento County Planning Area – DFIRM Flood Zones



0 10 20 Miles



Data Source: Sacramento County GIS, Cal-Atlas, FEMA NFHL 04/16/2016; Map Date: 05/2016.

The end result of the flood hazard analysis is an inventory of the numbers, types, and values of parcels subject to the flood hazard. Results are presented here first for the Sacramento County Planning Area and secondly for the unincorporated County. Results for the incorporated jurisdictions and the Delta are presented in their respective annexes to the plan.

In addition to the centroid analysis used to obtain numbers of parcels and assets at risk to flood hazards, parcel boundary analysis was performed to obtain total acres and flooded acres by flood zone for each parcel. The parcel layer was intersected with the FEMA DFIRM data to obtain the acres flooded. The results of the flooded acres analysis methodology and results are presented at the end of this section.

Sacramento County Planning Area

Table 4-70 and Table 4-71 contain flood analysis results for the entire Sacramento County Planning Area. This includes unincorporated Sacramento County and the incorporated jurisdictions. These tables show the number of parcels and assets at risk to the 1% and 0.2% annual chance event. Table 4-70 shows the value of improved parcels by jurisdiction. Table 4-71 shows the improved parcels by property use category in each flood zone for the entire Planning Area.

Table 4-70 Sacramento County Planning Area – Count and Improved Value of Parcels by 1% and 0.2% Annual Chance Flood Zones by Jurisdiction

| Jurisdiction | 1% Annual Chance | | | 0.2% Annual Chance* | | |
|----------------------------------|---------------------|-------------------------|------------------------|---------------------|-----------------------|------------------------|
| | Total Parcel Count* | Improved Parcel Count** | Total Improved Value | Total Parcel Count | Improved Parcel Count | Total Improved Value |
| Citrus Heights | 250 | 156 | \$29,175,678 | 303 | 276 | \$54,097,103 |
| Elk Grove*** | N/A | 37 | \$35,703,353 | N/A | 3,949 | \$808,888,633 |
| Folsom | 31 | 8 | \$2,357,379 | 194 | 122 | \$153,125,451 |
| Galt | 23 | 1 | \$315,000 | 3 | 0 | \$0 |
| Isleton | 504 | 325 | \$27,074,049 | 0 | 0 | \$0 |
| Rancho Cordova | 60 | 21 | \$10,205,817 | 989 | 971 | \$158,395,013 |
| City of Sacramento | 29,693 | 24,861 | \$6,675,340,607 | 16,165 | 14,495 | \$2,822,713,159 |
| Unincorporated Sacramento County | 7,051 | 3,862 | \$1,504,417,212 | 23,182 | 21,778 | \$3,992,497,296 |
| Total | 37,612 | 29,271 | \$8,284,589,095 | 40,836 | 41,591 | \$7,989,716,655 |

Source: FEMA DFIRM June 16, 2015, Sacramento County 2016 Parcel/2015 Assessor's Data

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

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

***The City of Elk Grove's analysis from 2011 is carried forward here as noted at the beginning of this Section 4.3.10. Total parcel counts were not created for that plan.

Table 4-71 Sacramento County Planning Area – Count and Improved Value by Property Use and 1% and 0.2% Annual Chance Flood Zone*

| Property Use | 1% Annual Chance Flood Zone | | | 0.2% Annual Chance Flood Zone** | | |
|-------------------|-----------------------------|-------------------------|------------------------|---------------------------------|-----------------------|------------------------|
| | Total Parcel Count** | Improved Parcel Count** | Total Improved Value | Total Parcel Count | Improved Parcel Count | Total Improved Value |
| Agricultural | 1,467 | 816 | \$267,807,574 | 6 | 4 | \$318,391 |
| Care/Health | 26 | 18 | \$54,069,366 | 49 | 46 | \$420,425,623 |
| Church/Welfare | 63 | 51 | \$85,344,771 | 125 | 105 | \$130,813,240 |
| Industrial | 351 | 255 | \$536,138,980 | 819 | 772 | \$828,718,388 |
| Miscellaneous | 983 | 5 | \$12,426 | 388 | 1 | \$935 |
| Office | 203 | 187 | \$704,911,767 | 171 | 150 | \$219,646,504 |
| Public/Utilities | 1,930 | 3 | \$2,211,598 | 651 | 1 | \$38,057 |
| Recreational | 99 | 73 | \$80,087,473 | 22 | 19 | \$10,103,789 |
| Residential | 28,212 | 27,636 | \$6,176,867,614 | 40,694 | 39,998 | \$5,827,191,977 |
| Retail/Commercial | 379 | 359 | \$449,769,895 | 558 | 513 | \$682,412,409 |
| Vacant | 4,286 | 96 | \$8,383,388 | 1,578 | 58 | \$6,364,539 |
| No Data | 2 | 0 | \$0 | 0 | 0 | \$0 |
| Total | 38,001 | 29,499 | \$8,365,604,852 | 45,061 | 41,667 | \$8,126,033,852 |

Source: FEMA DFIRM June 16, 2015, Sacramento County 2015 Parcel/Assessor's Data

* The City of Elk Grove's analysis from 2011 is carried forward here as noted at the beginning of this Section 4.3.10. Due to difficulties matching property use categories, this table contains data only from the 2016 analysis.

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

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

Table 4-72 shows potential losses summarized by the 1% and 0.2% annual chance flood event with loss estimate and loss ratios for the Planning Area. The loss ratio is the loss estimate divided by the total potential exposure (i.e., total of improved and contents value for all parcels located in the Planning Area) and displayed as a percentage of loss. FEMA considers loss ratios greater than 10% to be significant and an indicator that a community may have more difficulties recovering from a flood. The County should keep in mind that the loss ratio could increase with additional development in the 1% and 0.2% annual chance floodplain, unless development is elevated in accordance with the local floodplain management ordinance.

Table 4-72 Sacramento County Planning Area – Flood Loss Estimates

| Flood Zone | Improved Parcel Count* | Total Improved Value | Estimated Contents Value | Total Value | Loss Estimate | Loss Ratio |
|----------------------|------------------------|-------------------------|--------------------------|-------------------------|---------------------------|--------------|
| 1% Annual Chance | 29,271 | \$8,284,589,095 | \$4,182,802,426 | \$12,467,391,521 | \$2,493,478,304.20 | 1.92% |
| 0.2% Annual Chance** | 40,836 | \$7,989,716,655 | \$4,063,016,926 | \$12,052,733,581 | \$2,410,546,716.20 | 1.86% |
| Total | 71,166 | \$16,491,638,704 | \$8,245,819,352 | \$24,520,125,102 | \$4,904,025,020.40 | 3.78% |

Source: FEMA DFIRM June 16, 2015, Sacramento County 2015 Parcel/Assessor's Data

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

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

According to the information in Table 4-70 through Table 4-72, the Sacramento County Planning Area has 29,271 improved parcels and roughly \$12.5 billion of structure and contents value in the 1% annual chance floodplain. There are 40,836 improved parcels and roughly \$12.1 billion of structure and contents value in the 0.2% annual chance flood event. A loss ratio of 3.78% indicates that while the County does have assets at risk, those asset values do not indicate a disproportionate number of assets in the FEMA regulated floodplains.

Unincorporated Sacramento County

Table 4-73 and Table 4-74 contain information for unincorporated Sacramento County only. Table 4-73 shows the number of improved parcels, land value, and associated improved structure values at risk to the each of the FEMA flood zones using the DFIRM data in the unincorporated areas and Table 4-74 shows potential losses summarized by 1% and 0.2% annual chance flood events with loss estimates and loss ratios.

Table 4-73 Unincorporated Sacramento County – Count and Improved Value by Property Use and Detailed Flood Zone

| Flood Zone | Property Use | Total Parcel Count | Total Land Value | Improved Parcel Count | Improved Structure Value | Total Value* |
|------------|--------------------|--------------------|------------------|-----------------------|--------------------------|---------------|
| A | Agricultural | 314 | \$116,787,770 | 164 | \$68,069,670 | \$184,857,440 |
| | Care / Health | 0 | \$0 | | \$0 | \$0 |
| | Church / Welfare | 0 | \$0 | | \$0 | \$0 |
| | Industrial | 36 | \$13,904,226 | 3 | \$919,625 | \$14,823,851 |
| | Miscellaneous | 14 | \$11,617 | 0 | \$0 | \$11,617 |
| | Office | 0 | \$0 | | | \$0 |
| | Public / Utilities | 134 | \$455,096 | 1 | \$81,598 | \$536,694 |
| | Recreational | 4 | \$2,815,805 | 1 | \$2,003,644 | \$4,819,449 |
| | Residential | 187 | \$20,825,433 | 178 | \$35,660,701 | \$56,486,134 |

| Flood Zone | Property Use | Total Parcel Count | Total Land Value | Improved Parcel Count | Improved Structure Value | Total Value* |
|------------|---------------------|--------------------|----------------------|-----------------------|--------------------------|------------------------|
| | Retail / Commercial | 1 | \$198,216 | 1 | \$105,744 | \$303,960 |
| | Vacant | 84 | \$24,772,786 | 10 | \$276,033 | \$25,048,819 |
| | No Data | 0 | \$0 | | \$0 | \$0 |
| | Total | 774 | \$179,770,949 | 358 | \$107,117,015 | \$286,887,964 |
| | | | | | | |
| AE | Agricultural | 1,013 | \$237,154,495 | 629 | \$196,659,181 | \$433,813,676 |
| | Care / Health | 4 | \$999,696 | 3 | \$913,650 | \$1,913,346 |
| | Church / Welfare | 22 | \$3,350,133 | 16 | \$33,288,981 | \$36,639,114 |
| | Industrial | 84 | \$16,292,372 | 40 | \$20,716,328 | \$37,008,700 |
| | Miscellaneous | 277 | \$759,968 | 5 | \$12,426 | \$772,394 |
| | Office | 29 | \$15,123,953 | 27 | \$27,540,122 | \$42,664,075 |
| | Public / Utilities | 816 | \$1,124,615 | 0 | \$0 | \$1,124,615 |
| | Recreational | 73 | \$16,108,472 | 56 | \$15,847,312 | \$31,955,784 |
| | Residential | 2,273 | \$275,269,730 | 2,130 | \$509,854,352 | \$785,124,082 |
| | Retail / Commercial | 64 | \$8,477,968 | 60 | \$13,784,241 | \$22,262,209 |
| | Vacant | 672 | \$51,116,873 | 48 | \$5,307,705 | \$56,424,578 |
| | No Data | 1 | \$0 | 0 | \$0 | \$0 |
| | Total | 5,328 | \$625,778,275 | 3,014 | \$823,924,298 | \$1,449,702,573 |
| | | | | | | |
| AH | Agricultural | 0 | \$0 | 0 | \$0 | \$0 |
| | Care / Health | 0 | \$0 | 0 | \$0 | \$0 |
| | Church / Welfare | 1 | \$253,064 | 1 | \$437,444 | \$690,508 |
| | Industrial | 0 | \$0 | 0 | \$0 | \$0 |
| | Miscellaneous | 0 | \$0 | 0 | \$0 | \$0 |
| | Office | 1 | \$64,608 | 1 | \$72,064 | \$136,672 |
| | Public / Utilities | 9 | \$0 | 0 | \$0 | \$0 |
| | Recreational | 0 | \$0 | 0 | \$0 | \$0 |
| | Residential | 104 | \$4,791,627 | 104 | \$11,214,428 | \$16,006,055 |
| | Retail / Commercial | 5 | \$2,582,709 | 3 | \$1,751,382 | \$4,334,091 |
| | Vacant | 7 | \$746,462 | 0 | \$0 | \$746,462 |
| | No Data | | \$0 | 0 | \$0 | \$0 |
| | Total | 127 | \$8,438,470 | 109 | \$13,475,318 | \$21,913,788 |
| | | | | | | |
| AO | Agricultural | 0 | \$0 | 0 | \$0 | \$0 |

| Flood Zone | Property Use | Total Parcel Count | Total Land Value | Improved Parcel Count | Improved Structure Value | Total Value* |
|------------------------------------|---------------------|--------------------|------------------------|-----------------------|--------------------------|------------------------|
| | Care / Health | 0 | \$0 | 0 | \$0 | \$0 |
| | Church / Welfare | 3 | \$538,580 | 3 | \$1,274,398 | \$1,812,978 |
| | Industrial | 0 | \$0 | 0 | \$0 | \$0 |
| | Miscellaneous | 0 | \$0 | 0 | \$0 | \$0 |
| | Office | 0 | \$0 | 0 | \$0 | \$0 |
| | Public / Utilities | 3 | \$0 | 0 | \$0 | \$0 |
| | Recreational | 0 | \$0 | 0 | \$0 | \$0 |
| | Residential | 70 | \$9,210,884 | 70 | \$9,295,754 | \$18,506,638 |
| | Retail / Commercial | 0 | \$0 | 0 | \$0 | \$0 |
| | Vacant | 15 | \$1,999,748 | 1 | \$5,225 | \$2,004,973 |
| | No Data | 0 | \$0 | 0 | \$0 | \$0 |
| | Total | 91 | \$11,749,212 | 74 | \$10,575,377 | \$22,324,589 |
| | | | | | | |
| A99 | Agricultural | 128 | \$38,469,123 | 22 | \$2,928,106 | \$41,397,229 |
| | Care / Health | 4 | \$3,204,228 | 1 | \$14,856,000 | \$18,060,228 |
| | Church / Welfare | 4 | \$834,959 | 4 | \$2,541,241 | \$3,376,200 |
| | Industrial | 174 | \$96,891,233 | 161 | \$404,210,512 | \$501,101,745 |
| | Miscellaneous | 24 | \$1,533,789 | 0 | \$0 | \$1,533,789 |
| | Office | 35 | \$19,145,702 | 32 | \$88,227,532 | \$107,373,234 |
| | Public / Utilities | 107 | \$152,106 | 1 | \$2,100,000 | \$2,252,106 |
| | Recreational | 4 | \$2,096,779 | 3 | \$2,421,221 | \$4,518,000 |
| | Residential | 75 | \$9,088,260 | 69 | \$20,352,195 | \$29,440,455 |
| | Retail / Commercial | 9 | \$7,261,001 | 9 | \$11,605,951 | \$18,866,952 |
| | Vacant | 166 | \$70,772,359 | 5 | \$82,446 | \$70,854,805 |
| | No Data | 1 | \$78,407 | 0 | \$0 | \$78,407 |
| | Total | 731 | \$249,527,946 | 307 | \$549,325,204 | \$798,853,150 |
| | | | | | | |
| Total 1% Annual Chance | | 7,051 | \$1,075,264,852 | 3,862 | \$1,504,417,212 | \$2,579,682,064 |
| | | | | | | |
| Shaded X (0.2% Annual Chance)** | Agricultural | 5 | \$848,949 | 3 | \$105,144 | \$954,093 |
| | Care / Health | 27 | \$5,218,074 | 27 | \$36,436,591 | \$41,654,665 |
| | Church / Welfare | 51 | \$22,410,230 | 46 | \$85,076,951 | \$107,487,181 |
| | Industrial | 213 | \$100,697,813 | 198 | \$215,886,598 | \$316,584,411 |
| | Miscellaneous | 145 | \$513,998 | 1 | \$935 | \$514,933 |

| Flood Zone | Property Use | Total Parcel Count | Total Land Value | Improved Parcel Count | Improved Structure Value | Total Value* |
|----------------------------|---------------------|--------------------|------------------------|-----------------------|--------------------------|------------------------|
| | Office | 87 | \$25,727,530 | 75 | \$72,281,415 | \$98,008,945 |
| | Public / Utilities | 281 | \$2,670,605 | 1 | \$38,057 | \$2,708,662 |
| | Recreational | 15 | \$8,562,883 | 12 | \$4,118,758 | \$12,681,641 |
| | Residential | 21,508 | \$1,217,040,070 | 21,098 | \$3,183,717,846 | \$4,400,757,916 |
| | Retail / Commercial | 312 | \$196,238,125 | 291 | \$393,654,669 | \$589,892,794 |
| | Vacant | 538 | \$75,853,555 | 26 | \$1,180,332 | \$77,033,887 |
| | No Data | 0 | \$0 | 0 | \$ | \$0 |
| | Total | 23,182 | \$1,655,781,832 | 21,778 | \$3,992,497,296 | \$5,648,279,128 |
| | | | | | | |
| X Protected by Levee | Agricultural | 5 | \$1,160,373 | 5 | \$789,744 | \$1,950,117 |
| | Care / Health | 18 | \$7,758,946 | 13 | \$27,721,005 | \$35,479,951 |
| | Church / Welfare | 30 | \$10,824,424 | 25 | \$29,358,299 | \$40,182,723 |
| | Industrial | 95 | \$28,509,769 | 92 | \$69,653,665 | \$98,163,434 |
| | Miscellaneous | 45 | \$216,140 | 1 | \$31,352 | \$247,492 |
| | Office | 168 | \$88,235,208 | 145 | \$285,606,007 | \$373,841,215 |
| | Public / Utilities | 174 | \$353,474 | 4 | \$323,426 | \$676,900 |
| | Recreational | 8 | \$4,141,597 | 5 | \$8,942,031 | \$13,083,628 |
| | Residential | 9,922 | \$780,382,586 | 9,829 | \$1,775,227,193 | \$2,555,609,779 |
| | Retail / Commercial | 315 | \$143,381,393 | 297 | \$298,952,501 | \$442,333,894 |
| | Vacant | 207 | \$27,903,906 | 12 | \$2,997,130 | \$30,901,036 |
| | No Data | 1 | \$0 | 0 | \$0 | \$0 |
| | Total | 10,988 | \$1,092,867,816 | 10,428 | \$2,499,602,353 | \$3,592,470,169 |
| | | | | | | |
| X | Agricultural | 1,065 | \$285,499,726 | 530 | \$212,369,686 | \$497,869,412 |
| | Care / Health | 267 | \$106,557,849 | 253 | \$480,728,243 | \$587,286,092 |
| | Church / Welfare | 343 | \$89,373,407 | 301 | \$420,347,742 | \$509,721,149 |
| | Industrial | 829 | \$281,438,674 | 664 | \$588,845,257 | \$870,283,931 |
| | Miscellaneous | 1,143 | \$980,448 | 6 | \$66,196 | \$1,046,644 |
| | Office | 794 | \$264,455,707 | 739 | \$730,526,492 | \$994,982,199 |
| | Public / Utilities | 1,596 | \$5,676,727 | 12 | \$12,125,694 | \$17,802,421 |
| | Recreational | 66 | \$29,955,356 | 52 | \$71,024,781 | \$100,980,137 |
| | Residential | 118,931 | \$9,032,113,350 | 117,582 | \$20,266,748,974 | \$29,298,862,324 |
| | Retail / Commercial | 1,483 | \$716,623,478 | 1,370 | \$1,222,616,479 | \$1,939,239,957 |
| | Vacant | 3,903 | \$480,016,343 | 237 | \$17,084,778 | \$497,101,121 |

| Flood Zone | Property Use | Total Parcel Count | Total Land Value | Improved Parcel Count | Improved Structure Value | Total Value* |
|------------|--------------|--------------------|-------------------------|-----------------------|--------------------------|-------------------------|
| | No Data | 9 | \$1,467,707 | 4 | \$807,130 | \$2,274,837 |
| | Total | 130,429 | \$11,294,158,772 | 121,750 | \$24,023,291,452 | \$35,317,450,224 |

Source: FEMA DFIRM June 16, 2015, Sacramento County 2016 Parcel/ 2015 Assessor's Data

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

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

Table 4-74 Unincorporated Sacramento County – Flood Loss Estimates

| Flood Zone | Improved Parcel Count* | Improved Structure Value | Estimated Contents Value | Total Value | Loss Estimate | Loss Ratio |
|--------------------|------------------------|--------------------------|--------------------------|------------------------|------------------------|--------------|
| 1% Annual Chance | 3,862 | \$1,504,417,212 | \$752,208,606 | \$2,256,625,818 | \$451,325,164 | 0.35% |
| 0.2% Annual Chance | 21,778 | \$3,992,497,296 | \$1,996,248,648 | \$5,988,745,944 | \$1,197,749,189 | 0.92% |
| Total | 25,640 | \$5,496,914,508 | \$2,748,457,254 | \$8,245,371,762 | \$1,649,074,352 | 1.27% |

Source: FEMA DFIRM June 16, 2015, Sacramento County 2016 Parcel/2015 Assessor's Data

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

According to Table 4-73 and Table 4-74, unincorporated Sacramento County has 3,862 improved parcels and roughly \$2.25 billion of structure and contents value in the 1% annual chance floodplain. The unincorporated County has 21,778 parcels and roughly \$6 billion in structure and contents values in the 0.2% annual chance floodplain. These values can be refined a step further. Applying the 20 percent damage factor as previously described, there is a 1% chance in any given year of a flood event causing roughly \$451,325,164 in damage in the unincorporated areas of Sacramento County. Applying the same factor, there is a 0.2% chance of a flood event causing \$1.2 billion in damage to the unincorporated County. A loss ratio of 1.27% indicates that while the unincorporated County has assets at risk in the floodplain, flood losses would be limited compared to the total built environment and the community would likely be able to recover adequately.

Flooded Acres

Also of interest is the land area affected by the various flood zones. The following is an analysis of flooded acres in the County Planning Area in comparison to total area within the unincorporated County and city limits of each jurisdiction.

Methodology

GIS was used to calculate acres flooded by FEMA flood zones and property use categories. The Sacramento County parcel layer and effective DFIRM were intersected, and each segment divided by the intersection of flood zone and parcels was calculated for acres. This process was conducted for 1% flood chance areas, with each segment being defined by zone type (A, AE, AO) and acres, and the process repeated for X

Protected by Levee zones and 0.2% flood chance areas. The resulting data tables with flooded acreages were then imported into a database and linked back to the original parcels, including total acres and land/improvement values, by parcel number. Once this was completed, each parcel contained acreage values for flooded acre by zone type within the parcel. In some cases, a single parcel had multiple flooded acres values (e.g. parcels overlapping a 1%-0.2% flood chance boundary). In the tables below each flood zone is represented and then split out by property use, their total flooded acres, total improved acres, and percent of improved acres that are flooded.

Limitations

One limitation created by this type of analysis is that improvements are uniformly found throughout the parcel, while in reality, only portions of the parcel are improved, and improvements may or may not fall within the flood zone portion of a parcel; thus, areas of improvements flooded calculated through this method may be higher or lower than those actually seen in a similar real world event.

The following tables represent a detailed and summary analysis of total acres for each FEMA DFIRM flood zone. Table 4-75 gives summary information for the Planning Area. Table 4-76 gives detailed information by property use for the unincorporated County. This information is available for each jurisdiction in their respective annexes.

Table 4-75 Sacramento County Planning Area – Flooded Acres by Jurisdiction

| Jurisdiction | Flood Zone* | Total Flooded Acres | Improved Flooded Acres |
|--------------------|--------------------|---------------------|------------------------|
| Citrus Heights | 1% Annual Chance | 105.75 | 44.61 |
| | 0.2% Annual Chance | 66.81 | 57.09 |
| Elk Grove** | 1% Annual Chance | N/A | N/A |
| | 0.2% Annual Chance | N/A | N/A |
| Folsom | 1% Annual Chance | 110.21 | 2.24 |
| | 0.2% Annual Chance | 177.15 | 92.67 |
| Galt | 1% Annual Chance | 111.92 | 3.86 |
| | 0.2% Annual Chance | 5.11 | 0 |
| Isleton | 1% Annual Chance | 215.58 | 57.46 |
| | 0.2% Annual Chance | 0 | 0 |
| Rancho Cordova | 1% Annual Chance | 794.88 | 44.68 |
| | 0.2% Annual Chance | 307.17 | 190.19 |
| City of Sacramento | 1% Annual Chance | 12,958.27 | 5,468.67 |
| | 0.2% Annual Chance | 6,385.63 | 4,477.68 |
| Unincorporated | 1% Annual Chance | 179,672.53 | 86,988.83 |
| | 0.2% Annual Chance | 8,730.38 | 6,569.14 |
| Total | 1% Annual Chance | 193,999.13 | 92,610.36 |
| | 0.2% Annual Chance | 15,672.25 | 11,386.78 |

Source: Sacramento County DFIRM June 16, 2015 Sacramento County 2016 Parcel/2015 Assessor's Data

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

**The City of Elk Grove performed analysis based on the 2011 Plan. In that plan, no flooded acres analysis was performed.

