



Annex D City of Oroville

D.1 Introduction

This Annex details the hazard mitigation planning elements specific to the City of Oroville, a previously participating jurisdiction to the 2014 Butte County Local Hazard Mitigation Plan (LHMP) Update. This Annex is not intended to be a standalone document, but appends to and supplements the information contained in the Base Plan document. As such, all sections of the Base Plan, including the planning process and other procedural requirements apply to and were met by the City. This Annex provides additional information specific to the City of Oroville, with a focus on providing additional details on the risk assessment and mitigation strategy for this community.

D.2 Planning Process

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

Table D-1 City of Oroville – Planning Team

Name	Position/Title	How Participated
Joe Deal	City of Oroville Police	Attended meetings. Provided hazard identification table. Provided hazard related data. Reviewed and provide data and edits for Plan drafts.
Steve Solano	City of Oroville Police	Attended LHMP Update and HMPC Meeting. Gathered Mitigation Action Plan information.
Jesse Smith	City GIS Specialist	Reviewed drafts, provided data
Wes Erwin	City Planner	Reviewed drafts, provided data
Mike Mixon	City Planning Commission	Reviewed drafts, provided data

Coordination with other community planning efforts is paramount to the successful implementation of this Plan. This section provides information on how the City integrated the previously approved 2014 Plan into existing planning mechanisms and programs. Specifically, the City incorporated into or implemented the 2014 LHMP through other plans and programs shown in Table D-2.

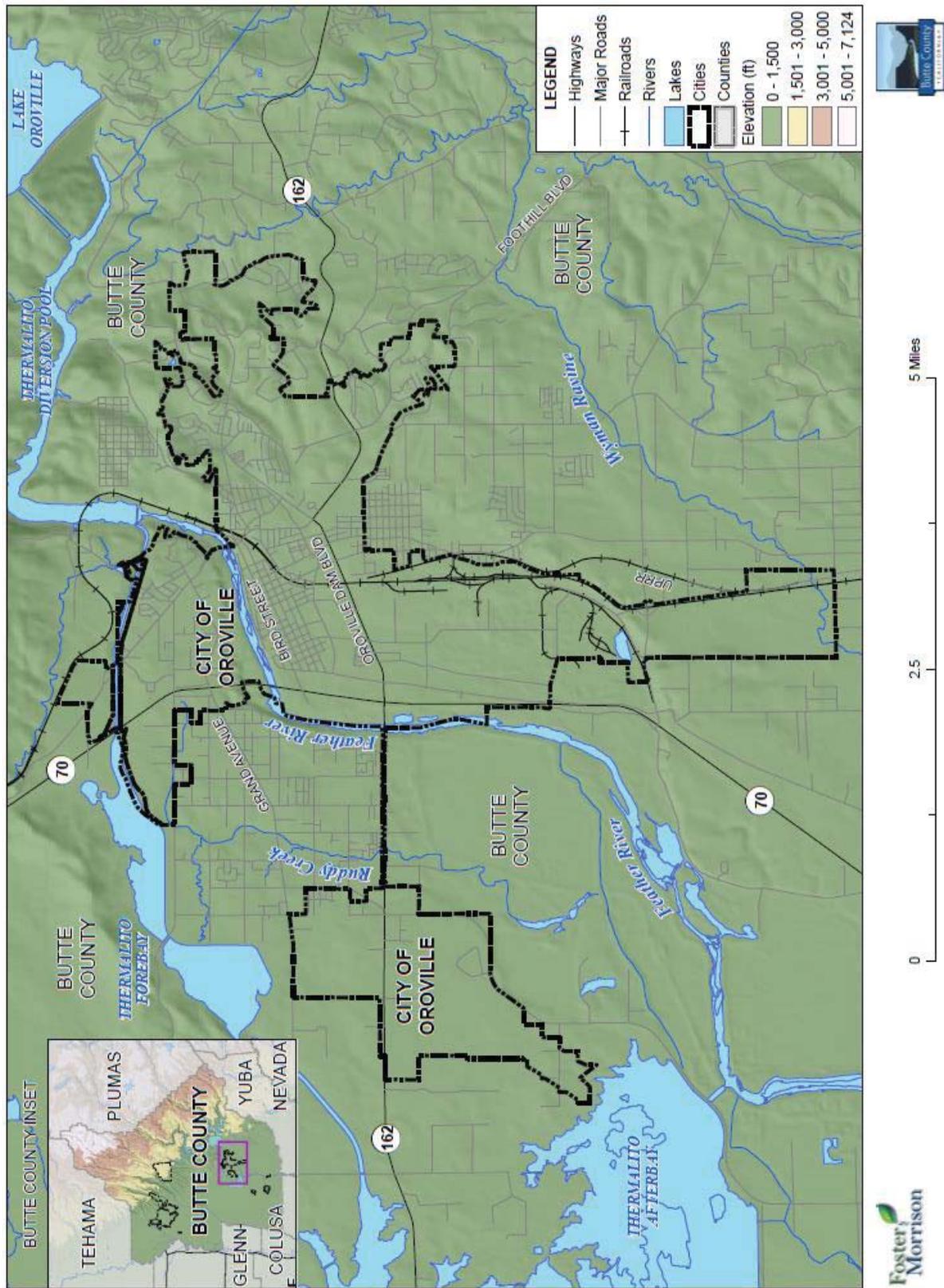
Table D-2 2014 LHMP Incorporation

Planning Mechanism 2014 LHMP Was Incorporated/Implemented In.	Details: How was it incorporated?
2015 City of Oroville General Plan	Data was used from the LHMP to create the Safety Element. Under Goal SAF-7, Policy P7.4 states “Use the Butte County Local Hazard Mitigation Plan as the guide for disaster planning in the Oroville Planning Area.”
2017 City of Oroville Evacuation Planning Operational Committee	The City of Oroville developed an Emergency Operations Plan. (http://www.cityoforoville.org/home/showdocument?id=16424 , City of Oroville, 2017).
The 2014 LHMP	In 2016, a Disaster Council Meeting was scheduled to discuss the LHMP.

D.3 Community Profile

The community profile for the City of Oroville is detailed in the following sections. Figure D-1 displays a City map and the location of the City of Oroville within Butte County.

Figure D-1 City of Oroville



D.3.1. Geography and Climate

The City of Oroville is one of five incorporated municipalities in Butte County and is the county seat. The City's incorporated area consists of a 13 square-mile area located 65 miles north of Sacramento, where the Sacramento Valley meets the Sierra Nevada foothills. Oroville lies 5 miles west of Highway 99 along Highway 70, a primary transportation route connecting Oroville with Sacramento to the south and Plumas County to the north.

Oroville is primarily a single-family residential community with an historic downtown district and a main commercial corridor along Oroville Dam Boulevard. As a charter city, Oroville operates largely in accordance with its own City Charter, compared to general law cities, which are governed according to State statutes. The City's southern and western areas are primarily flat river basin lands that rise into the Sierra Nevada foothills in the northeast. The eastern portion of the City is located in an urban-wildland interface that begins the Sierra Nevada foothills. Development in this eastern area occurs in and around tracts of oak woodlands and chaparral.

D.3.2. History

Oroville is situated on the banks of the Feather River where it flows out of the Sierra Nevada onto the flat floor of the California Central Valley. It was established as the head of navigation on the Feather River to supply gold miners during the California Gold Rush.

Gold found at Bidwell Bar, one of the first gold mining sites in California, brought thousands of prospectors to the Oroville area seeking riches. Now under the enormous Lake Oroville, Bidwell Bar is memorialized by the Bidwell Bar Bridge, an original remnant from the area and the first suspension bridge in California (California Historical Landmark #314). In the early 20th century the Western Pacific Railroad completed construction of the all-weather Feather River Canyon route through the Sierra Nevadas giving it the nickname of "The Feather River Route". Oroville would serve as an important stop for the famous California Zephyr during its 20-year run. In 1983, this became a part of the Union Pacific Railroad as their Feather River Canyon Subdivision. A major highway, State Route 70, roughly parallels the railroad line through the canyon.

The Chinese Temple (CHL #770) and listed on the National Register of Historic Places is another monument to Oroville's storied past. Chinese laborers from the pioneer era established the Temple as a place of worship for followers of Chinese Popular Religion and the three major Chinese religions: Taoism, Buddhism, and Confucianism. The Chinese Temple and Garden, as it is now called, has an extensive collection of artifacts and a serene garden to enjoy.

Ishi, Oroville's most famous resident, was the last of the Yahi Indians and is considered the last "Stone Age" Indian to come out of the wilderness and into western civilization. When he appeared in Oroville around 1911, he was immediately thrust into the national spotlight.

D.3.3. Economy and Tax Base

US Census estimates show economic characteristics for the City of Oroville. These are shown in Table D-3 and Table D-4. Mean household income in the City was \$56,328. Median household income in the City was \$46,233.

Table D-3 City of Oroville – Civilian Employed Population 16 years and Over

Industry	Estimated Employment	Percent
Agriculture, forestry, fishing and hunting, and mining	126	2.0%
Construction	431	7.0%
Manufacturing	351	5.7%
Wholesale trade	134	2.2%
Retail trade	692	11.2%
Transportation and warehousing, and utilities	187	3.0%
Information	81	1.3%
Finance and insurance, and real estate and rental and leasing	385	6.2%
Professional, scientific, and management, and administrative and waste management services	415	6.7%
Educational services, and health care and social assistance	1,606	25.9%
Arts, entertainment, and recreation, and accommodation and food services	966	16.1%
Other services, except public administration	247	4.0%
Public administration	547	8.8%

Source: US Census Bureau American Community Survey 2013-2017 Estimates

Table D-4 City of Oroville – Income and Benefits

Income Bracket	Population	Percent
<\$10,000	552	8.9%
\$10,000 – \$14,999	539	8.7%
\$15,000 - \$24,999	1,101	17.8%
\$25,000 – \$34,999	860	13.9%
\$35,000 – \$49,999	1,006	16.3%
\$50,000 – \$74,999	1,100	17.8%
\$75,000 – \$99,999	493	8.0%
\$100,000 – \$149,999	340	5.5%
\$150,000 – \$199,999	74	1.2%
\$200,000 or more	105	1.7%

Source: US Census Bureau, 2010

According to the US Census, the retail trade business sector brings in the most revenue in Oroville; in 2012 (the most recent data as of the writing of this Plan), this sector generated approximately \$396 million in

revenue, which was about 39 percent of total industry revenue in Oroville. Manufacturing was next at 31 percent of total revenue, followed by health care and social assistance at 20 percent. Together these top business sectors made up almost 90 percent of Oroville’s total business sales and revenue.

According to the City of Oroville 2030 General Plan Economic Development Element, similar to the sales and revenue data discussed above, the health care and social assistance, retail trade, and manufacturing sectors employ the most people in Oroville, together comprising about 75 percent of the total employees in the City. Largest employers in the City and their employment counts, from the Butte County Auditor’s Office, are listed below:

- County of Butte – 2,250
- Oroville Medical Complex – 950
- Pacific Coast Producers – 560
- Wal Mart Stores, Inc. – 284
- Home Depot USA – 107
- City of Oroville – 116
- Currier Square Spe LLC – 100
- Roplast Industries, Inc. – 105
- Ammunition Accessories – 90
- Sierra Pacific Industries – 108

D.3.4. Population

The California Department of Finance estimated the January 1, 2019 total population for the City of Oroville was 21,773.

D.4 Hazard Identification

Oroville’s planning team identified the hazards that affect the City and summarized their location, extent, frequency of occurrence, potential magnitude, and significance specific to Oroville (see Table D-5).

Table D-5 City of Oroville—Hazard Identification Assessment

Hazard	Geographic Extent	Likelihood of Future Occurrences	Magnitude/Severity	Significance	Climate Change Influence
Climate Change	Extensive	Likely	Limited	Low	–
Dam Failure	Extensive	Unlikely	Catastrophic	High	Medium
Drought & Water shortage	Limited	Likely	Negligible	Medium	High
Earthquake and Liquefaction	Significant	Occasional	Critical	Medium	Low
Floods: 100/200/500 year	Significant	Occasional	Critical	Medium	Medium
Floods: Localized Stormwater	Significant	Occasional	Critical	Medium	Medium
Hazardous Materials Transportation	Limited	Highly Likely	Negligible	Low	Low
Invasive Species: Aquatic	Significant	Occasional	Critical	Low	Medium
Invasive Species: Pests/Plants	Limited	Unlikely	Negligible	Low	Low
Landslide, Mudslide, and Debris Flow	Limited	Unlikely	Negligible	Low	Low
Levee Failure	Significant	Likely	Limited	Medium	Medium
Severe Weather: Extreme Heat	Limited	Highly Likely	Negligible	Medium	High
Severe Weather: Freeze and Winter Storm	Significant	Occasional	Negligible	Medium	Medium
Severe Weather: Heavy Rain and Storms (Hail, Lightning, Wind)	Significant	Likely	Limited	Medium	Medium
Severe Weather: Wind and Tornado	Extensive	Unlikely	Catastrophic	Low	Low
Stream Bank Erosion	Limited	Unlikely	Limited	Low	Low
Volcano	Significant	Unlikely	Critical	Low	Low
Wildfire	Extensive	Highly Likely	Critical	High	High
Geographic Extent Limited: Less than 10% of planning area Significant: 10-50% of planning area Extensive: 50-100% of planning area		Magnitude/Severity Catastrophic—More than 50 percent of property severely damaged; shutdown of facilities for more than 30 days; and/or multiple deaths Critical—25-50 percent of property severely damaged; shutdown of facilities for at least two weeks; and/or injuries and/or illnesses result in permanent disability Limited—10-25 percent of property severely damaged; shutdown of facilities for more than a week; and/or injuries/illnesses treatable do not result in permanent disability Negligible—Less than 10 percent of property severely damaged, shutdown of facilities and services for less than 24 hours; and/or injuries/illnesses treatable with first aid			
Likelihood of Future Occurrences Highly Likely: Near 100% chance of occurrence in next year, or happens every year. Likely: Between 10 and 100% chance of occurrence in next year, or has a recurrence interval of 10 years or less. Occasional: Between 1 and 10% chance of occurrence in the next year, or has a recurrence interval of 11 to 100 years. Unlikely: Less than 1% chance of occurrence in next 100 years, or has a recurrence interval of greater than every 100 years.		Significance Low: minimal potential impact Medium: moderate potential impact High: widespread potential impact			
		Climate Change Influence Low: minimal potential impact Medium: moderate potential impact High: widespread potential impact			

D.5 Hazard Profile and Vulnerability Assessment

The intent of this section is to profile Oroville’s hazards and assess the City’s vulnerability separate from that of the Planning Area as a whole, which has already been assessed in Sections 4.2 Hazard Profiles and 4.3 Vulnerability Assessment in the Base Plan. The hazard profiles in the Base Plan discuss overall impacts to the Planning Area and describes the hazard problem description, hazard location and extent, magnitude/severity, previous occurrences of hazard events and the likelihood of future occurrences. Hazard profile information specific to the City is included in this annex. This vulnerability assessment analyzes the property, population, critical facilities, and other assets at risk to hazards ranked of medium or high significance specific to the City and also includes a vulnerability assessment to the three primary hazards to the State of California: earthquake, flood, and wildfire. For more information about how hazards affect the County as a whole, see Chapter 4 Risk Assessment in the Base Plan.

D.5.1. Hazard Profiles

Each hazard vulnerability assessment in Section D.5.3, includes a hazard profile/problem description as to how each medium or high significant hazard affects the City and includes information on past hazard occurrences. The intent of this section is to provide jurisdictional specific information on hazards and further describe how the hazards and risks differ across the Planning Area.

D.5.2. Vulnerability Assessment and Assets at Risk

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

Values at Risk

The following data from the Butte County Assessor’s Office is based on the 3/28/2019 (post-Camp Fire) Assessor’s data. The methodology used to derive property values is the same as in Section 4.3.1 of the Base Plan. This data should only be used as a guideline to overall values in the County, as the information has some limitations. The most significant limitation is created by Proposition 13 and the Williamson Act as detailed in the Base Plan. With respect to Proposition 13, instead of adjusting property values annually, the values are not adjusted or assessed at fair market value until a property transfer occurs. As a result, overall value information is most likely low and does not reflect current market value of properties within the County. It is also important to note, in the event of a disaster, it is generally the value of the infrastructure or improvements to the land that is of concern or at risk. Generally, the land itself is not a loss. However, depending on the type of hazard and impact of any given hazard event, land values may be adversely affected; thus, land values are included as appropriate. Table D-6 shows the 3/28/2019 Assessor’s values (e.g., the values at risk) broken down by property type for the City of Oroville.

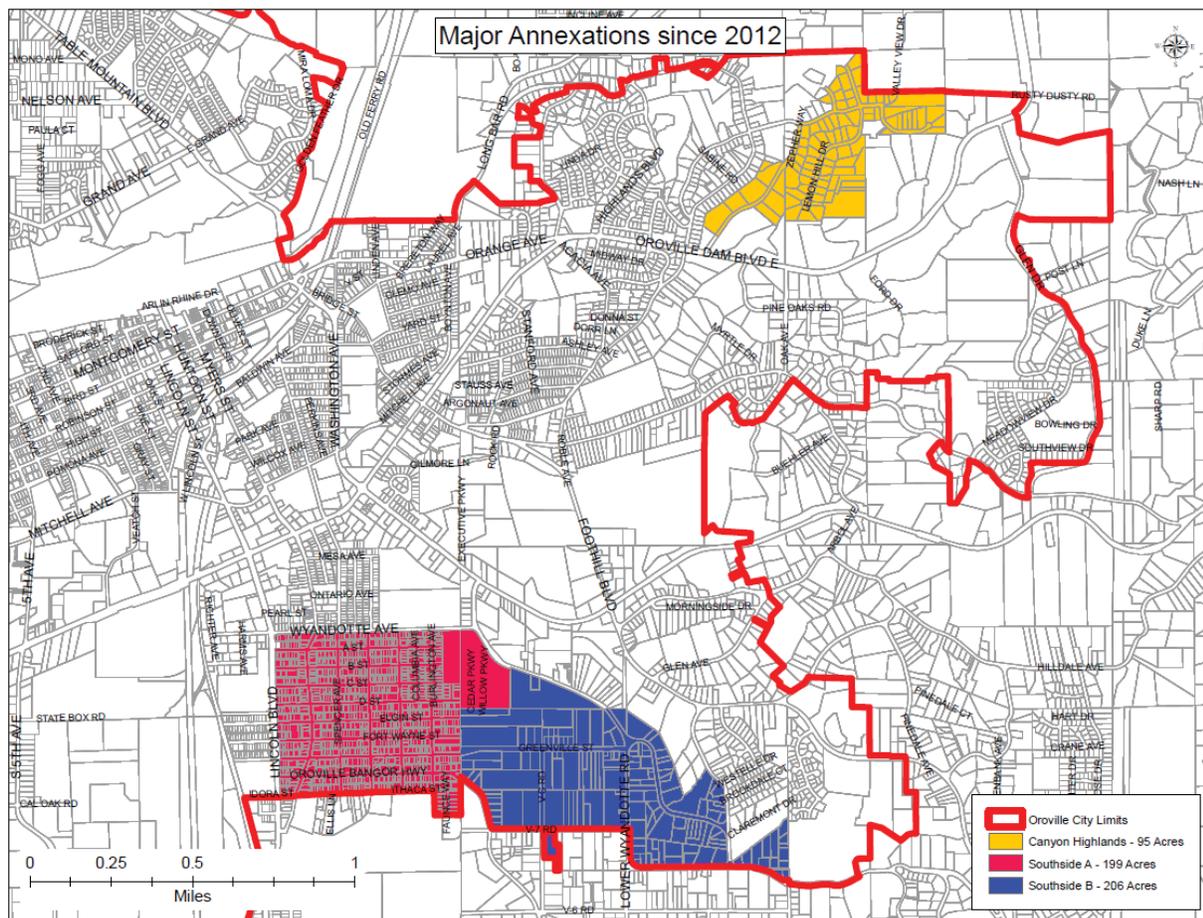
Table D-6 City of Oroville – Total Values at Risk by Property Use

Property Use	Total Parcel Count	Improved Parcel Count	Total Land Value	Improved Structure Value	Other Value	Estimated Contents Value	Total Value
Agricultural	9	0	\$1,291,076	\$0	\$7,947	\$0	\$1,299,023
Commercial	1,042	699	\$107,833,747	\$338,951,493	\$19,007,806	\$338,951,493	\$706,417,512
Industrial	227	72	\$26,057,297	\$40,098,771	\$42,318,610	\$60,148,157	\$192,568,485
Residential	5,705	4,728	\$185,105,000	\$504,810,718	\$7,000	\$252,405,359	\$882,337,953
Unknown	162	2	\$64,518	\$314,266	\$	\$0	\$377,654
City of Oroville Total	7,145	5,501	\$320,351,638	\$884,175,248	\$61,341,363	\$651,505,009	\$1,783,000,627

Source: Butte County 3/28/2019 Parcel/Assessor's Data

The City Planning Team noted late in the Planning Process that mapping for the City provided by Butte County did not account for annexations that had occurred since 2012. These annexations are shown on Figure D-2. Due to its late inclusion, GIS analysis of these annexed areas was not performed. The map is included here for reference purposes only.

Figure D-2 City of Oroville - Annexations since 2012



Source: City of Oroville

Population and Special Populations at Risk

General Population

As previously described in the community profile, based on California Department of Finance estimates, the current January 1, 2019 total population for the City of Oroville was 21,773, all of which are potentially vulnerable to hazard events.

Special Populations and Disadvantaged Communities

The City of Oroville 2030 General Plan Land Use Element noted that Senate Bill (SB) 244 requires that the Land Use Element identify Disadvantaged Unincorporated Communities (DUCs) within the City's SOI, analyze infrastructure and fire service needs and deficiencies, and assess potential funding mechanisms for expansions of services and facilities. DUCs are defined as follows:

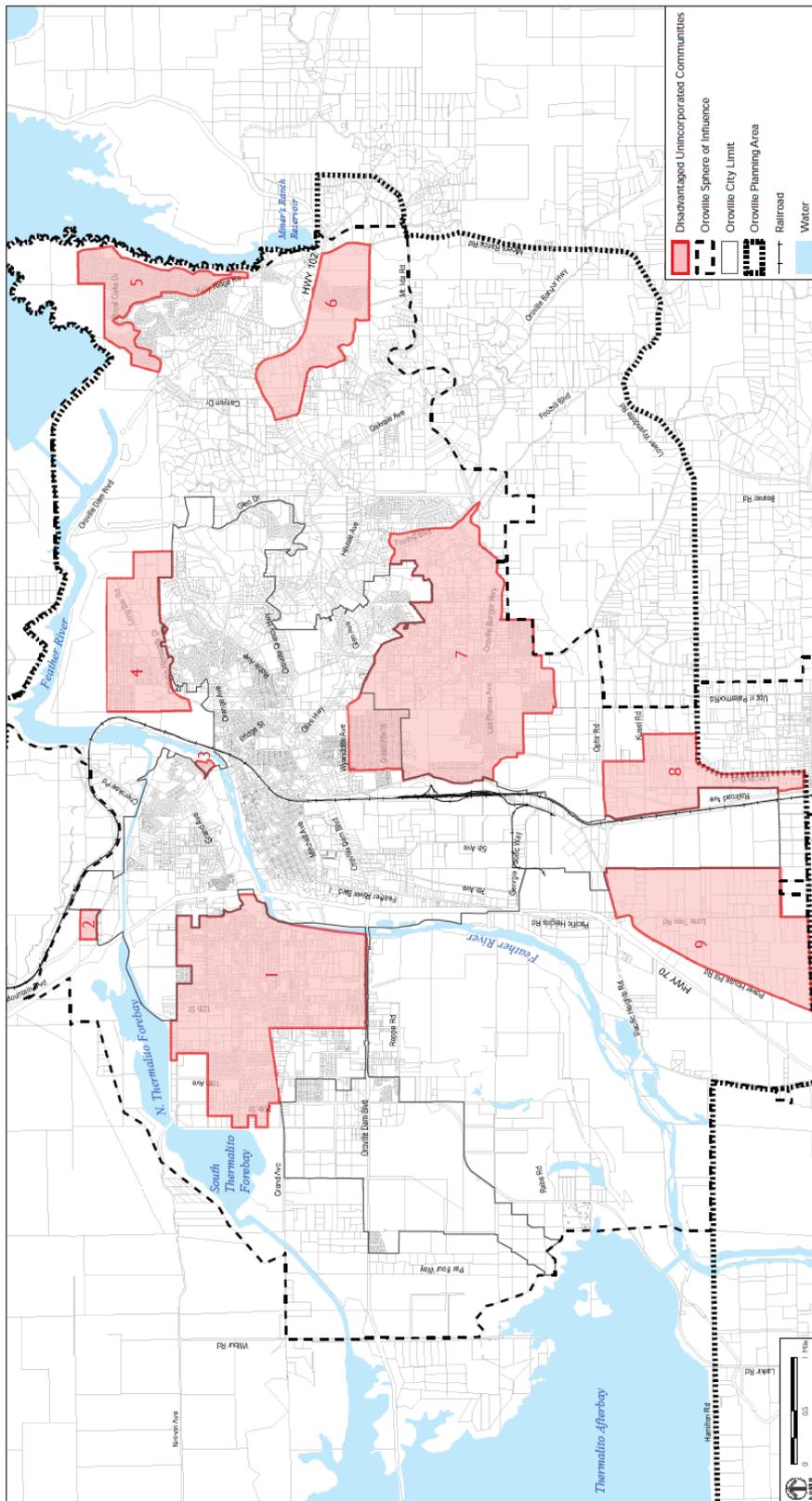
- Inhabited with ten or more homes adjacent or in close proximity to one another; and
- Either within a city's SOI, islands within a city boundary, or geographically isolated and have existed for more than 50 years; and
- The median household income is 80 percent or less than the statewide median household income.

Disadvantaged Unincorporated Communities in Oroville's SOI The DUCs within Oroville's SOI are shown in Figure D-3. These communities were mapped using the following steps:

- Identify Census block groups in which greater than 50 percent of the households have annual incomes that are less than 80 percent of the statewide median (based on 2010 Census data).
- Exclude areas of the Census block groups that are within the city limits or outside the SOI.
- Delineate the communities within these Census block groups based on aerial photographs and parcel data. Communities are defined as having ten or more

As shown in Figure D-3, there are nine DUCs in Oroville's SOI ranging in size from 9 acres to 1,940 acres. Some mapped DUCs encompass multiple communities that are adjacent to one another.

Figure D-3 City of Oroville - Disadvantaged Communities



Source: City of Oroville 2030 General Plan Land Use Element

The City of Oroville recognizes special populations and implemented the Butte County Precautionary Emergency Evacuation Plan for Special Needs population. This Plan was activated during the Oroville Dam Crisis in 2017.

Critical Facilities and Infrastructure

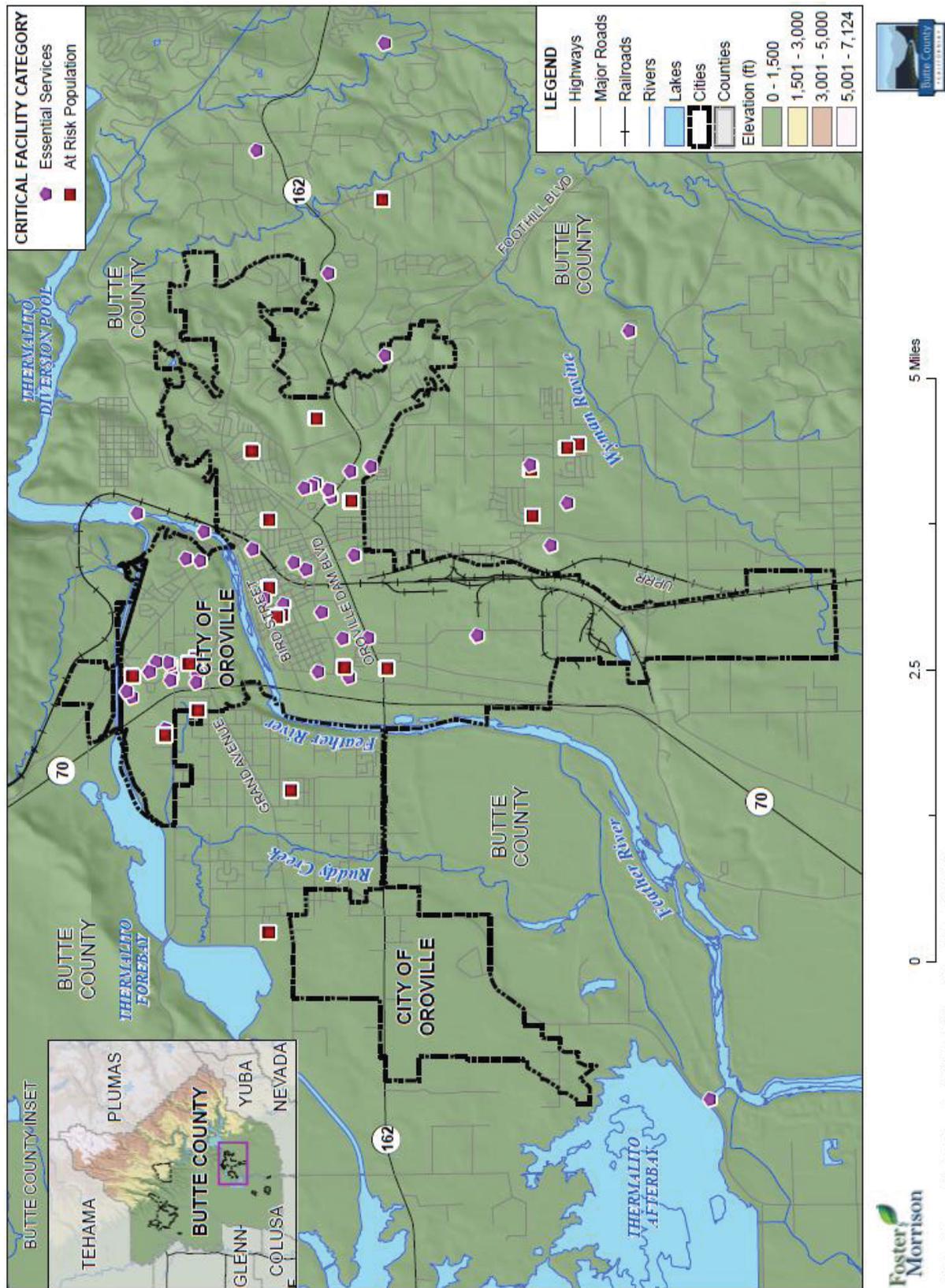
For purposes of this plan, a critical facility is defined as:

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 and (2) At-Risk Populations Facilities, as discussed in Section 4.3.1 of the Base Plan.

