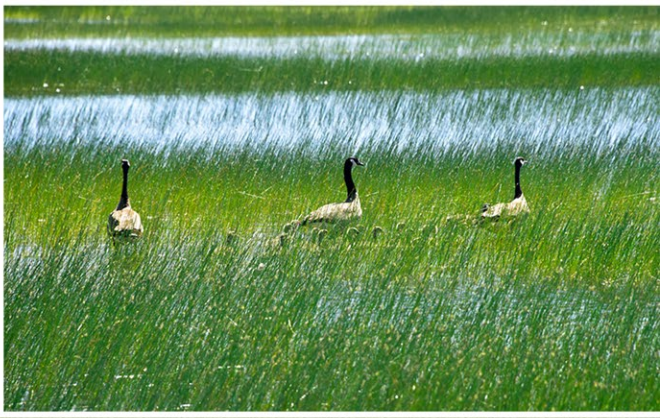
PREPARED FOR
CITY OF RED BLUFF



2020 URBAN WATER MANAGEMENT PLAN

FINAL / AUGUST 2022

carollo
Engineers...Working Wonders With Water®

City of Red Bluff

2020 URBAN WATER MANAGEMENT PLAN

CONTACT SHEET

Date plan submitted to the Department of Water Resources: 08/09/2022

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The Water supplier is a: **City**

The Water supplier is a: **Retailer**

Utility services provided by the water supplier include: **Water, Wastewater**

City of Red Bluff

2020 URBAN WATER MANAGEMENT PLAN

FINAL | August 2022

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Abbreviations

°F	degrees Fahrenheit
AB	Assembly Bill
AF	acre-feet
AFY	acre-feet per year
ADU	Accessory Dwelling Unit
AMI	advanced metering infrastructure
AMR	automatic meter reading
ASAR	adjusted sodium adsorption ratio
AWWA	American Water Works Association
BMP	best management practice
Caltrans	California Department of Transportation
Carollo	Carollo Engineers, Inc.
CASGEM	California Statewide Groundwater Elevation Monitoring
CCR	California Code of Regulations
CCR	Consumer Confidence Report
CF	cubic feet
CII	commercial, industrial, and institutional
CIMIS	California Irrigation Management Information System
City	City of Red Bluff
County	Tehama County
CREAT	Climate Resilience Evaluation and Awareness Tool
CWC	California Water Code
DDW	California Division of Drinking Water
DMM	demand management measure
DRA	drought risk assessment
DWR	California Department of Water Resources
EDD	California Employment Development Department
EPA	United States Environmental Protection Agency
ERP	Emergency Response Plan
ET, ETo	Evapotranspiration
FCWCD	Flood Control and Water Conservation District
GHG	greenhouse gas
gpcd	gallons per capita per day
gpm	gallons per minute
GSA	groundwater sustainability agency
GSP	Groundwater Sustainability Plan

I-5	Interstate 5
IRWM	Integrated Regional Water Management
kWh	kilowatt hours
LAFCo	Local Agency Formation Commission
MFR	multi-family residential
MG	million gallons
mgd	million gallons per day
mL	milliliter
MPN	most probable number
No.	Number
NPDES	National Pollutant Discharge Elimination System
PFAS	Per- and polyfluoroalkyl substances
RCP	Representative Concentration Pathway
RHNA	Regional Housing Needs Assessment
RP	reference point
SB	Senate Bill
SFR	single-family residential
SGMA	Sustainable Groundwater Management Act
SOI	Sphere of Influence
SPRR	Southern Pacific Railroad
SR	State Route
TDS	total dissolved solids
USGS	United States Geological Survey
UWMP	Urban Water Management Plan
UWMPA	Urban Water Management Planning Act
WDR	Waste Discharge Requirements
WRP	Wastewater Reclamation Plant
WSCP	Water Shortage Contingency Plan

Chapter 1

INTRODUCTION AND LAY DESCRIPTION

1.1 Lay Description

The City of Red Bluff (City) is located in Tehama County (County) on the northern edge of the Sacramento Valley. The City is approximately 30 miles south of Redding and 130 miles northwest of the City of Sacramento along Interstate 5 (I-5). The City's service area provides retail water services to the City and portions of the County outside the City limits, including the water main extension along Antelope Boulevard to the east of the City limits and Shasta College - Tehama Campus. The City provides recycled water to California Department of Transportation (Caltrans) for landscape irrigation.

The City currently utilizes local groundwater from the underlying Sacramento Valley Groundwater Basin, Red Bluff Subbasin as its sole water supply source. The City owns, maintains, and operates water supply wells, storage tanks, and water lines throughout the City. The water supplied by the City is not altered or treated prior to distribution. The City has two portable chlorination units that could be used to treat water on an emergency basis. The City manages and maintains over 80 miles of water lines spanning 4 to 24 inches in diameter, 11 active groundwater wells, and two 3 million gallon (MG) water storage facilities.

In 2020, the average annual population was estimated to be 14,391. The population is anticipated to increase to 15,901 by the year 2045, based on an average annual growth rate of 0.4 percent.

Water demands served by the City are primarily residential, including single-family residential (SFR) and multi-family residential (MFR), commercial, industrial, and institutional (CII), and landscape irrigation. All connections in the City are metered, with the exception of 8 unmetered commercial/institutional connections. The total demand in 2020 was approximately 4,077 acre-feet (AF). Residential demands account for 2,190 AF (53.7 percent) of the total demand, while CII demands account for 1,416 AF (34.7 percent) and irrigation demands account for 15 AF (0.4 percent). The remaining balance is attributed to unbilled authorized consumption of 7 AF (0.2 percent) and water loss of 451 AF (11.0 percent). Based on the growth rate of 0.4 percent, demands under normal conditions are anticipated to be 4,880 AF by the year 2045 with passive conservation. "Passive" savings are water savings from codes, standards, ordinances, or transportation and land use plans.

The per capita water demand was 253 gallons per capita per day (gpcd) in 2020. Although the City was able to meet the 2020 target of 274 gpcd, the year 2020 did not represent a typical year due to the impacts of the COVID-19 pandemic. Since the 2020 per capita demand of 253 gpcd was below the 2020 goal, adjustments for extraordinary events were not made.

Supply availability was reviewed under a single-dry year and a five-consecutive-year drought, in addition to a drought risk assessment (DRA) from 2021 through 2025. The City anticipates it can

supply all its water demands with groundwater from the Red Bluff Subbasin through the planning horizon (2045) for all water year scenarios.

The City Code Conservation and Rationing Stages Section 24.18 was also updated to address the latest requirements set forth by California Department of Water Resources (DWR) for drought planning, which now includes six supply shortage stages, response actions for demand reduction, supply augmentation, operational changes, and mandatory prohibitions to address shortage levels.

1.2 Background and Purpose

The California Water Code (CWC) requires urban water suppliers within the state to prepare and adopt an Urban Water Management Plan (UWMP) for submission to DWR. The UWMP, which must be filed every five years, must satisfy the requirements of the Urban Water Management Planning Act (UWMPA) of 1983, including amendments that have been made to the Act. The UWMPA requires urban water suppliers servicing 3,000 or more connections, or supplying more than 3,000 AF of water annually, to prepare a UWMP.

The purpose of the UWMP is to maintain efficient use of urban water supplies, continue to promote conservation programs and policies, ensure that sufficient water supplies are available for future beneficial use, and provide a mechanism for response during water drought conditions. This document, which was prepared in compliance with the CWC, and as set forth in the 2020 Urban Water Management Plan Guidebook for Urban Water Suppliers (March 2021) established by the DWR, constitutes the City 2020 UWMP.

This 2020 UWMP was prepared in compliance with the UWMPA (CWC §10610 et seq.) and the Water Conservation Bill of 2009 (Senate Bill [SB] X7-7) by Carollo Engineers (Carollo). Contact information for the City and Carollo is included in the Contact Sheet provided at the beginning of this document.

The City recognizes the importance of maintaining a high-quality reliable water supply. Although water is a renewable resource, it is limited. A long-term reliable supply of water is essential to protect the local and state economy. The main focus for the City is to provide high quality water, maximize the efficient use of water, and promote conservation.

1.2.1 Previous Urban Water Management Plan

The City previously prepared an UWMP in 2015, which was approved and adopted on January 17, 2017. Following adoption, the 2015 UWMP was submitted to and formally approved by the DWR. The 2020 UWMP report serves as an update to the 2015 UWMP and pulls extensively from that report.

1.3 Urban Water Management Planning and the California Water Code

The CWC sections applicable to UWMPs are summarized in the sections below.

1.3.1 Urban Water Management Planning Act

In 1983, State Assembly Bill (AB) 797 modified the CWC Division 6 by creating the UWMPA. Several amendments to the original UWMPA, which were introduced since 1983, have increased the data requirements and planning elements to be included in the UWMPs.

Initial amendments to the UWMPA required that total projected water use be compared to water supply sources over the next 20 years, in 5-year increments. DWR guidelines also suggest projecting through a 25-year planning horizon to maintain a 20-year timeframe until the next UWMP update has been completed.

Other amendments require that UWMPs include provisions for recycled water use, demand management measures (DMMs), and a Water Shortage Contingency Plan (WSCP). The UWMPA requires a WSCP which meets the specifications set forth therein. Recycled water was added in the reporting requirements for water usage and figures prominently in the requirements for evaluation of alternative water supplies, when future projections predict the need for additional water supplies. Each urban water purveyor must coordinate the preparation of the WSCP with other urban water purveyors in the area, to the extent practicable. Water suppliers must also describe their water DMMs that are being implemented or are scheduled for implementation.

In addition to the UWMPA and its amendments, there are several other regulations that are related to the content of the UWMP. In summary, the key relevant regulations are:

- AB 1420: Requires implementation of DMMs/best management practices (BMPs) and meeting the 20-by-2020 targets to qualify for water management grants or loans.
- AB 1420: Requires a plan to quantify and report on distribution system water loss.
- AB 1420: Provides for water use projections to display and account for the water savings estimated to result from adopted codes, standards, ordinances, or transportation and land use plans, when that information is available and applicable to an urban water supplier.
- AB 1465: Requires water suppliers to describe opportunities related to recycled water use and stormwater recapture to offset potable water use.
- Amendments SB 610 (Costa, 2001) and AB 901 (Daucher, 2001): Require counties and cities to consider information relating to the availability of water to supply new large developments by mandating the preparation of further water supply planning (Daucher) and Water Supply Assessments (Costa).
- SB 1087: Requires water suppliers to report SFR and MFR projected water use for lower income areas separately.
- Amendment SB 318 (Alpert, 2004): Requires the UWMP to describe the opportunities for development of desalinated water, including but not limited to, ocean water, brackish water, and groundwater, as long-term supply.
- AB 105 (Wiggins, 2004): Requires urban water suppliers to submit their UWMPs to the California State Library.
- SB X7-7: Requires development and use of new methodologies for reporting population growth estimates, base per capita use, and water conservation. An agency can choose from four methods to establish their interim (2015) and year 2020 water conservation targets.
- AB 2067: Requires water suppliers to provide narratives of water DMMs.
- SB 1036: Provides for an urban water supplier to include certain energy-related information, including, but not limited to, and estimate of the amount of energy used to extract or divert water supplies.
- AB 2409: Requires urban water suppliers to analyze and define water features that are artificially supplied with water, including ponds, lakes, waterfalls, and fountains separately from swimming pools and spas.

1.3.2 New Requirements to the Water Code since the 2015 UWMPs

The major new requirements to the CWC since 2015 UWMPs are summarized in Table 1-1.

Submittal Table 1-1: Applicable Changes to the Water Codes since 2015 UWMPs

Topic	Summary
Five Consecutive Dry-Year Water Reliability Assessment	The Legislature modified the dry-year water reliability planning from a "multiyear" time period to a "drought lasting five consecutive water years" designation.
DRA	The DRA requires a Supplier to assess water supply reliability over a five-year period from 2021 to 2025 that examines water supplies, water uses, and the resulting water supply reliability under a reasonable prediction for five consecutive dry years.
Seismic Risk	Requires Suppliers to specifically address seismic risk to various water system facilities and to have a mitigation plan.
Energy Use	Requires Suppliers to include readily obtainable information on estimated amounts of energy for their water supply extraction, treatment, distribution, storage, conveyance, and other water uses.
Water Loss Reporting for Five Years	The Water Code added the requirement to include the past five years of water loss audit reports as part of this UWMP.
WSCP	New requirements are more prescriptive than previous versions.
Groundwater Supplies Coordination	Water Code now requires Suppliers' 2020 UWMPs to be consistent with Groundwater Sustainability Plans, in areas where those plans have been completed by Groundwater Sustainability Agencies.
Lay Description	Suppliers to include a lay description of the fundamental determinations of the UWMP, especially regarding water service reliability, challenges ahead, and strategies for managing reliability risks. This section of the UWMP could be viewed as a go-to synopsis for new staff, new governing members, customers, and the media, and it can ensure a consistent representation of the Supplier's detailed analysis.

1.3.3 Water Conservation Act of 2009 (SB X7-7)

Beginning in 2016, retail water suppliers are required to comply with the water conservation requirements in SB X7-7 in order to be eligible for State water grants or loans. Refer to Chapter 5 for detailed information on SB X7-7.

1.4 Report Organization

This UWMP contains ten chapters, followed by appendices that provide supporting documentation for the information presented in the report. The chapters are briefly described below:

- Chapter 1 – Introduction and Lay Description: This chapter presents a lay description and the purpose of this UWMP stressing the importance and extent of the water management planning efforts.
- Chapter 2 – Plan Preparation: This chapter provides information on the process for developing the UWMP as well as coordination efforts with appropriate local agencies and discusses the measures used to solicit public participation during the development of the UWMP.
- Chapter 3 – System Description: This chapter presents a description of the water purveyor's service area and its characteristics including climate, population, and other demographic factors.
- Chapter 4 – Water Use Characterization: This chapter presents a description of the water purveyor's current and projected water uses within the service area in five-year increments.
- Chapter 5 – SB X7-7 Baselines, Targets, and 2020 Compliance: This chapter presents information on the water purveyor's compliance with the 2020 per-capita water conservation mandate. Demonstrate that the 2020 target adopted in the 2015 UWMP was met in 2020. This chapter provides analyses and calculations associated with the water conservation target pursuant to SB X7-7.
- Chapter 6 – Water Supply Characterization: This chapter presents a description of the water purveyor's current and projected potable and non-potable water supply sources including information on the usage of surface water, groundwater, imported water and an overview of usage of recycled water. This chapter includes information on the water purveyor's future considerations of a recycled water system.
- Chapter 7 – Water Service Reliability and Drought Risk Assessment: This chapter presents the reliability of the water purveyor's water system. This includes a discussion on future water reliability. In addition, there is an analysis of supply availability in a normal, single dry year and in five consecutive dry years. This chapter also includes the DRA.
- Chapter 8 – Water Shortage Contingency Plan: This chapter includes an urban water shortage contingency analysis that includes stages of action to be undertaken in the event of water supply shortages; prohibitions consumption reduction methods and penalties; actions to be taken during a catastrophic interruption of service; and a mechanism for measuring water use reduction.
- Chapter 9 – Demand Management Measures: This chapter communicates the water purveyor's efforts to promote conservation and to reduce demand. The chapter includes narratives on each DMM.
- Chapter 10 – Plan Adoption, Submittal, and Implementation: This chapter describes the steps taken to adopt, submit, and implement the UWMP and make it publicly available.

Chapter 2

PLAN PREPARATION

This section includes specific information on how the UWMP was developed, including efforts in coordination and outreach.

2.1 Basis for Plan Preparation

CWC 10617 requires that urban water suppliers with 3,000 or more service connections or supplying 3,000 or more AF of water per year prepare an UWMP every five years.

> *10617 "Urban water supplier" means a supplier, either publicly, or privately owned, providing water for municipal purposes either directly or indirectly to more than 3,000 customers or supplying more than 3,000 acre-feet of water annually. An urban water supplier includes a supplier or contractor for water, regardless of the basis of right, which distributes or sells for ultimate resale to customers. This part applies only to water supplied from public water systems…*

2.1.1 Public Water Systems

> *California Health and Safety Code 116275 (h) "Public Water System" means a system for the provision of water for human consumption through pipes or other constructed conveyances that has 15 or more service connections or regularly serves at least 25 individuals daily at least 60 days out of the year.*

To demonstrate the basis of reporting, the Public Water Systems services by the City are listed in Table 2-1. As listed in Table 2-1, the City served 1 public water system with a total of 4,870 connections and a total of 4,077 acre-feet per year (AFY) in year 2020.