Table 4-76 Unincorporated Sacramento County – Flooded Acres by Property Use and Detailed Flood Zone*

| Flood Zone* | Property Use | Total Flooded Acres | Improved Flooded Acres |
|-------------|---------------------|---------------------|------------------------|
| A | Agricultural | 32,617.68 | 19,467.81 |
| | Care / Health | 0.00 | 0.00 |
| | Church / Welfare | 0.00 | 0.00 |
| | Industrial | 977.22 | 83.82 |
| | Miscellaneous | 43.26 | 0.00 |
| | No Data | 0.00 | 0.00 |
| | Office | 0.00 | 0.00 |
| | Public / Utilities | 5,065.09 | 11.76 |
| | Recreational | 78.27 | 46.01 |
| | Residential | 1,319.46 | 1,104.78 |
| | Retail / Commercial | 0.61 | 0.61 |
| | Vacant | 1,778.53 | 125.28 |
| | Total | 41,880.12 | 20,840.07 |
| | | | |
| AE | Agricultural | 84,342.76 | 57,963.53 |
| | Care / Health | 9.27 | 7.61 |
| | Church / Welfare | 78.60 | 62.63 |
| | Industrial | 523.13 | 205.93 |
| | Miscellaneous | 510.43 | 25.39 |
| | No Data | 1.21 | 0.00 |
| | Office | 32.13 | 30.40 |
| | Public / Utilities | 27,099.43 | 0.00 |
| | Recreational | 488.53 | 365.63 |
| | Residential | 3,929.19 | 3,765.93 |
| | Retail / Commercial | 59.41 | 55.19 |
| | Vacant | 4,287.01 | 431.39 |
| | Total | 121,361.10 | 62,913.63 |
| | | | |
| AH | Agricultural | 0.00 | 0.00 |
| | Care / Health | 0.00 | 0.00 |
| | Church / Welfare | 2.15 | 2.15 |
| | Industrial | 0.00 | 0.00 |
| | Miscellaneous | 0.00 | 0.00 |

| Flood Zone* | Property Use | Total Flooded Acres | Improved Flooded Acres |
|-----------------|---------------------|---------------------|------------------------|
| | No Data | 0.00 | 0.00 |
| | Office | 0.15 | 0.15 |
| | Public / Utilities | 74.83 | 0.00 |
| | Recreational | 0.00 | 0.00 |
| | Residential | 23.28 | 23.28 |
| | Retail / Commercial | 7.42 | 4.99 |
| | Vacant | 7.40 | - |
| | Total | 115.23 | 30.57 |
| | | | |
| AO | Agricultural | 0.00 | 0.00 |
| | Care / Health | 0.00 | 0.00 |
| | Church / Welfare | 12.94 | 12.94 |
| | Industrial | 0.00 | 0.00 |
| | Miscellaneous | 0.00 | 0.00 |
| | No Data | 0.00 | 0.00 |
| | Office | 0.00 | 0.00 |
| | Public / Utilities | 7.48 | 0.00 |
| | Recreational | 0.00 | 0.00 |
| | Residential | 253.52 | 253.52 |
| | Retail / Commercial | 0.00 | 0.00 |
| | Vacant | 64.03 | 4.19 |
| | Total | 337.97 | 270.65 |
| | | | |
| A99 | Agricultural | 6,248.57 | 1,614.31 |
| | Care / Health | 15.12 | 12.38 |
| | Church / Welfare | 4.62 | 4.62 |
| | Industrial | 573.43 | 554.85 |
| | Miscellaneous | 278.57 | 0.00 |
| | No Data | 6.56 | 0.00 |
| | Office | 121.29 | 91.22 |
| | Public / Utilities | 4,845.43 | 33.24 |
| | Recreational | 109.30 | 61.92 |
| | Residential | 457.22 | 397.81 |
| | Retail / Commercial | 24.70 | 24.70 |
| | Vacant | 3,293.30 | 138.86 |
| | Total | 15,978.10 | 2,933.91 |
| | | | |
| Total 1% | | 179,672.53 | 86,988.83 |

| Flood Zone* | Property Use | Total Flooded Acres | Improved Flooded Acres |
|-----------------------|-----------------------|---------------------|------------------------|
| Shaded X (500-year)** | Agricultural | 38.56 | 16.68 |
| | Care / Health | 23.57 | 23.57 |
| | Church / Welfare | 152.83 | 140.27 |
| | Industrial | 722.14 | 647.87 |
| | Miscellaneous | 89.04 | 0.04 |
| | No Data | 0.00 | 0.00 |
| | Office | 120.56 | 84.61 |
| | Public / Utilities | 746.85 | 0.07 |
| | Recreational | 40.41 | 39.38 |
| | Residential | 5,210.90 | 4,990.42 |
| | Retail / Commercial | 561.64 | 547.79 |
| | Vacant | 1,023.88 | 78.44 |
| | Total Shaded X | 8,730.38 | 6,569.14 |
| X Protected by Levee | Agricultural | 315.52 | 315.52 |
| | Care / Health | 27.02 | 20.70 |
| | Church / Welfare | 80.24 | 63.45 |
| | Industrial | 456.42 | 454.05 |
| | Miscellaneous | 12.94 | 0.23 |
| | No Data | 0.64 | 0.00 |
| | Office | 200.94 | 181.30 |
| | Public / Utilities | 499.28 | 0.15 |
| | Recreational | 62.75 | 15.50 |
| | Residential | 2,168.87 | 2,097.75 |
| | Retail / Commercial | 275.26 | 267.84 |
| | Vacant | 192.37 | 8.35 |
| | Total Levee | 4,292.25 | 3,424.84 |
| X | Agricultural | 113,047.02 | 44,485.28 |
| | Care / Health | 574.02 | 552.77 |
| | Church / Welfare | 1,086.98 | 907.28 |
| | Industrial | 11,984.48 | 7,659.80 |
| | Miscellaneous | 811.66 | 4.37 |
| | No Data | 34.74 | 10.53 |
| | Office | 812.46 | 768.06 |
| | Public / Utilities | 17,998.80 | 56.63 |
| | Recreational | 831.80 | 745.02 |
| | Residential | 60,567.95 | 58,848.44 |

| Flood Zone* | Property Use | Total Flooded Acres | Improved Flooded Acres |
|-------------|---------------------|---------------------|------------------------|
| | Retail / Commercial | 1,832.80 | 1,755.13 |
| | Vacant | 18,137.40 | 1,763.99 |
| | Total Zone X | 227,720.11 | 117,557.30 |

Source: Sacramento County DFIRM June 16, 2015, Sacramento County 2016 Parcel/2015 Assessor's Data

* The City of Elk Grove performed analysis based on the 2011 Plan. In that plan, no flooded acres analysis was performed. As such, this flooded acres table represents all flooded acres based on the 2015 DFIRM flood zones.

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

Insurance Coverage, Claims Paid, and Repetitive Losses

Unincorporated Sacramento County joined the NFIP on March 15, 1979, and the CRS on October 1, 1992. The current effective date is May 1, 2013. According to the CRS listing of eligible communities dated May 1, 2014, the County is currently a Class 2, which provides a 40 percent discount on flood insurance for those located within the special flood hazard area (SFHA) and a 10 percent discount for those located in non-SFHA areas.

2016 NFIP Analysis

NFIP insurance data indicates that as of February 19, 2016, there were 10,468 policies in force in the unincorporated County, resulting in \$2,939,536,100 of insurance in force. Of these, 9,698 are for residential properties; 770 are nonresidential. 3,171 of these are in A zones; 7,297 policies are for parcels in the B, C, & X zones.

There have been 1,193 closed paid losses totaling \$22,391,339; 1,128 of these were for residential properties and 64 were nonresidential, while 1 was unknown. Of these 1,193 paid losses, 819 were parcels in A zones and 366 parcels were in B, C, & X zones. Information was not provided on the other 8 claims. Of the 1,193 claims, 970 claims were associated with pre-FIRM structures and 213 with post-FIRM structures; 10 claims unknown. There have been 95 substantial damage claims since 1979.

Based on this analysis of insurance coverage, unincorporated Sacramento County has significant assets at risk to the 100-year and greater floods. However, of the 3,862 improved parcels within the 100-year floodplain, 3,171 (or 82.1 percent) of those parcels maintain flood insurance. Flood insurance coverage for the unincorporated County and the incorporated jurisdictions can be seen in Table 4-77.

Table 4-77 Sacramento County Planning Area – Percentages of Policy Holders to Parcels in the 1% Annual Chance Floodplain

| Jurisdiction | Improved Parcels in 1% Annual Chance Floodplain* | Insurance Policies in the A (1% Annual Chance) Zone | Percentage of 1% Annual Chance Floodplain Parcels Currently Insured |
|----------------|--|---|---|
| Citrus Heights | 156 | 67 | 42.9% |
| Elk Grove | 265 | 8 | 3.1% |
| Folsom | 8 | 13 | 100% |
| Galt | 1 | 6 | 100% |

| Jurisdiction | Improved Parcels in 1% Annual Chance Floodplain* | Insurance Policies in the A (1% Annual Chance) Zone | Percentage of 1% Annual Chance Floodplain Parcels Currently Insured |
|-----------------------|--|---|---|
| Isleton | 325 | 122 | 37.5% |
| Rancho Cordova | 21 | 6 | 28.6% |
| City of Sacramento | 24,861 | 2,153 | 8.7% |
| Unincorporated County | 3,862 | 3,171 | 82.1% |
| Total | 29,499 | 5,546 | 18.8% |

Source: FEMA DFIRM June 16, 2015; Sacramento County 2016 Parcel Data

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

2015 Program for Public Information Flood Insurance Analysis

In addition to the 2016 data, a more detailed analysis of flood insurance by flood zone was performed for the 2015 Sacramento County Program for Public Information (PPI). That analysis is included here.

As of 12/31/2014, Sacramento County had 9,571 active flood insurance policies in effect. Flood insurance is required as a condition of Federal aid or mortgage or loan that is federally insured for a building located in a special flood hazard area. Flood insurance may not be required for properties that do not have a federally backed loan, but it is still advised. Level of coverage is measured in two ways:

- The number of buildings with insurance coverage compared to the number of buildings exposed to a flood hazard (see Table 4-78)
- The average amount of coverage by FIRM Zone and occupancy type compared to the amount of expected flood damage from a base flood (see Table 4-79, Table 4-80, and Table 4-81).

Table 4-78 Sacramento County – Percentage of Buildings Insured (as of 9/30/14)

| Flood Zone | Policies | Properties | Percent Coverage |
|--------------|--------------|----------------|------------------|
| Zone AE | 2,201 | 9,197 | 24% |
| Zone A | 203 | 1,395 | 15% |
| Zone AO | 348 | 823 | 42% |
| Zone AH | 17 | 716 | 2% |
| Zone AR* | 337 | 0 | 0% |
| Zone A99* | 424 | 0 | |
| Zone X | 0 | 159,663 | 4% |
| Standard | 420 | – | – |
| Preferred | 5,992 | – | – |
| Total | 9,942 | 171,794 | 6% |

Source: 2015 Program for Public Information

*There are currently no properties in Zone AR or A99 in Sacramento County.

Table 4-79 Sacramento County – Policy Break-down (as of 9/30/14)

| Structure Type | Number Policies in Force | Premium | Insurance in Force |
|-----------------------|--------------------------|--------------------|------------------------|
| Single Family | 7,059 | \$3,899,552 | \$2,077,759,400 |
| 2-4 Family | 413 | \$202,190 | \$92,290,000 |
| All Other Residential | 1,363 | \$566,396 | \$220,798,600 |
| Non-Residential | 736 | \$1,075,390 | \$248,079,800 |
| Total | 9,571 | \$5,743,528 | \$2,638,927,800 |

Source: 2015 Program for Public Information

Table 4-80 Sacramento County – Pre-FIRM Policies in Force (as of 9/30/14)

| Flood Zone | Pre-FIRM | Premium | Insurance in Force |
|--------------|--------------|--------------------|------------------------|
| Zone AE | 1,579 | \$1,174,252 | \$240,551,000 |
| Zone A | 123 | \$134,078 | \$23,207,400 |
| Zone AO | 319 | \$307,966 | \$60,462,600 |
| Zone AH | 12 | \$11,405 | \$2,531,600 |
| Zone AR* | 179 | \$144,366 | \$31,323,000 |
| Zone A99* | 314 | \$325,272 | \$66,997,100 |
| Zone X | | | |
| Standard | 146 | \$182,502 | \$36,442,700 |
| Preferred | 3,812 | \$1,668,465 | \$1,217,267,000 |
| Total | 6,484 | \$3,948,306 | \$1,678,782,400 |

Source: 2015 Program for Public Information

*There are currently no properties in Zone AR or A99 in Sacramento County.

Table 4-81 Sacramento County – Post-FIRM Policies in Force (as of 9/30/14)

| Flood Zone | Post-FIRM | Premium | Insurance in Force |
|--------------|--------------|--------------------|------------------------|
| Zone AE | 619 | \$222,943 | \$138,974,700 |
| Zone A | 80 | \$47,159 | \$19,236,600 |
| Zone AO | 29 | \$24,551 | \$8,008,300 |
| Zone AH | 5 | \$4,777 | \$1,910,500 |
| Zone AR* | 158 | \$54,322 | \$34,219,800 |
| Zone A99* | 110 | \$149,525 | \$28,530,600 |
| Zone X | | | |
| Standard | 274 | \$332,115 | \$75,199,500 |
| Preferred | 2,180 | \$1,206,920 | \$740,765,000 |
| Total | 3,455 | \$2,042,312 | \$1,046,845,000 |

Source: 2015 Program for Public Information

*There are currently no properties in Zone AR or A99 in Sacramento County.

Repetitive Loss Analysis

Unincorporated Sacramento County's vulnerability to flooding can be seen in the number of Repetitive Loss properties. The NFIP considers a property a Repetitive Loss Property if two or more flood insurance claims of more than \$1,000 have been paid within any 10-year period since 1978. According to FEMA's records and the analysis contained in the Sacramento County Department of Water Resources' July 2015 Repetitive Loss Area Analysis Report, there are 101 Repetitive Loss Properties within Sacramento County. Several more properties within Sacramento County may have reached the damage threshold for Repetitive Loss Properties, but not all properties are covered by flood insurance and flood insurance claims are not submitted for all flood damage sustained. There are 11 severe repetitive loss properties (a residential property has at least four NFIP claim payments (including building and contents) over \$5,000 each, and the cumulative amount of such claims payments exceeds \$20,000).

A Repetitive Loss Area (RLA) consists of Repetitive Loss Properties and the surrounding properties that experience the same or similar flooding conditions, whether or not the buildings on those surrounding properties have been damaged by flooding. Figure 4-83 shows the 28 RLAs in Sacramento County based on an analysis of the location of the RL properties. Information by area is shown on Table 4-82 that includes the RL properties, historical loss properties (ie., those properties with one insurance claim), and information on those RL properties that have been mitigated. Much greater detail can be found in the July 2015 Repetitive Loss Area Analysis Report, as shown in Appendix G.

Figure 4-83 Unincorporated Sacramento County – Repetitive Loss Areas

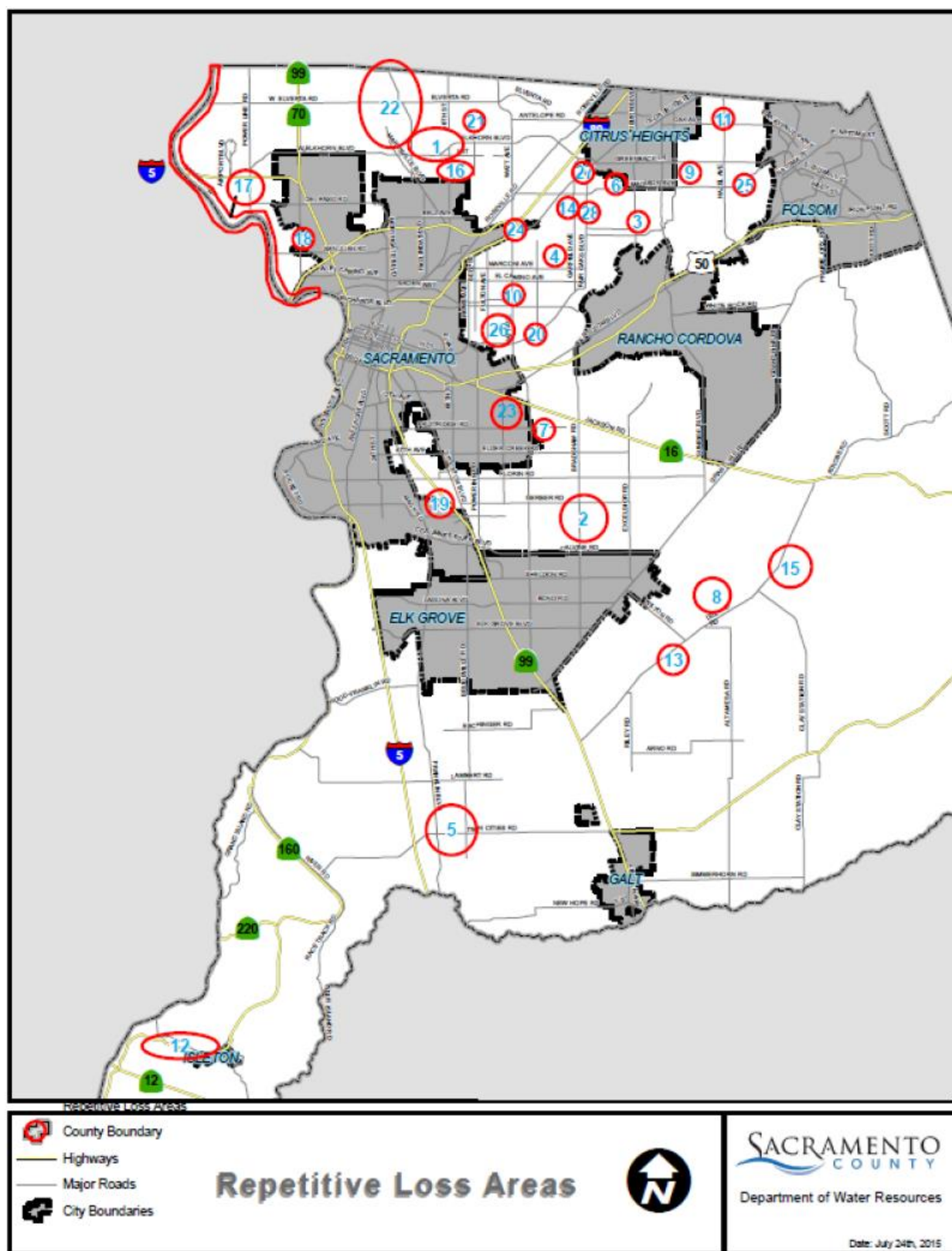


Table 4-82 Repetitive Loss Area Totals and Mitigated Properties

| Name | Repetitive Loss Properties | Historical Loss Properties | Repetitive Loss Area Properties | Total Repetitive Loss Properties | Mitigated Properties |
|---|----------------------------|----------------------------|---------------------------------|----------------------------------|----------------------|
| Area 1 – Dry Creek Watershed | | | | | |
| Cherry Lane | 10 | 10 | 8 | 28 | 12 |
| O Street | 2 | 9 | 20 | 31 | 2 |
| Dry Creek Road | 2 | 1 | 30 | 33 | 3 |
| 10th Street; 16th Street; Eye Street; Front Street | 0 | 0 | 16 | 16 | 0 |
| Fallon Woods Way | 0 | 2 | 35 | 37 | 0 |
| Curved Bridge Road | 0 | 3 | 6 | 9 | 2 |
| Elkhorn Boulevard | 9 | 8 | 7 | 24 | 14 |
| Jamie Court | 0 | 0 | 11 | 11 | 0 |
| K Street | 0 | 1 | 24 | 25 | 0 |
| Vickrey Court; Vickie Theresa La Ne; Linda Lane; Lilac Lane; 14th Street | 0 | 0 | 17 | 17 | 1 |
| 6th Street; 5th Street | 11 | 2 | 15 | 28 | 2 |
| 6th Street; 5th Street | 0 | 0 | 10 | 10 | 0 |
| Oak Lane | 0 | 2 | 14 | 16 | 0 |
| Fallon Place Court; JC Court | 0 | 0 | 17 | 17 | 0 |
| Alvide Court; Castle Creek Way; Q Street | 0 | 0 | 21 | 21 | 0 |
| Radalyac Court; Woodwright Way | 0 | 0 | 17 | 17 | 4 |
| Total Area 1 | 34 | 38 | 268 | 340 | 40 |
| Repetitive Loss Area 2 – Laguna Creek (Interbasin Transfer) and Gerber Creek | | | | | |
| Bar Du Lane | 0 | 2 | 14 | 16 | 0 |
| Bradshaw Road | 0 | 4 | 29 | 33 | 2 |
| Carmencita Avenue | 1 | 1 | 27 | 29 | 0 |
| Rogers Road; Gerber Road; Vineyard Road; Wildhawk West Drive | 0 | 1 | 24 | 25 | 0 |
| Total | 1 | 8 | 94 | 103 | 2 |
| Repetitive Loss Area 3- Andrew Alan Lane | | | | | |
| Andrew Alan Lane; Winding Way | 2 | 3 | 3 | 8 | 5 |

| Name | Repetitive Loss Properties | Historical Loss Properties | Repetitive Loss Area Properties | Total Repetitive Loss Properties | Mitigated Properties |
|--|----------------------------|----------------------------|---------------------------------|----------------------------------|----------------------|
| Repetitive Loss Area 4 – North Ave (Chicken Ranch Slough) | | | | | |
| North Avenue | 3 | 4 | 10 | 17 | 1 |
| McCowan Way; Murchison Way; Oakfield Drive | 3 | 4 | 10 | 17 | 1 |
| Total | 6 | 8 | 20 | 34 | 2 |
| Repetitive Loss Area 5 – Twin Cities Road | | | | | |
| Bruceville Road; Franklin Boulevard; Twin Cities Road | 1 | 0 | 9 | 10 | 0 |
| Repetitive Loss Area 6 –Brooktree Creek | | | | | |
| Elsinore Way; Leavitt Way | 1 | 0 | 10 | 11 | 1 |
| Southbrook Way; Northbrook Way | 1 | 0 | 6 | 7 | 0 |
| Total | 2 | 0 | 16 | 18 | 1 |
| Repetitive Loss Area 7 – Morrison Creek | | | | | |
| Fruitridge Road | 1 | 0 | 7 | 7 | 0 |
| Repetitive Loss Area 8 – Cosumnes River | | | | | |
| Green Road; Jeffcott Road | 2 | 5 | 26 | 33 | 0 |
| Repetitive Loss Area 9 – South Branch Of Arcade Creek | | | | | |
| Hoffman Lane | 1 | 6 | 4 | 11 | 1 |
| Long Acres Court; Manana Way | 0 | 4 | 7 | 11 | 0 |
| Total | 1 | 10 | 11 | 22 | 1 |
| Repetitive Loss Area 10 – Strong Ranch Slough | | | | | |
| Kincaid Way | 2 | 1 | 6 | 9 | 4 |
| Kubel Circle | 1 | 2 | 3 | 6 | 0 |
| Maple Glen Road | 1 | 3 | 23 | 27 | 0 |
| Ladino Road; Meadow Lane; Riding Club Lane; Rockwood Drive | 0 | 2 | 16 | 18 | 0 |
| Winding Creek Road | 4 | 4 | 11 | 19 | 0 |
| Total | 8 | 12 | 59 | 79 | 4 |
| Repetitive Loss Area 11 – Linda Creek | | | | | |
| Creek Oaks Lane; Eden Oaks Avenue | 0 | 2 | 10 | 12 | 0 |

| Name | Repetitive Loss Properties | Historical Loss Properties | Repetitive Loss Area Properties | Total Repetitive Loss Properties | Mitigated Properties |
|--|----------------------------|----------------------------|---------------------------------|----------------------------------|----------------------|
| Hazel Avenue | 1 | 3 | 6 | 10 | 0 |
| Leever Lane; Nipawin Way; Oak Avenue | 0 | 3 | 19 | 22 | 0 |
| Total | 1 | 8 | 35 | 44 | 0 |
| Repetitive Loss Area 12 – Grand Island Road & Vieira’s Resort | | | | | |
| Long Island Road; Grand Island Road; Sycamore Drive; Beach Drive; Anchor Drive | 8 | 12 | 23 | 43 | 5 |
| Repetitive Loss Area 13 – Badger Creek | | | | | |
| Collings Road; Mann Road | 1 | 0 | 19 | 20 | 0 |
| Haggie Road; Dillard Road; Davis Road | 0 | 1 | 12 | 13 | 0 |
| Repetitive Loss Area 14 - Arcade Creek | | | | | |
| Manzanita Avenue | 0 | 1 | 9 | 10 | 0 |
| Sycamore Avenue | 0 | 1 | 8 | 9 | 0 |
| Peppermill Court | 0 | 0 | 22 | 22 | 0 |
| Pasadena Avenue; Winding Way | 0 | 1 | 5 | 6 | 0 |
| Total | 0 | 3 | 44 | 47 | 0 |
| Repetitive Loss Area 15 - Dillard Rd/Berry Rd | | | | | |
| Apple Road; Berry Road | 2 | 0 | 10 | 12 | 0 |
| Cherry Road; Currant Road; Dillard Road | 0 | 1 | 11 | 12 | 0 |
| Early Times Road; Live Oak Road | 1 | 0 | 10 | 11 | 0 |
| Orange Road | 0 | 1 | 5 | 6 | 0 |
| Total | 3 | 2 | 36 | 41 | 0 |
| Repetitive Loss Area 16 - Robla Creek | | | | | |
| C Street | 2 | 5 | 9 | 16 | 0 |
| 16th Street; 20th Street | 0 | 2 | 12 | 14 | 0 |
| E Street | 2 | 5 | 14 | 21 | 1 |
| Total | 4 | 12 | 35 | 51 | 1 |
| Repetitive Loss Area 17 -Garden Highway | | | | | |
| Garden Highway* | 24 | 53 | 222 | 300 | 3 |
| Repetitive Loss Area 18 – Leona Circle | | | | | |
| Leona Circle | 1 | 0 | 13 | 14 | 0 |

| Name | Repetitive Loss Properties | Historical Loss Properties | Repetitive Loss Area Properties | Total Repetitive Loss Properties | Mitigated Properties |
|--|----------------------------|----------------------------|---------------------------------|----------------------------------|----------------------|
| Repetitive Loss Area 19 – Tangerine Avenue | | | | | |
| Persimmon Avenue; Tangerine Avenue | 1 | 0 | 2 | 3 | 0 |
| Repetitive Loss Area 20 – Treehouse Lane | | | | | |
| Columbia Drive; Cortlandt Drive; Fair Oaks Boulevard; Treehouse Lane | 1 | 7 | 4 | 12 | 0 |
| Repetitive Loss Area 21 – Rio Linda Dry Creek | | | | | |
| 24 th Street; U Street | 3 | 9 | 7 | 19 | 8 |
| Repetitive Loss Area 22 – North Natomas East Main Drain Canal | | | | | |
| Burr Av; E Levee Rd; El Modena Av | 0 | 0 | 15 | 15 | 0 |
| Marysville Boulevard | 1 | 10 | 4 | 15 | 0 |
| Rio Linda Boulevard; Schandoney Avenue; Sorento Road; Straugh Road | 9 | 3 | 4 | 16 | 0 |
| M Street; West M Street | 0 | 3 | 17 | 20 | 0 |
| Q Street; West Q Street | 0 | 2 | 10 | 12 | 0 |
| 2nd Street; West 2nd Street; 4th Street; West 4th Street; West 6th Street | 1 | 4 | 16 | 21 | 0 |
| Total | 11 | 22 | 66 | 99 | 0 |
| Repetitive Loss Area 23 – Morrison Creek | | | | | |
| Bradshaw Road | 1 | 0 | 19 | 20 | 0 |
| Mayhew Road | 0 | 0 | 4 | 4 | 0 |
| Total | 1 | 0 | 23 | 24 | 0 |
| Repetitive Loss Area 24 – Arcade Creek at Park Road | | | | | |
| Arcade Creek at Park Rd. | 3 | 2 | 0 | 5 | 4 |
| Repetitive Loss Area 25 – Madison Avenue at Rollingwood | | | | | |
| Madison Avenue | 8 | 17 | 44 | 69 | 0 |
| Repetitive Loss Area 26 – Strong Ranch Slough | | | | | |
| Bell Street; Northrop Avenue | 0 | 5 | 12 | 17 | 0 |
| Roselake Avenue; Roselee Way | 0 | 0 | 12 | 12 | 0 |
| Villanova Circle | 0 | 8 | 12 | 20 | 0 |

| Name | Repetitive Loss Properties | Historical Loss Properties | Repetitive Loss Area Properties | Total Repetitive Loss Properties | Mitigated Properties |
|---|----------------------------|----------------------------|---------------------------------|----------------------------------|----------------------|
| Woodside Lane | 52 | 11 | 87 | 150 | 0 |
| Total | 52 | 24 | 123 | 199 | 0 |
| Repetitive Loss Area 27 – Brooktree Creek | | | | | |
| Auburn Boulevard; Devecchi Avenue | 0 | 1 | 6 | 7 | 0 |
| Rosebud Lane | 1 | 2 | 6 | 9 | 1 |
| Total | 1 | 3 | 12 | 16 | 1 |
| Repetitive Loss Area 28 – Verda Cruz Creek | | | | | |
| College Oak Drive; Crestview Drive | 1 | 3 | 14 | 18 | 0 |
| Moraga Drive | 1 | 0 | 3 | 4 | 0 |
| Total | 2 | 3 | 17 | 22 | 0 |

Source: Repetitive Loss Area Analysis

*Includes 1 Severe Repetitive Loss structure

Population at Risk

A separate analysis was performed to determine population in flood zones. Using GIS, the DFIRM Flood dataset was overlaid on the improved residential parcel data. Those parcel centroids that intersect a flood zone were counted and multiplied by the Census Bureau factor for average household size; results were tabulated by jurisdiction and flood zone (see Table 4-83). According to this analysis, there is a residential population of 72,719 in the 1% annual chance flood event, and 140,353 in the 0.2% annual chance flood event for the Sacramento County Planning Area.

