

Annex A City of Colusa

A.1 Introduction

This Annex details the hazard mitigation planning elements specific to the City of Colusa, a previously participating jurisdiction to the 2018 Colusa 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 Colusa, with a focus on providing additional details on the planning process, risk assessment, and mitigation strategy for this jurisdiction.

A.2 Planning Process

As described above, the City of Colusa followed the planning process detailed in Chapter 3 of the Base Plan. In addition to providing representation on the Colusa 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 A-1. Additional details on Plan participation and City representatives are included in Appendix A.

Name	Position/Title	How Participated			
Bryan Stice	Previous City Planner	Attended workshops and provided details of the process the City of Colusa was going to take in relation to a mitigation strategy			
Dave Swartz	City Engineer	Provided City input on hazard issues and mitigation strategies			
Jesse Cain	City Manager	Oversaw the plan with the previous City Planner			
Logan Conley	City Fire Chief	Attended HMPC meetings. Provided input on Hazard events and vulnerability concerns to the City			

Table A-1 City of Colusa – Planning Team

Coordination with other community planning efforts is paramount to the successful implementation of this LHMP Update. This section provides information on how the City integrated the previously approved 2018 LHMP into existing planning mechanisms and programs. Specifically, the City incorporated into or implemented the 2018 LHMP through other plans and programs shown in Table A-2.



Table A-2 2018 LHMP Incorporation

Planning Mechanism 2018 LHMP Was Incorporated/Implemented In.	Details: How was it incorporated?		
-	Due to Covid-19, and the exit and absence of the city planner, it was difficult to implement any programs.		

A.3 Community Profile

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





A.3.1. Geography and Climate

The City of Colusa is located near the geographic center of the Sacramento Valley. The nearest major metropolitan city is Sacramento, approximately 60 miles to the south. The City of Chico, located approximately 50 miles northeast of Colusa, and Yuba City, 22 miles east, are other nearby urban areas. Unique features of the Colusa community include its location next to the Sacramento River and historic character in the downtown core. The climate varies from low temperatures ranging from 24 to 44 degrees to high temperatures reaching temperatures of 80 to as high as 110 degrees at certain times of the year. The average annual rainfall is about 14.2 inches per year, with primary rain events occurring in the Fall (October) through the Spring (April). Colusa lies in the central valley of California, is relatively flat, and sits at 49' in elevation above mean sea level.

A.3.2. History

Founded in 1850, the City of Colusa was briefly known as Salmon Bend. Prior to its incorporation, the City was the site of an Indian village inhabited by a subgroup of the Wintun Indian Nation. One of the first Anglo-Saxon settlers was the Semple family. This group settled along the Sacramento River at present day Colusa and established a trading center for gold mining activities farther north in Trinity and Shasta Counties. River steamers could travel as far north as Red Bluff in the winter but could navigate only up to Colusa in the summer due to low water levels. Because Colusa was at the upper end of navigable waters during summer months, the town became a year-round center of commerce.

In the 1860s, the economy of Colusa County changed from primarily stock-raising to the farming of wheat, barley, and other crops. Wheat production eventually became the predominant land use and economic activity. However, the market for wheat eventually declined when Argentina and Canada became major exporters of the product in the 1890s. Following the decline of the wheat industry, rice was introduced to the area and became the dominant crop in the County. Rice required a large amount of water compared to other crops produced in the area. The need for additional water was addressed with the construction of the Glenn-Colusa Irrigation Canal.

Colusa was incorporated in 1868, during an expansion of farming and a growth in population in the region. The City grew to a population of 2,000 in the prosperous 1870s, distinguished by broad, level streets, numerous brick business buildings, and stately residences. As the county seat, Colusa counted among its residents an unusually large complement of judges, attorneys, assessors, and governing officials, many of whom also earned their livelihoods as farmers and merchants.

Vestiges of Colusa's 19th century traditional life continue to the present day. Stately Italianate and Queen Anne dwellings, intermingled with Craftsman bungalows and clusters of Tudor Revival homes, provide residences for a new generation of Colusans. Farm-supporting businesses continue to service agricultural production in the surrounding unincorporated lands.

A.3.3. Economy and Tax Base

Colusa's location, at the intersection of two state highways, provides an advantage for its retail economy. Colusa has three highway ingresses, all of which funnel traffic through downtown. The highway layouts,

combined with the historic small town commercial sites, provide a distinct advantage to the City's opportunity for economic development. Colusa's retail sector is the predominant influence on its economy, as well as the major generator of tax revenues to the City.

Colusa still relies in large part on the same economic base that has sustained it for more than a century – agriculture and its related businesses. Most of the residents in Colusa work in Colusa or the surrounding area, within a 30-minute commute or less from their homes. Unlike many other cities of equal distance from Sacramento, it has not become a "bedroom" community where most working residents face hours of daily commute to work.

US Census estimates show economic characteristics for the City of Colusa. These are shown in Table A-3 and Table A-4. Mean household income in the City was \$75,073. Median household income in the City was \$59,400.

Table A-3 City of Colusa – Civilian Employed Population 16 years and Over

Industry	Estimated Employment	Percent
Agriculture, forestry, fishing and hunting, and mining	439	16.2%
Construction	169	6.2%
Manufacturing	370	13.7%
Wholesale trade	38	1.4%
Retail trade	187	6.9%
Transportation and warehousing, and utilities	90	3.3%
Information	15	0.6%
Finance and insurance, and real estate and rental and leasing	74	2.7%
Professional, scientific, and management, and administrative and waste management services	71	2.6%
Educational services, and health care and social assistance	594	21.9%
Arts, entertainment, and recreation, and accommodation and food services	270	10.0%
Other services, except public administration	126	4.7%
Public administration	265	9.8%

Source: US Census Bureau American Community Survey 2022 Estimates

Table A-4 City of Colusa – Income and Benefits

Income Bracket	Percent
<\$10,000	7.7%
\$10,000 - \$14,999	55.3%
\$15,000 - \$24,9999	7.9%
\$25,000 - \$34,999	13.0%
\$35,000 - \$49,999	10.3%
\$50,000 - \$74,999	17.0%

Income Bracket	Percent
\$75,000 - \$99,999	15.5%
\$100,000 - \$149,999	12.7%
\$150,000 - \$199,999	7.6%
\$200,000 or more	3.0%

Source: US Census Bureau American Community Survey 2022 Estimates

Major employers of City residents in the area include the County of Colusa, City of Colusa, Colusa Casino Resort, Colusa Unified School District, Colusa Regional Medical Center, Colusa Industrial Properties, and Sunsweet Dryers. While many residents work locally, others commute to Yuba City, Williams, and the Yolo-Sacramento area for work.

A.4 Risk Assessment

As defined by FEMA, risk is a combination of hazard, vulnerability, and exposure. "It is the impact that a hazard would have on people, services, facilities, and structures in a community and refers to the likelihood of a hazard event resulting in an adverse condition that causes injury or damage."

The City of Colusa risk assessment identifies and profiles relevant hazards and assesses the exposure of lives, property, infrastructure, and the environment to these hazards. The process allows for a better understanding of the City's potential risk to hazards and provides a framework for developing and prioritizing mitigation actions to reduce risk from future hazard events.

Building on the Community Profile above, a risk assessment was performed for the City. This includes the following sections:

- > A.4.1 Assets Inventory and Growth and Development Trends
- > A.4.2 Hazard Identification
- > A.4.3 Hazard Profiles and Vulnerability to Specific Hazards

A.4.1. Assets Inventory and Growth and Development Trends

This section provides an inventory of the City of Colusa's total assets potentially at risk to hazards and an overview of growth and development trends. This section is broken into two parts:

- Asset Inventory The assets inventory identifies the City of Colusa's total assets, including the people and populations; structures; critical facilities and infrastructure; community lifelines; natural, historic, and cultural resources; and economic assets and community activities of value. This data is not hazard specific, but is representative of total assets within the City, potentially at risk to identified hazards as discussed in Section A.4.3 Hazard Profiles and Vulnerability to Specific Hazards.
- Growth and Development Trends A discussion of growth and development trends in the City, both current and future, is presented.

Assets Inventory

The City's asset inventory is detailed in the following sections:

- People and Populations
- > Structures
- Critical Facilities and Infrastructure
- Community Lifelines
- > Natural, Historic, and Cultural Resources
- Economic Assets and Community Activities of Value

A discussion of each of these assets follows and serves as the template for the asset discussion for each hazard in Section A.4.3.

People and Populations

The most important asset within any community are the people and populations that reside in the community. This section includes an inventory of past and current populations of the City and also discusses socially vulnerable populations and underserved communities as a subsection of people and populations located within the City and potentially at risk to hazards. Information from the City, US Census Bureau, California Department of Finance, and other sources as detailed below form the basis of this discussion.

Historic Population Trends and Current Population

Population growth can increase the number of people living in hazard prone areas. The City of Colusa has 6,447 residents, as of January 1, 2024. The City of Colusa has seen growth rates as shown in Table A-5. As shown, the City has grown consistently since 1950, with growth slowing recently.

Year	Population	% Change
1950	3,031	_
1960	3.518	16.1%
1970	3.842	9.2%
1980	4,075	6.1%
1990	4,934	21.1%
2000	5,402	9.5%
2010	5,971	10.5%
2020	6,411	7.4%
2023	6,447	0.3%

 Table A-5 City of Colusa– Population Changes Since 1950

Source: US Census Bureau, California Department of Finance (2024)

Special Populations and Disadvantaged Communities

The City is a very socially and economically diverse community, and many residents that are socially or economically disadvantaged or vulnerable due to varying reasons reside within the City. The City and surrounding County are no strangers to large natural disasters which have had a direct impact on the populations of the area. Thus, it is important to consider the potential effects of hazard events and disasters

on these more vulnerable populations. Socially vulnerable and disadvantaged communities in the City are discussed by the following sources:

- CDC Social Vulnerability Index
- California Department of Water Resources (CA DWR) Special Populations and Disadvantaged Community Mapping
- FEMA Community Disaster Resilience Zones
- City Planning Team Input

CDC Social Vulnerability Index

Every community must prepare for and respond to a hazard event, including the range of natural hazards addressed in this Plan, from severe weather extremes to large potentially catastrophic events such as wildfires or earthquakes. A number of factors, including poverty, lack of access to transportation, and crowded housing may weaken a community's ability to prevent human suffering and financial loss in a disaster. These factors are known as social vulnerability.

Social vulnerability refers to the potential negative effects on communities caused by external stresses on human health. Such stresses include natural or human-caused disasters, or disease outbreaks. Reducing social vulnerability can decrease both human suffering and economic loss. The Agency for Toxic Substances and Disease Registry (ATSDR) Geospatial Research, Analysis & Services Program (GRASP) created databases to help emergency response planners and public health officials identify and map communities that will most likely need support before, during, and after a hazardous event. The CDC used these databases to create the CDC Social Vulnerability Index (CDC SVI), which uses 15 U.S. census variables to help local officials identify communities that may need additional support before, during, or after disasters.

CDC SVI uses U.S. Census data to determine the social vulnerability of every census tract. Census tracts are subdivisions of counties for which the Census collects statistical data. The CDC SVI ranks each tract on 15 social factors, including poverty, lack of vehicle access, and crowded housing, and groups them into four related themes. Each tract receives a separate ranking for each of the four themes, as well as an overall ranking. Maps of the four themes for the City are shown in the figures below.

The overall SVI map is shown in Figure A-2; the socioeconomic SVI for the census tracts in and around the City are shown in Figure A-3; the household composition SVI is shown in Figure A-4; the minority and language SVI is shown in Figure A-5; and the housing and transportation SVI is shown in Figure A-6. Overall, the maps indicate that, in general, the City sees little change in social vulnerability regardless of location. As shown, there is very minimal change in each SVI across the City.





Source: CDC Social Vulnerability Index – map retrieved 3/20/2024 Level of Vulnerability Rating: **Yellow** – Low; **Green** – Low/Medium; **Aqua** – Medium/High; **Blue** – High; **Grey Hatched** – No Data; **Grey** – Not Available

Figure A-3 City of Colusa – Socioeconomic Status Vulnerability



Source: CDC Social Vulnerability Index – map retrieved 3/20/2024 Level of Vulnerability Rating: Faint Green – Low; Light Green – Low/Medium; Green – Medium/High; Dark Green – High; Grey Hatched – No Data; Grey – Not Available





Source: CDC Social Vulnerability Index - map retrieved 3/20/2024

Level of Vulnerability Rating: Faint Orange – Low; Light Orange – Low/Medium; Orange – Medium/High; Dark Orange – High; Grey Hatched – No Data; Grey – Not Available

Figure A-5 City of Colusa – Racial and Ethnic Minority Status



Source: CDC Social Vulnerability Index - map retrieved 3/20/2024

Level of Vulnerability Rating: Faint Purple – Low; Light Purple – Low/Medium; Purple – Medium/High; Dark Purple – High; Grey Hatched – No Data; Grey – Not Available



Figure A-6 City of Colusa – Housing Type and Transportation

Source: CDC Social Vulnerability Index - map retrieved 3/20/2024

Level of Vulnerability Rating: Faint Blue – Low; Light Blue – Low/Medium; Blue – Medium/High; Dark Blue – High; Grey Hatched – No Data; Grey – Not Available

California DWR Disadvantaged Community Mapping Tool

The State of California's Proposition 1 Disadvantaged Community (DAC) Involvement Program is designated to ensure the involvement of DACs as well as Economically Distressed Areas and Underrepresented Communities, which DWR collectively refers to as DACs. The Cal DWR definition for a Disadvantaged Community is a community with an annual median household income (MHI) that is less than 80% of the Statewide annual MHI (PRC Section 75005(g)), and those census geographies with an annual MHI less than 60% of the Statewide annual MHI are considered "Severely Disadvantaged Communities". Those areas in the City considered disadvantaged are shown in Figure A-7. As shown, much of the City falls in these DAC areas.



Figure A-7 Colusa County Planning Area – Disadvantaged Areas

Source: Cal DWR DAC Mapping Tool - retrieved 3/14/2023

FEMA Community Disaster Resilience Zones

Community Disaster Resilience Zones aim to build and strengthen community resilience across the nation by driving federal, public, and private resources to the most at-risk and in-need communities. The Community Disaster Resilience Zones Act uses FEMA's National Risk Index to identify the most at-risk and in-need communities to identify resilience zones. Designated zones will be prioritized for targeted federal support, such as increased cost-share for resilience and mitigation projects, lessening the financial burden on communities to perform resilience-related activities. On September 6, 2023, FEMA announced the initial 483 designations in all 50 states and the District of Columbia. Figure A-8 shows these zones in teal green. As shown, these areas lie adjacent to the City, but outside of the City limits.



Figure A-8 Colusa County Planning Area – FEMA Community Disaster Resilience Zones

Source: FEMA. Map retrieved 3/15/2024.

City Planning Team Input

The City noted that the Critical Facilities and Infrastructure section below includes the facilities used by At-Risk populations. While this is not specific to what special populations reside in the City, it does speak to facilities that area used to serve (portions) of this population.

The City Planning Team noted that the City of Colusa has limited facilities/housing for special needs populations. The City also noted that elderly residents are primarily congregated in the Jaconetti Center near the NW corner of Carson and D Streets. The Eskaton Frank Jaconetti Center is one of the largest non-profit providers of aging services in Northern California and has been serving older adults in the region for over 55 years. The organization offers stand-alone independent living, assisted living, and memory care communities, Life Plan Communities (CCRC, Continuing Care Retirement Community), affordable housing communities, home and community-based services, along with an array of education, social programs and resources to empower older adults to live well.

In addition, the City provides services through the local Veterans Hall. The Veterans of Foreign Wars of the United States is a nonprofit veterans service organization comprised of eligible veterans and military service members.

City of Colusa General Plan 2020-2028 Housing Element

The City of Colusa 2020-2028 Housing Element also discusses special populations in the City. Discussions for seniors, those with disabilities, people experiencing homelessness, large households, female headed

households, extremely low-income households, and farmworkers were included. These are discussed below.

Seniors

Seniors have special housing needs primarily resulting from physical disabilities and limitations, fixed or limited income and health care costs. Additionally, senior households also have other needs to preserve their independence, including supportive services to maintain their health and safety, in-home support services to perform activities of daily living, conservators to assist with personal care and financial affairs, public administration assistance to manage and resolve estate issues, and networks of care to provide a wide variety of services and daily assistance.

According to the U.S. Census Bureau, approximately 683 persons in Colusa were 65 years and older in 2016 as compared to 868 in 2011. This resulted in an overall 3.1% decrease in seniors of the City's overall population. There are three skilled care senior facilities in the Colusa area: Colusa Regional Medical Center (Colusa), Valley West Care Center (Williams) and the Sunbridge Care Center (Willows) to help care for this population.

Persons with Disabilities

A disability includes, but is not limited to, any physical or mental disability that limits a major life activity by making the achievement of major life activities difficult, including physical, mental and social activities and working. disabled persons often require special housing needs related to potential limited earning capacity, the lack of accessible and affordable housing, and higher health costs associated with disabilities. Additionally, various disabilities require a wide range of different housing options depending on the type and severity of the disability. According to the US Census Bureau, there are 1,200 persons with a disability living in the City. 6.6% of this number are employed, typically in low wage-earning positions indicating that this population needs access to affordable housing options.

Persons with a Developmental Disability

This term "developmental disability" includes mental retardation, cerebral palsy, epilepsy, autism and disabling conditions found to be closely related to mental retardation or to require treatment similar to that required for individuals with mental retardation. The California Department of Development Services (DDS) reports that approximately 54 developmentally disabled persons reside in the City, with almost all persons living with a parent or guardian.

Large Households

Large households are defined as those households containing 5 or more people. These families are typically limited in their income which causes housing issues due to larger units are more expensive and most units with over 3 bedrooms are typically single-family homes, instead of multi-family rental units. Large family households are considered a special needs group because there is a limited supply of adequately sized housing to accommodate their needs. Between 2011 and 2016, the number of owner-occupied large households in Colusa decreased from 148 to 121. However, renter-occupied households increased by more than 69% from 62 to 201 units, an increase of 139 households.

Overcrowded Households

Overcrowded households are usually a reflection of the lack of affordable housing available. Households that cannot afford housing units suitably sized for their families are often forced to live in housing that is too small for their needs, which may result in poor physical condition of the dwelling unit. Although there is more than one way of defining overcrowded housing units, the definition used in the Housing Element is 1.01 or more persons per room, the same definition used in the 2000 and 2010 Censuses. Overcrowding increases health and safety concerns and stresses the condition of the housing stock and infrastructure.

According to the U.S. Census Bureau in 2016, 180 households were living in crowded conditions. The majority of these households were living in overcrowded conditions with 1.01 to 1.50 person per room. The level of overcrowding is somewhat higher among renter occupied households at 8.9% compared to 8.6% for owner-occupied households, for a total average of 8.3% for all housing types. However, over all this is lower than the County average of 12.5% of households experiencing overcrowded conditions.

Female Head of Households

There are about 304 female headed households (single without husbands) residing in the City, which consists of about 20.3% of all households in Colusa. There has been very little shift in this number since 2010. Just under half of this population lives below the poverty rate, indicating that more housing support is needed for this vulnerable group that typically struggles with earning income opportunities and other specific needs like daycare availability.

Extremely Low Income

Households in the extremely low-income category have special housing needs because they are unlikely to find market-rate housing that is affordable at any price. Extremely low-income households may be homeless or in danger of being homeless because of their inability to find appropriately priced housing. Over 100 people in Colusa with annual incomes of less than \$20,000 were paying more than 30% of their income for shelter. That constitutes over 26% of this extremely low-income category. Because of these cost burdens, extremely low-income households may require specific housing solutions, including subsidies, housing with supportive services, shared housing and/or single-room occupancy units.

Homeless Population

Homeless individuals, generally in the extremely low-income category, include, but are not limited to victims of domestic violence, persons with mental illness, persons suffering from addiction, families with single heads-of-household and unaccompanied minors. This term also includes individuals who have purchased parcels of land but are unable to afford site improvements for a home. Though there appears to be no significant homeless population in the City, some extremely low-income households are most at-risk of becoming homeless. In any case, it is clear that there is a need for a regional emergency shelter to serve the homeless' needs.

Periodically, there are a few individuals who are homeless in the City who call Colusa the location of their last permanent residence. There are no homeless encampments in the City. Many of the homeless individuals are permanently homeless who often live outside the City, but who need periodic emergency

shelter during in-climate weather, such as during the winter when the temperature can reach below freezing and during the summer when it can reach above 100 degrees.

Agricultural Workers

Agriculture workers can be characterized as having extremely low incomes that need special housing needs. They play a critical role in contributing to Colusa County's major producing industry since the largest portion of Colusa's workforce was employed in agriculture, forestry, fishing/hunting and mining in 2018. This does not account for how many of these individuals are employed separately in farm industries or whether they are seasonally or permanently employed. The housing needs of permanent farm workers are no different from those of other employment groups. Such needs consist of housing that is affordable in relation to income, meets acceptable housing standards and is reasonably accessible to the site of employment.

Seasonal or part-time farm workers who do not leave the area and seek year-round residency in the area, have similar needs, but their income is likely to be considerably less than year-round employees and these individuals may require subsidized housing or employer-based housing. As a result, migrant farm workers may seek housing in a labor camp or may rent an available and inexpensive unit (which may be shared among several workers). If such housing is not available, migrant farm workers may resort to substandard shelters, ranging from vehicles to tents or other forms of temporary shelter. Because migrant farm workers desire to reside near the work sites, most farm worker housing should be provided in these unincorporated areas; farm workers with reliable transportation could reside within the City limits.

Structures

This section looks at the parcels (and associated structures) that make up the built environment of the City. The following data from the Colusa County Assessor's Office is based on the 2023 Assessor's data, and the associated parcel layer. The methodology used to derive the number of total and improved parcels (i.e., those with an improved structure value) and land and improved property values (as well as content replacement values) and other values is the same as in Section 4.2.1 of the Base Plan. This data should only be used as a guideline to overall values in the City, as the information has some limitations. The most significant limitations are created by Proposition 13. 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 City. 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 A-6 shows the Colusa County Parcel/Assessor Data values and content replacement values (e.g., the values at risk) broken down by property use for the City.

Property Use	Total Parcel Count	Improved Parcel Count	Total Land Value	Improved Structure Value	Other Value	Estimated Contents Value	Total Value
Agricultural	23	11	\$13,938,078	\$552,43 0	\$ 495 , 940	\$552,430	\$15,538,878
Commercial	249	190	\$20,544,713	\$57,204,144	\$6,312,332	\$57,204,144	\$141,265,333
Government	107	51	\$5,985,502	\$33,560,789	\$18,519,832	\$33,560,789	\$91,626,912
Industrial	65	22	\$12,418,971	\$34,637,423	\$15,447,206	\$51,956,134	\$114,459,734
Institutional	34	20	\$2,286,791	\$6,200,820	\$6,039,649	\$6,200,820	\$20,728,080
Miscellaneous	12	5	\$615,343	\$8,431,121	\$ 0	\$8,431,121	\$17,477,585
Residential	1,844	1,778	\$88,514,146	\$303,181,060	\$2,413,584	\$151,590,525	\$545,699,315
City of Colusa Total	2,334	2,077	\$144,303,544	\$443,767,787	\$49,228,543	\$309,495,963	\$946,795,837

Table A-6 City of Colusa – Total Parcels (and Structures) by Property Use

Source: 2023 Colusa County Parcel/Assessor Data

Critical Facilities and Infrastructure

Beyond just the buildings and structures that comprise the built environment, it is important to identify the critical facilities and infrastructure that are critical for life safety and property protection. This is done for the City of Colusa below.

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:

- Essential Service Facility: A facility in either the public or private sector that provides essential products and services to the general public, is otherwise necessary to preserve the welfare and quality of life in the County, or fulfills important public safety, emergency response, and/or disaster recovery functions.
- At-Risk Populations: Pre-schools, public and private primary and secondary schools, before and after school care centers, daycare centers, group homes, and assisted living residential or congregate care facilities with multiple residents.

Critical facilities in the City are shown on Figure A-9. A summary of all critical facilities in the Colusa County Planning Area is shown in Table A-7 and detailed in Table A-8. Additional details of individual critical facilities can be found in Appendix F of this Plan Update.





Critical Facility Category	Facility Count		
Essential Services Facilities	10		
At Risk Population Facilities	40		
City of Colusa Total	50		

Table A-7 City of Colusa – Critical Facilities by Category

Source: Colusa County GIS

Table A-8 City of Colusa – Critical Facilities by Category and Type

Critical Facility Category	Facility Type	Facility Count
	Emergency Response	1
	Fire Station	2
	Medical	1
Essential Services Facilities	Police Station	1
	Public Services	3
	Utility Facility	2
	Essential Services Facilities Total	10
	Apartment Complex	22
	Assisted-Living	1
	Hotel or Motel	2
	Jail	1
At Risk Population Facilities	Mobile Home Park	5
	School	8
	Senior Living Facility	1
	At Risk Population Facilities Total	40
City of Colusa Total		50

Source: Colusa County GIS

Community Lifelines

Assessing the vulnerability of the City of Colusa to natural hazards and disasters also involves reviewing and inventorying the community lifelines in place that could be affected. It is important to include these items in hazard discussions as the continuous operation of critical government and business functions is essential to human health and safety, property protection, and economic security. The importance of community lifelines is discussed below:

- Lifelines are the most fundamental services in the community that, when stabilized, enable all other aspects of society to function.
- FEMA has developed a construct for objectives-based response that prioritizes the rapid stabilization of Community Lifelines after a disaster.

- The integrated network of assets, services, and capabilities that provide lifeline services are used dayto-day to support the recurring needs of the community and enable all other aspects of society to function.
- When disrupted, decisive intervention (e.g., rapid re-establishment or employment of contingency response solutions) is required to stabilize the incident.

Community lifelines, as defined by FEMA, include the following:

- Safety and Security Law Enforcement/Security, Fire Service, Search and Rescue, Government Service, Community Safety
- **Food, Hydration, Shelter** Food, Water, Shelter, Agriculture
- Health and Medical Medical Care, Public Health, Patient Movement, Medical Supply Chain, Fatality Management
- Energy Power Grid, Fuel
- Communications Infrastructure, Responder Communications, Alerts Warnings and Messages, Finance, 911 and Dispatch
- > Transportation Highway/Roadway/Motor Vehicle, Mass Transit, Railway, Aviation, Maritime
- > Hazardous Material Facilities, HAZMAT, Pollutants, Contaminants
- **Water Systems** Potable Water Infrastructure, Wastewater Management

It should be noted that these community lifelines are all in place and functional as part of regular government operations in the County as a partnership between the City, local special districts, and Colusa County. Due to its rural nature, there is an interplay in community lifelines between all jurisdictions in the County. In fact, most of the City's community lifelines overlap the County's. It should also be noted that these lifelines collectively include many of the critical facilities and infrastructure assets inventoried for this LHMP. Due to this fact, specific information on these community lifelines in the City and how they may be affected by a hazard event or disaster are discussed in each hazard section; however, many of these sections refer back to the detailed lists that are captured in Section 4.2.1 of the Base Plan.