An inventory of critical facilities in the City of Oroville from Butte County GIS is shown on Figure D-4. Table D-7 gives summary information about the critical facilities in the City. Table D-8 details the facility categories and breaks them down by facility type. Details of critical facility definition, type, name, address, and jurisdiction by hazard zone are listed in Appendix F.

Figure D-4 City of Oroville – Critical Facilities



Data Source: Butte County GIS, Cal-Atlas; Map Date: 7/1/2019.



Table D-7 City of Oroville – Critical Facility Summary

Critical Facility Category	Facility Count
Essential Services Facilities	40
At Risk Population Facilities	20
City of Oroville Total	60

Source: Butte County GIS

Table D-8 City of Oroville – Critical Facilities by Facility Type

Critical Facility Category / Facility Type	Facility Count
Essential Services Facilities	
Wastewater Treatment Plant	1
Fire	3
Health Care	19
Law Enforcement	3
Public Assembly Point / Evacuation Center	2
Radio Sites	3
Logistics Hub	6
Emergency Operation Center	1
DOC	1
Emergency Animal Shelter	1
Essential Services Facilities Total	40
At Risk Population Facilities	
School	20
At Risk Population Facilities Total	20
Grand Total	
	60

Source: Butte County GIS

Natural Resources

Biological communities in the City of Oroville Planning Area were significantly impacted beginning in the mid-1800s as the area was first hydraulically mined, and later dredged for gold, as well as developed for agriculture. Despite these human modifications to the natural environment, important biological resources continue to exist in and around Oroville.

Within the Planning Area, several regional parks and other protected public lands contain sensitive biological habitats (e.g. riparian, oak woodland and vernal pool) and may support State and federally listed species. These lands include the Thermalito Afterbay, Thermalito Forebay, Oroville Wildlife Area and other natural lands managed by the California Department of Fish and Game (DFG), California Department of Parks and Recreation (DPR) and the Feather River Recreation and Parks District. Although not in the Planning Area, nearby open space and wilderness areas such as the Plumas National Forest and North Table

Mountain Wildlife Area provide important biological resources to the region. Wide-ranging wildlife species (e.g. blacktailed deer, osprey, golden eagle, bald eagle and numerous species of migratory birds) within these areas could migrate through or forage in the Planning Area. Important biological resources in the Planning Area are described in greater detail below.

Nine main types of biological communities occur in the Planning Area. These nine communities include:

- **Foothill Pine-Blue Oak Woodland.** Foothill pine-blue oak woodlands are scattered throughout the Planning Area but are concentrated in the eastern half of the Planning Area in a mostly rural setting, with extensive woodlands occurring around Lake Oroville.
- **Riparian Woodlands.** Riparian woodlands are common throughout the Planning Area and occur along portions of the Feather River, Thermalito Afterbay and Forebay, Thermalito Diversion Pool and along numerous perennial and ephemeral drainages in the eastern portion of the Planning Area. Riparian woodlands are also commonly associated with dredge tailings throughout the Planning Area.
- **Annual Grasslands.** Annual grasslands occur throughout the Planning Area. Large, open areas of annual grasslands occur primarily in the western half of the Planning Area and are typically grazing pastures for livestock. Annual grasslands also form the understory for foothill pine-blue oak woodland and occur on vacant parcels in developed areas.
- **Chaparral.** A small aggregation of chaparral occurs in the northern portion of the Planning Area on the south-facing slopes of South Table Mountain. Small scattered areas of chaparral are also present within the understory of woodlands throughout the Planning Area.
- **Agricultural Lands.** Areas used for agriculture are scattered throughout the Planning Area. Row crops and rice fields occur predominantly in mostly flat areas in the northwest portion of the Planning Area along Highway 99. Within the Planning Area small olive groves occur on hillsides in the southeastern portion and citrus orchards in the southwest corner.
- **Wetlands.** Wetlands are considered sensitive natural communities by several resource agencies and should be given special consideration in the Planning Area because they provide a variety of important ecological functions and essential habitat for wildlife resources. Natural wetland habitats are steadily declining compared to their historical distribution, as a result of land management practices and development activities. Four types of wetlands occur in the Planning Area.
- **Vernal Pools.** Vernal pools occur primarily in the western half of the Planning Area and are concentrated in the areas shown on Figure D-5. The largest area of vernal pools is located north and south of Cottonwood Road between Highways 99 and 70; these pools are northern volcanic mud flow vernal pools. Vernal pools in the Planning Area occur within annual grasslands and represent a variety of pool types, including northern hardpan and northern volcanic mud flow pools. Vernal pools may occur as individual pools with discrete boundaries or be connected with other vernal pools via vernal swales to form a vernal pool complex. Vernal swales consist of vernal pools that occur within shallow, linear depressions.
- **Drainages.** Perennial and ephemeral drainages occur throughout the Planning Area and are shown in Figure D-5. These drainages are typically associated with riparian habitat described above and may support patches of freshwater marsh. Primary drainages within the Planning Area include the Feather River, Cottonwood Creek, Little Cottonwood Creek, Wyman Ravine, Wyndotte Creek and the Western Canal.
- **Freshwater Marsh.** Freshwater marsh occurs in the northwest portion of the Planning Area along the margins of flooded rice fields adjacent to Highway 99. Drainages and open water habitats in the Planning Area may also support patches of freshwater marsh.
- **Reservoir.** The Thermalito Afterbay and Thermalito Forebay are large reservoirs located on the Feather River in the western portion of the Planning Area formed by earthen dams. The Thermalito Afterbay and Thermalito Forebay provide resting and foraging habitat for migratory waterfowl traveling along the Pacific Flyway. The Thermalito Afterbay is part of the larger Oroville Wildlife Area (shown on

Figure D-5). The eastern portion of the preserve surrounding the Feather River contains numerous dredge tailings and borrows pits.

Figure D-5 Vernal Pools and Drainage Corridors in Oroville

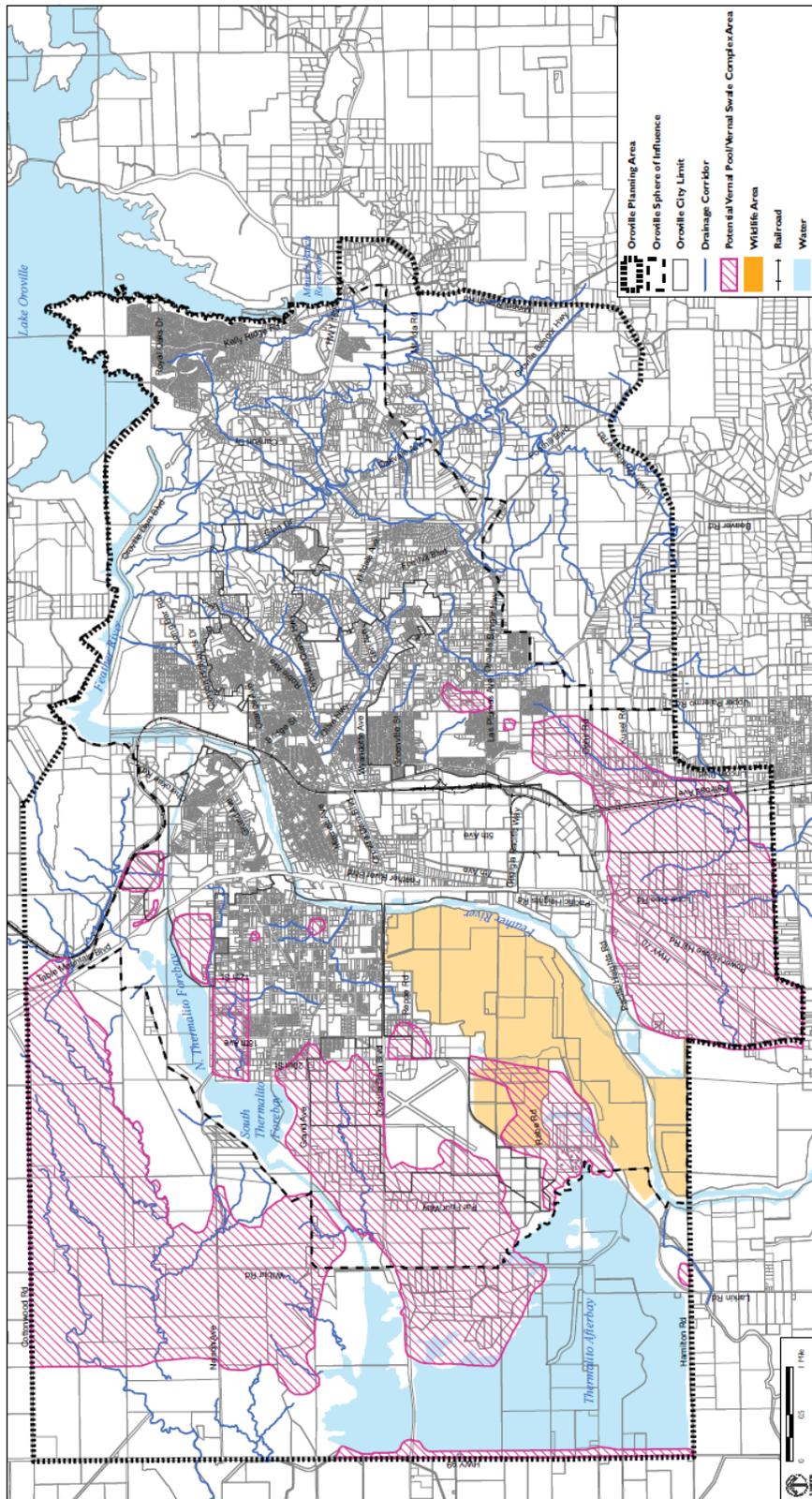


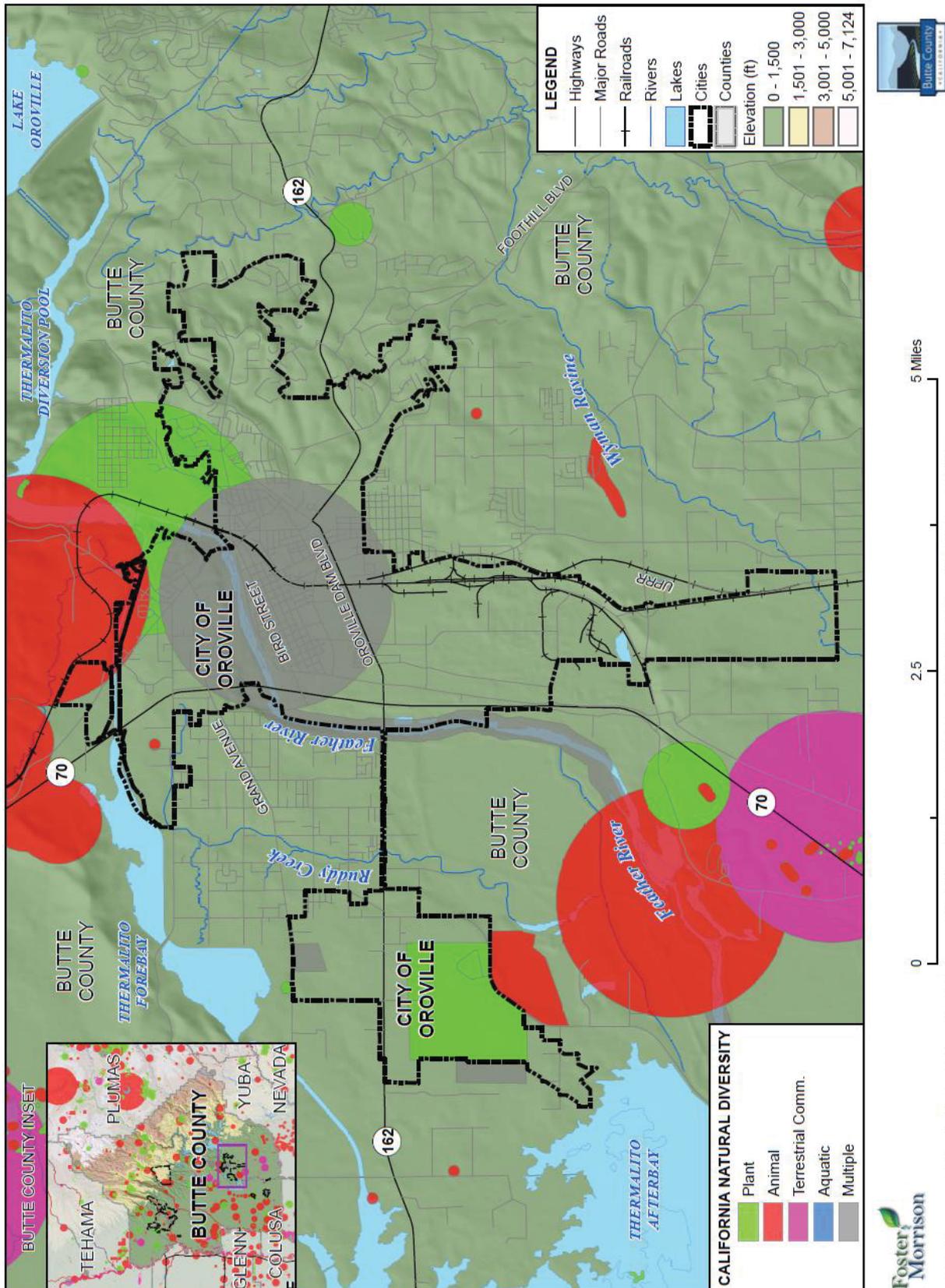
FIGURE OPS-3
VERNAL POOLS AND DRAINAGE CORRIDORS

Source: City of Oroville 2030 General Plan Open Space, Natural Resources, and Conservation Element

The distribution of biological communities in the Planning Area is closely associated with topography and hydrology. Some of the flat valley area supports agricultural lands, the hilly portions support most of the remaining grassland and woodland communities and stream corridors support riparian communities.

The California Natural Diversity Database (CNDDDB) is a "natural heritage program" and is part of a nationwide network of similar programs overseen by NatureServe (formerly part of The Nature Conservancy). All natural heritage programs provide location and natural history information on special status plants, animals, and natural communities to the public, other agencies, and conservation organizations. The data help drive conservation decisions, aid in the environmental review of projects and land use changes, and provide baseline data helpful in recovering endangered species and for research projects. Spatial information regarding these program areas in the City of Oroville is shown on Figure D-6.

Figure D-6 City of Oroville Natural Diversity Map



Data Source: California Natural Diversity Database - CA Fish and Wildlife, Butte County GIS, Cal-Atlas; Map Date: 3/1/2019.



Historic and Cultural Resources

The City of Oroville has a 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. These requirements are detailed in Section 4.3.1 of the base plan. Historic properties in Oroville are shown in Table D-9.

Table D-9 City of Oroville – Historic Properties

Resource Name (Plaque Number)	National Register	State Landmark	California Register	Point of Interest	Date Listed	City/Community
Bidwell's Bar (330)		X			8/8/1939	Oroville
Cherokee Townsite And Adjoining Spring Valley Mine (P557)				X	12/19/1980	Oroville
Chinese Cemetery (P584)				X	3/1/1982	Oroville
Chinese Temple (770)		X			1/31/1962	Oroville
Discovery Site of the Last Yahi Indian (809)		X			10/5/1965	Oroville
Garrott's Saw Mill (P116)				X	6/6/1969	Oroville
Jewish Cemetery (P585)				X	3/1/1982	Oroville
Lee, Fong, Company (N1057)	X				3/11/1982	Oroville
Long's Bar (P576)				X	12/21/1981	Oroville
Lott Museum-Sank Park (P2)				X	8/5/1966	Oroville
Old Chinese Cemetery (P413)				X	8/7/1975	Oroville
Old Suspension Bridge (314)		X			7/12/1939	Oroville
Oregon City (807)		X			6/28/1965	Oroville
Oroville Carnegie Library (N2362)	X				5/8/2007	Oroville
Oroville Cemetery (P583)				X	3/1/1982	Oroville
Oroville Chinese Temple (N431)	X				7/30/1976	Oroville
Oroville Commercial District (Old) (N1211)	X				7/28/1983	Oroville
Oroville Inn (N1635)	X				9/13/1990	Oroville
Oroville Odd Fellows Home Site, Bella Vista Hotel (P726)				X	8/17/1990	Oroville
State Theatre (N1731)	X				9/13/1991	Oroville

Source: California Department of Parks and Recreation Office of Historic Preservation

In addition, the City of Oroville 2030 General Plan Open Space, Natural Resources, and Conservation element details some of the prehistoric archaeological and historic resources. Some of these resources are located inside the City limits, while others are in the City Sphere of Influence (SOI).

Prehistoric and historic archaeological resources in the Planning Area include:

Native American habitation sites, temporary campsites, lithic reduction stations (stone tool making locations), milling stations, rock features and burial locations. To prevent possible looting and/or disturbance, the location of archaeological resources are not mapped.

A total of 33 sites with prehistoric components have been recorded within the City of Oroville SOI. Six of these sites contain historic components as well. The most common type of prehistoric site found in the City of Oroville SOI are milling stations at locations such as the Feather River Nature Center, followed by temporary campsites, habitation sites, burial locations and rock features. Two sites have known Native American burials.

Prehistoric sites are often found along major rivers in the Sacramento Valley, with their associated areas of high ground and natural levees. Prehistoric sites are also often found along the various creeks and minor drainages in the foothills of the Sierra Nevada Mountains and their adjacent interior valleys and grasslands. This pattern applies to the City of Oroville SOI, where prehistoric sites tend to be located along the Feather River, its tributaries and smaller drainages. In particular, the banks of the Feather River and its tributaries in the Historic Downtown, Hammon, Western Pacific, Canyon Highlands, northern Oakvale and Kelly Ridge areas are very sensitive for prehistoric archaeological resources.

Historic archaeological site types in the SOI include abandoned transportation corridors and alignments, and remnants of activities associated with historic mining, settlement and agriculture. For the purposes of this General Plan, historic archaeological resources are distinguished from historic resources (the built environment) largely by condition. That is, resources that are still functional (roads that are traveled, ditches carrying water, standing structures) are considered part of the built environment. The remnants of these structures are considered archaeological resources. Historic archaeological sensitivity is considered particularly high along the banks of the Feather River in the Historic Downtown, Hammon, Western Pacific, Kelly Ridge, Oroville Dam Area, Oro Bangor, Foothills and Oakvale areas.

Growth and Development Trends

Oroville has seen steady growth. Oroville has seen growth rates as shown in Table D-10. The City saw large growth between 1960 and 2000, with a dip between 2000 and 2010. Much of the 2019 growth is attributed to the movement of people into Oroville from Paradise due to the Camp Fire.

Table D-10 City of Oroville – Population Changes Since 1950

Year	Population	Change	% Change
1950	5,387	–	–
1960	6,115	728	13.5%
1970	7,536	1,421	23.2%
1980	8,683	1,147	15.2%
1990	11,960	3,277	37.4%
2000	13,004	1,044	8.7%
2010 ¹	15,546	2,542	19.5%
2019 ²	21,773	6,227	40.1%

Source: ¹US Census Bureau, ²California Department of Finance

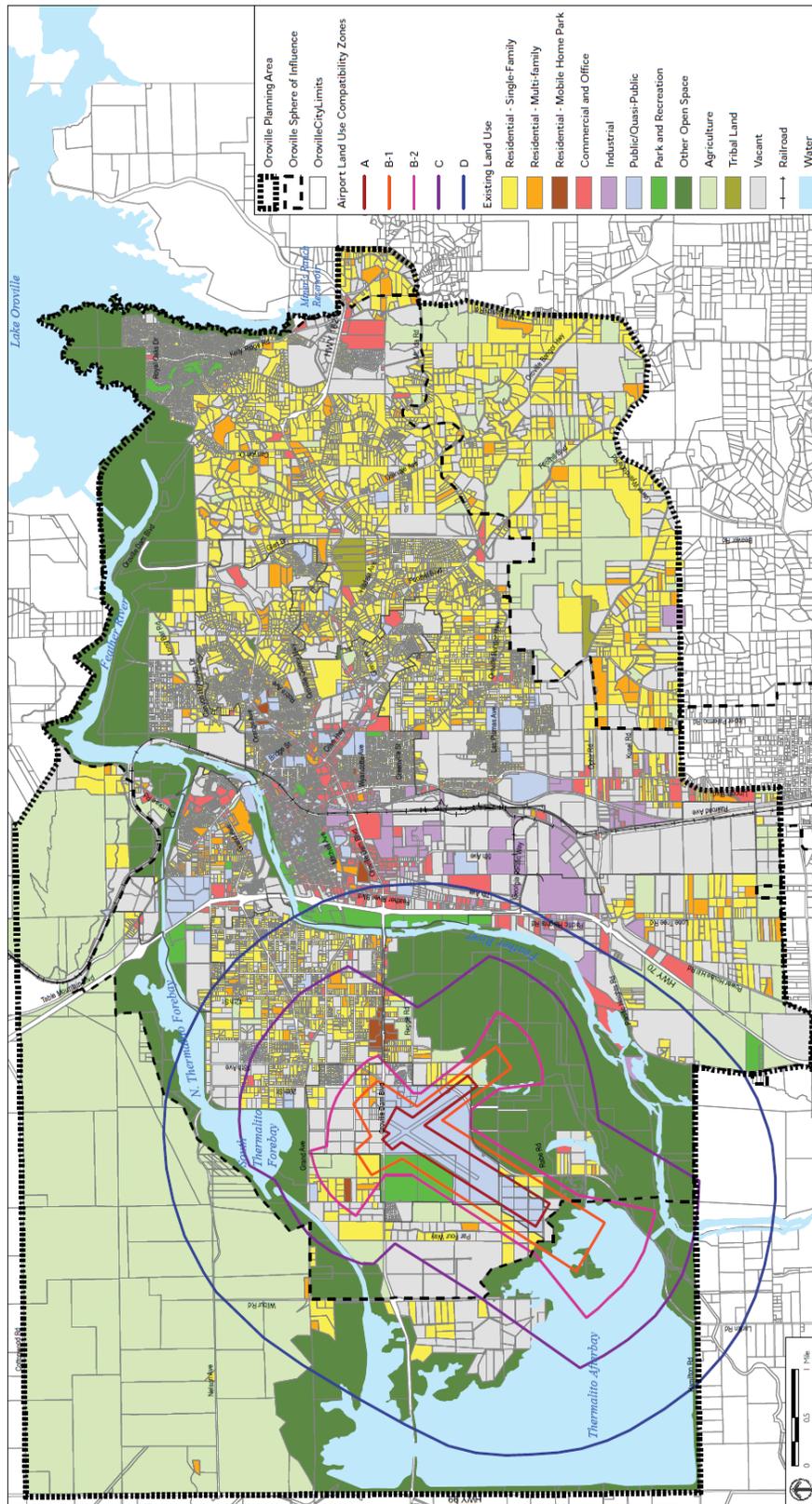
Land Use

As required by California Government Code Section 65302(a) and Public Resources Code Section 2762(a), the Land Use Element of the General Plan addresses the following issues:

- Distribution, location and extent of the uses of land for housing, business, industry, open space, natural resources, recreation, and enjoyment of scenic beauty, education, public buildings and grounds and other categories of public and private uses of land.
- Standards of population density and building intensity for the land use designations.

The Land Use Element focuses on development that could potentially occur in both the existing city limits and the City’s Sphere of Influence (SOI). The SOI is the area outside of the city limits that the City intends to incorporate in the future. Land use in the City of Oroville and surrounding area has not changed substantially since adoption of the 1995 City of Oroville General Plan. However, regional and local market trends have increased the rate of change over the past few years. Table D-11 shows the acreages of various existing land uses in the city limits and in the SOI, while Figure D-7 illustrates existing land uses.

Figure D-7 City of Oroville – Land Use Diagram



Source: City of Oroville 2030 General Plan Land Use Element

Table D-11 City of Oroville – Existing Land Uses

Land Use	City Limits (Acres)	Sphere of Influence (Acres)
Residential - Single-family	1,338	5,600
Residential – Multi-Family	265	535
Residential - Mobile Home Park	32	62
Commercial and Office	630	513
Industrial	416	336
Public/Quasi-Public	1,122	220
Parks and Recreation	513	106
Other Open Space	213	7,596
Agriculture	17	1,563
Tribal Lands	0	92
Vacant	3,117	5,805
Total	7,662	22,427

Source: City of Oroville 2030 General Plan Land Use Element

Development since 2014 Plan

The City Building Department tracked total building permits issued since 2014 for the City. These are tracked by total development, property use type, and hazard risk area. These are shown in Table D-12 and Table D-13. All development in the identified hazard areas, including the 1% annual chance floodplains, and moderate or higher 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 City to identified priority hazards.

Table D-12 City of Oroville – Total Development Since 2014

Property Use	2014	2015	2016	2017	2018
Agricultural	0	0	0	0	0
Commercial	1	1	3	4	2
Industrial	0	1	0	0	1
Residential	13	20	5	15	5

Property Use	2014	2015	2016	2017	2018
Unknown	0	0	0	0	0
Total	14	22	8	19	8

Source: City of Oroville Building Department

Table D-13 City of Oroville – Development in Hazard Areas since 2014

Property Use	1% Annual Chance Flood	Landslide Susceptibility Area	Wildfire Risk Area ¹	Other
Agricultural	0	0	0	0
Commercial	0	0	1	0
Industrial	0	0	0	0
Residential	0	0	2	0
Unknown	0	0	0	0
Total	0	0	3	0

Source: City of Oroville Building Department

¹Moderate or higher wildfire risk area

Future Development

Approximately every four years, the Butte County Association of Governments (BCAG) prepares long-term regional growth forecasts of housing, population, and employment for the Butte County area. The forecasts have been developed by BCAG in consultation with its Planning Directors Group which consists of representatives from each of BCAG’s local jurisdiction members and the Butte Local Agency Formation Commission. A low, medium, and high scenario has been developed for each forecast of housing, population, and employment. The 2018 process has been delayed due to the regional population redistribution and uncertain re-population timeline associated with the 2018 Camp Fire. At this time, it is anticipated that the new forecasts will be available near the end of 2019. The medium scenario for the City in the 2014-2040 Regional Transportation Plan is shown in Table D-14.

Table D-14 City of Oroville – Future Population Estimates

Jurisdiction	2020	2025	2030	2035	2040
Oroville	18,673	22,264	26,928	29,332	30,816

Source: Butte County Association of Governments 2014-2040 Regional Transportation Plan

More general information on growth and development in Butte County as a whole can be found in “Growth and Development Trends” in Section 4.3.1 Butte County Vulnerability and Assets at Risk of the Base Plan.

Using GIS, the following methodology was used in determining parcel counts and values associated with future development and redevelopment projects in the City of Chico.

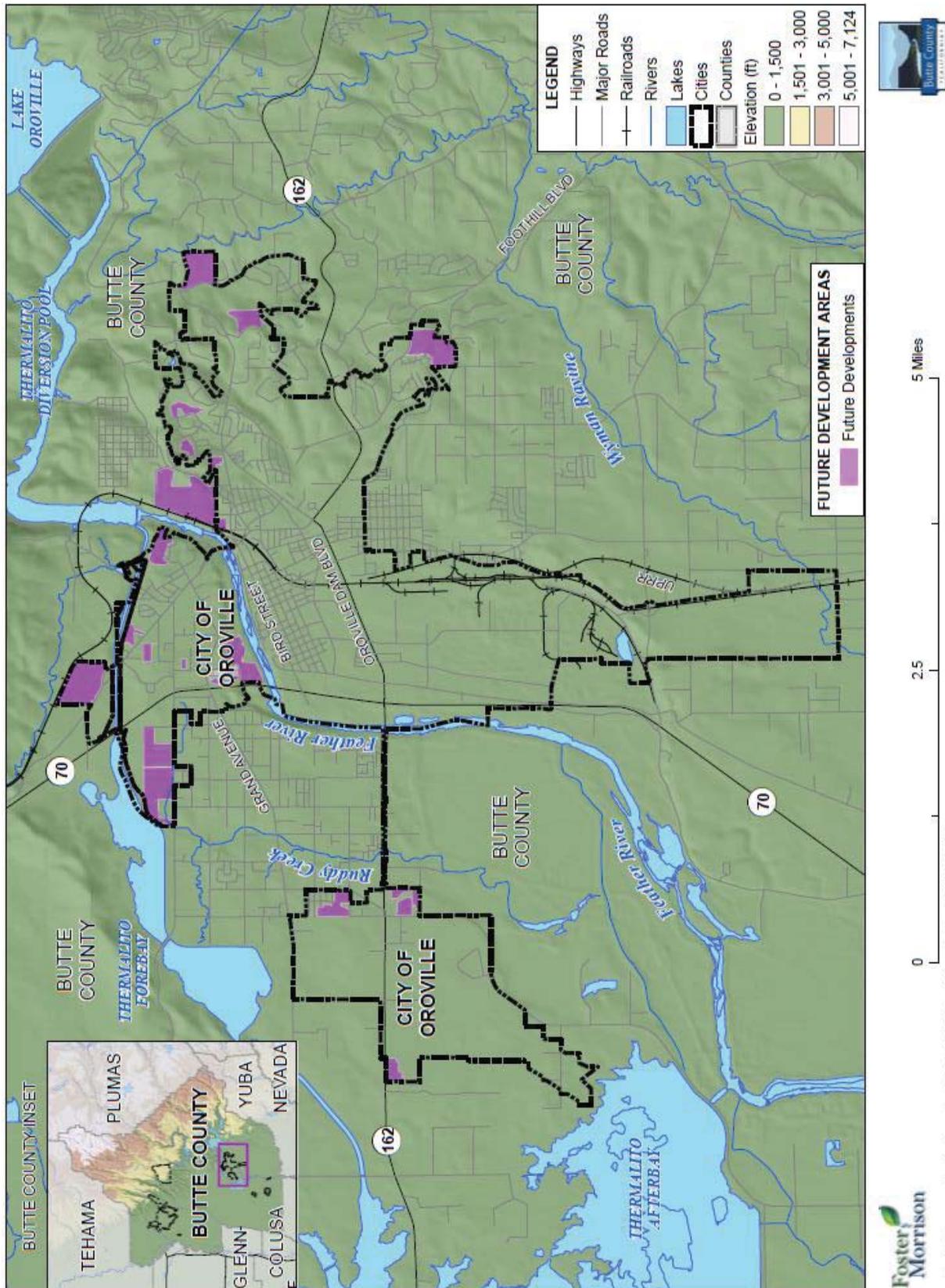
GIS Analysis

Butte County’s 3/21/2019 Assessor Data and the County’s GIS parcel data were used as the basis for the inventory of assessed values for both improved and unimproved parcels within the City. This data provides

the land and improved values assessed for each parcel. In this analysis, the parcel data was converted to a point layer using a centroid conversion process, in which each parcel was identified by a central point containing the assessor's data. In addition, Butte County provided a table containing the assessor parcel numbers (APNs) for the 260 parcels. Using the GIS parcel spatial file and the APNs, the 260 parcels associated with future development projects for which the analysis was to be performed was identified. Utilizing the future development project spatial layer, the parcel centroid data was intersected to determine the parcel counts within each area.