Submittal Table 2-1 Retail Only: Public Water Systems

Public Water System Number	Public Water System Name	Number of Municipal Connections 2020	Volume of Water Supplied 2020 *
Add additional rows as needed			
CA5210004	City of Red Bluff	4,870	4,077
	TOTAL	4,870	4,077

**** Units of measure (AF, CCF, MG)** must remain consistent throughout the UWMP as reported in Table 2-3.*

NOTES: Units of measure in this UWMP are acre-feet (AF). Sources: Large Water Systems 2020 Annual Report to the Drinking Water Program for Year Ending December 31, 2020, and City 2020 Itemized Water Estimates.

2.2 Individual Planning and Compilance

This UWMP reports solely on the City service area, as shown in Table 2-2. The City has notified and coordinated with appropriate regional agencies and constituents.

Submittal Table 2-2: Plan Identification			
Select Only One	**Type of Plan**		**Name of RUWMP or Regional Alliance** *if applicable* (select from drop down list)
☑	**Individual UWMP**		
	☐	Water Supplier is also a member of a RUWMP	
	☐	Water Supplier is also a member of a Regional Alliance	
☐	**Regional Urban Water Management Plan (RUWMP)**		

2.3 Calendar Year and Units of Measure

> *CWC 1608.20 (a) (1) Urban retail water suppliers…may determine the targets on a fiscal year or calendar year basis.*

The City is reporting on a calendar year basis and therefore, 2020 data includes the months of January to December 2020. Table 2-3 indicates the City type of reporting year, and the units of measure for reporting water volumes throughout the 2020 UWMP.

Submittal Table 2-3: Supplier Identification	
Type of Supplier (select one or both)	
☐	Supplier is a wholesaler
☑	Supplier is a retailer
Fiscal or Calendar Year (select one)	
☑	UWMP Tables are in calendar years
☐	UWMP Tables are in fiscal years
If using fiscal years provide month and date that the fiscal year begins (mm/dd)	
Units of measure used in UWMP * (select from drop down)	
Unit	AF
**** Units of measure (AF, CCF, MG)** must remain consistent throughout the UWMP as reported in Table 2-3.*	

2.4 Coordination and Outreach

The UWMPA requires that the UWMP identify the water agency's coordination with appropriate nearby agencies.

The City coordinated its efforts with relevant agencies and parties to ensure that the data and issues discussed in the plan are presented accurately.

2.4.1 Wholesale and Retail Coordination

Retail agencies that receive a water supply from one or more wholesalers are required to provide wholesalers with projected water demand from that source, in five-year increments for 20 years. The City does not purchase or receive potable water from a wholesaler. Therefore, Table 2-4 has been left blank.

Submittal Table 2-4 Retail: Water Supplier Information Exchange
The retail Supplier has informed the following wholesale supplier(s) of projected water use in accordance with Water Code Section 10631.
Wholesale Water Supplier Name
Add additional rows as needed

2.4.2 Coordination with Other Agencies and the Community

> *10620 (d)(2) Each urban water supplier shall coordinate the preparation of its plan with other appropriate agencies in the area including other water suppliers that share a common source, water management agencies, and relevant public agencies, to the extent practicable.*
>
> *10642. Each urban water supplier shall encourage the active involvement of diverse social, cultural, and economic elements of the population within the service area prior to and during the preparation of the plan…*

The City solicited participation from other agencies, organizations, and the community for the preparation of the 2020 UWMP. Table 2-5 summarizes how the UWMP preparation was coordinated.

Submittal Table 2-5: Coordination with Appropriate Agencies								
Coordinating Agencies	Participated in Developing the Plan	Notified of UWMP Update	Notified of Public Hearing	Attended Public Meetings	Was Contacted for Assistance	Was Sent a Copy of the Draft Plan	Was Sent a Notice of Intention to Adopt	Not Involved No Information
City Management	✓	✓	✓	✓	✓	✓	✓	
City Planning Department	✓	✓	✓	✓	✓	✓	✓	
City Public Works Department(1)	✓	✓	✓	✓	✓	✓	✓	
City Fire Department	✓	✓	✓		✓	✓	✓	
City of Tehama		✓	✓			✓	✓	
Tehama County Flood Control and Water Conservation District		✓	✓			✓	✓	
California Department of Transportation		✓	✓			✓	✓	
El Camino Irrigation District		✓	✓			✓	✓	
Los Molinos Mutual Water Company		✓	✓			✓	✓	
General Public		✓	✓			✓	✓	
Notes: (1) Includes Water, Wastewater, Parks, and Recreation Departments.								

At the present time, the City relies on the underlying groundwater basin as its sole water supply source. Accordingly, the City has endeavored to work closely with the other entities that draw upon the groundwater basin. For the development of this UWMP and other regional water planning efforts focusing on the long-term management of the shared groundwater basin, the City worked closely with area water purveyors and public interest groups.

2.4.3 Notice to Cities and Counties

CWC 10621 (b) requires that agencies notify cities and counties to which they serve water that the City's UWMP is being updated and reviewed.

> *10621(b) Every urban water supplier required to prepare a plan pursuant to this part shall, at least 60 days before the public hearing on the plan required by Section 10642, notify a city or county within which the supplier provides water supplies that the urban water supplier will be reviewing the plan and considering amendments or changes to the plan.*

The City does not provide water supplies to other cities or counties. The City provided formal written notification to the following agencies that the City's UWMP was being updated.

- City of Tehama.
- Tehama County Flood Control and Water Conservation District (FCWCD).
- Caltrans.
- El Camino Irrigation District.
- Los Molinos Mutual Water Company.

In accordance with the UWMPA, this notification was provided at least 60 days prior to the public hearing of the plan. Electronic copies of the final UWMP will be provided to these agencies no later than 30 days after its submission to DWR. Appendix A contains copies of outreach documents.

Notices were published informing interested parties that the draft 2020 UWMP was available for review. Pursuant to California Code Section 6066, a notification of the time and place of the public hearing was published in the local newspaper on July 14, 2022 and July 18, 2022. A notice was also posted on the City's website (www.cityofredbluff.org). The notice stated that a public review period was scheduled through August 1, 2022. Copies of these notifications are included in Appendix A.

The Final Draft 2020 UWMP was presented on August 2, 2022, for adoption by resolution following a public hearing. This hearing provided an opportunity for the City's customers, residents, and employees to learn and ask questions about the current and future water supply of the City.

Chapter 3

SYSTEM DESCRIPTION

The UWMPA requires that the UWMP include a thorough description of the water system, service area, and various aspects of the area served including climate, population, and other demographic factors.

> *10631. (a) Describe the service area of the supplier, including current and projected population, climate, and other demographic factors affecting the supplier's water management planning. The projected population estimates shall be based upon data from the state, regional, or local service agency population projections within the service area of the urban water supplier and shall be in five-year increments to 20 years or as far as data is available.*

3.1 General Description

The City is located in Tehama County on the northern edge of the Sacramento Valley. The City is approximately 30 miles south of Redding and 130 miles northwest of the City of Sacramento along I-5.

The current City limits (5,008 acres) represent all incorporated lands that are governed by the City. The City limits roughly extend from north of the Wilcox Oaks Golf Course to south of Langley Road; and from Baker Road on the west and I-5 on the east, including a strip that extends each side of Antelope Blvd (State Route 99 [SR 99]) to the intersection of Trinity Ave.

The City's service area provides retail water services to the City and portions of Tehama County outside the City limits, including the water main extension along Antelope Boulevard to the east of the City limits and Shasta College - Tehama Campus. The City's water service area is approximately 9 square miles.

The City Sphere of Influence (SOI) boundary was adopted by the Tehama Local Agency Formation Commission (LAFCo). According to the City's General Plan Land Use Element, the boundaries of the City's SOI boundaries are as follows:

- North: The north edge of the 100-year floodplain of Blue Tent Creek to the east right-of-way of I-5, then south to the northeast edge of the 100-year floodplain of Dibble Creek, southeast and across the Sacramento River and then to the existing SOI boundary north of Antelope Boulevard. There are minor expansions of the SOI boundary along the north and south margins of Antelope Boulevard.
- East: Extend the SOI boundary from previous terminus north and south of Antelope Boulevard to the east margin of the 100-year floodplain of the Salt Creek overflow (west branch), from the previous SOI boundary at Wiltsey Road, south along Philbrook Avenue, to Sykes Avenue, then west to Paynes Creek Slough, diagonally southwest to Williams Avenue and along the previous SOI boundary following Williams Avenue, the City limits boundary to Sale Lane and south to Gilmore Ranch Road, then west to the edge of I-5, south to the west bank of the Sacramento River and southeast edge of the 100-year floodplain of Red Bank Creek.

- South: The south edge of the 100-year floodplain of Red Bank Creek from the Sacramento River to a point west of the junction of Rawson and Pimentel Roads then west to a point 500 feet west of the southerly extension of Paskenta Road.
- West: North along a line 500 feet west of Paskenta Road to the south edge of the 100-year flood of Reeds Creek, then north and east along that boundary to Baker Road, then north, west and north along the City Limit continuing north along the west edge of Baker Road to Beegum Road (Highway 36) then northeast to the west margin of the Southern Pacific Railroad (SPRR) right-of-way and north to a point where the south margin of the 100-year floodplain of Blue Tent Creek meets the SPRR right-of-way, northeast across the floodplain to its northeast edge to complete the SOI boundary.

Figure 3-1 shows the City limits, SOI, water service area, and the main distribution system components (large diameter pipelines and water tanks).

3.1.1 Description of Transmission, Treatment, and Distribution Facilities

The City of operates a public water system under a permit issued by the California Division of Drinking Water (DDW) (formerly the California Department of Public Health). The permit was first issued in 1971 and is amended as improvements are added to the system. DDW makes routine inspections of the water system and is the recipient of all test results. The City is regulated by Title 22 of the California Code of Regulations (CCR).

The City owns, maintains, and operates water supply wells, storage tanks, and water lines throughout the City. The water supplied by the City is not altered or treated prior to distribution. The City has two portable chlorination units that could be used to treat water on an emergency basis. The City manages and maintains over 80 miles of water lines spanning 4 to 24 inches in diameter, 11 active groundwater wells, and two 3 MG water storage facilities. The City pumps and delivers water to its residential (including SFR and MFR), CII, and irrigation customers within the service area.

Refer to Chapter 6 for information on future water projects.

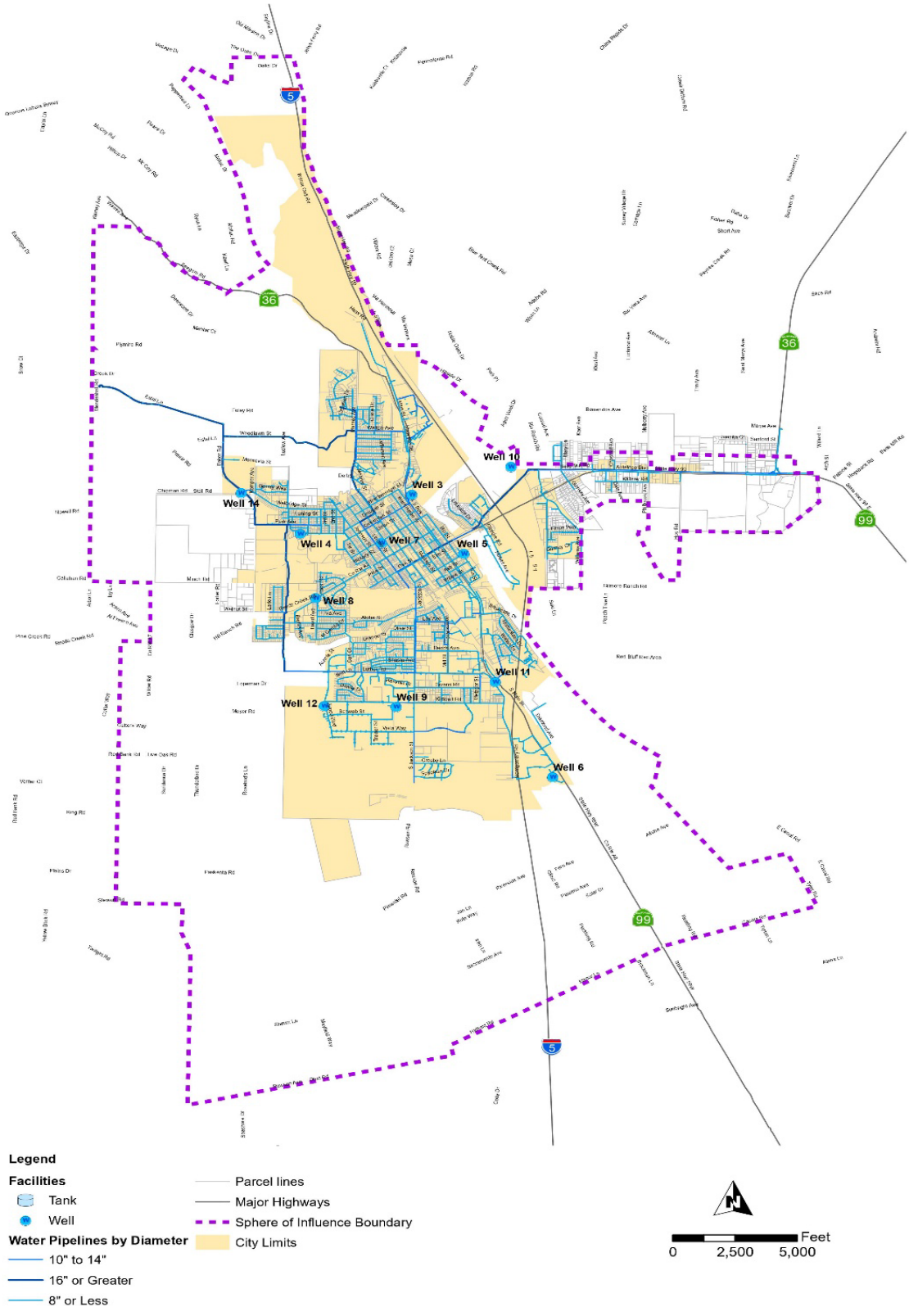

Figure 3-1 Water Service Area

3.2 Service Area Climate

> *10631(a). A plan shall… Describe the service area of the supplier, including … climate…*
>
> *10630. It is the intention of the Legislature, in enacting this part, to permit levels of water management planning… while accounting for impacts of climate change.*

The City has a Mediterranean-type climate with dry, hot summers and cool, wet winters. Average monthly evapotranspiration (ETo) rates, rainfall, and temperature are summarized in Table 3-0.

Submittal Table 3-0: Climate Characteristics

Month	Standard Monthly Average ETo[(1)] (inches)	Monthly Average Rainfall[(1)] (inches)	Monthly Average Temperature[(1)] degrees Fahrenheit (°F)		
			Average	Minimum	Maximum
January	1.33	2.45	47.81	39.64	57.67
February	2.42	2.20	50.60	39.43	63.09
March	3.57	2.28	53.69	42.04	66.31
April	5.41	1.24	60.14	45.83	74.37
May	7.41	1.09	67.40	52.83	81.23
June	8.66	0.20	76.23	60.51	90.59
July	8.55	0.00	79.03	62.83	93.69
August	6.65	0.01	76.49	60.74	92.30
September	5.59	0.22	71.41	56.04	87.95
October	4.14	0.80	62.97	49.23	79.64
November	1.98	1.85	51.87	40.86	65.47
December	1.44	2.93	46.79	38.20	57.03
Annual	**57.16**	**15.26**			

NOTES:

(1) Source: California Irrigation Management Information System (CIMIS) Station 222 Gerber South. Represents monthly average from August 2014 to September 2021.

Climate data is from the CIMIS Gerber South Station Number (No.) 222 (activated in August 2014). ETo values, which serve as indicators of how much water is required to maintain healthy agriculture and landscaping, range from 1.33 inches (January) to 8.66 inches (June). Average annual rainfall is approximately 15.26 inches (value reflects the sum of monthly average rainfall). The majority of rainfall occurs from November through May. Monthly precipitation has been as high as 8.91 inches (December 2014). The January mean temperature is 48°F, with an average high of 58°F and an average low of 40°F. The July mean temperature is 79°F with an average high of 94°F and an average low of 63°F.

3.3 Service Area Population and Demographics

> *10631(a). Describe the service area of the supplier, including current and projected population... The projected population estimates shall be based upon data from the state, regional, or local service agency population projections within the service area of the urban water supplier and shall be in five-year increments to 20 years or as far as data is available.*

This section summarizes historical, current, and projected population trends in the City. Population projections are essential to the planning process and form the basis for most planning decisions, yet projecting future growth is far from an exact science given the complex set of variables that can affect the rate of growth. Typically, projections are developed by taking past patterns and combining them with assumptions regarding the future to obtain an estimate of future growth rates. These projections serve to provide the City insight on the type and quantity of future growth as well as guidance regarding future planning activities; therefore, such planning activities can only be as effective as the ability to anticipate population growth.