Natural, Historic, and Cultural Resources

Assessing the vulnerability of the City of Colusa to natural hazards and disasters also involves inventorying the natural, historic, and cultural assets of the area. This step is important for the following reasons:

- Environmental and natural resources add to a community's identity and quality of life. They also help the local economy through agriculture, tourism, and recreation. They support ecosystem services, such as clean air and water.
- Conserving the environment may help people mitigate risk. It can also protect sensitive habitats, develop parks and trails, and build the economy.
- The community may decide that these types of resources warrant a greater degree of protection due to their unique and irreplaceable nature and contribution to the overall economy.
- If these resources are impacted by a disaster, knowing so ahead of time allows for more prudent care in the immediate aftermath, when the potential for additional impacts are higher.
- > The rules for reconstruction, restoration, rehabilitation, and/or replacement are often different for these types of designated resources.

Natural resources can have beneficial functions that reduce the impacts of natural hazards, such as wetlands and riparian habitat, which help absorb and attenuate floodwaters.

Natural Resources

The City contains a variety of natural resources. Natural resources are unique to each area and are difficult to replace. Should a natural disaster occur, these species, resources, and locations are at risk.

The City of Colusa has a variety of natural resources of value to the community. Surrounding the City are many natural resources in preserves and open space, including the Colusa National Wildlife Refuge, one-half mile west of the City, and the Colusa-Sacramento River State Recreation Area to the north. In the future, the City of Colusa intends to promote these natural resources through increased awareness and improved public access.

The 2007 City of Colusa General Plan noted that Colusa is located next to the Sacramento River, in an area with high levels of waterfowl activity and raptor nesting. The River Basin contains a number of species, subspecies, and genetically distinct populations of fish that are presently listed as federally- or state-threatened/endangered species or species that appear to be approaching that status. However, the urbanized areas both in and just outside of the City limits are generally less likely to contain significant wildlife resources or habitat, and the California Department of Fish and Game has indicated there are no endangered animal species within the City of Colusa.

Just south of the City of Colusa, the federal government maintains the Colusa National Wildlife Refuge, part of the Pacific Flyway, which provides winter refuge for migrating waterfowl, such as ducks and geese. The 10,783-acre refuge consists of about 7,600 acres of managed wetlands, uplands, riparian habitat, and vernal pools. The refuge supports several endangered plants and animals, including transplanted colonies of palmate-braced bird's-beak, species of fairy shrimp, vernal pool tadpole shrimp, giant garter snake, wintering peregrine falcon, bald eagle, and breeding tri-colored blackbird. Resident wildlife includes grebe, heron, blackbird, golden eagle, beaver, muskrat, black-tailed deer, and other species typical of upland and wetland habitats. Approximately 9,000 people hunt on the refuge each year, and 73,000 people use the visitor center, auto tour route, and walking trail.

Although the urbanized area of the City of Colusa and outlying areas do not have species or vegetation which fall into the rare, threatened, or endangered categories, the City does consider its large variety of mature trees lining its streets a significant resource.

Wetlands and their Natural and Beneficial Functions

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

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

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

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

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

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

Wetlands in the City are shown in Section 4.2.1 and detailed in Table A-9.

Table A-9 City of Colusa –	Wetland Types an	d Acreages
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Wetlands Area Type	Wetlands Count	Wetlands Area (in Acres)		
Freshwater Emergent Wetland	27	56		
Freshwater Forested/Shrub Wetland	12	87		
Freshwater Pond	29	67		
Lake	0	0		
Riverine	52	11		
Estuarine and Marine Wetland	0	0		
City of Colusa Total	120	221		

Source: US Fish and Wildlife Service

Historic and Cultural Resources

Historic and cultural resources are difficult to replace. Should a natural disaster occur, these properties and locations can be at risk. The City of Colusa has a stock of historically significant homes, public buildings, and landmarks. The California Department of Parks and Recreation Office of Historic Preservation (OHP) was the primary source of information. 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 4.2.1 of the Base Plan. Table A-10 shows 6 historic buildings in the City in the OHP Database.

Resource Name (Plaque Number)	National Register	State Landmark	Point of Interest	Date Listed	City/ Community
Colusa Carnegie Library (N1657)	Х			12/10/1990	Colusa
Colusa County Courthouse (890)		X		12/29/1975	Colusa
Colusa Grammar School (N632)	Х			6/13/1978	Colusa
Colusa High School and Grounds (N434)	X			8/13/1976	Colusa
Colusa IOOF Hall / Odd Fellows Building (P505)			Х	7/28/1977	Colusa
Grand Island Shrine (P329)	Х		Х	5/15/1974	Colusa

Table A-10 City of Colusa – Historic Resources

Source: California Department of Parks and Recreation Office of Historic Preservation, http://ohp.parks.ca.gov/. Retrieved March 2024.

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

Economic Assets and Community Activities of Value

Assessing the vulnerability of the City of Colusa to natural hazards and disasters also involves inventorying the economic assets and community activities of value in the City.

Economic Assets

After a disaster, economic resiliency is one of the major drivers of a speedy recovery. Each community has specific economic drivers. These include:

- Primary Economic Sectors
- Major employers
- Commercial Centers

In the City of Colusa, this includes the following:

- Colusa's retail sector is the predominant influence on its economy, as well as the major generator of tax revenues to the City.
- > The Countywide agricultural industry is an economic driver benefitting the City

Community Activities of Value

Inventorying economic assets in the City and their vulnerability to natural hazards and disasters also involves inventorying activities that have value to the community. This includes activities that are important to a community, like long-standing traditions such as a festival or fair. Some areas rely on seasonal industries to sustain them throughout the year. Many of these activities also provide economic benefits to the City. A hazard event that cancels or shortens these can affect a community's livelihood and can make disaster recovery more difficult or prolonged. This includes activities such as:

- Festivals and Fairs
- Sporting Events
- > Tourism
- Local Pool
- Local Splash Pool

The City noted the following community activities of value:

- Christmas time in Colusa
- ➢ 4th of July
- Founders Day
- Concerts in the Park
- Non-Profit events
- Farmers Market

Growth and Development Trends

As part of the planning process, the City looked at changes in growth and development, both current and future, and examined these changes in the context of hazard-prone areas, and how the changes in growth and development affect loss estimates and vulnerability over time.

Land Use

State planning law requires that a land use element of a general plan include a statement of the standard population density, building intensity, and allowed uses for the various land use designations in the plan (Government Code Section 65302(a)). The City's land use designations are generally described below and mapped on the Land Use Diagram (Figure A-10). The City of Colusa Municipal Code provides detailed land use and development standards for development.

The Municipal Code works hand in hand with the City's General Plan Land Use Element. The purpose of the Land Use Element is to provide goals, policies, actions diagrams and standards to guide future land use decisions in the City of Colusa. While all elements of the General Plan have equal weight under California

law, in some respects this Element is the most far-reaching. It informs all other elements of the General Plan, shaping the future transportation network and the location of future housing sites, and influencing public facility requirements and park and recreation needs. It defines the City's future open space system and responds to natural resource conservation issues and safety hazards. It establishes the basic pattern of development in the City for the next 20-25 years, including land uses and densities, and presents the policies and actions to ensure that future development will enhance the quality of life for all City of Colusa residents.

Future land use for the City of Colusa from the 2007 City of Colusa General Plan Land Use Element is shown on Figure A-10.



Figure A-10 City of Colusa – Land Use Diagram

Source: City of Colusa website (https://cityofcolusa.com/planning-and-building/). Retrieved 7/1/2024

Population Trends and Projections

The City is expected to continue to increase in population. The 2020-2028 City of Colusa Housing Element contained population projections for the City from 2020 to 2028. These are shown on Table A-11.

Table A-11 City of Colusa – Future Population Projections

1 0100001 1 00001	2020	2025	2028
Population	6,196	6,406	6,624

Source: 2020-2028 City of Colusa Housing Element

Development since 2018 Plan

The City noted that the Wildwood Estates (identified in the 2019 LHMP) has been completed. The Sunrise Landing Phase 1 and 2 was also developed since the last plan. Phase 1 and 2 included 90 units of single family residential housing. Also developed since last plan: it the Little Ceasars Pizza completed in 2023 on one parcel

Development has occurred in the City since the last plan. Some of this has occurred in hazard prone areas. The City Planning Department tracked total building permits issued since 2019 for the City. These are tracked by total development, property use type, and hazard risk area. These are shown in Table A-12 and Table A-13.

Table A-12	City of	f Colusa –	Total Deve	lonment	Since	2019
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	~			-		

Property Use	2019	2020	2021	2022	2023
Residential	36		42	21	21
Commercial	3	1		2	2
Industrial					
Other					
Total	39	1	42	23	23

Source: City of Colusa Planning Department

Table A-13 City of Colusa – Development in Hazard Areas since 2018

Property Use	1% Annual Chance Flood	Levee Protected Area	Wildfire Risk Area ¹	Other	
Total	110	18	0	0	

Source: City of Colusa Planning Department

¹Moderate or higher wildfire risk area

Development has occurred in the identified hazard areas, including the 1% annual chance floodplains and high wildfire risk areas. It was completed in accordance with all current and applicable development codes, floodplain ordinances, 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.

Future Development Areas

It is important to review future development plans for the City. Future development should be sited in areas that are away from known hazard risks. If this is not possible, mitigation should be done to ensure that future development is protected against future hazards.

GIS Analysis

The City provided 7 future development areas which were used as the basis for the inventory of future development for the City. These were mapped in GIS. Where multiple parcels are listed, the parcels are merged to form one polygon, and the hazards assigned are based on the centroid of the polygon. Figure A-11 show the locations of the future development areas in the City, while Table A-14 shows the details of the future development areas by acres and parcels.



Figure A-11 City of Colusa – Future Development Areas

Colusa County Local Hazard Mitigation Plan Update August 2024 Annex A-29

Future Development Status	Future Development Site Number	Future Development Name	Total Parcel Count	Total Acres
Proposed	4	Sunny Dhami	1	1
	5	Sunny Dhami	1	0.25
	7	Wilson-Cheney Development (temporary name)	1	9.36
	Proposed Total	·	3	10.61
Shovel Ready	1	Arco Town Center	1	4.58
	2	Colusa Sunrise Landing Phase 3 & 4 & 5	1	19
	3	Schmidt Development	4	8.4
	6	Taco Bell	1	1.26
	Shovel Ready Total		7	33.24
Grand Total			10	43.85

Table A-14 City of Colusa – Future Development by Status

Source: City of Colusa

A.4.2. Hazard Identification

The City of Colusa identified the hazards that affect the City and summarized their location, extent, likelihood of future occurrence, potential magnitude, and significance specific to the City (see Table A-15).

Likelihood of Climate				Climate
Geograph	Future	Magnitude/		Change
ic Extent	Occurrences	Severity	Significance	Influence
Limited	Occasional / Unlikely	Limited	Low	Medium
Extensive	Highly Likely	Limited	Low	_
Extensive	Occasional	Catastrophic	High	Medium
Extensive	Likely	Catastrophic	High	High
Extensive	Occasional	Critical	Medium	Low
Extensive	Occasional / Unlikely	Catastrophic	High	Medium
Significant	Likely	Critical	Medium	Medium
Likely	Unlikely	Negligible	Low	Medium
Likely	Unlikely	Negligible	High	Medium
Extensive	Highly Likely	Critical	Low	Medium
Extensive	Highly Likely	Critical	Low	High
Extensive	Highly Likely	Critical	Medium	Medium
Extensive	Highly Likely	Critical	Low	Low
Extensive	Likely	Catastrophic	Low	Medium
Significant	Occasional	Critical	Low	Low
Significant	Highly Likely	Critical	Low	Medium
 Magnitude/Severity a <i>Catastrophic:</i> More than 50 percent of property severely damaged; shutdown of facilities for more than 30 days; and/or multiple deaths <i>Critical:</i> 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 <i>Limited:</i> 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 <i>Negligible:</i> 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 Significance <i>Low:</i> Minimal potential impact <i>Medium:</i> Moderate potential impact <i>Climate</i> Change Influence <i>Low:</i> Minimal potential impact <i>Medium:</i> Moderate potential impact 				
	Geograph ic Extent Limited Extensive Extensive Extensive Extensive Extensive Significant Likely Extensive Extensive Extensive Extensive Extensive Extensive Significant Significant Significant Significant Significant Significant Significant Significant Significant Significant Significant Significant Significant Significant Catastroph shutdown of critical: 25 facilities for permanent Limited: 10 facilities for result in per Negligible shutdown of injuries/illin Significar Low: Mini Medium: M High: Widt	Geograph ic ExtentLikelihood of Future OccurrencesLimitedOccasional / UnlikelyExtensiveHighly LikelyExtensiveOccasionalExtensiveLikelyExtensiveOccasional / UnlikelyExtensiveOccasional / UnlikelyExtensiveOccasional / UnlikelySignificantLikelyLikelyUnlikelySignificantLikelyLikelyUnlikelyExtensiveHighly LikelyExtensiveHighly LikelyExtensiveHighly LikelyExtensiveLikelySignificantOccasionalSignificantOccasionalSignificantOccasionalSignificantOccasionalSignificantOccasionalSignificantHighly LikelyMagnitude/SeverityCatastrophic: More than 50 p shutdown of facilities for more Gracilities for at least two weeks permanent disabilityLimited: 10-25 percent of profacilities for more than a week result in permanent disabilityNegligible:Less than 10 perc shutdown of facilities and servinjuries/illnesses treatable withSignificance Low: Minimal potential impa Medium: Moderate potential High: Widespread potential impa Medium: Moderate potential	Likelihood of Geograph ic ExtentLikelihood of SeverityLimitedOccurrencesSeverityLimitedOccasional / UnlikelyLimitedExtensiveHighly LikelyLimitedExtensiveOccasionalCatastrophicExtensiveLikelyCatastrophicExtensiveOccasionalCriticalExtensiveOccasional / UnlikelyCatastrophicExtensiveOccasional / UnlikelyCatastrophicSignificantLikelyCriticalLikelyUnlikelyNegligibleLikelyUnlikelyNegligibleExtensiveHighly LikelyCriticalExtensiveHighly LikelyCriticalExtensiveHighly LikelyCriticalExtensiveLikelyCriticalExtensiveHighly LikelyCriticalSignificantOccasionalCriticalSignificantOccasionalCriticalSignificantOccasionalCriticalSignificantGeseverityCatastrophicMagnitude/SeverityCatastrophic:More than 30 days; aCritical: 25-50 percent of property severely difacilities for more than 30 days; aCritical: 25-50 percent of property severely difacilities for more than a week; and/or injuriespermanent disabilityLimited: 10-25 percent of property severely difacilities for more than a week; and/or injuriesresult in permanent disabilityNegligible: Less than 10 percent of propertySignificanceLow: Minimal potential impactLow: Mini	Likelihood of GeographLikelihood of Future OccurrencesMagnitude/ SeveritySignificanceLimitedOccasional / UnlikelyLimitedLowExtensiveHighly LikelyLimitedLowExtensiveOccasionalCatastrophicHighExtensiveOccasionalCatastrophicHighExtensiveOccasionalCriticalMediumExtensiveOccasional / UnlikelyCatastrophicHighExtensiveOccasional / UnlikelyCatastrophicHighSignificantLikelyCriticalMediumLikelyUnlikelyNegligibleLowLikelyUnlikelyNegligibleHighExtensiveHighly LikelyCriticalLowExtensiveHighly LikelyCriticalLowExtensiveHighly LikelyCriticalLowExtensiveHighly LikelyCriticalLowSignificantOccasionalCriticalLowSignificantOccasionalCriticalLowSignificantOccasionalCriticalLowSignificantHighly LikelyCriticalLowSignificantHighly LikelyCriticalLowSignificantHighly LikelyCriticalLowSignificantHighly LikelyCriticalLowSignificantHighly LikelyCriticalLowSignificantHighly LikelyCriticalLowSignificantHighly LikelyCritic

Table A-15 City of Colusa—Hazard Identification Assessment

A.4.3. Hazard Profiles and Vulnerability to Specific Hazards

This section includes the hazard profiles and vulnerability assessment for hazards ranked of medium or high significance specific to the City of Colusa (as identified in the Significance column of Table A-15) and also includes a hazard profile and vulnerability assessment to the four primary hazards to the State of California: dam failure, earthquake, flood, and wildfire, regardless of the significance ranking by the City. Chapter 4 of the Base Plan provides more detailed information about these hazards and their impacts on the Colusa County Planning Area. Methodologies for evaluating vulnerabilities and calculating loss estimates are the same as those described in Section 4.2 of the Base Plan.

Hazard Profiles and Vulnerability Assessment

Each hazard is profiled in the following format:

- **Hazard Profile** A hazard profile is included for each hazard. This includes information on:
 - ✓ Hazard Overview A general discussion of the hazard and related issues is detailed here.
 - Location and Extent Location is the geographic area within the City that is affected by the hazard. Extent is the expected range of intensity for each hazard. These are discussed in specific detail for mapped hazards, and in more general detail for those hazards that do not have discrete mapped hazard areas.
 - ✓ Past Occurrences Past occurrences are discussed for each hazard. A discussion of disaster declarations is included in each hazard section. NCDC events are also discussed. Other past occurrences data specific to the City follow the disaster declarations for each hazard.
 - ✓ **Climate Change**—This section contains the effects of climate change (as applicable). The possible influence of climate change on the hazard is discussed.

After the hazard profile, a vulnerability assessment is presented. As part of the vulnerability assessment, an estimate of the vulnerability of the City to each identified hazard, in addition to the estimate of risk of future occurrence, is provided in each of the hazard-specific sections that follow. Vulnerability is measured in general, qualitative terms and is a summary of the potential impact based on past occurrences, spatial extent, and damage and casualty potential. It is categorized into the following classifications:

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

After this classification, a general discussion of hazard vulnerabilities occurs. This is done in the following format:

- Local Concerns This includes City provided information on how the City is uniquely affected by or vulnerable to each hazard.
- Assets at Risk A discussion of the assets at risk follows, presented in the same format as in Section A.4.1 above. This includes sections on: People and Populations; Structures; Critical Facilities and Infrastructure, Community Lifelines; Natural, Historic, and Cultural Resources; and Economic Assets and Community Activities of Value. These are discussed in specific terms for mapped hazards, and in more general terms for those hazards that are unmapped.
- Impacts A discussion on hazard impacts follows. Impacts describe how each hazard can affect the City and its assets. The type and severity of impacts reflect both the potential magnitude of the hazard and the vulnerability of the asset. Impacts are also affected by the community's ability to mitigate, prepare for, respond to, and recover from an event.
- Future Conditions/Development A discussion of how future development will be affected by the hazard is also included. This is addressed specifically for mapped hazards, and in more general terms for those hazards that are unmapped.

Power Interruption/Power Failure: A Common Vulnerability of all Hazards

An impact of almost all hazards evaluated as part of this LHMP Update relates to power shortage and/or power failures. The US power grid crisscrosses the country, bringing electricity to homes, offices, factories, warehouses, farms, traffic lights and even campgrounds. According to statistics gathered by the U.S. Department of Energy, major blackouts are on the upswing. Incredibly, over the past two decades, blackouts impacting at least 50,000 customers have increased 124 percent. The electric power industry does not have a universal agreement for classifying disruptions. Nevertheless, it is important to recognize that different types of outages are possible so that plans may be made to handle them effectively. In addition to blackouts, brownouts can occur. A brownout is an intentional or unintentional drop in voltage in an electrical power supply system. Intentional brownouts are used for load reduction in an emergency. Electric power disruptions can be generally grouped into two categories: intentional and unintentional. More information on types of power disruptions can be found in Section 4.3 of the Base Plan.

Public Safety Power Shutoff (PSPS)

A new intentional disruption type of power shortage/failure event has been recently occurring in California. In recent years, several wildfires have started as a result of downed power lines or electrical equipment. This was the case for the Camp Fire in 2018. As a result, California's three largest energy companies (including PG&E), at the direction of the California Public Utilities Commission (CPUC), are coordinating to prepare all Californians for the threat of wildfires and power outages during times of extreme (fire) weather. To help protect customers and communities during extreme fire weather events, electric power may be shut off for public safety in an effort to prevent wildfire. This is called a PSPS. More information on PSPS criteria can be found in Section 4.3 of the Base Plan.

In addition to PSPSs, to help prevent wildfires, electric utilities have begun to evolve safety efforts. This includes installing safety settings on powerlines in and around high fire-risk areas. These are known as Enhanced Powerline Safety Settings (EPSS), and they help prevent falling tree branches, animals and other hazards from starting a wildfire. By stopping ignitions, it helps prevent wildfires from starting and spreading. According to PG&E, if ignitions occur, the size of fires are much smaller due to EPSS. In 2022,

there was a 99% decrease in acres impacted by ignitions (as measured by fire size from electric distribution equipment (compared to the 2018-2020 average). This decrease occurred despite dry conditions.

Local Concerns

The City noted that there have been no PSPS events that have affected them.

Dam Failure

Likelihood of Future Occurrence–Occasional Vulnerability–Extremely High

Hazard Profile

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 given 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.

Dam failure is a natural disaster from two perspectives. First, the inundation from released waters resulting from dam failure is related to naturally occurring floodwaters. Second, a total dam failure would most probably happen as a consequence of the natural disaster triggering the event, such as an earthquake.

Location and Extent

An inventory map of dams located within Colusa County was shown in Section 4.3.8 in the Base Plan. Dams with an inundation area within the City of Colusa are shown on Figure A-12. This includes two extremely high hazard dams – Lake Almanor and Lake Oroville. It also includes three high hazard dams – Black Butte, Shasta, and Whiskeytown. It should be noted that no mapped significant hazard dam inundation areas affect the City.

There is no scale with which to measure dam failure. However, FEMA and CA DWR Division of Safety of Dams (DSOD) assigns hazard potential classifications to dams within the State that provides information on the potential impact should a dam fail. The following two factors are considered when assigning hazard ratings: existing land use and land use controls (zoning) downstream of the dam. FEMA categorizes the downstream hazard potential into three categories in increasing severity: Low, Significant, and High. DSOD adds a fourth category of Extremely High. Dams are classified in these four categories that identify the potential hazard to life and property. These were discussed in more detail in Section 4.3.8 of the Base Plan.

While a dam may fill slowly with runoff from winter storms, a dam break has a very quick speed of onset. The duration of dam failure is generally not long - only as long as it takes to empty the reservoir of water the dam held back. For dam overtopping, the speed of onset is somewhat slower than that of a dam break,

and the duration is longer (as evidenced in the 2017 Oroville Dam spillway event). The City would be affected for as long as the flood waters from the dam failure took to drain downstream.

Geographic flood extent from the DSOD and Cal OES dam inundation areas is shown on Figure A-12 and Figure A-13, as well as in Table A-16.



Figure A-12 City of Colusa – Extremely High Hazard Dam Inundation Areas


Figure A-13 City of Colusa – High Hazard Dam Inundation Areas

Dam Inundation Area	Total Acres	% of Total Acres	Improved Acres	% of Total Improved Acres	Unimproved Acres	% of Total Unimproved Acres
Lake Almanor	81	3.349%	0	0.005%	81	7.887%
Oroville	1,283	53.180%	811	58.430%	471	46.057%
Shasta	2,412	100.000%	1,388	100.000%	1,023	100.000%
Thermalito Afterbay	0	0.000%	0	0.000%	0	0.000%

Table A-16 City of Colusa – Dam Inundation Areas Geographical Extents

Source: Cal OES, DSOD, Colusa County GIS

Past Occurrences

Disaster Declaration History

There have been no state or federal disaster declarations for dam failure in Colusa County.

NCDC Events

The NCDC does not contain any dam failure events for Colusa County.

City of Colusa Events

The City of Colusa noted that it was affected by dam incidents such as the 2017 Oroville dam failure. The City is indirectly affected due to the rise in river levels when there are dam failures. Similar to Colusa County, the City was also affected during the 2017 Oroville dam failure as a result of evacuees looking for shelter and other needs within the City of Colusa. The City noted that there have been no new dams or threats since the last LHMP.

Climate Change and Dam Failure

It is likely that climate change will increase the chance of future occurrence as well as future impacts associated with dam failure. More information on future impacts to the City can be found in the Future Conditions/Future Development section of the Vulnerability Assessment below.

The 2023 California State Hazard Mitigation Plan noted that modeling described in California's Fourth Climate Change Assessment projects less frequent but more extreme daily precipitation. Year-to-year precipitation will become more volatile, and the number of dry years will increase by mid-century. As the climate continues to warm, atmospheric rivers will carry more moisture, and extreme precipitation may increase. Climate model projections show a tendency for the northern part of the State to become wetter. Increases in both precipitation and heat causing snow melt in areas upstream of dams could increase the potential for dam failure and uncontrolled releases in Colusa County and the City.

Vulnerability to Dam Failure

The vulnerability of the City to dam failure flooding would vary depending on which dam fails and the nature and extent of the dam failure and associated flooding. An assessment of a community's vulnerability to dam failure begins with an understanding of local exposure to dam failure. This is included in the Local Concerns section below followed by a discussion of the City's Assets at Risk to this hazard.

Local Concerns

The City has specific concerns and unique vulnerabilities regarding this hazard. These concerns form a portion of the basis for the mitigation strategy and mitigation actions that seek to reduce vulnerabilities to this hazard.

The 2010 General Plan Background Report for the Colusa County noted that Lake Oroville, which is located in Butte County, would represent the most immediate threat to Colusa County (and the City) in the event of a dam failure, as flood waters could reach the County within eight hours. Lake Shasta, in Shasta County, could cause the most extensive inundation, reaching as far west as Maxwell and College City in a period of 42 hours. Inundation from Whiskeytown Lake, located in Trinity County, would take over three days to reach Colusa County. Failure of the dam of Black Butte Lake, which is on the border of Glenn and Tehama Counties, could result in some inundation within a period of about 35 hours. The inundation from a failure of this dam would be less extensive than if the other above referenced dams were to fail.