Figure D-8 shows the locations of future development areas the City is planning to develop. Table D-15 shows the parcels and acreages of each future development area in the City.

Figure D-8 City of Oroville – Future Development Areas



Data Source: Butte County GIS, Cal-Atlas, Map Date: 10/12/2019.



Table D-15 City of Oroville – Future Development Locations with Parcels and Acreage

Future Development	Total Parcel Count	Improved Parcel Count	Total Acres
City of Oroville			
Acacia Estates	2	0	6.7
Buttewoods 2	3	0	56.1
Calle Vista Estates Unit II	48	44	24.4
Canal View Estates	3	0	8.4
Deer Creek Estates 2	3	0	24.3
Ford Drive	2	0	22.4
Forebay Estates	1	0	40.2
Greenview Estates	1	1	1.9
Heritage Oak Estates	3	1	46.5
Highlands Estates	1	0	13.3
Linkside Place Phase I	66	6	11.5
Martin Ranch	1	0	73.1
Mission Olive Ranch	20	2	6.8
Nelson 56	1	0	56.5
Oak Park	1	0	5.1
Rivers Edge	1	0	10.3
Riverview	4	0	38.8
Rosewood Estates	1	0	5.0
Vista Del Oro	95	22	15.2
City of Oroville Total	257	76	466.4
Unincorporated Butte County			
Oak Park	3		94.3
Unincorporated Butte County Total	3		94.3
Grand Total			
	260	76	560.6

Source: City of Oroville

D.5.3. Vulnerability to Specific Hazards

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

An estimate of the vulnerability of the City to each identified priority 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.

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

Dam Failure

Likelihood of Future Occurrence—Occasional

Vulnerability—High

Hazard Profile and Problem Description

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

Location and Extent

Oroville is downstream of multiple dams (which are discussed in greater detail and mapped in the vulnerability section below), the largest of which is Oroville Dam. The Oroville Dam sits east of Oroville’s City Center, nestled at the mouth of the Feather River Canyon. At 770 feet tall and 6,920 feet long, the Oroville Dam is one of the 20 largest dams in the world and impounds the second largest reservoir in California. Lake Oroville has a capacity of 3.5 million-acre feet and is the principal water storage facility of the State Water Project (SWP). Flows from the failure of these dams could inundate non-urban portions of the Planning Area. These dams and their inundation areas are discussed in greater detail in the vulnerability section below. Dam failure is a natural disaster from two perspectives. First, the inundation from released waters resulting from dam failure is related to naturally occurring floodwaters. Second, dam failure would most probably happen as a consequence of the natural disaster triggering the event, such as

an earthquake. There is no scale with which to measure dam failure. While a dam may fill slowly with runoff from winter storms, a dam break has a very quick speed of onset. The duration of dam failure is not long – only as long as it takes to empty the reservoir of water the dam held back. The City would be affected for as long as the flood waters from the dam failure took to drain downstream. Geographical flood extent from the Cal OES dam inundation zones is shown in Table D-16. Note, the Cal OES dam inundation data did not include inundation mapping of all dams of concern to the Butte County Planning Area; thus, the below analysis reflects information based on available data. Other dams may be identified as a concern to the City.

Table D-16 City of Oroville – Geographical Dam Inundation Extents

Dam Inundation Area	Total Acres	% of Total Acres	Improved Acres	% of Total Improved Acres	Unimproved Acres	% of Total Unimproved Acres
Lake Almanor	1,804	22.83%	789	9.99%	1,015	12.85%
Miners Ranch	27	0.34%	0	0.00%	27	0.34%
Oroville	6,166	78.04%	2,310	29.24%	3,856	48.80%
Thermalito Diversion	213	2.70%	7	0.09%	206	2.61%

Source: Cal OES

Past Occurrences

February 11, 2017 – Heavy rainfall during the 2017 California floods damaged the main spillway on February 7, so the California Department of Water Resources stopped the spillway flow to assess the damage and contemplate its next steps. The rain eventually raised the lake level until it flowed over the emergency spillway, even after the damaged main spillway was reopened. As water flowed over the emergency spillway, headward erosion threatened to undermine and collapse the concrete weir, which could have sent a 30-foot wall of water into the Feather River below and flooded communities downstream. No collapse occurred, but the water further damaged the main spillway and eroded the bare slope of the emergency spillway. An evacuation order was put out for the City of Oroville.

Vulnerability to Dam Failure

Dam failure flooding would vary by community depending on which dam fails and the nature and extent of the dam failure and associated flooding. Based on the vulnerability assessment in the Base Plan, it is apparent that a major dam failure could have a significant impact on the City.

Failure of the Oroville Dam could result in release of water held behind the dam, and inundation of much of the City and surrounding area. A major seismic event would be the most likely cause of dam failure. A number of geologic faults have been mapped in the Oroville area which could cause a seismic event. Landslides around the reservoir rim have occurred since Lake Oroville has been in operation. These landslides are not considered to pose a threat to the freeboard of the dam or the safety of the public.

In addition to Oroville Dam, the City is in the inundation area for Lake Almanor, Miner’s Ranch, and Thermalito Diversion.

Impacts

Impacts to the City from a dam failure flood include damage to residential and commercial property, damage to critical facilities, damage to infrastructure, damage to levees that protect the City, and injuries or deaths to citizens of the City. Evacuations caused by potential dam failures can also cause significant disruption to the City and result in economic impacts to the City and its residents.

Values at Risk

Based on the vulnerability assessment in the Base Plan, it is apparent that a major dam failure could have a significant impact on the City. The City is located in four Cal OES mapped dam inundation areas as described in Section 4.3.4 of the Base Plan. These four dams are:

- Oroville (an extremely high hazard dam, as seen on Figure D-9)
- Lake Almanor (a high hazard dam, as seen on Figure D-10)
- Miner's Ranch (a high hazard dam, as seen on Figure D-10)
- Thermalito Diversion (a high hazard dam, as seen on Figure D-10)

Figure D-9 City of Oroville – Extremely High Dam Inundation Areas

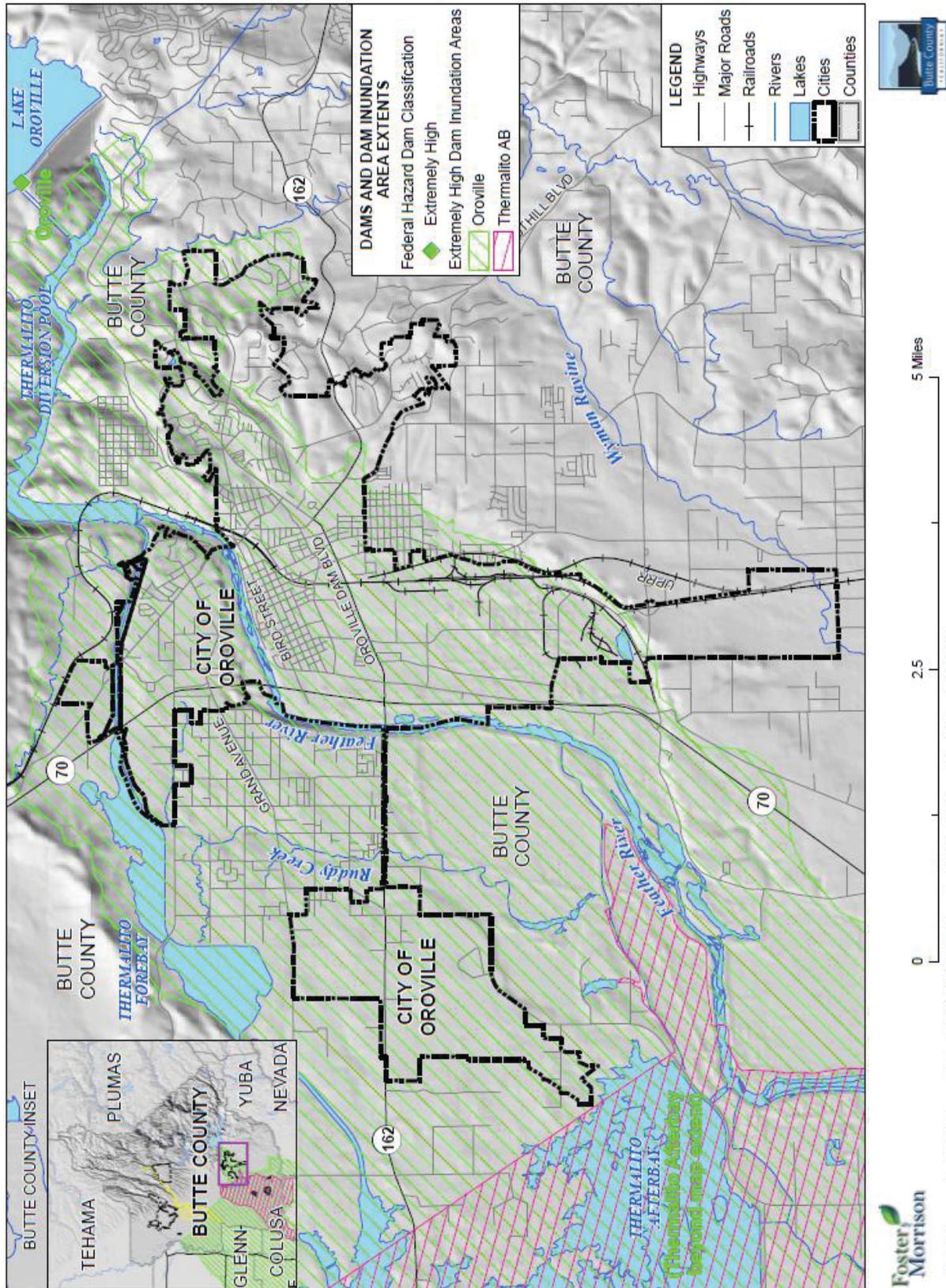
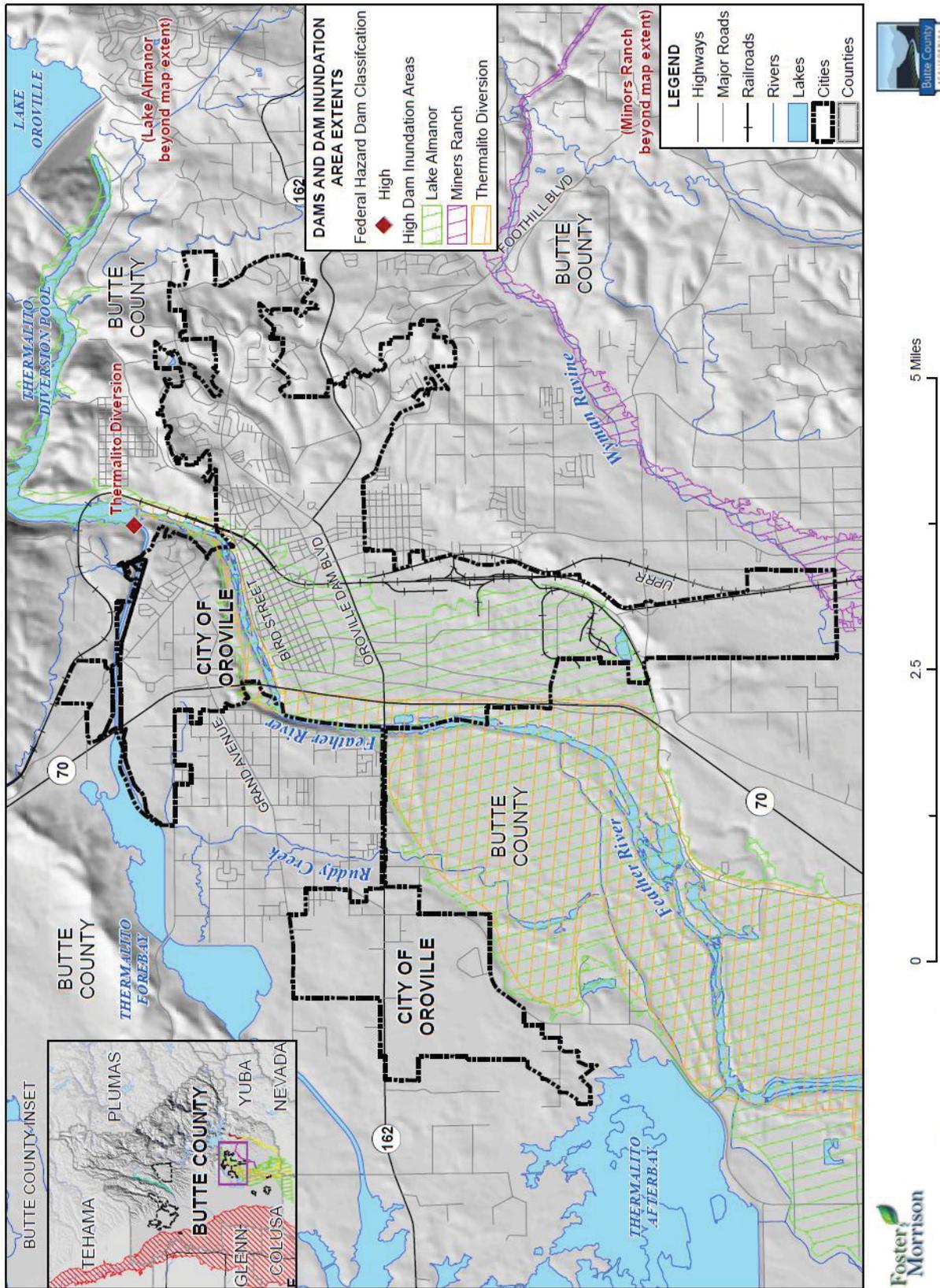


Figure D-10 City of Oroville – High Dam Inundation Areas



Data Source: Cal OES Dam Status 10/2017, Butte County GIS, Cal-Atlas; Map Date: 7/1/2019.

GIS was used to determine the possible impacts of dam failure flooding within the City of Oroville. The methodology described in Section 4.3.4 of the Base Plan was followed in determining structures and values at risk. Multiple analysis tables were created:

- Table D-17 shows the total parcel counts, improved parcel counts, their improved structure and land values in the singular extremely high hazard dam inundation area.
- Table D-18 shows the total parcel counts, improved parcel counts, their improved structure and land values in the three high hazard dam inundation areas.
- Table D-19 shows the total parcel counts, improved parcel counts, their improved structure and land values in the Oroville inundation areas.
- Table D-20 shows the total parcel counts, improved parcel counts, their improved structure and land values in the Lake Almanor dam inundation area
- Table D-21 shows the total parcel counts, improved parcel counts, their improved structure and land values in the Miner’s Ranch dam inundation area
- Table D-22 shows the total parcel counts, improved parcel counts, their improved structure and land values in the Thermalito Diversion dam inundation area

Table D-17 City of Oroville – Count and Value of Parcels in All Extremely High Hazard Dam Inundation Areas

Jurisdiction	Total Parcel Count	Improved Parcel Count	Total Land Value	Improved Structure Value	Other Value	Estimated Contents Value	Total Value
City of Oroville	6,262	4,802	\$276,524,176	\$776,873,996	\$60,972,453	\$585,978,221	\$1,584,003,840

Source: Cal OES, Butte County 3/28/2019 Parcel/Assessor’s Data

Table D-18 City of Oroville – Count and Value of Parcels in All High Hazard Dam Inundation Areas

Jurisdiction	Total Parcel Count	Improved Parcel Count	Total Land Value	Improved Structure Value	Other Value	Estimated Contents Value	Total Value
City of Oroville	1,563	1,094	\$91,571,747	\$232,439,950	\$44,211,667	\$216,261,801	\$577,213,784

Source: Cal OES, Butte County 3/28/2019 Parcel/Assessor’s Data

Table D-19 City of Oroville – Count and Value at Risk in Oroville Dam Inundation Area by Property Use

Property Use	Total Parcel Count	Improved Parcel Count	Total Land Value	Improved Structure Value	Other Value	Estimated Contents Value	Total Value
Agricultural	6	0	\$658,274	\$0	\$7,947	\$0	\$666,221
Commercial	1,007	678	\$100,544,300	\$315,471,114	\$18,639,996	\$315,471,114	\$657,575,440
Industrial	221	71	\$25,400,597	\$39,962,799	\$42,318,610	\$59,944,199	\$191,571,855
Residential	4,873	4,051	\$149,856,487	\$421,125,817	\$5,900	\$210,562,909	\$733,812,671
Unknown	155	2	\$64,518	\$314,266	\$0	\$0	\$377,654
City of Oroville Total	6,262	4,802	\$276,524,176	\$776,873,996	\$60,972,453	\$585,978,221	\$1,584,003,840

Source: Cal OES, Butte County 3/28/2019 Parcel/Assessor's Data

Table D-20 City of Oroville – Count and Value at Risk in Lake Almanor Dam Inundation Area by Property Use

Property Use	Total Parcel Count	Improved Parcel Count	Total Land Value	Improved Structure Value	Other Value	Estimated Contents Value	Total Value
Agricultural	0	0	\$0	\$0	\$0	\$0	\$0
Commercial	588	389	\$48,610,851	\$129,523,449	\$3,349,747	\$129,523,449	\$291,312,775
Industrial	147	48	\$21,260,503	\$35,437,234	\$40,861,920	\$53,155,851	\$174,080,348
Residential	749	655	\$21,616,845	\$67,165,001	\$0	\$33,582,501	\$111,422,847
Unknown	78	2	\$63,388	\$314,266	\$0	\$0	\$377,654
City of Oroville Total	1,562	1,094	\$91,551,587	\$232,439,950	\$44,211,667	\$216,261,801	\$577,193,624

Source: Cal OES, Butte County 3/28/2019 Parcel/Assessor's Data

Table D-21 City of Oroville – Count and Value at Risk in Miner's Ranch Dam Inundation Area by Property Use

Property Use	Total Parcel Count	Improved Parcel Count	Total Land Value	Improved Structure Value	Other Value	Estimated Contents Value	Total Value
Agricultural	0	0	\$0	\$0	\$0	\$0	\$0
Commercial	1	0	\$20,160	\$0	\$0	\$0	\$20,160
Industrial	0	0	\$0	\$0	\$0	\$0	\$0
Residential	0	0	\$0	\$0	\$0	\$0	\$0
Unknown	0	0	\$0	\$0	\$0	\$0	\$0
City of Oroville Total	1	0	\$20,160	\$0	\$0	\$0	\$20,160

Source: Cal OES, Butte County 3/28/2019 Parcel/Assessor's Data

Table D-22 City of Oroville – Count and Value at Risk in Thermalito Diversion Dam Inundation Area by Property Use

Property Use	Total Parcel Count	Improved Parcel Count	Total Land Value	Improved Structure Value	Other Value	Estimated Contents Value	Total Value
Agricultural	0	0	\$0	\$0	\$0	\$0	\$0
Commercial	6	2	\$212,547	\$291,443	\$184,125	\$291,443	\$982,248
Industrial	9	1	\$331,356	\$150,858	\$0	\$226,287	\$708,501
Residential	14	2	\$584,056	\$385,261	\$0	\$192,631	\$1,157,948
Unknown	8	0	\$0	\$0	\$0	\$0	\$0
City of Oroville Total	37	5	\$1,127,959	\$827,562	\$184,125	\$710,361	\$2,848,697

Source: Cal OES, Butte County 3/28/2019 Parcel/Assessor's Data

Population at Risk

The Cal OES dam inundation areas were overlaid on the parcel layer. Those residential parcel centroids that intersect the dam inundation zones were counted and multiplied by the 2010 Census Bureau average household factors for Oroville – 2.60. According to this analysis, there is a total population of 0 residents of the City at risk to dam failure flooding from these four dams. This is shown in Table D-43.

Table D-23 City of Oroville – Count of Improved Residential Parcels and Population by Flood Zone

Jurisdiction	Oroville Dam Inundation Area		Lake Almanor Dam Inundation Area		Miner's Ranch Dam Inundation Area		Thermalito Diversion Dam Inundation Area	
	Improved Residential Parcels	Population	Improved Residential Parcels	Population	Improved Residential Parcels	Population	Improved Residential Parcels	Population
Oroville	4,051	10,533	655	1,703	0	0	2	5

Source: FEMA DFIRM 1/6/2011, Butte County 3/28/2019 Parcel/Assessor's Data, US Census Bureau

Critical Facilities at Risk

An analysis was performed on the critical facility inventory in Oroville in identified dam inundation areas. GIS was used to determine whether the facility locations intersects a Cal OES dam inundation area. Details of critical facilities in extremely high hazard dam inundation areas in the City of Oroville are shown in Figure D-11 and detailed in Table D-24. Details of critical facilities in high hazard dam inundation areas in the City of Oroville are shown in Figure D-12 and detailed in Table D-25. Details of critical facility definition, type, name and address and jurisdiction by flood zone are listed in Appendix F.

Figure D-11 City of Oroville - Critical Facilities in Extremely High Hazard Dam Inundation Areas

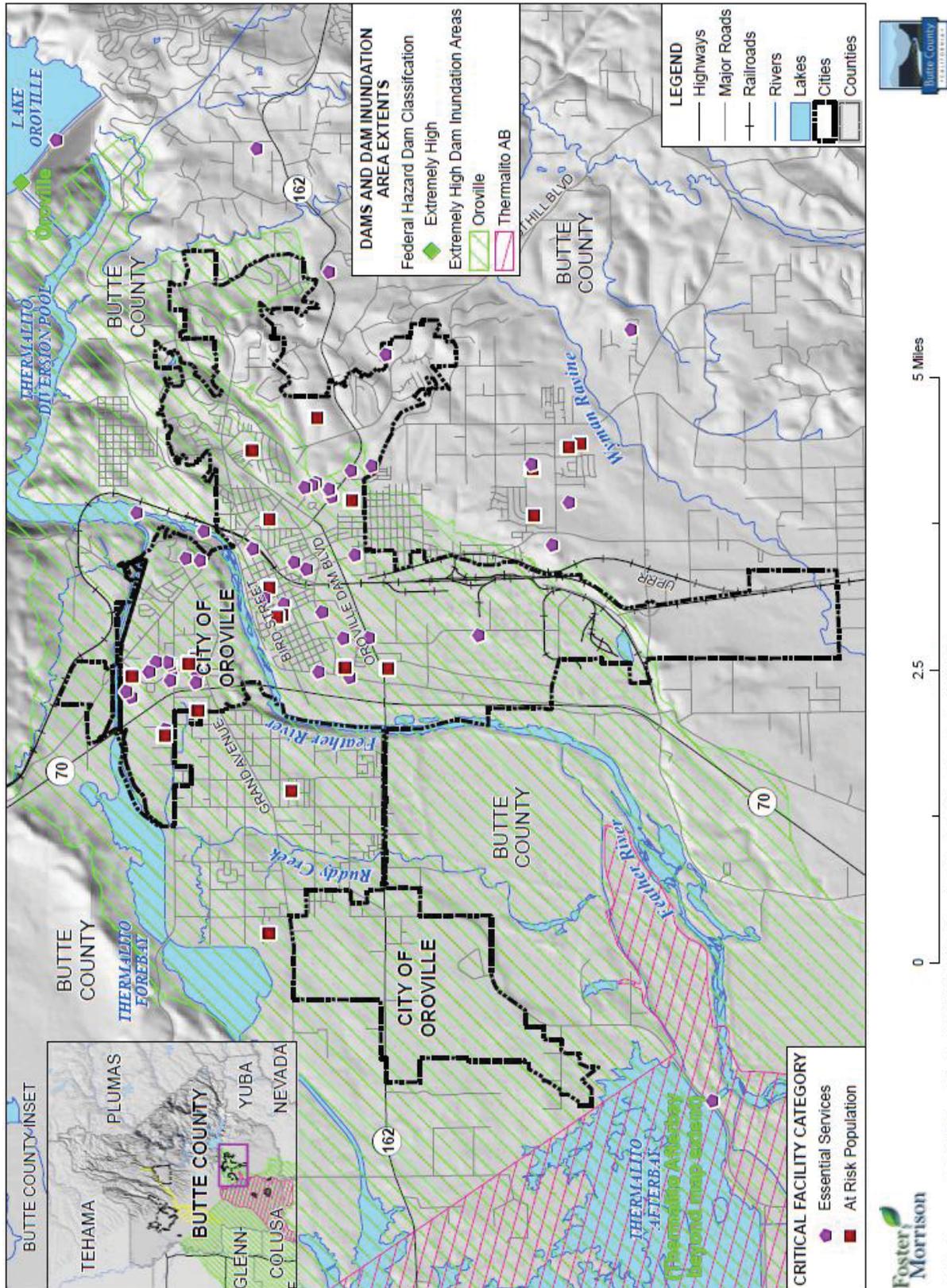


Table D-24 City of Oroville – Critical Facilities in Extremely High Hazard Dam Inundation Areas

Critical Facility Category	Facility Count
Essential Services Facilities	3
At Risk Population Facilities	4
City of Oroville Total	7

Source: Cal OES, Butte County GIS

Figure D-12 City of Oroville - Critical Facilities in High Hazard Dam Inundation Areas

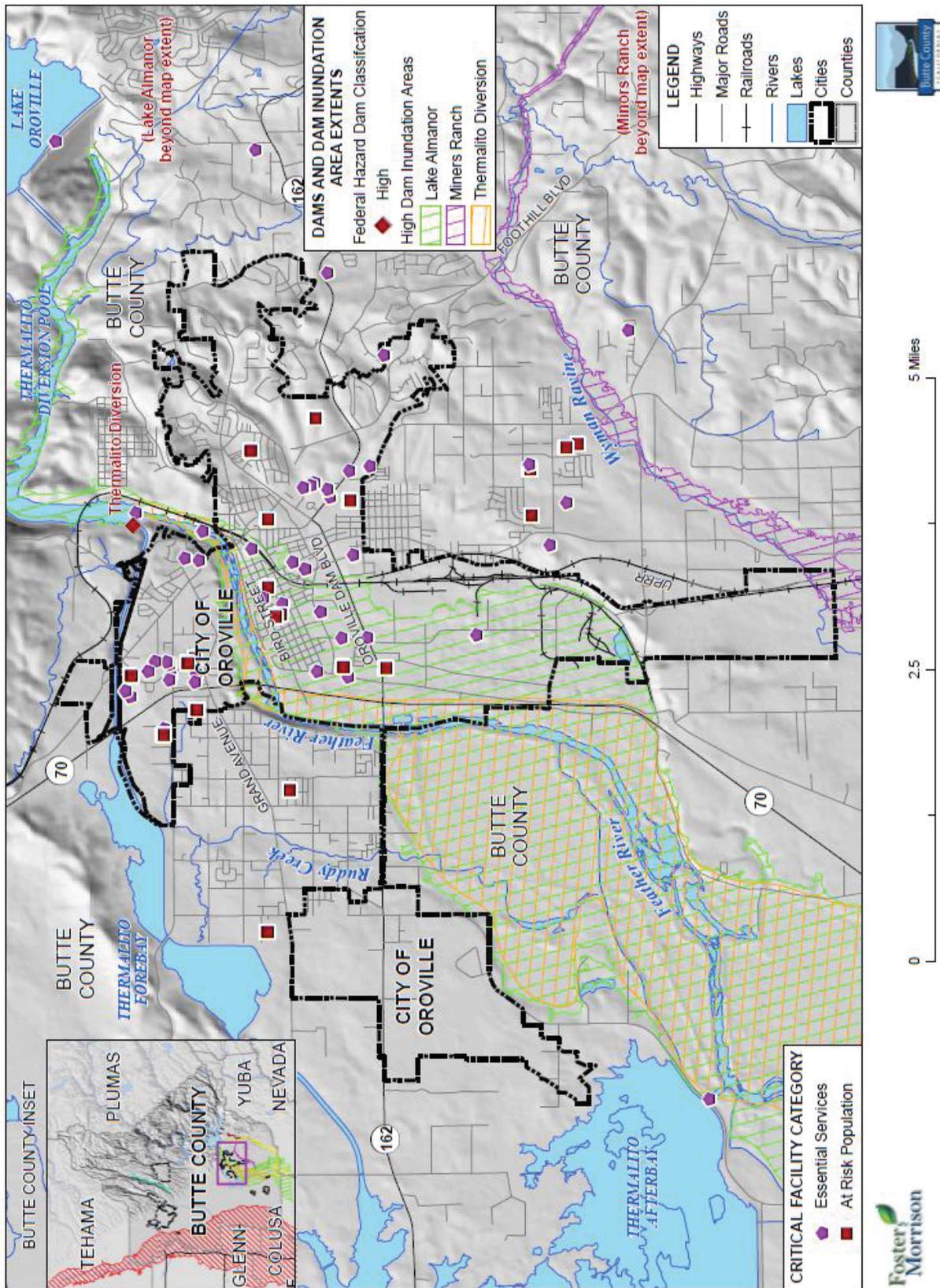


Table D-25 City of Oroville – Critical Facilities in High Hazard Dam Inundation Areas

Critical Facility Category	Facility Count
Essential Services Facilities	9
At Risk Population Facilities	6
City of Oroville Total	15