3.3.1 Service Area Population

From 2000 through 2020, the population grew from 13,147 (2000 Census) to 14,710 (US Census Bureau QuickFacts). From 2010 to 2018, the City experienced a population decline of approximately 0.2 percent per year (2019-2024 Housing Element Update). The City experienced a population increase in late 2018 due to the City of Paradise resident relocation that followed the Camp Fire.

The current and projected population for the City is contained in Table 3-1. As shown in Table 3-1, the DWR Population Tool for population estimates is used. The DWR Population Tool utilizes census data and electronic maps of the City's service area to obtain population data for census years. Residential connections were used to calculation the population for the non-census years. The results of the DWR Population Tool are included as Appendix B. The projected populations were estimated based on an annualized population growth rate of 0.4 percent (consistent with the 2015 UWMP).

Submittal Table 3-1 Retail: Population - Current and Projected

Population Served	2020	2025	2030	2035	2040	2045*(opt)*
	14,391	14,681	14,977	15,279	15,587	15,901

NOTES: 2020 population is per SB X7-7 Method of Population Estimates DWR Population Tool. Projected population assumes 0.4% annual population growth.

3.3.2 Other Social, Economic and Demographic Factors

> *10631. Describe the service area of the supplier, including... other social, economic and demographic factors affecting the supplier's water management planning.*

The City is the county seat and has become an important commercial hub for the area. Agriculture and tourism are the primary industries in the area. The 2019-2024 Housing Element Update indicates that the majority of housing units are single-family detached homes (61 percent), and the number of housing units was 5,511 in 2017. According to the 2019-2024

Housing Element Update, the largest employment sector was educational services and health care and social assistance (19 percent).

Analyzing demographic data can yield important information about possible shifts in demand for City water service. The median age in the City was 36.5 in 2017 (2019-2024 Housing Element Update) with 70.9 percent of the population over 18 years of age (US Census Bureau QuickFacts). The population was split 50.1 to 49.9 percent male to female, respectively (US Census Bureau QuickFacts).

Table 4-C.4 of the SB X7-7 Compliance Form (Appendix C) shows that the California Median Household Income in 2020 was $75,235. The median household income for the City from 2015-2019 in 2019 dollars was $31,450, or 42 percent of the statewide average (US Census Bureau QuickFacts). This defines the entire incorporated area of the City as a Disadvantaged Community.

The California Employment Development Department (EDD) reported an 8.4 percent unemployment rate for 2015 and a 11.3 percent unemployment rate for 2020.

3.4 Land Uses within Service Area

> *10631(a). The description shall include the current and projected land uses within the existing or anticipated service area affecting the supplier's water management planning. Urban water suppliers shall coordinate with local or regional land use authorities to determine the most appropriate land use information, including, where appropriate, land use information obtained from local or regional land use authorities…*

The largest land use category is residential, which accounted for approximately 60 percent of acreage within the City limits in 1992. Commercial (neighborhood, central, and general) and industrial (light, general, and limited) make up approximately 16 percent and 10 percent, respectively, of acreage within the City limits in 1992. Other land uses include the airport, recreational, and public land (General Plan Land Use Element).

3.5 Climate Change

Climate change mitigation and adaptation efforts are being implemented as part of the 2020 UWMP Guidebook update. Projected climate change trends for California include increasing temperature and increasing precipitation as rainfall rather than snow. Water suppliers are now having to assess local climate challenges and plan for vulnerabilities within their systems. As these risks are identified, methods of adaption and mitigation can be employed to increase sustainability of water resources.

In the past decade, there has been a significant increase in tools and models to help identify potential impacts of climate change. The various resources differ in the information available in each service area, scenario assumptions, and parameters potentially impacted by climate change. The following tools were evaluated for this UWMP and are described in further detail in the sections below:

- Climate Resilience Evaluation and Awareness Tool (CREAT).
- Cal-Adapt Extended Drought Scenarios Tool.
- Cal-Adapt Wildfire Tool.

3.5.1 EPA Climate Resilience Evaluation and Awareness Tool

The United States Environmental Protection Agency (EPA) created an online resource called CREAT to assist water agencies in preparing for potential future impacts on their systems caused by climate change. This tool utilizes model simulation to estimate changes in temperature, precipitation, storms, extreme heat, and sea level rise. For the purposes of this UWMP, the Cal-Adapt tool was used, which is consistent with the tool presented by DWR.

3.5.2 Cal-Adapt Extended Drought Scenarios Tools

Cal-Adapt is an online resource created by the State of California's scientific and research community to provide visualization tools and high-quality data regarding climate change at a local level. This resource allows the user to explore charts, maps, data, and projected climate variables for the State of California, and is a key recommendation of the 2009 California Climate Adaptation Strategy and the California DWR. All projections generated include two possible climate outcomes; one scenario where greenhouse gas (GHG) emissions peak near year 2040 and decline beyond 2040 (medium, Representative Concentration Pathway [RCP] 4.5), and another in which GHG emissions continue to rise throughout the 21st century (high, RCP 8.5). The tool allows the user to search by watershed, grid, counties, census tracts, and incorporated and census designated places. Thus, this tool was used to evaluate the impacts of climate change within the City's service area using the medium, RCP 4.5, and high, RCP 8.5, GHG emission scenarios.

The Extended Drought tool was used to evaluate early- and late-century variable climate impacts for the City watershed over a 20-year drought including 5 years prior and 4 years following. This two-decade extended drought period is often referred to as a "mega-drought." The results, which include minimum and maximum temperature, precipitation, ETo, and runoff, are summarized in Table 3-2.

Submittal Table 3-2: Extended Drought Scenario Projections

Parameter	Observed Historical (1961 - 1990)	Early-Century (2023 - 2042)	Late-Century (2051 - 2070)
Maximum Temperature (°F)	75.0	79.1	82.5
Minimum Temperature (°F)	49.7	53.2	56.5
Precipitation (inch)	25.7	20.3	20.3
Evapotranspiration (inch)	20.8	17.7	17.8
Runoff (inch)	2.2	1.6	1.6
Snow Water Equivalent (inch)	0.4	0.0	0.0

NOTES:
(1) Retrieved using Cal-Adapt Extended Drought tool.

The projected increase in maximum temperature from historical years to late-century is 7.5°F (10.0 percent), whereas the projected increase in minimum temperature is 6.8°F (13.7 percent). Precipitation is projected to decrease by 5.4 inches (21.0 percent) by late-century and ETo by 3.0 inches (14.4 percent). Runoff is projected to decrease by 0.6 inches (27.3 percent) and snow water equivalent by 0.4 inches (100 percent).

3.5.3 Cal-Adapt Wildfire

The Cal-Adapt Wildfire tool utilizes four models identified by the California Climate Action Team as priority models contributing to the 2018 California Fourth Climate Change Assessment. The models listed below describe the scenarios used in area burned wildfire projections.

- Warm/dry scenario (HadGEM2-ES).
- Cooler/wetter scenario (CNRM-CM5).
- Average scenario (CanESM2).
- A scenario that is unlike the first three models, the "complement" scenario (MIROC5).

The model projections generated include the same two possible climate outcomes: RCP 4.5 and RCP 8.5. Time periods for the wildfire analysis include historical (1961-1990), mid-century (2035-2064), and end of the century (2051-2070). The population growth scenario for the City service area was identified as central, or median. Summary statistics of all four priority models under medium and high RCP conditions are below in Table3-3.

Submittal Table 3-3: Summary of Projected Wildfire Area Burned

Parameter	Observed Historical (1961 - 1990)	Mid-Century (2035 - 2064)	End of the Century (2051 - 2070)
RCP 4.5 Conditions			
Minimum Area Burned (hectares)	166.0	144.0	147.0
Average Area Burned (hectares)	375.6	368.3	376.6
Maximum Area Burned (hectares)	930.0	878.0	1,036.0
RCP 8.5 Conditions			
Minimum Area Burned (hectares)	160.0	105.0	160.0
Average Area Burned (hectares)	377.5	371.8	403.1
Maximum Area Burned (hectares)	965.0	857.0	1,439.0

NOTES:
(1) Retrieved using Cal-Adapt Wildfire tool.

Based on these statistics, the probability of wildfires in the City watershed is anticipated to be fairly steady, while the maximum area burned is anticipated to increase under both the RCP 4.5 and RCP 8.5 conditions.

Chapter 4

WATER USE CHARACTERIZATION

The UWMPA requires that the UWMP identify the quantity of water supplied to the agency's customers including a breakdown by user classification. This section describes the water system demands and water demand projections.

4.1 Non-Potable Versus Potable Water Use

This chapter covers potable and raw water demand. Recycled water is addressed comprehensively in Chapter 6.

4.2 Past, Current, and Projected Water Use by Sector

> *10631(d). (1) For an urban retail water supplier, quantify, to the extent records are available, past and current water use, over the same five-year increments described in subdivision (a), and projected water use, based upon information developed pursuant to subdivision (a), identifying the uses among water use sectors, including, but not necessarily limited to, all of the following…*
>
> *(2). The water use projections shall be in the same five-year increments described in subdivision (a).*
>
> *(4)(A) Water use projections, where available, shall display and account for the water savings estimated to result from adopted codes, standards, ordinances, or transportation and land use plans identified by the urban water supplier, as applicable to the service area.*
>
> *(B) To the extent that an urban water supplier reports the information described in subparagraph (A), an urban water supplier shall do both of the following: (i) Provide citations of the various codes, standards, ordinances, or transportation and land use plans utilized in making the projections. (ii) Indicate the extent that the water use projections consider savings from codes, standards, ordinances, or transportation and land use plans. Water use projections that do not account for these water savings shall be noted of that fact.*

Water demands served by the City are primarily residential, including SFR and MFR, CII, and landscape irrigation. All connections in the City are metered, with the exception of 8 unmetered commercial/institutional connections.

The following water use sectors and associated metered deliveries, as shown in Table 4-0, were reported in the 2015 UWMP.

Submittal Table 4-0: 2015 Water Deliveries	
Use Type	Metered Volume
Single-Family Residential	1,209
Multi-Family Residential	469
Commercial/Industrial	1,083
Institutional/Governmental	0
Irrigation	11
Unbilled Authorized Consumption	147
Losses	245
Total	**3,166**
NOTES: Units of measure in this UWMP are AF. Source: City 2015 Itemized Water Use Estimates.	

The actual demands for potable and non-potable water are presented in Table 4-1 for the 2020 calendar year. Discrepancy in volume reported for each use type in 2015 and 2020 calendar years may be due to reclassification of use types.

Submittal Table 4-1 Retail: Demands for Potable and Non-Potable[1] Water - Actual			
Use Type	2020 Actual		
Drop down list May select each use multiple times These are the only Use Types that will be recognized by the WUEdata online submittal tool	Additional Description (as needed)	Level of Treatment When Delivered Drop down list	Volume[2]
Add additional rows as needed			
Single Family		Drinking Water	1,579
Multi-Family		Drinking Water	611
Commercial	Includes Industrial	Drinking Water	1,416
Institutional/Governmental		Drinking Water	0
Other	Irrigation	Drinking Water	15
Other	Unbilled Authorized Consumption	Drinking Water	7
Losses		Drinking Water	451
		TOTAL	4,077
[1] *Recycled water demands are NOT reported in this table. Recycled water demands are reported in Table 6-4.* [2] *Units of measure (AF, CCF, MG) must remain consistent throughout the UWMP as reported in Table 2-3.*			
NOTES: Units of measure in this UWMP are acre-feet (AF). Source: City 2020 Itemized Water Estimates.			

Table 4-2 contains the projected potable and raw water demands from 2025 through 2045. The demand projections are based on the City's 2020 target water use (includes conservation) and the projected populations. To project the number of connections per customer sector, it was assumed that the number of connections will grow consistently with the projected water demands; this is based on the relative distribution of customer types, accounts, and water use reported for 2020. However, the customer sector water deliveries in Table 4-2 are only general estimates of projected use and may vary significantly based on future development and water conservation measures taken by each customer sector. Ultimately, the implementation, magnitude, and type of future development will determine the distribution of water use per customer sector.

Submittal Table 4-2 Retail: Use for Potable and Non-Potable[1] Water - Projected

Use Type	Additional Description (as needed)	Projected Water Use[2] *Report To the Extent that Records are Available*				
Drop down list May select each use multiple times These are the only Use Types that will be recognized by the WUEdata online submittal tool		2025	2030	2035	2040	2045 (opt)
Add additional rows as needed						
Single Family		1,744	1,780	1,816	1,852	1,889
Multi-Family		675	689	702	717	731
Commercial	Includes Industrial	1,564	1,596	1,628	1,661	1,694
Institutional/Governmental		0	0	0	0	0
Other	Irrigation	16	17	17	17	18
Other	Unbilled Authorized Consumption	7	8	8	8	8
Losses		498	508	519	529	540
	TOTAL	4,506	4,597	4,689	4,784	4,880

[1] *Recycled water demands are NOT reported in this table. Recycled water demands are reported in Table 6-4.*
Units of measure (AF, CCF, MG) must remain consistent throughout the UWMP as reported in Table 2-3. [2]

NOTES: Units of measure in this UWMP are acre-feet (AF).

The City total water demands for potable and raw water, and recycled water demand, based on the figures presented in Table 4-1, Table 4-2, and Table 6-4, are summarized in Table 4-3. The City provides recycled water to several industries and irrigation customers, as described by Chapter 6.

Submittal Table 4-3 Retail: Total Water Use (Potable and Non-Potable)						
	2020	2025	2030	2035	2040	2045 (opt)
Potable Water, Raw, Other Non-potable *From Tables 4-1R and 4-2 R*	4,077	4,506	4,597	4,689	4,784	4,880
Recycled Water Demand[1] *From Table 6-4*	62	68	68	68	68	68
Optional Deduction of Recycled Water Put Into Long-Term Storage[2]	0	0	0	0	0	0
TOTAL WATER USE	4,139	4,574	4,665	4,757	4,852	4,948
[1] Recycled water demand fields will be blank until Table 6-4 is complete *[2] Long term storage means water placed into groundwater or surface storage that is not removed from storage in the same year. Supplier **may** deduct recycled water placed in long-term storage from their reported demand. This value is manually entered into Table 4-3.*						
NOTES: Units of measure in this UWMP are acre-feet (AF).						

4.3 Distribution System Water Losses

> *10631(e)(1) Quantify, to the extent records are available, past and current water use, over the same five-year increments described in subdivision (a), and projected water use, identifying the uses among water use sectors, including, but not necessarily limited to, all of the following uses:*
>
> *(J) Distribution system water loss.....*
>
> *10631(d)(3)(A) The distribution system water loss shall be quantified for each of the five years preceding the plan update, in accordance with rules adopted pursuant to Section 10608.34*

Distribution system water losses ("real" losses) are the physical water losses from the water distribution system and the supplier's storage facilities, up to the point of customer consumption. The City's distribution system losses are quantified using the American Water Works Association (AWWA) Method Guidance "Water Resources Water Audit Manual." The distribution system water loss for the last five years (2016 through 2020 calendar years) is reported in Table 4-4.

Submittal Table 4-4 Retail: Last Five Years of Water Loss Audit Reporting	
Reporting Period Start Date (mm/yyyy)	Volume of Water Loss [1,2]
01/2016	
01/2017	25
01/2018	85
01/2019	333
01/2020	451
[1] Taken from the field "Water Losses" (a combination of apparent losses and real losses) from the AWWA worksheet. *[2] **Units of measure (AF, CCF, MG)** must remain consistent throughout the UWMP as reported in Table 2-3.*	
NOTES: Units of measure in this UWMP are acre-feet (AF). Source: 2016-2019 volume of water loss per draft AWWA Water Resources Water Audits. 2016 Draft Audit resulted in "negative" water loss and is therefore left blank. 2020 volume of water loss per City 2020 Itemized Water Estimate.	

As shown in Table 4-4, the City had approximately 451 AFY of water loss (11.1 percent) in 2020 based on City estimates. The 2016 – 2020 AWWA water audits are in the process of being validated. The draft AWWA water audits version 5.0 for 2016 – 2020 are included in Appendix D. The state standard will be met for each of the last five years of water loss audit reporting.