Failure of the dam at East Park Reservoir could cause minor inundation at the reservoir's outlet. The flood waters would flow into Glenn County; thus, its failure would not likely impact areas of Colusa County. In Glenn County, the flooding could extend up to one-quarter mile on either side of Stony Creek at its widest point. The water could cause an overflow of Stony Gorge Reservoir, which is located on Stony Creek. Black Butte Reservoir would retain the excess inundation.

Assets at Risk

Assets at risk from dam failure include people and populations; structures; critical facilities and infrastructure; community lifelines; natural, historic, and cultural resources; economic assets; and community activities of value. These are discussed in the following sections.

People and Populations

All people and populations located in dam inundation areas are vulnerable to dam failure. Certain vulnerable populations may be at increased risk to dam failure, especially during a large event with minimal advance notice. These vulnerable populations may include: the unsheltered, those with limited mobility, and those that lack the resources to leave the area.

City residents that live in these dam inundation areas are often the most vulnerable. Not only are the residents at risk, but their homes and contents are all at risk, compounding the impacts associated with significant hazard events. To future evaluate the impact to the City of Colusa's residential populations located in these hazard areas, a separate analysis was performed to determine residential populations in the dam inundation areas. The DSOD and Cal OES dam inundation areas were overlayed on the parcel layer.

Those residential parcel centroids that intersect the dam inundation areas were counted and multiplied by the Census Bureau average household factors for the City of Colusa -2.55. This is shown in Table A-17.

Table A-17 City of Colusa – Improved Residential Parcels and Population by Dam Inundation Area

Dam Classification /Dams	City of Colusa					
	Improved Residential Parcels	Population				
Extremely High Hazard Dams						
Oroville	982	2,848				
High Hazard Dams						
Black Butte	76	194				
Shasta	1,778	5,156				
Whiskeytown	1,778	5,156				

Source: Cal OES, DSOD, Colusa County 2023 Parcel/Assessor Data, US Census Bureau American Community Survey 2022 Household Size Estimates.

The City noted that the Critical Facilities and Infrastructure section below includes the facilities used by At-Risk populations that are threatened by this hazard. While this is not specific to what special populations reside in the City, it does speak to facilities that area used to serve (portions) of this population.

Structures

Most structures in the City have some measure of risk to dam failure. Dam failure flooding can affect the built environment of the City. Structures in dam inundation areas are at risk and depending on flood depths, can range from slight damage to totally inundated. Analysis by extremely high hazard and high hazard dam follows.

A GIS based analysis was used to determine the possible impacts of dam inundation flooding on parcels and structures within the City of Colusa. The methodology described in Section 4.3.8 of the Base Plan was followed in determining City parcels and structures at risk to dam failure. Parcel counts, land and improved values (i.e., those with a structure improvement on the parcel), estimated content replacement values, and total values that fall within dam inundation areas in the City are presented below by hazard classification and by dam. The results are presented in tables below for the dams that affect the City. This starts with the extremely high hazard dam inundation areas – the Lake Oroville Dam (Table A-18). It continues with the high hazard dam inundation areas – the Black Butte Dam (Table A-19), the Shasta Dam (Table A-20), and the Whiskeytown Dam (Table A-21).

Table A-18 City of Colusa – Count and Value of Parcels (and Structures) in Lake 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	11	6	\$7,643,184	\$345,000	\$ 0	\$345,000	\$8,333,184
Commercial	221	174	\$18,937,630	\$43,421,758	\$4,378,626	\$43,421,758	\$110,159,772

Property Use	Total Parcel Count	Improved Parcel Count	Total Land Value	Improved Structure Value	Other Value	Estimated Contents Value	Total Value
Government	88	44	\$5,089,700	\$26,665,866	\$13,472,001	\$26,665,866	\$71,893,433
Industrial	2	2	\$510,358	\$1,791,452	\$ 0	\$2,687,178	\$4,988,988
Institutional	28	15	\$1,740,632	\$3,228,069	\$2,616,683	\$3,228,069	\$10,813,453
Miscellaneous	8	4	\$510,307	\$7,426,379	\$ 0	\$7,426,379	\$15,363,065
Residential	1,022	982	\$45,077,411	\$140,127,506	\$949,458	\$70,063,756	\$256,218,131
City of Colusa Total	1,380	1,227	\$79,509,222	\$223,006,030	\$21,416,768	\$153,838,006	\$477,770,026

Source: DSOD, Cal OES, Colusa County 2023 Parcel/Assessor Data,

Table A-19 City of Colusa – Count and	Value of Parcels	(and Structures)	in Black Butte 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	5	\$7,138,911	\$340,140	\$ 0	\$340,140	\$7,819,191
Commercial	19	15	\$1,191,676	\$2,038,772	\$ 0	\$2,038,772	\$5,269,220
Government	22	4	\$1,499,162	\$299,002	\$ 0	\$299,002	\$2,097,166
Industrial	2	2	\$510,358	\$1,791,452	\$ 0	\$2,687,178	\$4,988,988
Institutional	0	0	\$0	\$ 0	\$0	\$0	\$ 0
Miscellaneous	1	1	\$12,294	\$582,611	\$0	\$582,611	\$1,177,516
Residential	82	76	\$3,610,457	\$9,474,2 80	\$161,962	\$4,737,140	\$17,983,839
City of Colusa Total	132	103	\$13,962,858	\$14,526,257	\$161,962	\$10,684,843	\$39,335,920

Source: DSOD, Cal OES, 2023 Colusa County Parcel/Assessor Data

Table A-20	City of	[•] Colusa –	Count	and	Value	of Parcels	(and	Structures)	in	Shasta	Dam
Inundation 1	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	23	11	\$13,938,078	\$552,430	\$ 495 , 940	\$552,430	\$15,538,878
Commercial	249	190	\$20,544,713	\$57,204,144	\$6,312,332	\$57,204,144	\$141,265,333
Government	107	51	\$5,985,502	\$33,560,789	\$18,519,832	\$33,560,789	\$91,626,912
Industrial	65	22	\$12,418,971	\$34,637,423	\$15,447,206	\$51,956,134	\$114,459,734
Institutional	34	20	\$2,286,791	\$6,200,820	\$6,039,649	\$6,200,820	\$20,728,080
Miscellaneous	12	5	\$615,343	\$8,431,121	\$0	\$8,431,121	\$17,477,585
Residential	1,844	1,778	\$88,514,146	\$303,181,060	\$2,413,584	\$151,590,525	\$545,699,315
City of Colusa Total	2,334	2,077	\$144,303,544	\$443,767,787	\$49,228,543	\$309,495,963	\$946,795,837
Source: DSOD, C	al OES, 2023 (Colusa County I	Parcel/Assessor I	Data			

Table A-21 City of Colusa – Count and Value of Parcels (and Structures) in Whiskeytown 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	23	11	\$13,938,078	\$552,430	\$ 495 , 940	\$552,430	\$15,538,878
Commercial	249	190	\$20,544,713	\$57,204,144	\$6,312,332	\$57,204,144	\$141,265,333
Government	107	51	\$5,985,502	\$33,560,789	\$18,519,832	\$33,560,789	\$91,626,912
Industrial	65	22	\$12,418,971	\$34,637,423	\$15,447,206	\$51,956,134	\$114,459,734
Institutional	34	20	\$2,286,791	\$6,200,820	\$6,039,649	\$6,200,820	\$20,728,080
Miscellaneous	12	5	\$615,343	\$8,431,121	\$0	\$8,431,121	\$17,477,585
Residential	1,844	1,778	\$88,514,146	\$303,181,060	\$2,413,584	\$151,590,525	\$545,699,315
City of Colusa Total	2,334	2,077	\$144,303,544	\$443,767,787	\$49,228,543	\$309,495,963	\$946,795,837

Source: DSOD, Cal OES, 2023 Colusa County Parcel/Assessor Data

Critical Facilities and Infrastructure

Dam failure presents a threat to both critical facilities and infrastructure. A separate analysis was performed on the critical facility inventory in the City to determine critical facilities that fall into dam inundation areas. Using GIS, the DFIRM flood zones were overlayed on the critical facility GIS layer. This is shown on Figure A-14 for extremely high hazard dam inundation areas in the City, and on Figure A-15 for high hazard dam inundation areas in the City. Table A-22 details which critical facilities fall in which dam inundation area. Details of critical facility categories, type, name, and address by detailed flood zone are listed in Appendix F.



Figure A-14 City of Colusa – Critical Facilities in Extremely High Hazard Dam Inundation Areas

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Figure A-15 City of Colusa – Critical Facilities in High Hazard Dam Inundation Areas

Dam / Dam Classification/ Critical Facility Category	Facility Type	Facility Count
Extremely High Hazard Dam Inu	ndation Area – Oroville Dam	
	Emergency Response	1
	Fire Station	2
	Medical	1
Essential Services Facilities	Police Station	1
	Public Services	2
	Utility Facility	2
	Total	9
	Apartment Complex	19
	Assisted-Living	1
	Hotel or Motel	2
	Jail	1
At Risk Population Facilities	Mobile Home Park	4
	School	8
	Senior Living Facility	1
	Total	36
City of Colusa Oroville Dam Total		45
High Hazard Dam Inundation Are	ea – Black Butte Dam	
Essential Services Facilities	Emergency Response	1
	Public Services	1
	Utility Facility	1
	Total	3
At Risk Population Facilities	Mobile Home Park	2
	Total	2
City of Colusa Black Butte Dam T	otal	5
High Hazard Dam Inundation Are	ea – Shasta Dam	
	Emergency Response	1
	Fire Station	2
	Medical	1
Essential Services Facilities	Police Station	1
	Public Services	3
	Utility Facility	2
	Total	10
At Risk Population Facilities	Apartment Complex	22

Table A-22 City of Colusa – Critical Facilities in Extremely High and High Hazard Dam Inundation Areas by Category and Type

Dam / Dam Classification/ Critical Facility Category	Facility Type	Facility Count
	Assisted-Living	1
	Hotel or Motel	2
	Jail	1
	Mobile Home Park	5
	School	8
	Senior Living Facility	1
	Total	40
City of Colusa Shasta Dam Total		50
Hich Hazard Dam Inundation Are	a – Whiskeytown Dam	
	Emergency Response	1
	Fire Station	2
	Medical	1
Essential Services Facilities	Police Station	1
	Public Services	3
	Utility Facility	2
	Total	10
	Apartment Complex	22
	Assisted-Living	1
	Hotel or Motel	2
At Diele De geologie y Espellision	Jail	1
At Kisk Population Facilities	Mobile Home Park	5
	School	8
	Senior Living Facility	1
	Total	40
City of Colusa Whiskeytown Dam	Total	50

Source: Cal OES, DSOD, Colusa County GIS

Community Lifelines

Dam failure flooding presents a threat to life and property, including community lifelines in the City. They are likely to be overwhelmed in a dam failure event. A catastrophic dam failure could challenge local response capabilities and require evacuations to save lives. Many of the City's community lifelines are the same as or similar to Colusa County's. This was discussed in greater detail in Section 4.3.8 of the Base Plan.

Natural, Historic, and Cultural Resources

A major dam failure event and associated flooding could have a devastating impact on the City. Large flood events can affect all natural, historic, and cultural resources that lie in the dam inundation areas. There

are a number of ways floodwaters associated with a dam failure event can impact natural resources and the environment: Wildlife habitats can be destroyed by floodwaters. Contaminated floodwater can pollute rivers and habitats. Silt and sediment can destroy natural areas. Riverbanks and natural levées can be eliminated as rivers reach bankfull capacity. Rivers can be widened, and deposition can increase downstream. Trees can be uprooted by high-velocity water flow. Plants that survive the initial flood may die due to being inundated with water. Historic and cultural resources may also be affected. Generally, the impacts are associated with damage to these structures within the inundated areas, but other cultural resources such as those associated with Native Americans and old tribal areas can also be disturbed, damaged, and lost during extreme dam failure flood events.

Economic Assets and Community Activities of Value

As shown on the maps and tables above, there are multiple dams that would affect large swaths of the City should they fail. Most economic assets of the City would be at least temporarily disrupted. Many of these may come back online relatively quickly after a dam failure flood event, but some would take longer to reengage in business. Some economic assets may be damaged to the point where the business or area would no longer be economically viable to continue to operate.

Depending on the dam, and the nature and extent of the failure, most community activities of value would be affected if they occurred during a dam failure event.

Impacts from Dam Failure

Impacts to the City from dam failure flooding could be extensive and widespread and include loss of life and injury, flooding and damage to property and structures, damage to critical facilities and infrastructure, loss of natural resources, and all other flood related impacts. Levees within the City and surrounding areas may also be damaged or destroyed contributing to the flood waters. Additionally, mass evacuations may be necessary and compounded by impacts to transportation systems and infrastructure. Economic losses to the City and Colusa County Planning Area can also be significant.

Other impacts associated with dam failure include landslides, bank erosion, and destruction of habitat. Dam failures can cause downstream flooding and can transport large volumes of sediment and debris and contaminants from the floodwaters. Other environmental impacts can include contamination from septic system failures and releases of contaminants from hazardous materials facilities, contamination of potable water supplies; changes in configurations of streams; loss of wildlife habitats; and degradation of wetlands. A large dam failure event could have significant and catastrophic impacts.

Impacts to identified assets at risk to this hazard and the overall vulnerability of the City may be affected in the future by climate change (which was discussed in the Climate Change and Dam Failure discussion above), changes in population patterns (migration, density, or the makeup of socially vulnerable populations), and changes in land use and development. Changes in population patterns and land use, and the extent to which they affect this hazard, are discussed in the Future Conditions/Future Development discussion below.

Future Conditions/Future Development

Future conditions may be affected by climate change, changes in population patterns (migration, density, or the makeup of socially vulnerable populations), and changes in land use and development. Findings on this for Colusa include the following:

- Climate change is likely to exacerbate future rain and storm conditions and associated impacts and vulnerability of the City to dam failure.
- Population growth in the City has recently slowed; however, additional growth within the dam inundation areas of the City would place additional populations at risk to dam failure. Additional population growth would likely bring continued diversity to the City. Vulnerable population groups could face disproportionate effects from a dam failure and should be planned for. Changes in population and population patterns may or may not increase the impacts and vulnerability of the City to this hazard depending on the location and nature of growth and continued planning for future hazard conditions.
- Land use planning should be proactive to address future hazard conditions. Locating new development, structures, and critical facilities and infrastructure within or near areas of dam failure risk may put additional development at risk. However, City building codes are in effect to partially reduce this risk and should be updated as necessary to continue to address future dam failure conditions. Thus, depending on the location of new development and adherence to protective building codes, changes in land use and development may or may not increase the impacts and associated vulnerabilities of the City to this hazard.

Future dam failure events may occur in the City. Given the high number of affected parcels and structures, future development in the City, could be affected by dam failures and associated flooding. Siting of future development areas should take dam failure flooding into account. As the City continues to grow and develop, the population will continue to grow and become more diverse. Changing migration patterns will fluctuate the vulnerability of the City and the vulnerable populations such as AFN, unhoused, the elderly, and very young may feel the effects of this disaster disproportionately.

Future development areas and their vulnerability to dam failure are discussed further in the below GIS analysis.

GIS Analysis

The City provided 7 future development areas which were used as the basis for the inventory of future development for the City. These were mapped in GIS. Utilizing the future development area spatial layer, the parcel centroid data was intersected to determine the future development areas within each mapped dam inundation area. Figure A-16 show the locations of the future development areas overlayed on the extremely high hazard dam inundation areas, while Figure A-17 show the locations of the future development areas. Table A-23 shows each future development area in the City in these areas.



Figure A-16 City of Colusa – Future Developments in Extremely High Hazard Dam Inundation Areas

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Figure A-17 City of Colusa – Future Developments in High Hazard Dam Inundation Areas

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Table A-23 City of Colusa – Future Development in Extremely High and High Hazard Dam Inundation Areas

Dam Inundation Area	Future Development Status	Future Development Site Number	Future Development Name	Total Parcel Count	Total Acres
Extremely High I	Dam Inundation A	rea			
		4	Sunny Dhami	1	1
	Proposed	5	Sunny Dhami	1	0.25
		Proposed Total		2	1.25
Orovilla		1	Arco Town Center	1	4.58
Olovine	Shovel Ready	3	Schmidt Development	4	8.4
		6	Taco Bell	1	1.26
		Shovel Ready To	tal	6	14.24
	Oroville Total		8	15.49	
High Dam Inund	lation Area				
		4	Sunny Dhami	1	1
	Proposed	5	Sunny Dhami	1	0.25
		7	Wilson-Cheney Development (temporary name)	1	9.36
		Proposed Total	•	3	10.61
Sharta		1	Arco Town Center	1	4.58
Snasta		2	Colusa Sunrise Landing Phase 3 & 4 & 5	1	19
	Shover Mady	3	Schmidt Development	4	8.4
		6	Taco Bell	1	1.26
		Shovel Ready To	tal	7	33.24
	Shasta Total			10	43.85
		4	Sunny Dhami	1	1
		5	Sunny Dhami	1	0.25
Whiskeytown	Proposed	7	Wilson-Cheney Development (temporary name)	1	9.36
		Proposed Total	_	3	10.61
	Shovel Ready	1	Arco Town Center	1	4.58

Dam Inundation Area	Future Development Status	Future Development Site Number	Future Development Name	Total Parcel Count	Total Acres
		2	Colusa Sunrise Landing Phase 3 & 4 & 5	1	19
		3	Schmidt Development	4	8.4
		6	Taco Bell	1	1.26
		Shovel Ready Tot	tal	7	33.24
	Whiskeytown Tot	tal	10	43.85	

Source: DSOD/Cal OES, City of Colusa

Drought & Water Shortage

Likelihood of Future Occurrence–Likely Vulnerability–Medium

Hazard Profile

Drought and water shortage are complex issues involving many factors—it occurs when a normal amount of precipitation and snow is not available to satisfy an area's usual water-consuming activities. Drought can often be defined regionally based on its effects. Drought is different than many of the other natural hazards in that it is not a distinct event and usually has a slow onset. Drought can severely impact a region both physically and economically. Drought affects different sectors in different ways and with varying intensities. Adequate water supply is the most significant issue and is critical for agriculture, manufacturing, tourism, recreation, and commercial and domestic use. Drought has also affected tree mortality in the area in the past. As the population in the area continues to grow, so will the demand for water.

Location and Extent

Drought and water shortage are regional phenomenon. The whole of the City and County is at risk. The US Drought Monitor categorizes drought conditions with the following scale:

- > None
- ➢ D0 − Abnormally dry
- ➢ D1 − Moderate Drought
- \blacktriangleright D2 Severe Drought
- \rightarrow D3 Extreme drought
- ➢ D4 − Exceptional drought

Drought has a slow speed of onset and a variable duration. Drought can last for a short period of time (which does not usually affect water shortages) or for longer periods (which may challenge water supplies). Should a drought last for a long period of time, water shortage becomes a larger issue. Current drought conditions in the City are shown in Section 4.3.9 of the Base Plan.

Past Occurrences

Disaster Declaration History

There have been one federal and three state disaster declarations from drought. This can be seen in Table A-24.

Table A-24 Colusa County – Federal and State Drought Disaster Declarations 1950-2024

Disaster Type	Federal Declarations		State Declarations		
	Count	Years	Count	Years	
Drought	1	1977	3	1976, 2014, 2021	

Source: Cal OES, FEMA

NCDC Events

There have been 58 NCDC drought events in Colusa County. These most likely had some impact on the City.

City of Colusa Events

Based on historical information, the occurrence of drought in California, including the City of Colusa, is cyclical, driven by weather patterns. Section 4.3.9 of the Base Plan notes that five droughts have occurred in the past 86 years. Drought has occurred in the past and will occur in the future.

Climate Change and Drought and Water Shortage

It is likely that climate change will increase the chance of future occurrence as well as future impacts associated with drought and water shortage. More information on future impacts to the City can be found in the Future Conditions/Future Development section of the Vulnerability Assessment below.

Climate scientists studying California find that drought conditions are likely to become more frequent and persistent over the 21st century due to climate change. The experiences of California during recent years underscore the need to examine more closely the state's water storage, distribution, management, conservation, and use policies. The 2021 CAS stresses the need for public policy development addressing long term climate change impacts on water supplies. The CAS notes that climate change is likely to significantly diminish California's future water supply, stating that: California must change its water management and uses because climate change will likely create greater competition for limited water supplies needed by the environment, agriculture, and cities.

A 2018 report from the Public Policy Institute of California noted that thousands of Californians – mostly in rural, small, disadvantaged communities – already face acute water scarcity, contaminated groundwater, or complete water loss. Climate change would make these effects worse.

Cal Adapt scenarios for modeled future drought scenarios were shown in Section 4.3.9 of the Base Plan.

Vulnerability to Drought and Water Shortage

Based on historical information, the occurrence of drought and water shortage in California, including the City, is cyclical, driven by weather patterns. Drought has occurred in the past and will occur in the future. Periods of actual drought with adverse impacts can vary in duration, and the period between droughts can be 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 Colusa to drought may vary and include reduction in water supply, turf losses, impacts to natural resources, and an increase in dry fuels and tree dieback.

Tree Mortality and Drought

One of the specific impacts of drought in the City of Colusa and the Colusa County Planning Area is the increased risk to trees from beetle kill and other insects, pathogens and parasites, and other tree mortality and die back issues. Drought weakens trees and makes them more susceptible to insect infestation and other pathogens. Insects, such as bark beetles and others, frequently attack trees weakened by drought, disease, injuries, or other factors that may stress the tree. These insects and other pathogens can contribute to the decline and eventual death of trees throughout the City. The tree mortality and dieback problems are a high priority because of the issue of hazardous trees and an increased wildfire hazard. In addition to an increase in wildfire fuels, hazardous trees can fall onto structures causing damage and a result in a reduction on the tree canopy within the City that provides relief during extreme heat days.

The whole of the City is at some measure of vulnerability to drought and water shortage. An assessment of a community's vulnerability to drought and water shortage begins with an understanding of local exposure to drought. This is included in the Local Concerns section below followed by a discussion of the City's Assets at Risk to this hazard.

Local Concerns

The City has specific concerns and unique vulnerabilities regarding this hazard. These concerns form a portion of the basis for the mitigation strategy and mitigation actions that seek to reduce vulnerabilities to this hazard.

The City of Colusa obtains its drinking water from underground natural wells. Five municipal wells plus two additional wells are on an inter-tie agreement with CIP. The inter-tied wells are planned to be purchased by the City of Colusa at a later date. Two of the five City-owned wells will be shut down in the coming year and replaced with one new well. The City also has three untapped agricultural wells and no agricultural irrigation sites within its limits.

Assets at Risk

Assets at risk from drought and water shortage include people and populations; structures; critical facilities and infrastructure; community lifelines; natural, historic, and cultural resources; economic assets; and community activities of value. These are discussed in the following sections.

People and Populations

The people and populations of the City are not directly affected by drought; although, their turfed areas, trees, and other water dependent resources can all be affected. In extreme drought conditions, however, residents and other populations within the City may be vulnerability to drought and water shortage issues. Water quality can be impacted causing health problems, especially to vulnerable populations. Drought and water shortage can lead to an increase in wildfires threatening City residents. Water shortages can have an effect on all of the population in the City, but often have a greater effect on the unhoused and other vulnerable populations that may be unable to access clean drinking water during shortages. During periods of drought as the costs of water usage may increase, especially during mandated conservation times, those who are economically disadvantaged may be unable to afford the increased costs of potable water.

Structures

Structures have a limited vulnerability to drought and water shortage. It is the secondary hazard of drought (wildfire) which causes risks to structures. Drought can also stress trees, causing die off. These trees may fall on structures adjacent to them.

Critical Facilities and Infrastructure

Most critical facilities and infrastructure have a limited vulnerability to drought and water shortage. Should drought conditions be severe enough to cause water shortage reliability issues, some facilities and infrastructure may be affected. Water and wastewater systems may be impacted during times of reduced water supply and need to employ contingencies to remain functional and fully operational. Other water dependent systems may also be adversely affected. Further, the secondary hazard of drought (increased potential for spread of urban fires and wildfire) can pose a significant risk to critical facilities and infrastructure. Sufficient water supply for firefighting can also be an issue. Drought can also stress trees, causing die off. These trees may fall on critical infrastructure adjacent to them and impact power lines and other utilities.

Community Lifelines

While limited, community lifelines can have a vulnerability to drought and water shortage. Many of the City's community lifelines are the same as or similar to Colusa County's. Drought will most likely not overwhelm these community lifelines. This was discussed in greater detail in Section 4.3.9 of the Base Plan.

Natural, Historic, and Cultural Resources

Drought and water shortage can have a significant impact on natural resources. Water levels in reservoirs and lakes may be reduced and a loss of wetlands and coastal marsh areas may occur. Severe drought conditions can contribute to an increase in erosion of soils and lead to poor soil quality. Further, all of the trees in the City are at risk to drought impacts and a reduction in water supply. These trees provide a wealth of social and environmental benefits to City residents and visitors, from shade and beauty to air quality, carbon reduction and stormwater management. Drought can devastate crops and dry out pastures, dry out forests and critical habitat areas, and reduce food and water available for wildlife and livestock.

Additionally, drought conditions can also cause soil to compact and not absorb water well, potentially making an area more susceptible to flooding. It is unlikely that drought and water shortage would have a significant impact on historic and cultural resources in the City.

Economic Assets and Community Activities of Value

Economic assets and community activities in the City of Colusa generally have a limited vulnerability to drought and water shortage. Drought affects rural small business owners such as farmers and agricultural contractors who rely on water for their crops. Given that agriculture is very important in the County, this could have economic impacts in the City. Water supply issues can also affect businesses such as cafes and restaurants in more developed areas. Drought impacts to the agricultural industry can affect the supply chain and increase the cost of food and water, and adversely impact businesses tied to these industries. Reduction in or interruption of the water supply could also lead to lower productivity or closure of manufacturing facilities. Other economic sectors with a heavy reliance on water may also be affected. Depending upon how severe the conditions get and how long they last, drought and water shortage can restrict recreational and community activities, all of which can stress businesses and local economies over time.

The City noted that most of the community activities that the City provides could be affected by significant drought conditions. This includes the County Fair, 4th of July Firework Celebration, Splash Pad, and Community Pool.