Source: Cal OES, Butte County GIS

Future Development

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

GIS Analysis

Butte County’s 3/21/2019 Assessor Data and the County’s GIS parcel data were used as the basis for the inventory of assessed values for both improved and unimproved parcels within the City. Using GIS, the 260 parcels associated with future development projects for which the analysis was to be performed was identified. Future development in extremely high hazard dam inundation areas is shown on Figure D-13 and detailed in Table D-26. Future development in high hazard dam inundation areas is shown on Figure D-13 and detailed in Table D-27,

Figure D-13 City of Oroville – Future Development in Extremely High Hazard Dam Inundation Areas

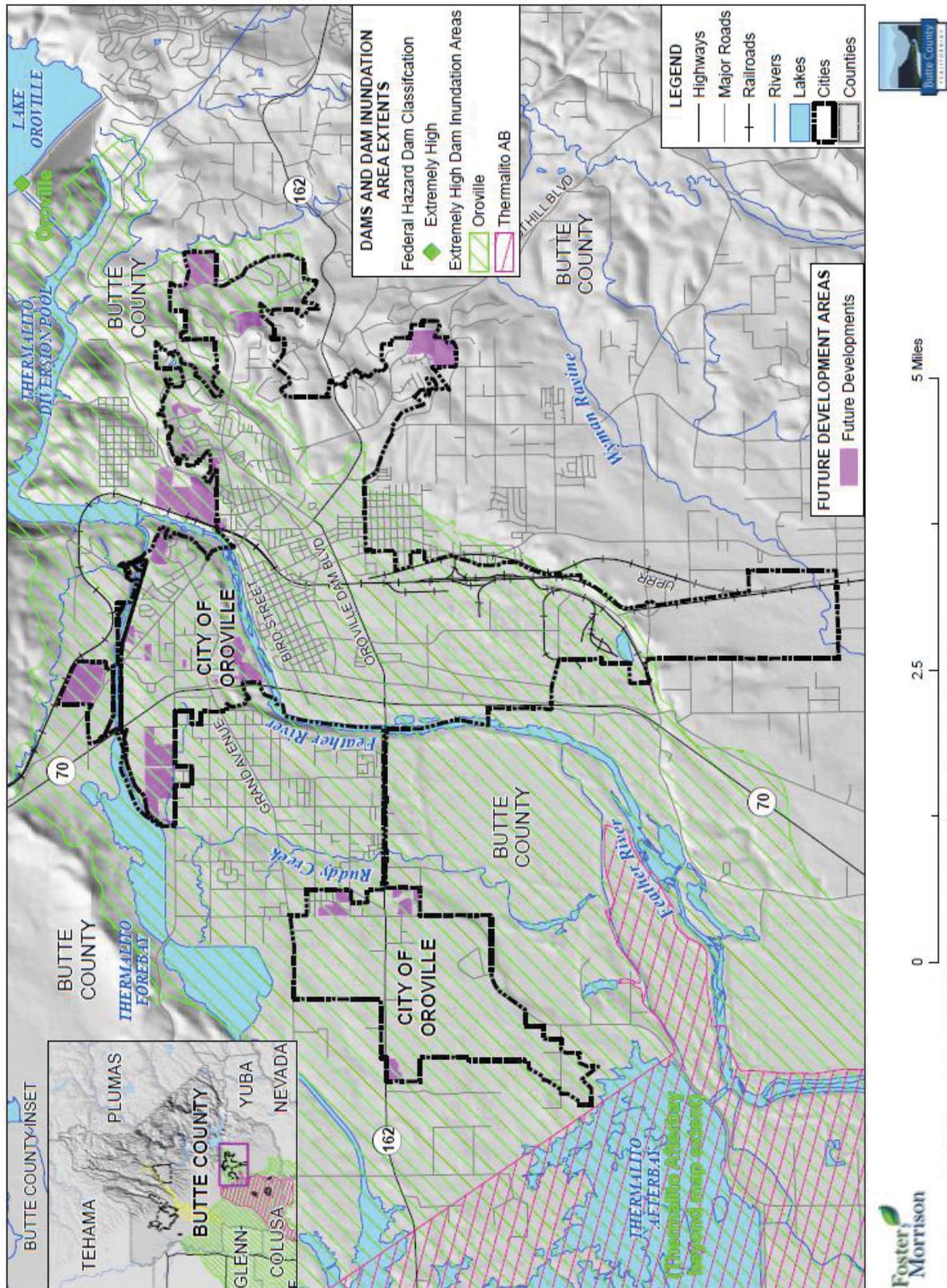
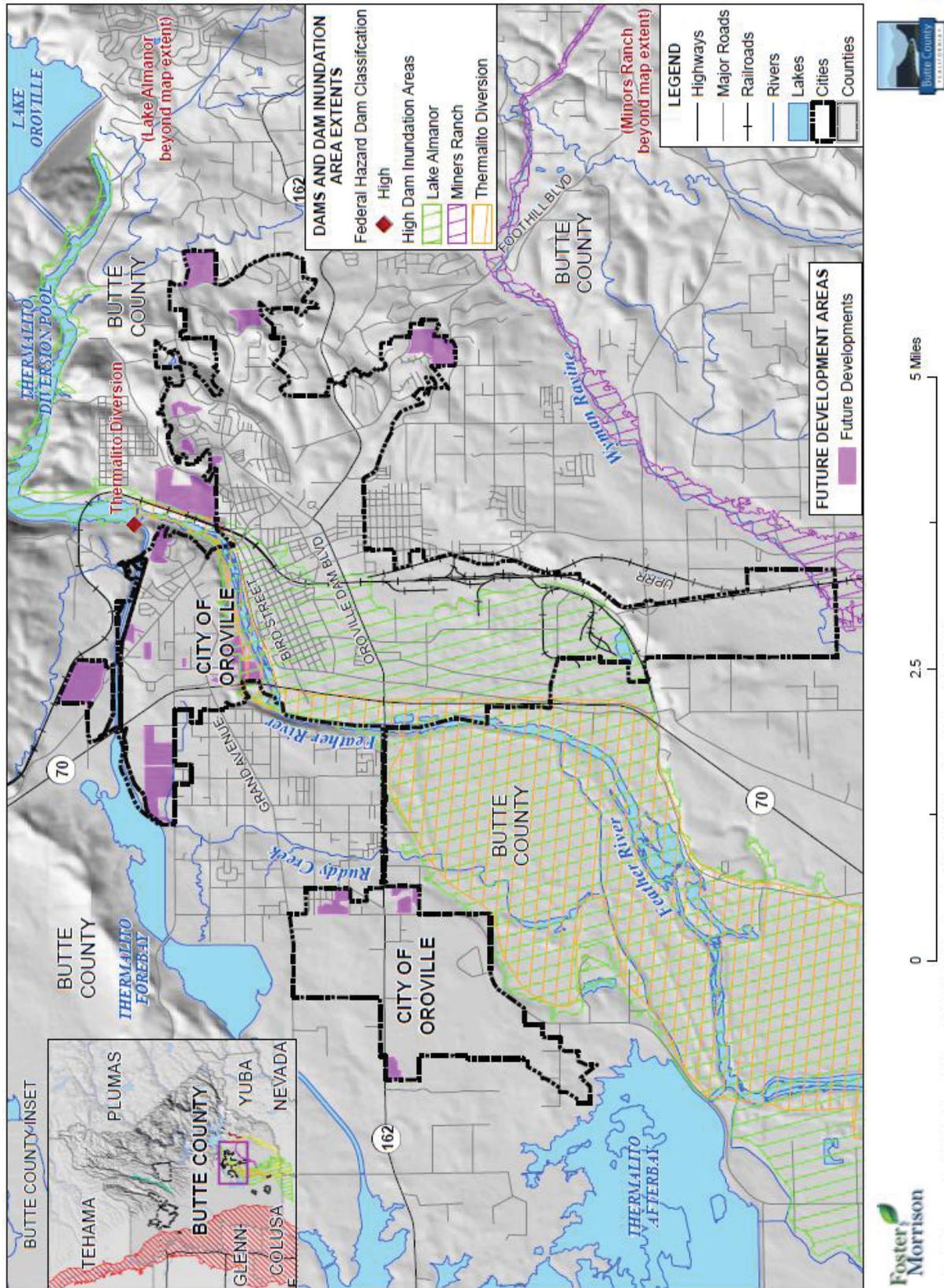


Table D-26 City of Oroville – Future Development Parcel Counts and Acreage in Extremely High Dam Inundation Areas

Extremely High Dam Inundation Area / Future Development	Total Parcel Count	Improved Parcel Count	Total Acres
Oroville Dam			
City of Oroville			
Acacia Estates	2	0	6.7
Calle Vista Estates Unit II	48	44	24.4
Canal View Estates	3	0	8.4
Deer Creek Estates 2	3	0	24.3
Forebay Estates	1	0	40.2
Greenview Estates	1	1	1.9
Heritage Oak Estates	3	1	46.5
Highlands Estates	1	0	13.3
Linkside Place Phase I	66	6	11.5
Martin Ranch	1	0	73.1
Mission Olive Ranch	20	2	6.8
Nelson 56	1	0	56.5
Oak Park	1	0	5.1
Rivers Edge	1	0	10.3
Riverview	4	0	38.8
Rosewood Estates	1	0	5.0
Vista Del Oro	95	22	15.2
Oroville Dam Total	252	76	387.9
Unincorporated Butte County			
Oak Park	3	0	94.3
Unincorporated Butte County Total	3	0	94.3
Extremely High Dam Inundation Area Total			
	255	76	482.1

Source: Cal OES, City of Oroville GIS, Butte County 3/28/2019 Parcel/Assessor's Data

Figure D-14 City of Oroville – Future Development in High Hazard Dam Inundation Areas



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 the City of Oroville to drought is City-wide, but impacts may vary and include reduction in water supply and an increase in dry fuels. The increased dry fuels result in an increased fire danger. Areas of Oroville are in the foothill interface and become more susceptible to wildfire as drought conditions increase. Residents of these areas are often times dependent upon ground water (water wells), as these water wells begin to fail the ability of the residents to water landscaping decreases, fire fuel loads increase.

Impacts

The most significant qualitative impacts associated with drought in the planning area are those related to water intensive activities such as wildfire protection, municipal usage, commerce, tourism, and recreation. Voluntary 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.

Future Development

As the population in the area continues to grow, so will the demand for water. Water shortages in the future may be worsened by drought. Increased planning will be needed to account for population growth and increased water demands.

Earthquake (minor/major) and Liquefaction

Likelihood of Future Occurrence—Occasional/Unlikely
Vulnerability—Medium

Hazard Profile and Problem Description

The State of California has identified five areas of critical seismic concern including surface ruptures, ground shaking, ground failure, tsunamis, and seiches. Each of these is caused by earthquake activity thereby creating hazards for life and property, which has the potential anywhere in California. Oroville is not at risk for tsunamis or seiches due to its inland location and the absence of nearby large bodies of water. Due to the proximity of the City to the Cleveland Hills Fault, the City can expect low to medium intensity shocks from time to time. These earthquakes can cause liquefaction within the City. Liquefaction is a process whereby soil is temporarily transformed to a fluid formed during intense and prolonged ground shaking.

Location and Extent

Since earthquakes are regional events, the whole of the City is at risk to earthquake. Chico and the surrounding area are relatively free from significant seismic and geologic hazards. There are no known or inferred active faults within the City. The only known active fault in Butte County is the Cleveland Hills fault, the site of the August 1975 Oroville earthquake. This earthquake had a Richter magnitude of 5.7. Due

to the proximity of the City to the nearby Cleveland Hills Fault, the City can expect low to medium intensity shocks from time to time.

The amount of energy released during an earthquake is usually expressed as a magnitude and is measured directly from the earthquake as recorded on seismographs. An earthquake’s magnitude is expressed in whole numbers and decimals (e.g., 6.8). Seismologists have developed several magnitude scales, as discussed in Section 4.2.10 of the Base Plan.

The City of Oroville 2030 General Plan Safety Element noted that in addition to mapped known faults, there are a large number of other faults within Butte County and in neighboring areas that could be considered potentially active, based on criteria developed by the California Department of Mines and Geology. Within Butte County, faults that are considered by some geologists to be potentially active include the Big Bend fault, which is thought to be capable of generating an earthquake of up to magnitude 7.0 in Butte County; the Foothill shear zone, which extends into southern Butte County, and the Chico monocline fault, which could produce an earthquake of up to magnitude 7.0, having the most significant impacts in the Chico area but which could also severely affect other parts of the county, including Oroville. Other mapped, active faults in the wider region, outside of Butte County, have the potential to generate seismic activity that could be felt in Oroville. These include:

- The Midland-Schweitzer Fault, an approximately 80-mile-long fault found about 60 miles southwest of Oroville.
- The northern section of the 350-mile long San Andreas Fault located about 115 miles west of Oroville.
- The Hayward-Calaveras Fault complex in the San Francisco Bay Area, located approximately 120 miles southwest of Oroville.
- The Russell Fault, located about 70 miles east of Oroville, which was associated with a major earthquake of up to magnitude 6.5 in 1966.
- The Last Chance-Honey Lake Fault located along the California/Nevada border to the east of Oroville.
- The Willows fault is located about 30 miles west of the Oroville, and the Coast Ranges thrust zone is located about 60 miles west of the City.

Another measure of earthquake severity is intensity. Intensity is an expression of the amount of shaking at any given location on the ground surface. Seismic shaking is typically the greatest cause of losses to structures during earthquakes. The City is located in an area where few earthquakes of significant magnitude occur, so both magnitude and intensity of earthquakes are expected to remain low. Geographical liquefaction potential extents for the City of Oroville from the Butte County 2030 General Plan are shown in Table D-28.

Table D-28 City of Oroville – Geographical Extents of Liquefaction Potential by Jurisdiction

Liquefaction Potential	Total Acres	% of Total Acres	Improved Acres	% of Total Improved Acres	Unimproved Acres	% of Total Unimproved Acres
Generally High	0	0.00%	0	0.00%	0	0.00%
Generally Moderate	2,586	32.73%	1,100	13.92%	1,486	18.81%
Generally Low	5,212	65.97%	1,782	22.55%	3,430	43.41%

Source: Butte County General Plan 2030

Past Occurrences

As shown in the Base Plan, only the 1975 5.7 Oroville earthquake federal disaster declaration has occurred in the County. The HMPC noted no other past occurrences of earthquakes or liquefaction that affected the City in any meaningful way.

Vulnerability to Earthquake and Liquefaction

Seismic events can have particularly negative effects on older buildings constructed of unreinforced masonry (URM), including materials such as brick, concrete and stone. The Uniform Building Code (UBC) identifies four seismic zones in the United States. The zones are numbered one through four, with Zone 4 representing the highest level of seismic hazard. The UBC establishes more stringent construction standards for areas within Zones 3 and 4. All of California lies within either Zone 3 or Zone 4. The City of Oroville is within the less hazardous Zone 3.

The General Plan Safety Element noted that where older alluvial sediments underlie the Planning Area, liquefaction potential is considered to be low. Since soils must be saturated to be at risk of liquefaction, the areas in Oroville most susceptible to liquefaction include areas within the FEMA 1% annual chance flood zone along the Feather River and other drainages, and where there are high groundwater levels.

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. There are minimal amount of URM buildings within the City of Oroville and all of those buildings are privately owned.

Impacts from Earthquake and Liquefaction

The combination of plate tectonics and associated California coastal mountain range building geology essentially guarantees earthquake as a result of the periodic release of tectonic stresses. Butte County's mountainous terrain lies in the center of the North American and Pacific tectonic plate activity. There have been earthquakes as a result of this activity in the historic past, and there will continue to be earthquakes in the future of the California north coastal mountain region. The Cleveland Hills fault poses one of the more significant impact to Butte County and the City as it has the capabilities of producing a quake in the upwards of 6.5 or greater.

Fault ruptures itself contributes very little to damage unless the structure or system element crosses the active fault; however, liquefaction can occur further from the source of the earthquake. In general, newer construction is more earthquake resistant than older construction due to enforcement of improved building codes. Manufactured housing is very susceptible to damage because their foundation systems are rarely braced for earthquake motions. Locally generated earthquake motions and associated liquefaction, 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 earthquake.

Earthquake Analysis

Due to the limited amount of earthquake risk in the County and City, Hazus earthquake analysis was performed on a countywide basis only. This can be found in Section 4.3.6 of the Base Plan.

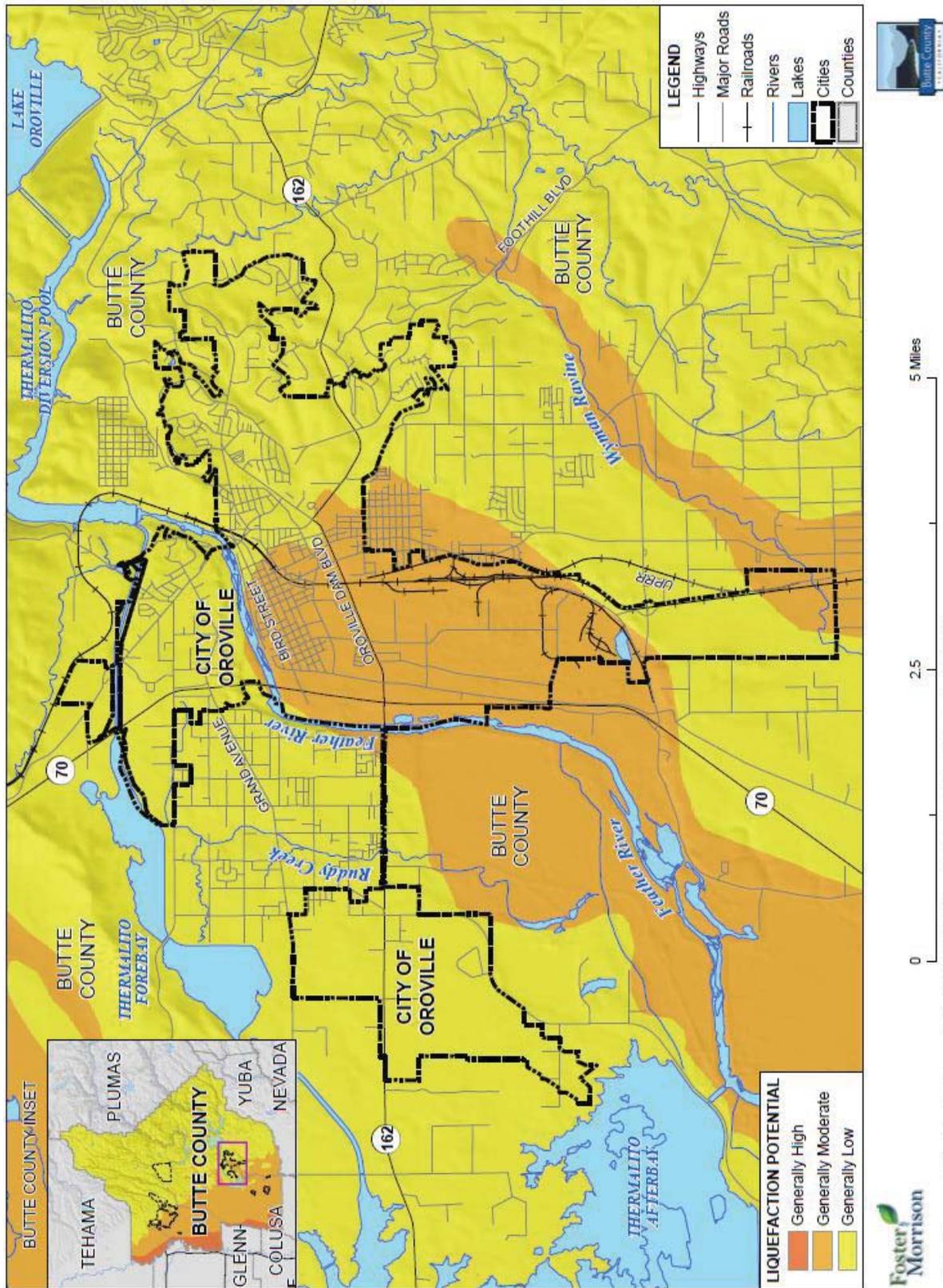
Liquefaction GIS Analysis

GIS was used to determine the possible impacts of liquefaction within the City of Oroville. The methodology described in Section 4.3.6 of the Base Plan was followed in determining structures and values at risk to the earthquake-based liquefaction.

Values at Risk

Liquefaction potential zones for the City of Oroville are shown on Figure D-15. As seen on this map, portions of the City are in the Generally Low and Moderate areas. Table D-29 gives a summary of parcel counts and values in the liquefaction area in the City of Oroville. Table D-30 shows the property use, improved parcel count, improved values, estimated contents, total values and estimated loss of parcels that fall in a liquefaction area in the City.

Figure D-15 City of Oroville – Liquefaction Potential



Data Source: Butte County General Plan 2030, Butte County GIS, Cal-Atlas, Map Date: 3/1/2019.



Table D-29 City of Oroville – County and Value of Parcels by Liquefaction Potential

Liquefaction Potential	Total Parcel Count	Improved Parcel Count	Total Land Value	Improved Structure Value	Other Value	Estimated Contents Value	Total Value
Generally Moderate	2,835	2,212	\$130,315,875	\$324,850,206	\$46,863,176	\$285,294,073	\$770,340,217
Generally Low	4,310	3,289	\$190,035,763	\$559,325,042	\$14,478,187	\$366,210,936	\$1,012,660,410
City of Oroville Total	7,145	5,501	\$320,351,638	\$884,175,248	\$61,341,363	\$651,505,009	\$1,783,000,627

Source: Butte County 2030 General Plan, Butte County 3/28/2019 Parcel/Assessor's Data

Table D-30 City of Oroville – County and Value of Parcels by Liquefaction Potential and Property Use

Liquefaction Potential / Property Use	Total Parcel Count	Improved Parcel Count	Total Land Value	Improved Structure Value	Other Value	Estimated Contents Value	Total Value
Generally Moderate							
Agricultural	0	0	\$0	\$0	\$0	\$0	\$0
Commercial	741	526	\$69,671,761	\$168,438,596	\$4,544,566	\$168,438,596	\$386,467,487
Industrial	185	66	\$23,812,762	\$38,806,805	\$42,318,610	\$58,210,208	\$187,094,035
Residential	1,812	1,618	\$36,767,964	\$117,290,539	\$0	\$58,645,270	\$196,401,042
Unknown	97	2	\$63,388	\$314,266	\$0	\$0	\$377,654
Generally Moderate Total	2,835	2,212	\$130,315,875	\$324,850,206	\$46,863,176	\$285,294,073	\$770,340,217
Generally Low							
Agricultural	9	0	\$1,291,076	\$0	\$7,947	\$0	\$1,299,023
Commercial	301	173	\$38,161,986	\$170,512,897	\$14,463,240	\$170,512,897	\$319,950,025
Industrial	42	6	\$2,244,535	\$1,291,966	\$0	\$1,937,949	\$5,474,450
Residential	3,893	3,110	\$148,337,036	\$387,520,179	\$7,000	\$193,760,090	\$685,936,912
Unknown	65	0	\$1,130	\$0	\$0	\$0	\$0
Generally Low Total	4,310	3,289	\$190,035,763	\$559,325,042	\$14,478,187	\$366,210,936	\$1,012,660,410
City of Oroville Total							
City of Oroville Total	7,145	5,501	\$320,351,638	\$884,175,248	\$61,341,363	\$651,505,009	\$1,783,000,627

Source: Butte County 2030 General Plan, Butte County 3/28/2019 Parcel/Assessor's Data

Population at Risk

The liquefaction potential areas were overlaid on the parcel layer. Those residential parcel centroids that intersect the liquefaction potential areas were counted and multiplied by the 2010 Census Bureau average household factors for Oroville – 2.60. According to this analysis, there is a total population of 4,207 residents of the City at risk to liquefaction in the Generally Moderate area, with no population in the

Generally High area. This is shown in Table D-31. The remainder of the population falls in the Generally Low area.

Table D-31 City of Oroville – Count of Improved Residential Parcels and Population by Liquefaction Potential Area

Jurisdiction	Generally Moderate		Generally High	
	Improved Residential Parcels	Population	Improved Residential Parcels	Population
Oroville	1,618	4,207	0	0

Source: Butte County 2030 General Plan, Butte County 3/28/2019 Parcel/Assessor's Data, US Census Bureau

Critical Facilities at Risk

An analysis was performed on the critical facility inventory in Oroville in identified liquefaction potential areas. GIS was used to determine whether the facility locations intersects a USGS liquefaction area. Details of critical facilities in a liquefaction potential areas in the City of Oroville are shown in Figure D-16 and detailed in Table D-32. Details of critical facility definition, type, name and address and jurisdiction by liquefaction potential area are listed in Appendix F.

Figure D-16 City of Oroville – Critical Facilities in Liquefaction Potential Areas

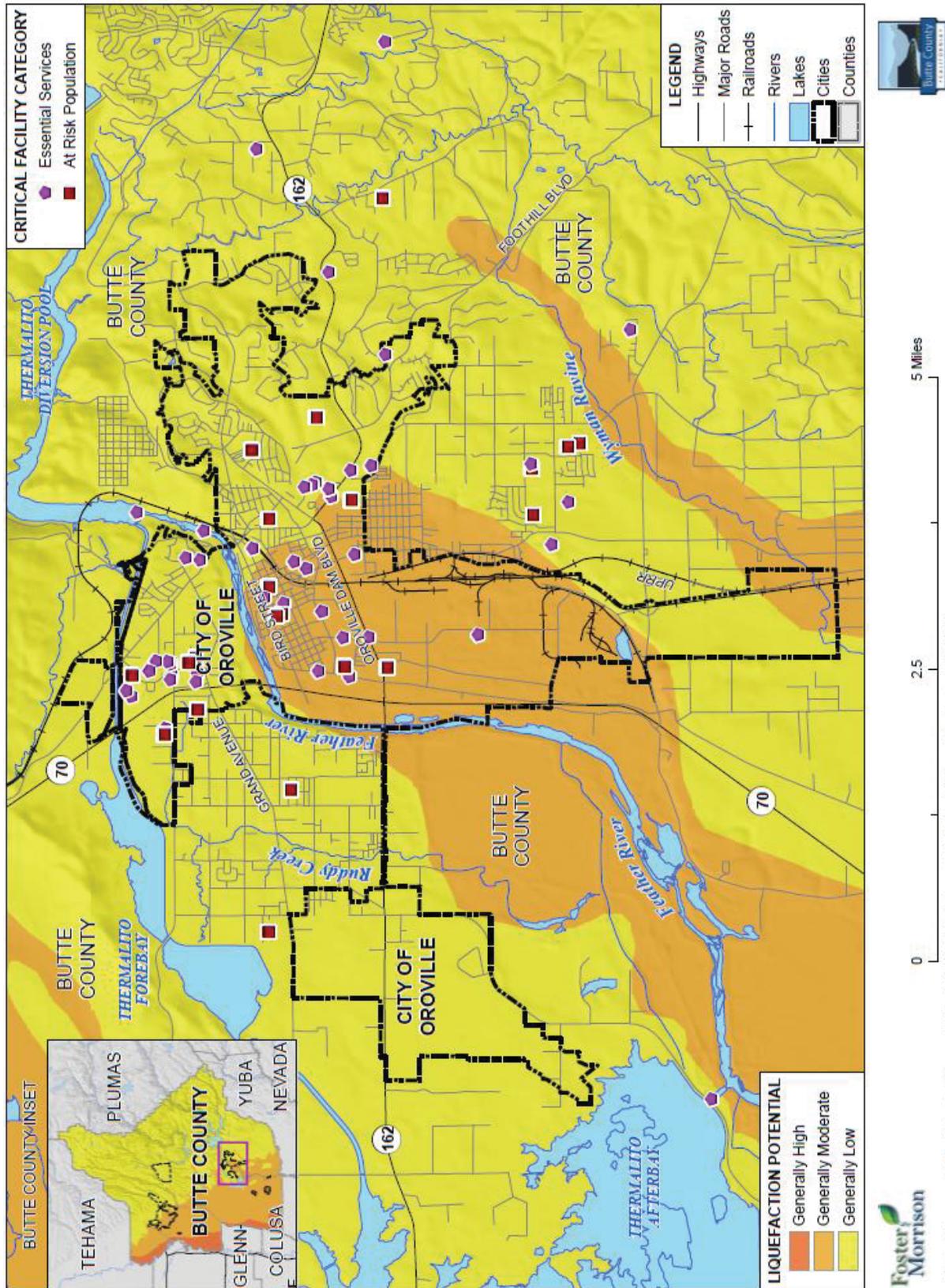


Table D-32 City of Oroville – Critical Facilities by Liquefaction Potential

Liquefaction Potential/ Critical Facility Category / Critical Facility Type	Facility Count
Generally Moderate	
Essential Services Facilities	
Wastewater Treatment Plant	1
Health Care	13
Law Enforcement	1
Logistics Hub	3
Essential Services Facilities Total	18
At Risk Population Facilities	
School	2
At Risk Population Facilities Total	6
Generally Moderate Total	24
Generally Low	
Essential Services Facilities	
Fire	3
Health Care	2
Law Enforcement	2
Public Assembly Point / Evacuation Center	2
Radio Sites	3
Logistics Hub	3
Emergency Operation Center	1
DOC	1
Emergency Animal Shelter	1
Essential Services Facilities Total	22
At Risk Population Facilities	
School	2
At Risk Population Facilities Total	14
Generally Low Total	36
Grand Total	
	60

Source: Butte County General Plan, Butte County GIS

Future Development

Although new growth and development corridors would fall in the area affected by earthquake and liquefaction, given the small chance of major earthquake and the building codes in effect, development in the earthquake area will continue to occur. The City enforces the state building code, which mandates construction techniques that minimize seismic hazards. Future development in the City is subject to these building codes.

GIS Analysis

Butte County’s 3/21/2019 Assessor Data and the County’s GIS parcel data were used as the basis for the inventory of assessed values for both improved and unimproved parcels within the City. Using GIS, the 260 parcels associated with future development projects for which the analysis was to be performed was identified. Future development in liquefaction potential inundation areas is shown on Figure D-17 and detailed in Table D-33.