4.4 Estimating Future Water Savings

"Passive" savings are water savings from codes, standards, ordinances, or transportation and land use plans. As shown in Table 4-5, future water savings are not included in the total water use projections (Table 4-2).

Submittal Table 4-5 Retail Only: Inclusion in Water Use Projections	
Are Future Water Savings Included in Projections? (Refer to Appendix K of UWMP Guidebook) *Drop down list (y/n)*	No
If "Yes" to above, state the section or page number, in the cell to the right, where citations of the codes, ordinances, or otherwise are utilized in demand projections are found.	
Are Lower Income Residential Demands Included In Projections? *Drop down list (y/n)*	Yes

4.5 Water Use for Lower Income Households

The UWMPA requires that the UWMP identify planned low-income housing developments within the agency's service area and develop demand projections for those units. A lower income

household is defined as one with an income below 80 percent of area median income, adjusted for family size.

> *10631.1(a). The water use projections required by Section 10631 shall include projected water use for single-family and multifamily residential housing needed for lower income households, as defined in Section 50079.5 of the Health and Safety Code, as identified in the housing element of any city, county, or city and county in the service area of the supplier.*

As shown in Table 4-5, lower income household demand projections are included in the total water use projections (Table 4-2 and Table 4-3).

The Regional Housing Needs Assessment (RHNA) is mandated by State Housing Law as part of the periodic process of updating local housing elements of the General Plan. The RHNA for the City for the 2018 to 2024 projection period is 368 new housing units, including 82 very low-income units, 63 low-income units, 63 moderate-income units, and 160 above moderate-income units. It should also be noted, State legislation in 2017 made Accessory Dwelling Units (ADUs) legal in all California cities. Homeowners can decide to build either a detached ADU in their backyard, an attached ADU that is part of a home addition, or an ADU conversion. Although the State has determined ADUs contribute no additional stress on utilities, the addition of another dwelling unit, another family occupant, on a single-family property does impact water usage. The City has issued permits for a few ADUs since 2017.

4.6 Climate Change Considerations

As temperature rises, water demands from various types of users will likely increase. Daily heat patterns, such as the duration of daytime heat prior to nighttime cooling, will change the diurnal demand patterns and peaking factors for activities, such as landscaping and other outdoor water use features (e.g., pools, fountains, open water bodies), due to increased ET values. The altered climate patterns in California creating hotter days and longer heat waves will increase customer water use and evaporative water losses. Extended drought periods are expected to become both more frequent, and more severe, which could lead to reduced rainfall and snowpack.

The combination of a long-term reduction in water supply availability with a long-term increase in water demand and higher summer demand peaks will increase pressure on the City to meet demands. Technology and devices to increase monitoring through the distribution system will help the City prepare for, and respond to, changes in supply and demand due to climate change. Creating redundancy through backup systems, the addition of pipes to connect dead ends or areas only served by one main line or water source, will help the City achieve efficiencies required in the face of climate change considerations. Getting localized, region specific data on climate change forecasts and impacts would also help the City for planning purposes.

The City's service area is predicted to have declining precipitation and increasing temperatures. The increasing temperatures may change demand levels and patterns. Continued reduction in per capita demand with water conservation will become more challenging as BMP saturation levels climb. It can be concluded that climate change will likely put more strain on the City's ability to meet demands long-term. If per capita water demand were to increase with temperature, or the population were to increase at a higher rate, or groundwater supplies were to drop due to extended droughts, or water availability were to be impacted due to wildfires, the effects could have serious and devastating consequences.

Chapter 5

SB X7-7 BASELINES, TARGETS, AND 2020 COMPLIANCE

The UWMPA requires that the UWMP identify the baseline water demand, urban water use target, and interim urban water use target for the City. In the 2015 UWMP, these water use targets were determined per the DWR Methodologies. The daily per capita water use, expressed in gpcd, is the total water use within the service area divided by the population. These targets are necessary to judge compliance with the 2020 use reductions set forth in the Water Conservation Bill of 2009 (SB X7-7).

The purpose of this section in the 2020 UWMP is to determine whether the City has met the 20 percent conservation mandate. All SB X7-7 forms are included in Appendix C.

5.1 2015 UWMP Baseline and Targets

A supplier may update the baseline and target water use if there were changes to their distribution area. The City's distribution area has not changed since 2015. Therefore, the baseline and target gpcd values from the 2015 UWMP are utilized in this UWMP to determine compliance with the 2020 target.

In the 2015 UWMP, a 10-year baseline and a 5-year baseline were calculated to establish the minimum criteria for the City water use reduction targets. A summary of the 2008 total and recycled water deliveries, 10-year baseline range (2001 to 2010), and 5-year baseline range (2006 to 2010) is included in Table 1 of the SB X7-7 Verification Forms (Appendix C).

5.2 Service Area Population

> *10608.20. (e) An urban retail water supplier shall include in its urban water management plan due in 2010… the baseline per capita water use… along with the bases for determining those estimates, including references to supporting data.*
>
> *(f) When calculating per capita values for the purposes of this chapter, an urban retail water supplier shall determine population using federal, state, and local population reports and projections.*
>
> *10644. (a)(2) The plan… shall include any standardized forms, tables or displays specified by the department.*

The City's service area boundaries overlap by approximately 59 percent with the boundaries of the City limits. The City's service area boundary is estimated based on water meter locations. As shown in Table 2 of the SB X7-7 Verification and Compliance Forms (Appendix C), the DWR Population Tool for population estimates is used. The DWR Population Tool utilizes census data and electronic maps of the City's service area to obtain population data for census years. Residential connections were used to calculation the population for the non-census years. The results of the DWR Population Tool are included as Appendix B.

Service area population is reported for each year in the baseline periods as well as 2015 in Table 3 of the SB X7-7 Verification Form (Appendix C). Service area population is reported for 2020, the compliance year, in Table 3 of the SB X7-7 Compliance Form (Appendix C).

5.3 Gross Water Use

> *10608.12 (g) "Gross Water Use" means the total volume of water, whether treated or untreated, entering the distribution system of an urban retail water supplier, excluding all of the following:*
>
> *(1) Recycled water that is delivered within the service area of an urban retail water supplier or its urban wholesale water supplier*
>
> *(2) The net volume of water that the urban retail water supplier places into long term storage*
>
> *(3) The volume of water the urban retail water supplier conveys for use by another urban water supplier*
>
> *(4) The volume of water delivered for agricultural use, except as otherwise provided in subdivision (f) of Section 10608.24.*

"Gross Water Use" is the total volume of water, whether treated or untreated, entering the distribution system of an urban retail water supplier with certain acceptable exclusions. Gross water use is reported for each year in the baseline periods as well as 2015 and 2020, the compliance year, in Table 4 of the SB X7-7 Verification and Compliance Forms (Appendix C).

As shown in Table 4-C.4 of the SB X7-7 Verification and Compliance Forms (Appendix C), the City is eligible for process water deductible exclusion. However, the City is not subtracting process water from their gross water use.

5.4 Baseline Daily Per Capita Water Use

The baseline daily per capita water use in each of the baseline years is calculated in Table 5 of the SB X7-7 Verification Form (Appendix C) by dividing annual gross water use by annual service area population. The average baseline daily per capita water use is summarized in Table 6 of the SB X7-7 Verification Form (Appendix C) for the 10-year baseline, 5-year baseline, and 2015. The average baseline daily per capita water use is summarized in Table 5 of the SB X7-7 Compliance Form (Appendix C) for the 2020 compliance year.

5.5 Baselines and Targets Summary

As mentioned above, a supplier may update the baseline and target water use if there were changes to their distribution area. The City's distribution area has not changed since 2015. Therefore, the baseline and target gpcd values from the 2015 UWMP are utilized in this UWMP to determine compliance with the 2020 target.

Based on the water use targets calculated in 2015, the City water use target for 2020 is 274 gpcd. Based on the 10-year baseline of 342 gpcd, the 2015 interim water use target was 308 gpcd. The 2020 target was determined using Method 1. In order to meet the confirmation criteria, the 2020 target must fall below 95 percent of the 5-year baseline, which is 358 gpcd for the City. According to the DWR guidelines, the 2020 target is valid since it is less than the target confirmation criteria of 341 gpcd.

A summary of the various baselines and the confirmed 2020 target are summarized in Table 5-1. Refer to Table 7 and Table 8 of the SB X7-7 Verification Form (Appendix C) for more information on the calculation method and a summary of the targets.

Submittal Table 5-1 Baselines and Targets Summary From SB X7-7 Verification Form
Retail Supplier or Regional Alliance Only

Baseline Period	Start Year *	End Year *	Average Baseline GPCD*	Confirmed 2020 Target*
10-15 year	*2001*	*2010*	*342*	*274*
5 Year	*2006*	*2010*	*358*	

**All cells in this table should be populated manually from the supplier's SBX7-7 Verification Form and reported in Gallons per Capita per Day (GPCD)*

5.6 2020 Compliance Daily Per Capita Water Use

> *10608.12(e) "Compliance daily per-capita water use" means the gross water use during the final year of the reporting period...*
>
> *10608.20 (e) An urban retail water supplier shall include in its urban water management plan due in 2010 . . . compliance daily per capita water use, along with the bases for determining those estimates, including references to supporting data.*

Compliance daily per-capita water use means the gross water use during the final year of the reporting period. Water suppliers are required to calculate their actual 2020 water use (2020 calendar year) and evaluate whether their per capita 2020 target use was met. Refer to Table 5-2 and SB X7-7 Compliance Form Table 9 (Appendix C) for 2020 compliance.

Submittal Table 5-2: 2020 Compliance From SB X7-7 2020 Compliance Form
Retail Supplier or Regional Alliance Only

2020 GPCD			2020 Confirmed Target GPCD*	Did Supplier Achieve Targeted Reduction for 2020? Y/N
Actual 2020 GPCD*	2020 TOTAL Adjustments*	Adjusted 2020 GPCD* *(Adjusted if applicable)*		
253	*0*	*253*	*274*	*YES*

**All cells in this table should be populated manually from the supplier's SBX7-7 2020 Compliance Form and reported in Gallons per Capita per Day (GPCD)*

The City met the 2020 target (274 gpcd) in the year 2020 (253 gpcd). If the City can maintain water consumption rates, it will maintain conservation goals. However, if consumption rates begin to rise, the City must implement additional conservation measures. In all of its conservation programs, the City will avoid placing a disproportionate burden on any customer sector.

Although the City was able to meet the 2020 target, the year 2020 did not represent a typical year due to the impacts of the COVID-19 pandemic. Since the 2020 per capita demand of 253 gpcd was below the 2020 goal, adjustments for extraordinary events were not made in Table 5-2.

Chapter 6

WATER SUPPLY CHARACTERIZATION

The UWMPA requires that the UWMP include a description of the agency's existing and future water supply sources for the next 20 years. The description of water supplies must include detailed information on surface water, groundwater, the groundwater basin, potential opportunities for desalination of groundwater and seawater, and detailed information on the agency's imported water.

6.1 Purchased or Imported Water

The City does not purchase or import any water from other water suppliers or other entities.

6.2 Groundwater

The City currently utilizes local groundwater as its sole water supply source. The City extracts its water supply from the underlying Sacramento Valley Groundwater Basin, Red Bluff Subbasin via 11 active groundwater wells scattered throughout the water service area (refer to Figure 3-1). Table 6-0 lists the active groundwater wells for the City. The pumping capacities of the City's active wells currently range from approximately 600 to 2,500 gallons per minute (gpm).

Submittal Table 6-0: Water Supply Wells

Well Location	Well No. (1)	Depth, feet	Flow, gpm
1250 Main Street	3	272	675
1295 Redbud Avenue	4	518	765
115 Sycamore Street	5	276	580
2585 Sister Mary Columbia Drive	6	492	650
827 Cedar Street	7	478	950
1730 Walnut Street	8	520	785
945 Kimball Road	9	383	718
215 White Road	10	625	2,475
1220 Montgomery Road	11	520	628
1700 Airport Boulevard	12	463	718
2410 Stoll Road	14	580	996

NOTES:
1. No. = Number. Well Nos. 1, 2, and 13 are inactive.

6.2.1 Basin Description

The City is located within the geomorphic province known as the Central Valley, which is divided into the Sacramento Valley and the San Joaquin Valley. The groundwater underlying the City is part of the larger Sacramento Valley Groundwater Basin within the Sacramento River Hydrologic

Region. The City relies upon groundwater from the Red Bluff Subbasin (California DWR Groundwater Basin Number 5-21.50) of the Sacramento Valley Groundwater Basin as its sole source of domestic potable water. The Red Bluff Subbasin is an un-adjudicated basin that supports both municipal and agricultural users. DWR Bulletin 118, "California's Groundwater," contains a detailed description of the Red Bluff Subbasin and its characteristics and conditions. A copy of the Red Bluff Subbasin description is included in Appendix E (last updated in February 2004).

The City's water supplies are entirely obtained from the Sacramento Valley Groundwater Basin, Red Bluff Subbasin. However, the City limits and SOI also overly the Antelope Subbasin of the Sacramento Valley Groundwater Basin (DWR Groundwater Basin Number 5-21.54). The Antelope Subbasin is an un-adjudicated basin that supports both municipal/industrial and agricultural users. DWR Bulletin 118 contains a detailed description of the Antelope Subbasin and its characteristics and conditions. A copy of the Antelope Subbasin description is included in Appendix E (last updated in February 2004).

6.2.2 Groundwater Management

The Sustainable Groundwater Management Act of 2014 (SGMA) requires that the groundwater basins within Tehama County be managed by one or more groundwater sustainability agencies (GSAs) on or before June 30, 2017. The Tehama County FCWCD has been listed as the Exclusive GSA for the following seven subbasins or the portions of those subbasins located within the County: Bowman, Red Bluff, Corning, Los Molinos, Antelope, Bend, and South Battle Creek as of February 11, 2016. The "Groundwater Commission" consists of 11 members, including 1 member from the City of Red Bluff. The City is the largest water supplier in Tehama County. The City will remain actively engaged to ensure the City's needs and concerns are carefully considered.

On December 8, 2021, the Tehama County Groundwater Commission recommended approval of the Red Bluff Subbasin Groundwater Sustainability Plans (GSPs) by the Tehama County Flood Control and Water Conservation District Board of Directors.

6.2.3 Overdraft Conditions

DWR has continuously monitored the groundwater level at a California Statewide Groundwater Elevation Monitoring (CASGEM) well in the Sacramento Valley Groundwater Basin, Red Bluff Subbasin (CASGEM Well No. 22257, Master Site Code 401835N1222319W001) in Red Bluff since 1952. Figure 6-1 shows the groundwater levels at the well from 1952 to 2021. According to the DWR Bulletin 118, there was a decline of 3 to 7 feet associated with the 1976 to 1977 and 1987 to 1994 droughts, followed by a recovery to pre-drought conditions of the early 1970s and 1980s. Overall, there does not appear to be any increasing or decreasing trends in the groundwater levels.

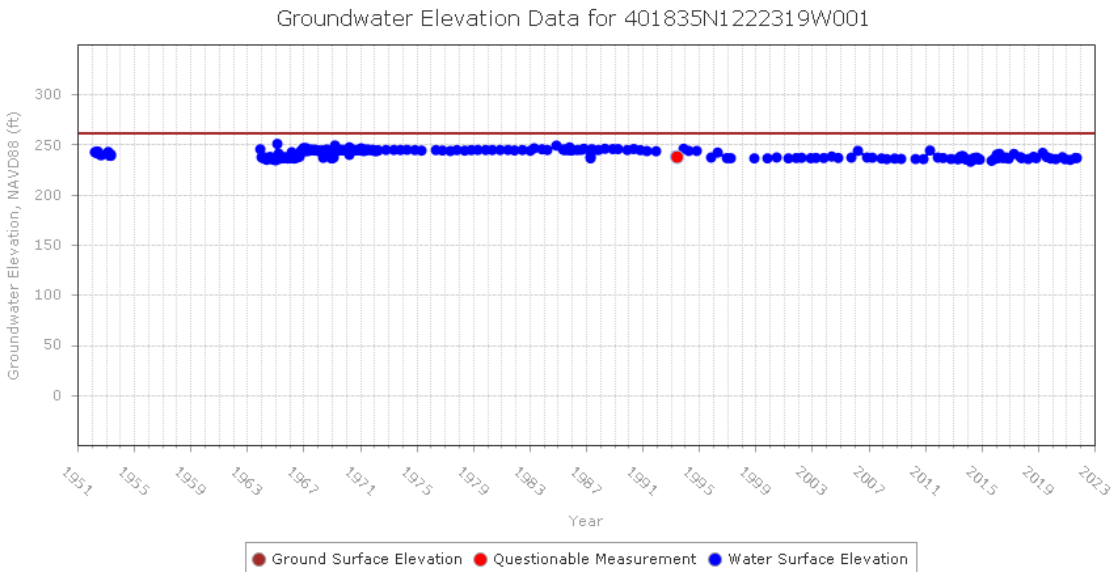

Figure 6-1 Red Bluff Subbasin Groundwater Levels

DWR has continuously monitored the groundwater level at a CASGEM well in the Sacramento Valley Groundwater Basin, Antelope Subbasin (CASGEM Well No. 22255, Master Site Code 401897N1222049W001) since 2000. This well is within the City SOI. Figure 6-2 shows the groundwater levels at the well from 2000 to 2021. According to the DWR Bulletin 118, there was a decline of 5 to 10 feet associated with the 1976 to 1977 and 1987 to 1994 droughts, followed by a recovery to pre-drought conditions of the early 1970s and 1980s. Generally, groundwater level data show a seasonal fluctuation of approximate 2 to 15 feet for normal and dry years.