Impacts from Drought and Water Shortage

The vulnerability of the City to drought is City-wide, but impacts may vary and include reduction in water supply and an increase in dry fuels. The potential for a reduction in water supply during drought conditions generally leads to both mandated and voluntary conservations measures during extended droughts. During these times, the costs of water can also increase. Also of concern, the increased dry fuels and fuel loads associated with drought conditions can result in an increased fire danger. In areas of extremely dry fuels, the intensity and speed of fires can be significant. Water supply and flows for fire suppression can also be an issue during extended droughts. Drought can also lead to turf losses and cause tree die off within the City.

Other qualitative impacts associated with drought in the City are those related to water intensive activities such as municipal usage, commerce, tourism, and recreation use. With more precipitation likely falling as rain instead of snow in the Sierra's, and warmer temperatures causing decreased snowfall to melt faster and earlier, water supply is likely to become more unreliable. In addition, drought and water shortage is predicted to become more common. This means less water available for use over the long run, and additional challenges for water supply reliability, especially during periods of extended drought.

Impacts to identified assets at risk to this hazard and the overall vulnerability of the City may be affected in the future by climate change (which was discussed in the Likelihood of Future Occurrence discussion above), changes in population patterns (migration, density, or the makeup of socially vulnerable populations), and changes in land use and development. Changes in population patterns and land use, and the extent to which they affect this hazard, are discussed in the Future Conditions/Future Development discussion below.

Future Conditions/Future Development

Future conditions may be affected by climate change, changes in population patterns (migration, density, or the makeup of socially vulnerable populations), and changes in land use and development. Findings on this for the City of Colusa include the following:

- Climate change is likely to exacerbate future drought conditions and associated impacts and vulnerability of the City to drought and water shortage.
- Future population growth should be considered as having more or less people in a community affects the overall hazard vulnerability to the City. Population growth in the City has recently slowed. According to the HMPC, the City and Colusa County has access to large quantities of water through its groundwater as well as surface water. However, any future population growth in the City will add additional pressure to water companies during periods of drought and water shortage. Water companies will need to continue to plan for and add infrastructure capacity for population growth. As the population grows, the nature and makeup of populations will shift and change along with it. Vulnerable and underserved populations, such as those with low incomes and the unhoused that might not always have access to clean water, will need to be considered as future development continues, since they may experience a disproportionate impact from drought and water shortage. Potential population growth will be a challenge not only with regard to the City's water access for agricultural production, but state-and nation-wide with regard to food production. Should the City see a growth in population, it will increase the vulnerability and impacts to the County from this hazard.
- Land use planning should be proactive to address future hazard conditions. As the City continues to grow, more cropland will be taken out of production to provide housing to accommodate for population growth. As Colusa's agricultural lands are reduced, it seems likely that there would be less of a competing demand for water. However, more development will also require an increase in water supply and associated infrastructure. Changes in land use and development may or may not increase the impacts and associated vulnerabilities of the City to this hazard depending on where and how this future growth occurs.

As the community develops, an additional ground storage tank and booster pumps will be necessary. The City is working towards increasing efforts to reduce the demand for water, and to move toward more sustainable water use. The 2007 City of Colusa General Plan noted that it is anticipated that the City's wells will continue to produce approximately 3.17 million gallons per day, which currently serves a population of approximately 5,600 people. Currently, the City's groundwater wells produce an adequate supply of potable water for Colusa residents. While peak demand is currently less than peak supply, demand will grow as the City's population grows with new residential development. In order to serve future growth and buildout of the General Plan, new water distribution conveyance and pumping facilities will need to be constructed.

Earthquake

Likelihood of Future Occurrence–Occasional (minor)/ Unlikely (major) Vulnerability–Extremely High

Hazard Profile

An earthquake is caused by a sudden slip on a fault. Stresses in the earth's outer layer push the sides of the fault together. Stress builds up, and the rocks slip suddenly, releasing energy in waves that travel through the earth's crust and cause the shaking that is felt during an earthquake. Earthquakes can cause structural damage, injury, and loss of life, as well as damage to infrastructure networks, such as water, power, gas, communication, and transportation. Earthquakes may also cause collateral emergencies including dam and levee failures, seiches, hazmat incidents, fires, avalanches, and landslides. The degree of damage depends on many interrelated factors. Among these are: the magnitude, focal depth, distance from the causative fault, source mechanism, duration of shaking, high rock accelerations, type of surface deposits or bedrock, degree of consolidation of surface deposits, presence of high groundwater, topography, and the design, type, and quality of building construction.

Location and Extent

Since earthquakes are regional events, the whole of the City is at risk to earthquake. The City of Colusa, Colusa County, and surrounding areas have some level of risk from seismic and geologic hazards. Faults in and around the City were shown in Section 4.3.10 of the Base Plan. These include the Great Valley and Sutter Buttes faults. A significant seismic event on any of these major faults could cause serious damage in the City of Colusa.

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 4.3.10 of the Base Plan.

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 earthquakes of significant magnitude occur, so both magnitude and intensity of earthquakes are expected to remain moderate. Seismic shaking maps for the area in Section 4.3.10 of the Base Plan show Colusa County and the City fall within a low to moderate shake risk.

Past Occurrences

Disaster Declaration History

There has been no state or federal disaster declarations in Colusa County from earthquake.

NCDC Events

The NCDC does not track earthquake events.

City of Colusa Events

As shown in the Base Plan, no disaster declarations have occurred in the County due to earthquake. The HMPC noted no past occurrences of earthquakes that affected the City in any meaningful way.

Climate Change and Earthquake

Climate change is unlikely to increase earthquake frequency or strength. More information on future impacts can be found in the Future Conditions/Future Development section of the Vulnerability Assessment below.

Vulnerability to Earthquake

The combination of plate tectonics and associated California coastal mountain range building geology generates earthquakes as a result of the periodic release of tectonic stresses 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. The primary impacts of concern are life safety and property damage. Although several faults are in and near the Colusa County Planning Area, seismic hazard mapping indicates that the City has low to moderate seismic hazard potential. There is the potential for the City and Colusa County Planning Area to be subject to some level of moderate seismic shaking. Some degree of structural damage due to stronger seismic shaking could be expected.

Earthquake shaking can also cause liquefaction to occur. Areas with loose soil and high water tables are at risk from liquefaction. There are limited areas in and near the City prone to liquefaction.

The whole of the City is at some measure of vulnerability to earthquake. An assessment of a community's vulnerability to earthquakes begins with an understanding of local exposure to earthquakes. This is included in the Local Concerns section below. After that section, assets at risk are discussed.

Local Concerns

The City has specific concerns and unique vulnerabilities regarding this hazard. These concerns form a portion of the basis for the mitigation strategy and mitigation actions that seek to reduce vulnerabilities to this hazard.

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 Colusa is within Zone 3.

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 is a

minimal amount of URM buildings within the City of Colusa. No survey of URM buildings has taken place. The City's historic "Chinatown" district (APNs: 001-035-001 through -009) is constructed of URM and located approximately 100 feet from the toe of the Sacramento River levee. There are underground tunnels (which fill with periodic seasonal high groundwater fluctuations) constructed by the original inhabitants. The Chinatown area is shown on Figure A-18, while a URM example in the City is shown on Figure A-19.



Figure A-18 City of Colusa – Chinatown District and Levee

Source: City of Colusa

Figure A-19 City of Colusa – URM Building Example



Source: City of Colusa

The City is also concerned with aging underground infrastructure pertaining to water and sewer utilities.

Assets at Risk

Many assets in the City are at risk to ground shaking. Assets at risk from earthquake include people and populations; structures; critical facilities and infrastructure; community lifelines; natural, historic, and cultural resources; economic assets; and community activities of value. These are discussed in the following sections.

People and Populations

All people and populations are at risk from earthquake shaking and surface fault. Those at heightened risk include:

- > The unsheltered
- > Infants and children under age five and their caregivers
- Elderly (65 and older)
- Individuals with disabilities

- > Individuals dependent on medical equipment
- Individuals with impaired mobility

The greatest risk to people and populations from earthquake is death and injury. More information on people and populations at risk to earthquake shaking events can be seen in the Hazus scenarios developed for this LHMP and described below specific to the City of Colusa. More information on the Hazus scenarios and how the County is affected is included in Section 4.3.10 of the Base Plan.

Structures

All structures in the City are vulnerable to earthquakes, depending on the severity and location of the event. Though not specific to the City, the Hazus scenarios in the Base Plan show how the larger Colusa County Planning Area structures may be affected.

Critical Facilities and Infrastructure

Earthquake and its related hazards present risks to the City. Earthquakes can damage critical facilities and infrastructure that provide vital services to the City. The critical facilities at risk to earthquake for the Colusa County Planning Area, including the City of Colusa, are presented in the Hazus analysis in Section 4.3.10 of the Base Plan.

Community Lifelines

All community lifelines in the City are vulnerable to earthquakes, depending on the severity and location of the shake. A major earthquake event could cause these lifelines to be overwhelmed. Some of these would be able to be restored to service quickly, while others would take more time having a prolonged impact on the people and structures within the City. More information on lifelines at risk can be seen in the Hazus scenarios in Section 4.3.10 of the Base Plan.

Natural, Historic, and Cultural Resources

The 2023 State Hazard Mitigation Plan noted that environmental problems from earthquakes can be numerous. It is possible for earthquakes to reroute streams, which can change the water quality, possibly damaging habitat and feeding areas. Streams fed by groundwater and/or springs may dry up because of changes in underlying geology. Another threat to the environment from earthquakes is the potential release of hazardous materials. Historical and cultural resources are at risk, often due to their age and construction types. The Hazus scenarios in Section 4.3.10 of the Base Plan and included below are relatively silent on the vulnerability to natural, historic, and cultural resources, but impacts to these resources could be long lasting.

Economic Assets and Community Activities of Value

All economic assets in the City are vulnerable to earthquakes, depending on the severity and location of the shake and associated cascading hazards and impacts. Should an earthquake occur causing significant damages, the local economy can be affected for an extended period until recovery occurs and businesses and other economic drivers are operational. More information on economic assets at risk can be seen in

the Hazus scenarios in Section 4.3.10 of the Base Plan. All community activities of value would be affected by an earthquake if they were underway during an earthquake event and may be postponed or cancelled until the City has sufficiently recovered.

Impacts from Earthquake

Earthquakes can strike without warning and cause dramatic changes to the landscape of an area that can have devastating impacts on the built environment. The greatest impact is to life safety of the City of Colusa residents and visitors. Other impacts to the City would include damages to infrastructure such as roads, bridges, and dams; damages and loss of services to utilities and critical infrastructure, including those related to gas, power, water, wastewater and communication systems; damages to structures and other development; and possible loss of life and injuries.

Earthquakes can also cause failure of dams, levees, and reservoirs. Facilities and land downslope from dams or water reservoirs or behind levees might be subject to flooding, if the dams, reservoirs, or levees fail as a result of an earthquake. The City has locations with significant flood risk that include facilities downslope from dams or reservoirs or behind levees that could be affected by a significant earthquake event.

Impacts that are not quantified, but can be anticipated in large future events, include:

- Injury and loss of life;
- > Commercial and residential structural and property damage;
- Disruption of and damage to public infrastructure, utilities, and services;
- Damage to roads/bridges resulting in loss of mobility;
- > Significant economic impact (jobs, sales, tax revenue) to the community; and
- Negative impact on commercial and residential property values

Impacts to identified assets at risk to this hazard and the overall vulnerability of the City may be affected in the future by climate change (which was discussed in the Likelihood of Future Occurrence discussion above), changes in population patterns (migration, density, or the makeup of socially vulnerable populations), and changes in land use and development. Changes in population patterns and land use, and the extent to which they affect this hazard, are discussed in the Future Conditions/Future Development discussion below.

Future Conditions/Future Development

Future conditions may be affected by climate change, changes in population patterns (migration, density, or the makeup of socially vulnerable populations), and changes in land use and development. Findings on this for the City of Colusa include the following:

- Climate change is likely to have no effect on future earthquake conditions and associated impacts and vulnerability of the City.
- Population growth in the City of Colusa has recently slowed. Any additional growth in the City would place additional populations at risk to earthquake. Additional population growth would likely bring continued diversity to the City. Vulnerable population groups could face disproportionate effects from

an earthquake and should be planned for. Changes in population and population patterns may or may not increase the impacts and vulnerability of the City to this hazard depending on the location and nature of growth and continued planning for future hazard conditions.

Land use planning should be proactive to address future hazard conditions. However, City building codes are in effect to reduce structure damage, including damage to critical facilities and infrastructure, and should be updated as necessary to continue to address future earthquake conditions. Depending on the location of new development and adherence to protective building codes, changes in land use and development may or may not increase the impacts and associated vulnerabilities of the City to this hazard.

Although new growth and development corridors would fall in the area affected by earthquake, given the limited chance of major earthquake and the building codes in effect, development in areas prone to earthquakes will continue to occur. The City enforces the state building code, which mandates construction techniques that minimize seismic hazards. Migration patterns may impact the number of residents within the City, possibly affecting overall vulnerability. Future development in the City is subject to these building codes and land use planning.

Flood: 1%/0.2% Annual Chance

Likelihood of Future Occurrence–Occasional (1%)/Unlikely (0.2%) **Vulnerability**–High

Hazard Profile

This hazard analyzes the FEMA DFIRM 1% and 0.2% annual chance floods. These tend to be the larger floods that can occur in the City and have caused damage in the past. Flooding can be a significant problem in the City. Historically, the City has been at risk to flooding primarily during the winter and spring months when river systems in the City swell with heavy rainfall and snowmelt runoff. Normally, storm floodwaters are kept within defined limits by a variety of storm drainage and flood control measures including the numerous levee systems located throughout the Colusa County Planning Area and the City of Colusa. 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 in the City.

Location and Extent

The City of Colusa has areas located in the 1% and 0.2% annual chance flood zones. This is seen in Figure A-20.



Figure A-20 City of Colusa – FEMA DFIRM Flood Zones

Table A-25 details the DFIRM mapped flood zones located within the City.

Flood Zone	Description	Flood Zone Present in City of Colusa
А	1% annual chance flooding: No base flood elevations provided	
AE	1% annual chance flooding: Base flood elevations provided	X
АН	1% annual chance flood areas of shallow flooding between one to three feet deep. Regulatory floodway; Base flood elevations provided	
АО	1% annual chance flooding: sheet flow areas. BFEs derived from detailed hydraulic analyses are shown in this zone.	
Shaded X	0.2% annual chance flooding: The areas between the limits of the 1% annual chance flood and the 0.2-percent-annual-chance (or 500-year) flood	Х
X (unshaded)	No flood hazard	X
D	Areas with a potentially moderate to high risk of flooding, but the probability has not been determined.	

Table A-25 City of Colusa– DFIRM Flood Hazard Zones

Source: FEMA DFIRM 3/27/2024

Additionally, flood extents can generally 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 extents for the City from the FEMA DFIRMs are shown in Table A-26.

Flood Zone	Total Acres	% of Total Acres	Improved Acres	% of Total Improved Acres	Unimproved Acres	% of Total Unimproved Acres
1% Annual Chance Flood Hazard	2,857	26.82%	1,175	21.95%	1,682	31.74%
0.2% Annual Chance Flood Hazard	2,935	27.56%	1,618	30.23%	1,318	24.86%
Other Areas	4,858	45.62%	2,558	47.82%	2,300	43.40%
City of Colusa Total	10,651	100.00%	5,350	100.00%	5,300	100.00%

 Table A-26 City of Colusa – Geographical DFIRM Flood Zone Extents

Source: FEMA DFIRM 3/27/2024

California Department of Water Resources Best Available Maps (BAM)

The FEMA regulatory maps provide just one perspective on flood risks in the City. 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 100year 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. The BAM map for the City of Colusa is shown in Figure A-21.





Source: California DWR

Legend explanation: **Blue** - FEMA 100-Year, **Orange** – Local 100-Year (developed from local agencies), **Red** – DWR 100-year (Awareness floodplains identify the 100-year flood hazard areas using approximate assessment procedures.), **Pink** – USACE 100-Year (2002 Sac and San Joaquin River Basins Comp Study), **Yellow** – USACE 200-Year (2002 Sac and San Joaquin River Basins Comp Study), **Tan** – FEMA 500-Year, Grey – Local 500-Year (developed from local agencies), **Purple** – USACE 500-Year (2002 Sac and San Joaquin River Basins Comp Study).

Past Occurrences

Disaster Declaration History

A list of state and federal disaster declarations for Colusa County from flooding is shown on Table A-27. These events also likely affected the City to some degree.

Table A-27 Colusa County – Federal and State Disaster Declarations from Flood 1950-2024

Disaster Type		Federal Declarations	State Declarations		
	Count	Years	Count	Years	
Flood (including heavy rain and storms)	17	1955, 1958, 1963 (twice), 1970, 1983, 1986, 1995 (twice), 1997, 1998, 2005/2006, 2017, 2019 (twice), 2023 (twice)	19	1950, 1955, 1958 (twice), 1963 (twice), 1973, 1978, 1983, 1986, 1995 (twice), 1997, 1998, 2005/2006, 2008, 2017, 2019 (twice)	

Source: Cal OES, FEMA

NCDC Events

The NCDC tracks flooding events for the County. Events have been tracked for flooding since 1993. Colusa County has seen 14 events. These events most likely had some impact on the City.

City of Colusa Events

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

- During December 1996 January 1997, the nearby Colusa Weir Gage reached flood stage. This historic flooding event devastated the region by destroying thousands of crop acres (rice, tomatoes, alfalfa) and property. The Colusa Weir Gage reached flood stage 68.67 feet on 1/3/1997.
- During 1995 the entire state experienced severe flooding, and the nearby Colusa Weir along with nearly all local main drainages including Powell Slough, and the 2047 canal reached flood stage, flooding nearly every piece of ground surrounding the south and west of the City of Colusa. Enormous damage occurred to the City and surrounding areas and the City and County were declared disaster areas by the state and federal government.
- 1998, 2006, and 2017 the areas in and surrounding the City of Colusa experiences severe flooding, to the point where many roads leading into and from the City were closed, pavement was damaged, and the wastewater treatment plant and sewer collection facilities were inundated causing sanitary sewer overflows into the public streets.

Since 2019, the City has only experienced localized flooding, which has caused no significant property damage or loss. The localized flooding has been in the City streets and some alleyways.

Climate Change and Flood

It is likely that climate change will increase the chance of future occurrence as well as future impacts associated with flood. More information on future impacts to the City can be found in the Future Conditions/Future Development section of the Vulnerability Assessment below.

According to the CAS, climate change may affect flooding in California, the Colusa County Planning Area, and the City of Colusa. While average annual rainfall may increase or decrease slightly, the intensity of individual rainfall events is likely to increase during the 21st century. It is possible that average soil moisture and runoff could decline, however, due to increasing temperature, evapotranspiration rates, and spacing between rainfall events. Reduced snowpack and increased number of intense rainfall events are likely to put additional pressure on water infrastructure which could increase the chance of flooding associated with breaches or failures of flood control structures such as levees and dams. Cal Adapt future precipitation projections were shown in Section 4.3.4.

Vulnerability to Flood: 1% and 0.2% Annual Chance

Floods have been a part of the City's historical past and will continue to be so in the future. During winter months, long periods of precipitation and the timing of that precipitation are critical in determining the threat of flood, and these characteristics further dictate the potential for widespread structural and property damage. Predominantly, the effects of 1% and 0.2% annual chance flooding are generally confined to areas near the waterways of the City. As waterways grow in size from local drainages, so grows the threat of flood and dimensions of the threat.

The whole of the City is at some measure of vulnerability to floods. An assessment of a community's vulnerability to flood begins with an understanding of local exposure to flood. This is included in the Local Concerns section below followed by a discussion of the City's Assets at Risk to this hazard.

Local Concerns

The City has specific concerns and unique vulnerabilities regarding this hazard. These concerns form a portion of the basis for the mitigation strategy and mitigation actions that seek to reduce vulnerabilities to this hazard.

As previously described in Section 4.3.11 of the Base Plan, the Colusa County Planning Area and the City of Colusa have been subject to historical flooding. The 2007 City of Colusa General Plan noted that Colusa is situated on the southern bank of a bend in the Sacramento River, which drains the northern half of the Central Valley. No other major bodies of water are located near the City. The river levee that protects the City from catastrophic flooding falls under the jurisdiction of Reclamation District No. 108 and is maintained by the Sacramento West Side Levee District.

The 2007 General Plan also noted that flooding within the City occurs during heavy rains and to some extent, even during mild storms. Periods of flooding can cause significant circulation problems and has resulted in some property damage in flood-prone areas. Flooding events cause inconveniences and potential safety hazards to motorists traveling through the flooded streets and property owners attempting to access parked cars. Minor flooding events can appear as quickly as one hour after significant rainstorms. While flooding may occur as quickly as one hour after the initiation of a storm event, generally speaking, the flooded areas drain within two or three hours after the end of the storm event.

Assets at Risk

Assets at risk from flood include people and populations; structures; critical facilities and infrastructure; community lifelines; natural, historic, and cultural resources; and economic assets and community activities of value. These are discussed in the following sections.

People and Populations

All people and populations located in the 1% and 0.2% annual chance floodplains are at some risk to flooding. Certain vulnerable populations located within areas prone to flooding may be at increased risk to this hazard, especially during a large event with minimal advance notice. These vulnerable populations include: the unsheltered, those with limited mobility, and those that lack the resources to leave the area.

City residents that live in the 1% and 0.2% annual chance floodplains are often the most vulnerable. With the recent remapping of the City's floodplains, all former levee protected areas now fall in the DFIRM floodplains. Not only are the residents at risk, but their homes and contents are all at risk, compounding the impacts associated with significant hazard events. To further evaluate the impact to the City of Colusa's residential population residing within these hazard areas, the DFIRM flood zones were overlayed on the parcel layer. Those residential parcel centroids that intersect the flood zones were counted and multiplied by the 2022 Census Bureau average household factors for the City of Colusa – 2.55. According to this analysis, there is a total population of 870 and 38 residents of the City at risk to flooding in the 1% and 0.2% annual chance floodplains, respectively. This is shown in Table A-28.

Table A-28 City of Colusa – Improved Residential Parcels and Population by Summary FEMA DFIRM Flood Zone

	1% Annu	al Chance	0.2% Annual Chance		
Jurisdiction	Improved Residential Parcels	Population at Risk	Improved Residential Parcels	Population at Risk	
City of Colusa	300	870	13	38	

Source: FEMA DFIRM 3/27/2024, Colusa County 2023 Parcel/Assessor Data, US Census Bureau American Community Survey 2022 Household Size Estimates.

The City noted that the Critical Facilities and Infrastructure section below includes the facilities used by At-Risk populations that are threatened by this hazard. While this is not specific to what special populations reside in the City, it does speak to facilities that area used to serve (portions) of this population.

Structures

Certain structures in the City are at risk of DFIRM flooding and primarily include those structures located within the 1% and 0.2% annual chance floodplains. GIS was used to determine the possible impacts of flooding on parcels and structures within the City of Colusa. The methodology described in Section 4.3.11 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. Table A-29 is a summary table for the City of Colusa. Parcel counts, land and improved values (i.e., those with a structure improvement on the parcel), other values, estimated content replacement values, 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 A-30 breaks down Table A-29 and shows the same analysis further broken out by detailed FEMA flood zone and property use.

Table A-29 City of Colusa – Count and Value of Parcels (and Structures) at Risk in Summary DFIRM Flood Zone

Flood Zone	Total Parcel Count	Improved Parcel Count	Total Land Value	Improved Structure Value	Other Value	Total Value
1% Annual Chance Flood Hazard	476	355	\$41,614,561	\$118,703,421	\$12,800,623	\$173,118,605
0.2% Annual Chance Flood Hazard	18	15	\$796,791	\$3,866,267	\$ 0	\$4,663,058
Other Areas	1,840	1,707	\$101,892,192	\$321,198,099	\$36,427,920	\$459,518,211
City of Colusa Total	2,334	2,077	\$144,303,544	\$443,767,787	\$49,228,543	\$637,299,874

Source: FEMA DFIRM 3/27/2024, Colusa County 2023 Parcel/Assessor 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 A-30 City of Colusa – Count and Values of Parcels (and Structures) at Risk by Detailed DFIRM 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										
Zone AE										
Agricultural	12	6	\$7,527,941	\$337,204	\$0	\$337,204	\$8,202,349			
Commercial	34	20	\$1,916,839	\$12,429,596	\$1,916,816	\$12,429,596	\$28,692,847			
Government	39	9	\$2,018,999	\$2,650,628	\$22,874	\$2,650,628	\$7,343,129			
Industrial	57	15	\$10,691,358	\$25,993,102	\$9,522,346	\$38,989,652	\$85,196,458			
Institutional	2	2	\$286,062	\$485,498	\$771,560	\$485,498	\$2,028,618			
Miscellaneous	5	3	\$492,767	\$7,399,098	\$0	\$7,399,098	\$15,290,963			
Residential	327	300	\$18,680,595	\$69,408,295	\$567,027	\$34,704,148	\$123,360,065			
Zone AE Total	476	355	\$41,614,561	\$118,703,421	\$12,800,623	\$96,995,824	\$270,114,429			
1% Annual Chance Flood Hazard Total	476	355	\$41,614,561	\$118,703,421	\$12,800,623	\$96,995,824	\$270,114,429			
0.2% Annual Chance Flood Hazard										
Zone X (shaded)									

Flood Zone / 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	
Commercial	2	0	\$76,256	\$0	\$0	\$ 0	\$76,256
Government	1	0	\$23,286	\$ 0	\$0	\$ 0	\$23,286
Industrial	2	2	\$17,815	\$1,017,083	\$0	\$1,525,625	\$2,560,523
Institutional	0	0	\$0	\$0	\$0	\$0	\$ 0
Miscellaneous	0	0	\$0	\$0	\$0	\$ 0	\$ 0
Residential	13	13	\$679,434	\$2,849,184	\$0	\$1,424,591	\$4,953,209
Zone X (shaded) Total	18	15	\$796,791	\$3,866,267	\$0	\$2,950,216	\$7,613,274
0.2% Annual Chance Flood Hazard Total	18	15	\$796,791	\$3,866,267	\$0	\$2,950,216	\$7,613,274
Other Areas							
Zone X (unshad	ed)						
Agricultural	11	5	\$6,410,137	\$215,226	\$495,94 0	\$215,226	\$7,336,529
Commercial	213	170	\$18,551,618	\$44,774,548	\$4,395,516	\$44,774,548	\$112,496,230
Government	67	42	\$3,943,217	\$30,910,161	\$18,496,958	\$30,910,161	\$84,260,497
Industrial	6	5	\$1,709,798	\$7,627,238	\$5,924,860	\$11,440,857	\$26,702,753
Institutional	32	18	\$2,000,729	\$5,715,322	\$5,268,089	\$5,715,322	\$18,699,462
Miscellaneous	7	2	\$122,576	\$1,032,023	\$ 0	\$1,032,023	\$2,186,622
Residential	1,504	1,465	\$69,154,117	\$230,923,581	\$1,846,557	\$115,461,786	\$417,386,041
Zone X (unshaded) Total	1,840	1,707	\$101,892,192	\$321,198,099	\$36,427,920	\$209,549,923	\$669,068,134
Other Areas Total	1,840	1,707	\$101,892,192	\$321,198,099	\$36,427,920	\$209,549,923	\$669,068,134
City of Colusa Total	2,334	2,077	\$144,303,544	\$443,767,787	\$49,228,543	\$309,495,963	\$946,795,837

Source: FEMA DFIRM 3/27/2024, Colusa County 2023 Parcel/Assessor 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 A-31 summarizes Table A-30 and shows City of Colusa loss estimates and improved values at risk by FEMA 1% and 0.2% annual chance flood zones. According to Table A-30 and Table A-31, the City of Colusa has 355 parcels and \$228.5 million of structure and contents values or values in the 1% annual chance flood zone, and 15 improved parcels and \$6.8 million of structure and contents values in the 0.2% annual chance flood zone. These values can be refined a step further. Applying the 20 percent damage factor as previously described in Section 4.3.11 of the Base Plan, there is a 1% chance in any given year of
a flood event causing \$45 million in damage and a 0.2% chance in any given year of a flood event causing \$1.4 million in damage in the City of Colusa. The loss ratio of 4.83% indicates that flood losses for 1% annual chance flooding would be relatively moderate, but the City would be able recover. The loss ratio of 0.14% indicates that flood losses for 0.2% annual chance flooding would be relatively major and the City would have some difficulty in recovering.