Figure D-17 City of Oroville – Future Development in Liquefaction Potential Areas

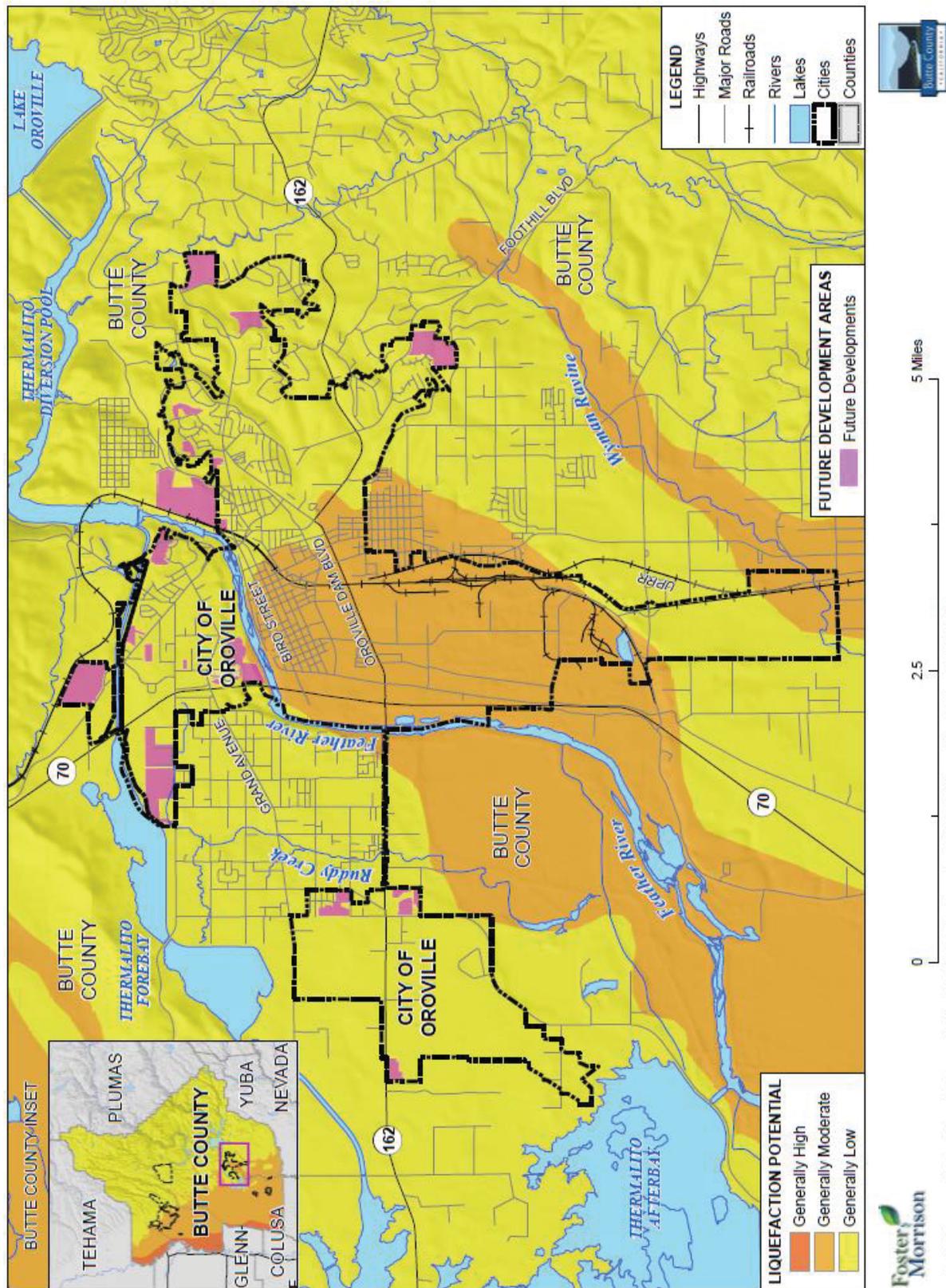


Table D-33 City of Oroville – Future Development Parcel Counts and Acreage in Liquefaction Potential Areas

Liquefaction Areas/ Future Development	Total Parcel Count	Improved Parcel Count	Total Acres
Generally Low			
City of Oroville			
Acacia Estates	2	0	6.7
Buttewoods 2	3	0	56.1
Calle Vista Estates Unit II	48	44	24.4
Canal View Estates	3	0	8.4
Deer Creek Estates 2	3	0	24.3
Ford Drive	2	0	22.4
Forebay Estates	1	0	40.2
Greenview Estates	1	1	1.9
Heritage Oak Estates	3	1	46.5
Highlands Estates	1	0	13.3
Linkside Place Phase I	66	6	11.5
Martin Ranch	1	0	73.1
Mission Olive Ranch	20	2	6.8
Nelson 56	1	0	56.5
Oak Park	1	0	5.1
Rivers Edge	1	0	10.3
Riverview	4	0	38.8
Rosewood Estates	1	0	5.0
Vista Del Oro	95	22	15.2
City of Oroville Total	257	76	466.4
Unincorporated Butte County			
Oak Park	3	0	94.3
Unincorporated Butte County Total	3	0	94.3
Grand Total			
	260	76	560.6

Source: Butte County General Plan 2030, City of Oroville GIS, Butte County 3/28/2019 Parcel/Assessor’s Data

Flood: 100/200/500-Year

**Likelihood of Future Occurrence–Occasional/Unlikely
Vulnerability–Medium**

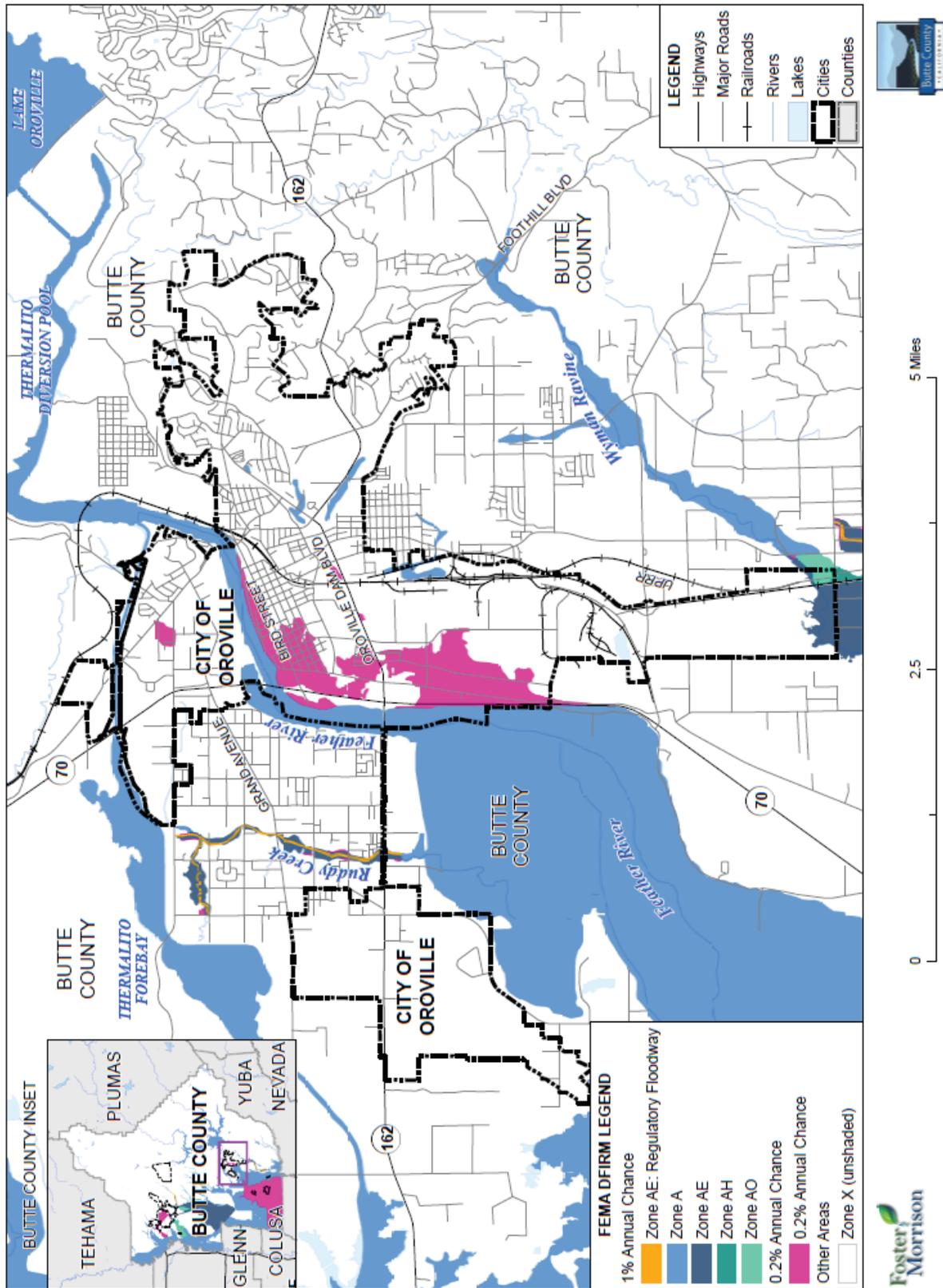
Hazard Profile and Problem Description

Flooding is an important concern throughout the entire Oroville Planning Area, with flooding hazards associated with dam failure and release of water, and flooding associated with major waterways. As previously described in Section 4.2.11 of the Base Plan, the Butte County Planning Area and the City of Oroville have been subject to historical flooding. The City of Oroville General Plan Safety Element noted that the Oroville area has historically been subject to flooding from various rivers and creeks found within the Planning Area, most particularly from the Feather River and its tributaries. Local flooding was much more prevalent prior to the construction of the Oroville Dam and its related flood control projects, which have helped to protect Oroville and many other areas of the County from serious flooding in recent years.

Location and Extent

The City of Oroville is located inside both the FEMA 1% and 0.2% annual chance flood zones. The City does not have any mapped 0.5% (200-year) flood zones. This is seen in Figure D-18.

Figure D-18 City of Oroville – FEMA DFIRM Flood Zones



Additionally, flood extents can be measured in volume, velocity, and depths of flooding. Expected flood depths in the City vary, depending on the nature and extent of a flood event; specific depths are unknown. Flood durations in the City tend to be short to medium term, or until either the storm drainage system can catch up or flood waters move downstream. Flooding in the City tends to have a shorter speed of onset, due to the amount of water that flows through the City. Geographical flood extent from the FEMA DFIRMs is shown in Table D-34.

Table D-34 City of Oroville – Geographical Flood Hazard Extents in FEMA DFIRM Flood Zones

Flood Zone	Total Acres	% of Total Acres	Improved Acres	% of Total Improved Acres	Unimproved Acres	% of Total Unimproved Acres
1% Annual Chance Flood Hazard	1,382	17.49%	67	0.85%	1,315	16.64%
0.2% Annual Chance Flood Hazard	924	11.69%	394	4.99%	530	6.71%
Other Areas	7,801	98.73%	2,753	34.84%	5,048	63.89%

Source: Butte County 1/16/2011 DFIRM

Past Occurrences

A list of state and federal disaster declarations for Butte County from flooding is shown on Table D-35. These events also affected Oroville.

Table D-35 Butte County – State and Federal Disaster Declaration from Flood 1950-2018

Disaster Type	Federal Declarations		State Declarations	
	Count	Years	Count	Years
Flood (including heavy rain and storms)	17	1955, 1958, 1962, 1964, 1969, 1970, 1982, 1986, 1995 (twice), 1997, 1998, 2005, 2017 (three times), 2019	17	1950, 1955, 1958 (twice), 1962, 1963, 1969, 1970, 1982, 1986, 1990, 1995 (twice), 1997, 1998, 2008, 2017

Source: Cal OES, FEMA

The City also noted that the following events had affects and damages to the City:

- The City suffered minor damages during the 2017 Oroville dam disaster. No deaths or injuries occurred. No critical facilities were damaged.

Vulnerability to Flood

The General Plan Safety Element noted that the Oroville area has historically been subject to flooding from various rivers and creeks found within the Planning Area, most particularly from the Feather River and its tributaries. Local flooding was much more prevalent prior to the construction of the Oroville Dam and its

related flood control projects, which have helped to protect Oroville and many other areas of the County from serious flooding in recent years.

However, flooding remains an issue which regulatory agencies, the City and Butte County are seeking to address, in part through mapping of flood hazard areas and study of flooding hazards. Locally, Butte County, in consultation with the City of Oroville, has completed an assessment of flooding hazards as part of a Flood Mitigation Plan. This includes the Feather River and Lower Honcut Creek Watersheds.

Impacts

Floods are among the costliest natural disasters in terms of human hardship and economic loss nationwide. Floods can cause substantial damage to structures, landscapes, and utilities as well as life safety issues. Floods can be extremely dangerous, and even six inches of moving water can knock over a person given a strong current. A car will float in less than two feet of moving water and can be swept downstream into deeper waters. This is one reason floods kill more people trapped in vehicles than anywhere else. During a flood, people can also suffer heart attacks or electrocution due to electrical equipment short outs. Floodwaters can transport large objects downstream which can damage or remove stationary structures, such as dam spillways. Ground saturation can result in instability, collapse, or other damage. Objects can also be buried or destroyed through sediment deposition. Floodwaters can also break utility lines and interrupt services. Standing water can cause damage to crops, roads, foundations, and electrical circuits. Direct impacts, such as drowning, can be limited with adequate warning and public education about what to do during floods. Where flooding occurs in populated areas, warning and evacuation will be of critical importance to reduce life and safety impacts from any type of flooding.

Normally, storm floodwaters are kept within defined limits by a variety of storm drainage and flood control measures in the City. Occasionally, extended heavy rains result in floodwaters that exceed normal high-water boundaries and cause damage. Flooding has occurred both within the 1% and 0.2% annual chance floodplains and in other localized areas. The vulnerability of the City to severe flooding is high as it can result in significant life safety, property damage, environmental, and economic impacts to the City.

Based on the vulnerability of Oroville to the flood hazard, the sections that follow describes significant assets at risk in the City of Oroville.

Values at Risk

GIS was used to determine the possible impacts of flooding within the City of Oroville. The methodology described in Section 4.3.7 of the Base Plan was followed in determining structures and values at risk to the 1% (100-year) and 0.2% (500-year) annual chance flood event. Analysis is presented in two parts:

- Summarized for the City by DFIRM Flood Zone
- Grouped by watershed and DFIRM Flood Zone

Values for Oroville Summarized by DFIRM Flood Zone

Table D-36 is a summary table for the City of Oroville. Parcel counts, values, estimated contents, and total values in the City are shown for the 1% and 0.2% annual chance flood zones, as well as for those properties

that fall outside of the mapped FEMA DFIRM flood zones. Table D-37 breaks down Table D-36 and shows the property use, improved parcel count, improved values, estimated contents, and total values that fall in each floodplain in the City.

Table D-36 City of Oroville – Count and Value of Parcels at Risk in Summary DFIRM Flood Zones

Flood Zone	Total Parcel Count	Improved Parcel Count	Total Land Value	Improved Structure Value	Other Value	Estimated Contents Value	Total Value
1% Annual Chance Flood Hazard	94	51	\$6,584,673	\$15,062,584	\$358,940	\$12,087,296	\$32,245,879
0.2% Annual Chance Flood Hazard	604	452	\$43,419,507	\$91,016,487	\$2,052,234	\$78,213,094	\$214,554,239
Other Areas	6,447	4,998	\$270,347,458	\$778,096,177	\$58,930,189	\$561,204,619	\$1,536,200,509
City of Oroville Total	7,145	5,501	\$320,351,638	\$884,175,248	\$61,341,363	\$651,505,009	\$1,783,000,627

Source: Butte County 1/16/2011 DFIRM, Butte County 3/28/2019 Parcel/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 flood zone, exclusive of the 1% annual chance flood zone. The 0.2% annual chance flood, in actuality, also includes all parcels in the 1% annual chance flood zone.

Table D-37 City of Oroville – Count and Values of Parcels at Risk by Detailed Flood Zone and Property Use

Flood Zone / Property Use	Total Parcel Count	Improved Parcel Count	Total Land Value	Improved Structure Value	Other Value	Estimated Contents Value	Total Value
1% Annual Chance Flood Hazard							
Agricultural	1	0	\$122,499	\$0	\$0	\$0	\$122,499
Commercial	33	22	\$4,445,872	\$9,112,008	\$358,940	\$9,112,008	\$21,176,711
Industrial	3	0	\$0	\$0	\$0	\$0	\$0
Residential	47	29	\$2,016,302	\$5,950,576	\$0	\$2,975,288	\$10,946,669
Unknown	10	0	\$0	\$0	\$0	\$0	\$0
1% Annual Chance Total	94	51	\$6,584,673	\$15,062,584	\$358,940	\$12,087,296	\$32,245,879
0.2% Annual Chance Flood Hazard							
Agricultural	0	0	\$0	\$0	\$0	\$0	\$0
Commercial	156	96	\$24,189,383	\$52,163,843	\$2,002,854	\$52,163,843	\$131,559,143
Industrial	63	17	\$8,777,399	\$6,715,749	\$49,380	\$10,073,624	\$25,649,422
Residential	370	338	\$10,406,825	\$31,951,255	\$0	\$15,975,628	\$57,114,135
Unknown	15	1	\$45,900	\$185,640	\$0	\$0	\$231,540

Flood Zone / Property Use	Total Parcel Count	Improved Parcel Count	Total Land Value	Improved Structure Value	Other Value	Estimated Contents Value	Total Value
0.2% Annual Chance Total	604	452	\$43,419,507	\$91,016,487	\$2,052,234	\$78,213,094	\$214,554,239
Other Areas							
Agricultural	8	0	\$1,168,577		\$7,947		\$1,176,524
Commercial	853	581	\$79,198,492	\$277,675,642	\$16,646,012	\$277,675,642	\$553,681,658
Industrial	161	55	\$17,279,898	\$33,383,022	\$42,269,230	\$50,074,533	\$166,919,063
Residential	5,288	4,361	\$172,681,873	\$466,908,887	\$7,000	\$233,454,444	\$814,277,150
Unknown	137	1	\$18,618	\$128,626			\$146,114
Other Areas Total	6,447	4,998	\$270,347,458	\$778,096,177	\$58,930,189	\$561,204,619	\$1,536,200,509
Grand Total							
Grand Total	7,145	5,501	\$320,351,638	\$884,175,248	\$61,341,363	\$651,505,009	\$1,783,000,627

Source: Butte County 1/16/2011 DFIRM, Butte County 3/28/2019 Parcel/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 flood zone, exclusive of the 1% annual chance flood zone. The 0.2% annual chance flood, in actuality, also includes all parcels in the 1% annual chance flood zone.

Table D-38 summarizes Table D-37 above and shows City of Oroville loss estimates and improved values at risk by FEMA 1% and 0.2% annual chance flood zones.

Table D-38 City of Oroville – Flood Loss Estimates

Flood Zone	Total Parcel Count	Improved Parcel Count	Total Land Value	Improved Structure Value	Other Value	Estimated Contents Value	Total Value	Loss Estimate	Loss Ratio
1% Annual Chance	94	51	\$6,584,673	\$15,062,584	\$358,940	\$12,087,296	\$27,508,820	\$5,501,764	0.43%
0.2% Annual Chance	604	452	\$43,419,507	\$91,016,487	\$2,052,234	\$78,213,094	\$171,281,815	\$34,256,363	2.71%
Grand Total	698	503	\$50,004,180	\$106,079,071	\$2,411,174	\$90,300,390	\$198,790,635	\$39,758,127	3.14%

Source: Butte County 1/16/2011 DFIRM, Butte County 3/28/2019 Parcel/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 flood zone, exclusive of the 1% annual chance flood zone. The 0.2% annual chance flood, in actuality, also includes all parcels in the 1% annual chance flood zone.

According to Table D-37 and Table D-38, the City of Oroville has 51 parcels and \$27.5 million in values in the 1% annual chance floodplain, and an additional 452 improved parcels and \$171.3 million of 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 in Section 4.3.6 of the Base Plan, there is a 1% chance in any given year of a flood event causing \$5.5 million in damages, and a 0.2% chance in any given year of a flood event causing \$34.2 million in damage in the City of Oroville. The loss ratio of 0.43% and 2.71% indicates that flood losses for the City would be relatively minor and the City should be able to recover relatively quickly.

Values for Oroville by Watershed

Analysis was performed to determine DFIRM Flood Zones and which watershed they are located in. This analysis is presented in three tables:

- Table D-39 breaks the parcels and values of the City into the two watersheds that fall in the City.
- Table D-40 breaks down Table D-39 to show the parcels and values in each watershed in each FEMA DFIRM flood zone
- Table D-41 breaks down Table D-39 into property use categories. This table shows the watershed by both DFIRM flood zone and property use type.

Table D-39 City of Oroville – Count and Value of Parcels by Watershed

Watershed	Total Parcel Count	Improved Parcel Count	Total Land Value	Improved Structure Value	Other Value	Estimated Contents Value	Total Value
Feather River / Lower Honcut Creek Watershed	7,145	5,501	\$320,351,638	\$884,175,248	\$61,341,363	\$651,505,009	\$1,783,000,627
City of Oroville Total	7,145	5,501	\$320,351,638	\$884,175,248	\$61,341,363	\$651,505,009	\$1,783,000,627

Source: Butte County 1/16/2011 DFIRM, Butte County 3/28/2019 Parcel/Assessor's Data

Table D-40 City of Oroville – Count and Value of Parcels by Watershed and Summary DFIRM Zones

Watershed / Flood Zone	Total Parcel Count	Improved Parcel Count	Total Land Value	Improved Structure Value	Other Value	Estimated Contents Value	Total Value
Feather River / Lower Honcut Creek Watershed							
1% Annual Chance Flood Hazard	94	51	\$6,584,673	\$15,062,584	\$358,940	\$12,087,296	\$32,245,879
0.2% Annual Chance Flood Hazard	604	452	\$43,419,507	\$91,016,487	\$2,052,234	\$78,213,094	\$214,554,239
Other Areas	6,447	4,998	\$270,347,458	\$778,096,177	\$58,930,189	\$561,204,619	\$1,536,200,509
Feather River / Lower Honcut Creek Watershed Total	7,145	5,501	\$320,351,638	\$884,175,248	\$61,341,363	\$651,505,009	\$1,783,000,627

Watershed / Flood Zone	Total Parcel Count	Improved Parcel Count	Total Land Value	Improved Structure Value	Other Value	Estimated Contents Value	Total Value
City of Oroville Total	7,145	5,501	\$320,351,638	\$884,175,248	\$61,341,363	\$651,505,009	\$1,783,000,627

Source: Butte County 1/16/2011 DFIRM, Butte County 3/28/2019 Parcel/Assessor's Data

Table D-41 City of Oroville – Count and Value of Parcels by Watershed, DFIRM Flood Zone, and Property Use

Watershed / Flood Zone / Property Use	Total Parcel Count	Improved Parcel Count	Total Land Value	Improved Structure Value	Other Value	Estimated Contents Value	Total Value
Feather River / Lower Honcut Creek Watershed							
1% Annual Chance Flood Hazard							
Agricultural	1	0	\$122,499	\$0	\$0	\$0	\$122,499
Commercial	33	22	\$4,445,872	\$9,112,008	\$358,940	\$9,112,008	\$21,176,711
Industrial	3	0	\$0	\$0	\$0	\$0	\$0
Residential	47	29	\$2,016,302	\$5,950,576	\$0	\$2,975,288	\$10,946,669
Unknown	10	0	\$0	\$0	\$0	\$0	\$0
1% Annual Chance Flood Hazard Total	94	51	\$6,584,673	\$15,062,584	\$358,940	\$12,087,296	\$32,245,879
0.2% Annual Chance Flood Hazard							
Agricultural	0	0	\$0	\$0	\$0	\$0	\$0
Commercial	156	96	\$24,189,383	\$52,163,843	\$2,002,854	\$52,163,843	\$131,559,143
Industrial	63	17	\$8,777,399	\$6,715,749	\$49,380	\$10,073,624	\$25,649,422
Residential	370	338	\$10,406,825	\$31,951,255	\$0	\$15,975,628	\$57,114,135
Unknown	15	1	\$45,900	\$185,640	\$0	\$0	\$231,540
0.2% Annual Chance Flood Hazard Total	604	452	\$43,419,507	\$91,016,487	\$2,052,234	\$78,213,094	\$214,554,239
Other Areas							
Agricultural	8	0	\$1,168,577	\$0	\$7,947	\$0	\$1,176,524
Commercial	853	581	\$79,198,492	\$277,675,642	\$16,646,012	\$277,675,642	\$553,681,658
Industrial	161	55	\$17,279,898	\$33,383,022	\$42,269,230	\$50,074,533	\$166,919,063
Residential	5,288	4,361	\$172,681,873	\$466,908,887	\$7,000	\$233,454,444	\$814,277,150
Unknown	137	1	\$18,618	\$128,626			\$146,114
Other Areas Total	6,447	4,998	\$270,347,458	\$778,096,177	\$58,930,189	\$561,204,619	\$1,536,200,509
Feather River / Lower Honcut Creek Watershed Total	7,145	5,501	\$320,351,638	\$884,175,248	\$61,341,363	\$651,505,009	\$1,783,000,627
City of Oroville Total							
City of Oroville Total	7,145	5,501	\$320,351,638	\$884,175,248	\$61,341,363	\$651,505,009	\$1,783,000,627

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 City in comparison to total area within the City limits. The same methodology, as discussed in Section 4.3.8 of the Base Plan, was used for the City of Oroville as well as for the County as a whole. Table D-42 represents a detailed and summary analysis of total acres for each FEMA DFIRM flood zone in the City.

Table D-42 City of Oroville – Flooded Acres

Flood Zone	Total Acres	% of Total Acres	Improved Acres	% of Total Improved Acres	Unimproved Acres	% of Total Unimproved Acres
1% Annual Chance Flood Hazard	1,382	0.10%	67	0.01%	1,315	0.14%
0.2% Annual Chance Flood Hazard	924	0.06%	394	0.07%	530	0.06%
Other Areas	7,801	0.54%	2,753	0.51%	5,048	0.55%
City of Oroville Total	10,107	0.70%	3,213	0.60%	6,894	0.76%

Source: FEMA DFIRM 1/6/2011

Population at Risk

The DFIRM flood zones were overlaid on the parcel layer. Those residential parcel centroids that intersect the flood zones were counted and multiplied by the 2010 Census Bureau average household factors for Oroville – 2.60. According to this analysis, there is a total population of 75 and 874 residents of the City at risk to flooding in the 1% and 0.2% annual chance floodplains, respectively. This is shown in Table D-43.

Table D-43 City of Oroville – Count of Improved Residential Parcels and Population by Flood Zone

Jurisdiction	1 % Annual Chance Flooding		0.2% Annual Chance Flooding	
	Improved Residential Parcels	Population	Improved Residential Parcels	Population
Oroville	29	75	338	874

Source: Butte County 1/16/2011 DFIRM, Butte County 3/28/2019 Parcel/Assessor's Data, US Census Bureau

Critical Facilities at Risk

An analysis was performed on the critical facility inventory in Oroville in DFIRM flood zones. GIS was used to determine whether the facility locations intersects a DFIRM flood zone and, if so, what zone it intersects. Details of critical facilities in a DFIRM flood zones in the City of Oroville are shown in Figure

D-19 and detailed in Table D-44. Details of critical facility definition, type, name and address and jurisdiction by flood zone are listed in Appendix F.

Figure D-19 City of Oroville – Critical Facilities in DFIRM Flood Zones

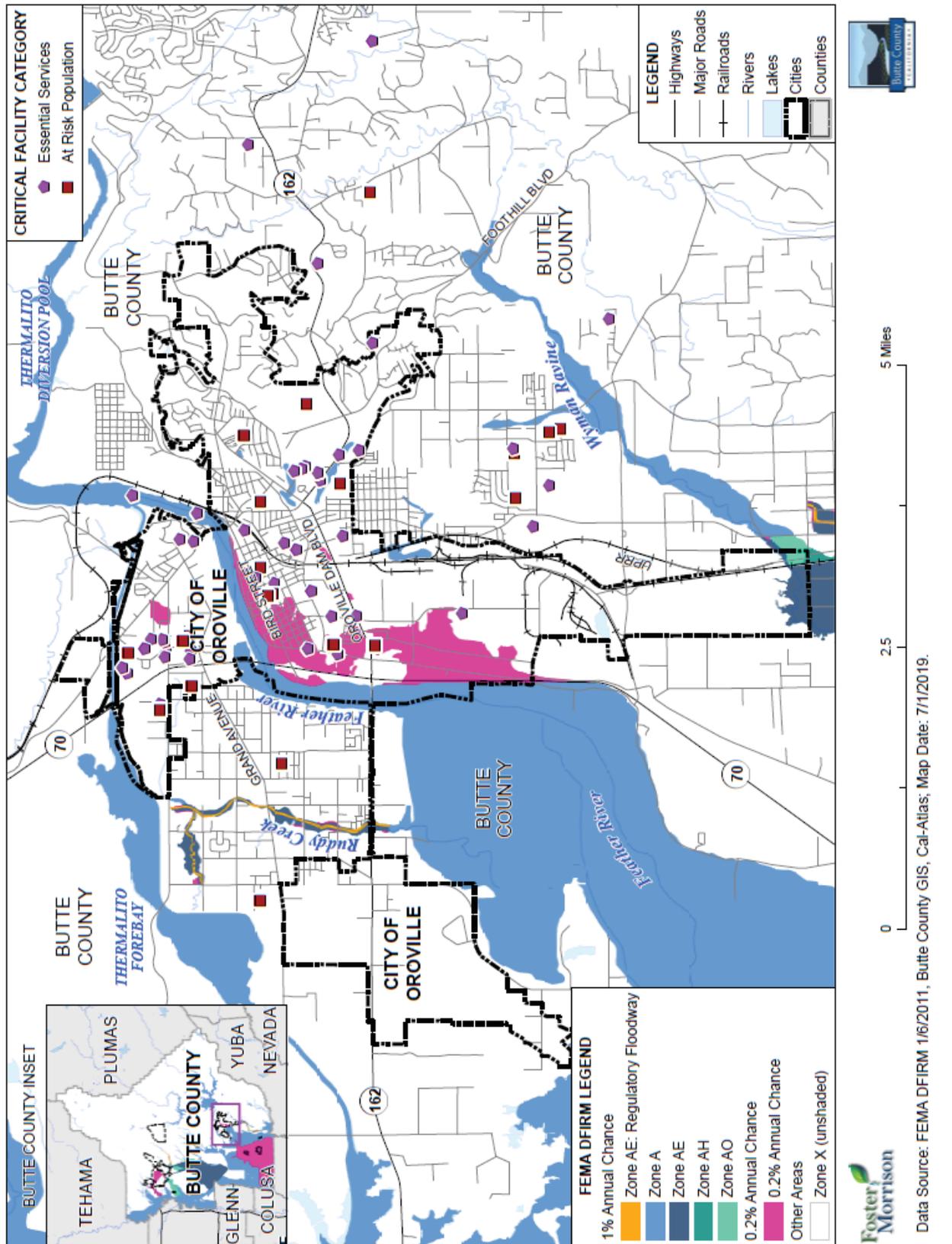


Table D-44 City of Oroville – Critical Facilities in DFIRM Flood Zones

Flood Zone/ Critical Facility Category / Critical Facility Type	Facility Count
0.2% Annual Chance Flood Hazard	
Essential Services Facilities	
Health Care	1
Essential Services Facilities Total	1
At Risk Population Facilities	
School	1
At Risk Population Facilities Total	1
0.2% Annual Chance Flood Hazard Total	2
Other Areas	
Zone X (unshaded)	
Essential Services Facilities	
Wastewater Treatment Plant	1
Fire	3
Health Care	18
Law Enforcement	3
Public Assembly Point / Evacuation Center	2
Radio Sites	3
Logistics Hub	6
Emergency Operation Center	1
DOC	1
Emergency Animal Shelter	1
Essential Services Facilities Total	39
At Risk Population Facilities	
School	19
At Risk Population Facilities Total	19
Zone X (unshaded) Total	58
Other Areas Total	58
Grand Total	
	60

Source: FEMA DFIRM 1/6/2011, Butte County GIS

Insurance Coverage, Claims Paid, and Repetitive Losses

The City of Oroville joined the National Flood Insurance Program (NFIP) on September 24, 1984. The City does not participate in CRS program. NFIP data indicates that as of July 19, 2018, there were 99 flood insurance policies in force in the City with \$29,287,400 of coverage. Of the 99 policies, 82 were residential (single-family homes) and 17 were non-residential. Of the 99 policies, 14 were in A zones, and 85 were in B, C, and X zones. The GIS parcel analysis detailed above identified 51 improved parcels in the 1%

annual chance flood zone with 14 policies covering them, which equates to 26.9% coverage of parcels in the 1% annual chance floodplain. There have been 21 historical claims for flood losses totaling \$494,395.16. 3 of these claims were substantial damage claims. NFIP data further indicates that there is 1 repetitive loss (RL) and 0 severe repetitive loss (SRL) buildings.