Table 4-83 Sacramento County Planning Area – Population at Risk to Flooding by Jurisdiction

| Jurisdiction | 1% Annual Chance | | 0.2% Annual Chance* | |
|----------------|--------------------------------|---------------|--------------------------------|----------------|
| | Improved Residential Parcels** | Population*** | Improved Residential Parcels** | Population*** |
| Citrus Heights | 146 | 369 | 262 | 663 |
| Elk Grove**** | 37 | 118 | 3,949 | 12,558 |
| Folsom | 7 | 18 | 76 | 198 |
| Galt | 0 | 0 | 0 | 0 |
| Isleton | 244 | 593 | 0 | 0 |
| Rancho Cordova | 21 | 58 | 963 | 2,648 |
| Sacramento | 24,416 | 63,970 | 13,622 | 35,690 |
| Unincorporated | 2,551 | 6,913 | 21,098 | 57,176 |
| Total | 27,636 | 72,039 | 39,970 | 139,645 |

Source: Sacramento County DFIRM June 16, 2015; US Census Bureau; Sacramento County 2016 Parcel/2015 Assessor Data

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

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

***Census Bureau 2010 average household sizes are: Citrus Heights – 2.53; Elk Grove – 3.18; Folsom – 2.61; Galt – 3.24; Isleton – 2.43; Rancho Cordova – 2.75; City of Sacramento – 2.62; Unincorporated County – 2.71

**** The City of Elk Grove performed analysis based on the 2011 Plan. The City of Elk Grove’s population analysis from that plan is included here and in its annex to this Plan Update.

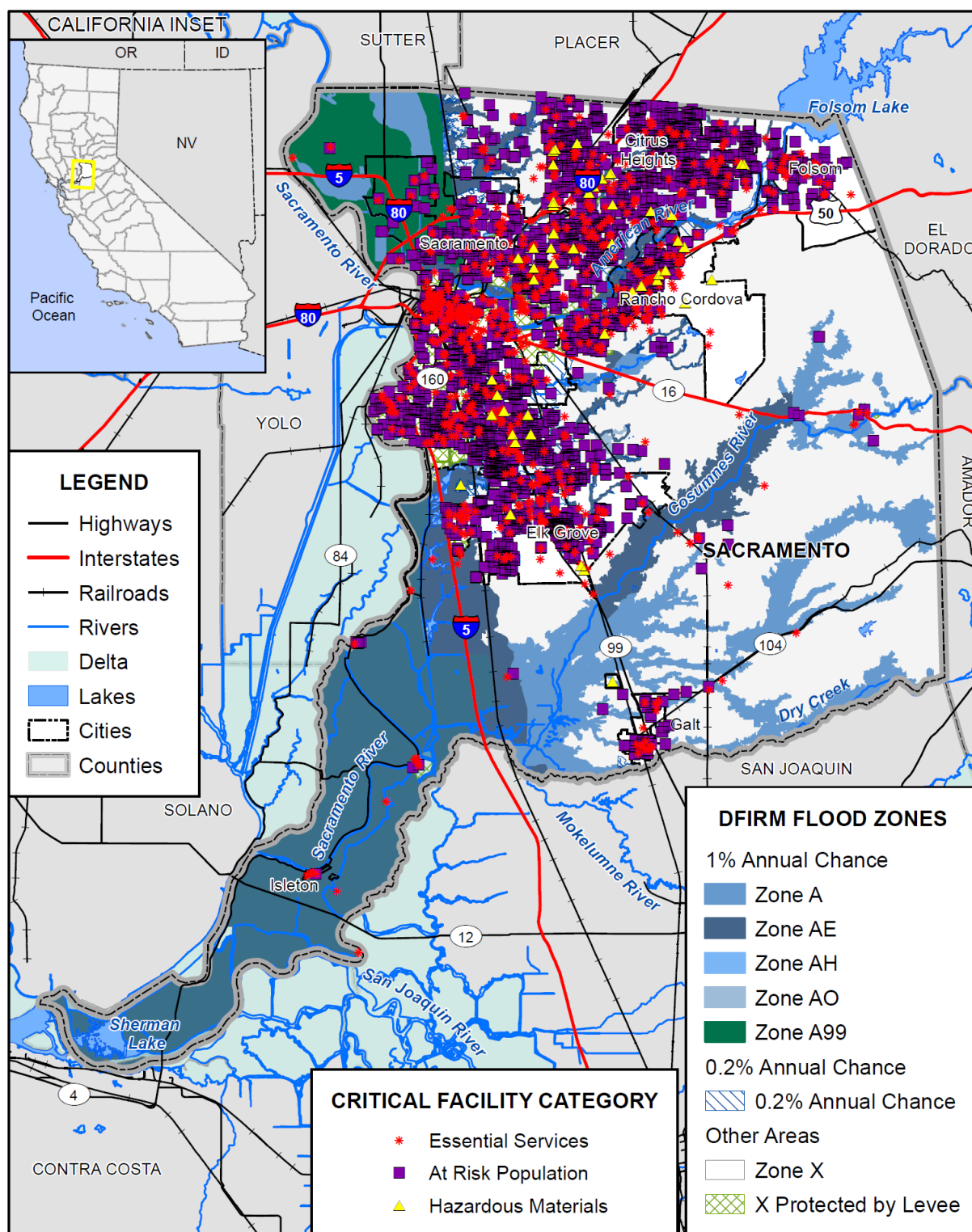
Cultural and Natural Resources at Risk

The Sacramento County Planning Area has significant cultural and natural resources located throughout the County as previously described. Risk analysis of these resources was not possible due to data limitations. However, as previously described, natural areas, such as wetlands and riparian areas within the floodplain, often benefit from periodic flooding as a naturally recurring phenomenon. These natural areas often reduce flood impacts by allowing absorption and infiltration of floodwaters. Preserving and protecting these areas and associated functions are a vital component of sound floodplain management practices for the Sacramento County Planning Area.

Critical Facilities at Risk

A separate analysis was performed on the critical facility inventory in Sacramento County and all jurisdictions to determine critical facilities in the 1% and 0.2 annual chance floodplains. Using GIS, the Preliminary DFIRM flood zones were overlayed on the critical facility location data. Figure 4-84 shows critical facilities, as well as the DFIRM flood zones. Table 4-84 details critical facilities by facility type and count for the Planning Area, while Table 4-85 details the critical facilities for the unincorporated County. Details of critical facility definition, type, name and address and jurisdiction by flood zone are listed in Appendix E.

Figure 4-84 Sacramento County Planning Area – Critical Facilities in DFIRM Flood Zones



Data Source: Sacramento County GIS, Cal-Atlas, FEMA NFHL 04/16/2016; Map Date: 05/2016.

*Table 4-84 Sacramento County Planning Area – Critical Facilities in DFIRM Flood Zones**

| Critical Facility Category | Facility Type | Facility Count |
|-------------------------------|---------------------------------|----------------|
| Zone A | | |
| Essential Services Facilities | Airport | 1 |
| | Detention Basin | 13 |
| | Emergency Evacuation Shelter | 1 |
| | Total | 15 |
| At Risk Population Facilities | Detention Center | 1 |
| | Public Continuation High School | 1 |
| | School-Age Day Care Center | 1 |
| | Total | 3 |
| Zone A Total | | 18 |
| A99 | | |
| Essential Services Facilities | Airport | 1 |
| | Arena | 1 |
| | Emergency Evacuation Shelter | 10 |
| | Fire Station | 4 |
| | Medical Health Facility | 3 |
| | Total | 19 |
| At Risk Population Facilities | Adult Residential | 7 |
| | Alternative Education School | 1 |
| | Charter School | 3 |
| | Day Care Center | 19 |
| | Group Home | 1 |
| | Hotel | 3 |
| | Private Elementary School | 2 |
| | Public Continuation High School | 1 |
| | Public Elementary School | 10 |
| | Public High School | 2 |
| | Public Middle School | 3 |
| | Residential Care/Elderly | 6 |
| | School-Age Day Care Center | 8 |
| | Total | 66 |
| A99 Total | | 85 |
| Zone AE | | |
| Essential Services Facilities | Airport | 3 |
| | Detention Basin | 9 |

| Critical Facility Category | Facility Type | Facility Count |
|--------------------------------|---------------------------------|----------------|
| | Emergency Evacuation Shelter | 11 |
| | Fire Station | 3 |
| | Government Facilities | 2 |
| | Medical Health Facility | 5 |
| | Police | 2 |
| | Stadium | 1 |
| | Total | 36 |
| At Risk Population Facilities | Adult Day Care | 1 |
| | Adult Residential | 3 |
| | Community Day School | 1 |
| | Day Care Center | 3 |
| | Detention Center | 1 |
| | Group Home | 2 |
| | Hotel | 1 |
| | Private K-12 School | 2 |
| | Public Continuation High School | 1 |
| | Public Elementary School | 3 |
| | Residential Care/Elderly | 1 |
| | Total | 19 |
| Hazardous Materials Facilities | Sewer Treatment Plant | 1 |
| | Total | 1 |
| AE Total | | 56 |
| AH | | |
| Essential Services Facilities | Detention Basin | 1 |
| | Emergency Evacuation Shelter | 1 |
| | Total | 2 |
| At Risk Population Facilities | Adult Residential | 2 |
| | Residential Care/Elderly | 1 |
| | School-Age Day Care Center | 1 |
| | Total | 4 |
| AH Total | | 6 |
| | | |
| Total 1% Annual Chance | | 165 |
| 0.2% Annual Chance | | |
| Essential Services Facilities | Bus Terminal | 2 |
| | Detention Basin | 6 |
| | Drainage | 1 |

| Critical Facility Category | Facility Type | Facility Count |
|----------------------------------|---------------------------------|----------------|
| | Emergency Evacuation Shelter | 18 |
| | Fire Station | 7 |
| | General Acute Care Hospital | 2 |
| | Government Facilities | 5 |
| | Light Rail Stop | 2 |
| | Medical Health Facility | 22 |
| | Police | 3 |
| | Total | 68 |
| At Risk Population Facilities | Adult Day Care | 2 |
| | Adult Education School | 1 |
| | Adult Residential | 70 |
| | Alternative Education School | 1 |
| | Assisted Living Centers | 8 |
| | Charter School | 2 |
| | College/University | 1 |
| | Community Day School | 1 |
| | Day Care Center | 51 |
| | Group Home | 11 |
| | Hotel | 1 |
| | Infant Center | 6 |
| | Private Elementary School | 7 |
| | Private High School | 1 |
| | Private K-12 School | 5 |
| | Public Continuation High School | 5 |
| | Public Elementary School | 25 |
| | Public High School | 4 |
| | Public Middle School | 4 |
| | Residential Care/Elderly | 53 |
| | School | 4 |
| | School-Age Day Care Center | 11 |
| | Total | 274 |
| Hazardous Materials Facilities | Oil Collection Center | 6 |
| | Total | 6 |
| 0.2% Annual Chance Total* | | 348 |
| Zone X | | |
| Essential Services Facilities | Airport | 4 |
| | Bus Terminal | 2 |

| Critical Facility Category | Facility Type | Facility Count |
|-------------------------------------|-------------------------------|----------------|
| | Corporation Yard | 1 |
| | Detention Basin | 16 |
| | Dispatch Center | 2 |
| | Drainage | 4 |
| | Emergency Evacuation Shelter | 133 |
| | Emergency Rooms | 1 |
| | EOC | 2 |
| | Fire Station | 61 |
| | Gas Storage | 1 |
| | General Acute Care Hospital | 5 |
| | Government Facilities | 43 |
| | Hospitals | 1 |
| | Light Rail Stop | 24 |
| | Medical Health Facility | 91 |
| | Police | 15 |
| | Sand Bag | 3 |
| | State and Fed Facilities | 1 |
| | State Facility | 1 |
| | Traffic Operations Center | 1 |
| | Train Station | 1 |
| | Urgent Care Facilities | 2 |
| | Vehicle and Equipment Storage | 1 |
| | Water Treatment Plant | 2 |
| | Total | 418 |
| At Risk Population Facilities Total | Adult Day Care | 12 |
| | Adult Education School | 7 |
| | Adult Residential | 165 |
| | Alternative Education School | 5 |
| | Assisted Living Centers | 47 |
| | Charter School | 15 |
| | Children's Home | 2 |
| | College/University | 4 |
| | Community Day School | 5 |
| | Day Care Center | 236 |
| | Detention Center | 1 |
| | Group Home | 64 |
| | Hotel | 29 |

| Critical Facility Category | Facility Type | Facility Count |
|--------------------------------|----------------------------------|----------------|
| | Independent Study School | 1 |
| | Infant Center | 16 |
| | JAIL | 1 |
| | Prison | 1 |
| | Private Elementary School | 45 |
| | Private High School | 23 |
| | Private K-12 School | 26 |
| | Public Continuation High School | 14 |
| | Public Elementary School | 136 |
| | Public High School | 24 |
| | Public Middle School | 27 |
| | Residential Care/Elderly | 308 |
| | Residential Facility Chronically | 1 |
| | School | 33 |
| | School-Age Day Care Center | 55 |
| | Senior Center | 1 |
| | Social Rehabilitation Facility | 4 |
| | Special Education School | 10 |
| | Total | 1,318 |
| Hazardous Materials Facilities | Oil Collection Center | 37 |
| | OTHER | 1 |
| | Propane Storage | 1 |
| | Sewer Treatment Plant | 1 |
| | Total | 40 |
| X Total | | 1,776 |
| X Protected by Levee | | |
| Essential Services Facilities | Airport | 1 |
| | Bus Terminal | 4 |
| | Convention Center | 1 |
| | Drainage | 1 |
| | Emergency Evacuation Shelter | 59 |
| | Fire Station | 19 |
| | General Acute Care Hospital | 2 |
| | Government Facilities | 18 |
| | Light Rail Stop | 26 |
| | Medical Health Facility | 79 |
| | Police | 2 |

| Critical Facility Category | Facility Type | Facility Count |
|--------------------------------------|-------------------------------|----------------|
| | Sand Bag | 2 |
| | Stadium | 2 |
| | Vehicle and Equipment Storage | 1 |
| | Water Treatment Plant | 1 |
| | Total | 218 |
| At Risk Population Facilities | Adult Day Care | 11 |
| | Adult Education School | 4 |
| | Adult Residential | 61 |
| | Assisted Living Centers | 3 |
| | Charter School | 5 |
| | College/University | 2 |
| | Community Day School | 2 |
| | Day Care Center | 107 |
| | Group Home | 18 |
| | Hotel | 16 |
| | Independent Study School | 1 |
| | Infant Center | 11 |
| | Private Elementary School | 11 |
| | Private High School | 6 |
| | Private K-12 School | 4 |
| | Public Elementary School | 56 |
| | Public High School | 5 |
| | Public Middle School | 9 |
| | Residential Care/Elderly | 45 |
| | School | 1 |
| | School-Age Day Care Center | 21 |
| | Total | 399 |
| Hazardous Materials Facilities Total | Oil Collection Center | 2 |
| | Total | 2 |
| X Protected by Levee Total | | 619 |
| | | |
| Grand Total | | 2,908 |

Source: Sacramento County DFIRM, Sacramento County GIS

* The City of Elk Grove performed analysis based on the 2011 Plan. The City of Elk Grove's annex shows the critical facilities in the floodplain. Due to difficulties in matching the datasets from 2011 and 2016, this table shows analysis of the critical facilities based on the 2015 DFIRM for all jurisdictions, including Elk Grove.

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

Table 4-85 Unincorporated Sacramento County – Critical Facilities in DFIRM Flood Zones

| Critical Facility Category | Facility Type | Facility Count |
|-------------------------------|---------------------------------|----------------|
| A | | |
| Essential Services Facilities | Airport | 1 |
| | Emergency Evacuation Shelter | 1 |
| | Total | 2 |
| At Risk Population Facilities | Detention Center | 1 |
| | Public Continuation High School | 1 |
| | School-Age Day Care Center | 1 |
| | Total | 3 |
| A Total | | 5 |
| A99 | | |
| Essential Services Facilities | Airport | 1 |
| | Fire Station | 2 |
| | Medical Health Facility | 3 |
| | Total | 6 |
| At Risk Population Facilities | Hotel | 1 |
| | Total | 1 |
| A99 Total | | 7 |
| AE | | |
| Essential Services Facilities | Airport | 3 |
| | Detention Basin | 4 |
| | Emergency Evacuation Shelter | 7 |
| | Fire Station | 3 |
| | Medical Health Facility | 3 |
| | Police | 1 |
| | Stadium | 1 |
| | Total | 22 |
| At Risk Population Facilities | Adult Day Care | 1 |
| | Adult Residential | 2 |
| | Community Day School | 1 |
| | Day Care Center | 2 |
| | Detention Center | 1 |
| | Group Home | 2 |
| | Hotel | 1 |
| | Private K-12 School | 2 |
| | Public Continuation High School | 1 |

| Critical Facility Category | Facility Type | Facility Count |
|-------------------------------------|---------------------------------|----------------|
| | Public Elementary School | 2 |
| | Residential Care/Elderly | 1 |
| | Total | 16 |
| Hazardous Materials Facilities | Sewer Treatment Plant | 1 |
| | Total | 1 |
| AE Total | | 39 |
| | | |
| Total 1% Annual Chance | | 51 |
| 0.2% ANNUAL CHANCE | | |
| Essential Services Facilities Total | Bus Terminal | 1 |
| | Emergency Evacuation Shelter | 9 |
| | Fire Station | 4 |
| | Government Facilities | 2 |
| | Light Rail Stop | 1 |
| | Medical Health Facility | 11 |
| | Police | 2 |
| | Total | 30 |
| At Risk Population Facilities | Adult Day Care | 1 |
| | Adult Education School | 1 |
| | Adult Residential | 34 |
| | Community Day School | 1 |
| | Day Care Center | 26 |
| | Group Home | 8 |
| | Infant Center | 4 |
| | Private Elementary School | 2 |
| | Private High School | 1 |
| | Private K-12 School | 2 |
| | Public Continuation High School | 4 |
| | Public Elementary School | 11 |
| | Public High School | 1 |
| | Public Middle School | 1 |
| | Residential Care/Elderly | 31 |
| | School-Age Day Care Center | 5 |
| | Total | 133 |
| Hazardous Materials Facilities | Oil Collection Center | 5 |
| | Total | 5 |
| 0.2% Annual Chance Total* | | 168 |

| Critical Facility Category | Facility Type | Facility Count |
|-------------------------------------|----------------------------------|----------------|
| Zone X | | |
| Essential Services Facilities Total | Airport | 4 |
| | Emergency Evacuation Shelter | 70 |
| | Fire Station | 38 |
| | General Acute Care Hospital | 1 |
| | Government Facilities | 17 |
| | Light Rail Stop | 2 |
| | Medical Health Facility | 45 |
| | Police | 8 |
| | Traffic Operations Center | 1 |
| | Vehicle and Equipment Storage | 1 |
| | Total | 187 |
| At Risk Population Facilities | Adult Day Care | 6 |
| | Adult Education School | 4 |
| | Adult Residential | 86 |
| | Alternative Education School | 5 |
| | Charter School | 9 |
| | College/University | 1 |
| | Community Day School | 3 |
| | Day Care Center | 112 |
| | Detention Center | 1 |
| | Group Home | 41 |
| | Hotel | 5 |
| | Infant Center | 8 |
| | Private Elementary School | 22 |
| | Private High School | 12 |
| | Private K-12 School | 16 |
| | Public Continuation High School | 7 |
| | Public Elementary School | 70 |
| | Public High School | 12 |
| | Public Middle School | 16 |
| | Residential Care/Elderly | 164 |
| | Residential Facility Chronically | 1 |
| | School-Age Day Care Center | 24 |
| | Social Rehabilitation Facility | 2 |
| | Special Education School | 6 |
| | Total | 633 |

| Critical Facility Category | Facility Type | Facility Count |
|-----------------------------------|-------------------------------|----------------|
| Hazardous Materials Facilities | Oil Collection Center | 26 |
| | OTHER | 1 |
| | Total | 27 |
| X Total | | 847 |
| X Protected by Levee | | |
| Essential Services Facilities | Emergency Evacuation Shelter | 11 |
| | Fire Station | 3 |
| | Light Rail Stop | 3 |
| | Medical Health Facility | 8 |
| | Police | 1 |
| | Vehicle and Equipment Storage | 1 |
| | Total | 27 |
| At Risk Population Facilities | Adult Day Care | 2 |
| | Adult Residential | 12 |
| | Charter School | 1 |
| | Day Care Center | 14 |
| | Group Home | 5 |
| | Hotel | 1 |
| | Infant Center | 2 |
| | Private Elementary School | 1 |
| | Private High School | 2 |
| | Private K-12 School | 1 |
| | Public Elementary School | 10 |
| | Public High School | 1 |
| | Public Middle School | 1 |
| | Residential Care/Elderly | 6 |
| | School-Age Day Care Center | 3 |
| | Total | 62 |
| Hazardous Materials Facilities | Oil Collection Center | 1 |
| | Total | 1 |
| X Protected by Levee Total | | 90 |
| | | |
| Grand Total | | 1,156 |

Source: Sacramento County DFIRM, Sacramento County GIS

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

Overall Community Impact

Floods and their impacts vary by location and severity of any given event and will likely only affect certain areas of the County during specific times. Based on the risk assessment, it is evident that floods will continue to have potentially devastating economic impacts to certain areas of the County. However, many floods in the County are minor, localized events that cause nominal damage rather than a disaster. Impacts that are not quantified, but can be anticipated in large future events, include:

- Commercial and residential structural and property damage;
- Costs incurred due to post-flood clean up and repair of buildings and infrastructure;
- Damage to roads/bridges resulting in loss of mobility;
- Decreased revenue due to loss of income, sales, tourism, and property taxes;
- Deterioration of homes and neighborhoods as floods recur;
- Disruption of and damage to public infrastructure and services;
- Health hazards associated with mold and mildew, contamination of drinking water, etc.;
- Impact on the overall mental health of the community;
- Injury and loss of life, including first responders rescuing those who did not evacuate or are stranded;
- Loss of historical or unique artifacts;
- Loss of jobs due to businesses closing or cutting back on operating hours;
- Loss of programs or services that are cut to pay for flood recovery;
- Mental health and family impacts, including increased occurrence of suicides and divorce
- Negative impact on commercial and residential property values;
- Significant disruption to students and teachers as temporary facilities and relocations would likely be needed; and
- Significant economic impact (jobs, sales, tax revenue) to the community.

Future Development and Future Flood Conditions

This section provides an analysis of the flood hazard and proposed future development within the County based on FEMA DFIRMs and also discusses considerations in evaluating future flooding conditions.

Future Development: General Considerations

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

The International Residential Code (IRC) and International Building Code (IBC), by reference to ASCE 24, include requirements that govern the design and construction of buildings and structures in flood hazard areas. FEMA has determined that the flood provisions of the I-Codes are consistent with the requirements of the NFIP (the I-Code requirements shown either meet or exceed NFIP requirements). ASCE 24, a design standard developed by the American Society of Civil Engineers, expands on the minimum NFIP requirements with more specificity, additional requirements, and some limitations.

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

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

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

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

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

Sacramento Planning Area SB 5 Compliance Status

In June of 2016, SAFCA released their Engineering Report certifying "Adequate Progress Towards an Urban Level of Flood Protection". This certification is made with respect to the following levee systems:

- Natomas Levee System comprised of Natomas Cross Canal south levee; Sacramento River east levee, Natomas Cross Canal to Powerline Road; Sacramento River east levee, Powerline Road to American River; American River north levee; Natomas East Main Drainage Canal west levee; and Pleasant Grove Creek Canal west levee.
- Dry Creek Levee System comprised of the Dry Creek north levee. Robla-Arcade Levee System comprised of Robla Creek south levee; Natomas East Main Drainage Canal east levee from Robla (Dry) Creek to Arcade Creek; and Arcade Creek north levee.
- American River North Levee System comprised of Arcade Creek south levee; Natomas East Main Drainage Canal east levee from Arcade Creek to American River; and American River north levee from NEMDC east levee to Arden Way (at William B. Pond Recreation Area).
- American River South and Sacramento River East Levee System comprised of American River south levee; from Sacramento River to Mayhew Drain; Sacramento River east levee from American River to Beach Lake north levee; and Beach Lake north levee from Sacramento River to UPRR.
- South Sacramento Streams Levee System comprised of the Morrison Creek right and left bank levees and floodwalls, Florin Creek right and left bank levees and floodwalls, Elder Creek right and left bank levees and floodwalls, and Unionhouse right bank levee and floodwall.

SAFCA has prepared a separate report, titled SAFCA Urban Level of Flood Protection Plan and Adequate Progress Baseline Report (SAFCA, 2016), that demonstrates adequate progress and the identified scope, schedule, and cost of the construction of a flood protection system which will result in flood protection equal to or greater than the urban level of flood protection in urban or urbanizing areas. For urban and urbanizing areas protected by project levees, the urban level of flood protection shall be achieved by 2025.