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	476	355	\$41,614,561	\$118,703,421	\$12,800,623	\$96,995,824	\$228,499,868	\$45,699,974	483%
0.2% Annual Chance	18	15	\$796,791	\$3,866,267	\$0	\$2,950,216	\$6,816,483	\$1,363,297	0.14%
Total	2,334	2,077	\$144,303,544	\$443,767,787	\$49,228,543	\$309,495,963	\$802,492,293	\$160,498,459	0.05%

Table A-31 City of Colusa – Flood Loss Estimates

Source: FEMA DFIRM 3/27/2024, Colusa County 2023 Parcel/Assessor 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.

Critical Facilities and Infrastructure

Flooding presents a threat to threat to both critical facilities and infrastructure. Critical infrastructure plays an immensely important role in our communities. As previously noted, communities rely on roads and related biking and pedestrian routes for transportation, and on water infrastructure for drinking water, wastewater service, and draining streets of rainwater. Damage to any one of these systems can threaten public safety, wreak havoc on daily life, impact properties far from flood zones, and result in economic impacts that cascade throughout the Colusa County Planning Area.

A separate analysis was performed on the critical facility inventory in the City to determine critical facilities that fall into DFIRM flood zones. Using GIS, the DFIRM flood zones were overlayed on the critical facility GIS layer. This is shown on Figure A-22. Table A-32 details which critical facilities fall in which flood zone. Details of critical facility categories, type, name, and address by detailed flood zone for the entire Colusa County Planning Area including the City of Colusa are listed in Appendix F.



Figure A-22 City of Colusa – Critical Facilities in DFIRM Flood Zones

Critical Facility Category	Facility Type	Facility Count
1% Annual Chance Flood Hazar	d	
Zone AE		
	Emergency Response	1
Essential Services Facilities	Public Services	2
	Total	3
	Apartment Complex	3
At Risk Population Facilities	Mobile Home Park	4
	Total	7
Zone AE Total		10
1% Annual Chance Flood Hazar	d Total	10
Other Areas		
Zone X (unshaded)		
	Fire Station	2
	Medical	1
	Police Station	1
Essential Services Facilities	Public Services	1
	Utility Facility	2
	Total	7
	Apartment Complex	19
	Assisted-Living	1
	Hotel or Motel	2
At Diele De geologie y Erecilities	Jail	1
At Kisk Population Facilities	Mobile Home Park	1
	School	8
	Senior Living Facility	1
	Total	33
Zone X (unshaded) Total		40
Other Areas Total		40
City of Colusa Total		50

Table A-32 City of Colusa – Critical Facilities in DFIRM Flood Zones

Source: FEMA DFIRM 3/27/2024, City of Colusa GIS

Community Lifelines

1% and 0.2% annual chance flooding presents a threat to life and property, including community lifelines in the City. Many of the City's community lifelines are the same as or similar to Colusa County's. This was discussed in greater detail in Section 4.3.11 of the Base Plan. Generally, even major flood events are temporary events with flood waters receding back to pre-storm levels at the conclusion of the storm.

However, depending on the location, duration, and magnitude and severity of any given flood event, some of these community lifelines may be overwhelmed in the short term.

Natural, Historic, and Cultural Resources

Large flood events can affect natural, historic, and cultural resources. There are a number of ways floodwaters can impact natural resources and the environment: Wildlife habitats can be destroyed by floodwaters. Contaminated floodwater can pollute rivers and habitats. Silt and sediment can destroy natural areas. Riverbanks and natural levées can be eliminated as rivers reach bankfull capacity. Rivers can be widened, and deposition can increase downstream. Trees can be uprooted by high-velocity water flow. Plants that survive the initial flood may die due to being inundated with water. Historic and cultural resources may also be affected. Generally, the impacts are associated with damage to structures within the flooded areas, but other cultural resources such as those associated with Native Americans and old tribal areas can also be disturbed, damaged and lost during extreme flood events. Any of these that fall in the flood zones shown on Figure A-20 would be vulnerable.

Economic Assets and Community Activities of Value

Since the City lies entirely in the floodplain, major flood events could affect any economic asset that lies in the floodplain and can have long lasting effects. This could cause those businesses and economic assets within these areas to close or relocate. This could cause temporary or permanent loss of sales tax revenue. These events can also affect those economic assets outside of the floodplain, at least in the short term until the City has sufficiently recovered.

Impacts from Flood: 1% and 0.2% Annual Chance

Floods are among the costliest natural disasters in terms of human hardship and economic loss nationwide. Large flood events, including those associated with 1% and 0.2% annual chance floods, can cause substantial damage to structures, landscapes, and utilities as well as life safety issues. People may be swept away in floodwaters, causing injuries or deaths. Floods can be extremely dangerous, and even six inches of moving water can knock over a person given a strong current. During a flood, people can also suffer heart attacks or electrocution due to electrical equipment short outs. Direct impacts, such as drowning, can be limited with adequate warning and public education about what to do during floods. Floodwaters can transport large objects downstream which can damage or remove stationary structures. Structures can be damaged directly from floodwaters and can also be damaged from trees falling as a result of water-saturated soils. 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 causing power outages. The interruption of power causes major problems and can result in the closure of governmental offices and community businesses. Public schools may also be required to close or be placed on a delayed start schedule. Roads can be damaged and closed, causing safety and evacuation issues.

Standing water can cause damage to crops, roads, foundations, and electrical circuits. Other problems connected with flooding and stormwater runoff include erosion, sedimentation, degradation of water quality, loss of environmental resources, and economic impacts.

Impacts that are not quantified, but can be anticipated in large future events, include:

- Injury and loss of life;
- > Commercial and residential structural and property damage;
- > Disruption of and damage to public infrastructure, utilities, and services;
- > Damage to roads/bridges resulting in loss of mobility;
- > Significant economic impact (jobs, sales, tax revenue) to the community; and
- > Negative impact on commercial and residential property values

Impacts to identified assets at risk to this hazard and the overall vulnerability of the City may be affected in the future by climate change (which was discussed in the Likelihood of Future Occurrence discussion above), changes in population patterns (migration, density, or the makeup of socially vulnerable populations), and changes in land use and development. Changes in population patterns and land use, and the extent to which they affect this hazard, are discussed in the Future Conditions/Future Development discussion below.

Health Hazards from Flooding

According to FEMA, certain health hazards are also common to flood events. Three general types of health hazards accompany floods. The first comes from the water itself. Floodwaters carry anything that was on the ground that the upstream runoff picked up, including dirt, oil, animal waste, and lawn, farm, and industrial chemicals. Pastures and areas where cattle and other livestock are kept or their wastes are stored can contribute polluted waters to the receiving streams.

Floodwaters also saturate the ground, which leads to infiltration into sanitary sewer lines. When wastewater treatment plants are flooded, there is nowhere for the sewage to flow. Infiltration and lack of treatment can lead to overloaded sewer lines that can back up into low-lying areas and homes. Even when it is diluted by flood waters, raw sewage can be a breeding ground for bacteria such as e. coli and other disease-causing agents.

The second type of health problem arises after most of the water has gone. Stagnant pools can become breeding grounds for mosquitoes, and wet areas of a building that have not been properly cleaned breed mold and mildew. A building that is not thoroughly cleaned becomes a health hazard, especially for small children, the elderly, and those that are medically vulnerable.

Another health hazard occurs when heating ducts in a forced air system are not properly cleaned after inundation. When the furnace or air conditioner is turned on, the sediments left in the ducts are circulated throughout the building and breathed in by the occupants. If a water system loses pressure, a boil order may be issued to protect people and animals from contaminated water.

The third problem is the long-term psychological impact of having been through a flood and seeing one's home damaged and irreplaceable keepsakes destroyed. The cost and labor needed to repair a flood-damaged structure puts a severe strain on people, especially the unprepared and uninsured. There is also a long-term problem for those who know that their homes can be flooded again. The resulting stress on floodplain residents takes its toll in the form of aggravated physical and mental health problems.

Insurance Coverage, Claims Paid, and Repetitive Losses

Standard property insurance does not include flood coverage because of the relatively high risk. The National Flood Insurance Program (NFIP) provides flood insurance to residents in those communities that participate in the NFIP. Federal financial assistance requires the purchase of flood insurance for structures located within a 100-year floodplain – a requirement that affects nearly all mortgages financed through commercial lending institutions. Flood insurance is also recommended for all structures protected by levees, even if not mapped within a floodplain.

The City of Colusa joined the National Flood Insurance Program (NFIP) on June 30, 1976. The City does not participate in CRS program. NFIP data indicates that as of February 2, 2024, there were 75 flood insurance policies in force in the City with \$25,650,000 of coverage. Of the 75 policies: 72 were for single family homes were residential (single-family homes), 2 were for a multi-family home, and 1 was for non-residential properties. Of the 75 policies in force, all were in B, C, and X zones. It should be noted that this data was provided before the new FEMA DFIRM flood mapping came into effect. The GIS parcel analysis detailed above identified 355 improved parcels in the 1% annual chance flood zone. There have been 13 historical claims for flood losses totaling \$101,045.82.00. NFIP data further indicates that there are 2 repetitive loss (RL) and no severe repetitive loss (SRL) buildings in the City of Colusa. Data for FEMA's PIVOT database indicates that these repetitive loss parcels have been mitigated. There have been no substantial damage claims since 1978 in the City.

Based on this analysis of insurance coverage, the City has values at risk to the 1% annual chance and greater floods. Of the 355 improved parcels within the 1% annual chance flood zone, none of those parcels maintain flood insurance. This can be seen on Table A-33.

Table A-33 City of Colusa –	Percentage	of Policy	Holders	to In	mproved	Parcels	in	the	1%
Annual Chance Floodplain									

Jurisdiction	Improved Parcels in SFHA (1% Annual Chance) Floodplain*	Insurance Policies in the SFHA (1% Annual Chance) Floodplain	Percentage of 1% Annual Chance Floodplain Parcels Currently Insured
City of Colusa	355	0	0.0%

Source: FEMA DFIRM 3/27/2024, Colusa County 2023 Parcel/Assessor Data, NFIP CIS data.

As the levees are decertified, an increased number of Colusa County residents are placed in the floodplain. Table A-34 illustrates the changes in the number of insured structures in the 1% annual chance floodplain. As seen in the table, the overall percentage of policy holders remains unchanged. Thus, flood insurance education and promotion will be an important focus moving forward with the recent DFIRM update putting more people and structures within the 1% annual chance floodplain.

	2018 LHMP			2024 LHMP			
Jurisdiction	Improved Parcels in SFHA (1% Annual Chance) Floodplain*	Insurance Policies in the SFHA (1% Annual Chance) Floodplain	Percentage of 1% Annual Chance Floodplain Parcels Currently Insured	Improved Parcels in SFHA (1% Annual Chance) Floodplain*	Insurance Policies in the SFHA (1% Annual Chance) Floodplain	Percentage of 1% Annual Chance Floodplain Parcels Currently Insured	
City of Colusa	7	0	0.0%	355	0	0.0%	

Table A-34 City of Colusa – Comparison of 2024 and 2018 Percentage of Policy Holders to Improved Parcels in the 1% Annual Chance Floodplain

Source: FEMA DFIRM 3/27/2024, 2023 Colusa County Parcel/Assessor's Data, 2018 Colusa County LHMP Update

Future Conditions/Future Development

Future conditions may be affected by climate change, changes in population patterns (migration, density, or the makeup of socially vulnerable populations), and changes in land use and development. Findings on this for the City of Colusa include the following:

- Climate change is likely to exacerbate future flood conditions and associated impacts and vulnerability of the County to 1% and 0.2% annual chance flooding.
- Future population growth should be considered, as having more or less people in a community affects the overall hazard vulnerability to the City. Population growth in the City of Colusa has recently slowed; however, additional growth within the recently decertified levee protected areas of the County and other 1% and 0.2% annual chance floodplains would place additional populations at risk to flood. Additional population growth would likely bring continued diversity to the County. Vulnerable population groups could face disproportionate effects from flooding and should be planned for. Changes in population and population patterns may or may not increase the impacts and vulnerability of the City to this hazard depending on the location and nature of growth and continued planning for future hazard conditions.
- Land use planning should be proactive to address future hazard conditions. Locating new development, structures and critical facilities and infrastructure within or near areas of flood risk may put additional development at risk. However, City building codes and the City's floodplain ordinance are in effect to reduce this risk and should be updated as necessary to continue to address future flood conditions. Depending on the location of new development and adherence to protective building codes has recently slowed; however, additional growth within the recently decertified levee protected areas of the City and County and other 1% and 0.2% annual chance floodplains would place land at risk to flood.

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

are decertified, vulnerability increases, and certain populations may experience a disproportionate impact due to lack of access to resources.

The City enforces its floodplain management ordinance. More detail on the specifics of the floodplain ordinance can be found in the Capability section below. With the new effective 2024 DFIRMs, the City's floodplain ordinance should be updated to ensure new development within floodplains is adequately protected. A discussion of general considerations follows.

Future Development: General Considerations

Communities that participate in the NFIP adopt regulations and codes that govern development in special flood hazard areas (SFHAs) and enforce those requirements through their local floodplain management ordinances through the issuance of permits. The City of Colusa's floodplain management ordinance provides standards for development, subdivision of land, construction of buildings, and improvements and repairs to buildings that meet the minimum requirements of the NFIP and also the requirements of the City's current adopted version of the California Building Code (and International Building Code), which in some areas exceed the base requirements of the NFIP.

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

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

One of the most effective ways to reduce vulnerability to potential flood damage is through careful land use planning that fully considers applicable flood management information and practices. Master planning will also be necessary to assure that open channel flood flow conveyances serving the smaller internal streams and drainage areas are adequately prepared to accommodate the flows. Preservation and maintenance of natural and riparian areas should also be an ongoing priority to realize the flood control benefits of the natural and beneficial functions of these areas.

Future development in the City may be built in the floodplain, in conformance to the standards of the floodplain ordinance. The City enforces the floodplain ordinance on new development in the City of Colusa. With the new FEMA DFIRMs in place, the City should consider additional flood protection standards with their flood ordinance update.

Future development areas and their vulnerability to DFIRM flooding is discussed further in the below GIS analysis.

GIS Analysis

The City provided 7 future development areas which were used as the basis for the inventory of future development for the City. These were mapped in GIS. Utilizing the future development area spatial layer, the parcel centroid data was intersected to determine the future development areas within each FEMA DFIRM flood zone. Figure A-23 show the locations of the future development areas overlayed on the FEMA DFIRM flood zones. Table A-35 shows each future development area in the City in these zones.



Figure A-23 City of Colusa – Future Development in DFIRM Flood Zones

Colusa County Local Hazard Mitigation Plan Update August 2024

Flood Zone	Future Development Status	Future Development Site Number	Future Development Name	Total Parcel Count	Total Acres
1% Annual Chan	ce Flood Hazard				
		2	Colusa Sunrise Landing Phase 3 & 4 & 5	1	19
Zone AE	Shovel Ready	3	Schmidt Development	3	3.27
		Shovel Ready To	tal	4	22.27
	Zone AE Total		4	22.27	
1% Annual Chan	ce Flood Hazard	Гotal		4	22.27
Other Areas					
		4	Sunny Dhami	1	1
		5	Sunny Dhami	1	0.25
	Proposed	7	Wilson-Cheney Development (temporary name)	1	9.36
		Proposed Total		3	10.61
Zone X (unshaded)		1	Arco Town Center	1	4.58
	Shovel Ready	3	Schmidt Development	1	5.13
		6	Taco Bell	1	1.26
		Shovel Ready Total		3	10.97
	Zone X (unshad	ed) Total	6	21.58	
Other Areas Tot	al			6	21.58
Grand Total				10	43.85

Table A-35 City of Colusa – Future Development Areas in FEMA DFIRM Flood Zones

Source: FEMA 3/27/2024 DFIRM, City of Colusa

Flood: Localized Stormwater Flooding

Likelihood of Future Occurrence–Likely Vulnerability-Medium

Hazard Profile

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

Location and Extent

The City of Colusa is subject to localized flooding throughout the City. This is discussed in Table A-36 below. 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

Disaster Declaration History

There have been no state or federal disaster declarations from localized floods. There would most likely have been localized flood events during the disaster declarations from flood as shown in the previous 1%/0.2% annual chance flood section.

NCDC Events

The NCDC occurrences of localized flooding are included in the 1% and 0.2% annual chance flood hazard profile above.

City of Colusa Events

The City noted the following past occurrences of localized flooding:

Bridge Street between Main and south to Sioc Street experiences chronic flooding several times each year. Sioc Street on many of the same types of storm events experiences flooding west of the Bridge Street intersection and has to be closed. The central portion of the City covering a 10-12 block area bounded by Main street on the north, 4th street on the East, Fremont Street on the South and 9th Street on the north experiences chronic flooding. This area of town contains no underground storm drains. The Powell Slough leading out of town as an escape route at the Highway 20 crossing experiences severe flooding which overtops the Highway, which can then not be crossed by vehicular traffic. East Clay Street, east of Bridge Street experiences chronic flooding due to river seepage when the Sacramento River is at or around flood stage for extended time periods, and due to the lack of maintained storm drainage facilities and facilities that have been changed or removed downstream. Wilson road serving some commercial areas, and leading to the WWTP, experiences frequent flooding and must be closed.

Climate Change and Localized Flood

It is likely that climate change will increase the chance of future occurrence as well as future impacts from localized flood. More information on future impacts to the City can be found in the Future Conditions/Future Development section of the Vulnerability Assessment below.

Even if average annual rainfall may decrease slightly, the intensity of individual rainfall events is likely to increase during the 21st century, increasing the likelihood of overwhelming stormwater systems built to historical rainfall averages. This makes localized flooding more likely.

Vulnerability to Localized Flood

Flood vulnerability and their impacts vary by location and severity of any given flood event and will likely only affect certain areas of the City during specific times. Based on the risk assessment, it is evident that floods will continue to have potentially significant impacts to certain areas of the City. However, while flooding can cause significant impacts, depending on the duration and volume of precipitation and the drainage in any given area, many of the floods in the City are minor, localized flood events that are more of a nuisance than a disaster.

Many areas of the City are at some measure of vulnerability to localized flooding. An assessment of a community's vulnerability to localized flooding begins with an understanding of local exposure to localized flooding. This is included in the Local Concerns section below followed by a discussion of the City's Assets at Risk to this hazard.

Local Concerns

The City has specific concerns and unique vulnerabilities regarding this hazard. These concerns form a portion of the basis for the mitigation strategy and mitigation actions that seek to reduce vulnerabilities to this hazard.

Localized flooding in the City is caused by heavy downpours, which overwhelm the city's drainage capacity for a short time. The City's drainage quickly drains the access water held in the streets. When these events occur, the City streets can carry the excess water. Very few properties are in danger of flooding because the City streets, curb, and gutter systems were designed to hold additional water during intermittent downpours. There has been degraded drainage in some areas due to damaged drainpipes at alley access points, i.e., 13th Street ditch.

The City storm drains were originally not designed for the new atmospheric river storms and the rain now experienced during the downpours.

Historically, the City has been affected by flooding of streams and creeks occurring during heavy rain and storm events. Additional development in the City and in the watersheds of these streams affects both the frequency and duration of damaging floods through an increase in stormwater runoff and contributes to localized flooding occurring in areas throughout the City. The lack of or inadequate drainage infrastructure in the City contributes to localized flooding issues.

The City tracks localized flooding areas. Affected localized flood areas identified by the City of Colusa are summarized in Table A-36.

Road/Area Name	Flooding	Pavement Deterioration	Washouts	High Water/ Creek Crossing	Landslides/ Mudslides	Debris	Downed Trees
5 th street and Fremont	X	Х					Х
13 th Street, Fremont St. to Market St.	Х	X					Х
North side of Main street	X						Х
8 th and 9 th and SIOC	X	Х					Х
1 st Parkhill	X						Х
1 st Clay							
1 st Webster							Х

Table A-36 City of Colusa – List of Localized Flooding Problem Areas

Source: City of Colusa

Assets at Risk

Assets at risk from localized flood include people and populations; structures; critical facilities and infrastructure; community lifelines; natural, historic, and cultural resources; economic assets; and community activities of value. These are discussed in the following sections.

People and Populations

People and populations (including vulnerable populations) are traditionally not highly vulnerable to localized flooding, but their structures and contents can be at risk. Localized flooding may also cause transportation issues as roads and lanes are impacted or closed and affect the ability for people to travel throughout the City.

Structures

Structures in areas with localized flooding can be affected if floodwaters intrude into the structure. Structures in low lying areas, or those with basements can be at greater risk. Buildings with older foundations that are prone to water intrusion are also at greater risk. Once water finds its way into a structure, it tends to continue to do so until the path that brings water into a structure is mitigated. Structures can also be damaged by trees that have become uprooted and fall during rain and storm events. Large trees falling onto structures can cause significant damage.

Critical Facilities and Infrastructure

Localized flooding, while often more of a nuisance, can cause damage to critical facilities and infrastructure during a heavy rain and storm event. Any facility that experiences localized flooding can be impacted. Utilities and other critical infrastructure can all be affected, causing interruptions in service until repairs

can be made. For example, water and wastewater systems can be vulnerable to heavy rains and flood events. Rainfall creates a high water table, surging streams and creeks, and saturates soil. Infiltration of stormwater into water and wastewater systems may occur and presents a threat to public health and safety, when the infrastructure is no longer able to meet operational needs and local demands. Other critical facilities such as roads, bridges and other transportation facilities can also experience localized flooding causing road closures and other impacts until storm waters recede. This can result in extended road closures requiring alternate routes.

Community Lifelines

Due to the relatively minor nature of localized flooding, community lifelines are unlikely to be overwhelmed. Many of the City's community lifelines are the same as or similar to Colusa County's. This was discussed in greater detail in Section 4.3.12 of the Base Plan.

Natural, Historic, and Cultural Resources

Natural resource assets may have some vulnerabilities to localized flood during major storm events, but can benefit from floodwaters, often by design. Many parks and green spaces are designed to take overflow water and release it into the underlying soils and natural areas. Wetlands areas in the City actually help reduce the risk of flooding, as they can absorb excess rainfall that would have to be drained away from impervious surfaces. Flooding can provide many benefits to the natural environment, including recharging wetlands and groundwater, increasing fish production, creating wildlife habitat, and rejuvenating soil fertility. These smaller localized flooding events often provide more benefits to the environment in comparison to negative impacts associated with large flood events. Historic and cultural resources may be at some measure of vulnerability if they are located in areas subject to repeated localized flooding.

Economic Assets and Community Activities of Value

Localized flooding occurs on an annual basis throughout the City during storm events. Most of these events have limited impacts and include those associated with localized flooding due to undersized drainage systems, affecting nearby roads, structures, and other nearby assets. Unless directly affected by localized flooding, these events are unlikely to affect the City's key economic assets.

Community activities of value may have minor vulnerabilities if a localized flood event were to occur during the activity. This may cause the activity to be relocated, cancelled, or rescheduled.

Impacts from Localized Flood

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

Life safety issues from localized flooding would be more limited. The amount and type of damage or flooding that occurs varies from year to year and from storm to storm, depending on the quantity of precipitation and runoff.

Impacts to identified assets at risk to this hazard and the overall vulnerability of the City may be affected in the future by climate change (which was discussed in the Likelihood of Future Occurrence discussion above), changes in population patterns (migration, density, or the makeup of socially vulnerable populations), and changes in land use and development. Changes in population patterns and land use, and the extent to which they affect this hazard, are discussed in the Future Conditions/Future Development discussion below.

Future Conditions/Future Development

Future conditions may be affected by climate change, changes in population patterns (migration, density, or the makeup of socially vulnerable populations), and changes in land use and development. Findings on this for the City of Colusa include the following:

- Climate change is likely to exacerbate future heavy rain conditions and associated impacts and vulnerability of the City to localized flood.
- Population growth in the City of Colusa has recently slowed. Additional population growth would likely bring continued diversity to the City. This can also impact the vulnerable populations, like lowincome individuals and households living in areas that are typically more hazardous. Vulnerable population groups such as low-income individuals and households living in floodprone areas could face disproportionate effects from localized flood and should be planned for. Changes in population and population patterns may or may not increase the impacts and vulnerability of the City to this hazard depending on the location and nature of growth and continued planning for future hazard conditions.
- Land use planning should be proactive to address future hazard conditions. Creating more urban areas causes an increase in peak flow and stormwater runoff. Such growth will consume previously undeveloped acres, and the impacts may overwhelm existing drainage and flood control facilities. Locating new development, structures and critical facilities and infrastructure within or near areas of localized flooding risk may put additional development at risk. However, City building codes are in effect to reduce this risk and should be updated as necessary to continue to address future localized flood conditions. Depending on the location of new development and adherence to protective building codes, changes in land use and development may or may not increase the impacts and associated vulnerabilities of the City to this hazard.