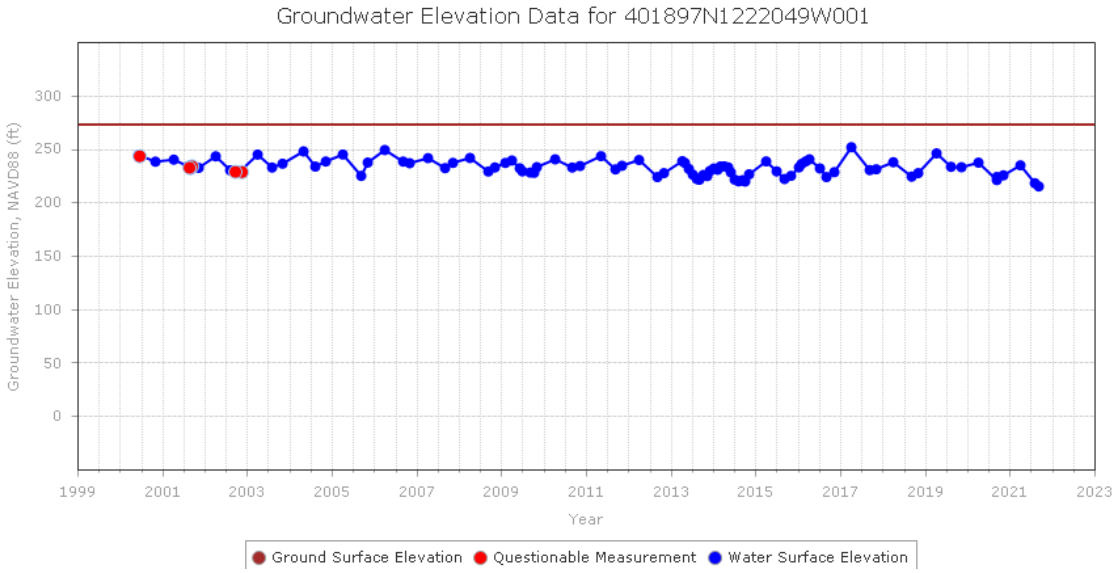

Figure 6-2 Antelope Subbasin Groundwater Levels

6.2.4 Historical Groundwater Pumping

The historical volume of groundwater pumped by the City over the past five years is provided in Table 6-1. The City's water supplies are entirely obtained from the Sacramento Valley Groundwater Basin, Red Bluff Subbasin.

Submittal Table 6-1 Retail: Groundwater Volume Pumped						
☐	Supplier does not pump groundwater. The supplier will not complete the table below.					
☐	All or part of the groundwater described below is desalinated.					
Groundwater Type ***Drop Down List*** *May use each category multiple times*	Location or Basin Name	2016*	2017*	2018*	2019*	2020*
Add additional rows as needed						
Alluvial Basin	Sacramento Valley Basin, Red Bluff Subbasin	3241	3559	3732	3669	4077
	TOTAL	3,241	3,559	3,732	3,669	4,077
**** Units of measure (AF, CCF, MG)*** *must remain consistent throughout the UWMP as reported in Table 2-3.*						
NOTES: Units of measure in this UWMP are acre-feet (AF). Source: Large Water Systems Annual Reports to the Drinking Water Program.						

6.3 Surface Water

The City does not have any surface water sources as part of its water supply.

6.4 Stormwater

The City has not identified any opportunities related to stormwater recapture to offset potable water use.

6.5 Wastewater and Recycled Water

The UWMPA requires that the UWMP address the opportunities for development of recycled water, including the description of existing recycled water applications, quantities of wastewater currently being treated to recycled water standards, limitations on the use of available recycled water, an estimate of projected recycled water use, the feasibility of said projected uses, and practices to encourage the use of recycled water.

6.5.1 Recycled Water Coordination

> *10633. The plan shall provide, to the extent available, information on recycled water and its potential for use as a water source in the service area of the urban water supplier. The preparation of the plan shall be coordinated with local water, wastewater, groundwater, and planning agencies that operate within the supplier's service area.*

The City owns the Wastewater Reclamation Plant (WRP) that collects and treats all wastewater within the service area. Therefore, the City coordinates recycled water use within the service area and does not rely on an outside facility or agency.

6.5.2 Wastewater Collection, Treatment Systems, and Disposal

10633. (a) (Describe) the wastewater collection and treatment systems in the supplier's service area, including a quantification of the amount of wastewater collected and treated and the methods of wastewater disposal.

6.5.2.1 Wastewater Collected within Service Area

The City owns and maintains gravity sewer pipelines and forcemains, sewer lift stations, and pump stations. The City collects wastewater from residential, and CII customers within the service area. The 2020 wastewater flows from the City's service area is summarized in Table 6-2. As shown in Table 6-2, the City contributed 1,260 AFY of wastewater flow into the WRP in 2020.

Submittal Table 6-2 Retail: Wastewater Collected Within Service Area in 2020

☐	There is no wastewater collection system. The supplier will not complete the table below.
	Percentage of 2020 service area covered by wastewater collection system *(optional)*
	Percentage of 2020 service area population covered by wastewater collection system *(optional)*

Wastewater Collection			Recipient of Collected Wastewater			
Name of Wastewater Collection Agency	Wastewater Volume Metered or Estimated? *Drop Down List*	Volume of Wastewater Collected from UWMP Service Area 2020 *	Name of Wastewater Treatment Agency Receiving Collected Wastewater	Treatment Plant Name	Is WWTP Located Within UWMP Area? *Drop Down List*	Is WWTP Operation Contracted to a Third Party? *(optional)* *Drop Down List*
City of Red Bluff	Metered	1,260	City of Red Bluff	Wastewater Reclamation Plant	Yes	Yes
Total Wastewater Collected from Service Area in 2020:		1,260				

**** Units of measure (AF, CCF, MG)** must remain consistent throughout the UWMP as reported in Table 2-3 .*

NOTES: Units of measure in this UWMP are acre-feet (AF). The City WRP staff believes that the volume of wastewater collected (volume of wastewater treated in Table 6-3) is not a true representation of actual flow. Additionally, the volume of wastewater collected includes flow recycle from the secondary clarifier and filter backwash.

6.5.2.2 Wastewater Treatment and Discharge within Service Area

The City owns and maintains the WRP, which is operated by Operations Management International, Inc. (a subsidiary of Jacobs). The WRP is located east of I-5 and north of Shasta College - Tehama Campus. The WRP is permitted to treat 2.5 million gallons per day (mgd) and currently operates at approximately 1.0 mgd. Treatment consists of screening for removal of large solids, aerated grit removal, primary sedimentation, activated sludge treatment with secondary clarification, filtration, and chlorination/dechlorination. Primary and waste activated sludge are treated by aerobic digestion and stored in sludge storage basins, until dewatered and dried in sludge drying beds.

Advanced secondary treated effluent, where median concentration of total coliform is not to exceed 23 most probable number (MPN) per 100 milliliter (mL), is used for irrigation purposes and/or is discharged to the Sacramento River. The discharge is regulated under National Pollutant Discharge Elimination System (NPDES) Waste Discharge Requirements (WDR) Order

No. R5-2018-0041. Table 6-3 identifies the volume of treated wastewater either recycled or disposed of within the service area in 2020.

Submittal Table 6-3 Retail: Wastewater Treatment and Discharge Within Service Area in 2020

☐ **No wastewater is treated or disposed of within the UWMP service area.** The supplier will not complete the table below.

Wastewater Treatment Plant Name	Discharge Location Name or Identifier	Discharge Location Description	Wastewater Discharge ID Number *(optional)* [2]	Method of Disposal *Drop down list*	Does This Plant Treat Wastewater Generated Outside the Service Area? *Drop down list*	Treatment Level *Drop down list*	2020 volumes [1]				
							Wastewater Treated	Discharged Treated Wastewater	Recycled Within Service Area	Recycled Outside of Service Area	Instream Flow Permit Requirement
City of Red Bluff Wastewater Reclamation Plant	EFF-001	Sacramento River	CA0078891	River or creek outfall	Yes	Secondary, Disinfected - 23	1,260	1,167	62	0	0
						Total	1,260	1,167	62	0	0

[1] **Units of measure (AF, CCF, MG)** must remain consistent throughout the UWMP as reported in Table 2-3.
[2] If the **Wastewater Discharge ID Number** is not available to the UWMP preparer, access the SWRCB CIWQS regulated facility website at https://ciwqs.waterboards.ca.gov/ciwqs/readOnly/CiwqsReportServlet?inCommand=reset&reportName=RegulatedFacility

NOTES: Units of measure in this UWMP are acre-feet (AF). The City WRP staff believes that the volume of wastewater treated (volume of wastewater collected in Table 6-2) is not a true representation of actual flow. Additionally, the volume of wastewater treated includes flow recycle from the secondary clarifier and filter backwash.

6.5.3 Recycled Water System Description

> *10633. (c) A description of the recycled water currently being used in the supplier's service area, including, but not limited to, the type, place, and quantity of use.*

The City's WRP produces disinfected secondary recycled water per the recycled water criteria defined by DDW under Title 22 of the CCR. The City provides recycled water to Caltrans for landscape irrigation. No infrastructure exists at this time to support recycled water use within the City.

6.5.4 Recycled Water Beneficial Uses

6.5.4.1 Current and Planned Uses of Recycled Water

> *10633. (b) A description of the quantity of treated wastewater that meets recycled water standards, is being discharged, and is otherwise available for use in a recycled water project.*
>
> *(d) A description and quantification of the potential uses of recycled water, including, but not limited to, agricultural irrigation, landscape irrigation, wildlife habitat enhancement, wetlands, industrial reuse, groundwater recharge, indirect potable reuse, and other appropriate uses, and a determination with regard to the technical and economic feasibility of serving those uses.*
>
> *(e) The projected use of recycled water within the supplier's service area at the end of 5, 10, 15, and 20 years, and a description of the actual use of recycled water in comparison to uses previously projected pursuant to this subdivision.*

The City provides recycled water to Caltrans for irrigation along the southeastern I-5 corridor in the City limits. Projected recycled water uses include expanded irrigation by Caltrans north to the Adobe Road overcrossing, including servicing of off-ramp islands as well as medians. The current and projected recycled water uses are summarized in Table 6-4.

Submittal Table 6-4 Retail: Recycled Water Direct Beneficial Uses Within Service Area											
☐	Recycled water is not used and is not planned for use within the service area of the supplier. The supplier will not complete the table below.										
Name of Supplier Producing (Treating) the Recycled Water:	City of Red Bluff Water Reclamation Plant										
Name of Supplier Operating the Recycled Water Distribution System:	City of Red Bluff Water Reclamation Plant										
Supplemental Water Added in 2020 (volume) *Include units*											
Source of 2020 Supplemental Water											
Beneficial Use Type *Insert additional rows if needed.*	**Potential** Beneficial Uses of Recycled Water (Describe)	Amount of **Potential** Uses of Recycled Water (Quantity) *Include volume units*[1]	General Description of 2020 Uses	Level of Treatment *Drop down list*	2020[1]	2025[1]	2030[1]	2035[1]	2040[1]	2045[1] (opt)	
Agricultural irrigation											
Landscape irrigation (exc golf courses)	Caltrans		I-5 Landscape Irrigation	Secondary, Disinfected - 23	62	68	68	68	68	68	
Golf course irrigation											
Commercial use											
Industrial use											
Geothermal and other energy production											
Seawater intrusion barrier											
Recreational impoundment											
Wetlands or wildlife habitat											
Groundwater recharge (IPR)											
Reservoir water augmentation (IPR)											
Direct potable reuse											
Other (Description Required)											
				Total:	62	68	68	68	68	68	
				2020 Internal Reuse							
[1] ***Units of measure (AF, CCF, MG)*** *must remain consistent throughout the UWMP as reported in Table 2-3.*											
NOTES: Units of measure in this UWMP are acre-feet (AF). Source: City of Red Bluff Water Reclamation Plant Self-Monitoring Report.											

6.5.4.2 Planned Versus Actual Use of Recycled Water

The recycled water use projection for 2020 from the 2015 UWMP is compared to the 2020 actual use in Table 6-5.

Submittal Table 6-5 Retail: 2015 UWMP Recycled Water Use Projection Compared to 2020 Actual		
☐	Recycled water was not used in 2015 nor projected for use in 2020. The supplier will not complete the table below. If recycled water was not used in 2020, and was not predicted to be in 2015, then check the box and do not complete the table.	
Beneficial Use Type	**2015 Projection for 2020 [1]**	**2020 Actual Use[1]**
Insert additional rows as needed.		
Agricultural irrigation		
Landscape irrigation (exc golf courses)	88	62
Golf course irrigation		
Commercial use		
Industrial use		
Geothermal and other energy production		
Seawater intrusion barrier		
Recreational impoundment		
Wetlands or wildlife habitat		
Groundwater recharge (IPR)		
Reservoir water augmentation (IPR)		
Direct potable reuse		
Other (Description Required)		
Total	88	62
[1] **Units of measure (AF, CCF, MG)** must remain consistent throughout the UWMP as reported in Table 2-3.		
NOTE: Units of measure in this UWMP are acre-feet (AF).		

6.5.5 Actions to Encourage and Optimize Future Recycled Water Use

> *10633. The plan shall provide, to the extent available, information on recycled water and its potential for use as a water source in the service area of the urban water supplier... and shall include the following:*
>
> *(g) A plan for optimizing the use of recycled water in the supplier's service area, including actions to facilitate the installation of dual distribution systems, to promote recirculating uses, to facilitate the increased use of treated wastewater that meets recycled water standards, and to overcome any obstacles to achieving that increased use.*

The City supports use of recycled water and has taken steps to promote the use of recycled water and increase awareness among City stakeholders. Expansion of recycled water usage in the City, for uses such as golf course and park irrigation, would require increased treatment (advanced secondary treated effluent where median concentration of total coliform is not to exceed 2.2 MPN/100 mL) and construction of recycled water infrastructure. As shown in Table 6-6, the City does not plan to expand recycled water use at this time.

Submittal Table 6-6 Retail: Methods to Expand Future Recycled Water Use			
☑	Supplier does not plan to expand recycled water use in the future. Supplier will not complete the table below but will provide narrative explanation.		
Section 6.5.5	Provide page location of narrative in UWMP		
Name of Action	Description	Planned Implementation Year	Expected Increase in Recycled Water Use *
Add additional rows as needed			
		Total	0
***Units of measure (AF, CCF, MG)** must remain consistent throughout the UWMP as reported in Table 2-3.*			

6.6 Desalinated Water Opportunities

> *10631(d). Describe the opportunities for development of desalinated water, including, but not limited to, ocean water, brackish water, and groundwater, as a long-term supply.*

The UWMPA requires that the UWMP address the opportunities for development of desalinated water, including ocean water, brackish water, and groundwater.

At the present time, the City does not foresee any opportunities for the use of desalinated water, including ocean water, brackish ocean water, and brackish groundwater, as a long-term supply since the City is not located near the coast or a brackish groundwater source.

6.7 Exchanges or Transfers

> *10631(d). Describe the opportunities for exchanges or transfers of water on a short-term or long-term basis.*

The UWMPA requires the UWMP to address the opportunities for development of short or long-term transfer or exchange opportunities. The City is relatively isolated from neighboring

potable water systems and, due to this isolation, the City is not participating in any inter-connection programs with neighboring purveyors. Therefore, transfer or exchange opportunities are not immediately available to the City.

6.7.1 Exchanges

Water exchanges entail water being delivered by one water user to another water user, with the receiving water user providing water in return at a specified time or when the conditions of the parties' agreements are met. The City does not have any planned or potential water exchanges.