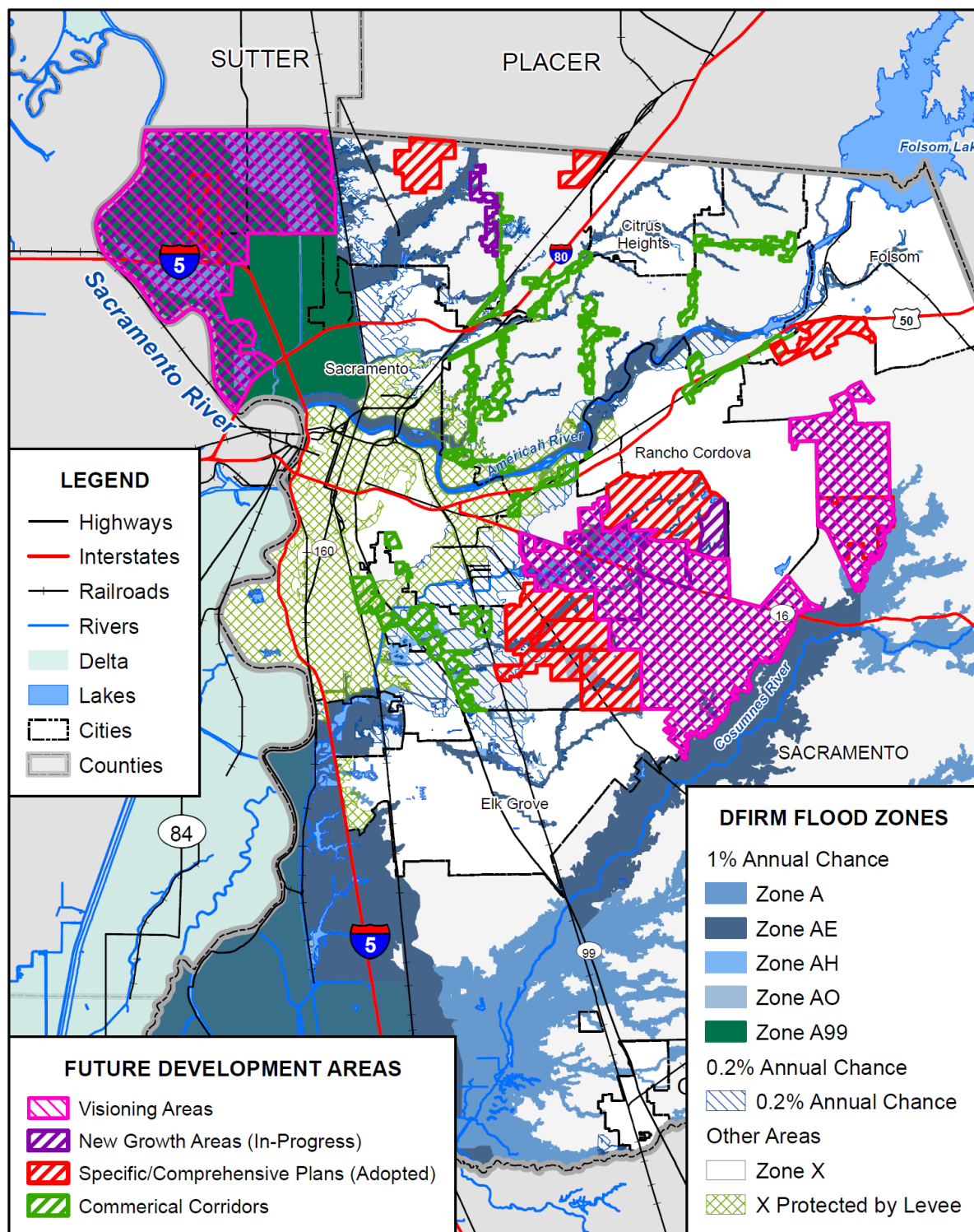
SAFCA's June 2016 Engineering Report, "Adequate Progress Towards an Urban Level of Flood Protection" was developed to provide substantial evidence that, once the planned improvements have been completed, the structural flood control facilities protecting the urban areas of the City and County from flooding from the Sacramento and American Rivers and their tributaries will be able to withstand flooding from a 1-in-200-year flood event in accordance with the State of California's Urban Levee Design Criteria (ULDC), issued in May 2012. To this end, for each of the six levee systems discussed, there is a description of the status for compliance with each criterion for each levee within the levee system.

Future Development: DFIRM GIS Analysis

Future development areas for unincorporated Sacramento County is broken out into four primary categories: Vision areas, new growth areas, specific/comprehensive plan areas, and commercial corridors. GIS data is maintained by Sacramento County, and was made available for this plan. An analysis was performed to quantify parcels within these development areas that are also in flood hazard areas. Results can provide information on how and where to grow in the future.

GIS was used to determine the number of parcels in the 1% and 0.2% annual chance flood events within the four categories of future development areas. GIS was used to create a centroid, or point representing the center of the parcel polygon. Those parcels centroids that fall inside the future development areas and that were within the 1% annual chance flood event or the 0.2% annual chance flood events were selected and tabulated in Figure 4-85 and shown in Table 4-86.

Figure 4-85 Unincorporated Sacramento County – Future Development in DFIRM Flood Zones



0 6.5 13 Miles



Data Source: Sacramento County GIS, Cal-Atlas, FEMA NFHL 04/16/2016; Map Date: 05/2016.

Table 4-86 Unincorporated Sacramento County– Future Development in FEMA DFIRM Zones

| Future Development Areas | Parcels | Acres | DFIRM Flood Zone |
|--|---------|--------|--|
| Visioning Area | | | |
| Jackson | 1,099 | 21,670 | A, AE, AO, 0.2% Annual Chance, X-Protected by Levee, X |
| Natomas | 907 | 24,504 | A, A99, AE, X |
| Grantline East | 48 | 8,198 | A, X |
| New Growth Areas | | | |
| Mather South Master Plan | 12 | 1,299 | AE, 0.2% Annual Chance, X |
| Natomas North | 907 | 24,504 | A, A99, AE, X |
| Jackson Township | 61 | 1,909 | AE, 0.2% Annual Chance, X |
| New Bridge | 27 | 1,339 | AE, 0.2% Annual Chance, X |
| West Jackson Highway | 455 | 6,181 | A, AE, AO, 0.2% Annual Chance, X-Protected by Levee, X |
| West of Watt | 383 | 609 | AE, 0.2% Annual Chance, X |
| Specific/Comprehensive Plan Areas | | | |
| Cordova Hills Master Plan | 26 | 2,436 | A, X |
| East Antelope Specific Plan | 1,425 | 601 | X |
| Easton Project | 19 | 1,409 | 0.2% Annual Chance, X |
| Elverta Specific Plan | 158 | 1,581 | AE, X |
| Florin-Vineyard Gap Community Plan | 827 | 3,875 | A, AE, AO, 0.2% Annual Chance, X |
| Jackson Township Master Plan | 61 | 1,909 | AE, 0.2% Annual Chance, X |
| Mather Field | 1,421 | 5,493 | A, AE, 0.2% Annual Chance, X |
| Mather South Master Plan | 12 | 1,299 | AE, 0.2% Annual Chance, X |
| Metro Airpark | 78 | 1,810 | A, A99 |
| New Bridge Master Plan | 27 | 1,339 | AE, 0.2% Annual Chance, X |
| North Vineyard Station Specific Plan | 1,320 | 1,553 | AE, AO, 0.2% Annual Chance, X |
| Vineyard Springs Comprehensive Plan | 2,732 | 2,344 | AE, AO, 0.2% Annual Chance, X |
| West Jackson Highway Master Plan | 455 | 6,181 | A, AE, AO, 0.2% Annual Chance, X-Protected by Levee, X |
| West of Watt | 383 | 609 | AE, 0.2% Annual Chance, X |
| Commercial Corridor Areas | | | |
| Corridor 1 | 1,277 | 554 | AE, 0.2% Annual Chance, X |
| Corridor 2 | 533 | 226 | X |
| Corridor 3 | 1,033 | 625 | AE, 0.2% Annual Chance, X |
| Corridor 4 | 626 | 532 | AE, 0.2% Annual Chance, X |
| Corridor 5 | 516 | 621 | AE, AH, 0.2% Annual Chance, X |
| Corridor 6 | 579 | 311 | AE, 0.2% Annual Chance, X |
| Corridor 7 | 722 | 460 | AE, 0.2% Annual Chance, X |
| Corridor 8 | 126 | 136 | X |

| Future Development Areas | Parcels | Acres | DFIRM Flood Zone |
|--------------------------|---------|-------|--|
| Visioning Area | | | |
| Corridor 9 | 946 | 290 | AE, 0.2% Annual Chance, X-Protected by Levee, X |
| Corridor 10 | 593 | 101 | X |
| Corridor 11 | 266 | 76 | X-Protected by Levee, X |
| Corridor 12 | 2,537 | 1,929 | A, AE, AH, 0.2% Annual Chance, X-Protected by Levee, X |
| Corridor 13 | 325 | 402 | AE, 0.2% Annual Chance, X |
| Corridor 14 | 30 | 155 | X |
| Corridor 15 | 224 | 465 | 0.2% Annual Chance, X |
| Corridor 16 | 31 | 11 | X |
| Corridor 17 | 203 | 254 | A, 0.2% Annual Chance, X-Protected by Levee, X |
| Corridor 18 | 3 | 1 | X-Protected by Levee |
| Corridor 19 | 48 | 130 | 0.2% Annual Chance, X-Protected by Levee |

Source: Sacramento County GIS, Sacramento County DFIRM June 16, 2015

Future Flood Conditions

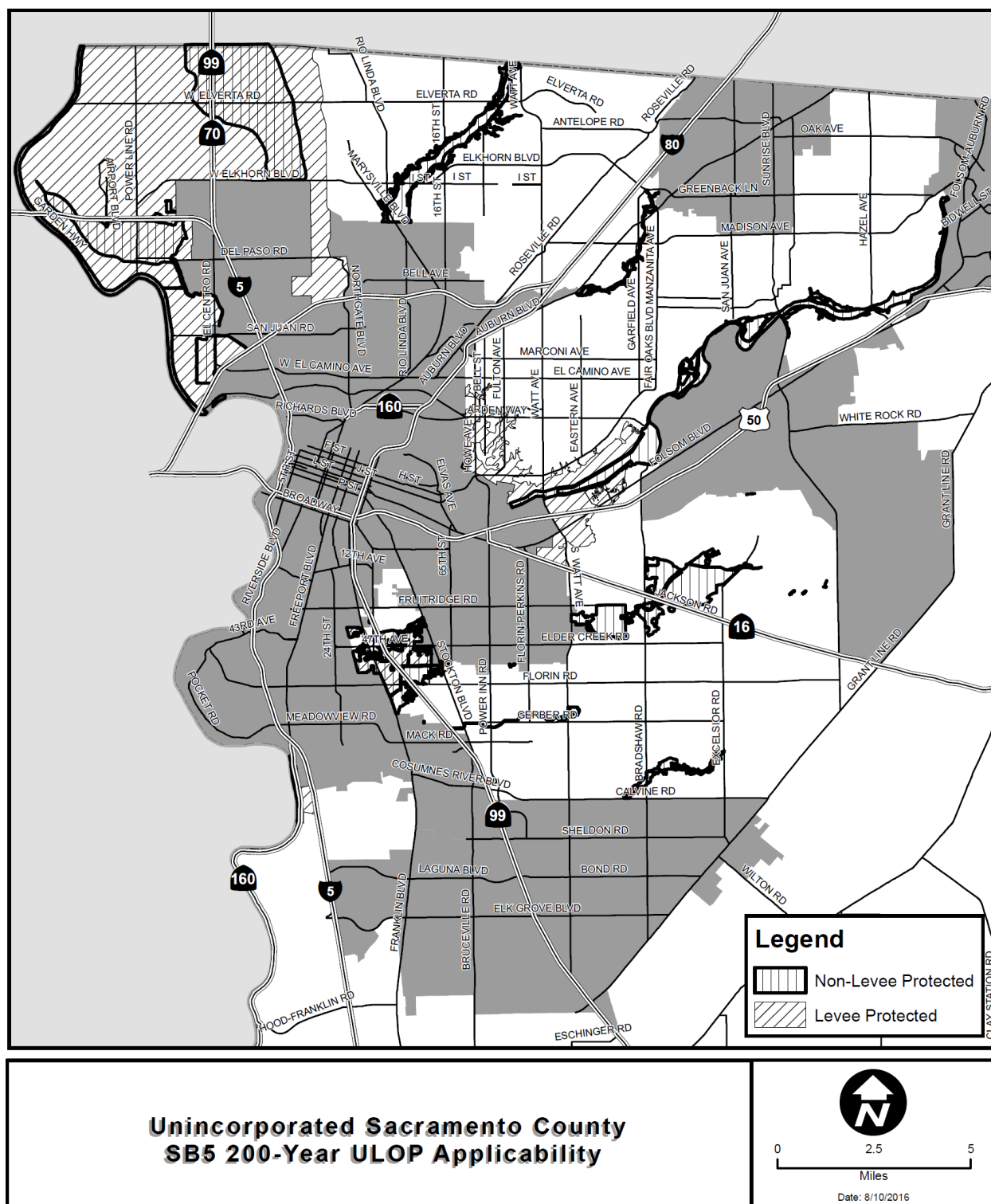
The flood risk assessment included a detailed analysis of historic and existing conditions through documentation of past occurrences and various mapping efforts conducted by multiple agencies, as well as an evaluation of areas likely to flood in the future/future flooding conditions. Future flooding conditions were considered by the County for this assessment using a variety of tools:

- The new FEMA DFIRMs (6/16/2015) and updated FIS provide information on the updated 1% and 0.2% annual chance floods and X-protected by levee areas based on the latest studies and considering recent growth and development in the County. This new mapping is a representation of areas subject to major floods in the future and is used for regulatory and future planning and development purposes.
- Local Flood Mapping prepared by Sacramento County Department of Water Resources. These maps have local floodplains identified throughout the County that are based on high water data, local hydrologic and hydraulic studies, and other reports of flooding.
- The County also maintains a separate database and mapping effort of all RL and historical loss properties in the County. This RL/historical loss analysis is also used to identify areas likely to flood in the future and to assist with the development of mitigation measures to mitigate future flood damage to these areas. This information and analysis is included in the County's and City of Sacramento's updated 2015 RLAA Reports, attached as an Appendix to this plan.
- Also to be considered when evaluating future flood conditions in the Sacramento County Planning Area, the California DWR developed Best Available Maps (BAM)/Flood Awareness Maps. These maps were developed to provide communities with an additional tool in understanding potential flood hazards currently not mapped as a regulated floodplain. These preliminary maps include the 100-, 200- and 500-year floodplains to provide information on the true risk of flooding to allow communities to make informed floodplain management and property use decisions. These advisory maps are intended to help communities begin implementing activities to meet SB 5 requirements calling for a minimum of 200-year protection for new development in urban and urbanizing area.

Regulatory Considerations for Future Flood Conditions

As previously described, Sacramento County and participating jurisdictions have been evaluating and determining the impact of both existing and future flood conditions, including development of a local program to address the 200-year state requirement for the ULOP. The County is in the process of finalizing updates to the General Plan and Zoning Code addressing new flood protection requirements that establish a 200-year flood standard of protection in urban areas (e.g., ULOP). This is the primary policy change that will affect construction in urban or urbanizing areas that are in a SFHA or a Moderate Flood Zone. Areas not considered to be urbanizing will remain subject to the FEMA 0.1% standard of flood protection. Figure 4-86 shows the 200-year ULOP applicability areas within the unincorporated County. 200-year studies have been completed or are underway for areas that are non-levee protected. Proposed amendments address: agency coordination, setbacks along levees, elevation and construction standards, flood map data, flood emergency response, floodway management, building design standards, and the process for making legal determinations and project approvals for development in flood hazard zones.

Figure 4-86 Unincorporated Sacramento County – Urban Level of Flood Protection



Mapping of these areas will be part of implementation of the program moving forward

Future Flood Conditions: The Effects of Climate Change

The effects of climate change on future flood conditions should also be considered. While the risk and associated short and long term impacts of climate change are uncertain, experts in this field tend to agree that among the most significant impacts include those resulting from increased heat and precipitation events that cause increased frequency and magnitude of flooding. Changes associated with climate change and flooding could be significant given the effects of snowmelt runoff combined with significant rain events. Increases in damaging flood events may cause greater property damage, public health and safety concerns displacement, and loss of life. In addition, an increase in the magnitude and severity of flood events can lead to potential contamination of potable water and contamination of food crops given the agricultural industry in the County. Displacement of residents can include both temporary and long-term displacement.

Sacramento County will continue to study the risk and vulnerability associated with future flood conditions, both in terms of future growth areas and other considerations such as climate change, as they evaluate and implement their flood mitigation and adaptation strategy for the Sacramento County Planning Area.

Future Flood Conditions: ARkStorm Scenario

Also to be considered in evaluating potential “worst case” future flood conditions, is the ARkStorm Scenario. Although much attention in California’s focuses on the “Big One” as a high magnitude earthquake, there is the risk of another significant event in California – a massive, statewide winter storm. The last such storms occurred in the 19th century, outside the memory of current emergency managers, officials, and communities. However, massive storms are a recurring feature of the state, the source of rare but inevitable disasters. The USGS Multi Hazards Demonstration Project’s (MHDP) developed a product called ARkStorm, which addressed massive U.S. West Coast storms analogous to those that devastated California in 1861-1862. Over the last decade, scientists have determined that the largest storms in California are the product of phenomena called Atmospheric Rivers (discussed above in Section 4.2.14 in the discussion of Pineapple Express), and so the MHDP storm scenario is called the ARkStorm, for Atmospheric River 1000 (a measure of the storm’s size).

Scientific studies of offshore deposits in northern and southern California indicate that storms of this magnitude and larger have occurred about as often as large earthquakes on the southern San Andreas Fault. Such storms are projected to become more frequent and intense as a result of climate change. This scientific effort resulted in a plausible flood hazard scenario to be used as a planning and preparation tool by hazard mitigation and emergency response agencies.

For the ARkStorm Scenario, experts designed a large, scientifically realistic meteorological event followed by an examination of the secondary hazards (e.g., landslides and flooding), physical damages to the intense winter storms of 1861-62 that left California’s Central Valley impassible. Storms far larger than the ARkStorm, dubbed megastorms, have also hit California at least six times in the last two millennia.

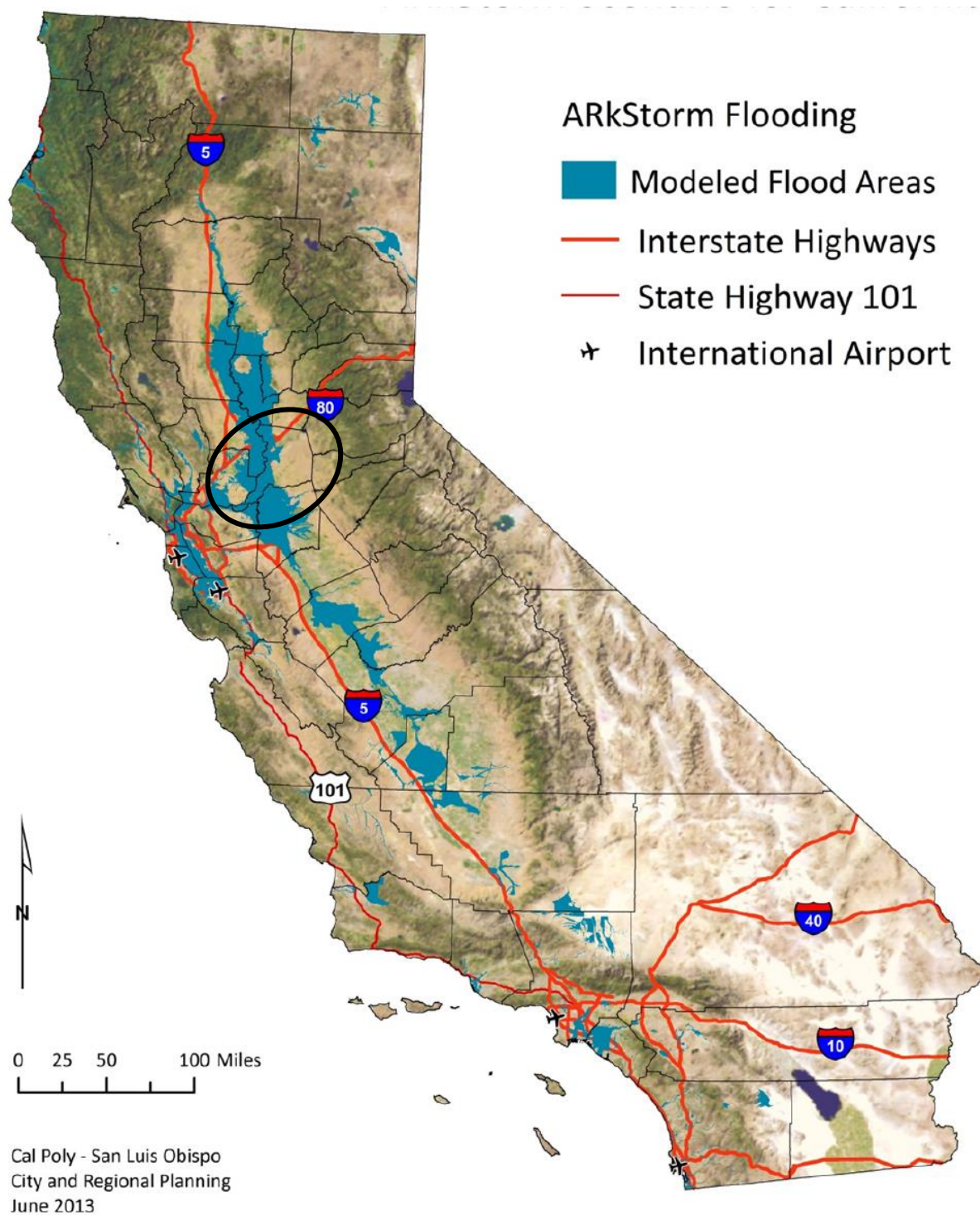
The ARkStorm produces precipitation in many places exceeding levels experienced on average every 500 to 1,000 years. Extensive flooding in many cases overwhelms the state’s flood protection system, which is at best designed to resist 100- to 200-year runoffs (many flood protection systems in the state were designed for smaller runoff events). The Central Valley experiences widespread flooding. Serious flooding also

occurs in Orange County, Los Angeles County, San Diego, the San Francisco Bay Area, and other coastal communities. In some places, winds reach hurricane speeds, as high as 125 miles per hour. Hundreds of landslides occur, damaging roads, highways, and homes. Property damage exceeds \$300 billion, most of it from flooding. Agricultural losses and other costs to repair lifelines, dewater flooded islands, and repair damage from landslides brings the total direct property loss to nearly \$400 billion, of which only \$20 to \$30 billion would be recoverable through public and commercial insurance. Power, water, sewer, and other lifelines experience damage that takes weeks or months to restore. Flooding evacuation could involve over one million residents in the inland region and Delta counties.

A storm of ARkStorm's magnitude has important implications: 1) it raises serious questions about the ability of existing national, state, and local disaster policy to handle an event of this magnitude; 2) it emphasizes the choice between paying now to mitigate, or paying a lot more later to recover; 3) innovative financing solutions are likely to be needed to avoid fiscal crisis and adequately fund response and recovery costs; 4) responders and government managers at all levels could be encouraged to conduct self-assessments and devise table-top exercises to exercise their ability to address a similar event; 5) the scenario can be a reference point for application of FEMA and Cal OES guidance connecting federal, state, and local natural hazards mapping and mitigation planning under the NFIP and Disaster Mitigation Act of 2000; and 6) common messages to educate the public about the risk of such an extreme event could be developed and consistently communicated to facilitate policy formulation and transformation.

Figure 4-87 depicts an ARkStorm modeled scenario showing the potential for flooding in the Central Valley as the result of a large storm. In Sacramento County, the modeled scenario suggests the westernmost portion of the County would face inundation.

Figure 4-87 Projected ARkStorm Flooding in California



Source: USGS ARkStorm

4.3.11. Flood: Localized Stormwater Flooding Vulnerability Assessment

Likelihood of Future Occurrence—Highly Likely

Vulnerability—Medium

Historically, the Planning Area has been at risk to flooding primarily during the spring months when river systems in the County swell with heavy rainfall. Localized flooding also occurs throughout the Planning Area at various times throughout the year with several areas of primary concern unique to each City and the unincorporated County. Mapping of these areas is an ongoing effort by the County and Cities. However, affected localized flood areas and associated values identified by the County are summarized in Table 4-87.

Methodology

Areas in Sacramento County vulnerable to localized flooding were identified by the County and analysis was performed for the 2011 Plan Update. That analysis was updated here, using 2016 mean values of structures in the County. Parcel and road segments vulnerable to these areas were tabulated by watershed, and are shown in Table 4-35 in Section 4.2.15. Road segments were initially selected if they were within 50 feet of an affected parcel. For the purposes of this analysis, parcels and road segments that overlapped watershed boundaries were counted for each of the watersheds. Parcels and road segments that intersect the 1% or 2% annual flood events (see DFIRM flood analysis, Section 4.3.10) were eliminated from these counts. It is important to note that localized flooding may also occur within those DFIRM zones, making this analysis a conservative approach.

There are 10,034 parcels affected by localized flooding (and outside of the DFIRM flood zones) in Sacramento County. Morrison Creek and Laguna Creek Watersheds have the highest counts of parcels affected, each with over 1,000. These are large watersheds that extend in a northeast-southwest orientation across the middle of the county and that cover unincorporated county and areas in Sacramento, Elk Grove and Rancho Cordova.

According to the County Assessor data, the mean (average) structure value of improved residential parcels county-wide is \$295,000 (it was \$158,665 in 2010). Assuming that the parcels listed in Table 4-35 are improved residential parcels, there is a total structure value of \$2.9 billion at risk to localized flooding. Assuming contents value is 50% of residential structure value, there is a total value of \$4.4 billion at risk. Applying the 20% loss due to flooding, the loss estimate for the Planning Area is \$888 million. Total values at risk are shown in Table 4-87. Total population at risk to localized flooding is 27,192 (based on Census 2010 household factor of 2.71).

Table 4-87 Sacramento County Planning Area – Vulnerability to Localized Flooding

| Parcel Count | Improved Value/Parcel* | Structure Value | Contents Value | Total Value | Loss Estimate |
|--------------|------------------------|-----------------|-----------------|-----------------|---------------|
| 10,034 | \$295,000 | \$2,960,030,000 | \$1,480,015,000 | \$4,440,045,000 | \$888,009,000 |

*mean value of an improved residential structure

Future Development

Much of the growth in Sacramento County is occurring through expansion of the urban areas, causing a significant increase in peak flow and stormwater runoff. Such growth can consume previously undeveloped acres, and the impacts may overwhelm existing drainage and flood control facilities.