Future development in the City mainly east of Bridge Street and State Route (SR) 20 must adequately address and mitigate impacts upon storm water drainage systems which will add more impervious surfaces and need to drain those waters. The City will need to be proactive to ensure that increased development has proper siting and drainage for stormwaters. These considerations will also aid the vulnerable populations within the city, since these groups face a disproportionate impact from hazards. The risk of localized flooding to future development can also be minimized by accurate recordkeeping of repetitive localized storm activity. Mitigating the root causes of the localized stormwater flooding will reduce future risks of losses.

Levee Failure

Likelihood of Future Occurrence–Unlikely Vulnerability–Extremely High

Hazard Profile

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

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

In the City of Colusa, levee failure poses a great risk to life and property in areas where levees protect surrounding property from flooding associated with stream and riverine flooding as well as areas where levees protect areas subject to events.

Location and Extent

Numerous levees are located throughout the City (as shown in Section 4.3.14 of the Base Plan. Figure A-24 shows the Levee Flood Protection Zones (LFPZs) in the City. Since the decertification of the levees, there is no FEMA DFIRM X Protected by Levee Flood Zone. However, analysis is performed using the LFPZ data of expected flood depths.

There is not a scientific scale or measurement system in place for levee failure. Expected flood depths from a levee failure in the City are not fully known, but the LFPZ maps provide a rough estimation. The speed of onset is slow as the river rises, but if a levee fails the warning times are generally short for those in the inundation area. The duration of a levee failure can be hours to weeks, depending on the water flows that the levee holds back. The City noted that when northern California reservoirs are nearing maximum capacity, they release water through the river systems, causing additional burdens on City levees. Geographical levee failure flood extent for the City developed from the LFPZs is shown in Table A-37.

Figure A-24 City of Colusa – LFPZ



Levee Flood Protection Zone	Total Acres	% of Total Acres	Improved Acres	% of Total Improved Acres	Unimproved Acres	% of Total Unimproved Acres
Shallow: <3ft	2,062	85.504%	1,377	99.194%	685	66.927%
City of Colusa Total	2,062	85.504%	1,377	99.194%	685	66.927%

Table A-37 City of Colusa –Geographical LFPZ Extents

Source: CA DWR

Past Occurrences

Disaster Declarations

There have been no state or federal disaster declarations from levee failure.

NCDC Events

There have been no NCDC levee failure events in Colusa County.

City of Colusa Events

The City has not experienced significant changes in its levee system since 2019. The seepage locations have remained the same as in prior years and are accurately identified in the 2018 plan. More recently, the City levee system did experience potential damage from encampments set up on the river side of the levee near the 3rd Street access. DWR inspected the levee where the people living in the camp had dug into the base of the levee near the river's edge. DWR was confident that it did not pose a serious risk to the levee because of the location of the dug-in. It was located at one of the most comprehensive portions of the levee and did not pose any immediate threat.

Climate Change and Levee Failure

It is likely that climate change will increase the chance of future occurrence as well as future impacts from levee failure. More information on future impacts to the City can be found in the Future Conditions/Future Development section of the Vulnerability Assessment below.

In general, increased flood frequency in California is a predicted consequence of climate change. Mechanisms whereby climate change leads to an elevated flood risk include more extreme precipitation events and shifts in the seasonal timing of river flows. This threat may be particularly significant because recent estimates indicate the additional force exerted upon the levees is equivalent to the square of the water level rise. These extremes are most likely to occur during storm events, leading to more severe damage to levees from waves and floods.

Vulnerability to Levee Failure

The probability of levee failure is increasing over time due to increased storms and flooding potential from global climate change. Levee failure flooding can occur as the result of partial or complete collapse of an

impoundment, and often results from prolonged rainfall and flooding. A levee failure can range from a small uncontrolled release to a catastrophic failure. The primary danger associated with levee failure is the high velocity flooding of those properties downstream of the breach. Vulnerability to levee failures is generally confined to the areas subject to inundation downstream of the levee. In addition, levee failure can cause stream bank erosion, which can in some instances have effects worse than those of flooding itself.

Large portions of the City are at some measure of vulnerability to levee failure as shown by the number of levees located within the City and the LFPZs. An assessment of a community's vulnerability to levee failure begins with an understanding of local exposure to levee failure. This is included in the Local Concerns section below followed by a discussion of the City's Assets at Risk to this hazard.

Local Concerns

The City has specific concerns and unique vulnerabilities regarding this hazard. These concerns form a portion of the basis for the mitigation strategy and mitigation actions that seek to reduce vulnerabilities to this hazard.

The 2004 LHMP noted that since dredging the river bottom has been discontinued, 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. Also, since the levees have been decertified in the County, many areas that were once outside the floodplain have now been placed inside the Special Flood Hazard Area. This has put many citizen's homes or businesses into the floodplain, which requires them to have flood insurance. The seepage locations have remained the same as in prior years and are accurately identified in the 2018 plan.

At this time, the City has no plans to certify the levees. The City will continue to work with the reclamation districts to evaluate levee improvement options, including possible levee certification in the future?

Assets at Risk

Assets at risk from levee failure include people and populations; structures; critical facilities and infrastructure; community lifelines; natural, historic, and cultural resources; economic assets; and community activities of value. These are discussed in the following sections.

People and Populations

Populations in the floodplains are at risk to flooding, including populations located in in leveed areas. The LFPZ areas provide some indication of the potential risk to populations located within areas protected by levees. Certain vulnerable populations may be at a greater risk of a sudden levee failure, including the unsheltered, those with limited mobility and those that lack the resources to leave the area.

City residents that live in areas protected by levees are often the most vulnerable, Not only are the residents at risk, but their homes and contents are all at risk, compounding the impacts associated with significant hazard events. To evaluate the population of residents of the City that live within areas protected by levees, the LFPZ was used to determine the potential risk of populations located within these leveed areas. The

LFPZs were overlayed on the parcel layer and linked to the Assessor data. Those residential parcel centroids that intersect the LFPZ were counted and multiplied by the 2022 Census Bureau average household factors for the City of Colusa – 2.55. According to this analysis, there is a total population of 5,156 residents of the City that reside in the LFPZs; although, all of these residents fall within the shallow, <3ft LFPZs. However, it should be noted that all populations located within areas protected by levees may be a risk to levee failure flooding. Residential populations within LFPZs are shown in Table A-28.

Table A-38 City of Colusa – Improved Residential Parcels and Population in LFPZs

Jurisdiction	Deep: >3ft	:	Shallow: <3ft		
	Improved Residential Parcels	Population	Improved Residential Parcels	Population	
City of Colusa	0	0	1,778	5,156	

Source: CA DWR, Colusa County 2023 Parcel/Assessor Data, US Census Bureau American Community Survey 2022 Household Size Estimates.

The City noted that the Critical Facilities and Infrastructure section below includes the facilities used by At-Risk populations that are threatened by this hazard. While this is not specific to what special populations reside in the City, it does speak to facilities that area used to serve (portions) of this population.

Structures

A levee failure can affect the built environment of the City, with multiple structures in the City at risk to a levee failure event. While all structures located within leveed areas are potentially at risk to a levee failure event, the LFPZ data was used to help quantify this risk. GIS was used to determine the possible impacts of levee failure flooding from LFPZs within the City of Colusa. The methodology described in Section 4.3.14 of the Base Plan was followed in determining structures and values at risk to levee failure flooding based on the LFPZ data. Table A-39 shows the parcel counts, land and improved values (i.e., those with a structure improvement on the parcel), estimated content replacement values, and total values by property use in the City that fall in LFPZs.

Table A-39 City of Colusa – Count and Value of Parcels (and Structures) in LFPZs by Property Use

Levee Flood Protection Zone / Property Use	Total Parcel Count	Improved Parcel Count	Total Land Value	Improved Structure Value	Other Value	Estimated Contents Value	Total Value
Deep: >3ft							
Agricultural	0	0	\$0	\$0	\$0	\$0	\$0
Commercial	0	0	\$0	\$0	\$0	\$0	\$0
Government	0	0	\$0	\$0	\$0	\$0	\$0
Industrial	4	2	\$105,143	\$261,230	\$309,690	\$391,845	\$1,067,908
Institutional	0	0	\$0	\$0	\$ 0	\$ 0	\$0
Miscellaneous	0	0	\$0	\$0	\$0	\$0	\$0
Residential	0	0	\$0	\$0	\$0	\$0	\$0

Levee Flood Protection Zone / Property Use	Total Parcel Count	Improved Parcel Count	Total Land Value	Improved Structure Value	Other Value	Estimated Contents Value	Total Value
Deep: >3ft Total	4	2	\$105,143	\$261,230	\$309,690	\$391,845	\$1,067,908
Shallow: <3ft							
Agricultural	23	11	\$13,938,078	\$552,430	\$495,94 0	\$552,430	\$15,538,878
Commercial	246	190	\$20,522,317	\$57,204,144	\$6,312,332	\$57,204,144	\$141,242,937
Government	93	51	\$4,841,496	\$33,560,789	\$18,519,832	\$33,560,789	\$90,482,906
Industrial	61	20	\$12,313,828	\$34,376,193	\$15,137,516	\$51,564,289	\$113,391,826
Institutional	34	20	\$2,286,791	\$6,200,820	\$6,039,649	\$6,200,820	\$20,728,080
Miscellaneous	12	5	\$615,343	\$8,431,121	\$0	\$8,431,121	\$17,477,585
Residential	1,843	1,778	\$88,505,253	\$303,181,060	\$2,413,584	\$151,590,525	\$545,690,422
Shallow: <3ft Total	2,312	2,075	\$143,023,106	\$443,506,557	\$48,918,853	\$309,104,118	\$944,552,634
City of Colusa Total	2,316	2,077	\$143,128,249	\$443,767,787	\$49,228,543	\$309,495,963	\$945,620,542

Source: CA DWR, Colusa County 2023 Parcel/Assessor

Structures protected by levees that fail, including those with mapped LFPZs, are often total losses. The analysis above assumes all levees in the City break at one time, which is unlikely. The extent and depth of actual flooding and associated damage will vary depending on the location, nature, depth, and extent of any levee break.

Critical Facilities and Infrastructure

Levee failure flooding presents a threat to both critical facilities and infrastructure. Critical infrastructure failures such as loss of power, impacts to potable and wastewater treatment systems, and road and bridge failures can all be caused by levee failure events, depending on the magnitude of the resulting flood. While all critical facilities that are located behind leveed areas are potentially at risk to a levee failure event, a separate analysis was performed on the critical facility inventory in the City to determine critical facilities that fall within the LFPZs. Using GIS, the LFPZs were overlayed on the critical facility GIS layer. This is shown on Figure A-25 and detailed in Table A-40 for the LFPZ areas in the City. As shown, facilities lie in the Shallow: <3ft LFPZ.



Levee Flood Protection Zone	Critical Facility Category	Facility Type	Facility Count
		Emergency Response	1
		Fire Station	2
	Essential Services Facilities	Medical	1
		Police Station	1
		Public Services	3
		Utility Facility	2
		Total	10
Shallow: <3ft		Apartment Complex	22
		Assisted-Living	1
		Hotel or Motel	2
	At Disla Descalations Equilities	Jail	1
	At Kisk Population Facilities	Mobile Home Park	4
		School	8
		Senior Living Facility	1
		Total	39
Shallow: <3ft Total			49
City of Colusa Total			49

Table A-40 City of Colusa – Critical Facilities in LFPZ

Source: CAL FIRE, City of Colusa GIS

Community Lifelines

Levee failure flooding presents a threat to life and property, including community lifelines in the City. Many of the City's community lifelines are the same as or similar to Colusa County's. These were discussed in greater detail in Section 4.3.14 of the Base Plan. A levee failure could overwhelm these community lifelines in the short term.

Natural, Historic, and Cultural Resources

Large levee failure events can affect natural, historic, and cultural resources. There are a number of ways levee failures and associated floodwaters can impact natural resources and the environment: Wildlife habitats can be destroyed. Contaminated floodwater can pollute rivers and habitats. Silt and sediment can destroy natural areas. Riverbanks and natural levées can be eliminated as rivers reach bankfull capacity. Rivers can be widened, and deposition can increase downstream. Trees can be uprooted by high-velocity water flow. Plants that survive the initial flood may die due to being inundated with water. Historic and cultural resources may also be affected. Generally, the impacts are associated with damage to structures within the areas protected by levees, but other cultural resources such as those associated with Native Americans and tribal cultural areas can also be disturbed, damaged and lost during extreme levee failure events. Any of these that fall in areas protected by levees and within the LFPZ flood zones would be vulnerable.

Economic Assets and Community Activities of Value

Major levee failure flooding events could affect any economic asset that lies in the areas protected by levees. These events can also affect those economic assets outside of the areas protected by levees, at least in the short term until floodwaters have receded and the City has sufficiently recovered. The City felt that a levee failure would have bearing on community activities of value, if a failure had a direct impact on the activity.

Impacts from Levee Failure

Floods and their impacts vary by location, including the added impacts associated with a levee failure flood event, and will only affect certain areas of the City that are in areas protected by levees. Based on the number of levees within the City and the LFPZ analysis, it is evident that levee failure floods could potentially have significant impacts to areas of the City protected by levees, depending on the severity of the event. Impacts that are not quantified, but could be anticipated in large future levee failure events, include:

- ➢ Injury and loss of life.
- > Commercial and residential structural and property damage.
- > Disruption of and damage to public critical infrastructure and services.
- > Health hazards associated with mold and mildew, contamination of drinking water, etc.
- > Impacts to natural resource areas, including stream bank erosion and loss of habitat areas.
- > Damage to roads/bridges resulting in loss of mobility.

In addition to flood related levee failures, the levees in the City are at risk to failure during earthquake. Levee failure flooding could accompany an earthquake, especially if a dam or storage reservoir or tank fails. Severe ground shaking from an earthquake event can cause a dam to fail or overflow to the surrounding area. Levees are especially susceptible to rapid settlement due to liquefaction or horizontal spreading of underlying soils.

Impacts to identified assets at risk to this hazard and the overall vulnerability of the City may be affected in the future by climate change (which was discussed in the Likelihood of Future Occurrence discussion above), changes in population patterns (migration, density, or the makeup of socially vulnerable populations), and changes in land use and development. Changes in population patterns and land use, and the extent to which they affect this hazard, are discussed in the Future Conditions/Future Development discussion below.

Future Conditions/Future Development

Future conditions may be affected by climate change, changes in population patterns (migration, density, or the makeup of socially vulnerable populations), and changes in land use and development. Findings on this for the City of Colusa include the following:

- Climate change is likely to exacerbate future heavy rain conditions and associated impacts and vulnerability of the County to levee failure flooding.
- Population growth in the City of Colusa has recently slowed; however, additional growth within the recently decertified levee protected areas, including the LFPZs would place additional populations at

risk to flood. Additional population growth would likely bring continued diversity to the County. Vulnerable population groups could face disproportionate effects from flooding and should be planned for. Changes in population and population patterns may or may not increase the impacts and vulnerability of the City to this hazard depending on the location and nature of growth and continued planning for future hazard conditions

Land use planning should be proactive to address future hazard conditions. Locating new development, structures and critical facilities and infrastructure within or near areas of levee failure risk may put additional development at risk. Future development built behind levees are subject to being built to the standards in the City of Colusa Floodplain Ordinance. However, City building codes are in effect to reduce this risk and should be updated as necessary to continue to address future conditions. Thus, depending on the location of new development and adherence to protective building codes, changes in land use and development may or may not increase the impacts and associated vulnerabilities of the City to this hazard.

Future development will be affected by this hazard as most of the Colusa area relies upon the protection of levees, not only directly adjacent to the City but also with the potential for levee failures upstream as far north as the Colusa Casino. Thus, it will always be some level of concern. Some areas of the City of Colusa, namely, west where future development is planned, are protected by a current levee, the Shattenger Levee, which, once certified will mitigate the flood risk, and the County is planning to install a new levee called the Powell Slough Levee that will protect against back water flooding the entire southwest quadrant of town.

Future development areas and their vulnerability to levee failure are discussed further in the below GIS analysis.

GIS Analysis

The City provided 7 future development areas which were used as the basis for the inventory of future development for the City. These were mapped in GIS. Figure A-26 show the locations of the future development areas overlayed on the LFPZs. Table A-41 shows each future development area in the City in these zones.



Figure A-26 City of Colusa – Future Development in LFPZs

Colusa County Local Hazard Mitigation Plan Update August 2024

Levee Flood Protection Zone	Future Development Status	Future Development Site Number	Future Development Name	Total Parcel Count	Total Acres
Shallow: <3ft	Proposed	4	Sunny Dhami	1	1
		5	Sunny Dhami	1	0.25
		7	Wilson-Cheney Development (temporary name)	1	9.36
		Proposed Total		3	10.61
	Shovel Ready	1	Arco Town Center	1	4.58
		2	Colusa Sunrise Landing Phase 3 & 4 & 5	1	19
		3	Schmidt Development	4	8.4
		6	Taco Bell	1	1.26
		Shovel Ready Total		7	33.24
Shallow: <3ft Total				10	43.85
Grand Total				10	43.85

Table A-41 City of Colusa – Future Development in LFPZs

Source: LFPZ BAM 2023, City of Colusa

Severe Weather: Heavy Rains and Storms

Likelihood of Future Occurrence–Highly Likely

Vulnerability-Medium

Hazard Profile

Storms in the City 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. Wind often accompanies these storms; hail and lightning are rare in the City.

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 and storms. Most of the severe rains occur during the fall, winter, and spring months in the City as discussed below (with problem flooding areas associated with heavy rains and storms shown in Table A-36 in the Flood: Localized Stormwater section). 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. Hail and lightning are rarer in the City and Colusa County. Duration of severe storms in the City can range from minutes to hours to days. Information on precipitation extremes can be found in Section 4.3.4 of the Base Plan.

Past Occurrences

Disaster Declaration History

According to historical hazard data, severe weather, including heavy rains and storms, is an annual occurrence in the City. This contributes to many of the federal disaster declarations related to flooding. Disaster declarations from flooding are shown on Table A-42.

Table A-42 Colusa County – Federal and State Disaster Declarations from Flood (Heavy Rain and Storms) 1950-2024

Disaster Type	Federal Declarations		State Declarations		
	Count	Years	Count	Years	
Flood (including heavy rains and storms)	17	1955, 1958, 1963 (twice), 1970, 1983, 1986, 1995 (twice), 1997, 1998, 2005/2006, 2017, 2019 (twice), 2023 (twice)	19	1950, 1955, 1958 (twice), 1963 (twice), 1973, 1978, 1983, 1986, 1995 (twice), 1997, 1998, 2005/2006, 2008, 2017, 2019 (twice)	

Source: Cal OES, FEMA

NCDC Events

The NCDC data recorded 30 hail, heavy rain, and winter weather incidents for Colusa County since 1950.

City of Colusa Events

The City noted that heavy rains and storms are an annual occurrence. Events causing issues are listed in the Past Occurrences section of the Flood: 1%/0.2% Annual Chance and Flood: Localized Stormwater Flooding discussions above.

Climate Change and Heavy Rains and Storms

It is likely that climate change will increase the chance of future occurrence as well as future impacts from heavy rains and storms. More information on future impacts to the City can be found in the Future Conditions/Future Development section of the Vulnerability Assessment below.

According to the CAS, while average annual rainfall may increase or decrease slightly, the intensity of individual rainfall events is likely to increase during the 21st century. It is unlikely that hail will become more common in Colusa County and the City of Colusa. The amount of lightning is not projected to change.

Cal-Adapt noted that, on average, the projections show little change in total annual precipitation in California. Furthermore, among several models, precipitation projections do not show a consistent trend during the next century. Cal-Adapt modeled scenarios are shown in Section 4.3.4 of the Base Plan.

Vulnerability to Heavy Rain and Storms

Heavy rain and severe storms are the most frequent type of severe weather occurrences in the City. These events can cause both significant and localized flooding. Flooding can be worse during times where the ground is already saturated. Wind often accompanies these storms and has caused damage in the past. Hail and lightning are rare in the City, but also can cause damage, with lightning occasionally igniting wildfires.

The whole of the City is at some measure of vulnerability to heavy rain and storms. An assessment of a community's vulnerability to heavy rains and storms begins with an understanding of local exposure to heavy rain and storms. This is included in the Local Concerns section below followed by a discussion of the City's Assets at Risk to this hazard.

Local Concerns

The City has specific concerns and unique vulnerabilities regarding this hazard. These concerns form a portion of the basis for the mitigation strategy and mitigation actions that seek to reduce vulnerabilities to this hazard.

The primary concern of the City from heavy rains and storms is the flooding that occurs during storm events. These heavy rains and storms can cause damages from localized flooding. This was discussed in the Flood: Localized Stormwater Flooding section above.

The City also experiences short power outages annually when severe weather occurs. In the past, these outages did not last long and did not cause an interruption in critical services. Most city facilities have standby generators and were able to operate without issue.

The City also noted that heavy rains and storms cause localized flooding in the City. The problem areas area shown on Table A-36 above.

Assets at Risk

Assets at risk from heavy rain and storms include people and populations; structures; critical facilities and infrastructure; community lifelines; natural, historic, and cultural resources; economic assets; and community activities of value. These are discussed in the following sections.

People and Populations

All populations (including vulnerable populations) in the City have some measure of risk to heavy rains and storms. Those populations that work or recreate outside and unhoused individuals are more vulnerable to impacts from heavy storm events. Heavy rains and storms occur every year and do not generally cause significant adverse impacts to individuals; it is the secondary hazard, flooding, which poses the biggest impact to people. Populations at risk to flooding resulting from heavy rains and storm events include those who live in floodplains (discussed in further detail in the Flood: 1%/0.2% Annual Chance section above) and those who live in and near localized flooding areas (discussed in further detail in the Flood: Localized Stormwater Flooding section above).

Structures

Structures in the City have some risk to heavy rains and storms. Structures built to modern building codes are built to withstand heavy rains and storms (including high winds and lightning). During a heavy storm, localized flooding may cause water intrusion into buildings from the outside. Trees can be downed causing impacts to structures. Older homes and buildings may be at increased risk to heavy rains and storms. Power outages during severe storm events can occur, impacting the use of structures until the power is back online.

Critical Facilities and Infrastructure,

Heavy rain and storms can affect critical facilities and infrastructure during large events. Power outages may occur taking facilities offline. High winds can down power lines and trees impacting facilities. Water intrusion into facilities and infrastructure can impact operations. City roads, streets, and bridges can be impacted resulting in closures restricting traffic flow in the City. In certain areas, large storms can cause erosion and localized landslides which can impact affected facilities. Many critical facilities are built to modern design standards that take heavy rains and storms into account when siting and building these structures, and others may need to be retrofitted to better withstand these events.

Community Lifelines

Community lifelines are likely to have some vulnerability to heavy rains and storms. Many of the City's community lifelines are the same as or similar to Colusa County's. These were discussed in greater detail in Section 4.3.4 of the Base Plan.

Short-term, heavy rains and storms can cause both widespread flooding as well as extensive localized drainage issues throughout the City. As storms continue to increase in intensity, existing drainage and stormwater systems may be overwhelmed at least temporarily contributing to an increase in flooding related impacts. While components of these lifelines may be damaged or otherwise impacted, it is unlikely that large storm events would overwhelm and take out any of these lifelines in the City as a whole.

Natural, Historic, and Cultural Resources

Large rain and storm events and associated flooding can affect natural, historic, and cultural resources. Silt and sediment can damage natural areas. Trees can be uprooted and downed by high winds. Extended periods of rainfall can erode natural banks along waterways and degrade soil stability for terrestrial species. While some natural systems can be adversely impacted during these large storms, heavy rain events can also provide benefits. Groundwater and wetland areas can be recharged and water supplies replenished. Historic and cultural resources may also be affected. Generally, the impacts are associated with damage to structures affected by large storm events, but other cultural resources such as those associated with Native Americans and old tribal areas can also be disturbed, damaged, and lost during extreme rain and storm and events.

Economic Assets and Community Activities of Value

Heavy rain and storm events can cause direct damage to economic assets such as businesses and commercial centers. During extreme events, the economy may slow as people stay home or inside. Business revenue

may be reduced during extended storm events. Community activities of value may see a reduction in attendance, impacting revenues associated with these events, especially those that occur outdoors. Events may be cancelled or rescheduled. Along with this, a heavy rain and storm event could shut down schools and businesses, causing interruptions to education and economic areas of the City.

Impacts from Heavy Rain and Storms

Impacts from heavy rains and storms include damage to property, critical facilities and infrastructure, and the natural landscape. This includes: erosion; downed trees; damaged utility structures and infrastructure; power outages; road damage and blockages; and even lightning strikes to critical infrastructure and people. Lightning can also cause wildfires and urban fires to occur. Landsliding and erosion occur when the soil on slopes becomes oversaturated and fails. Climate change may cause these impacts to worsen.

Actual damage associated with the primary effects of severe storms and heavy rains has been somewhat limited. It is the secondary hazards caused by these severe weather events, such as floods and erosion that would likely have the greatest impact.

Impacts to identified assets at risk to this hazard and the overall vulnerability of the City may be affected in the future by climate change (which was discussed in the Likelihood of Future Occurrence discussion above), changes in population patterns (migration, density, or the makeup of socially vulnerable populations), and changes in land use and development. Changes in population patterns and land use, and the extent to which they affect this hazard, are discussed in the Future Conditions/Future Development discussion below.

Future Conditions/Future Development

Future conditions may be affected by climate change, changes in population patterns (migration, density, or the makeup of socially vulnerable populations), and changes in land use and development. Findings on this for the City Colusa include the following:

- Climate change is likely to exacerbate future heavy rain and storm conditions and associated impacts and vulnerability of the City to flooding.
- Population is expected to decrease for the City of Colusa; however, the vulnerability may change depending on changes to the makeup of more vulnerable populations. Certain vulnerable populations, such as the unhoused, could experience disproportional effects from this hazard. and should be addressed as the County continues to grow. Thus, changes in population and population patterns may or may not increase the impacts and vulnerability of the City to this hazard depending on the location and nature of growth and continued planning for future hazard conditions.
- Land use planning should be proactive to address future hazard conditions. Changes in land use may also amplify the impacts of heavy rains and storms, as additional impervious surfaces can cause additional runoff and localized flooding throughout the City. Building codes in the City ensure that new development is built to current building standards, which should reduce the risk to future development in the City from heavy rains and storms. With adherence to development standards, future losses to new development should be minimal.