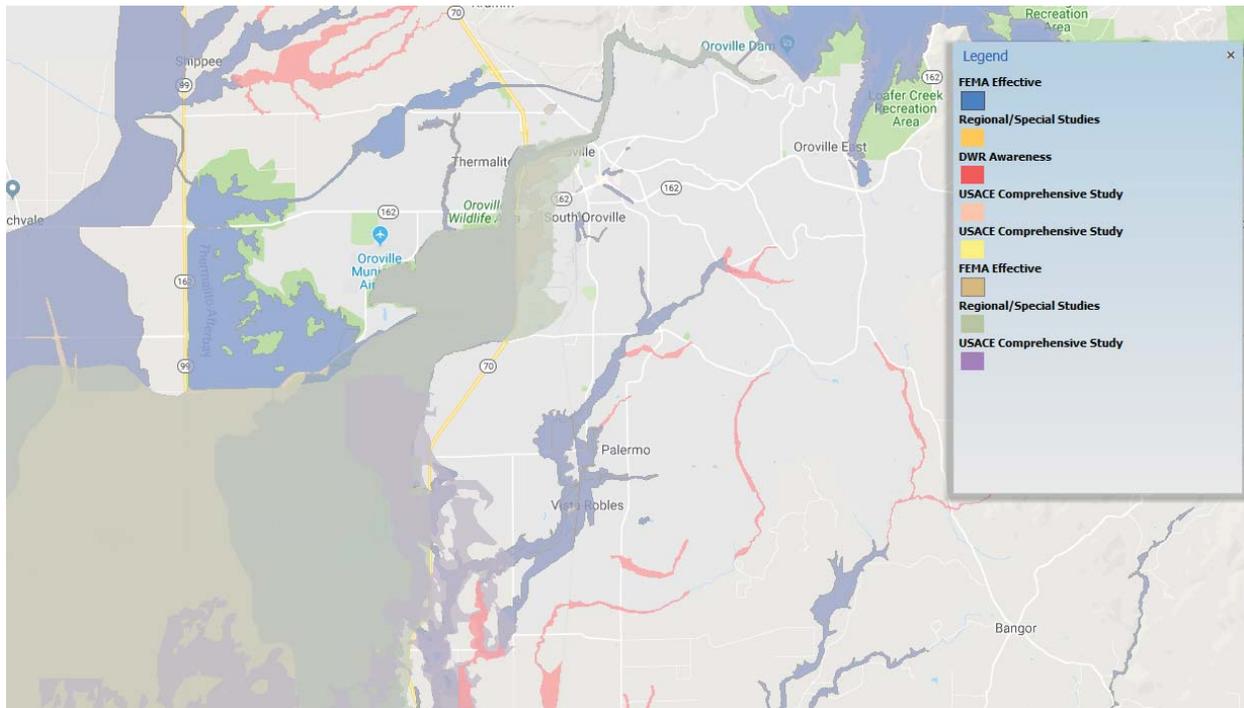
California Department of Water Resources Best Available Maps (BAM)

The FEMA regulatory maps provide just one perspective on flood risks in Butte County. Senate Bill 5 (SB 5), enacted in 2007, authorized the California DWR to develop the Best Available Maps (BAM) displaying 100- and 200-year floodplains for areas located within the Nevada-San Joaquin (SAC-SJ) Valley watershed. This effort was completed by DWR in 2008. DWR has expanded the BAM to cover all counties in the State and to include 500-year floodplains.

Different than the FEMA DFIRMs which have been prepared to support the NFIP and reflect only the 100-year event risk, the BAMs are provided for informational purposes and are intended to reflect current 100-, 200-(as applicable), and 500-year event risks using the best available data. The 100-year floodplain limits on the BAM are a composite of multiple 100-year floodplain mapping sources. It is intended to show all currently identified areas at risk for a 100-year flood event, including FEMA's 100-year floodplains. The BAM are comprised of different engineering studies performed by FEMA, Corps, and DWR for assessment of potential 100-, 200-, and 500-year floodplain areas. These studies are used for different planning and/or regulatory applications, and for each flood frequency may use varied analytical and quality control criteria depending on the study type requirements.

The value in the BAMs is that they provide a bigger picture view of potential flood risk to the City than that provided in the FEMA DFIRMs. This provides the community and residents with an additional tool for understanding potential flood hazards not currently mapped as a regulated floodplain. Improved awareness of flood risk can reduce exposure to flooding for new structures and promote increased protection for existing development. Informed land use planning will also assist in identifying levee maintenance needs and levels of protection. By including the FEMA 100-year floodplain, it also supports identification of the need and requirement for flood insurance. The BAM map for Oroville is shown in Figure D-20.

Figure D-20 City of Oroville – Best Available Map



Source: California DWR

Legend explanation: Blue - FEMA 1%, Orange – Local 1% (developed from local agencies), Red – DWR 1%r (Awareness floodplains identify the 1% annual chance flood hazard areas using approximate assessment procedures.), Pink – USACE 1% (2002 Sac and San Joaquin River Basins Comp Study), Yellow – USACE 0.5% (2002 Sac and San Joaquin River Basins Comp Study), Tan – FEMA 0.2%, Grey – Local 0.2% (developed from local agencies), Purple – USACE 0.2%(2002 Sac and San Joaquin River Basins Comp Study).

Future Development

No development is occurring in the floodway. However, development may occur in specific flood zones. This development must meet specific criteria based on the City’s flood ordinance and as outlined on the DFIRM for that particular area. These maps are available on the Butte County Website. Map 06007C0795E located on the Butte County website contains additional information regarding the floodplain for the downtown Oroville area.

GIS Analysis

Butte County’s 3/21/2019 Assessor Data and the County’s GIS parcel data were used as the basis for the inventory of assessed values for both improved and unimproved parcels within the City. Using GIS, the 260 parcels associated with future development projects for which the analysis was to be performed was identified. Future development in DFIRM flood zones are shown on Figure D-21 and detailed in Table D-45.

Figure D-21 City of Oroville – Future Development in DFIRM Flood Zones

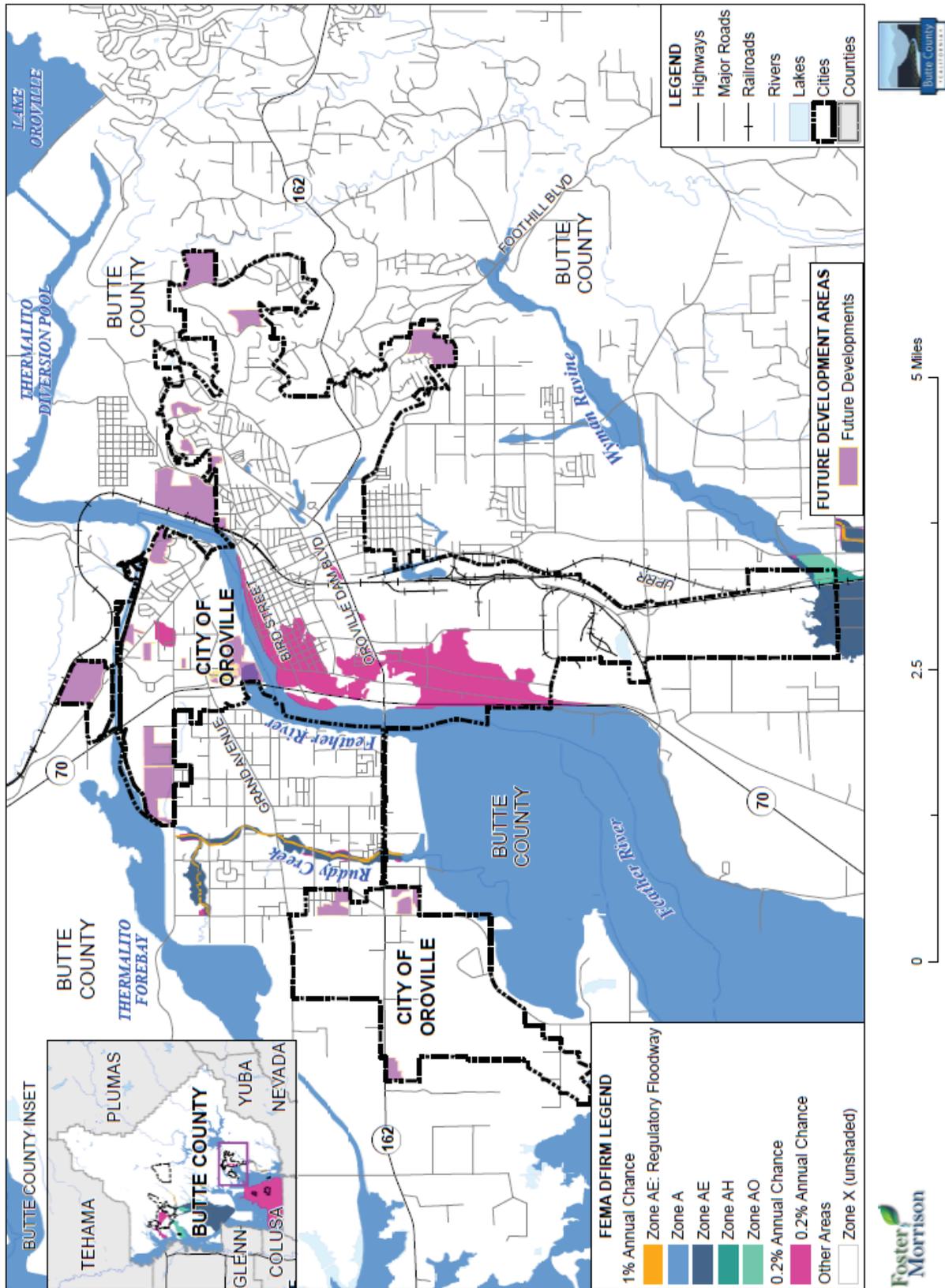


Table D-45 City of Oroville – Future Development Parcels and Acreages in DFIRM Flood Zones

Flood Zone / Future Development	Total Parcel Count	Improved Parcel Count	Total Acres
City of Oroville			
1% Annual Chance Flood Hazard			
Riverview	2		17.7
1% Annual Chance Flood Hazard Total	2		17.7
Other Areas			
Acacia Estates	2	0	6.7
Buttewoods 2	3	0	56.1
Calle Vista Estates Unit II	48	44	24.4
Canal View Estates	3	0	8.4
Deer Creek Estates 2	3	0	24.3
Ford Drive	2	0	22.4
Forebay Estates	1	0	40.2
Greenview Estates	1	1	1.9
Heritage Oak Estates	3	1	46.5
Highlands Estates	1	0	13.3
Linkside Place Phase I	66	6	11.5
Martin Ranch	1	0	73.1
Mission Olive Ranch	20	2	6.8
Nelson 56	1	0	56.5
Oak Park	1	0	5.1
Rivers Edge	1	0	10.3
Riverview	2	0	21.1
Rosewood Estates	1	0	5.0
Vista Del Oro	95	22	15.2
Other Areas Total	255	76	448.7
City of Oroville Total	257	76	466.4
Unincorporated Butte County			
Other Areas			
Oak Park	3	0	94.3
Other Areas Total	3	0	94.3
Unincorporated Butte County Total	3	0	94.3
Grand Total			
	260	76	560.6

Source: FEMA DFIRM 1/6/2011/ City of Oroville GIS, Butte County 3/28/2019 Parcel/Assessor's Data

Flood: Localized Stormwater Flooding

Likelihood of Future Occurrence—Occasional

Vulnerability—Medium

Hazard Profile and Problem Description

While flooding happens in the City from time to time in the FEMA floodplains, areas outside of the floodplain can experience intermittent flooding as well. Localized flooding and other issues caused by severe weather events, primarily heavy rains and severe storms, can often pose a risk to the community. Primary concerns include impacts to infrastructure that provides a means of ingress and egress throughout the community.

Location and Extent

As described above, the City is subject to localized flooding throughout the City. Flood extents are usually measured in areas affected, velocity of flooding, and depths of flooding. Expected flood depths in the City vary by location. Flood durations in the City tend to be short to medium term, or until either the storm drainage system can catch up or flood waters move downstream. Localized flooding in the City tends to have a shorter speed of onset, especially when antecedent rainfall has soaked the ground and reduced its capacity to absorb additional moisture.

Past Occurrences

The City noted the following past occurrences of localized flooding:

- The Oroville Dam Spillway incident in February of 2017 cause a mass evacuation and flooding in areas of the City of Oroville

The City also noted that various areas within the City are prone to localized flooding during heavy rain and storm events as described further below.

Vulnerability to Localized Flooding

There are two primary sources of stormwater runoff that are of concern to the City: regional runoff, which originates outside the City, and runoff from properties located inside the City. Regional runoff has historically posed the greatest threat of flooding to properties in the City; however, flood control facilities such as Oroville Dam have minimized this threat considerably. As a result, the more immediate concern for the City is the collection, conveyance, and discharge of stormwater from properties within the City.

The City tracks localized flooding areas. Affected localized flood areas identified by the City of Oroville are summarized in Table D-46.

Table D-46 City of Oroville – Road List of Localized Flooding Problem Areas

Road Name	Flooding	Pavement Deterioration	Washout	High Water	Landslide/ Mudslide	Debris	Downed Trees
Alice Ave.	X						
Bald Rock Rd.							X
Black Bart Rd.					X		
Cherokee Rd.					X		X
Darby Rd.				X			
Foothill Blvd.							X
Forbestown Rd.					X	X	
Hurelton Rd.	X						
Long Bar Rd.							X
Louis Ave.	X						
Lumpkin Rd.					X		
Oregon Gulch Rd.							X
Railroad Ave.	X						
Stringtown Rd.	X						X
Zink Rd.							X

Source: City of Oroville

Impacts

Localized flooding and other issues caused by severe weather events, primarily heavy rains and thunderstorms, can often pose a risk to the community. Primary concerns include impacts to infrastructure that provides a means of ingress and egress throughout the community. Ground saturation can result in instability, collapse, or other damage. Objects can also be buried or destroyed through sediment deposition. Floodwaters can also break utility lines and interrupt services. Standing water can cause damage to crops, roads, foundations, and electrical circuits.

Future Development

Future development in the City will add more impervious surfaces causing more runoff. The City has addressed localized flooding in the past and will continue those efforts in the future through stormwater master planning efforts as well as through requirements for new development. The City of Oroville is in the planning stages of storm drain improvements.

Levee Failure

Likelihood of Future Occurrence–Likely
Vulnerability–Medium

Hazard Profile and Problem Description

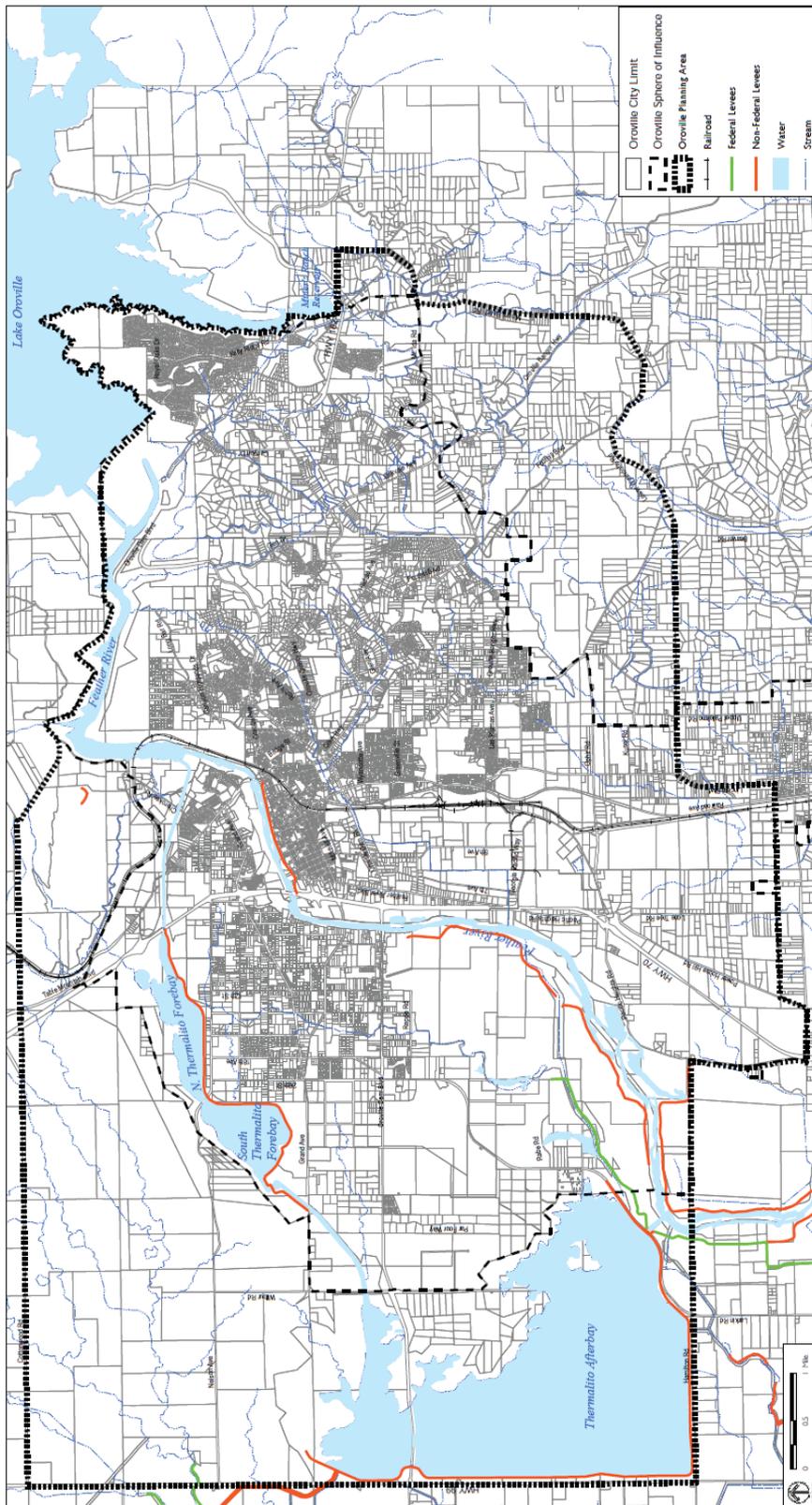
A levee is a raised area that runs along the banks of a stream or canal. Levees reinforce the banks and help prevent flooding by containing higher flow events to the main stream channel. By confining the flow to a narrower stream channel, levees can also increase the speed of the water. Levees can be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

Location and Extent

There is not a scientific scale or measurement system in place for levee failure. Figure D-22 shows the location of levee centerlines for federal and non-federal levees in the Oroville Planning Area. The majority of levees in the Planning Area are non-federal levees, and they are concentrated along the Feather River, the western and southern fringes of the Thermalito Afterbay, and the southern fringes of the Thermalito Forebay. Federal levees are located in the southwest portion of the Planning Area, between the Feather River and the Thermalito Afterbay. The City of Oroville 2030 General Plan Safety Element noted that levee inundation area maps are not available for the Oroville Planning Area. However, the California Department of Water Resources mapped Levee Flood Protection Zones for State Water Project levees in the Sacramento River Basin in August 2011, and only a small portion of the Planning Area is included in the Levee Flood Protection Zone: approximately 150 acres adjacent to the southeast corner of the Thermalito Afterbay, which is currently used for open space and designated State Water Project in this General Plan.

Expected flood depths in the City are not known. The speed of onset is slow as the river rises, but if a levee fails the warning times are short for those in the inundation area. The duration of levee failure risk times can be hours to weeks, depending on the river flows that the levee holds back. The HMPC noted that since dredging the river bottom has been limited, the bottom of the river has become higher, thus the water levels reach higher on the banks of the levees. When northern California reservoirs are nearing maximum capacity, they release water through the river systems, causing additional burdens on County levees. The potential for levee breaches and erosion damage has increased.

Figure D-22 City of Oroville – Levee Locations



Source: City of Oroville 2030 General Plan

Past Occurrences

The City Planning Team noted no past occurrences of levee failures.

Vulnerability to Levee Failure

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. 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.

Levee failure flooding would vary in the City 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 critical facilities and lifeline utilities (e.g., water, sewerage, and power), transportation, jobs, tourism, the environment, agricultural industry, and the local and regional economies.

Impacts

Should the levees fail, all of the area protected by the levees would be at risk to flooding causing property damage and life safety concerns. Business losses would be large should facilities be flooded. Additional issues include dewatering of the levee protected areas, as well as the rebuilding of the levees. Road closures would occur, and would impede both evacuation routes and ability of first responders to quickly respond to calls for aid.

Future Development

Future development built in the areas protected by levees is subject to being built to the standards in the City of Oroville Floodplain Ordinance. Future development in levee protected areas may be affected by this hazard, thus there will always be some level of concern.

Severe Weather: Extreme Heat

Likelihood of Future Occurrence–Highly Likely

Vulnerability–Medium

Hazard Profile and Problem Description

According to FEMA, extreme heat is defined as temperatures that hover 10 degrees or more above the average high temperature for the region and last for several weeks. Heat kills by taxing the human body beyond its abilities. In extreme heat and high humidity, evaporation is slowed and the body must work extra hard to maintain a normal temperature.” Most heat disorders occur because the victim has been overexposed to heat or has over-exercised for his or her age and physical condition. Older adults, young children, and those who are sick or overweight are more likely to succumb to extreme heat. Conditions

that can induce heat-related illnesses include stagnant atmospheric conditions and poor air quality. Consequently, people living in urban areas may be at greater risk from the effects of a prolonged heat wave than those living in rural areas. Also, asphalt and concrete store heat longer and gradually release heat at night, which can produce higher nighttime temperatures known as the urban heat island effect. Extreme heat, coupled with high winds, can trigger PG&E to perform a Public Safety Power Shutdown (PSPS), which cuts off electricity to those in the City and the County.

Location and Extent

Heat is a regional phenomenon and affects the whole of the City. Heat emergencies are often slower to develop, taking several days of continuous, oppressive heat before a significant or quantifiable impact is seen. Heat waves do not strike victims immediately, but rather their cumulative effects slowly take the lives of vulnerable populations. Heat waves do not generally cause damage or elicit the immediate response of floods, fires, earthquakes, or other more “typical” disaster scenarios.

The NWS has in place a system to initiate alert procedures (advisories or warnings) when extreme heat is expected to have a significant impact on public safety. The expected severity of the heat determines whether advisories or warnings are issued. The NWS HeatRisk forecast provides a quick view of heat risk potential over the upcoming seven days. The heat risk is portrayed in a numeric (0-4) and color (green/yellow/orange/red/magenta) scale which is similar in approach to the Air Quality Index (AQI) or the UV Index. This can be seen in Section 4.2.2 of the Base Plan.

Past Occurrences

The City Planning Team note that since extreme heat is a regional phenomenon, events that affected the County also affected the City. Those past occurrences were shown in the Base Plan in Section 4.2.2.

Vulnerability to Extreme Heat

The City experiences temperatures in excess of 100 degrees during the summer and fall months. The temperature moves to 105-115°F in rather extreme situations. Health impacts are the primary concern with this hazard, though economic impacts are also an issue.

Impacts

The elderly and individuals below the poverty level are the most vulnerable to extreme temperatures. Nursing homes and elder care facilities are especially vulnerable to extreme heat events if power outages occur and air conditioning is not available. In addition, individuals below the poverty level may be at increased risk to extreme heat if use of air conditioning is not affordable. This is especially true of homeless people and the transient population.

Reliance on air conditioning causes a strain on the electrical energy in the City. Occasionally peak demands outweigh supply and a condition known as brown-out occurs. This is an extremely dangerous situation for electrical equipment as it operates without the needed electricity causing damage to the systems. Days of extreme heat have been known to result in medical emergencies, civil unrest, and unpredictable human behavior. Periods of extended heat and dryness (droughts) can have major economic, agricultural, and

water resources impacts. Extreme heat can also dry out vegetations, making it more vulnerable to wildfire ignitions. PSPS can also happen, which cuts off electricity to the City during periods of high heat.

Future Development

Vulnerability to extreme heat will increase as the average age of the population in each City shifts. 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 and in the event of a Public Safety Power Shutoff. Low income residents and homeless populations are also vulnerable. Cooling centers for these populations should be utilized when necessary. However, many of the residents of the City are accustomed to living with extreme heat and take precautions to guard against the threat of extreme heat.

Severe Weather: Freeze and Winter Storm

Likelihood of Future Occurrence—Occasional

Vulnerability—Medium

Hazard Profile and Problem Description

According to the National Weather Service (NWS) and the Western Regional Climate Center (WRCC), extreme cold often accompanies a winter storm or is left in its wake. Prolonged exposure to cold can cause frostbite or hypothermia and can be life-threatening. Winter snowstorms can include heavy snow, ice, and blizzard conditions.

Location and Extent

Freeze and winter storms are regional issues, meaning the entire City is at risk to freeze and winter storm. While there is no scale (i.e. Richter, Enhanced Fujita) to measure the effects of freeze, temperature data from the County from the WRCC indicates that there are 21.8 days that fall below 32°F in western Butte County, with no days falling below 0°F. Freeze has a slow onset and can be generally be predicted in advance for the County. Freeze events can last for hours (in a cold overnight), or for days to weeks at a time. Snowfall is measured in snow depths. It is rare for snow to fall in the City, and even rarer that snow accumulates in the City. Snowfall has an onset that is similar to freeze in the City.

Past Occurrences

The City Planning Team note that since freeze and winter storm is a regional phenomenon, events that affected the lower elevations of the County also affected the City. Those past occurrences were shown in the Base Plan in Section 4.2.3.

Vulnerability to Severe Weather: Freeze and Winter Storms

The City experiences temperatures below 32 degrees during the winter months. The temperature moves to the teens in rather extreme situations.

Impacts

Freeze normally does not impact structures, but is a life safety issue. Secondary impacts of extreme cold can affect the supporting mechanisms or systems of a community's infrastructure. For example, when extreme cold is coupled with high winds or ice storms, power lines may be downed, resulting in an interruption in the transmission of that power shutting down electric furnaces, which may lead to frozen pipes in homes and businesses.

Occasionally, winter storms with snow and ice can affect the City. Transportation networks, communications, and utilities infrastructure are the most vulnerable physical assets in the City. The ability for the City to continue to operate during periods of winter storm and freeze is paramount. The elderly population in the planning area is most vulnerable to temperature extremes. 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 cold. Transient and homeless populations are also at risk to freeze.

Future Development

Future development should be built to code. Pipes at risk of freezing should be mitigated by either burying or insulating them from freeze as new facilities are improved or added. Vulnerability to extreme cold will increase as the average age of the population in the County shifts. The elderly are more at risk to the effects of freeze. However, many of the residents of the City are accustomed to living with freeze and take precautions to guard against the threat of freeze.

Severe Weather: Heavy Rain and Storms (Hail, Lightning, Wind)

Likelihood of Future Occurrence–Likely

Vulnerability–Medium

Hazard Profile and Problem Description

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

Location and Extent

Heavy rain events occur on a regional basis. Rains and storms can occur in any location of the City. All portions of the City are at risk to heavy rains. Most of the severe rains occur during the winter months. There is no scale by which heavy rains and severe storms are measured. Magnitude of storms is measured often in rainfall and damages. The speed of onset of heavy rains can be short, but accurate weather prediction mechanisms often let the public know of upcoming events. Duration of severe storms in California, Butte County, and the City is often short, ranging from minutes to hours. In some cases, rains

can continue for days at a time. Information on precipitation extremes can be found in Section 4.2.4 of the Base Plan.

Past Occurrences

According to historical hazard data, severe weather is an annual occurrence in the City of Oroville. Past heavy rains have flooded the main roadway in the City of Oroville. These heavy rains have caused the storm drains to overflow onto the streets and nearby businesses. These flooding of city streets have an impact on public safety entities within the City.