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

The risk of stormwater/localized flooding to future development can be minimized by accurate recordkeeping of repetitive localized storm activity. Mitigating the root causes of the localized stormwater through compliance with stormwater management regulations or choosing not to develop in areas that often are subject to localized flooding will reduce future risks of losses due to stormwater/localized flooding.

4.3.12. Levee Failure Vulnerability Assessment

Likelihood of Future Occurrence—Occasional

Vulnerability—Medium

Levee failure flooding can occur as the result of partial or complete collapse of an impoundment, and often results from prolonged rainfall and flooding. The primary danger associated with dam or levee failure is the high velocity flooding of those properties downstream of the breach. Section 4.2.17 Levee Failure describes the levee inventory in the Sacramento County Planning Area.

A levee failure can range from a small, uncontrolled release to a catastrophic failure. Vulnerability to levee failures is generally confined to the areas subject to inundation downstream of the facility. Secondary losses would include loss of the multi-use functions of the facility and associated revenues that accompany those functions.

Approximately 150 years ago, the levees of the Sacramento-San Joaquin Delta were raised to prevent flooding on what remains some of the most fertile farmland in the nation. While the peat soils were excellent for agriculture, they were not the best choice to create strong foundations for levee barriers meant to contain a constant flow of river water. Nevertheless, it was these native soils that were primarily used to create the levee system.

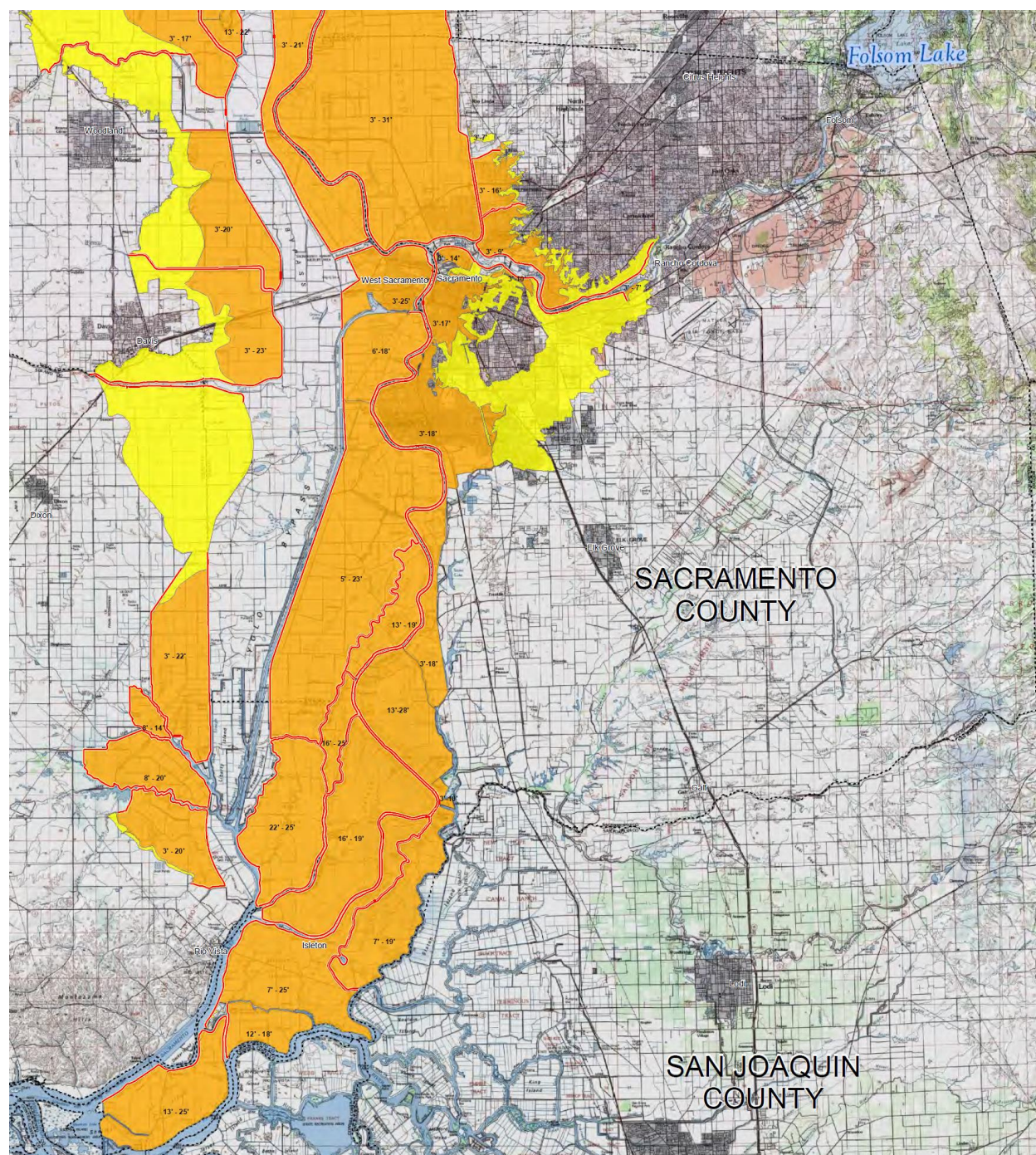
Levee failure flooding would vary in the County depending on which structure fails and the nature and extent of the failure and associated flooding. This flooding presents a threat to life and property, including buildings, their contents, and their use. Large flood events can affect lifeline utilities (e.g., water, sewerage, and power), transportation, jobs, tourism, the environment, agricultural industry, and the local and regional economies.

Levee Flood Protection Zones

Levee Flood Protection Zones estimate the maximum area that may be inundated if a project levee fails when water surface elevation is at the top of a project levee. Zones depicted on Figure 4-88 do not necessarily depict areas likely to be protected from flow events for which project levees were designed. Figure 4-88 illustrates the depths of flooding should a levee that protects that area fail.

Lands within the Levee Flood Protection Zones and other leveed areas may be subject to flooding due to various factors, including the failure or overtopping of project or non-project levees, flows that exceed the design capacity of project or non-project levees, and flows from water sources not specifically protected against by project levees. Lands not mapped within a Levee Flood Protection Zone and within other areas protected by a levee are not invulnerable to flood risk, and some may also experience flooding from these or other related events.

Figure 4-88 Expected Flood Depths from Levee Failure



Levee Flood Protection Zones

- Estimated Depth Greater Than 3'
(Numbers shown indicate approximate inundation depths)
- Depth Unknown
- Butte Basin: Not an LFPZ - area is designed to flood.
Area shown is based on historical limits of flooding.

- State Federal Project Levee
- County Boundary

Source: DWR, USGS

Values at Risk

Unincorporated Sacramento County and its incorporated jurisdictions have mapped flood hazard areas. This includes areas protected by levees. GIS was used to determine the possible impacts of flooding in areas protected by levee within the County, and how the risk varies across the Planning Area. The following methodology was followed in determining improved parcel counts and values at risk to levee failure. However, this analysis was performed based on the most current 2015 DFIRMs which still reflect some levees as providing 100-year level of protection. According to the County, all levees have since been decertified as not providing a 100-year level of protection, so this analysis is based solely on the information presented in the DFIRMs. Further it is important to note that many levee improvement projects are ongoing throughout the Planning Area, some of which will be providing certification of area levees to both a 100-year and 200-year levels depending on applicable requirements. Thus, this analysis reflects a moment in time and while it does provide information on areas developed behind levees, the X Protected by Levee flood zone will continue to change as these projects are completed and new certifications obtained.

The methodology detailed below was followed in determining assets at risk to a levee failure. Analysis on assets at risk is provided for two different areas in this Base Plan:

- Sacramento County Planning Area
- Unincorporated Sacramento County

The Sacramento County Planning Area includes both the unincorporated County and each jurisdiction, essentially the entire geographical area of Sacramento County. Summary tables for the Planning Area are presented below. For the unincorporated County, both summary and detail tables are shown and discussed below. Detail tables for the participating jurisdictions are included in their respective annexes to this plan.

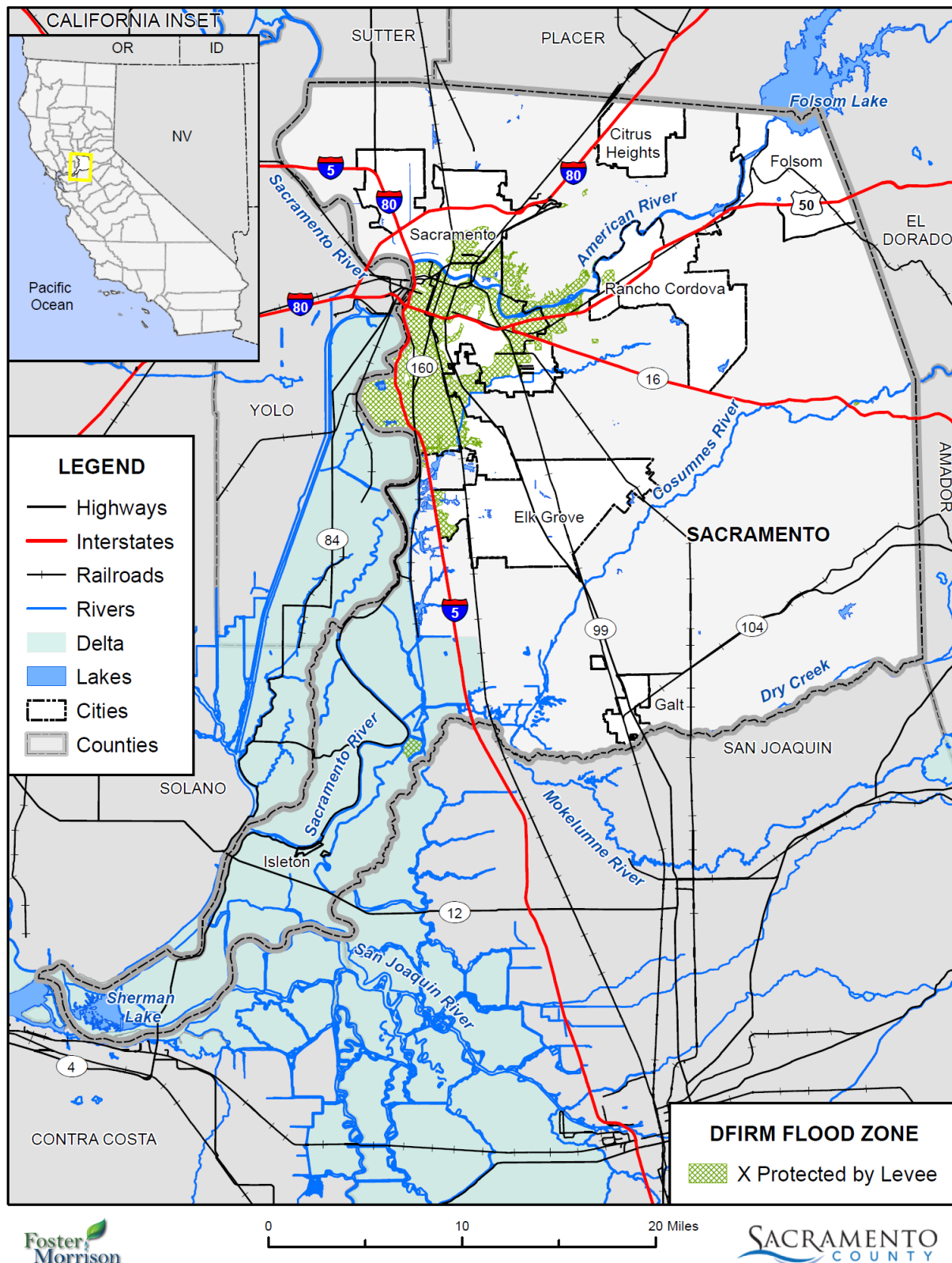
X Protected by Levee Analysis

Methodology

Sacramento's parcel and associated secured roll assessor 2015 data was used as the basis for the countywide inventory of developed parcels, land value, and structure value. Sacramento County's current FEMA DFIRM, obtained from the FEMA National Flood Hazard Layer and dated April 16, 2016 was utilized to perform this analysis of areas protected by levees. GIS was used to create a centroid, or point representing the center of the parcel polygon. DFIRM data was then overlaid on the parcel centroids. For the purposes of this analysis, the X-protected by levee flood zone that intersected a parcel centroid was assigned that zone for the entire parcel. The model assumes that every parcel with a structure value greater than zero is improved in some way. It is important to note that there could be more than one structure on an improved parcel (i.e. condo complex occupies one parcel but might have several structures).

Figure 4-89 contains flood analysis results for area protected by a levee (i.e. designation of X Protected by Levee) for the entire Sacramento County Planning Area.

Figure 4-89 Sacramento County Planning Area – X Protected by Levee Zones



Data Source: Sacramento County GIS, Cal-Atlas, FEMA NFHL 04/16/2016; Map Date: 05/2016.

Sacramento County Planning Area

Based on FEMA guidance for levee failure, contents value is estimated using the methodology shown in Table 4-56. Table 4-92 contains levee failure analysis results for the entire Sacramento County Planning Area. This includes unincorporated Sacramento County and the incorporated jurisdictions. This table shows the number of parcels and assets at risk in levee protected areas. Table 4-92 shows the value of improved parcels by jurisdiction. Results of this analysis are presented for the Sacramento County Planning Area.

Table 4-88 Sacramento County Planning Area – Count and Structure Value of Improved Parcels in X Protected by Levee Zone

| Jurisdiction | Total Parcel Count | Improved Parcel Count | Total Land Value | Improved Structure Value | Total Value |
|----------------------------------|--------------------|-----------------------|------------------------|--------------------------|-------------------------|
| Citrus Heights | 0 | 0 | \$0 | \$0 | \$0 |
| Elk Grove | 2,359 | 2,261 | \$261,870,363 | \$778,210,531 | \$1,040,080,894 |
| Folsom | 0 | 0 | \$0 | \$0 | \$0 |
| Galt | 0 | 0 | \$0 | \$0 | \$0 |
| Isleton | 0 | 0 | \$0 | \$0 | \$0 |
| Rancho Cordova | 826 | 796 | \$41,727,801 | \$113,935,128 | \$155,662,929 |
| City of Sacramento | 69,158 | 64,495 | \$6,259,968,574 | \$14,814,016,310 | \$21,073,984,884 |
| Unincorporated Sacramento County | 10,654 | 10,188 | \$1,077,093,916 | \$2,472,625,848 | \$3,549,719,764 |
| Total | 82,997 | 77,740 | \$7,640,660,654 | \$18,178,787,817 | \$25,819,448,471 |

Source: Sacramento County 2016 Parcel/2015 Assessor's Data; Sacramento County DFIRM, April 2016

Table 4-93 shows potential losses from levee failure with loss estimates and loss ratios for the Sacramento County Planning Area. The loss ratio is the loss estimate divided by the total potential exposure (i.e., total of improved and contents value for all parcels located in the unincorporated County) and displayed as a percentage of loss. Due to the varying flood depths that may occur during flooding, the loss estimate uses 3 scenarios: 3 foot flood depth (30% damage), 6 foot flood depth (60% damage to structure and contents), and total loss (all structure and contents are lost). Land values are not included in the loss estimates, as the land itself is usually not a loss. FEMA considers loss ratios greater than 10% to be significant and an indicator that a community may have more difficulties recovering from a dam failure.

Table 4-89 Sacramento County Planning Area – X Protected by Levee Loss Estimates

| Flood Zone | Improved Parcel Count* | Improved Structure Value | Estimated Contents Value | Total Value | Loss Estimate* | Loss Ratio |
|----------------------|------------------------|--------------------------|--------------------------|------------------|--|------------------------|
| X Protected by Levee | 77,740 | \$18,178,787,817 | \$12,091,140,402 | \$30,269,928,219 | \$9,080,978,465.70 \$18,161,956,931.40 \$30,269,928,219.00 | 7.0% 14.0% 23.3% |

Source: Sacramento County 2016 Parcel/2015 Assessor's Data; Sacramento County DFIRM, April 2016

*Three values are shown here due to varying flood depths expected – 3 foot, 6 foot, and total loss.

According to the information in Table 4-92 and Table 4-93, the Sacramento County Planning Area has 77,740 improved parcels and roughly \$30.3 billion of structure and contents value in the X Protected by Levee areas. The 3 foot loss ratio of 7.0%, the 6 foot loss ratio of 14.0%, and the total loss ratio of 23.3% indicates that the County has large amounts of assets at risk to possible levee failures.

Structures protected by levees that fail are often total losses (see Figure 4-41 in Section 4.2.17). The analysis above assumes all levees in the Sacramento County Planning Area break at one time, which is unlikely. The extent and depth of actual flooding and associated damage will vary depending on the location, nature, depth, and extent of any levee break.

Unincorporated Sacramento County

Table 4-94 contains levee failure analysis results for unincorporated Sacramento County. These tables show the number of parcels and assets at risk in X Protected by Levee areas. Table 4-94 shows the value of improved parcels by land use. Results of this analysis are presented for unincorporated Sacramento County.

Table 4-90 Unincorporated Sacramento County – Count and Structure Value of Improved Parcels by Land Use in X Protected by Levee Zone

| Property Use | Total Parcel Count | Improved Parcel Count | Total Land Value | Improved Structure Value | Total Value |
|---------------------|--------------------|-----------------------|------------------------|--------------------------|------------------------|
| Agricultural | 1 | 1 | \$256,152 | \$138,321 | \$394,473 |
| Care / Health | 16 | 13 | \$7,758,169 | \$27,721,005 | \$35,479,174 |
| Church / Welfare | 28 | 23 | \$10,782,719 | \$29,340,621 | \$40,123,340 |
| Industrial | 86 | 84 | \$27,845,077 | \$68,708,090 | \$96,553,167 |
| Miscellaneous | 35 | 1 | \$105,638 | \$31,352 | \$136,990 |
| Office | 155 | 133 | \$87,237,295 | \$283,380,334 | \$370,617,629 |
| Public / Utilities | 149 | 4 | \$353,474 | \$323,426 | \$676,900 |
| Recreational | 2 | 2 | \$3,159,193 | \$8,192,213 | \$11,351,406 |
| Residential | 9,743 | 9,657 | \$772,836,538 | \$1,756,520,864 | \$2,529,357,402 |
| Retail / Commercial | 279 | 263 | \$140,803,738 | \$295,289,034 | \$436,092,772 |
| Vacant | 159 | 7 | \$25,955,923 | \$2,980,588 | \$28,936,511 |
| No Data | 1 | - | \$0 | \$0 | \$0 |
| Total | 10,654 | 10,188 | \$1,077,093,916 | \$2,472,625,848 | \$3,549,719,764 |

Source: Sacramento County 2016 Parcel/2015 Assessor's Data; Sacramento County DFIRM, April 2016

Table 4-95 shows potential losses from levee failure with loss estimate and loss ratios for the unincorporated County. The loss ratio is the loss estimate divided by the total potential exposure (i.e., total of improved and contents value for all parcels located in the unincorporated County) and displayed as a percentage of loss. Due to the varying flood depths that may occur during flooding, the loss estimate uses 3 scenarios: 3 foot flood depth (30% damage), 6 foot flood depth (60% damage to structure and contents), and total loss (all structure and contents are lost). Land values are not included in the loss estimates, as the land itself is

usually not a loss. FEMA considers loss ratios greater than 10% to be significant and an indicator that a community may have more difficulties recovering from a dam failure.

Table 4-91 Unincorporated Sacramento County – X Protected by Levee Loss Estimates

| Flood Zone | Improved Parcel Count* | Improved Structure Value | Estimated Contents Value | Total Value | Loss Estimate* | Loss Ratio |
|----------------------|------------------------|--------------------------|--------------------------|-----------------|--------------------|------------|
| X Protected by Levee | 10,188 | \$2,472,625,848 | \$1,625,738,873 | \$4,098,364,721 | \$1,229,509,416.30 | 2.6% |
| | | | | | \$2,459,018,832.60 | 5.2% |
| | | | | | \$4,098,364,721.00 | 8.7% |

Source: Sacramento County 2016 Parcel/2015 Assessor's Data; Sacramento County DFIRM, April 2016

*Three values are shown here due to varying flood depths expected – 3 foot, 6 foot, and total loss.

According to the information in Table 4-94 and Table 4-95, unincorporated Sacramento County has 10,188 improved parcels and roughly \$4.1 billion of structure and contents value in X Protected by Levee areas. The 3 foot loss ratio of 2.6%, the 6 foot loss ratio of 5.2%, and the total loss ratio of 8.7% indicates that the unincorporated County has moderate amounts of assets at risk to levee failure.

Structures protected by levees that fail are often total losses (see Figure 4-41 in Section 4.2.17). The analysis above assumes all levees in unincorporated Sacramento County break at one time, which is unlikely. The extent and depth of actual flooding and associated damage will vary depending on the location, nature, depth, and extent of any levee break.

Other values at risk from levee failure include agricultural crop loss. High value crops are grown in the Delta and other agricultural areas would be at risk to levee failure. Specific dollar values of crops protected by levees was not available for this plan.

Population at Risk

A separate analysis was performed to determine population in the X Protected by Levee areas. Using GIS, the X Protected by Levee DFIRM Zone was overlaid on the improved residential parcel data. Those parcel centroids that intersect the levee protected area were counted and multiplied by the Census Bureau household factor for each jurisdiction; and results were tabulated in Table 4-92. According to this analysis, there is a population of 193,533 in the X Protected by Levee Zone for the Sacramento County Planning Area.

Table 4-92 Sacramento County Planning Area – X Protected by Levee – Improved Residential Parcels and Population

| Jurisdiction | Improved Residential Parcels | Population* |
|----------------|------------------------------|-------------|
| Citrus Heights | 0 | 0 |
| Elk Grove | 2,193 | 5,548 |
| Folsom | 0 | 0 |
| Galt | 0 | 0 |
| Isleton | 0 | 0 |

| Jurisdiction | Improved Residential Parcels | Population* |
|----------------|------------------------------|----------------|
| Rancho Cordova | 792 | 2,178 |
| Sacramento | 61,023 | 159,880 |
| Unincorporated | 9,567 | 25,927 |
| Total | 73,575 | 193,533 |

Source: Sacramento County 2016 Parcel/2015 Assessor's Data; Sacramento County DFIRM, June 2016; US Census Bureau

*Census Bureau 2010 average household sizes are: Citrus Heights – 2.53; Elk Grove – 3.18; Folsom – 2.61; Galt – 3.24; Isleton – 2.43; Rancho Cordova – 2.75; City of Sacramento – 2.62; Unincorporated County – 2.71

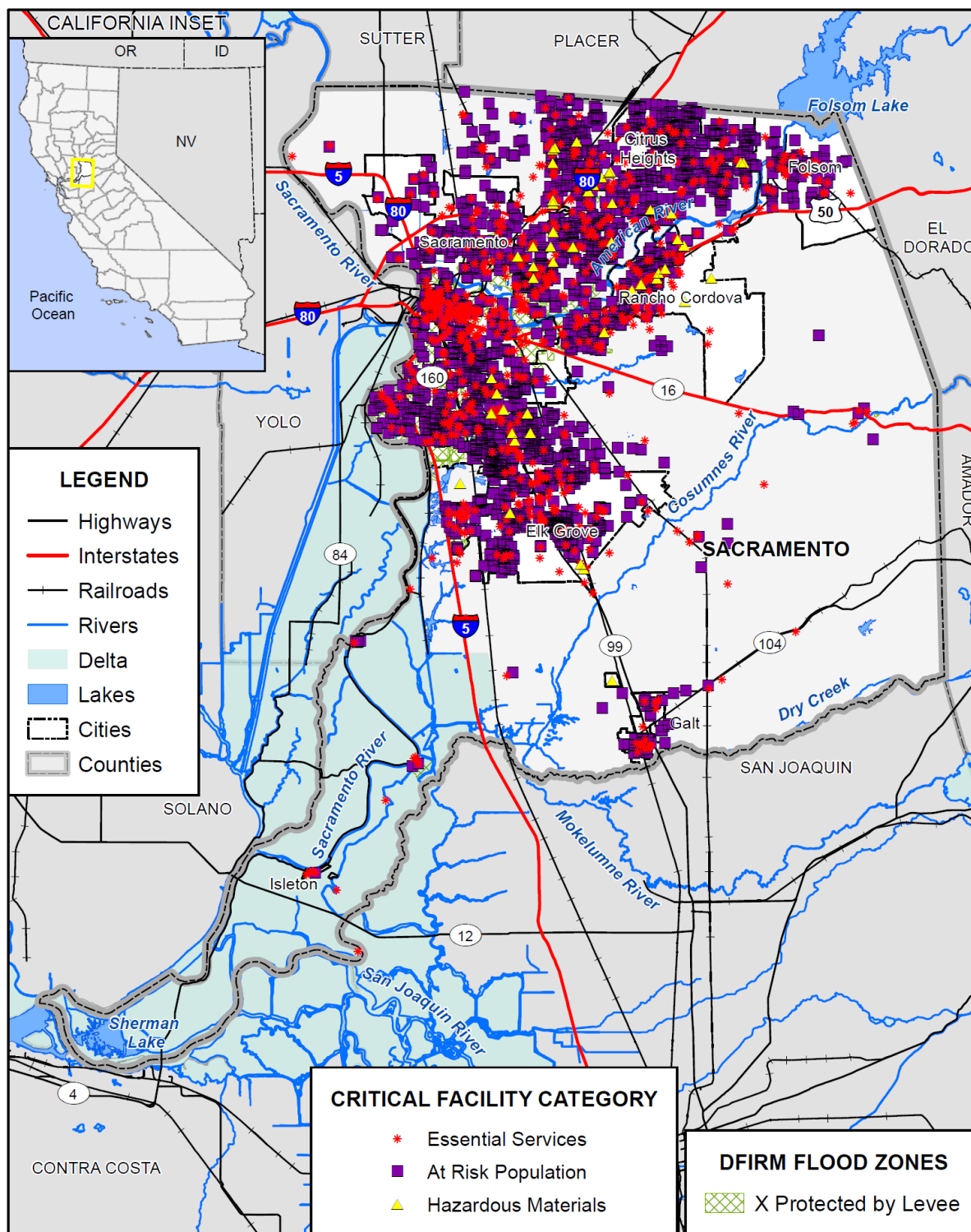
Cultural and Natural Resources at Risk

The Sacramento County Planning Area has significant cultural and natural resources located throughout the County as previously described. Vulnerability analysis of these resources was not possible due to data limitations, as the cultural and natural resource data is not available in a GIS layer.