Building codes in the City ensure that new development is built to current building standards, which should reduce the risk to future development in the City from heavy rains and storms. New critical facilities such as communications towers and others should be built to withstand hail damage, lightning, and thunderstorm winds. With adherence to development standards, future losses to new development should be minimal. Changes in population could increase the number of people impacted by heavy rains and storms, including an increase in vulnerable populations such as AFN, low-income families, the elderly, children, and the unhoused. Changes in land use may also amplify the impacts of heavy rains and storms, as additional impervious surfaces can cause additional runoff and localized flooding throughout the City.

Wildfire

Likelihood of Future Occurrence–Highly Likely Vulnerability–Low

Note: Though a low priority hazard for the City, due to its importance in the County and State of California, wildfire is profiled here. It is a low priority hazard for mitigation planning purposes.

Hazard Profile

Wildland fire and the risk of a conflagration is an ongoing concern for the City of Colusa. Throughout California, communities are increasingly concerned about wildfire safety as increased development in the foothills and mountain areas and subsequent fire control practices have affected the natural cycle of fire regimes. Wildland fires affect grass, forest, and brushlands, as well as structures. Where there is human access to wildland areas the risk of fire increases due to a greater chance for human carelessness and historical fire management practices. Historically, the fire season extends from early spring through late fall of each year during the hotter, dryer months; however, in recent years, the risk of wildfire has become a year around concern. Fire conditions arise from a combination of high temperatures, low moisture content in the air and fuel, accumulation of vegetation, and high winds. These weather conditions can result in red flag (e.g., fire weather) days, and can result in PSPS/ESPS events in the City. While wildfire risk has predominantly been associated with more remote forested areas and wildland urban interface (WUI) areas, significant wildfires can also occur in more populated, urban areas. There is also the concern of wildfires occurring in these more remote, forested areas that under certain weather conditions, can extend into areas not generally considered at a high risk to wildfire. Smoke and air quality also become an issue, both from fires occurring inside and outside of the Colusa County Planning Area and the City.

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 4.3.17 of the Base Plan, wildfire maps for the City of Colusa were created. Figure A-27 shows the CAL FIRE Fire Hazard Severity Zone (FHSZ) in the City. As shown on the maps, FHSZs within the City range from Urban Unzoned to Moderate.



Figure A-27 City of Colusa – CAL FIRE Fire Hazard Severity Zones

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 or during hot dry summer months. Fires can burn for a short period of time or may have durations lasting for a week or more. Geographical FHSZ extent from CAL FIRE is shown in Table A-43.

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	0	0.00%	0	0.00%	0	0.00%
Moderate	507	21.03%	168	12.13%	339	33.10%
Non- Wildland/Non- Urban	1,113	46.17%	544	39.18%	569	55.65%
Urban Unzoned	791	32.81%	676	48.69%	115	11.25%
City of Colusa Total	2,412	100.00%	1,388	100.00%	1,023	100.00%

Table A-43 City of Colusa – CAL FIRE Fire Hazard Severity Zone Geographical Extents

Source: CAL FIRE

Past Occurrences

Disaster Declaration History

There has been one federal and two state disaster declaration due to fire, as shown in Table A-44.

Table A-44 Colusa County – Federal and State Wildfire Disaster Declarations 1950-2024

Disaster Type	Federal Declarations		State Declarations		
	Count	Years	Count	Years	
Wildfire	1	2018	2	1987, 2018	

Source: Cal OES, FEMA

NCDC Events

The NCDC has tracked 13 wildfire events in the County dating back to 1993.

City of Colusa Events

The City noted that 2021 and 2022 experienced unprecedented fires in the riparian areas of the State Park and properties that border the Sacramento River and the City of Colusa.

2021 - The "Jungle Fire" happened on the night of the 4th of July during the City's fireworks show. The cause was undetermined. The fire was primarily contained in the riparian area of the state park with minimal slope over to private property near Roberts Road. The estimated acreage affected was approximately 30 acres.

- 2022 A fire started west of Roberts Road on private property. The fire was caused by a pan-head mower operated in and around dry brush. The fire started in the Sacramento River Fire Protection District service area and passed through the City's jurisdictional area. This fire was much more active than previous years and experienced ember-cast 1-2 miles from the fire edge.
 - ✓ In the City residential area, there was one related 911 call for gutters on fire at a single-family home near 1st Street and Clay Street.
 - \checkmark The CIP area had a spot fire related to the fire.
 - ✓ Due to smoke, it was difficult to carry out normal activities, especially for the more vulnerable residents.

Climate Change and Wildfire

It is likely that climate change will increase the chance of future occurrence as well as future impacts from wildfire. More information on future impacts to the City can be found in the Future Conditions/Future Development section of the Vulnerability Assessment below.

Warmer temperatures can exacerbate drought conditions. Drought often kills plants and trees, which serve as fuel for wildfires. Warmer temperatures could increase the number of wildfires and pest outbreaks, such as the western pine beetle. Cal-Adapt's wildfire tool predicts the potential increase in the amount of burned areas for the year 2090-2099, as compared to recent (2010) conditions. This is shown in Section 4.3.17 of the Base Plan. Based on this model, Cal-Adapt predicts that wildfire risk in Colusa County will increase moderately at the end of the century. However, wildfire models can vary depending on the parameters used. Cal-Adapt does not take landscape and fuel sources into account in their model. In all likelihood, in the Colusa County Planning Area, precipitation patterns, high levels of heat, topography, and fuel load will determine the frequency and intensity of future wildfire.

Vulnerability to Wildfire

Risk and vulnerability to the City from wildfire is of concern. Wildfires that occur in the City occur from a variety of both natural and manmade causes. The City can be affected both by fires that start on or near City lands as well as those that start elsewhere and move into the City. In addition to burning large areas of land, air quality can be affected in the City by fires occurring inside the City as well as those from many miles away. As growth continues and populations increase in the City, the potential for wildfires will also increase.

The whole of the City is at some measure of vulnerability to wildfire. An assessment of a community's vulnerability to wildfire begins with an understanding of local exposure to wildfire. This is included in the Local Concerns section below. After that section, assets at risk are discussed.

Local Concerns

The City has specific concerns and unique vulnerabilities regarding this hazard. These concerns form a portion of the basis for the mitigation strategy and mitigation actions that seek to reduce vulnerabilities to this hazard.
As discussed in the Past Occurrences section above, dry conditions can cause fires to start in or near the City. The City has areas of moderate wildfire hazard, as defined by CAL FIRE.

Wildfire Smoke and Air Quality

Smoke from wildfires is made up of gas and particulate matter, which can be easily observed in the air. Air quality standards have been established to protect human health with the pollutant referred to as PM2.5 which consists of particles 2.5 microns or less in diameter. These smaller sizes of particles are responsible for adverse health effects because of their ability to reach the lower regions of the respiratory tract.

Wildfire smoke can have negative effects to those who live in or near a fire burn area. Smoke and air pollution from wildfires can be a severe health hazard. Significant wildfires occurring in both Colusa County and nearby northern California communities since the 2018 LHMP Update have created significant air pollution affecting area residents. This was the case during the 2020 North Complex Fire, as well as others that affected the nearby areas.

Assets at Risk

Assets at risk from wildfire include people and populations; structures; critical facilities and infrastructure; community lifelines; natural, historic, and cultural resources; economic assets; and community activities of value. These are discussed in the following sections.

People and Populations

All populations are at some vulnerability to wildfire. Certain vulnerable populations are at greater risk to the effects of wildfire as well as smoke and air quality issues that wildfires bring. Vulnerable populations include:

- > Unhoused
- > Infants and children under age five and their caregivers
- Elderly (65 and older)
- Individuals with disabilities
- > Individuals' dependent on medical equipment
- > Individuals who exercise, recreate, or work outdoors
- Individuals with impaired mobility

To further evaluate the impact to the residential population within the City, the CAL FIRE FHSZ dataset was overlayed on the parcel layer. Those residential parcel centroids that intersect the FHSZs were counted and multiplied by the 2022 Census Bureau average household factors for the City of Colusa - 2.55. According to this analysis, there is a total population of 508 residents of the City of Colusa at risk to moderate or higher FHSZs. This is shown in Table A-45.

Table A-45 City of Colusa – Improved Residential Parcels and Population by CAL FIRE Fire Hazard Severity Zone

	Very	High	Hi	gh	Moderate	
Jurisdiction	Improved Residential Parcels	Population at Risk	Improved Residential Parcels	Population at Risk	Improved Residenti al Parcels	Population at Risk
City of Colusa	0	0	0	0	175	508

Source: CAL FIRE, Colusa County 2023 Parcel/Assessor Data, US Census Bureau American Community Survey 2022 Household Size Estimates.

The City noted that the Critical Facilities and Infrastructure section below includes the facilities used by At-Risk populations that are threatened by this hazard. While this is not specific to what special populations reside in the City, it does speak to facilities that area used to serve (portions) of this population.

Structures

All structures in the City have some risk to wildfire. GIS was used to determine the possible impacts of wildfire within the City of Colusa. The methodology described in Section 4.3.17 of the Base Plan was followed in determining structures and values at risk in CAL FIRE's Fire Hazard Severity Zone layer. Summary analysis results for the City of Colusa are shown in Table A-46, which summarizes total parcel counts, improved parcel counts and their structure values by fire hazard severity zone. Table A-47 breaks out the Table A-46 by adding the property use details by fire hazard severity zone for the City.

Table A-46 City of Colusa – Count and Value of Parcels (and Structures) by CAL FIRE 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
Moderate	271	205	\$26,303,908	\$100,956,400	\$20,126,336	\$78,616,901	\$226,003,545
Non- Wildland/Non- Urban	109	66	\$21,782,513	\$18,275,854	\$7,091,405	\$15,337,734	\$62 , 487,506
Urban Unzoned	1,954	1,806	\$96,217,123	\$324,535,533	\$22,010,802	\$215,541,328	\$658,304,786
City of Colusa Total	2,334	2,077	\$144,303,544	\$443,767,787	\$49,228,543	\$309,495,963	\$946,795,837

Source: CAL FIRE, Colusa County 2023 Parcel/Assessor Data

Table A-47 City of Colusa – Count and Value of Parcels (and Structures) by CAL FIRE 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
Moderate							
Agricultural	2	0	\$106,121	\$ 0	\$ 0	\$ 0	\$106,121

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
Commercial	26	16	\$4,655,038	\$16,536,493	\$2,454,172	\$16,536,493	\$40,182,196
Government	17	3	\$1,598,240	\$12,603,396	\$13,416,418	\$12,603,396	\$40,221,450
Industrial	30	10	\$5,703,369	\$13,066,387	\$3,853,036	\$19,599,581	\$42,222,373
Institutional	0	0	\$ 0	\$ 0	\$0	\$ 0	\$ 0
Miscellaneous	1	1	\$57,740	\$1,004,742	\$0	\$1,004,742	\$2,067,224
Residential	195	175	\$14,183,400	\$57,745,382	\$402,710	\$28,872,689	\$101,204,181
Moderate Total	271	205	\$26,303,908	\$100,956,400	\$20,126,336	\$78,616,901	\$226,003,545
Non-Wildland/M	Non-Urb	an	•	•	•		
Agricultural	17	8	\$13,575,300	\$371,644		\$371,644	\$14,318,588
Commercial	8	3	\$928,464	\$1,005,421	\$151,733	\$1,005,421	\$3,091,039
Government	5	0	\$1,253,620				\$1,253,620
Industrial	26	4	\$3,301,172	\$4,914,780	\$6,138,700	\$7,372,170	\$21,726,822
Institutional	1	1	\$188,346	\$610,371	\$798,717	\$610,371	\$2,207,805
Miscellaneous	1	1	\$12,294	\$582,611	\$0	\$582,611	\$1,177,516
Residential	51	49	\$2,523,317	\$10,791,027	\$2,255	\$5,395,517	\$18,712,116
Non- Wildland/Non- Urban Total	109	66	\$21,782,513	\$18,275,854	\$7,091,405	\$15,337,734	\$62,487,506
Urban Unzoned			•	•	•		
Agricultural	4	3	\$256,657	\$180,786	\$495,940	\$180,786	\$1,114,169
Commercial	215	171	\$14,961,211	\$39,662,230	\$3,706,427	\$39,662,230	\$97,992,098
Government	85	48	\$3,133,642	\$20,957,393	\$5,103,414	\$20,957,393	\$50,151,842
Industrial	9	8	\$3,414,430	\$16,656,256	\$5,455,470	\$24,984,383	\$50,510,539
Institutional	33	19	\$2,098,445	\$5,590,449	\$5,240,932	\$5,590,449	\$18,520,275
Miscellaneous	10	3	\$545,309	\$6,843,768	\$ 0	\$6,843,768	\$14,232,845
Residential	1,598	1,554	\$71,807,429	\$234,644,651	\$2,008,619	\$117,322,319	\$425,783,018
Urban Unzoned Total	1,954	1,806	\$96,217,123	\$324,535,533	\$22,010,802	\$215,541,328	\$658,304,786
City of Colusa Total	2,334	2,077	\$144,303,544	\$443,767,787	\$49,228,543	\$309,495,963	\$946,795,837

Source: CAL FIRE, Colusa County 2023 Parcel/Assessor Data

Critical Facilities and Infrastructure

Wildfire presents a threat to critical facilities and infrastructure. The following analysis identifies critical facilities and infrastructure at risk to wildfire.

An analysis was performed on the critical facility inventory in the City of Colusa in identified Cal Fire's FHSZ mapping. Critical facilities in CAL FIRE FHSZs in the City of Colusa are shown in Figure A-28 and detailed in Table A-48. Details of critical facility definition, type, name and address and jurisdiction by fire hazard severity zone are listed in Appendix F.



Figure A-28 City of Colusa – Critical Facilities in Fire Hazard Severity Zones

Fire Hazard Severity Zone	Critical Facility Category	Facility Type	Facility Count
		Public Services	1
	Essential Services Facilities	Total	1
Moderate		Apartment Complex	2
	At Risk Population Facilities	Mobile Home Park	1
		Total	3
Moderate Total			4
		Utility Facility	1
	Essential Services Facilities	Total	1
Non-Wildland/Non-Urban		Apartment Complex	1
	At Risk Population Facilities	Mobile Home Park	1
		Total	2
Non-Wildland/Non-Urban	Total		3
		Emergency Response	1
		Fire Station	2
		Medical	1
	Essential Services Facilities	Police Station	1
		Public Services	2
		Utility Facility	1
		Total	8
Urban Unzoned		Apartment Complex	19
		Assisted-Living	1
		Hotel or Motel	2
		Jail	1
	At Risk Population Facilities	Mobile Home Park	3
		School	8
		Senior Living Facility	1
		Total	35
Urban Unzoned Total			43
City of Colusa Total			50

Table A-48 City of Colusa – Critical Facilities by Fire Hazard Severity Zone

Source: CAL FIRE, City of Colusa GIS

Community Lifelines

Wildfire presents a threat to life and property, including to community lifelines in the City. Many of the City's community lifelines are the same as or similar to Colusa County's. These were discussed in greater detail in Section 4.3.17 of the Base Plan. A large wildfire near the City could overwhelm community lifelines.

Natural, Historic, and Cultural Resources

Natural, historic, and cultural resources located within areas at risk to wildfire would be vulnerable. Should a wildfire occur in the City, the impacts to natural, historic and cultural resources could be extensive and include air pollution, contamination from water runoff containing toxic products, and other environmental discharges or releases from burned materials affecting soils, habitat areas, wildlife, and aquatic resources. Historic and cultural resources can be affected and are often more vulnerable due to their older age, construction type, and lack of fire prevention infrastructure such as sprinklers.

Economic Assets and Community Activities of Value

Wildfires in the City can cause direct damage to economic assets such as businesses and commercial centers located in affected areas. During extreme events, the economy may slow while recovery efforts are prioritized. Business revenue may be reduced during extended events. Community activities and events in areas affected by wildfire (and smoke and air quality issues) may be cancelled or rescheduled. As shown on the maps, the areas of moderate FHSZ in the City are in areas that have minimal development. There are few economic assets or community activities of value in these areas.

Impacts from Wildfire

Potential impacts from wildfire include loss of life and injuries; damage to structures (commercial, industrial, and residential) and other improvements, natural and cultural resources, croplands, and timber; and loss of recreational opportunities. Wildfires can cause short-term and long-term disruption to the City. Fires can have devastating effects on watersheds through loss of vegetation and soil erosion, which may impact the City by changing runoff patterns, increasing sedimentation, reducing natural and reservoir water storage capacity, and degrading water quality. Fires can also affect air quality in the City; smoke and air pollution from wildfires can be a severe health hazard. Smoke impacts may come from wildfires outside the City, as well as from within.

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. 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. Schools and businesses can be forced to close for extended periods of time. Recently, the threat of wildfire, combined with the potential for high winds, heat, and low humidity, has caused PG&E to initiate a PSPS which can also significantly impact a community through loss of services, business closures, and other impacts associated with loss of power for an extended period. In addition, catastrophic wildfire can create favorable conditions for other hazards such as flooding, landslides, and erosion during the rainy season.

The impacts of a fire are felt long after the fire is extinguished. In addition to the loss of property in fires, the loss in vegetation and changes in surface soils alters the environment. When supporting vegetation is burned, hillsides become destabilized and prone to erosion. The burnt surface soils are harder and absorb less water. When winter rains come, this leads to increased runoff, erosion, and landslides in hilly areas.

Impacts that are not quantified, but can be anticipated in large future events, include:

- Injury and loss of life;
- > Commercial and residential structural and property damage;
- > Disruption of and damage to public infrastructure, utilities, and services;
- > Damage to roads/bridges resulting in loss of mobility;
- > Significant economic impact (jobs, sales, tax revenue) to the community; and
- > Negative impact on commercial and residential property values

Impacts to identified assets at risk to this hazard and the overall vulnerability of the City may be affected in the future by climate change (which was discussed in the Likelihood of Future Occurrence discussion above), changes in population patterns (migration, density, or the makeup of socially vulnerable populations), and changes in land use and development. Changes in population patterns and land use, and the extent to which they affect this hazard, are discussed in the Future Conditions/Future Development discussion below.

Future Conditions/Future Development

Future conditions may be affected by climate change, changes in population patterns (migration, density, or the makeup of socially vulnerable populations), and changes in land use and development. Findings on this for the City of Colusa include the following:

- Climate change is likely to exacerbate future wildfire conditions and associated impacts and vulnerability of the City to wildfire.
- Population growth in the City of Colusa has recently slowed. Additional population growth would likely bring continued diversity to the City. Vulnerable population groups could face disproportionate effects from wildfire and should be planned for. Changes in population and population patterns may or may not increase the impacts and vulnerability of the City to this hazard depending on the location and nature of growth and continued planning for future hazard conditions.
- Land use planning should be proactive to address future hazard conditions. Locating new development, structures and critical facilities and infrastructure within or near areas of wildfire risk may put additional development at risk. However, City building codes are in effect to reduce this risk and should be updated as necessary to continue to address future wildfire conditions. It should be noted that most of the growth in the City is occurring in areas outside the moderate or higher fire hazard severity zones. Thus, depending on the location of new development and adherence to protective building codes, changes in land use and development may or may not increase the impacts and associated vulnerabilities of the City to this hazard.

Additional growth and development within moderate or higher fire hazard severity zones in the City would place additional values at risk to wildfire. More vulnerable populations may experience a disproportionate impact from wildfire, and this should be considered as development continues. However, City building codes are in effect and should continue to be updated as appropriate to reduce this risk.

Future development areas and their vulnerability to wildfire are discussed further in the below GIS analysis.

GIS Analysis

The City provided 7 future development areas which were used as the basis for the inventory of future development for the City. These were mapped in GIS. Figure A-29 show the locations of the future development areas overlayed on the CAL FIRE FHSZs. Table A-49 shows each future development area in the City in these zones.



Fire Hazard Severity Zone	Future Development Status	Future Development Site Number	Future Development Name	Total Parcel Count	Total Acres
Moderate	Shovel Ready	1	Arco Town Center	1	4.58
		2	Colusa Sunrise Landing Phase 3 & 4 & 5	1	19
		6	Taco Bell	1	1.26
		Shovel Ready Tot	tal	3	24.84
	Moderate Total			3	24.84
Urban Unzoned	Proposed	4	Sunny Dhami	1	1
		5	Sunny Dhami	1	0.25
		7	Wilson-Cheney Development (temporary name)	1	9.36
		Proposed Total		3	10.61
	Shovel Ready	3	Schmidt Development	4	8.4
		Shovel Ready Tot	4	8.4	
	Urban Unzoned Total			7	19.01
Grand Total				10	43.85

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1 able A-49	City of	Colusa –	Future	Develo	pment in	FH5ZS

Source: FEMA 3/27/2024 DFIRM, City of Colusa

A.5 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, outreach, and partnerships, and other mitigation efforts.

A.5.1. Regulatory Mitigation Capabilities

Table A-50 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 Colusa.

Table A-50	City of	Colusa's	Regulatory	Mitigation	Capabilities
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Plans	In Place Y/N	Does the plan address hazards? Can the plan be used to carry out mitigation actions? When was it last updated??
Capital Improvements Plan	Ν	

Climate Change Adaptation Plan		
Community Wildfire Protection Plan	Ν	
Comprehensive/Master Plan	Y	The General Plan addresses various hazards but does not identify any mitigation projects. The General Plan does not implement mitigation. 2007
Continuity of Operations Plan		
Economic Development Plan	Ν	
Land Use Plan		
Local Emergency Operations Plan		
Stormwater Management Plan		
Transportation Plan	Y	
Other		
		Is the ordinance an effective way to reduce hazard impacts?
Land Use Planning and Ordinances	Y/N	Is the ordinance adequately administered and enforced?
Land Use Planning and Ordinances Acquisition of land for open space and public recreation use	Y/N	Is the ordinance adequately administered and enforced?
Land Use Planning and Ordinances Acquisition of land for open space and public recreation use Building code	Y/N Y	Is the ordinance adequately administered and enforced?
Land Use Planning and Ordinances Acquisition of land for open space and public recreation use Building code Flood insurance rate maps	Y/N Y Y Y	Is the ordinance adequately administered and enforced? Yes and n/a
Land Use Planning and Ordinances Acquisition of land for open space and public recreation use Building code Flood insurance rate maps Floodplain ordinance	Y/N Y Y Y Y	Is the ordinance adequately administered and enforced? Yes and n/a Yes and Yes
Land Use Planning and Ordinances Acquisition of land for open space and public recreation use Building code Flood insurance rate maps Floodplain ordinance Natural hazard-specific ordinance (stormwater, steep slope, wildfire)	Y/N Y Y Y Y N	Is the ordinance adequately administered and enforced? Yes and n/a Yes and Yes
Land Use Planning and Ordinances Acquisition of land for open space and public recreation use Building code Flood insurance rate maps Floodplain ordinance Natural hazard-specific ordinance (stormwater, steep slope, wildfire) Subdivision ordinance	Y/N Y Y Y Y N Y	Is the ordinance adequately administered and enforced? Yes and n/a Yes and Yes Yes and Yes
Land Use Planning and Ordinances Acquisition of land for open space and public recreation use Building code Flood insurance rate maps Floodplain ordinance Natural hazard-specific ordinance (stormwater, steep slope, wildfire) Subdivision ordinance Zoning ordinance	Y/N Y Y Y Y N Y Y Y	Is the ordinance adequately administered and enforced? Yes and n/a Yes and Yes Yes and Yes Yes and Yes
Land Use Planning and Ordinances Acquisition of land for open space and public recreation use Building code Flood insurance rate maps Floodplain ordinance Natural hazard-specific ordinance (stormwater, steep slope, wildfire) Subdivision ordinance Zoning ordinance	Y/N Y Y Y N Y Y Y	Is the ordinance adequately administered and enforced? Yes and n/a Yes and Yes Yes and Yes Yes and Yes
Land Use Planning and Ordinances Acquisition of land for open space and public recreation use Building code Flood insurance rate maps Floodplain ordinance Natural hazard-specific ordinance (stormwater, steep slope, wildfire) Subdivision ordinance Zoning ordinance Other How can these capabilities be expan	Y/N Y Y Y N Y Y Y ded and in	Is the ordinance adequately administered and enforced? Yes and n/a Yes and Yes Yes and Yes

grants, building our social media presence, and making the community more aware of the training, education, and emergencies.

The 2028 General Plan that is currently being produced will feature future mitigation.

Source: City of Colusa

The City of Colusa General Plan Program, 2007

The City of Colusa General Plan Program serves as the blueprint for future growth and development and provides comprehensive planning for the future. It encompasses what the City is now, and what it intends to be, and provides the overall framework of how to achieve this future condition (see the discussion in Section 4.3.1 Growth and Development Trends).

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 Colusa 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:

- ➢ Flooding − 3 policies and 9 actions
- ➢ Seismic and Geologic Hazards − 2 policies and 4 actions

City of Colusa Drainage Master Plan (2009)

In order to reduce flooding in the City from localized flooding, a drainage master plan was put in place in 2009. The City continues to work through the actions put together in this plan to mitigate localized flooding.

Mitigation Related Ordinances

Building Regulations (Chapter 6)

or the purpose of decreasing the hazard from fire and for the protection of property therefrom the entire city is hereby declared to be, and is hereby established as, a fire district, and such fire district is divided into zones designated fire zones one, two and three.

- Fire Zone One. Fire zone one shall include all areas in the city designated C-2 central business district and C-3 general commercial district as such districts are defined and specified in the zoning regulations of the city.
- Fire Zone Two. Fire zone two shall include all areas in the city designated R-3 neighborhood apartment district, R-4 general apartment district, C-1 neighborhood business district, C-2-F central business district (special highway frontage district), C-3-F general commercial district (special highway frontage district), and M-1 light industrial district, as such districts are defined and specified in the zoning regulations of the city.
- Fire Zone Three. Fire zone three shall include all areas in the city designated as R-1 single-family residence district and R-2 two-family residence district, as such districts are defined and specified in the zoning regulations of the city.

Buildings or structures hereafter erected, constructed, moved within or into any of such fire zones shall be subject to the provisions and restrictions set forth in Chapter 16 of Part IV of the Uniform Building Code, as adopted by this chapter/

This Chapter adopts the following codes:

- 2013 California Building Standards Code, Title 24 Part 1 Administrative Code, Part 2.5 Residential Code, Part 6 - Energy Code, Part 8, Historical Code, Part 10 Existing Building Code, Part 11 - Green Building Standards Code, and Part 12 - Referenced Standards Code, as adopted by the California Building Standards Commission.
- > The 2013 California Building Code
- > The 2013 California Mechanical Code
- > The 2013 California Electrical Code
- > The California Plumbing Code, 2013

Civil Emergencies (Chapter 7)

The declared purposes of this chapter are to provide for the preparation and carrying out of plans for the protection of persons and property within this city in the event of an emergency; the direction of the emergency organization; and the coordination of the emergency functions of this city with all other public agencies, corporations, organizations and affected private persons.