6.7.2 Transfers

Water transfers entail a temporary or long-term change in the point of diversion, place of use, or purpose of use due to a transfer, sale, lease, or exchange of water or water rights. The City does not have any planned or potential water transfers.

6.7.3 Emergency Interties

The City does not have any emergency interties in which transfers of water can be made.

6.8 Future Water Projects

> *10631(f)... The urban water supplier shall include a detailed description of expected future projects and programs that the urban water supplier may implement to increase the amount of the water supply available to the urban water supplier in normal and single dry water years and for a period of drought lasting five consecutive water years. The description shall identify specific projects and include a description of the increase in water supply that is expected to be available from each project. The description shall include an estimate with regard to the implementation timeline for each project or program.*

The UWMPA requires that suppliers describe water supply projects and programs that may be undertaken to meet the projected water demands.

The current City policy is to accommodate new potable water demands through additional groundwater pumping. This pumping capacity is to be provided via new wells. A new well and storage tank is proposed in the Antelope area near SR 99 and SR 36. Additionally, Well No. 3 (as listed in Table 6-0) is proposed for pump replacement for a nominal expected increase in flow.

The City is also in the initial stages of exploring the feasibility of additional recycling measures, including consideration of a groundwater recharge project at the WRP.

Table 6-7 contains the City's future water projects. The planned implementation year and expected increase in the water supply have not been included as projects are only in discussion stages at this time.

Submittal Table 6-7 Retail: Expected Future Water Supply Projects or Programs						
☐	No expected future water supply projects or programs that provide a quantifiable increase to the agency's water supply. Supplier will not complete the table below.					
☑	Some or all of the supplier's future water supply projects or programs are not compatible with this table and are described in a narrative format.					
Section 6.8	Provide page location of narrative in the UWMP					
Name of Future Projects or Programs	Joint Project with other suppliers?		Description (if needed)	Planned Implementation Year	Planned for Use in Year Type *Drop Down List*	Expected Increase in Water Supply to Supplier* *This may be a range*
	Drop Down List (y/n)	*If Yes, Supplier Name*				
Add additional rows as needed						
New Well and Storage Tank	No				All Year Types	
Well No. 3 Replacement Pump	No				All Year Types	
Groundwater Recharge	No				All Year Types	
***Units of measure (AF, CCF, MG)** must remain consistent throughout the UWMP as reported in Table 2-3.*						

6.9 Summary of Existing and Planned Sources of Water

10631 (b) Identify and quantify, to the extent practicable, the existing and planned sources of water available to the supplier over the same five-year increments described in subdivision (a), providing supporting and related information, including all of the following...

(b)(2) When multiple sources of water supply are identified, a description of the management of each supply in correlation with the other identified supplies.

(h) An urban water supplier that relies upon a wholesale agency for a source of water shall provide the wholesale agency with water use projections from that agency for that source of water in five-year increments to 20 years or as far as data is available. The wholesale agency shall provide information to the urban water supplier for inclusion in the urban water supplier's plan that identifies and quantifies, to the extent practicable, the existing and planned sources of water as required by subdivision (b), available from the wholesale agency to the urban water supplier over the same five-year increments, and during various water-year types in accordance with subdivision (f). An urban water supplier may rely upon water supply information provided by the wholesale agency in fulfilling the plan informational requirements of subdivisions (b) and (f).

The actual source and volume of water for the year 2020 is presented in Table 6-8. As shown in Table 6-8, the City's actual supply was approximately 4,139 AFY.

Submittal Table 6-8 Retail: Water Supplies — Actual				
Water Supply		2020		
Drop down list May use each category multiple times.These are the only water supply categories that will be recognized by the WUEdata online submittal tool	Additional Detail on Water Supply	Actual Volume*	Water Quality Drop Down List	Total Right or Safe Yield* (optional)
Add additional rows as needed				
Purchased or Imported Water		0		
Groundwater (not desalinated)		4,077	Drinking Water	
Surface water (not desalinated)		0		
Stormwater Use		0		
Recycled Water		62	Recycled Water	
Desalinated Water - Groundwater		0		
Desalinated Water - Surface Water		0		
Exchanges		0		
Transfers		0		
Total		4,139		0
Units of measure (AF, CCF, MG) *must remain consistent throughout the UWMP as reported in Table 2-3.*				
NOTES: Units of measure in this UWMP are acre-feet (AF).				

The projected water supply in 5-year increments is included in Table 6-9. The projected water supply is based on demand projections and incorporates water conservation associated with SB X7-7. The projected supply available to the City assumes that new wells will be developed in the future if warranted by demand. As shown in Table 6-9, the City anticipates it can supply all its water demands with groundwater from the Red Bluff Subbasin through the planning horizon.

Submittal Table 6-9 Retail: Water Supplies — Projected											
Water Supply		Projected Water Supply * Report To the Extent Practicable									
Drop down list May use each category multiple times. These are the only water supply categories that will be recognized by the WUEdata online submittal tool	Additional Detail on Water Supply	2025		2030		2035		2040		2045 (opt)	
		Reasonably Available Volume	Total Right or Safe Yield (optional)	Reasonably Available Volume	Total Right or Safe Yield (optional)	Reasonably Available Volume	Total Right or Safe Yield (optional)	Reasonably Available Volume	Total Right or Safe Yield (optional)	Reasonably Available Volume	Total Right or Safe Yield (optional)
Add additional rows as needed											
Purchased or Imported Water		0		0		0		0		0	
Groundwater (not desalinated)		4,506		4,597		4,689		4,784		4,880	
Surface water (not desalinated)		0		0		0		0		0	
Stormwater Use		0		0		0		0		0	
Recycled Water		68		68		68		68		68	
Desalinated Water - Groundwater		0		0		0		0		0	
Desalinated Water - Surface Water		0		0		0		0		0	
Exchanges		0		0		0		0		0	
Transfers		0		0		0		0		0	
Total		4,574	0	4,665	0	4,757	0	4,852	0	4,948	0
Units of measure (AF, CCF, MG) *must remain consistent throughout the UWMP as reported in Table 2-3.*											
NOTES: Units of measure in this UWMP are acre-feet (AF).											

6.10 Climate Change Impacts to Supplies

The CWC requires that suppliers consider climate change in their water supply analysis. The potential water supply effects related to climate change are discussed briefly in this section.

The Integrated Regional Water Management (IRWM) Climate Change Vulnerability Assessment is included as Appendix F. No vulnerabilities were identified for *Water Supply* and *Sea Level Rise* categories. For the category of *Water Demand*, it was noted that water use can vary by more than 50 percent seasonally. The City also indicated that water use curtailment measures are effective. For the category of *Water Quality* and *Flooding*, it was noted that increased wildfires are a threat in the region; however, increased erosion does not pose a water quality concern. Critical infrastructure lies within the 200-year floodplain and the region lies within the Sacramento-San Joaquin Drainage District, as noted within the *Flooding* category. For the category of *Ecosystem and Habitat Vulnerability*, it was noted that the region has endangered or threatened species in addition to rivers in the region with quantified environmental flow requirements (Shasta Dam discharges). For the category of Hydropower, it was noted that hydropower is a source of electricity in the region (Shasta Dam).

Because the City is 100 percent reliant on groundwater for its potable water supply, the effects of climate change are best summarized by considering the effects of the region as a whole. These effects will likely include:

- Reduction in snowpack, which is a significant source of water as it melts and feeds aquifers in the Sacramento Valley.
- Increase in intensity and frequency of extreme weather events.
- Effects on groundwater recharge during droughts.
- General decline in ecosystem health and function.
- Changes to demand levels and patterns due to increasing temperatures.

As scientific understanding of climate change continues to advance, the nature of these impacts and the impact on water supply availability and reliability will be thoroughly studied to identify proper mitigation and adaptation strategies.

One additional consideration for the City is the impact of wildfires on water quality. The wildfire season is typically followed by the rainy season and sometimes heavy precipitation, leading to high levels of sediment in runoff that can severely degrade water quality, such as the increase in turbidity levels. In addition, Per- and polyfluoroalkyl substances (PFAS) is also an emerging contaminant that can be found in firefighting foam that can stay and spread in the environment for decades and become a major contributor to drinking water contamination. With the increasing frequency of wildfires and atmospheric rivers across California, changes in treatment operations and/or treatment processes may be necessary to reliably treat and maintain water service to customers experiencing back-to-back impacts.

According to a recent article a, "first-of-its-kind national-scale study of private well water, conducted in collaboration with the Centers for Disease Control and Prevention, showed that drought may lead to elevated levels of naturally occurring arsenic and that the longer a drought lasts, the higher the probability of arsenic concentrations exceeding the EPA's standard for drinking water (United States Geological Survey [USGS], 2021).

Additional details related to climate change data that has been collected using the Cal-Adapt tool are included in Chapter 3.

6.11 Energy Intensity

The 2020 UWMP guidebook requests that water suppliers provide information on the energy required to produce and distribute their water supply. Water energy intensity is the total amount of energy on a per acre-foot basis associated with water management processes occurring within the City's operational control. The City has selected to report its energy intensity using the total utility approach Option B. In 2020, the City produced 4,077 AF of water within its service area. The energy needed across the City's potable water system in 2020 was 1,610,957 kilowatt hours (kWh). The energy intensity analysis is located in Appendix G. The City's 2020 energy intensity is estimated at 1,213 kWh/MG.

Chapter 7

WATER SERVICE RELIABILITY AND DROUGHT RISK ASSESSMENT

The UWMPA requires that the UWMP address the reliability of the agency's water supplies. This includes supplies that are vulnerable to seasonal or climatic variations. In addition, an analysis must be included to address supply availability in a single-dry year and in a five-consecutive-year drought.

> *10635 (a) Every urban water supplier shall include, as part of its urban water management plan, an assessment of the reliability of its water service to its customers during normal, dry, and multiple dry water years. This water supply and demand assessment shall compare the total water supply sources available to the water supplier with the long-term total projected water use over the next 20 years, in five-year increments, for a normal water year, a single dry water year, and a drought lasting five consecutive water years. The water service reliability assessment shall be based upon the information compiled pursuant to Section 10631, including available data from state, regional, or local agency population projections within the service area of the urban water supplier.*

7.1 Introduction

This section examines the reliability of the water supply available to the City, under both normal and dry conditions. When assessing the adequacy of the water supply, the City's current water system is limited by the pumping and water system storage capacity. If warranted by demand, it is assumed the City would construct new wells and supply facilities. When assessing the vulnerability of the water supply due to seasonal or climatic changes, the City groundwater supply has not been impacted in the past.

Table 7-0 contains a summary of factors affecting water supply reliability and that may pose an opportunity for inconsistency in supply. Water quantity represents the potential supply limitation of the pumping capacity. Climatic factors are selected as the City would be required to comply with state mandates for conservation.

Submittal Table 7-0: Factors Resulting in Inconsistency of Supply							
Source Information		Source Limitation					
Water Supply Source	Specific Source Name	Water Quantity (1)	Legal	Environmental	Water Quality (2)	Climatic (3)	Additional Information
Groundwater	Sacramento Valley Basin Red Bluff Subbasin	Yes	-	-	No	Yes	-

NOTES:
1. Limited by pumping capacity.
2. Water quality factors may require additional treatment of the groundwater.
3. The City would be required to comply with state mandates for conservation.

7.2 Constraints of Water Sources

> *10631 (b)(1) A detailed discussion of anticipated supply availability under a normal water year, single dry year, and droughts lasting at least five years, as well as more frequent and severe periods of drought, as described in the drought risk assessment. For each source of water supply, consider any information pertinent to the reliability analysis conducted pursuant to Section 10635, including changes in supply due to climate change*

There are two aspects of supply reliability that can be considered. The first relates to immediate service needs and is primarily a function of the availability and adequacy of the supply facilities. The second aspect is climate-related and involves the availability of water during mild or severe drought periods.

There are a variety of factors that can affect water supply reliability. The factors that might result in supply reliability issues include water quality and climatic changes.

7.2.1 Water Supply Quality

The UWMPA requires that the UWMP include a discussion of water quality impacts on the reliability of an agency's water supplies.

In general, groundwater quality in the Red Bluff Subbasin is very good, and as such has a limited effect on the City's ability to provide its service area with a reliable source of high quality drinking water. Nor does it have a significant effect on water management strategies or supply reliability. California DWR Bulletin 118 contains a detailed description of the Red Bluff Subbasin impairments. Impairments include high magnesium, total dissolved solids (TDS), calcium, adjusted sodium adsorption ratio (ASAR), and phosphorus. The groundwater is not altered or treated prior to distribution.

The City's drinking water meets all applicable water quality regulations. The Annual Consumer Confidence Report (CCR) for the City's service area in year 2020 can be found in Appendix H.

7.2.2 Climate Change

Climate change is likely to add uncertainties to supply planning and future supply availability. The severe and prolonged drought that began in 2012 has been a test of the City's ability to prepare for, and adapt to, the effects of climate change. Considering reductions in per capita use and projected demands, the City continues to balance a cautious optimism with a long-term strategy for sustainable sources of supply.

As stated in Chapter 4, the altered climate patterns in California creating hotter days and longer heat waves will increase customer water use and evaporative water losses. Extended drought periods are expected to become both more frequent, and more severe, which could lead to reduced surface water flows, reduced snowpack, and less groundwater availability for the City. Higher temperatures and decreased precipitation will result in drought, making wildfires more frequent, more severe, and harder to fight with less water supplies. Wildfires, followed by flooding, mean more landslides and mudslides, further impacting water supply reliability. Creating defensible space as well as slope stabilization and erosion prevention near critical infrastructure will be important for preserving supplies.

Efficient use of water is paramount in the City's effort to adapt to climate change. Technology and equipment to appropriately monitor and manage water supplies will be critical. Ensuring that pipes are appropriately sized and upgraded to minimize water loss is equally important. Redundancy in source of supply will provide operational flexibility in the event supplies are interrupted by fire, floods, earthquakes, or drought. Climate change effects such as drought, wildfire, and temperature fluctuations may all contribute to a degradation of water quality over time.

7.2.3 Potential Alternative Sources

The City currently utilizes local groundwater as its sole water supply source. The City anticipates it can supply all of its water demands with groundwater from the Red Bluff Subbasin through the planning horizon. The City has not evaluated any potential alternative sources, such as purchased water, imported water, or surface water. As stated in Chapter 6, the City has not identified any transfer or exchange opportunities, or opportunities related to stormwater or desalinated water.

7.3 Water Supply Reliability by Type of Year

This section considers the City's water supply reliability during three water scenarios: average year, single-dry year, and five-consecutive-year drought. An average year is also referred to as a "normal" year.

These scenarios are defined as follows:

- Average Year: A year, or an averaged range of years, that most closely represents the average water supply available to the City. Generally, a year in the historical sequence that most closely represents median runoff levels and patterns. It is defined as the median runoff over the previous 30 years or more. This median is recalculated every 10 years.
- Single-Dry Year: The year that represents the lowest water supply available to the City. Generally considered to be the lowest annual runoff for a watershed since the

water-year beginning in 1903. Suppliers should determine this for each watershed from which they receive supplies.

- Five-Consecutive-Year Drought: The period that represents the driest five-year historical sequence for the City. Generally considered to be the lowest average runoff for a five-consecutive-year period for a watershed since 1903.

7.3.1 Basis of Water Year Data

Since the source for the City is exclusively groundwater, the runoff tables are not deemed as suitable for selecting year types since the timing for recharge would vary. Groundwater elevation data were analyzed for CASGEM Well No. 22257 (Master Site Code 401835N1222319W001) located in the Red Bluff Subbasin in Red Bluff. The ground surface elevation is 261.9 feet and the reference point (RP) elevation is 262 feet. Data was available from 1952 through 2021. The median groundwater elevation over the 69 years (1952-2021) was 243.0 feet. The 69 year minimum was 233.7 feet in 2014. Groundwater elevation records were reviewed for the years 2000 to 2020. Using the median over the 69 years, the average year would be 2011 (average elevation 241.3). The single-dry year would be 2014 and the five-consecutive-year drought years would be 2000 through 2004.

A prolonged drought has historically had little extended effect upon the availability of supply since the only source is groundwater. Data demonstrates that periods of drought have resulted in short-term increases in the depth to groundwater due to the slower than normal aquifer recharge. Historically, the water table has recharged and depth to groundwater returned to average levels in the years following periods of drought. To date, the temporary increase in depth to groundwater has not impacted the City's ability to supply water, nor has there been any significant impact upon the well water quality. The volume available and supply by water year type cannot be accurately determined since the water pumped is based on demand that includes the conservation measures implemented that year. Therefore, there is no anticipated difference in supply and demand. This may change in the 2025 UWMP based on the impact of drought on groundwater levels and any changes in groundwater management that could occur in the future.