Critical Facilities at Risk

A separate analysis was performed on the critical facility inventory in Sacramento County. GIS was used to determine whether the facility locations intersect the X Protected by Levee hazard areas. These are shown in Figure 4-90. Table 4-93 details critical facilities by facility type and count for the Planning Area, while Table 4-94 details the critical facilities for the unincorporated County. Details of critical facility definition, type, name and address and jurisdiction by flood zone are listed in Appendix E.

Figure 4-90 Sacramento County Planning Area – Critical Facilities in X Protected by Levee Zones



Foster
Morrison

0 10 20 Miles

SACRAMENTO
COUNTY

Data Source: Sacramento County GIS, Cal-Atlas, FEMA NFHL 04/16/2016; Map Date: 05/2016.

Table 4-93 Sacramento County Planning Area – Critical Facilities in DFIRM X Protected by Levee Flood Zones

| Critical Facility Category | Facility Type | Facility Count |
|-------------------------------|-------------------------------|----------------|
| Essential Services Facilities | Airport | 1 |
| | Bus Terminal | 4 |
| | Convention Center | 1 |
| | Drainage | 1 |
| | Emergency Evacuation Shelter | 59 |
| | Fire Station | 19 |
| | General Acute Care Hospital | 2 |
| | Government Facilities | 18 |
| | Light Rail Stop | 26 |
| | Medical Health Facility | 79 |
| | Police | 2 |
| | Sand Bag | 2 |
| | Stadium | 2 |
| | Vehicle and Equipment Storage | 1 |
| | Water Treatment Plant | 1 |
| | Total | 218 |
| At Risk Population Facilities | Adult Day Care | 11 |
| | Adult Education School | 4 |
| | Adult Residential | 61 |
| | Assisted Living Centers | 3 |
| | Charter School | 5 |
| | College/University | 2 |
| | Community Day School | 2 |
| | Day Care Center | 107 |
| | Group Home | 18 |
| | Hotel | 16 |
| | Independent Study School | 1 |
| | Infant Center | 11 |
| | Private Elementary School | 11 |
| | Private High School | 6 |
| | Private K-12 School | 4 |
| | Public Elementary School | 56 |
| | Public High School | 5 |
| | Public Middle School | 9 |
| | Residential Care/Elderly | 45 |

| Critical Facility Category | Facility Type | Facility Count |
|--------------------------------------|----------------------------|----------------|
| | School | 1 |
| | School-Age Day Care Center | 21 |
| | Total | 399 |
| Hazardous Materials Facilities Total | Oil Collection Center | 2 |
| | Total | 2 |
| X Protected by Levee Total | | 619 |

Source: Sacramento County DFIRM, Sacramento County GIS

Table 4-94 Unincorporated Sacramento County – Critical Facilities in DFIRM X Protected by Levee Flood Zones

| Critical Facility Category | Facility Type | Facility Count |
|-----------------------------------|-------------------------------|----------------|
| Essential Services Facilities | Emergency Evacuation Shelter | 11 |
| | Fire Station | 3 |
| | Light Rail Stop | 3 |
| | Medical Health Facility | 8 |
| | Police | 1 |
| | Vehicle and Equipment Storage | 1 |
| | Total | 27 |
| At Risk Population Facilities | Adult Day Care | 2 |
| | Adult Residential | 12 |
| | Charter School | 1 |
| | Day Care Center | 14 |
| | Group Home | 5 |
| | Hotel | 1 |
| | Infant Center | 2 |
| | Private Elementary School | 1 |
| | Private High School | 2 |
| | Private K-12 School | 1 |
| | Public Elementary School | 10 |
| | Public High School | 1 |
| | Public Middle School | 1 |
| | Residential Care/Elderly | 6 |
| | School-Age Day Care Center | 3 |
| | Total | 62 |
| Hazardous Materials Facilities | Oil Collection Center | 1 |
| | Total | 1 |
| X Protected by Levee Total | | 90 |

Source: Sacramento County DFIRM, Sacramento County GIS

Overall Community Impact

Levee failures and their impacts vary by location and severity of any given flood event and will likely only affect certain areas of the County during specific times. Based on the risk assessment, it is evident that levee failures will continue to have potentially devastating economic impacts to certain areas of the County. Impacts that are not quantified, but can be anticipated in large future events, include:

- Commercial and residential structural and property damage;
- Costs incurred due to post-flood clean up and repair of buildings and infrastructure;
- Damage to roads/bridges resulting in loss of mobility;
- Decreased revenue due to loss of income, sales, tourism, and property taxes;
- Deterioration of homes and neighborhoods as floods recur;
- Disruption of and damage to public infrastructure and services;
- Health hazards associated with mold and mildew, contamination of drinking water, etc.;
- Impact on the overall mental health of the community;
- Injury and loss of life, including first responders rescuing those who did not evacuate or are stranded;
- Loss of historical or unique artifacts;
- Loss of jobs due to businesses closing or cutting back on operating hours;
- Loss of programs or services that are cut to pay for flood recovery;
- Mental health and family impacts, including increased occurrence of suicides and divorce
- Negative impact on commercial and residential property values;
- Significant disruption to students and teachers as temporary facilities and relocations would likely be needed; and
- Significant economic impact (jobs, sales, tax revenue) to the community.

Future Development

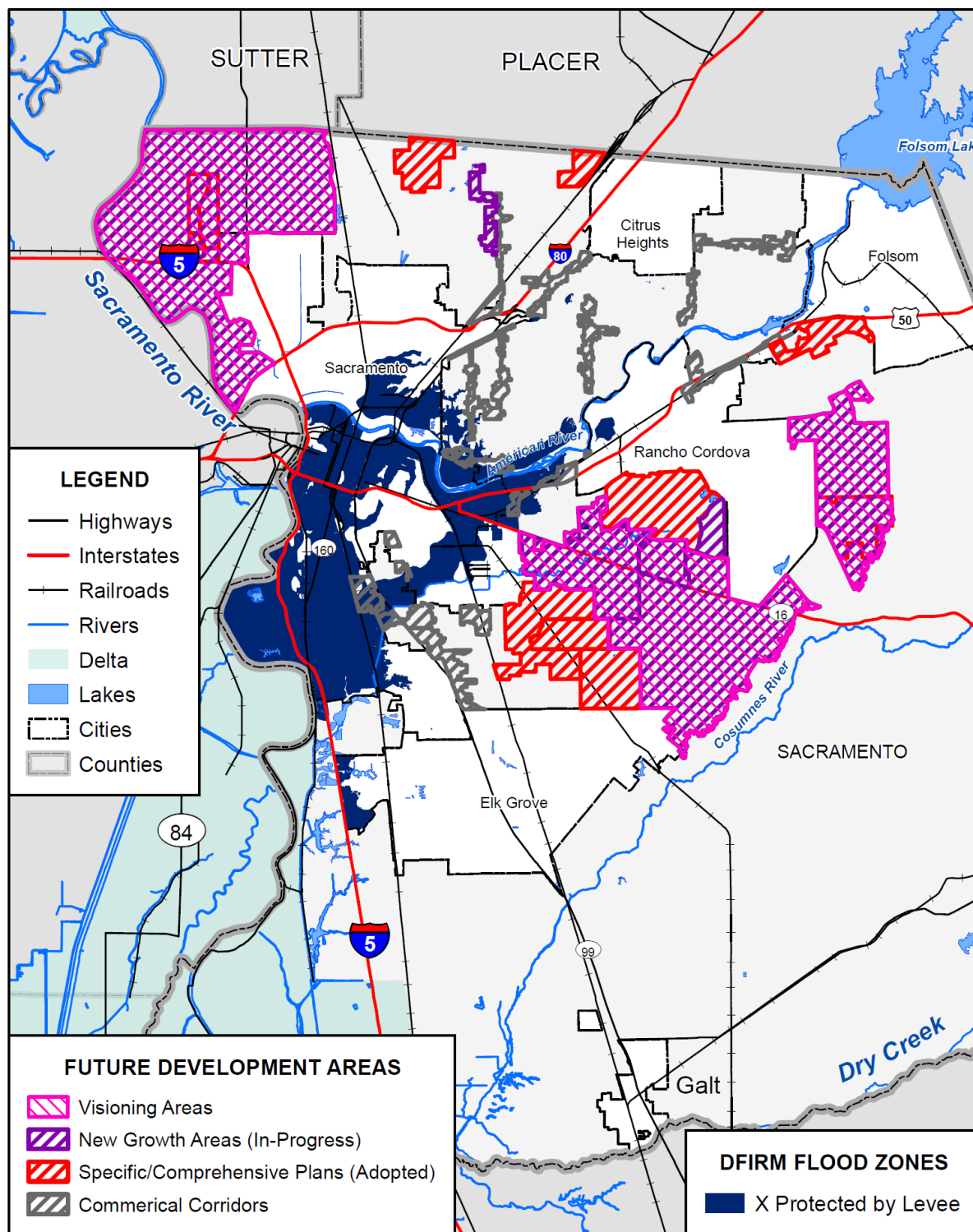
The HMPC detailed that SB 5 and levee improvements ULOP that will provide 200-year level of protection for urbanizing areas, as well as levee improvement projects to provide 100-year level in non urban areas. Both of these levee improvements will allow development in leveed areas to continue without being within a SFHA. For those areas where 100 and 200 cannot be met to accredit/certify these levees, then development standards associated with their FEMA floodzones would apply; most likely the SFHA.

Future Development GIS Analysis

Visioning areas, new growth areas, specific plan areas, commercial corridors data is maintained by Sacramento County, and was made available for this plan. A simple analysis was performed to quantify parcels within these development areas that are also in flood hazard areas. Results can serve as confirmation for future development.

GIS was used to determine the number of parcels in the X Protected by Levee flood zones within visioning areas, specific plan areas, new growth areas, and commercial corridor areas. GIS was used to create a centroid, or point representing the center of the parcel polygon. Those parcels centroids that fall inside the future development areas and that were within the X Protected by Levee flood zone were selected and tabulated in Figure 4-91 and shown in Table 4-95.

*Figure 4-91 Sacramento County Planning Area – Future Development in X Protected by Levee
DFIRM Flood Zones*



0 6.5 13 Miles



Data Source: Sacramento County GIS, Cal-Atlas, FEMA NFHL 04/16/2016; Map Date: 05/2016.

Table 4-95 Sacramento County Planning Area – Future Development in X Protected by Levee DFIRM Flood Zones

| Area | Parcels | Acres | DFIRM Flood Zone |
|----------------------------------|---------|--------|--|
| Visioning Area | | | |
| Jackson | 1,099 | 21,670 | A, AE, AO, 0.2% Annual Chance, X-Protected by Levee, X |
| Plan Areas | | | |
| West Jackson Highway Master Plan | 455 | 6,181 | A, AE, AO, 0.2% Annual Chance, X-Protected by Levee, X |
| Corridor Areas | | | |
| Corridor 9 | 946 | 290 | AE, 0.2% Annual Chance, X-Protected by Levee, X |
| Corridor 11 | 266 | 76 | X-Protected by Levee, X |
| Corridor 12 | 2,537 | 1,929 | A, AE, AH, 0.2% Annual Chance, X-Protected by Levee, X |
| Corridor 17 | 203 | 254 | A, 0.2% Annual Chance, X-Protected by Levee, X |
| Corridor 19 | 48 | 130 | 0.2% Annual Chance, X-Protected by Levee |
| New Growth Areas | | | |
| West Jackson Highway | 455 | 6,181 | A, AE, AO, 0.2% Annual Chance, X-Protected by Levee, X |

Source: Sacramento County GIS, Sacramento County DFIRM June 16, 2015

4.3.13. River/Stream/Creek Bank Erosion Vulnerability Assessment

Likelihood of Future Occurrence—Highly Likely

Vulnerability—Medium

Sacramento is traversed by many waterways, both large and small (see Figure 4-41 and Table 4-33). These locations are all subject to bank erosion. Certain developed areas that abut creeks and rivers in the County are at risk to continued bank erosion. The HMPC noted that areas of the American River near the Fair Oaks area were at risk to continued erosion, and possible landslide, of American River banks. Levees are at risk to erosion as well, due to the channelization due to narrow river channels, high water levels, and wave action from boating. The annual costs of repairs to the banks of rivers and levees can vary, but the average cost of erosion repairs done under the Sacramento Bank Protection program by the Corps of Engineers/Central Valley Flood Protection Board has averaged between \$2 million to \$3 million a year over the last several years within SAFCA’s jurisdiction.

The County Department of Water Resources – Drainage Department tracks areas of erosion troubles and mitigates, to the extent possible, the root causes of erosion. These are shown on Table 4-108 in Section 4.4.1. Costs to the County for these mitigation efforts were not available for this Plan Update.

Future Development

Planned developments should take erosion risk areas into account during the construction of new homes and commercial properties. Enforcement of leveed setback areas may also prevent erosion due to encroachment activities. The County will continue to enforce the zoning, subdivision, and development ordinances that are discussed in Section 4.4.1.

4.3.14. Severe Weather: Extreme Temperatures – Heat Vulnerability Assessment

Likelihood of Future Occurrence—Highly Likely

Vulnerability—Medium

Extreme heat happens in Sacramento County each year. Limited data on temperature extreme impacts per County was available during the development of this hazard’s profile. Extreme heat normally does not impact structures as there may be a limited number of days where the temperatures stay high which gives the structure periodic relief between hot and cool temperature cycles. Areas prone to excessively high temperatures are identified normally on a nation-wide assessment scale, which doesn’t allow detailed results on specific structures.

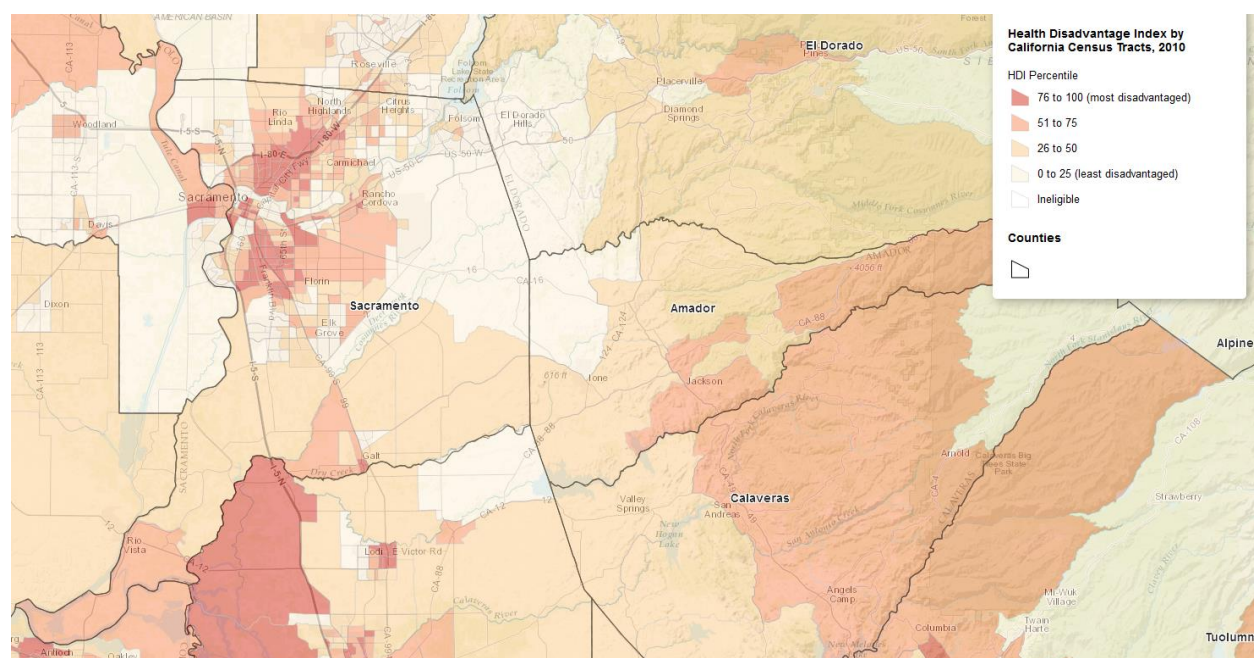
Recent research indicates that the impact of extreme temperatures, particularly on populations, has been historically under-represented. The risks of extreme temperatures are often profiled as part of larger hazards, such as severe winter storms or drought (see Section 4.3.7). However, as temperature variances may occur outside of larger hazards or outside of the expected seasons but still incur large costs, it is important to examine them as stand-alone hazards. Extreme heat may overload demands for electricity to run air conditioners in homes and businesses during prolonged periods of exposure and presents health concerns to individuals outside in the temperatures. Extreme heat may also be a secondary effect of droughts, or may cause drought-like conditions in a temporary setting. For example, several weeks of extreme heat increases evapotranspiration and reduces moisture content in vegetation, leading to higher wildfire vulnerability for that time period even if the rest of the season is relatively moist.

Vulnerable populations to extreme heat include:

- Homeless
- Infants and children under age five
- Elderly (65 and older)
- Individuals with disabilities
- Individuals dependent on medical equipment
- Individuals with impaired mobility

The Public Health Alliance has developed a composite index to identify cumulative health disadvantage in California. Factors such as those bulleted above were combined to show what areas are at greater risk to hazards like extreme heat. This is shown on Figure 4-92.

Figure 4-92 Health Disadvantage Index by California Census Tract



Source: Public Health Alliance of Southern California

In addition to vulnerable populations, pets and livestock are at risk to extreme heat.

Future Development

As the County shifts in demographics, more residents will become senior citizens. The residents of nursing homes and elder care facilities are especially vulnerable to extreme temperature events. It is encouraged that such facilities have emergency plans or backup power to address power failure during times of extreme heat. Low income residents and homeless populations are also vulnerable. Cooling centers for these populations are opened when necessary.

4.3.15. Severe Weather: Heavy Rains and Storms (Thunderstorms, Hail, and Lightning) Vulnerability Assessment

Likelihood of Future Occurrence—Highly Likely

Vulnerability—Medium

According to historical hazard data, severe weather is an annual occurrence in Sacramento County. Damage and disaster declarations related to severe weather have occurred and will continue to occur in the future. Heavy rain and thunderstorms are the most frequent type of severe weather occurrences in the County. Wind and lightning often accompany these storms and have caused damage in the past. However, actual damage associated with the primary effects of severe weather has been limited. It is the secondary hazards caused by weather, such as floods, fire, and agricultural losses that have had the greatest impact on the County. The risk and vulnerability associated with these secondary hazards are discussed in other sections (Section 4.2.14 Flood: 100/200/500-year, Section 4.2.15 Flood: Localized, Section 4.2.16 Levee Failure).

Future Development

New critical facilities should be built to withstand heavy rains, hail damage, and lightning. While minimal damages have occurred to critical facilities in the past due to heavy rains, lightning, and hail, there remains future risk. With development occurring in the region, future losses to both existing and new development may occur.

4.3.16. Wildfire Vulnerability Assessment

Likelihood of Future Occurrence—Highly Likely

Vulnerability—High

Risk and vulnerability to the Sacramento County Planning Area from wildfire is of significant concern, with some areas of the Planning Area being at greater risk than others as described further in this section. High fuel loads in the Planning Area, combined with a large built environment and population, create the potential for both natural and human-caused fires that can result in loss of life and property. These factors, combined with natural weather conditions common to the area, including periods of drought, high temperatures, low relative humidity, and periodic winds, can result in frequent and potentially catastrophic fires. During the May to October fire season, the dry vegetation and hot and sometimes windy weather, combined with continued growth in the WUI areas, results in an increase in the number of ignitions. Any fire, once ignited, has the potential to quickly become a large, out-of-control fire. As development continues throughout the Planning Area, especially in these interface areas, the risk and vulnerability to wildfires will likely increase.

Wildfires can cause short-term and long-term disruption to the County. Fires can have devastating effects on watersheds through loss of vegetation and soil erosion, which may impact the County by changing runoff patterns, increasing sedimentation, reducing natural and reservoir water storage capacity, and degrading water quality. Fires may result in casualties and can destroy buildings and infrastructure.

Although the physical damages and casualties arising from wildland-urban interface fires may be severe, it is important to recognize that they also cause significant economic impacts by resulting in a loss of function of buildings and infrastructure. In some cases, the economic impact of this loss of services may be comparable to the economic impact of physical damages or, in some cases, even greater. Economic impacts of loss of transportation and utility services may include traffic delays/detours from road and bridge closures and loss of electric power, potable water, and wastewater services. Fires can also cause major damage to power plants and power lines needed to distribute electricity to operate facilities as well as impact the agricultural industry.

Sacramento County Communities at Risk to Wildfire

The National Fire Plan is a cooperative, long-term effort between various government agency partners with the intent of actively responding to severe wildland fires and their impacts to communities while ensuring sufficient firefighting capacity for the future. For purposes of the National Fire Plan, CAL FIRE generated a list of California communities at risk for wildfire. The intent of this assessment was to evaluate the risk to a given area from fire escaping off federal lands. Three main factors were used to determine the wildfire

threat in the wildland-urban interface areas of California: fuel hazards, probability of fire, and areas of suitable housing density that could create wildland urban interface fire protection strategy situations. The preliminary criteria and methodology for evaluating wildfire risk to communities is published in the Federal Register, January 4, 2001. The National Fire Plan identifies 13 “Communities at Risk” in Sacramento County. These are shown in Table 4-96.

Table 4-96 Sacramento County Communities at Risk to Wildfire

| Communities at Risk | | |
|---------------------|-----------------------|------------|
| Fair Oaks | Mather Air Force Base | Rio Lindo |
| Folsom | North Highlands | Rosemont |
| Galt | Orangevale | Sacramento |
| Isleton | Rancho Cordova | |
| La Riviera | Rancho Murieta | |

Source: CAL FIRE

Beetle Kill and Tree Mortality

Drought can weaken trees, making them less resistant to bark beetles. These beetles attack trees weakened trees and can kill them. These trees then become fuel for wildfires. This is discussed in greater detail in Section 4.3.7.

On October 30, 2015, Governor Brown proclaimed a State of Emergency and included provisions to expedite the removal and disposal of dead and dying hazardous trees. As a result, costs related to identification, removal, and disposal of dead and dying trees caused from drought conditions may be eligible for California Disaster Assistance Act (CDAA) reimbursement.

Wildfire and Air Quality

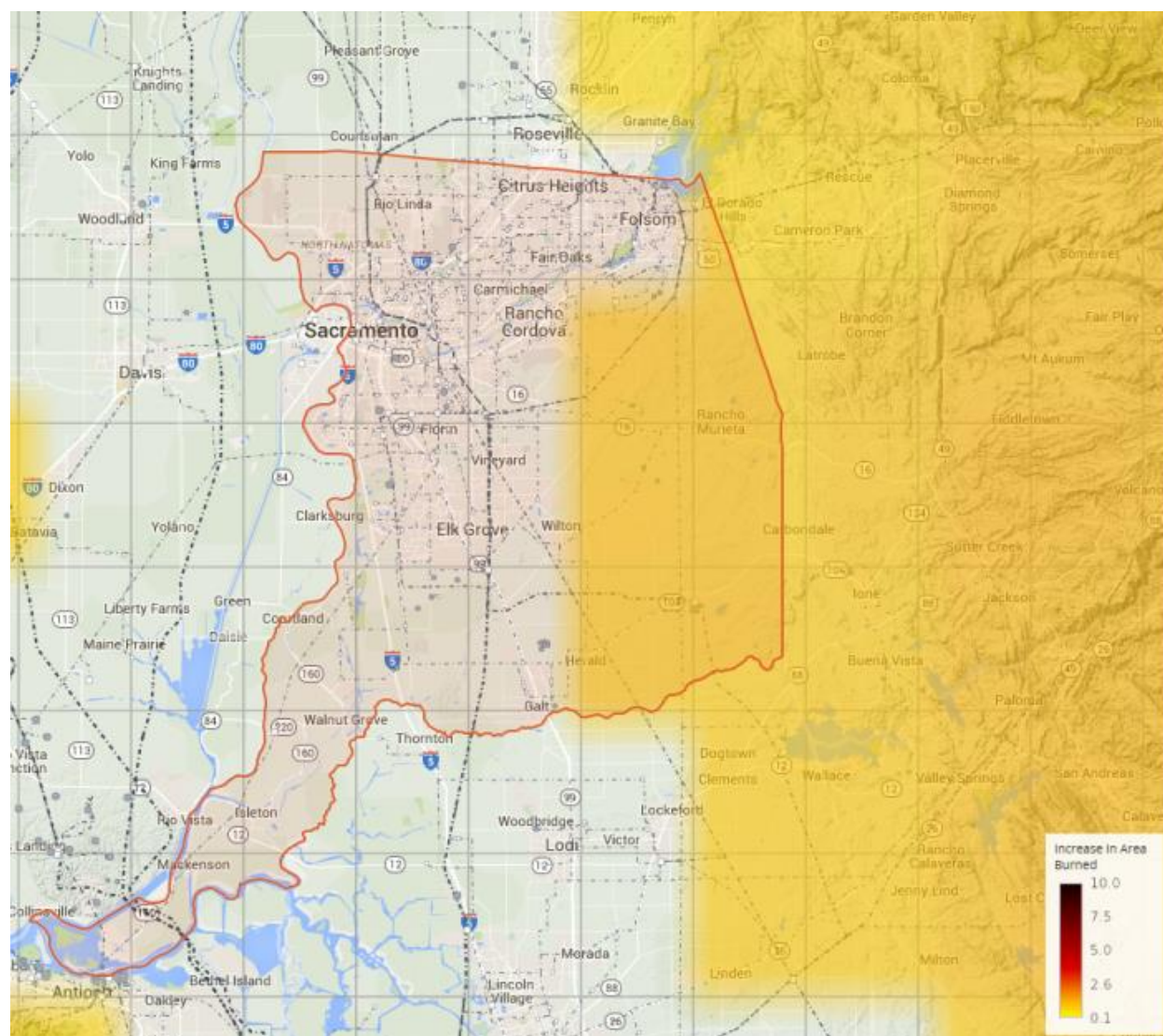
During many summer months in past years, Sacramento County residents have had to breathe wildfire smoke both from fires occurring within the County, but also from wildfires occurring throughout the region. Wildfire smoke is particularly dangerous because it contains a key air pollutant known as PM 2.5, or fine particulate matter less than 2.5 microns in diameter. These particulates are small enough to travel deep into the lungs causing short-term health impacts while aggravating long-term, existing respiratory and heart issues. For example, a report in *Climate Central* indicated that wildfire smoke can exacerbate chronic heart and lung disease, trigger asthma attacks and heart attacks, and increase visits to emergency rooms and hospitalizations. (1)

During the summers of 2013 through 2015, several wildfire incidents occurred in Northern California that increased PM2.5 concentration within Sacramento County. When Sacramento air quality is affected by wildfire smoke, whether from fires within the County or from throughout Northern California, the Sacramento County Air Pollution Control Officer will work with the County health department to issue health advisories to residents. These advisories are sent to the media, including newspapers, TV, radio, the community, and posted on county websites and the regional Spare the Air website.