It shall be the duty of the city disaster council, and it is hereby empowered to develop and recommend for adoption by the city council, emergency and mutual aid plans and agreements and such ordinances and resolutions and rules and regulations as are necessary to implement such plans and agreements. The disaster council shall meet upon call of the chairman or, in his absence from the city or inability to call such meeting, upon call of the vice-chairman.

All officers and employees of this city, together with those volunteer forces enrolled to aid them during an emergency, and all groups, organizations and persons who may by agreement or operation of law, including persons impressed into service under the provisions of subsection (a)(6)c of section 7-6, be charged with duties incident to the protection of life and property in this city during such emergency, shall constitute the emergency organization of the city.

The city disaster council shall be responsible for the development of the city emergency plan, which plan shall provide for the effective mobilization of all of the resources of this city, both public and private, to meet any condition constituting a local emergency, state of emergency or state of war emergency; and shall provide for the organization, powers and duties, services and staff of the emergency organization. Such plan shall take effect upon adoption by resolution of the city council.

Fire Protection (Chapter 9)

The 2013 California Fire Code, including all state-adopted appendices, including its Appendix Chapters 1—4 and Appendices B—H, is hereby adopted as the Fire Code of the City of Colusa, in regulating and governing the safeguarding of life and property from fire and explosion hazards arising from the storage, handling, and use of hazardous substances, materials and devices, and from conditions hazardous to life or property in the occupancy of buildings and premises as herein provided; providing for the issuance of permits and collection of fees therefore; and each and all of the regulations, provisions, penalties, conditions and terms of said fire code on file in the office of the city clerk are hereby referred to, adopted, and made a part hereof, as if fully set out in this chapter, with the additions, insertions, deletions and changes, if any, prescribed in this chapter.

A fire department for the city is hereby established. The fire department shall be under the charge of a chief, who shall have had previous training and experience as a fireman. The other members of the fire department shall consist of paid firemen or such companies of volunteer firemen as the city council may determine.

Zoning (Appendix A)

here is hereby adopted a Zoning Ordinance for the City of Colusa, as provided by Section 65000 et seq. of the Government Code of the State of California. This ordinance constitutes a precise plan for the use of land in conformity with the adopted City of Colusa General Plan.

This ordinance shall be known and cited as the "Zoning Ordinance of the City of Colusa." In any administrative action taken by any public official under the authority set forth in the ordinance the use of the term "zoning ordinance," unless further modified shall also refer to and mean this ordinance.

The plan is adopted to provide reasonable protective regulations designed to promote and protect the public health, safety, peace, morals, comfort, convenience and general welfare, and:

- > To protect the established character and the social and economic stability of agricultural, residential, commercial, industrial and other types of improved areas, and:
- To assist in providing a definite comprehensive plan for sound and orderly development, and to guide and regulate such development in accordance with the General Plan and the objectives and standards set forth therein.

The Zoning Plan consists of the establishment of various districts within same, all of which shall it be lawful, and within same, all or none of which it shall be unlawful to erect, construct, alter, move, locate or maintain certain buildings or to carry on certain trades or occupations or to conduct certain uses of land or buildings; within which the heights and bulk of future buildings, shall be limited; within which certain open spaces shall be required about future buildings and consisting further of appropriate additional regulations to be enforced in such districts, all as set forth in this ordinance.

The Zoning Plan is intended to apply to all private, public, quasi-public, institutional, and public utility properties and all other lands, buildings and structures within the incorporated area of the City of Colusa.

Floodplain Management (Appendix A - Article 39)

The flood hazard areas of the City of Colusa are subject to periodic inundation which results in loss of life and property, health and safety hazards, disruption of commerce and governmental services, extraordinary public expenditures for flood protection and relief, and impairment of the tax base, all of which adversely affect the public health, safety, and general welfare. These flood losses are caused by uses that are inadequately elevated, floodproofed, or protected from flood damage. The cumulative effect of obstructions in areas of special flood hazards which increase flood heights and velocities also contribute to the flood loss. It is the purpose of this ordinance to promote the public health, safety, and general welfare, and to minimize public and private losses due to flood conditions in specific areas by provisions designed to:

- > Protect human life and health.
- > Minimize expenditure of public money for costly flood control projects.
- Minimize the need for rescue and relief efforts associated with flooding and generally undertaken at the expense of the general public.
- Minimize prolonged business interruptions.
- Minimize damage to public facilities and utilities such as water and gas mains, electric, telephone and sewer lines, and streets and bridges located in areas of special flood hazard.
- Help maintain a stable tax base by providing for the sound use and development of areas of special flood hazard so as to minimize future blighted areas caused by flood damage.
- > Ensure that potential buyers are notified that property is in an area of special flood hazard.
- > Ensure that those who occupy the areas of special flood hazard assume responsibility for their actions.

In order to accomplish its purposes, this ordinance includes methods and provisions to:

- Restrict or prohibit uses which are dangerous to health, safety, and property due to water or erosion hazards, or which result in damaging increases in erosion or flood heights or velocities.
- Require that uses vulnerable to floods, including facilities which serve such uses, be protected against flood damage at the time of initial construction;
- Control the alteration of natural floodplains, stream channels, and natural protective barriers, which help accommodate or channel flood waters.
- > Control filling, grading, dredging, and other development which may increase flood damage.
- Prevent or regulate the construction of flood barriers which will unnaturally divert flood waters or which may increase flood hazards in other areas.

A new development in Colusa, Sunrise Landing, has Five Phases. Phase 1 and Phase 2 have been completed, and Phase 3 is shovel ready. FEMA created the new Flood Plain Map before Phase 1 was started and did not consider the rise in elevation during construction and mapped this entire development as BFE. This area should be reconsidered by FEMA as not being below the Flood Plain Elevation.

A.5.2. Administrative/Technical Mitigation Capabilities

Table A-51 identifies the City department(s) responsible for activities related to mitigation and loss prevention in the City of Colusa.

Administration	In Place Y/N	Describe capability Is coordination effective?
Staff		Is staffing adequate to enforce regulations? Is staff trained on hazards and mitigation? Is coordination between agencies and staff effective?
Chief Building Official	Y	
Civil Engineer, including dam and levee safety	Y	
Community Planner	Y	
Emergency Manager	Y	
Floodplain Administrator	Y	
GIS Coordinator	Ν	We do not currently have a GIS plan in place, but will be exploring this in the near future
Planning Commission	Y	Planning Commission capability / defined roles are limited to land use planning, development, and flood plain variances. Mitigation review is on limited projects only.
Other		
Technical	Y/N	Has capability been used to assess/mitigate risk in the past?
Grant writing		
Hazard data and information	Y	
GIS analysis		

Table A-51 City of Colusa's Administrative and Technical Mitigation Capabilities

Mutual aid agreements

The City has the capability to assist and received assistance for mutual aid with the County and the State.

Other

How can these capabilities be expanded and improved to reduce risk?

Υ

Increase capacity through enhanced education and training. Along with this, seeking after funding opportunities like grants, building our social media presence, and making the community more aware of the training, education, and emergencies.

Source: City of Colusa

A.5.3. Fiscal Mitigation Capabilities

Table A-52 identifies financial tools or resources that the City could potentially use to help fund mitigation activities.

Table A-52 City of Colusa's Fiscal Mitigation Capabilities

Funding Resource	In Place 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	Yes – Infrastructure Upgrades. Yes
Community Development Block Grant	Y	No – Applications made not funded
Federal funding programs (non-FEMA)	Y	Unknown
Fees for water, sewer, gas, or electric services	Y	No
Impact fees for new development	Y	Yes - Combine with street projects
State funding programs	Y	Yes - Partnership with other agencies
Stormwater utility fee	Y	No
Other		

How can these capabilities be expanded and improved to reduce risk?

Increase capacity through enhanced education and training. Along with this, seeking after funding opportunities like grants, building our social media presence, and making the community more aware of the training, education, and emergencies.

Source: City of Colusa

A.5.4. Mitigation Education, Outreach, and Partnerships

Table A-53 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 A-53 City of Colusa's Mitigation Education, Outreach, and Partnerships

Program/Organization	In Place Y/N	How widespread are each of these in your community?
Community newsletters		

Program/Organization	In Place Y/N	How widespread are each of these in your community?
Hazard awareness campaigns (such as Firewise, Storm Ready, Severe Weather Awareness Week, school programs, public events)	Y	Fire prevention, risk management and worker safety training and CPR training is offered regularly by/through the City Fire Dept.
Local news		
Organizations that interact with underserved and vulnerable communities		
Social media		
How can these capabilities be expanded and improved to reduce risk?		
Increase capacity through enhanced education and training. Along with this, seeking after funding opportunities like grants, building our social media presence, and making the community more aware of the training, education, and		

grants, building our social media presence, and making the community more aware of the training, education, emergencies.

Source: City of Colusa

A.5.5. Other Mitigation Efforts

The City has many other completed or ongoing mitigation projects/efforts that include the following:

- City road and drainage maintenance has seen improvements, and the City now has additional staff employed to better prepare for the severe weather.
- Annual Fire department training on flood related emergencies and is working with Colusa County fire agencies when providing pre-Positions for high water or severe weather. The pre-position task force is staffed with fire department personnel that are trained in swift water rescue and flood water emergencies.
- Street project currently bid and beginning construction to install underground storm drain in Harris Street and 6th Street. The City noted that there have been visible improvements from these repairs.
- Bridge Street partnership project, where the City has partnered with Cal Trans for the installation of two 48" storm drain pipes to travers Bridge Street between Main and Wescott Road.

A.6 Mitigation Strategy

A.6.1. Mitigation Goals and Objectives

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

A.6.2. NFIP Mitigation Strategy

The City of Colusa joined the National Flood Insurance Program (NFIP) as an emergency entrant on February 9, 1973. The City followed up with a regular entry on June 30, 1976. As a participant of the NFIP, the City of Colusa 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 Colusa will continue to comply with the requirements of the NFIP in the future.

The City's regulatory activities apply to existing and new development areas of the City; implementing flood protection measures for existing structures and new development and maintaining drainage systems. The goal of the program is to enhance public safety and reduce impacts and losses while protecting the environment. The City's Municipal Code has a Flood Damage Prevention Section under the Zoning Ordinance that regulates construction in the floodplain. The City intends to continue to implement the ordinance and participate at the regional level with Colusa County implementing appropriate measures to mitigate exposure and damages within designated flood prone areas.

The NFIP's 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 Colusa is not a current participant in the CRS program.

More information about the floodplain administration in the City of Colusa can be found in Table A-54.

NFIP Topic	Comments	
Staff Resources		
Who is responsible for floodplain management in your community? Provide Department/Title. Do they serve any roles other than Community Floodplain Administrator (FPA)?	The City manager or his or her designee shall serve as City's floodplain administrator and shall administer, implement, and enforce this ordinance by granting or denying development permits in accord with its provisions. The City manager does server other roles.	
Is the Community FPA or NFIP Coordinator a Certified Floodplain Manager?	No	
Is floodplain management an auxiliary function?	Yes	
Provide an explanation of NFIP administration services (e.g., permit review, GIS, education or outreach, inspections, engineering capability)	This is discussed in the cell titled "Provide an explanation of the permitting process" below.	
What are the barriers to running an effective NFIP program in the community, if any?	Recent additions of multiple properties to the NFIP floodplain may cause staffing issues.	
Insurance Summary		
How many NFIP policies are in the community? What is the total premium and coverage?	75 policies \$42,482 in annual premiums \$26,650,000 of insurance in force	
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?	13 paid losses \$101,045.82 in paid claims. \$0 substantial damage claims	
How many structures (residential and non-residential) are exposed to flood risk within the community?	355 in 1% annual chance flood zone 15 in 0.2% annual chance flood zone	
Are there Repetitive Loss (RL) and Severe Repetitive Loss Properties (SRL) structures in the community?	2 RL (FEMA PIVOT database shows these have been mitigated) 0 SRL	

 Table A-54 City of Colusa Compliance with NFIP
 Image: NFIP

NFIP Topic	Comments
Describe any areas of flood risk with limited NFIP policy coverage	County was recently remapped by FEMA resulting in a base BFE approx. 2.5ft higher than the previous Flood Plain Mapping, resulting in expanded SFHA's being created throughout the city and county.
How does the community teach property owners or other stakeholders about the importance flood insurance?	Completes education and outreach by sending letters
What digital sources (like the FEMA Map Service Center, National Flood Hazard Layer) or non-regulatory tools does the community use?	DFIRMs are used.
Compliance History	
Is the community in good standing with the NFIP?	Yes
Are there any outstanding compliance issues (i.e., current violations)?	No

NFIP Topic	Comments
NFIP Topic Who is responsible (Department, Title) for making substantial damage/improvement determinations? How does the community identify substantially damaged/improved structures? What is the process to make sure these structures are brought into compliance?	Comments For applications for building permits to improve buildings and structures, including alterations, movement, enlargement, replacement, repair, additions, rehabilitations, renovations, substantial improvements, repairs of substantial damage, and any other improvement of or work on such buildings and structures, the floodplain administrator, in coordination with the building official, shall: Estimate the market value, or require the applicant to obtain an appraisal of the market value prepared by a qualified independent appraiser, of the building or structure before the start of construction of the proposed work; in the case of repair, the market value of the building or structure shall be the market value before the damage occurred and before any repairs are made. Compare the cost to perform the improvement, the cost to repair the damaged building to its pre-damaged condition, or the combined costs of improvements and repairs, when applicable, to the market value of the building or structure. Determine and document whether the proposed work constitutes substantial improvement or repair of substantial damage. Notify the applicant when it is determined that the work constitutes substantial improvement or repair of substantial damage. Map determinations. Make interpretations where needed, as to the location of the boundaries of the areas of special flood hazard. Where there appears to be a conflict between a mapped boundary and actual field condition, grade and base flood elevations shall be used to determine the boundaries of the special flood hazard area. The person contesting the location of the boundary shall be given a reasonable opportunity to appeal the interpretation as provided in section 39.06. Require applicants who submit hydrologic and hydraulic engineering analyses to support permit applications to submit to FEMA the data and information necessary to maintain the flood insurance rate maps when the analyses indicate changes in base flood alexaritors.
	rate maps when the analyses indicate changes in base flood elevations, flood hazard area boundaries, or floodway designations; such submissions shall be made within six months of such data becoming available. The analyses shall be prepared by a qualified registered professional anginage in a format required by EEMA
When was the most recent Community Assistance Visit	CAV – $5/1/2015$
(CAV) or Community Assistance Contact (CAC)?	
Is a CAV or CAC scheduled or needed?	Ν

NFIP Topic	Comments
Regulation	
When did the community enter the NFIP?	6/30/1976
Are the FIRMs digital or paper?	Digital
Has the community adopted the NFIP minimum floodplain management criteria via local regulation? Date of current local regulation?	Meets, we just adopted a new Flood Plain Ordinance in Feb 2024
Has the community adopted the latest effective FIRM? Date adopted?	Yes.
How does the community enforce local floodplain regulations and monitor compliance?	This is discussed in the cell titled "Provide an explanation of the permitting process" below.
Do floodplain development regulations meet or exceed FEMA or State minimum requirements? If so, in what ways?	The City's regulations meet the minimum requirements of the NFIP and the CRS.
How are Letters of Map Change (LOMCs) tracked and compiled?	New DFIRMs are downloaded regularly which include the latest LOMCs, LOMRs, and CLOMRs.
Provide an explanation of the permitting process.	When building permits are being pulled, if it is eligible, the property is flagged as being in the flood plain.
Community Rating System	
Does the community participate in CRS? If so, what is the community's CRS Class Ranking?	No
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
Source: City of Colusa	

A.6.3. Mitigation Actions

The Planning Team for the City of Colusa 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 & Water shortage
- > Earthquake
- Floods: 1%/0.2% annual chance
- Floods: Localized Stormwater
- ➢ Levee Failure
- Severe Weather: Heavy Rain and Storms (Wind, Hail, Lightning)

Low priority hazards for mitigation planning include:

- > Ag Hazards: Severe Weather/Invasive Species (Pests and Weeds)
- Climate Change

- > Landslide, Mudslide, and Debris Flow
- > Severe Weather: Extreme Cold and Freeze
- Severe Weather: Extreme Heat
- > Severe Weather: High Winds and Tornados
- Stream Bank Erosion
- > Subsidence
- > Wildfire

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

Mitigation Actions

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

Hazards Addressed: Multi-hazard (Dam Failure, Drought & Water shortage, Earthquake, Floods: 1%/0.2% annual chance, Floods: Localized Stormwater, Levee Failure, Severe Weather: Heavy Rain and Storms (Wind, Hail, Lightning))

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

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

Responsible Office: City of Colusa Planning Department

Priority (H, M, L): High

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: Multi-hazard (Dam Failure, Drought & Water shortage, Earthquake, Floods: 1%/0.2% annual chance, Floods: Localized Stormwater, Levee Failure, Severe Weather: Heavy Rain and Storms (Wind, Hail, Lightning))

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

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, 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.

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 Colusa in partnership with the County

Participating Jurisdictions: County and all cities.

Priority (H, M, L): High

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 (like CA DWR, Cal OESPDM, HMGP, FMA, BRIC, or other sources).

Timeline: Ongoing/Annual public awareness campaign

Action 3. Evacuation Training for the Community of Colusa

Hazards Addressed: Dam Failure

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

Issue/Background: The pump stations are critical for preventing interior flooding of the District. If the pump stations were to lose power, interior flooding may occur. Generators have been installed, but if they were unable to keep up, or access to them was prohibited, a greater evacuation plan should be in place for the community.

Project Description: Colusa is situated on the southern bank of a bend in the Sacramento River, which drains the northern half of the Central Valley. No other major bodies of water are located within the Planning Area. The river levee that protects the City from catastrophic flooding falls under the jurisdiction of Reclamation District No. 108 and is maintained by the Sacramento West Levee District. The main channel for the Colusa Drain is an excavated earthen channel. The channel has levees on both sides for the most part, and levee height varies to a maximum of approximately six feet. Additional levees along tributary drains connect to the Colusa Drain. The information presented above shall be used for emergency planning and is based on worst case scenarios. The time factors indicated appear to allow for safe evacuation out of the Colusa area both to the south and west. Also, it should be noted that the probability of dam failure at any given time is low. The Division of Safety of Dams, a division of the California Department of Water Resources, inspects dams under state jurisdiction belongs to the agency constructing the dam. Federal agency programs to maintain dam safety are based on the Federal Guidelines for Dam Safety prepared by FEMA

Other Alternatives: The City will continue to train City public safety employees in the Safety Assessment Program offered by the Governor's Office of Emergency Services.

Existing Planning Mechanism(s) through which Action Will Be Implemented: Safety Element of General Plan

Responsible Office/Partners: City of Colusa Planning Department, City of Colusa Fire Department

Benefits (Losses Avoided): In the event of generator failure, an evacuation plan is in place

Potential Funding: Local budgets/Grants (like CA DWR, Cal OESPDM, HMGP, FMA, BRIC, or other sources).

Timeline: Ongoing

Project Priority (H, M, L): High

Action 4. Fire and sanitation water is needed in case of emergency in the City of Colusa during a drought.

Hazards Addressed: Drought & Water Shortage & Fire Risk

Goals Addressed: 1, 3, 4

Issue/Background: Fires can be significant hazards in developed areas. Even well-constructed buildings may suffer damage from fires started accidentally or intentionally. In addition, structures located adjacent to fields and wildlands may be vulnerable to fires started on such lands. In addition to property damage, fires pose a threat to human life. The City of Colusa, surrounded by agricultural fields, is in an area of low potential for wildfires. Cultivated and irrigated fields have a low incidence of fire, unless these fields are burned as part of agricultural operations. Such burning would pose a threat only to City structures adjacent to these fields. However, in recent years the State of California has sought to discourage burning of agricultural fields, particularly rice fields that are widespread in Colusa County. The City of Colusa Fire Chief has expressed concern that this could lead to a greater potential for vegetation fires, as fields are not maintained. This could become more of a concern as the City annexes agricultural fields that may not be developed immediately. Fires originating in these fields could threaten adjacent existing buildings. The riparian area adjacent to the Sacramento River is a potential source of wildland fires, started by either natural or human causes. This hazard would be greatest during the summer and early autumn. Lack of rain lowers river levels, and low humidity and high temperatures cause some vegetation to lose moisture. Given its proximity to the Sacramento River, the riparian area is unlikely to go completely dry, except during times of severe drought. Most of the riparian area is separated from the City by the levee in the downtown area. However, it is possible that fires in the riparian area would jump over the levee and threaten adjacent buildings. In summary, the potential fire hazard to Colusa from adjacent open space and agricultural areas is not considered significant. Fires started in buildings and other structures in the City are considered a more significant threat.

Project Description: Water storage tanks sizable to fit the needs of the Fire Department for fires and sanitation. Currently there are tanks on the Cortina Rancheria, and new larger storage is still needed. CIP has a 2 wells that we currently have an emergency inter-tie agreement that we would use.

Other Alternatives: The Cortina Rancheria seeks to enlarge this tank and desires to build a 50,000 water tank up the hill from the existing tank.

Existing Planning Mechanism(s) through which Action Will Be Implemented: Safety Element Plan, Fire Prevention Programs and Fire Plans.

Responsible Office/Partners: City of Colusa Fire Department and County

Benefits (Losses Avoided): Provide for fire protection and increase water supply for residents in case of emergency.

Potential Funding: Local budgets/Grants(like CA DWR, Cal OESPDM, HMGP, FMA, BRIC, or other sources)/WUI Funds

Timeline: When funding is available

Project Priority (H, M, L): High

Action 5. URM Mapping and Identification

Hazards Addressed: Earthquake

Goals Addressed: 1, 3, 4

Issue/Background: The City will consider a plan to identify older masonry structures that could be significantly impacted due to an earthquake including an inventory of un-reinforced masonry buildings and an assessment of their damage potential, a program to retrofit un-reinforced masonry buildings or to take other actions to reduce the potential risk, and funding sources for the adopted program

Project Description: This project would map URM buildings in the City.

Other Alternatives: No action

Existing Planning Mechanism(s) through which Action Will Be Implemented: Safety Element of General Plan

Responsible Office/Partners: City of Colusa Planning Department

Benefits (Losses Avoided): Reduced risk to people and property from building collapse during earthquake.

Potential Funding: Local budgets/Grants (like CA DWR, Cal OESPDM, HMGP, FMA, BRIC, or other sources).

Timeline: On Going

Project Priority (H, M, L): High

Action 6. Project improvements to Decrease Flooding

Hazards Addressed: Flood: 1%/0.2% annual chance; Levee Failure; Flood: Localized/Stormwater

Goals Addressed: 1, 3, 4, 5

Issue/Background: The City of Colusa is vulnerable to flooding from both the east and the west; to the east the existing levees experience seepage during high water events. To the west, the Colusa Basin Drain is partially leveed using levees with insufficient freeboard and inadequate levee geometry profiles.

Project Description: The City shall continue to regulate all uses and development in areas subject to potential flooding through land use planning, zoning and other appropriate actions.

The City will review and revise its Zoning and Subdivision Ordinances as needed to incorporate specific data and design requirements related to flooding hazards that are contained in this General Plan update and other future flood hazard studies.

The City will pursue mechanisms to finance flood prevention and storm maintenance programs, including local, state, and federal sources. If necessary, the City will consider alternative funding sources, including development impact fees and the establishment of a drainage utility and assessment district

Other Alternatives: No action.

Existing Planning Mechanism(s) through which Action Will Be Implemented: The Public Works Department will take the lead with support from OES, other county departments, California Department of Water Resources (CA DWR), Sacramento River West Side Levee District (SRWSLD), and the City of Colusa

Responsible Office/Partners: City Public Works, City Planning

Benefits (Losses Avoided): Life safety from flooding and improved drainage

Potential Funding: Local budgets/Grants (like CA DWR, Cal OESPDM, HMGP, FMA, BRIC, or other sources).

Timeline: Ongoing

Project Priority (H, M, L): High

Action 7. Levee Mitigation

Hazards Addressed: Levee Failure

Goals Addressed: 1, 3, 4, 5

Issue/Background: The City of Colusa is vulnerable to flooding from both the east and the west; to the east the existing levees experience seepage during high water events. To the west, the Colusa Basin Drain is partially leveed using levees with insufficient freeboard and inadequate levee geometry profiles.

Project Description: Mitigate against seepage on the Sacramento River Right Bank Levees near the City of Colusa through the installation of seepage prevention measures (e.g. Bentonite Slurry Cut-off Wall) along a reach approximately 22,000 feet in length. Construct new levees to the north and south totaling 12,000 feet in length. Rehabilitate existing levees to the west totaling 19,000 feet in length and construct a new levee to the west totaling 18,000 feet in length.

Other Alternatives: No action

Existing Planning Mechanism(s) through which Action Will Be Implemented: The Public Works Department will take the lead with support from OES, other county departments, California Department of Water Resources (CA DWR), Sacramento River West Side Levee District (SRWSLD), and the City of Colusa

Responsible Office/Partners: County Department of Public Works, County OES, CA DWR, SRWSLD, City of Colusa

Benefits (Losses Avoided): Life safety from levee failure; levee damage; improved drainage

Potential Funding: Federal grant funds: FEMA HMGP, CIP funding, Mitigation Grant Funding

Timeline: 2028

Project Priority (H, M, L): High

Action 8. Colusa Basin Drain

Hazards Addressed: Severe Weather: Heavy Rains and Storms

Goals Addressed: 1, 3, 4, 5

Issue/Background: The Colusa Basin Drain levees are prone to instability issues due to the clay levee construction during severe weather.

Project Description: Stability repairs would be designed and constructed. Typical fixes include stability berms, slope flattening or levee realignment.

Other Alternatives: No action

Existing Planning Mechanism(s) through which Action Will Be Implemented: None

Responsible Office/Partners: City of Colusa Planning Department, City of Colusa Fire Department

Benefits (Losses Avoided): Reduced risk of levee failure. Life safety and property protection.

Potential Funding: DWR grant, PDM, HMGP

Timeline: As soon as possible/ Work in progress

Project Priority (H, M, L): High