As described above, the specific years identified for average, single-dry, and five consecutive-year drought water years presented in Table 7-1 were developed based on the CASGEM Program historical groundwater level records for the Red Bluff Subbasin. As discussed above, the available supply cannot be quantified. Therefore, the box indicating that the quantification of available supplies is not compatible with Table 7-1 has been checked, but the water type years have been included.

Submittal Table 7-1 Retail: Basis of Water Year Data (Reliability Assessment)			
Year Type	**Base Year** If not using a calendar year, type in the last year of the fiscal, water year, or range of years, for example, water year 2019-2020, use 2020	**Available Supplies if Year Type Repeats**	
		☑	Quantification of available supplies is not compatible with this table and is provided elsewhere in the UWMP. Location _Section 7.3.1_____
		☐	Quantification of available supplies is provided in this table as either volume only, percent only, or both.
		Volume Available *	**% of Average Supply**
Average Year	2011		100%
Single-Dry Year	2014		
Consecutive Dry Years 1st Year	2000		
Consecutive Dry Years 2nd Year	2001		
Consecutive Dry Years 3rd Year	2002		
Consecutive Dry Years 4th Year	2003		
Consecutive Dry Years 5th Year	2004		
Supplier may use multiple versions of Table 7-1 if different water sources have different base years and the supplier chooses to report the base years for each water source separately. If a Supplier uses multiple versions of Table 7-1, in the "Note" section of each table, state that multiple versions of Table 7-1 are being used and identify the particular water source that is being reported in each table.			
***Units of measure (AF, CCF, MG)** must remain consistent throughout the UWMP as reported in Table 2-3.*			

7.4 Water Service Reliability Assessment

> *10635(a). Every urban water Supplier shall include, as part of its urban water management plan, an assessment of the reliability of its water service to its customers during normal, dry, and multiple dry water years. This water supply and demand assessment shall compare the total water supply sources available to the water supplier with the long-term total projected water use over the next 20 years, in five-year increments, for a normal water year, a single dry water year, and a drought lasting five consecutive water years. The water service reliability assessment shall be based upon the information compiled pursuant to Section 10631, including available data from state, regional, or local agency population projections within the service area of the urban water supplier.*

The projected demand and supplies are compared in 5-year increments in Table 7-2, Table 7-3, and Table 7-4. The demand is based on the total water use from Table 4-3. As described above, there is no anticipated difference in supply and demand.

7.4.1 Normal Year

Table 7-2 provides an estimate of the projected normal year supply and demand totals. As shown in Table 7-2, the City is anticipated to have sufficient water production capabilities to support the growth of the community.

Submittal Table 7-2 Retail: Normal Year Supply and Demand Comparison					
	2025	2030	2035	2040	2045 *(Opt)*
Supply totals *(autofill from Table 6-9)*	4,574	4,665	4,757	4,852	4,948
Demand totals *(autofill from Table 4-3)*	4,574	4,665	4,757	4,852	4,948
Difference	0	0	0	0	0
NOTES: Units of measure in this UWMP are acre-feet (AF).					

7.4.2 Single-Dry Year

Table 7-3 provides an estimate of the projected single-dry year supply and demand totals. Demand reductions due to water shortage stage rationing measures are not included in the single-dry year demand estimates.

Submittal Table 7-3 Retail: Single Dry Year Supply and Demand Comparison					
	2025	2030	2035	2040	2045 (Opt)
Supply totals*	4,574	4,665	4,757	4,852	4,948
Demand totals*	4,574	4,665	4,757	4,852	4,948
Difference	0	0	0	0	0
***Units of measure (AF, CCF, MG)** must remain consistent throughout the UWMP as reported in Table 2-3.*					
NOTES: Units of measure in this UWMP are acre-feet (AF).					

7.4.3 Five-Consecutive-Year Drought

Table 7-4 provides an estimate of the projected five-consecutive-year drought supply and demand totals. Demand reductions due to water shortage stage rationing measures are not included in the five-consecutive-year drought demand estimates.

Submittal Table 7-4 Retail: Multiple Dry Years Supply and Demand Comparison						
		2025*	2030*	2035*	2040*	2045* (Opt)
First year	Supply totals	4,574	4,665	4,757	4,852	4,948
	Demand totals	4,574	4,665	4,757	4,852	4,948
	Difference	0	0	0	0	0
Second year	Supply totals	4,574	4,665	4,757	4,852	4,948
	Demand totals	4,574	4,665	4,757	4,852	4,948
	Difference	0	0	0	0	0
Third year	Supply totals	4,574	4,665	4,757	4,852	4,948
	Demand totals	4,574	4,665	4,757	4,852	4,948
	Difference	0	0	0	0	0
Fourth year	Supply totals	4,574	4,665	4,757	4,852	4,948
	Demand totals	4,574	4,665	4,757	4,852	4,948
	Difference	0	0	0	0	0
Fifth year	Supply totals	4,574	4,665	4,757	4,852	4,948
	Demand totals	4,574	4,665	4,757	4,852	4,948
	Difference	0	0	0	0	0
Sixth year *(optional)*	Supply totals					
	Demand totals					
	Difference	0	0	0	0	0
***Units of measure (AF, CCF, MG)** must remain consistent throughout the UWMP as reported in Table 2-3.*						
NOTES: Units of measure in this UWMP are acre-feet (AF).						

7.4.4 Hazard Mitigation Plan

The County's Multi-Jurisdictional Hazard Mitigation Plan is included as Appendix I. Refer to Section 8.7 for additional details.

7.5 Drought Risk Assessment

> *10635(b) Every urban water supplier shall include, as part of its urban water management plan, a drought risk assessment for its water service to its customers as part of information considered in developing the demand management measures and water supply projects and programs to be included in the urban water management plan. The urban water supplier may conduct an interim update or updates to this drought risk assessment within the five-year cycle of its urban water management plan update. The drought risk assessment shall include each of the following…*
>
> *(3) A comparison of the total water supply sources available to the water supplier with the total projected water use for the drought period. [Emphasis added]*
>
> *(4) Considerations of the historical drought hydrology, plausible changes on projected supplies and demands under climate change conditions, anticipated regulatory changes, and other locally applicable criteria.*

CWC Section 10635(b) is a new requirement for the 2020 UWMPs where suppliers are required to prepare a DRA with descriptions of data and methods used, basis for the supply shortage conditions, determination of the reliability of sources, and a comparison of the total water supplies and uses during the drought. The DRA will be submitted every five years in addition to conducting an annual water supply and demand assessment. Evaluation for the DRA is based on the five dry years with consideration of climate changes, regulations, and other local criteria. In the event of stressed hydrologic conditions, suppliers will consider management of their water supplies in relation to customer usage, identify potential system vulnerabilities, and provide explanations of assumptions and decisions on which the analysis was based.

A summary of the City's water supply DRA from 2021 through 2025 is summarized in Table 7-5. Table 7-5 contains the projected potable and recycled water demands from 2021 through 2025. As described above, there is no anticipated difference in supply and demand. Use reduction savings are not quantified in Table 7-5 (refer to Table 8-3).

Submittal Table 7-5: Five-Year Drought Risk Assessment Tables to address Water Code Section 10635(b)

2021	Total
Total Water Use	4,503
Total Supplies	4,503
Surplus/Shortfall w/o WSCP Action	0
Planned WSCP Actions (use reduction and supply augmentation)	
WSCP - supply augmentation benefit	0
WSCP - use reduction savings benefit	0
Revised Surplus/(shortfall)	0
Resulting % Use Reduction from WSCP action	0%

2022	Total
Total Water Use	4,520
Total Supplies	4,520
Surplus/Shortfall w/o WSCP Action	0
Planned WSCP Actions (use reduction and supply augmentation)	
WSCP - supply augmentation benefit	0
WSCP - use reduction savings benefit	0
Revised Surplus/(shortfall)	0
Resulting % Use Reduction from WSCP action	0%

2023	Total
Total Water Use	4,538
Total Supplies	4,538
Surplus/Shortfall w/o WSCP Action	0
Planned WSCP Actions (use reduction and supply augmentation)	
WSCP - supply augmentation benefit	0
WSCP - use reduction savings benefit	0
Revised Surplus/(shortfall)	0
Resulting % Use Reduction from WSCP action	0%

2024	Total
Total Water Use	4,556
Total Supplies	4,556
Surplus/Shortfall w/o WSCP Action	0
Planned WSCP Actions (use reduction and supply augmentation)	
WSCP - supply augmentation benefit	0
WSCP - use reduction savings benefit	0
Revised Surplus/(shortfall)	0
Resulting % Use Reduction from WSCP action	0%

2025	Total
Total Water Use	4,574
Total Supplies	4,574
Surplus/Shortfall w/o WSCP Action	0
Planned WSCP Actions (use reduction and supply augmentation)	
WSCP - supply augmentation benefit	0
WSCP - use reduction savings benefit	0
Revised Surplus/(shortfall)	0
Resulting % Use Reduction from WSCP action	0%

7.6 Regional Supply Reliability

> *10620 (f) an urban water supplier shall describe in the plan water management tools and options used by that entity that will maximize resources and minimize the need to import water from other regions.*

The City is maximizing the use of local water resources (groundwater) and reducing waste through the implementation of DMMs. The City's efforts help to minimize the need to purchase water from other agencies and construct new wells.

Chapter 8

WATER SHORTAGE CONTINGENCY PLAN

In response to the severe drought of 2012-2016, new legislation in 2018 created a WSCP mandate replacing the water shortage contingency analysis under former law. The new requirements are more prescriptive to have consistency throughout California. The City Code Conservation and Rationing Stages Section 24.18, included in Appendix J, serves as the City's WSCP and may be amended as needed without amending this 2020 UWMP.

In the event any provision of this Chapter or the Conservation and Rationing Stages Section (Appendix J) conflicts or overlaps with any mandatory State regulation related to water conservation, the most stringent shall apply.

8.1 WSCP Overview

The City's WSCP details the stages of actions to be taken during a reduction in available water supply. These actions are broken up based upon six possible stages of water shortage. Reductions in supply are most frequently associated with drought, but could also be the result of flooding, major fire emergencies, earthquakes, regional power outages, water contamination, and any other situation that could impact the City's water supply.

The goal of a WSCP is to have a procedure for managing and mitigating shortages allowing the City to respond in an efficient and timely manner. Water shortage response actions include demand reduction, supply augmentation, operational changes, and mandatory prohibitions to address shortage levels. The following sections summarize the City's water shortage stages and the measures employed during each stage, as outlined in the WSCP.

8.2 Stages of Action

The stages of action in response to water supply shortages, including greater than 50 percent reduction in water supply are summarized in Table 8-1. Detailed descriptions of each stage of action are included in the Conservation and Rationing Stages Section (Appendix J). Stage I is the normal operating stage for the water system and is always in effect.

Submittal Table 8-1 Water Shortage Contingency Plan Levels		
Shortage Level	**Percent Shortage Range**	**Shortage Response Actions** (*Narrative description*)
1	Up to 10%	Conservation Measures
2	Up to 20%	Moderate Water Shortage
3	Up to 30%	Serious Water Shortage
4	Up to 40%	Severe Water Shortage
5	Up to 50%	Critical Water Shortage
6	>50%	Disaster Shortage/Rationing (See Note 1)
NOTES: (1) Major catastrophe or contamination of the water supply including flooding, major fire emergencies, earthquakes, regional power outages, water contamination, and emergencies other than water shortage.		

For planning purposes, the City has assumed that the above stages could result in water shortages created by a loss of pumping capacity caused by either well or distribution system failure or via state mandate to reduce groundwater pumping.

8.3 Demand Reduction

Table 8-2 contains demand reduction actions and the water shortage stage when they are enacted. These prohibitions are detailed in the Conservation and Rationing Stages Section (Appendix J).

Submittal Table 8-2: Demand Reduction Actions				
Shortage Level	Demand Reduction Actions ***Drop down list*** *These are the only categories that will be accepted by the WUEdata online submittal tool. Select those that apply.*	How much is this going to reduce the shortage gap? *Include units used (volume type or percentage)*	Additional Explanation or Reference *(optional)*	Penalty, Charge, or Other Enforcement? ***For Retail Suppliers Only*** *Drop Down List*
Add additional rows as needed				
I-VI	Landscape - Restrict or prohibit runoff from landscape irrigation	<10%		Yes
I-VI	Landscape - Limit landscape irrigation to specific times	<5%		Yes
I-VI	Landscape - Prohibit certain types of landscape irrigation	<10%		Yes
III-VI	Landscape - Limit landscape irrigation to specific days	<5%		Yes
VI	Landscape - Prohibit all landscape irrigation	<30%		Yes
V-VI	Landscape - Other landscape restriction or prohibition	<5%	See Note 1.	Yes
III-VI	CII - Lodging establishment must offer opt out of linen service	<2%		Yes
III-VI	CII - Restaurants may only serve water upon request	<1%		Yes
I-VI	Other water feature or swimming pool restriction	<5%	See Note 2.	Yes
III-VI	Water Features - Restrict water use for decorative water features, such as fountains	<5%		Yes
IV-VI	Other water feature or swimming pool restriction	<5%		Yes
I-VI	Other - Customers must repair leaks, breaks, and malfunctions in a timely manner	<5%		Yes
I-VI	Other - Require automatic shut of hoses	<5%		Yes
I-VI	Other - Prohibit use of potable water for washing hard surfaces	<5%		Yes
IV-VI	Other - Prohibit vehicle washing except at facilities using recycled or recirculating water	<5%		Yes
V-VI	Other	<5%	See Note 3.	Yes
NOTES: (1) No new landscape shall be installed. Exceptions are replacing landscaping with drought tolerant landscape material. (2) Use of non-recirculated water in a fountain or other decorative water feature is prohibited. (3) No new residential development shall be permitted. Building permit applications may proceed with a deferral of landscape installation.				

On May 9, 2016, the Governor of California issued an Executive Order declaring the following practices be permanently prohibited:

- Hosing off sidewalks, driveways, and other hardscapes.
- Washing automobiles with hoses not equipped with a shut-off nozzle.
- Using non-recirculated water in a fountain or other decorative water feature.
- Watering lawns in a manner that causes runoff, or within 48 hours after measurable precipitation.
- Irrigating ornamental turf on public street medians.

8.4 Supply Augmentation

The UWMPA requires that the UWMP include an urban water shortage contingency analysis that addresses methods to reduce consumption. Table 8-3 contains other actions by water shortage stage. There is very little opportunity for the City to augment supply as they are wholly dependent on local groundwater. As such, the City is heavily reliant on demand reduction measures and operational changes to address water shortages.

Submittal Table 8-3: Supply Augmentation and Other Actions			
Shortage Level	Supply Augmentation Methods and Other Actions by Water Supplier ***Drop down list*** *These are the only categories that will be accepted by the WUEdata online submittal tool*	How much is this going to reduce the shortage gap? *Include units used (volume type or percentage)*	Additional Explanation or Reference *(optional)*
Add additional rows as needed			
I-VI	Improve Customer Billing	<5%	
I-VI	Other Actions (describe)	<5%	Offer Water Use Surveys
I-VI	Other Actions (describe)	<5%	Decrease Line Flushing
I-VI	Other Actions (describe)	<1%	Reduce System Water Loss
II-VI	Expand Public Information Campaign	<5%	
II-VI	Other Actions (describe)	<5%	Increase Frequency of Meter Reading
III-VI	Other Actions (describe)	<5%	Increase Water Waste Patrols
V-VI	Other Actions (describe)	<5%	Moratorium or Net Zero Demand Increase on New Connections

The effectiveness of the shortage response actions and the extent to which it reduces the gap between supply and demand can be determined through monitoring. The metered data will be analyzed on a month-by-month basis to monitor the effectiveness of reduction actions for each shortage level declarations.

8.5 Annual Water Supply and Demand Assessment Procedures

The annual water supply and demand assessment identifies key data and methods for determining the supply reliability each year. The annual assessment is due to DWR on or before July 1 of each year, as required by CWC Section 10632.1. The assessment assumes the year following the planning calendar year is a dry year.

The annual supply and demand assessment will include:

- Anticipated shortage.
- Triggered shortage response actions.
- Compliance and enforcement actions.
- Communication actions.
- Review of assets.

8.5.1 Timeline

The timeline for the annual supply and demand assessment is listed below and is subject to change.