Vulnerability to Heavy Rain and Storms

According to historical hazard data, severe weather is an annual occurrence in the City. Damage and disaster declarations related to severe weather have occurred and will continue to occur in the future. Heavy rain and severe storms are the most frequent type of severe weather occurrences in the City. Wind and lightning often accompany these storms and have caused damage in the past. Hail is rare in the City.

Impacts

Impacts to property, critical facilities (such as utilities), and life safety can be expected during heavy storms. Actual damage associated with the primary effects of severe weather have 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 City. The risk and vulnerability associated with these secondary hazards are discussed in the flood and localized flood sections of this Annex.

Future Development

New critical facilities such as communications towers and others should be built to code to withstand hail damage, lightning, and thunderstorm winds. Future losses to new development should be minimal.

Wildfire

Likelihood of Future Occurrence—Highly Likely

Vulnerability—High

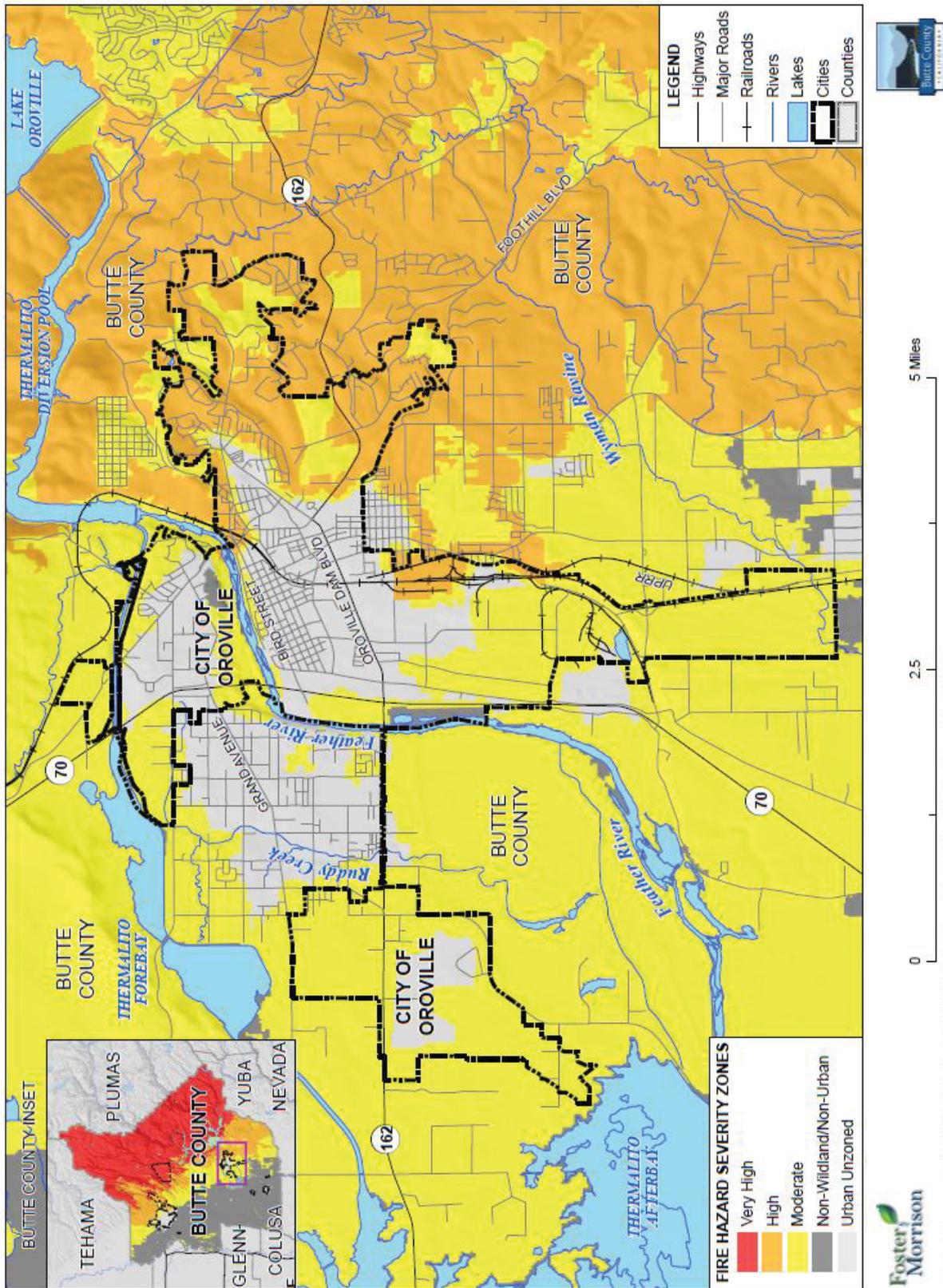
Hazard Profile and Problem Description

Wildland fire is an ongoing concern for the City of Oroville. Generally, the fire season extends from early spring through late fall of each year during the hotter, dryer months. Fire conditions arise from a combination of high temperatures, low moisture content in the air and fuel, accumulation of vegetation, and high winds. Throughout California, communities are increasingly concerned about wildfire safety as increased development in the foothills and mountain areas and subsequent fire suppression practices have affected the natural cycle of the ecosystem.

Location and Extent

Wildfire can affect all areas of the City. CAL FIRE has estimated that the risk varies across the City and has created maps showing risk variance. Following the methodology described in Section 4.3.16, a wildfire maps for the City of Oroville were created. Figure D-23 shows the CAL FIRE FHSZ in the City. As shown on the maps, wildfire threat within the City is widely varied from low to high.

Figure D-23 City of Oroville – Fire Hazard Severity Zones



The City of Oroville 2030 General Plan Safety Element also noted that urban fire risk is greatest in older structures and neighborhoods built before modern building codes for fire safety and building systems were in place. Other factors affecting urban fire risk and relative likelihood of loss of life or property include building age, height, and use; storage of flammable material; building construction materials; availability of sprinkler systems; and proximity to a fire station and hydrants.

Wildfires tend to be measured in structure damages, injuries, and loss of life as well as on acres burned. Fires can have a quick speed of onset, especially during periods of drought. Fires can burn for a short period of time, or may have durations lasting for a week or more. Geographical I FHSZ extent from CAL FIRE is shown in Table D-47.

Table D-47 City of Oroville – Geographical FHSZ Extents

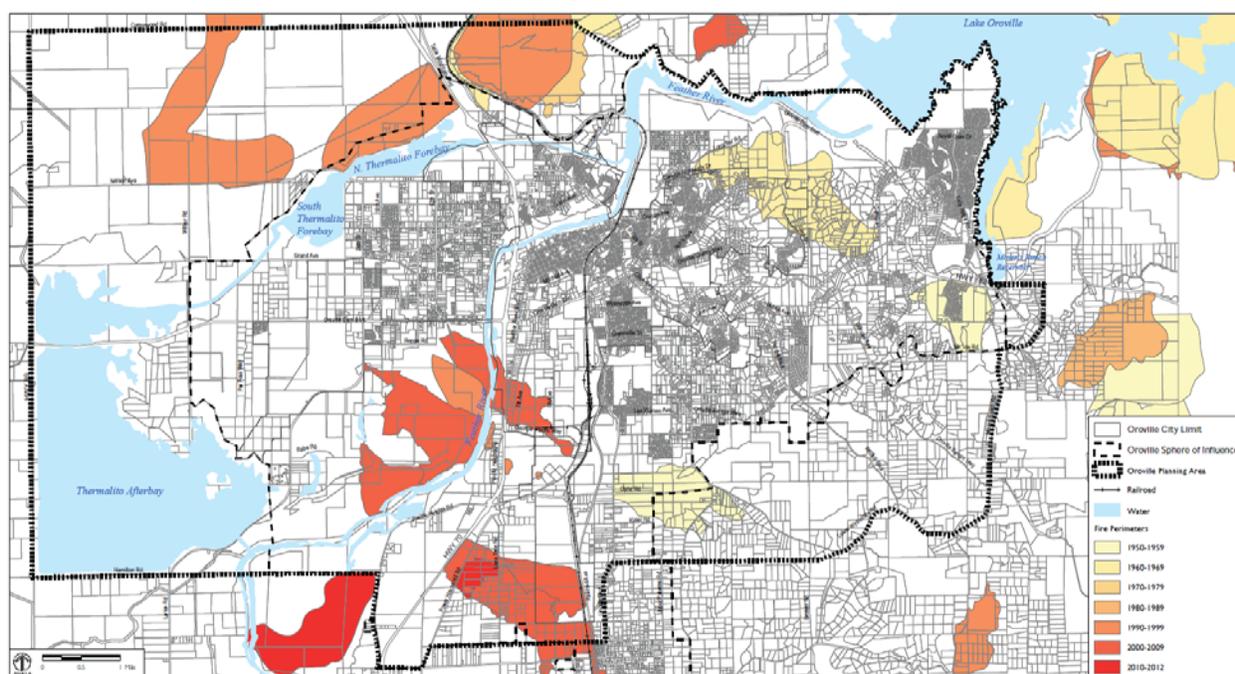
Fire Hazard Severity Zones	Total Acres	% of Total Acres	Improved Acres	% of Total Improved Acres	Unimproved Acres	% of Total Unimproved Acres
Very High	0	0.00%	0	0.00%	0	0.00%
High	1,565	19.81%	972	12.30%	0	0.00%
Moderate	4,018	50.85%	807	10.21%	0	0.00%
Non-Wildland/Non-Urban	99	1.25%	1	0.01%	191	2.42%
Urban Unzoned	2,117	26.79%	1,102	13.95%	82	1.04%

Source: CAL FIRE

Past Occurrences

Historical wildfire perimeters from the General Plan Safety Element dating back to 1950 in the Oroville Planning Area are mapped in Figure D-24. The map clearly illustrates that the majority of wildfires in the Oroville Planning Area since 1990 occurred in the areas west of the railroad tracks, including large areas north of the Thermalito Forebay during the 1990-1999 period, and near the Feather River south of Thermalito and west of Palermo since 2000. Wildfires during the 1950s and 1960s primarily occurred in areas east of the railroad tracks, including in the foothills north and east of the city and in the area north of Palermo.

Figure D-24 City of Oroville – Historic Fire Perimeters



Source: City of Oroville 2030 General Plan Safety Element

The HMPC noted that the 2018 Campfire threatened the City of Oroville. The potential of wildfires from these rural areas of Butte County caused evacuation preparedness/warnings for the City of Oroville. During the Campfire, the maps of the fire progress showed the potential wildfires entering the City from the south, Kelly Ridge area toward downtown Oroville.

Vulnerability to Wildfire

A number of factors affect the behavior of wildland and interface fires, including terrain, weather, wind, fuels and seasons. It is well known that fire travels faster uphill than down and is more difficult to fight on steep slopes than on level ground. When weather is hot and the humidity is low, wildland fires can explode with intensity of rapid combustion. Even in the absence of strong winds, a fast-moving fire can generate its own updrafts, particularly in canyons, causing burning brands to be carried high in the air and drop a long distance ahead. This results in spot fires over a wide radius as the wind changes its direction.

Oroville is not immune to numerous types of grass and brush fires and any one of them may accelerate into an urban interface wildfire. Such a situation could lead to evacuation of large portions of the population and the potential for significant loss of personal property, structures, and rangeland. The natural fuels available in or near the City vary greatly in the rate and intensity of burning. Fires in heavy brush and stands of trees burn with great intensity but more slowly than in dry grass and leaves. Dense fuels will propagate fire better than sparse fuels. The local fire season generally extends from June through early October, but is now becoming more of a year-round concern.

Impacts

Wildfires can cause short-term and long-term disruption to the County and City of Oroville, as evidenced by the Camp Fire in Paradise and the resultant increase in the population in Oroville due to fire victims relocating. 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.

Based on the vulnerability of the City of Oroville to the wildfire hazard, the sections that follow describes significant assets at risk in the City.

Values at Risk

GIS was used to determine the possible impacts of flooding within the City of Oroville. The methodology described in Section 4.3.19 of the Base Plan was followed in determining structures and values at risk in fire hazard severity zones. Summary analysis results for Oroville are shown in Table D-48, which summarizes total parcel counts, improved parcel counts and their structure values by fire hazard severity zone.

Table D-48 City of Oroville – Count and Value of Parcels by Fire Hazard Severity Zone

Fire Hazard Severity Zone	Total Parcel Count	Improved Parcel Count	Total Land Value	Improved Structure Value	Other Value	Estimated Contents Value	Total Value
High	1,988	1,663	\$81,040,528	\$255,349,705	\$14,264,880	\$174,383,234	\$455,316,711
Moderate	1,761	1,063	\$84,356,508	\$184,006,372	\$15,771,435	\$123,656,024	\$388,367,444
Non-Wildland/Non-Urban	6	0	\$347,035	\$0	\$5,473	\$0	\$352,508
Urban Unzoned	3,390	2,775	\$154,607,567	\$444,819,171	\$31,299,575	\$353,465,751	\$938,963,964
City of Oroville Total	7,145	5,501	\$320,351,638	\$884,175,248	\$61,341,363	\$651,505,009	\$1,783,000,627

Source: CAL FIRE, Butte County 3/28/2019 Parcel/Assessor's Data

Table D-49 breaks out the Table D-48 by adding the property use details by fire hazard severity zone for the City. As shown in both of these tables, the City has 1,663 properties in the very high or high fire hazard severity zone.

Table D-49 City of Oroville – Count and Value of Parcels by Fire Hazard Severity Zone and Property Use

Fire Hazard Severity Zone / Property Use	Total Parcel Count	Improved Parcel Count	Total Land Value	Improved Structure Value	Other Value	Estimated Contents Value	Total Value
High							
Agricultural	0	0	\$0	\$0	\$0	\$0	\$0
Commercial	86	57	\$13,849,975	\$91,919,077	\$12,817,540	\$91,919,077	\$146,973,780
Industrial	4	2	\$339,502	\$748,843	\$1,445,840	\$1,123,265	\$4,194,740
Residential	1,871	1,604	\$66,849,921	\$162,681,785	\$1,500	\$81,340,893	\$304,148,192
Unknown	27	0	\$1,130	\$0	\$0	\$0	\$0
High Total	1,988	1,663	\$81,040,528	\$255,349,705	\$14,264,880	\$174,383,234	\$455,316,711
Moderate							
Agricultural	6	0	\$932,692	\$0	\$0	\$0	\$932,692
Commercial	127	67	\$16,216,764	\$35,710,676	\$373,745	\$35,710,676	\$85,959,387
Industrial	121	17	\$13,529,301	\$13,797,500	\$15,397,690	\$20,696,250	\$72,092,321
Residential	1,458	979	\$53,677,751	\$134,498,196	\$0	\$67,249,098	\$229,383,044
Unknown	49	0	\$0	\$0	\$0	\$0	\$0
Moderate Total	1,761	1,063	\$84,356,508	\$184,006,372	\$15,771,435	\$123,656,024	\$388,367,444
Non-Wildland/Non-Urban							
Agricultural	2	0	\$347,035	\$0	\$5,473	\$0	\$352,508
Commercial	0	0	\$0	\$0	\$0	\$0	\$0
Industrial	2	0	\$0	\$0	\$0	\$0	\$0
Residential	2	0	\$0	\$0	\$0	\$0	\$0
Unknown	0	0	\$0	\$0	\$0	\$0	\$0
Non-Wildland/Non-Urban Total	6	0	\$347,035	\$0	\$5,473	\$0	\$352,508
Urban Unzoned							
Agricultural	1	0	\$11,349	\$0	\$2,474	\$0	\$13,823
Commercial	829	575	\$77,767,008	\$211,321,740	\$5,816,521	\$211,321,740	\$473,484,345
Industrial	100	53	\$12,188,494	\$25,552,428	\$25,475,080	\$38,328,642	\$116,281,424
Residential	2,374	2,145	\$64,577,328	\$207,630,737	\$5,500	\$103,815,369	\$348,806,718
Unknown	86	2	\$63,388	\$314,266	\$0	\$0	\$377,654
Urban Unzoned Total	3,390	2,775	\$154,607,567	\$444,819,171	\$31,299,575	\$353,465,751	\$938,963,964
City of Oroville Total							
City of Oroville Total	7,145	5,501	\$320,351,638	\$884,175,248	\$61,341,363	\$651,505,009	\$1,783,000,627

Source: CAL FIRE, Butte County 3/28/2019 Parcel/Assessor's Data

Population at Risk

The Fire Hazard Severity Zone dataset was overlaid on the parcel layer. Those residential parcel centroids that intersect the severity zones were counted and multiplied by the 2010 Census Bureau average household factors for the City of Oroville – 2.60. According to this analysis, there is a total population of 6,625 residents of Oroville at risk to moderate or higher FHSZs. This is shown in Table D-50.

Table D-50 City of Oroville – Count of Improved Residential Parcels and Population by Fire Hazard Severity Zone

Jurisdiction	Moderate		High		Very High	
	Improved Residential Parcels	Population	Improved Residential Parcels	Population	Improved Residential Parcels	Population
Oroville	979	2,455	1,604	4,170	0	0

Source: CAL FIRE, Butte County 3/28/2019 Parcel/Assessor's Data, US Census Bureau

Critical Facilities at Risk

An analysis was performed on the critical facility inventory in Oroville in identified FHSZs facilities in a FHSZ in the City of Oroville are shown in Figure D-25 and detailed in Table D-51. Details of critical facility definition, type, name and address and jurisdiction by FHSZ are listed in Appendix F.

Table D-51 City of Oroville – Critical Facilities by Fire Hazard Severity Zone

Fire Hazard Severity Zones/ Critical Facility Category / Critical Facility Type	Facility Count
High	
Essential Services Facilities	
Health Care	13
Public Assembly Point / Evacuation Center	1
Essential Services Facilities Total	14
High Total	14
Moderate	
Essential Services Facilities	
Wastewater Treatment Plant	1
Essential Services Facilities Total	1
At Risk Population Facilities	
School	3
At Risk Population Facilities Total	3
Moderate Total	4
Urban Unzoned	
Essential Services Facilities	
Fire	3
Health Care	6
Law Enforcement	3
Public Assembly Point / Evacuation Center	1
Radio Sites	3
Logistics Hub	6
Emergency Operation Center	1
DOC	1
Emergency Animal Shelter	1
Essential Services Facilities Total	25
At Risk Population Facilities	
School	17
At Risk Population Facilities Total	17
Urban Unzoned Total	42
Grand Total	
	60

Source: CAL FIRE, Butte County

Future Development

The pattern of increased damages is directly related to increased urban growth spread into historical forested areas that have wildfire as part of the natural ecosystem. Many WUI fire areas have long histories of wildland fires that burned only vegetation in the past. However, with new development, a wildland fire following a historical pattern now burns developed areas. Growth in the City, especially growth in the wildland urban interface, will increase the risk to wildfire. Adherence to building codes and the use of fire-resistant construction methods as well as implementing sound vegetation management practices will reduce the impact of wildfire to future development.

GIS Analysis

Butte County's 3/21/2019 Assessor Data and the County's GIS parcel data were used as the basis for the inventory of assessed values for both improved and unimproved parcels within the City. Using GIS, the 260 parcels associated with future development projects for which the analysis was to be performed was identified. Future development in FHSZs are shown on Figure D-26 and detailed in Table D-52.

Figure D-26 City of Oroville – Future Development in Fire Hazard Severity Zones

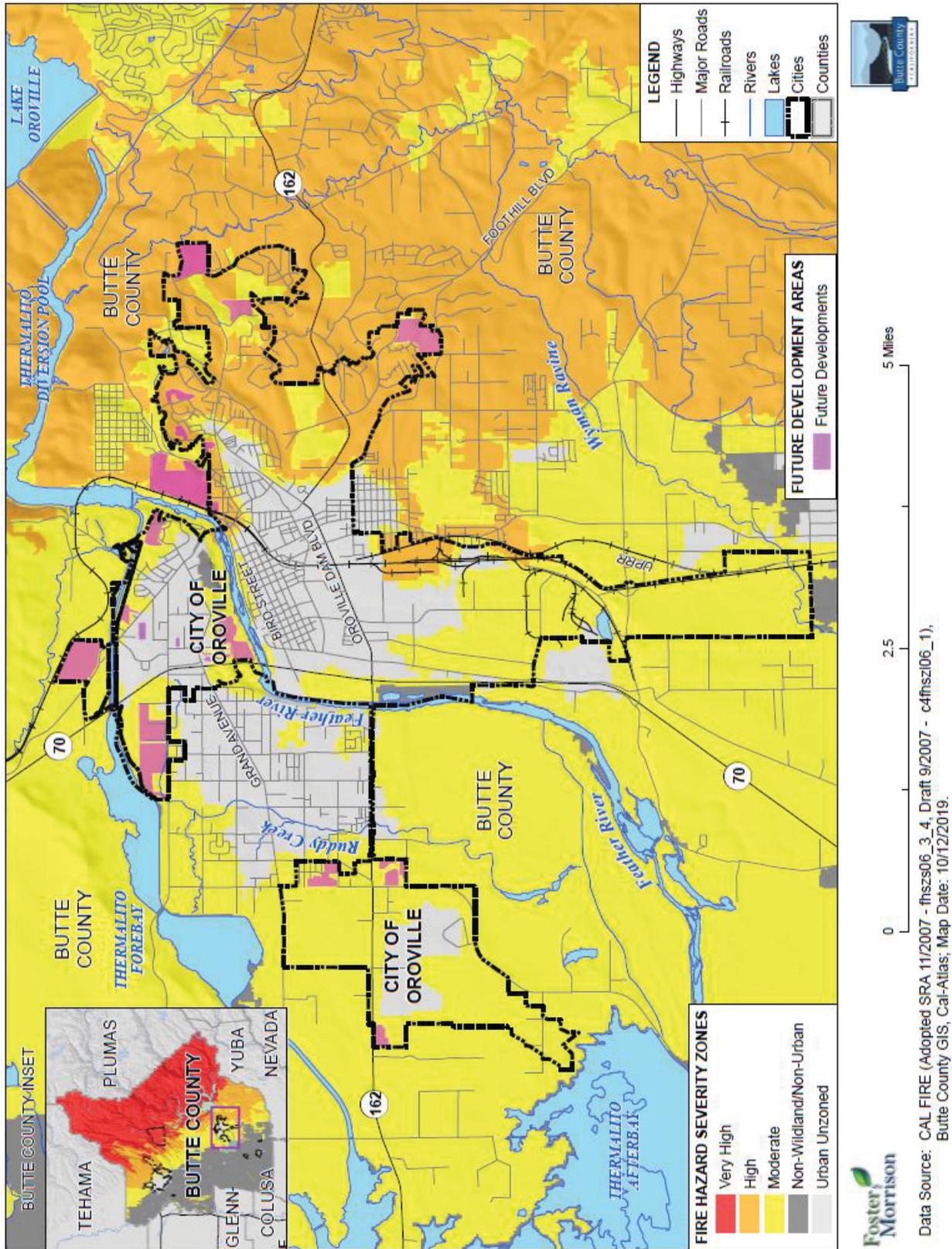


Table D-52 City of Oroville – Future Development Parcels and Acreages in Fire Hazard Severity Zones

Fire Hazard Severity Zone / Future Development	Total Parcel Count	Improved Parcel Count	Total Acres
City of Oroville			
High			
Acacia Estates	2	0	6.7
Heritage Oak Estates	3	1	46.5
Highlands Estates	1	0	13.3
Mission Olive Ranch	14	2	4.8
Oak Park	1	0	5.1
High Total	21	3	76.4
Moderate			
Buttewoods 2	3	0	56.1
Calle Vista Estates Unit II	48	44	24.4
Canal View Estates	3	0	8.4
Deer Creek Estates 2	3	0	24.3
Ford Drive	2	0	22.4
Forebay Estates	1	0	40.2
Linkside Place Phase I	66	6	11.5
Martin Ranch	1	0	73.1
Mission Olive Ranch	6	0	1.9
Nelson 56	1	0	56.5
Rivers Edge	1	0	10.3
Riverview	4	0	38.8
Vista Del Oro	95	22	15.2
Moderate Total	234	72	383.0
Urban Unzoned			
Greenview Estates	1	1	1.9
Rosewood Estates	1		5.0
Urban Unzoned Total	2	1	6.9
City of Oroville Total	257	76	466.4
Unincorporated Butte County			
High			
Oak Park	3	0	94.3
High Total	3	0	94.3
Unincorporated Butte County Total	3	0	94.3

Fire Hazard Severity Zone / Future Development	Total Parcel Count	Improved Parcel Count	Total Acres
Grand Total	260	76	560.6

Source: CAL FIRE, City of Oroville GIS,

D.6 Capability Assessment

Capabilities are the programs and policies currently in use to reduce hazard impacts or that could be used to implement hazard mitigation activities. This capabilities assessment is divided into five sections: regulatory mitigation capabilities, administrative and technical mitigation capabilities, fiscal mitigation capabilities, mitigation education, outreach, and partnerships, and other mitigation efforts.

D.6.1 Regulatory Mitigation Capabilities

Table D-53 lists regulatory mitigation capabilities, including planning and land management tools, typically used by local jurisdictions to implement hazard mitigation activities and indicates those that are in place in the City of Oroville.

Table D-53 City of Oroville Regulatory Mitigation Capabilities

Plans	Y/N Year	Does the plan/program address hazards? Does the plan identify projects to include in the mitigation strategy? Can the plan be used to implement mitigation actions?
Comprehensive/Master Plan/General Plan	2016	Multi-Hazards Plans, Yes
Capital Improvements Plan	2014	Infrastructure Commercial and Residential. Yes.
Economic Development Plan		
Local Emergency Operations Plan	2017	City of Oroville Emergency Operations Plan. Yes
Continuity of Operations Plan	2017	Emergency Operations Plan. Yes
Transportation Plan	2017	Emergency Operations Plan
Stormwater Management Plan/Program	2019	Early Planning Stages, No.
Engineering Studies for Streams		
Community Wildfire Protection Plan	2014	Wildfires
Other special plans (e.g., brownfields redevelopment, disaster recovery, coastal zone management, climate change adaptation)	2014 SCOR	
Building Code, Permitting, and Inspections	Y/N	Are codes adequately enforced?
Building Code	Y	Version/Year: 2016 California Code, Title 24
Building Code Effectiveness Grading Schedule (BCEGS) Score	Y	Score: Class 3

Fire department ISO rating:		Rating:
Site plan review requirements	Y	All new construction is reviewed for site compliance
Is the ordinance an effective measure for reducing hazard impacts?		
Land Use Planning and Ordinances	Y/N	Is the ordinance adequately administered and enforced?
Zoning ordinance	Y	Yes. Hazard mitigation incorporated into ordinances
Subdivision ordinance	Y	Yes. Mirrors state ordinance
Floodplain ordinance	Y	Building elevations and electrical raised, etc.
Natural hazard specific ordinance (stormwater, steep slope, wildfire)	Y	Hillside ordinance
Flood insurance rate maps	Y	
Elevation Certificates	Y	Covers all new development
Acquisition of land for open space and public recreation uses	Y	Master Facility Plan and parkland set asides for larger developments.
Erosion or sediment control program	Y	Parcel-specific
Other		
How can these capabilities be expanded and improved to reduce risk?		
Oroville has operated for several years with reduced staff, and is now re-staffing to minimum effective levels.		

Source: City of Oroville

City of Oroville 2030 General Plan (2015)

The General Plan provides the fundamental basis for the City’s land use, development and conservation policy, and represents the basic community values, ideals and aspirations that will govern the City through 2030. This General Plan addresses all aspects of development, including land use; community character; circulation and transportation; open space, natural resources and conservation; public facilities and services; safety; and noise.

California Government Code Section 65300 requires the General Plan to be comprehensive and internally consistent, and to provide long-term guidance for the community. Although the General Plan is required to address the issues specified by State law, it may be organized in a way that best suits the City of Oroville.

The General Plan includes a Safety Element that focuses on safety issues to be considered in planning for the present and future development of the Oroville Planning Area. Identified hazards include wildfire, geologic/seismic, flooding, and other natural and man-made hazards (such as hazardous materials). Mitigation-related actions and objective summaries are as follows:

- **GOAL SAF-1:** Reduce the risk of injury, loss of life, and property damage from earthquakes, landslides, and other geologic hazards.
 - ✓ Policy P1.1 Group and locate new residential development in such a way as to avoid areas of geologic hazard, including steep slopes and areas of unstable soils.
 - ✓ Policy P1.2 Require all new developments to be subjected to a geotechnical study prior to development approval and to mitigate any identified hazards to a level of insignificance. If mitigation is not possible, do not approve the development.

- ✓ Policy P1.3 Encourage retrofitting of structures, particularly older buildings, to withstand earthquake shaking and landslides, consistent with state Building Codes and Historic Building Codes.
 - ✓ Policy P1.4 Ensure that new development incorporates design and engineering that minimizes the risk of damage from seismic events and landsliding, consistent with state Building Codes and Historic Building Codes.
- **Goal SAF-2:** Reduce hazards associated with flooding, including flooding caused by failure of Oroville Dam.
- ✓ Policy P2.1 Discourage development within the Feather River floodplain and other flood-prone areas, in order to minimize risks associated with flooding.
 - ✓ Policy P2.2 If development occurs within flood plains, ensure that existing and proposed structures are provided adequate protection from flood damage and hazards.
 - ✓ Policy P2.3 Continue to work with appropriate local, State, and federal agencies (particularly the Federal Emergency Management Agency) to maintain the most current flood hazard and floodplain information and use it as a basis for project review and to guide development in accordance with federal, State, and local standards.
 - ✓ Policy P2.4 Continue to participate in the Federal Emergency Management Agency National Flood Insurance Program – Community Rating System.
 - ✓ Policy P2.5 Where feasible, given flood control requirements, maintain the natural condition of waterways and flood plains to ensure adequate groundwater recharge and water quality, preservation of habitat, and access to mineral resources.
 - ✓ Policy P2.6 Support a multi-use concept of flood plains, flood-related facilities, and waterways, including, where appropriate, the following uses:
 - flood control;
 - groundwater recharge;
 - water quality preservation;
 - open space;
 - agriculture;
 - nature study;
 - habitat preservation;
 - pedestrian, equestrian, and bicycle circulation;
 - outdoor sports and recreation.
 - ✓ Policy P2.7 Cooperate with all affected or interested public and private agencies involved to ensure that flood control improvements do not result in unacceptable degradation of environmentally sensitive areas.
 - ✓ Policy P2.8 Incorporate stormwater drainage systems in development projects to effectively control the rate and amount of runoff, so as to prevent increases in downstream flooding potential.
 - ✓ Policy P2.9 Explore the possibility of creating an additional stormwater detention area in Dry Creek.
 - ✓ Policy P2.10 If future studies establish a conclusive relationship between reservoir drawdown, refilling, and seismic activity, encourage the Department of Water Resources to manage the Oroville Dam water regime to reduce risk.