While Sacramento-specific projections on future wildfire risk are limited, overall wildfire risk in California is expected to increase as a result of reduced precipitation, rising temperatures, deteriorating forest health due to drought, heat, and tree disease and pests; and logging dead trees. According to a study by Climate Central, wildfires burning within 50-100 miles of a city generally caused air quality to be 5-15 times worse than normal. On average, in the U.S. West there are now twice as many fires burning each year as there were in the 1970s. A recent Yale University study published in *Climatic Change* predicts a significant increase in the number of days that people in the western U.S. will be exposed to wildfire smoke by 2050. The number of people exposed to “smoke waves,” or consecutive days with poor air quality due to wildfires, will also increase from 57 million today to 82 million by 2050, the majority of whom will be in northern California, western Oregon, and the Great Plains.

Cal-Adapt is an online tool put together by the California Energy Commission that downscales global climate models to the California level with projections for sea-level rise, drought, temperature increase, heat, and wildfire, from 2020 out to 2085. Figure 4-93 shows the 2020 wildfire projection for Sacramento County. The lines represent transmission lines and the dots and squares power lines and transmission lines. Air quality in these areas of the County would be lower due to wildfire if the scenario projected is accurate.

Figure 4-93 2020 Wildfire Projections for Sacramento County



Source; Cal-Adapt

Assets at Risk

Unincorporated Sacramento County and the incorporated jurisdictions have mapped CAL FIRE fire threat areas. GIS was used to determine the possible impacts of wildfire within the County and how the wildfire risk varies across the Planning Area. The following methodology was followed in determining improved parcel counts and values by fire threat. Analysis on assets at risk to wildfire in the County is provided for two different areas in this Base Plan:

- Sacramento County Planning Area
- Unincorporated Sacramento County

The Sacramento County Planning Area includes both the unincorporated County and all of the incorporated jurisdictions, essentially the entire geographical area of Sacramento County. Summary tables for the

Planning Area are presented below. For the unincorporated County, both summary and detail tables are shown and discussed below. Detail tables for the participating jurisdictions are included in their respective annexes to this plan.

Methodology

Cal Fire develops and maintains datasets related to wildland fire threat and risk. The Fire Threat dataset, created in 2004, was used for analysis on unincorporated Sacramento County and for the county's seven incorporated areas including Citrus Heights, Elk Grove, Folsom, Galt, Isleton, Rancho Cordova and Sacramento. This fire threat layer was used for loss estimation purposes based on its comprehensive coverage of the Planning Area. Sacramento County's parcel and associated assessor data was used as the basis for the countywide inventory of developed parcels, or structures.

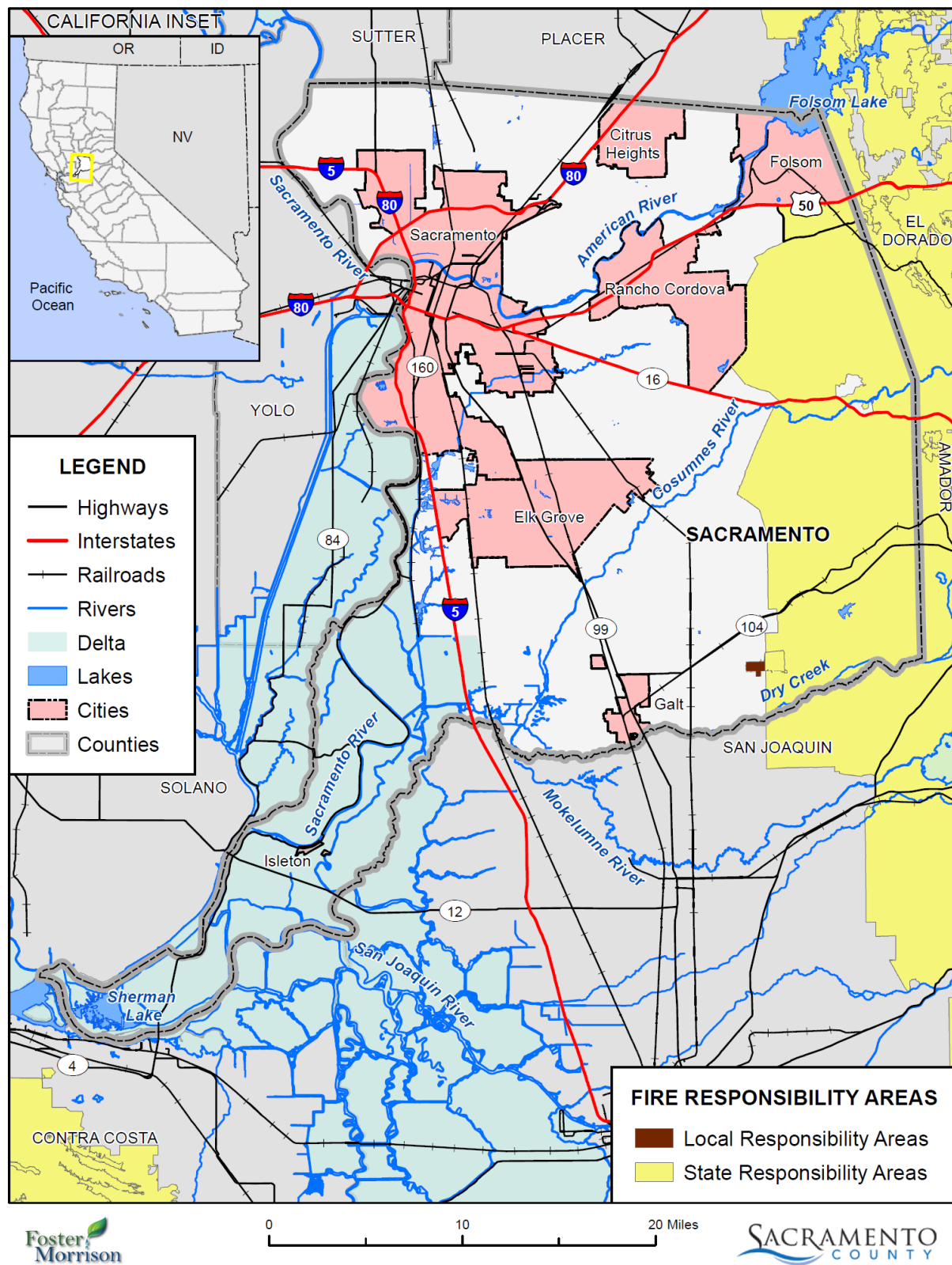
The Fire Threat dataset is a combination of fire frequency, or the likelihood of a given area to burn, and potential fire behavior. Fire rotation is calculated using fifty years of fire history, as well as climate, vegetation, and land ownership information. Fuel rank is calculated based on expected fire behavior for unique combinations of topography and vegetative fuels under given weather conditions (wind speed, humidity, temperature, and fuel moistures). Fuel rank and fire rotation are then combined to create the 5 threat classes in the Fire Threat dataset, ranging from Little or No Threat to Extreme Threat. The fire threat maps are based on designated responsibility areas: Federal Responsibility Area (FRA), State Responsibility Area (SRA) and Local Responsibility Area (LRA)

GIS was used to create a centroid, or point representing the center of the Sacramento County parcel polygon. Fire Threat was then be overlayed on the parcel centroids. For the purposes of this analysis, the wildfire threat zone (Little or No Threat | Moderate | High | Very High | Extreme) that intersected a parcel centroid was assigned as the threat zone for the entire parcel.

Responsibility Areas

CAL FIRE has a legal responsibility to provide fire protection on all SRA lands, which are defined based on land ownership, population density and property use. CAL FIRE is now also responsible for determining parcels subject to the SRA Fire Prevention Fee under AB X1 29. This dataset (SRA15_2) represents SRA status as of 7/1/2015 and was used for the final determination of which parcels were potentially eligible for the fee. CAL FIRE's State Responsibility Area layer was used in this analysis to show Sacramento County's values, inventory and population by FRA, SRA, and LRA. The FRA in the County contains no improved properties. The largest number of improved properties is in the LRA. Locations of each responsibility area are shown in Figure 4-94.

Figure 4-94 Sacramento County FRA, SRA, LRA Wildfire Responsibility Areas



Data Source: Sacramento County GIS, Cal-Atlas, Cal-Fire FRAP Statewide LRA/SRA 11/2007; Map Date: 05/2016.

The FRA contains no improved parcels. The SRA contains 1,987 parcels, with about \$811 million in total value, and the LRA has 442,068 parcels with nearly \$129 billion in total value. It should be noted that fire does not just affect structural values, fire can also affect land values. As such the Assessor's land values and all parcels were accounted for in this analysis to represent total county assets at risk. However, it is highly unlikely the whole County will ever be on fire at once. The County parcel inventory and associated values by responsibility area are provided in Table 4-97.

Table 4-97 Sacramento County Planning Area – Assets in Local, State, and Federal Responsibility Areas by Property Use

| Property Use | Total Parcel Count | Total Land Value | Improved Parcel Count | Improved Structure Value | Total Value* |
|------------------------------------|--------------------|------------------|-----------------------|--------------------------|---------------|
| Federal Responsibility Area | | | | | |
| Agricultural | 4 | \$0 | 0 | \$0 | \$0 |
| Care / Health | 0 | \$0 | 0 | \$0 | \$0 |
| Church / Welfare | 0 | \$0 | 0 | \$0 | \$0 |
| Industrial | 0 | \$0 | 0 | \$0 | \$0 |
| Miscellaneous | 0 | \$0 | 0 | \$0 | \$0 |
| Office | 0 | \$0 | 0 | \$0 | \$0 |
| Public / Utilities | 29 | \$0 | 0 | \$0 | \$0 |
| Recreational | 0 | \$0 | 0 | \$0 | \$0 |
| Residential | 1 | \$0 | 0 | \$0 | \$0 |
| Retail / Commercial | 0 | \$0 | 0 | \$0 | \$0 |
| Vacant | 0 | \$0 | 0 | \$0 | \$0 |
| No Data | 0 | \$0 | 0 | \$0 | \$0 |
| Total | 34 | \$0 | 0 | \$0 | \$0 |
| State Responsibility Area | | | | | |
| Agricultural | 450 | \$176,979,238 | 108 | \$84,873,195 | \$261,852,433 |
| Care / Health | 0 | \$0 | 0 | | \$0 |
| Church / Welfare | 1 | \$286,472 | 1 | \$3,404,127 | \$3,690,599 |
| Industrial | 27 | \$23,699,591 | 6 | \$1,498,794 | \$25,198,385 |
| Miscellaneous | 39 | \$81,529 | 2 | \$5,379 | \$86,908 |
| Office | 2 | \$440,424 | 1 | \$677,579 | \$1,118,003 |
| Public / Utilities | 112 | \$0 | 0 | \$0 | \$0 |
| Recreational | 7 | \$3,867,428 | 3 | \$4,793,289 | \$8,660,717 |
| Residential | 1,090 | \$126,111,415 | 954 | \$224,865,488 | \$350,976,903 |
| Retail / Commercial | 3 | \$4,191,169 | 3 | \$4,493,161 | \$8,684,330 |
| Vacant | 255 | \$149,723,488 | 15 | \$918,274 | \$150,641,762 |
| No Data | 1 | \$0 | 0 | \$0 | \$0 |

| Property Use | Total Parcel Count | Total Land Value | Improved Parcel Count | Improved Structure Value | Total Value* |
|----------------------------------|--------------------|-------------------------|-----------------------|--------------------------|--------------------------|
| Total | 1,987 | \$485,380,754 | 1,093 | \$325,529,286 | \$810,910,040 |
| Local Responsibility Area | | | | | |
| Agricultural | 2,157 | \$590,713,601 | 1,265 | \$398,101,195 | \$988,814,796 |
| Care / Health | 657 | \$285,193,234 | 578 | \$1,868,570,719 | \$2,153,763,953 |
| Church / Welfare | 1,151 | \$277,976,428 | 999 | \$1,285,532,595 | \$1,563,509,023 |
| Industrial | 4,296 | \$1,430,169,222 | 3,731 | \$3,695,929,958 | \$5,126,099,180 |
| Miscellaneous | 5,027 | \$10,078,985 | 21 | \$435,962 | \$10,514,947 |
| Office | 3,295 | \$1,811,845,814 | 2,981 | \$6,903,518,450 | \$8,715,364,264 |
| Public / Utilities | 8,007 | \$18,100,245 | 27 | \$17,165,874 | \$35,266,119 |
| Recreational | 332 | \$137,582,547 | 244 | \$297,824,035 | \$435,406,582 |
| Residential | 394,051 | \$28,618,208,743 | 388,309 | \$69,988,291,012 | \$98,606,499,755 |
| Retail / Commercial | 6,357 | \$3,185,018,016 | 5,728 | \$6,037,477,479 | \$9,222,495,495 |
| Vacant | 16,714 | \$1,968,565,618 | 622 | \$58,396,689 | \$2,026,962,307 |
| No Data | 24 | \$2,123,330 | 10 | \$2,342,809 | \$4,466,139 |
| Total | 442,068 | \$38,335,575,783 | 404,515 | \$90,553,586,777 | \$128,889,162,560 |

Source: CAL FIRE, Sacramento County 2016 Parcel/2015 Assessor's Data

*Land and structure values

Fire Threat Analysis

Cal Fire develops and maintains datasets related to wildland fire threat and risk. The Fire Threat dataset, created in 2004, was used for analysis on unincorporated Sacramento County and for the county's seven incorporated areas including Citrus Heights, Elk Grove, Folsom, Galt, Isleton, Rancho Cordova and Sacramento. This fire threat layer was used for loss estimation purposes based on its comprehensive coverage of the Planning Area. Sacramento County's parcel and associated assessor data was used as the basis for the countywide inventory of developed parcels, or structures.

The Fire Threat dataset is a combination of fire frequency, or the likelihood of a given area to burn, and potential fire behavior. Fire rotation is calculated using fifty years of fire history, as well as climate, vegetation, and land ownership information. Fuel rank is calculated based on expected fire behavior for unique combinations of topography and vegetative fuels under given weather conditions (wind speed, humidity, temperature, and fuel moistures). Fuel rank and fire rotation are then combined to create the 5 threat classes in the Fire Threat dataset, ranging from Little or No Threat to Extreme Threat. There is no area of Extreme Threat in Sacramento County.

GIS was used to create a centroid, or point representing the center of the Sacramento County parcel polygon. Fire Threat was then overlaid on the parcel centroids. For the purposes of this analysis, the wildfire threat zone (Little or No Threat | Moderate | High | Very High | Extreme) that intersected a parcel centroid was assigned as the threat zone for the entire parcel.

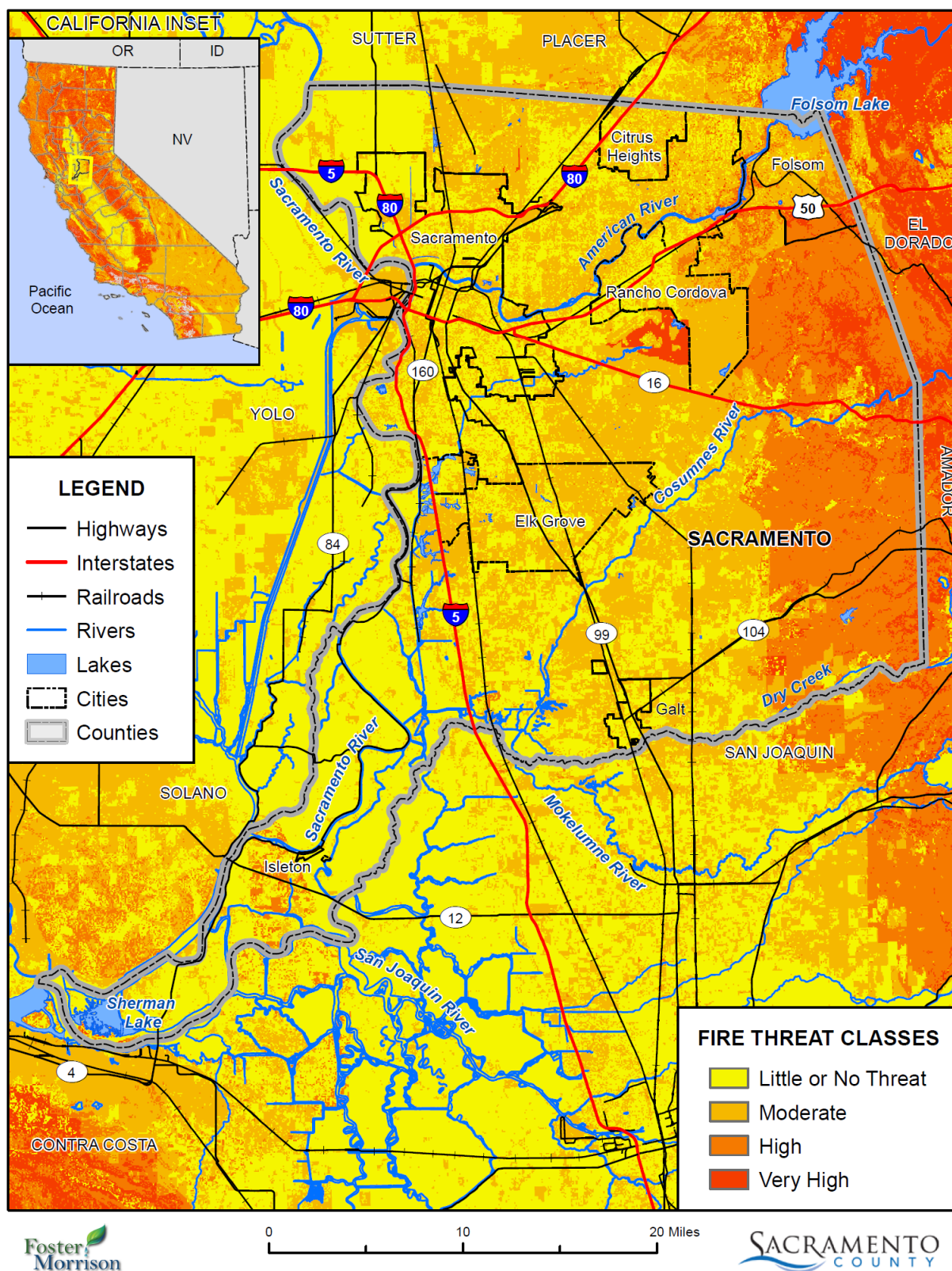
Assets at Risk

Results are presented by total Planning Area, unincorporated county, and for the participating jurisdictions (in their respective annexes to the plan), and detailed tables show improved parcel counts and their land and structure values by property use (residential, industrial, etc.) within each fire threat zone.

Sacramento County Planning Area

Analysis results for the entire Sacramento County Planning Area are summarized in Table 4-98, which summarizes total parcel counts, improved parcel counts, and their improved and land values by jurisdiction. Fire threat is shown in Figure 4-95.

Figure 4-95 Sacramento County Planning Area Fire Threat Zones



Data Source: Sacramento County GIS, Cal-Atlas, Cal-Fire 2004 Fire Threat Data; Map Date: 05/2016.

Table 4-98 Sacramento County Planning Area – Count and Value of Parcels by Jurisdiction and Fire Threat Zone

| Jurisdiction | Little or No Threat | | Moderate | | High | | Very High | |
|----------------------------|---------------------|--------------------------|-------------------|--------------------------|-------------------|--------------------------|-------------------|--------------------------|
| | Imp. Parcel Count | Improved Structure Value | Imp. Parcel Count | Improved Structure Value | Imp. Parcel Count | Improved Structure Value | Imp. Parcel Count | Improved Structure Value |
| Citrus Heights | 9,027 | \$1,528,881,062 | 14,296 | \$2,480,158,745 | 19 | \$3,556,445 | 163 | \$35,932,376 |
| Elk Grove | 19,397 | \$4,501,259,568 | 27,947 | \$7,562,799,423 | 58 | \$19,703,611 | 0 | \$0 |
| Folsom | 3,041 | \$767,685,499 | 15,557 | \$5,940,882,470 | 1,648 | \$861,468,891 | 351 | \$113,606,213 |
| Galt | 4,869 | \$777,657,262 | 1,903 | \$429,612,755 | 3 | \$177,790 | 0 | \$0 |
| Isleton | 248 | \$22,266,676 | 86 | \$6,286,028 | 0 | \$0 | 0 | \$0 |
| Rancho Cordova | 9,593 | \$2,715,054,337 | 8,485 | \$1,945,831,870 | 13 | \$12,557,201 | 1 | \$5,297,123 |
| City of Sacramento | 87,831 | \$20,158,400,464 | 43,213 | \$8,958,468,787 | 38 | \$10,287,720 | 3 | \$1,475,434 |
| Unincorporated County | 76,521 | \$15,046,236,091 | 79,118 | \$16,390,513,662 | 1,612 | \$451,368,485 | 567 | \$131,690,075 |
| Planning Area Total | 210,527 | \$45,517,440,959 | 190,605 | \$43,714,553,740 | 3,391 | \$1,359,120,143 | 1,085 | \$288,001,221 |

Source: CAL FIRE, Sacramento County 2016 Parcel/2015 Assessor's Data

*Land and structure values

Unincorporated Sacramento County

Table 4-99 breaks out the details of fire threat class and property use type for the unincorporated County.

Table 4-99 Unincorporated Sacramento County – Count and Value of Parcels by Property Use and Fire Threat Zone

| Property Use | Total Parcel Count | Total Land Value | Improved Parcel Count | Improved Structure Value | Total Value |
|----------------------------|--------------------|------------------|-----------------------|--------------------------|------------------|
| Little or No Threat | | | | | |
| Agricultural | 1,380 | \$375,260,590 | 861 | \$264,918,899 | \$640,179,489 |
| Care / Health | 164 | \$51,833,586 | 153 | \$347,569,562 | \$399,403,148 |
| Church / Welfare | 274 | \$66,085,343 | 242 | \$306,205,804 | \$372,291,147 |
| Industrial | 894 | \$349,488,969 | 768 | \$834,488,119 | \$1,183,977,088 |
| Miscellaneous | 649 | \$2,437,203 | 7 | \$43,176 | \$2,480,379 |
| NO DATA | 5 | \$1,379,765 | 3 | \$762,048 | \$2,141,813 |
| Office | 841 | \$315,184,580 | 777 | \$915,391,891 | \$1,230,576,471 |
| Public / Utilities | 1,442 | \$6,630,808 | 14 | \$13,264,491 | \$19,895,299 |
| Recreational | 126 | \$52,675,850 | 98 | \$84,850,716 | \$137,526,566 |
| Residential | 72,660 | \$4,459,923,163 | 71,768 | \$10,755,174,845 | \$15,215,098,008 |

| Property Use | Total Parcel Count | Total Land Value | Improved Parcel Count | Improved Structure Value | Total Value |
|---------------------|--------------------|------------------------|-----------------------|--------------------------|-------------------------|
| Retail / Commercial | 1,830 | \$866,774,980 | 1,704 | \$1,512,330,761 | \$2,379,105,741 |
| Vacant | 1,762 | \$263,501,839 | 126 | \$11,235,779 | \$274,737,618 |
| Total | 82,027 | \$6,811,176,676 | 76,521 | \$15,046,236,091 | \$21,857,412,767 |
| Moderate | | | | | |
| Agricultural | 747 | \$204,491,937 | 421 | \$180,465,853 | \$384,957,790 |
| Care / Health | 151 | \$70,995,676 | 140 | \$211,641,630 | \$282,637,306 |
| Church / Welfare | 176 | \$56,282,638 | 151 | \$242,735,799 | \$299,018,437 |
| Industrial | 512 | \$166,219,126 | 386 | \$464,696,414 | \$630,915,540 |
| Miscellaneous | 942 | \$1,458,357 | 3 | \$59,279 | \$1,517,636 |
| NO DATA | 6 | \$166,349 | 1 | \$45,082 | \$211,431 |
| Office | 268 | \$96,635,887 | 238 | \$287,852,802 | \$384,488,689 |
| Public / Utilities | 1,493 | \$3,744,898 | 5 | \$1,404,284 | \$5,149,182 |
| Recreational | 43 | \$10,991,764 | 31 | \$19,507,031 | \$30,498,795 |
| Residential | 78,275 | \$6,651,475,883 | 77,225 | \$14,540,264,093 | \$21,191,739,976 |
| Retail / Commercial | 353 | \$205,970,921 | 321 | \$427,344,776 | \$633,315,697 |
| Vacant | 3,532 | \$383,691,610 | 196 | \$14,496,619 | \$398,188,229 |
| Total | 86,498 | \$7,852,125,046 | 79,118 | \$16,390,513,662 | \$24,242,638,708 |
| High | | | | | |
| Agricultural | 339 | \$87,366,810 | 63 | \$32,559,555 | \$119,926,365 |
| Care / Health | 3 | \$487,080 | 2 | \$776,664 | \$1,263,744 |
| Church / Welfare | 3 | \$4,927,189 | 2 | \$23,181,514 | \$28,108,703 |
| Industrial | 21 | \$20,609,680 | 4 | \$1,047,452 | \$21,657,132 |
| Miscellaneous | 40 | \$116,663 | 3 | \$8,454 | \$125,117 |
| NO DATA | 1 | \$0 | - | \$0 | \$0 |
| Office | 3 | \$264,252 | 2 | \$518,911 | \$783,163 |
| Public / Utilities | 126 | \$56,917 | - | \$0 | \$56,917 |
| Recreational | 1 | \$13,278 | - | \$0 | \$13,278 |
| Residential | 1,575 | \$183,267,476 | 1,522 | \$391,815,820 | \$575,083,296 |
| Retail / Commercial | 1 | \$6,096 | 1 | \$531,121 | \$537,217 |
| Vacant | 259 | \$74,890,918 | 13 | \$928,994 | \$75,819,912 |
| Total | 2,372 | \$372,006,359 | 1,612 | \$451,368,485 | \$823,374,844 |
| Very High | | | | | |
| Agricultural | 64 | \$12,801,099 | 8 | \$2,977,224 | \$15,778,323 |
| Care / Health | 2 | \$422,451 | 2 | \$667,633 | \$1,090,084 |

| Property Use | Total Parcel Count | Total Land Value | Improved Parcel Count | Improved Structure Value | Total Value |
|---------------------|--------------------|-------------------------|-----------------------|--------------------------|-------------------------|
| Church / Welfare | 1 | \$289,627 | 1 | \$201,939 | \$491,566 |
| Industrial | 4 | \$1,416,312 | - | \$0 | \$1,416,312 |
| Miscellaneous | 17 | \$3,737 | - | \$0 | \$3,737 |
| Office | 2 | \$667,989 | 2 | \$490,028 | \$1,158,017 |
| Public / Utilities | 59 | \$0 | - | \$0 | |
| Residential | 560 | \$54,055,418 | 545 | \$124,816,685 | \$178,872,103 |
| Retail / Commercial | 5 | \$2,010,893 | 5 | \$2,264,309 | \$4,275,202 |
| Vacant | 39 | \$11,097,665 | 4 | \$272,257 | \$11,369,922 |
| Total | 753 | \$82,765,191 | 567 | \$131,690,075 | \$214,455,266 |
| | | | | | |
| Grand Total | 171,650 | \$15,118,073,272 | 157,818 | \$32,019,808,313 | \$47,137,881,585 |

Source: CAL FIRE, Sacramento County 2016 Parcel/2015 Assessor's Data

Population at Risk

A separate analysis was performed to determine population in fire threat zones. Using GIS, the CAL FIRE fire threat dataset was overlayed on the improved residential parcel data. Those parcel centroids that intersect a fire threat zone were counted and multiplied by the Census Bureau Sacramento County average household size (2.71 for the County); results were tabulated by jurisdiction and fire threat zone (see Table 4-100). Information on specific jurisdictions can be found in their respective annexes to this plan. According to this analysis, there is a population of 515,563 in the moderate or higher fire severity zone category.