- ✓ Policy P2.11 Prior to project approval, consult Flood Insurance Rate Maps on file with the Planning Department to identify areas in the vicinity of a waterway or drainage course that have not been subject to detailed study. If the project falls within an area that has not been studied, perform studies and, if necessary, require mitigation or restrictions on development.
- **Goal SAF-3:** Protect lives and property from risks associated with wildland and urban fire.
 - ✓ Policy P3.1 Enforce fire protection standards as specified by the City of Oroville Fire Department, Butte County Fire Department, and California Department of Forestry and Fire Protection within rural and undeveloped portions of the Planning Area and in the urban-wildland interface, including implementation of fire safety ordinances to minimize wildland fire hazards, including incorporation of fire resistant building and roofing materials, and attainment and maintenance of “defensible space.” Defensible space may include revegetation with less flammable species, such as fire resistant native and adapted species, and the use of mulch to prevent erosion on bare soil.
 - ✓ Policy P3.2 Ensure that the development review process addresses wildland fire risk, including assessment of both construction- and project related fire risks particularly in areas of the City most susceptible to fire hazards. Review fire safety plans and provisions, consistent with California Public Resources Code (PRC) 4290 and 4291, for new development, including aspects such as emergency access, site design for maintenance of defensible space, and use of non-combustible materials.
 - ✓ Policy P3.3 Require that all development in areas of potential wildland fire hazards, including areas designated by CAL FIRE as High Fire Hazard Severity Zones, include the following:
 - Fire breaks adjoining open space areas.
 - Adequate access to adjoining open space areas.
 - Adequate clearance around structures.
 - Fire-resistant ground cover.
 - Fire-resistant roofing materials.
 - Adequate emergency water flow.
 - ✓ Policy P3.4 Incorporate drought-resistant and fire-resistant plants in public works projects in areas subject to wildland fires.
 - ✓ Policy P3.5 Regularly train Oroville Fire Department staff for wildland firefighting conditions.
- **Goal SAF-7** Prepare Oroville residents to respond to emergency situations.
 - ✓ Policy P7.1 Encourage a high degree of city-level self-sufficiency in emergency response, but coordinate with surrounding jurisdictions to the extent possible.
 - ✓ Policy P7.2 Work with Caltrans to coordinate establishment of appropriate emergency access routes through the City when closure of State highways is necessitated by weather-related or other emergencies.
 - ✓ Policy P7.3 Support the efforts of the Department of Homeland Security, Oroville Fire Department, Butte County Office of Emergency Services, and other agencies to educate the public about emergency preparedness and response.
 - ✓ Policy P7.4 Use the Butte County Local Hazard Mitigation Plan as the guide for disaster planning in the Oroville Planning Area.

Mitigation Related Ordinances

Zoning (Chapter 26)

The purpose of this chapter is to provide specific guidelines for the development of the City in such a manner as to achieve progressively the general arrangement of land uses and implement the policies depicted in the General Plan. More specifically, this chapter is intended to achieve the following objectives:

- To regulate and limit the height, number of stories and size of buildings and other structures hereafter designed, erected or altered.
- To regulate and determine the size of building setbacks and other open spaces;
- To regulate and limit the density of the City's residential population.
- To divide the City into zoning districts of whatever number, shape and area are deemed best suited to carry out these regulations and provide for their enforcement.
- To protect, conserve, stabilize and enhance real property values and the City's natural assets.
- To provide adequate open space for light and air, and to minimize the risk of fires and other hazards to public safety.
- To promote a safe, effective traffic circulation system and provide for appropriate off-street parking and loading facilities.
- To promote, protect and preserve the general public health, safety and welfare, and to implement the goals and objectives of the General Plan for the City of Oroville.

Subdivision (Chapter 23)

In the interest of protecting the health, safety and general welfare of the people of the City of Oroville, this chapter has as its purposes:

- To give effect to the California Subdivision Map Act;
- To give effect to the General Plan and specific plans of the City relative to the subdivision of land;
- To regulate, by local ordinance, those matters of land division and lot line adjustment not governed by the Subdivision Map Act;
- To facilitate and ensure orderly development of lands in the incorporated City;
- To implement the objectives established for the development of the City in conformance with its General Plan and any specific plans that may be adopted, and to ensure that a proposed subdivision or land division shall be considered in relation to those plans;
- To provide standards governing the surveys, designs and improvements of subdivisions, and the submission of maps, plans and specifications for the construction of improvements;
- To provide for a resolution governing standards for, and the construction and installation of, streets, roads, highways, public utilities and other improvements, as well as fee schedules for services rendered by the City;
- To provide for the creation of reasonable building sites by establishing appropriate standards for streets and lots, and to ensure that each property has a means of ingress and egress;
- To control the division of land that is subject to inundation by flooding from natural streams or artificial ponding, and other detrimental influences which may cause land to be unsuitable for satisfactory development;
- To control the division of land which may be subject to dangerous or unsuitable soil conditions of any type, or subject to any other impediments affecting the use of the land for human habitation;

Building Code (Chapter 6)

The purpose of this Chapter is to adopt by reference the 2010 edition of the California Building Standards Code, Title 24 of the California Code of Regulations, subject to the definitions, clarifications, and the amendments set forth in this Chapter. The purpose of this Chapter is also to provide minimum requirements and standards for the protection of the public safety, health, property, and welfare of the City of Oroville. This Chapter is adopted under the authority of Government Code Subsection 50022.2, Health and Safety Code Section 18941.5, and the California Constitution.

Flood Ordinance (Chapter 8B)

This chapter shall apply to all areas of special flood hazards within the jurisdiction of the City of Oroville. The areas of special flood hazard identified by the Federal Emergency Management Agency in the Flood Insurance Rate Map (FIRM) for the City of Oroville is adopted by reference and declared to be a part of this chapter. This FIRM is the minimum area of applicability of this chapter and may be supplemented by studies for other areas which allows implementation of this chapter and which are recommended to the city council by the floodplain administrator. The basis for establishing the area of special flood hazard is the flood insurance study (FIS) for Butte County, California, dated January 6, 2011, and accompanying flood insurance rate map panels related to the city of Oroville (FIRMS) and all subsequent amendments and/or revisions, which are hereby adopted by reference and declared to be a part of this chapter.

No structure or land shall hereafter be constructed, located, extended, converted or altered without full compliance with the terms of this chapter and other applicable regulations. Violations of the provisions of this chapter by failure to comply with any of its requirements (including violations of conditions and safeguards established in connection conditions) shall constitute misdemeanor. Nothing herein shall prevent the city council from taking such lawful action as is necessary to prevent or remedy any violation.

This chapter is not intended to repeal, abrogate, or impair any existing easements, covenants, or deed restrictions. However, where this chapter and another ordinance, easement, covenant, or deed restriction conflict or overlap, whichever imposes the more stringent restrictions shall prevail.

In the interpretation and application of this chapter, all provisions shall be:

- Considered as minimum requirements;
- Liberally construed in favor of the governing body; and
- Deemed neither to limit nor repeal any other powers granted under state statutes.

The degree of flood protection required by this chapter is considered reasonable for regulatory purposes and is based on scientific and engineering considerations. Larger floods can and will occur on rare occasions. Flood heights may be increased by man-made or natural causes. This chapter does not imply that land outside the areas of special flood hazards or uses permitted within such areas will be free from flooding or flood damages.

D.6.2. Administrative/Technical Mitigation Capabilities

Table D-54 identifies the City department(s) responsible for activities related to mitigation and loss prevention in Oroville.

Table D-54 City of Oroville’s Administrative and Technical Mitigation Capabilities

Administration	Y/N	Describe capability Is coordination effective?
Planning Commission	Y	Reviews all use permits and maintains zoning code.
Mitigation Planning Committee	Y	Development Review Committee
Maintenance programs to reduce risk (e.g., tree trimming, clearing drainage systems)	Y	Regular street, tree, storm drain and parks maintenance
Mutual aid agreements	N	
Other		
Staff	Y/N FT/PT	Is staffing adequate to enforce regulations? Is staff trained on hazards and mitigation? Is coordination between agencies and staff effective?
Chief Building Official	PT	Adequate until development pace accelerates
Floodplain Administrator	PT	Adequate until development pace accelerates
Emergency Manager	PT	More training and dedicated staff needed
Community Planner	PT	Adequate until development pace accelerates
Civil Engineer	PT	Minimally adequate
GIS Coordinator	FT	Adequate until development pace accelerates
Other – front counter personnel	3 FT	Adequate until development pace accelerates
Technical		
Warning systems/services (Reverse 911, outdoor warning signals)	Y	The City of Oroville Mass Evacuation Notification will consist in use of Butte County evacuation system. In addition, the City of Oroville will use its' own notification system which is ongoing. The City of Oroville is collaborating with the California Department of Water Resource on this project.
Hazard data and information	N	
Grant writing	PT	
Hazus analysis	N	
Other		
How can these capabilities be expanded and improved to reduce risk?		
Staffing levels increased, including risk management and notification capacity.		

Source: City of Oroville

D.6.3. Fiscal Mitigation Capabilities

Table D-55 identifies financial tools or resources that the City could potentially use to help fund mitigation activities.

Table D-55 City of Oroville’s Fiscal Mitigation Capabilities

Funding Resource	Access/ Eligibility (Y/N)	Has the funding resource been used in past and for what type of activities? Could the resource be used to fund future mitigation actions?
Capital improvements project funding	Y	Varies
Authority to levy taxes for specific purposes	Y	Streets, landscaping, fire
Fees for water, sewer, gas, or electric services	Y	By individual utilities
Impact fees for new development	Y	Parks, police, fire, traffic, sewer, storm drainage, schools
Storm water utility fee	N	Utility fee not legal in Calif, impact fees yes
Incur debt through general obligation bonds and/or special tax bonds	Y	Mello Roos has funded several subdivisions in the past.
Incur debt through private activities	Y	Can access IDB’s, CIEDB, etc. as needed
Community Development Block Grant	Y	Active user
Other federal funding programs	Y	As opportunity presents
State funding programs	Y	As opportunity presents
Other		
How can these capabilities be expanded and improved to reduce risk?		
Improved staffing levels to take advantage of access to consultants and to increase capacity to consider, create, submit and implement		

Source: City of Oroville

D.6.4. Mitigation Education, Outreach, and Partnerships

Table D-56 identifies education and outreach programs and methods already in place that could be/or are used to implement mitigation activities and communicate hazard-related information.

Table D-56 City of Oroville’s Mitigation Education, Outreach, and Partnerships

Program/Organization	Yes/No	Describe program/organization and how relates to disaster resilience and mitigation. Could the program/organization help implement future mitigation activities?
Local citizen groups or non-profit organizations focused on environmental protection, emergency preparedness, access and functional needs populations, etc.	Y	Especially local park district and those dedicated to serving disadvantaged populations.
Ongoing public education or information program (e.g., responsible water use, fire safety, household preparedness, environmental education)	N	
Natural disaster or safety related school programs	Y	Through the schools
StormReady certification	N	
Firewise Communities certification	N	

Program/Organization	Yes/No	Describe program/organization and how relates to disaster resilience and mitigation. Could the program/organization help implement future mitigation activities?
Public-private partnership initiatives addressing disaster-related issues	N	
Other		
How can these capabilities be expanded and improved to reduce risk?		
Additional staffing to replace capacity lost during recession		

Source: City of Oroville

D.6.5. Other Mitigation Efforts

The City of Oroville has many other completed or ongoing mitigation efforts that include the following:

- Flood mitigation
 - ✓ Drainage ditches maintenance
 - ✓ Yearly inspection
 - ✓ Yearly obstruction removal and cleanup
 - ✓ Yearly spraying to prevent and minimize unwanted growth of vegetations / obstructions
 - ✓ Necessary permit from related State agencies
- Storm Drain maintenance
 - ✓ City has a Storm Drain Master plan
 - ✓ Assign an officer over storm drain system
 - ✓ City is also in the process of updating a Storm Drain Master Plan
 - Include comprehensive survey of the entire system
 - Analysis of current system
 - Establish priority and budget for upgrade
 - Application for MS4 permit
 - ✓ Regular storm drain maintenance
 - Debris removal at drainage inlet
 - Storm drain pipes inspection
 - Removal of surface debris
 - Street sweeping
 - Leaf pickup program (debris that otherwise will clog storm drains)
 - Grate inspection, lockdown, replacement program
 - Purchase dedicated machines and tools for storm drain maintenance, including additional street sweeper, vacuum truck, and leaf pickup vehicles.
 - ✓ City is proceeding with studies towards a levee certification
 - Levee analysis is underway
 - Mitigation projects if necessary
 - Share findings with partners, stakeholders, and regulating agencies
 - Obtain levee certification

- Continuity of Government during Public Safety Power Shut-off by upgrading or renewing generators at the public safety building, city hall, and airport.
- Sewerage Commission Oroville Region (SCOR)
- Improve communication line for existing cell towers that connect to Public Safety Communication Center.

D.7 Mitigation Strategy

D.7.1. Mitigation Goals and Objectives

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

D.7.2. NFIP Mitigation Strategy

The City of Oroville joined the National Flood Insurance Program (NFIP) on September 24, 1984. As a participant of the NFIP, the City of Oroville has administered floodplain management regulations that meet the minimum requirements of the NFIP. The management program objective is to protect people and property within the City. The City of Oroville will continue to comply with the requirements of the NFIP in the future.

In addition, the City of Oroville actively participates with Butte County to address local NFIP issues through a regional approach. Many of the program activities are the same for the City of Oroville as for Butte County since participation at the County level includes all local jurisdictions.

Upon request, the City of Oroville Public Works, Building and Planning Divisions provide map information services, public hazard disclosure, and flood protection information. This information is readily available to the public and consists of current and accurate flood mapping. In addition, the Public Works Department provides information about our stormwater management program and up-to-date information related to the maintenance of our drainage system.

The NFIP Community Rating System (CRS) is a voluntary incentive program that recognizes and encourages community floodplain management activities that exceed the minimum NFIP requirements. As a result, flood insurance premium rates are discounted to reflect the reduced flood risk resulting from the community actions meeting the three goals of the CRS which are to reduce flood losses, facilitate accurate insurance rating, and promote the awareness of flood insurance. The City of Oroville is not a current participant in the CRS program.

More information about the floodplain administration in the City of Oroville can be found in Table D-57.

Table D-57 City of Oroville Compliance with NFIP

NFIP Topic	Comments
Insurance Summary	

NFIP Topic	Comments
How many NFIP policies are in the community? What is the total premium and coverage?	99 policies \$99,829 in premiums \$29,287,400 in coverage
How many claims have been paid in the community? What is the total amount of paid claims? How many of the claims were for substantial damage?	21 paid claims \$494,395 in paid claims 3 substantial damage claims
How many structures are exposed to flood risk within the community?	51 in 1% annual chance floodplain 452 in 0.2% annual chance floodplain
Repetitive Loss (RL) and Severe Repetitive Loss Properties (SRL)	1 RL 0 SRL
Describe any areas of flood risk with limited NFIP policy coverage	Unknown
Staff Resources	
Is the Community Floodplain Administrator or NFIP Coordinator certified?	No
Provide an explanation of NFIP administration services (e.g., permit review, GIS, education or outreach, inspections, engineering capability)	Permit review, stormwater capture, engineering and inspection capabilities
What are the barriers to running an effective NFIP program in the community, if any?	Staffing levels
Compliance History	
Is the community in good standing with the NFIP?	Y
Are there any outstanding compliance issues (i.e., current violations)?	N
When was the most recent Community Assistance Visit (CAV) or Community Assistance Contact (CAC)?	CAV 8/10/2010 GTA 9/20/2016
Is a CAV or CAC scheduled or needed?	N
Regulation	
When did the community enter the NFIP?	9/24/1984
Are the FIRMs digital or paper?	Digital
Do floodplain development regulations meet or exceed FEMA or State minimum requirements? If so, in what ways?	Y via levee protections outside the 100-year floodplain
Provide an explanation of the permitting process.	Review of design & grading for new development, stormwater compliance under Regional Water Quality Control Board permit.
Community Rating System	
Does the community participate in CRS?	NO
What is the community's CRS Class Ranking?	N/A
What categories and activities provide CRS points and how can the class be improved?	N/A
Does the plan include CRS planning requirements?	N/A

D.7.3. Mitigation Actions

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

- Dam Failure
- Drought and Water Shortage
- Earthquake and Liquefaction
- Floods: 100/200/500 year
- Floods: Localized Stormwater
- Levee Failure
- Severe Weather: Extreme Heat
- Severe Weather: Freeze and Winter Storm
- Severe Weather: Heavy Rain and Storms (Hail, Lightning, Wind)
- Wildfire

It should be noted that many of the projects submitted by each jurisdiction in Table 5-2 in the Base Plan benefit all jurisdictions whether or not they are the lead agency. Further, many of these mitigation efforts are collaborative efforts among multiple local, state, and federal agencies. In addition, the countywide public outreach action, as well as many of the emergency services actions, apply to all hazards regardless of hazard priority. Collectively, this multi-jurisdictional mitigation strategy includes only those actions and projects which reflect the actual priorities and capacity of each jurisdiction to implement over the next 5-years covered by this plan. It should further be noted, that although a jurisdiction may not have specific projects identified for each priority hazard for the five year coverage of this planning process, each jurisdiction has focused on identifying those projects which are realistic and reasonable for them to implement and would like to preserve their hazard priorities should future projects be identified where the implementing jurisdiction has the future capacity to implement.

Multi-Hazard Actions

Action 1. Integrate Local Hazard Mitigation Plan into Safety Element of General Plan

Hazards Addressed: Climate Change, Dam Failure, Drought & Water shortage, Earthquake and Liquefaction, Floods: 100/200/500 year, Floods: Localized Stormwater, Hazardous Materials Transportation, Invasive Species: Aquatic, Invasive Species: Pests/Plants, Landslide, Mudslide, and Debris Flow, Levee Failure, Severe Weather: Extreme Heat, Severe Weather: Freeze and Winter Storm, Severe Weather: Heavy Rain and Storms (Hail, Lightning), Severe Weather: Wind and Tornado, Stream Bank Erosion, Volcano, Wildfire

Goals Addressed: 1, 2, 3, 4, 5, 6, 7, 8, 9

Issue/Background: Local jurisdictional reimbursement for mitigation projects and cost recovery after a disaster is guided by Government Code Section 8685.9 (AB 2140). Specifically, this section requires that each jurisdiction adopt a local hazard mitigation plan (LHMP) in accordance with the federal Disaster

Mitigation Act of 2000 as part of the Safety Element of its General Plan. Adoption of the LHMP into the Safety Element of the General Plan may be by reference or incorporation.

Other Alternatives: No action

Existing Planning Mechanisms through which Action will be Implemented: Safety Element of General Plan, especially as incorporated into local ordinances and Zoning Code

Responsible Office: City of Oroville Community Development Department

Priority (H, M, L): High

Cost Estimate: Jurisdictional board/staff time

Potential Funding: Local budgets

Benefits (avoided Losses): Incorporation of an adopted LHMP into the Safety Element of the General Plan will help jurisdictions maximize the cost recovery potential following a disaster.

Schedule: As soon as possible

Action 2. Enhance Public Education and Awareness of Natural Hazards and Public Understanding of Disaster Preparedness

Hazards Addressed: Climate Change, Dam Failure, Drought & Water shortage, Earthquake and Liquefaction, Floods: 100/200/500 year, Floods: Localized Stormwater, Hazardous Materials Transportation, Invasive Species: Aquatic, Invasive Species: Pests/Plants, Landslide, Mudslide, and Debris Flow, Levee Failure, Severe Weather: Extreme Heat, Severe Weather: Freeze and Winter Storm, Severe Weather: Heavy Rain and Storms (Hail, Lightning), Severe Weather: Wind and Tornado, Stream Bank Erosion, Volcano, Wildfire

Goals Addressed: 1, 2, 3, 4, 5, 6, 7, 8, 9

Issue/Background: The City and County play a key role in public outreach/education efforts to communicate the potential risk and vulnerability of their community to the effects of natural hazards. A comprehensive multi-hazard public education program will better inform the community of natural hazards of concern and actions the public can take to be better prepared for the next natural disaster event.

Project Description: A comprehensive multi-hazard outreach program will ascertain both broad and targeted educational needs throughout the community. The City will work with the County and other agencies as appropriate to develop timely and consistent annual outreach messages in order to communicate the risk and vulnerability of natural hazards of concern to the community. This includes measures the public can take to be better prepared and to reduce the damages and other impacts from a hazard event. The public outreach effort will leverage and build upon existing mechanisms, will include elements to meet the objectives of Goal 3 of this LHMP Update, and will consider:

- Using a variety of information outlets, including websites, local radio stations, news media, schools, and local, public sponsored events;
- Creating and distributing (where applicable) brochures, leaflets, water bill inserts, websites, and public service announcements;
- Displaying public outreach information in County office buildings, libraries, and other public places and events;
- Developing public-private partnerships and incentives to support public education activities.

Location of Project: Citywide

Other Alternatives: Continue public information activities currently in place.

Existing Planning Mechanism(s) through which Action Will Be Implemented: Existing County outreach programs will be reviewed for effectiveness and leveraged and expanded upon to reach the broader region.

Responsible Office: City of Oroville in partnership with the County

Participating Jurisdictions: County and all cities.

Priority (H, M, L): High

Cost Estimate: Annual costs to be determined, and will depend on the scope and frequency of activities and events as well as volunteer participation

Benefits (Losses Avoided): Increase residents' knowledge of potential hazards and activities required to mitigate hazards and be better prepared. Protect lives and reduce damages, relatively low cost to implement.

Potential Funding: Local budgets, grant funds

Timeline: Ongoing/Annual public awareness campaign

Action 3. City Infrastructure Protection

Hazards Addressed: Climate Change, Dam Failure, Drought & Water shortage, Earthquake and Liquefaction, Floods: 100/200/500 year, Floods: Localized Stormwater, Hazardous Materials Transportation, Invasive Species: Aquatic, Invasive Species: Pests/Plants, Landslide, Mudslide, and Debris Flow, Levee Failure, Severe Weather: Extreme Heat, Severe Weather: Freeze and Winter Storm, Severe Weather: Heavy Rain and Storms (Hail, Lightning), Severe Weather: Wind and Tornado, Stream Bank Erosion, Volcano, Wildfire

Goals Addressed: 1, 2, 3, 4, 5, 6, 7, 8, 9

Issue/Background: The current infrastructure of the city cannot withstand the fast growth in population. The city needs a drainage culvert that can withstand the growing population. An overflow of these culverts

floods the street of Oroville such as Oro Dam Blvd. These floods will flow into the city sewage system, which cannot hold the increased capacity.

Project Description: This is a multi-project of increasing the size of the drainage system and improving sewage system.

Other Alternatives:

Existing Planning Mechanism(s) through which Action Will Be Implemented: Currently in planning stage.

Responsible Office/Partners: The City of Oroville public works, housing, and planning.

Cost Estimate: According to the City of Oroville, this cost is estimated at \$10,000,000

Benefits (Losses Avoided): Potential benefits are health and safety of citizens of Oroville, environmental hazards of streams and rivers.

Potential Funding: Local, State, and Federal funding

Timeline: 5 Years.

Project Priority: High

Action 4. Planning for Mass Evacuation-Notifications Early Warning System

Hazards Addressed: Climate Change, Dam Failure, Drought & Water shortage, Earthquake and Liquefaction, Floods: 100/200/500 year, Floods: Localized Stormwater, Hazardous Materials Transportation, Invasive Species: Aquatic, Invasive Species: Pests/Plants, Landslide, Mudslide, and Debris Flow, Levee Failure, Severe Weather: Extreme Heat, Severe Weather: Freeze and Winter Storm, Severe Weather: Heavy Rain and Storms (Hail, Lightning), Severe Weather: Wind and Tornado, Stream Bank Erosion, Volcano, Wildfire

Goals Addressed: 1, 2, 3, 4, 5, 6, 7, 8, 9

Issue/Background: A recent incident of the Oroville Dam cause panic and traffic congestion. This was cause by citizens attempting to evacuate at once. An early warning system would mitigate traffic congestion and risk of safety.

Project Description: This in-progress project is to rebuild the siren in the downtown area of Oroville.

Other Alternatives:

Existing Planning Mechanism(s) through which Action Will Be Implemented: Rebuilding the fibers within the sirens.

Responsible Office/Partners: The City of Oroville is partnership with the Department of Water Resources.

Cost Estimate: \$50,000 is the estimated cost to implement this project.

Benefits (Losses Avoided): Public safety and mitigate the congestion of traffic for citizens attempting to evacuate the downtown area.

Potential Funding: Local, state, and federal funding

Timeline: Five-year plan.

Project Priority: High

Action 5. Weed Abatement

Hazards Addressed: Wildfire, Drought, Extreme Heat, High Winds

Goals Addressed: 1, 2, 3, 4, 5, 6, 7, 9

Issue/Background: Fire-Fuel Reduction which has a high potential of causing a fire. Especially in the eastern areas of the City of Oroville. The city of Oroville believes a possible fire in these high hazards weed areas are a threat to the city/county areas in close proximity.

Project Description: Five-person team at 20-hours per weeks, to reduce potential fire causing fuel

Other Alternatives: No action.

Existing Planning Mechanism(s) through which Action Will Be Implemented: Public works with Oroville Fire Department working together to reduce fuel.

Responsible Office/Partners: The City of Oroville and Dept. of Water Resources are working together to implement this project.

Cost Estimate: According to the City of Oroville, this cost is estimated at \$50,000.

Benefits (Losses Avoided): Potential benefits are safety of citizens of Oroville.

Potential Funding: Local and State funding

Timeline: Continuous since 2011. This project will continue for Five-years.

Project Priority: High Priority.

Action 6. Public Safety Power Shut-off (PSPS)

Hazards Addressed: Functions of wildfires, wind, and heat. May be exacerbated by drought.

Goals Addressed: 1, 2, 3, 4, 5, 6, 7, 9

Issue/Background: During the past year 2018/19, the City of Oroville has endured several power outages due to the weather. During the power outages, the City of Oroville Government utilizes the use of generators. These generators were not built to withstand the numerous PSPS and need replacement.

Project Description: Replacement of City Generators:

The stakeholders rely on the flow of governmental services such as city hall, airports, and public safety departments to include public works for assistance. Replacement of these generators will mitigate the loss of access to city government in times of need such as the PSPS.

Other Alternatives: NO action

Existing Planning Mechanism(s) through which Action Will Be Implemented: The issue of PSPS is in the planning stages of the Local Hazard Mitigation Plan.

Responsible Office/Partners: The City of Oroville in partnership with Public Utilities Committee.

Cost Estimate: \$100,000 is the estimated cost to replace the generators

Benefits (Losses Avoided): The benefit of generator replacement would allow the stakeholder (Community) governmental access.

Potential Funding: Local, State, and Federals Funding.

Timeline: Five-year plan.

Project Priority: High

Action 7. Community Development (Code Enforcement) post disaster recovery projects.

Hazards Addressed: Fire and subsequent multi hazards

Goals Addressed: 1, 2, 3, 4, 5, 6, 7, 9

Issue/Background: Recent fire disasters to the adjacent areas of the City of Oroville has left the City vulnerable to unexpected hazards. These unexpected hazards are created from such things as rapid increase in population, environmental, flooding, and fires. The City of Oroville Code Enforcement is a subsection of Community Development and is currently understaffed and makes it difficult to mitigate the potential risk of fires by conducting building inspections.

Project Description: The project of code enforcement would be to mitigate hazards through citizen compliance of building codes and laws. Mitigation of fires through reduction of fuel beds within and outside the City of Oroville. Collaborate with fire departments and outside agency jurisdictions to mitigate fire hazards. This project includes public outreach such as presentations at neighborhood watch meetings.

Other Alternatives:

Existing Planning Mechanism(s) through which Action Will Be Implemented: The city has collaborated with the City Fire Department to ensure code enforcement law are being enforced.

Responsible Office/Partners: City Administration and City of Oroville Community Development Department.

Project Priority: High

Cost Estimate: \$25,000

Benefits (Losses Avoided): Mitigate loss of live and property.

Potential Funding: Local, Regional, State, and Federal funding.

Timeline: Continuous; however, 3-5 years

Action 8. Flood Sewage Commission-Oroville Region (SC-OR)

Hazards Addressed: Flood, Localized Flood, Dam Failure, Levee Failure

Goals Addressed: 1, 2, 3, 4, 7, 9

Issue/Background: Concerns regarding the capabilities to return to the SCOR plant during an evacuation and coordinating with emergency personnel. When the plant is flooded, all the pumps will shut down and sewage will back up into town and add to the flooding which will cause an environmental hazard. Rebuilding sewage infrastructure will be needed to support the growing population, climate change, and increase rains.

Project Description: Protect the treatment plant and the environment from adverse impact that may occur when hazardous or toxic wastes are discharged into the sewer system. Joint powers agreement between the City, Lake Oroville Area Public Utility District and Thermalito Irrigation District.

Other Alternatives:

Existing Planning Mechanism(s) through which Action Will Be Implemented: Designed and implemented a pretreatment program for publicly owned treatment works with a design flow of greater than five (5) million gallons per day increased to 6.5 million gallons per day or greater with industrial users subject to federal categorical Pretreatment Standards.

Responsible Office/Partners: SC-OR City of Oroville City Council member.

Project Priority: High Capital Improvement Plan

Cost Estimate: From Table 8.1 CIP - Sanitary Sewer Master Plan, City of Oroville

- Element 1: System Deficiencies \$8,488,000
- Element 2: System Upgrades \$3,705,000
- Element 3: System Expansion \$28,214,000
- Total \$40,407,000
- Reference: <http://www.cityoforoville.org/home/showdocument?id=9350>.

Benefits (Losses Avoided): Avoid contamination of treatment facilities.

Potential Funding: Local revenue

Timeline: Five to Ten years