Table 4-100 Sacramento County Planning Area – Population at Risk by Fire Threat Zone

| Fire Threat Zone | Improved Residential Parcels | Population* |
|---------------------|------------------------------|-------------|
| Very High | 1,051 | 2,848 |
| High | 3,237 | 8,772 |
| Moderate | 185,957 | 503,943 |
| Little or No Threat | 199,018 | 539,339 |

Source: CAL FIRE, US Census Bureau, Sacramento County 2016 Assessor/2015 Parcel Data

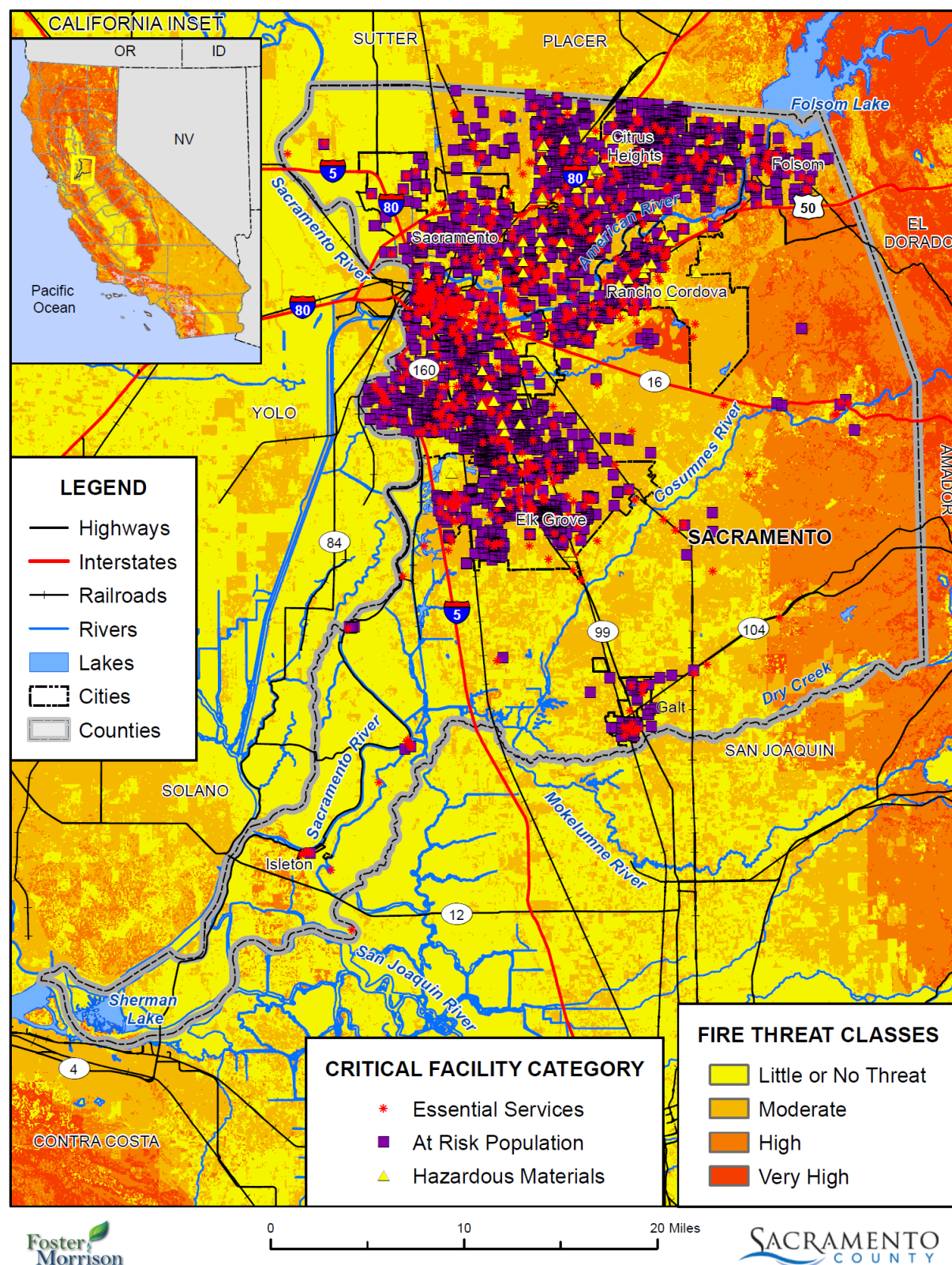
Cultural and Natural Resources at Risk

Sacramento County has substantial cultural and natural resources located throughout the County as previously described. In addition, there are other natural resources at risk when wildland-urban interface fires occur. One is the watershed and ecosystem losses that occur from wildland fires. This includes impacts to water supplies and water quality as well as air quality. Another is the aesthetic value of the area. Major fires that result in visible damage detract from that value. Other assets at risk include wildland recreation areas, wildlife and habitat areas, and rangeland resources. The loss to these natural resources can be significant.

Critical Facilities at Risk

Wildfire analysis was performed on the critical facility inventory in Sacramento County and all jurisdictions. GIS was used to determine whether the facility locations intersect a wildfire hazard areas provided by CAL FIRE, and if so, which zone it intersects. This is shown on Figure 4-96. Table 4-101 shows the breakdown of critical facilities by fire threat zone for the Planning Area, while Table 4-102 shows the breakdown of critical facilities by fire threat zone for the unincorporated County. Details of critical facility definition, type, name, address, and jurisdiction by fire threat zone are listed in Appendix E.

Figure 4-96 Sacramento County Planning Area – Critical Facilities in Fire Threat Zones



Data Source: Sacramento County GIS, Cal-Atlas, Cal-Fire 2004 Fire Threat Data; Map Date: 05/2016.

Table 4-101 Sacramento County Planning Area – Critical Facilities in Fire Threat Zones

| Critical Facility Category | Facility Type | Facility Count |
|-------------------------------|-------------------------------|----------------|
| Little or No Threat | | |
| Essential Services Facilities | Airport | 5 |
| | Arena | 1 |
| | Bus Terminal | 6 |
| | Convention Center | 1 |
| | Detention Basin | 22 |
| | Dispatch Center | |
| | Drainage | 3 |
| | Emergency Evacuation Shelter | 113 |
| | Emergency Rooms | 1 |
| | EOC | 1 |
| | Fire Station | 56 |
| | Gas Storage | 1 |
| | General Acute Care Hospital | 7 |
| | Government Facilities | 49 |
| | Hospitals | 1 |
| | Light Rail Stop | 49 |
| | Medical Health Facility | 152 |
| | Police | 16 |
| | Sand Bag | 2 |
| | Stadium | 2 |
| | Traffic Operations Center | 1 |
| | Train Station | 1 |
| | Vehicle and Equipment Storage | 2 |
| | Water Treatment Plant | 2 |
| | Total | 495 |
| At Risk Population Facilities | Adult Day Care | 25 |
| | Adult Education School | 7 |
| | Adult Residential | 199 |
| | Alternative Education School | 5 |
| | Assisted Living Centers | 27 |
| | Charter School | 15 |
| | Children's Home | 2 |
| | College/University | 4 |
| | Community Day School | 5 |
| | Day Care Center | 228 |

| Critical Facility Category | Facility Type | Facility Count |
|----------------------------------|----------------------------------|----------------|
| | Detention Center | 2 |
| | Group Home | 49 |
| | Hotel | 40 |
| | Independent Study School | 1 |
| | Infant Center | 17 |
| | JAIL | 1 |
| | Private Elementary School | 36 |
| | Private High School | 19 |
| | Private K-12 School | 19 |
| | Public Continuation High School | 12 |
| | Public Elementary School | 110 |
| | Public High School | 15 |
| | Public Middle School | 20 |
| | Residential Care/Elderly | 209 |
| | Residential Facility Chronically | 1 |
| | School | 17 |
| | School-Age Day Care Center | 45 |
| | Senior Center | 1 |
| | Social Rehabilitation Facility | 2 |
| | Special Education School | 7 |
| | Total | 1,140 |
| Hazardous Materials Facilities | Oil Collection Center | 41 |
| | OTHER | 1 |
| | Propane Storage | 1 |
| | Sewer Treatment Plant | 2 |
| | Total | 45 |
| Little or No Threat Total | | 1,680 |
| Moderate | | |
| Essential Services Facilities | Airport | 4 |
| | Bus Terminal | 2 |
| | Corporation Yard | 1 |
| | Detention Basin | 23 |
| | Dispatch Center | 1 |
| | Drainage | 3 |
| | Emergency Evacuation Shelter | 118 |
| | EOC | 1 |
| | Fire Station | 37 |

| Critical Facility Category | Facility Type | Facility Count |
|-------------------------------|---------------------------------|----------------|
| | General Acute Care Hospital | 1 |
| | Government Facilities | 18 |
| | Light Rail Stop | 3 |
| | Medical Health Facility | 45 |
| | Police | 6 |
| | Sand Bag | 3 |
| | Stadium | 1 |
| | State and Fed Facilities | 1 |
| | State Facility | 1 |
| | Urgent Care Facilities | 2 |
| | Water Treatment Plant | 1 |
| | Total | 272 |
| At Risk Population Facilities | Adult Day Care | 1 |
| | Adult Education School | 5 |
| | Adult Residential | 109 |
| | Alternative Education School | 2 |
| | Assisted Living Centers | 31 |
| | Charter School | 10 |
| | College/University | 3 |
| | Community Day School | 4 |
| | Day Care Center | 185 |
| | Detention Center | 1 |
| | Group Home | 46 |
| | Hotel | 10 |
| | Independent Study School | 1 |
| | Infant Center | 16 |
| | Prison | 1 |
| | Private Elementary School | 29 |
| | Private High School | 11 |
| | Private K-12 School | 17 |
| | Public Continuation High School | 10 |
| | Public Elementary School | 119 |
| | Public High School | 19 |
| | Public Middle School | 23 |
| | Residential Care/Elderly | 202 |
| | School | 21 |
| | School-Age Day Care Center | 52 |

| Critical Facility Category | Facility Type | Facility Count |
|--------------------------------|--------------------------------|----------------|
| | Social Rehabilitation Facility | 2 |
| | Special Education School | 3 |
| | Total | 933 |
| Hazardous Materials Facilities | Oil Collection Center | 4 |
| | Total | 4 |
| Moderate Total | | 1,209 |
| High | | |
| Essential Services Facilities | Airport | 1 |
| | Emergency Evacuation Shelter | 1 |
| | Fire Station | 1 |
| | General Acute Care Hospital | 1 |
| | Government Facilities | 1 |
| | Medical Health Facility | 1 |
| | Total | 6 |
| At Risk Population Facilities | Day Care Center | 3 |
| | Group Home | 1 |
| | Public Elementary School | 1 |
| | Public High School | 1 |
| | Residential Care/Elderly | 1 |
| | Total | 7 |
| High Total | | 13 |
| Very High | | |
| Essential Services Facilities | Emergency Evacuation Shelter | 1 |
| | Medical Health Facility | 2 |
| | Total | 3 |
| At Risk Population Facilities | Private K-12 School | 1 |
| | Residential Care/Elderly | 2 |
| | Total | 3 |
| Very High Total | | 6 |
| | | |
| Grand Total | | 2,908 |

Source: CAL FIRE, Sacramento County GIS

Table 4-102 Unincorporated Sacramento County – Critical Facilities in Fire Threat Zones

| Critical Facility Category | Facility Type | Facility Count |
|-------------------------------|----------------------------------|----------------|
| Little or No Threat | | |
| Essential Services Facilities | Airport | 4 |
| | Bus Terminal | 1 |
| | Detention Basin | 2 |
| | Emergency Evacuation Shelter | 47 |
| | Fire Station | 29 |
| | General Acute Care Hospital | 1 |
| | Government Facilities | 13 |
| | Light Rail Stop | 5 |
| | Medical Health Facility | 54 |
| | Police | 9 |
| | Traffic Operations Center | 1 |
| | Vehicle and Equipment Storage | 2 |
| | Total | 168 |
| At Risk Population Facilities | Adult Day Care | 10 |
| | Adult Education School | 3 |
| | Adult Residential | 81 |
| | Alternative Education School | 4 |
| | Charter School | 4 |
| | College/University | 1 |
| | Community Day School | 4 |
| | Day Care Center | 88 |
| | Detention Center | 2 |
| | Group Home | 26 |
| | Hotel | 7 |
| | Infant Center | 7 |
| | Private Elementary School | 19 |
| | Private High School | 11 |
| | Private K-12 School | 10 |
| | Public Continuation High School | 7 |
| | Public Elementary School | 43 |
| | Public High School | 4 |
| | Public Middle School | 6 |
| | Residential Care/Elderly | 94 |
| | Residential Facility Chronically | 1 |
| | School-Age Day Care Center | 18 |

| Critical Facility Category | Facility Type | Facility Count |
|----------------------------------|---------------------------------|----------------|
| | Social Rehabilitation Facility | 1 |
| | Special Education School | 4 |
| | Total | 455 |
| Hazardous Materials Facilities | Oil Collection Center | 29 |
| | OTHER | 1 |
| | Sewer Treatment Plant | 1 |
| | Total | 31 |
| Little or No Threat Total | | 654 |
| Moderate | | |
| Essential Services Facilities | Airport | 4 |
| | Detention Basin | 2 |
| | Emergency Evacuation Shelter | 50 |
| | Fire Station | 20 |
| | Government Facilities | 5 |
| | Light Rail Stop | 1 |
| | Medical Health Facility | 14 |
| | Police | 3 |
| | Stadium | 1 |
| | Total | 100 |
| At Risk Population Facilities | Adult Education School | 2 |
| | Adult Residential | 53 |
| | Alternative Education School | 1 |
| | Charter School | 6 |
| | Community Day School | 1 |
| | Day Care Center | 63 |
| | Detention Center | 1 |
| | Group Home | 29 |
| | Hotel | 1 |
| | Infant Center | 7 |
| | Private Elementary School | 6 |
| | Private High School | 4 |
| | Private K-12 School | 10 |
| | Public Continuation High School | 6 |
| | Public Elementary School | 49 |
| | Public High School | 10 |
| | Public Middle School | 12 |
| | Residential Care/Elderly | 106 |

| Critical Facility Category | Facility Type | Facility Count |
|--------------------------------|--------------------------------|----------------|
| | School-Age Day Care Center | 15 |
| | Social Rehabilitation Facility | 1 |
| | Special Education School | 2 |
| | Total | 385 |
| Hazardous Materials Facilities | Oil Collection Center | 3 |
| | Total | 3 |
| Moderate Total | | 488 |
| High | | |
| Essential Services Facilities | Airport | 1 |
| | Emergency Evacuation Shelter | 1 |
| | Fire Station | 1 |
| | Government Facilities | 1 |
| | Total | 4 |
| At Risk Population Facilities | Day Care Center | 3 |
| | Group Home | 1 |
| | Public Elementary School | 1 |
| | Residential Care/Elderly | 1 |
| | Total | 6 |
| High Total | | 10 |
| Very High | | |
| Essential Services Facilities | Medical Health Facility | 2 |
| | Total | 2 |
| At Risk Population Facilities | Private K-12 School | 1 |
| | Residential Care/Elderly | 1 |
| | Total | 2 |
| Very High Total | | 4 |
| | | |
| Grand Total | | 1,156 |

Source: CAL FIRE, Sacramento County GIS

Overall Community Impact

The overall impact to the community from a severe wildfire includes:

- Injury and loss of life;
- Commercial and residential structural and property damage;
- Decreased water quality in area watersheds;
- Increase in post-fire hazards such as flooding, sedimentation, and mudslides;
- Damage to natural resource habitats and other resources, such as timber and rangeland;

- Loss of water, power, roads, phones, and transportation, which could impact, strand, and/or impair mobility for emergency responders and/or area residents;
- Economic losses (jobs, sales, tax revenue) associated with loss of commercial structures;
- Negative impact on commercial and residential property values;
- Loss of churches, which could severely impact the social fabric of the community;
- Loss of schools, which could severely impact the entire school system and disrupt families and teachers, as temporary facilities and relocations would likely be needed; and
- Impact on the overall mental health of the community.

Future Development

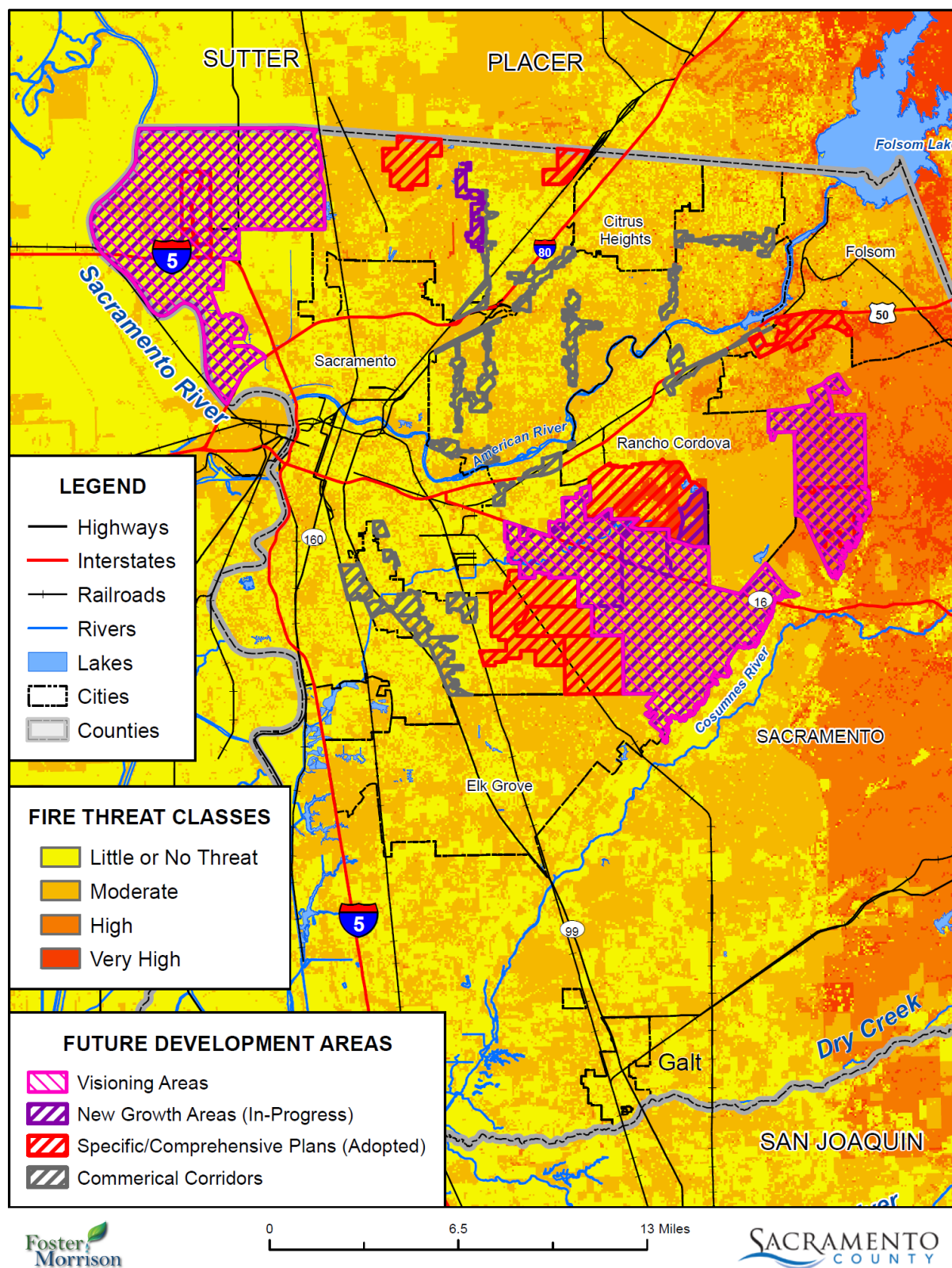
Population growth and development in Sacramento County is on the rise. Additional growth and development within the WUI areas of the County would place additional assets at risk to wildfire.

Future Development GIS Analysis

Future development areas that include visioning areas, new growth areas, specific/comprehensive plan areas, and commercial corridors data is maintained by Sacramento County, and was made available for this plan. An analysis was performed to quantify parcels within these development areas that are also in identified fire threat areas. Results can provide the County with information on where and how to grow in the future.

GIS was used to determine the number of parcels in the CAL FIRE threat zones within identified future development areas. GIS was used to create a centroid, or point representing the center of the parcel polygon. Those parcels centroids that fall inside the future development areas and that were within the fire threat zones were selected and shown on Figure 4-97 and tabulated in Table 4-103.

Figure 4-97 Unincorporated Sacramento County – Future Development in Fire Threat Zones



Data Source: Sacramento County GIS, Cal-Atlas, Cal-Fire 2004 Fire Threat Data; Map Date: 05/2016.

Table 4-103 Sacramento County Planning Area – Future Development in Fire Threat Zones

| Area | Parcels | Acres | Fire Threat Zones |
|--|---------|--------|--|
| Visioning Area | | | |
| Jackson | 1,099 | 21,670 | Little or No Hazard, Moderate, High, Very High |
| Natomas | 907 | 24,504 | Little or No Hazard, Moderate, High |
| Grantline East | 48 | 8,198 | Little or No Hazard, Moderate, High, Very High |
| New Growth Areas | | | |
| Mather South Master Plan | 12 | 1,299 | Little or No Hazard, Moderate, Very High |
| Natomas North | 907 | 24,504 | Little or No Hazard, Moderate, High |
| Jackson Township | 61 | 1,909 | Little or No Hazard, Moderate, High, Very High |
| West Jackson Highway | 455 | 6,181 | Little or No Hazard, Moderate, Very High |
| New Bridge | 27 | 1,339 | Little or No Hazard, Moderate, High, Very High |
| West of Watt | 383 | 609 | Little or No Hazard, Moderate, High |
| Specific/Comprehensive Plan Areas | | | |
| Cordova Hills Master Plan | 26 | 2,436 | Moderate, High, Very High |
| East Antelope Specific Plan | 1,425 | 601 | Little or No Hazard, Moderate, High |
| Easton Project | 19 | 1,409 | Little or No Hazard, Moderate, High, Very High |
| Elverta Specific Plan | 158 | 1,581 | Little or No Hazard, Moderate, High |
| Florin-Vineyard Gap Community Plan | 827 | 3,875 | Little or No Hazard, Moderate, High |
| Jackson Township Master Plan | 61 | 1,909 | Little or No Hazard, Moderate, High, Very High |
| Mather Field | 1,421 | 5,493 | Little or No Hazard, Moderate, High, Very High |
| Mather South Master Plan | 12 | 1,299 | Little or No Hazard, Moderate, Very High |
| Metro Airpark | 78 | 1,810 | Little or No Hazard, Moderate |
| New Bridge Master Plan | 27 | 1,339 | Little or No Hazard, Moderate, Very High |
| North Vineyard Station Specific Plan | 1,320 | 1,553 | Little or No Hazard, Moderate |
| Vineyard Springs Comprehensive Plan | 2,732 | 2,344 | Little or No Hazard, Moderate, High |
| West Jackson Highway Master Plan | 455 | 6,181 | Little or No Hazard, Moderate, High, Very High |
| West of Watt | 383 | 609 | Little or No Hazard, Moderate, High |
| Commercial Corridor Areas | | | |
| Corridor 1 | 1,277 | 554 | Little or No Hazard, Moderate, High, Very High |
| Corridor 2 | 533 | 226 | Little or No Hazard, Moderate |
| Corridor 3 | 1,033 | 625 | Little or No Hazard, Moderate |
| Corridor 4 | 626 | 532 | Little or No Hazard, Moderate |
| Corridor 5 | 516 | 621 | Little or No Hazard, Moderate |
| Corridor 6 | 579 | 311 | Little or No Hazard, Moderate |
| Corridor 7 | 722 | 460 | Little or No Hazard, Moderate |
| Corridor 8 | 126 | 136 | Little or No Hazard, Moderate |

| Area | Parcels | Acres | Fire Threat Zones |
|-------------|---------|-------|--|
| Corridor 9 | 946 | 290 | Little or No Hazard, Moderate |
| Corridor 10 | 593 | 101 | Little or No Hazard, Moderate |
| Corridor 11 | 266 | 76 | Little or No Hazard, Moderate |
| Corridor 12 | 2,537 | 1,929 | Little or No Hazard, Moderate |
| Corridor 13 | 325 | 402 | Little or No Hazard, Moderate, High |
| Corridor 14 | 30 | 155 | Little or No Hazard, Moderate, High, Very High |
| Corridor 15 | 224 | 465 | Little or No Hazard, Moderate, High |
| Corridor 16 | 31 | 11 | Little or No Hazard, Moderate |
| Corridor 17 | 203 | 254 | Little or No Hazard, Moderate |
| Corridor 18 | 3 | 1 | Little or No Hazard, Moderate |
| Corridor 19 | 48 | 130 | Little or No Hazard, Moderate |

Source: Sacramento County GIS, CAL FIRE