- Preparation of draft supply and demand analysis – February.
- Submit and present assessment to City Manager – March.
- Update and finalize assessment – April.
- Receive City Manager approval – May or June.
- Annual supply and demand assessment – Due July 1.

8.5.2 Decision-Making Process

The steps in the decision-making process that the City will use each year to determine and subsequently report to the state are listed below.

1. Determine supply available, infrastructure constraints, and expected demand.
2. Compare supply and demand and decide on the water supply reliability for the current year and one dry year.
3. Present the findings and recommendations of the Annual Assessment Report to the City Manager.
4. Prepare and submit the Annual Assessment Report to the state.
5. Determine the shortage levels and other conservation matters, including but not limited to any restrictions in the number of new service connections allowed annually for any or all portions of the City service area.
6. Director of Public Works or a designated representative implements the provisions of the WSCP.

8.5.3 Key Data and Methodologies

The key data inputs and assessment methodology used to evaluate the City's water supply reliability for the current year and one dry year, include the following:

- Current year unconstrained demand, considering weather, growth, building permit trends, and other influencing factors.
- Current year available supply, considering hydrological and regulatory conditions in the current year and one dry year. The annual supply and demand assessment may consider more than one dry year solely at the discretion of the City.
- Existing infrastructure capabilities and plausible constraints.
- A defined set of locally applicable evaluation criteria that are consistently relied upon for each annual water supply and demand assessment.
- A description and quantification of each source of water supply.
- The California Drought Monitor.
- Precipitation on a calendar and weather year basis.
- Any potential State or regional actions related to drought and water use restrictions.

8.5.3.1 Water Supply

The annual assessment will evaluate the current year available and one subsequent dry year. The available water supplies for the City shall be quantified each year by summing the capacity of each groundwater well. Potential production constraints, hydrological, and regulatory conditions will be considered.

8.5.3.2 Unconstrained Customer Demand

Water demand/consumption for the previous year shall be quantified by summing the meter usage of each customer class for the previous year. Customer water demands shall be projected for the upcoming year based on the previous year's water consumption and the projected population growth.

8.5.3.3 Planned Water Use for Current Year Considering Dry Subsequent Year

The City has not historically exceeded their basin yield. However, a subsequent dry year will be considered during the assessment. The dry year will be equivalent to the lowest water supply available to the City.

8.5.3.4 Infrastructure Considerations

Infrastructure projects anticipated for the upcoming year that could impact water supply production (e.g., new groundwater well, etc.) will be evaluated for the timeframe the projects will impact supply. The available water supply will be increased or reduced accordingly for each month.

8.5.3.5 Evaluation Criteria

Evaluation of the appropriate shortage level will include, but not be limited to, the following considerations:

1. Current groundwater levels.
2. Recent trends in groundwater levels.
3. Other hydrological or other local conditions indicative of water supply available.
4. The previous winter's precipitation.
5. The previous year's water demand.
6. Current demand and anticipated demand for water by City customers.
7. Current and anticipated production capacity of City water sources.
8. Damage to one or more of the City's water system.
9. Anticipated ability to optimize use of above-ground water storage.
10. Predicted weather patterns.
11. Water content of the snowpack.
12. Climate change impacts.
13. California Drought Monitor.
14. Current or pending state and regional water use efficiency or drought related actions.

If the available water supply is greater than the anticipated customer demand for the upcoming year, then the City does not need to take any further action. If the anticipated customer demand for the upcoming year is greater than the available water supplies, or that additional conditions exist (such as a State declared drought emergency), the City can initiate water conservation actions as detailed in the WSCP.

8.5.3.6 Triggering Mechanisms for Shortage Levels

The triggering mechanisms to use as guidelines for the shortage levels include:

- System malfunction resulting in up to the percent shortage of a level or catastrophic interruption of water supplies.
- City or state declaration due to drought.
- Federal, state, or local disaster declaration that may impact water supplies.
- City determination.
- Unplanned City water system maintenance.

The City may impose any of the shortage levels based upon facts and circumstances which may not have been otherwise anticipated in this chapter or WSCP.

8.6 Catastrophic Supply Intervention

The UWMPA requires that the City develop stages of action to be undertaken during a catastrophic interruption of water supply or the City's water treatment facilities that could include flooding, major fire emergencies, regional power outage, an earthquake, water contamination, and acts of sabotage. In response to these possibilities, the City developed an Emergency Response Plan (ERP) (December 2009), which identifies the following service goals:

- To continue minimum service levels and mitigate the public health risks from drinking water contamination that may occur during a disaster or other emergency event.
- To provide reliable water service and minimize public health risks from unsafe drinking water during those events.

The City will take the following actions in the event of a catastrophic supply interruption:

- Initiate full ERP activation.
- Follow State Incident Command System.
- Coordinate alternative water supply, as needed, or consider alternate (interim) treatment schemes.
- Issue public notice and issue follow-up media press releases.

The City is in the process of completing an ERP update.

8.7 Hazard Mitigation Plan

The City owns, maintains, and operates water supply wells, storage tanks, and water line throughout the City. All components of the City's water system are vulnerable to seismic activity.

The County's Multi-Jurisdictional Hazard Mitigation Plan is included as Appendix I. The Hazard Mitigation Plan may be updated at any time. The most recent Hazard Mitigation Plan shall apply to the current WSCP.

8.8 Revenue and Expenditure Impacts

The City is fully metered (with the exception of 8 unmetered commercial/institutional connections) and City customers are billed volumetrically. Therefore, the City may experience a decrease in revenue with reduced water sales during a water shortage. Although the variable costs of supplying water will be reduced as water usage decreases, the fixed costs will remain constant. The variable costs are linked to the operation of the wells (power and usage-based maintenance). The fixed costs are independent of well operation and include the debt for the capital improvement associated with the development of the wells and salaries for maintenance and operations personnel.

Additional costs during water shortage situations could be associated with increased monitoring, efficiency incentives, and outreach, namely due to an increase in the hours required to monitor customer accounts and enforce reduction actions. The additional costs associated with this effort, however, are not expected to significantly impact revenues and expenditures.

To overcome a reduction in revenue due to a water shortage the City could adjust the water rates or develop a reserve fund.

8.8.1 Drought Rate Structures and Surcharges

The City's water rates and charges does not include drought rate structures or surcharges.

8.8.2 Use of Financial Reserves

The City has an annual General Reserve Fund established that can be utilized for a financially qualifying event, such as providing for the continued operation of the water system in the event of a decline in water service revenue.

8.8.3 Other Measures

The City will consider postponement of capital improvements and operational measures to temporarily reduce power and chemical costs as a means to overcome impacts from water shortage contingency planning to revenues and expenditures.

8.9 Monitoring and Reporting

The City is fully metered (with the exception of 8 unmetered commercial/institutional connections) and City customers are billed volumetrically. The City uses these meters to monitor City-wide use, individual customer use, and track actual reductions in water use. By periodic review of customer water use, the City is able to track the effectiveness of the shortage level reduction actions, educate customers regarding water use, and also identify leaks and other areas where additional conservation may be possible.

Monitoring will be used to ensure appropriate data is collected, tracked, and analyzed for purposes of determining:

- Customer compliance.
- Effectiveness of reduction actions.
- Potential leaks in the distribution system.
- Accurate monthly demand data for the annual supply and demand assessment.

Monitoring and reporting key water use metrics is fundamental to water supply planning and management and will be a critical part of the annual supply and demand assessment. Monitoring is also essential to ensure that the shortage level response actions achieve their intended water use reduction purposes or to determine if improvements or new actions are needed. Monitoring for customer compliance tracking is useful in enforcement actions. It should be noted that timing, frequency, and metrics will likely be variable, depending on the water shortage level and enforcement action logistics.

The City can compare meter data with water use in prior months and during non-drought years to determine if it is achieving specific percentage goals for water consumption associated with the drought response levels. If the goals are not being met, the City can implement additional shortage response actions at any time.

8.10 WSCP Refinement Procedures

To evaluate the effectiveness of the WSCP and to ensure that procedures and practices developed under the WSCP are adequate and are being implemented properly, the City will perform audits of the program on a periodic basis, at least every 5 years in coordination with the UWMP update.

The City will perform a thorough review of monitoring and reporting program data to determine the effectiveness of the reduction actions and whether the procedures and provisions of the WSCP need to be revised. The review will compare the expected percent demand reduction against actual reductions and shortage response actions.

City staff, customers, and other interested parties may have suggested actions or procedures to refine the WSCP. The City will evaluate these on a case-by-case basis for incorporation into the WSCP.

Chapter 9

DEMAND MANAGEMENT MEASURES

The UWMPA requires that the UWMP involve a comprehensive discussion of the agency's water conservation measures.

> *10631 (f)(A)… The narrative shall describe the water demand management measure that the supplier plans to implement to achieve its water use targets pursuant to Section 10608.30.*
>
> *(B) The narrative pursuant to this paragraph shall include descriptions of the following water demand management measures:*
>
> *(i) Water waste prevention ordinances*
>
> *(ii) Metering*
>
> *(iii) Conservation pricing*
>
> *(iv) Public education and outreach*
>
> *(v) Programs to assess and manage distribution system real loss*
>
> *(vi) Water conservation program coordination and staffing support.*
>
> *(vii) Other demand management measures that have a significant impact on water use as measured in gallons per capita per day, including innovative measure, if implemented.*

This chapter presents details of the DMMs contained in the UWMPA, as well as the City's existing and planned efforts to further develop their water conservation program. The City is committed to water conservation and has implemented several policies and on-going programs that promote and encourage water conservation.

The UWMPA was amended in 2014 to streamline DMMs from 14 specific measures to 6 more general requirements and an "other" category. Brief descriptions of the City's current and planned implementation of DMMs are included in the following sections. The UWMPA did not make any changes to the DMM requirements for the 2020 UWMP.

9.1 Water Waste Prevention Ordinances

This DMM involves adoption of an ordinance prohibiting water waste. The City Code contains the Prevention of Waste Ordinance (Section 24.11) (see Appendix K). This Water Waste Prevention Ordinance is in place at all times and is not dependent upon a water shortage for implementation. See Chapter 8 and the Conservation and Rationing Stages Section (Appendix J) for detailed information on stages of action, prohibitions of end uses, and penalties.

9.1.1 Implementation over the Past Five Years

City staff contacts residents for any incidents of water waste and provides a verbal warning in addition to education about efficient water use and conservation measures. City staff does not keep records of verbal warnings.

9.1.2 Planned Implementation

The City will continue to enforce this DMM. The effectiveness of this DMM will be evaluated by the frequency of incidents. If an area is determined to have excessive incidents, the City may implement a specific public outreach program informing the public about the Water Waste Prevention Ordinance.

9.2 Metering

Installing water meters and billing for actual water use provides a strong incentive for customers to use less water and equalizes service cost for each customer to their actual use (i.e., high water users would pay a more equitable share of the system costs). Water metering can reduce exterior landscape water use and can also achieve a modest reduction in interior water use.

9.2.1 Implementation over the Past Five Years

All City customers are metered (with the exception of 8 unmetered commercial/institutional connections). The City has advanced metering infrastructure (AMI) and automatic meter reading (AMR).

9.2.2 Planned Implementation

The best way to evaluate the effectiveness of metering is periodic review of customer water use. Customer water use is reviewed when a variation of typical billing is experienced. Customer records are pulled, historic use is evaluated, meter calibration is checked, and if warranted, potential private leak sources are investigated.

9.3 Conservation Pricing

Water conservation is encouraged through a pricing system that rewards customers who use less water with financial incentives, while high water users are charged a higher rate. Often this is implemented through a tiered pricing system.

9.3.1 Implementation over the Past Five Years

The City has an increasing-tier water rate schedule (rates effective July 15, 2012). These metered water rates consist of a monthly rate based on meter size as well as a rate per 100 cubic feet (CF) based on usage (see Appendix L).

The City bills residential user classes for sewer service on a flat rate schedule. Commercial user classes are billed at a rate per 100 CF based on usage (see Appendix L).

9.3.2 Planned Implementation

The City may consider charging a sewer service rate based on water consumption for all user classes.

9.4 Public Education and Outreach

Examples for public education and outreach for water demand management can include coordination with other agencies and provision of programs promoting water conservation, speakers for the media or community groups, school education programs, public service announcements, water conservation bill inserts, information booths at public events, websites, newsletters and newspaper articles, rebates, and daily water use comparisons on customer's bills.

9.4.1 Implementation over the Past Five Years

The City has not organized any public events or distributed documents to promote water conservation over the past five years.

The City posted public notices of implementation of conservation measures at City Hall on October 9, 2019, and July 9, 2021. The notices were also promoted through press releases, on the City's website (www.cityofredbluff.org), and on social media.

In 2021, City staff participated in monthly meetings with the multi-jurisdictional Drought Task Force led by the Tehama County Sheriff's Department Emergency Operations Center. Certain City property were periodically used for bottled water distribution and drought response information. City staff assisted the Sheriff's Department with providing information to residents in the surrounding areas of the City.

9.4.2 Planned Implementation

Public information can be one of the best tools to conserve water. The City will continue to promote water conservation in the Red Bluff community. The Water Conservation Coordinator could enhance the program by coordinating additional opportunities for community speakers and special events. Additionally, the Building Department could provide additional information/coordination during building permit phase for new and older homes.

9.5 Programs to Assess and Manage Distribution System Real Loss

This DMM focuses on the water distribution system itself, and includes water audits, leak detection, and repair. The first step in a water audit is relatively straightforward, involving comparison of the amount of water produced with the amount of water delivered to customers. The difference is termed "unaccounted water," which includes actual losses (leaks) in the distribution system, authorized but unmetered use (e.g., hydrant flushing and firefighting), unauthorized water use, and meter error.

9.5.1 Implementation over the Past Five Years

The City is continuously monitoring the distribution system for leaks. Any leaks found are reported immediately to the Water Division and repairs are scheduled or coordinated with City staff and private owners. The City performs surveys on water mains and service lines on an ongoing basis.

In April 2018, approximately 20 feet of 18 inch water main was replaced due to a rupture. Other leaks and subsequent repairs were minor in nature (ex. clamps, bell splits, removal and replacement of greater than 3 foot sections, etc.).

9.5.2 Planned Implementation

The City will work to improve record keeping of repairs and pipeline replacement, including the number of leaks repaired, their location, and the method in which they were repaired by City Staff.

The best way to evaluate the effectiveness of this program is to compare water production data at the wells with water consumption from the City's customers. The City has metered all services (with the exception of 8 unmetered commercial/institutional connections) and installed flow meters on each of the water supply wells so that the production rate of each well can be

monitored regularly. As described in Section 4.3, the City's distribution system losses are quantified annually using the AWWA Method Guidance "Water Resources Water Audit Manual."

9.6 Water Conservation Program Coordination and Staffing Support

This DMM entails designating a Water Conservation Coordinator responsible for managing water conservation efforts, preparing conservation reports, promoting water conservation to agency staff and the community, and evaluating the results of efforts. The Water Conservation Coordinator tasks may include, but are not limited to, monthly tracking of production versus consumption, enforcement of water use restrictions, and implementation of conservation programs.

9.6.1 Implementation over the Past Five Years

The Public Works Director and Water Division Supervisor share the Water Conservation Coordinator responsibilities. The Public Works Director is Robin Kampmann (rkampmann@cityofredbluff.org). The Water Division Supervisor is Rick Lara (rlara@cityofredbluff.org). The program budget over the past five years is reported in Table 9-1.

Submittal Table 9-1: Water Conservation Program Over Past Five Years

Year	Program Budget
2016	$7,500
2017	$7,500
2018	$7,500
2019	$7,500
2020	$7,500

9.6.2 Planned Implementation

The effectiveness of this DMM is determined by the work performed by the Water Conservation Coordinator. The City may set up performance standards and goals and compare them with the results. The City may also educate community volunteers to aid the City in water conservation efforts.

9.7 Other Demand Management Measures

The City does not plan to implement rebate programs or other DMMs in the future.

9.8 Planned Implementation to Achieve Water Use Targets

The City has met their 2020 target of 274 gpcd. If the City can maintain water consumption rates, it will maintain conservation goals.

Chapter 10

PLAN ADOPTION, SUBMITTAL, AND IMPLEMENTATION

The City prepared this 2020 UWMP during the fall of 2021 through summer of 2022. A completed UWMP checklist is included in Appendix M.

10.1 Inclusion of All 2020 Data

The 2020 UWMPs must include the water use and planning data for the entire year of 2020. The City is reporting on a calendar year basis and therefore, 2020 data includes the months of January to December 2020.

10.2 Notice of Public Hearing

A public hearing was held on August 2, 2022, prior to adoption of the UWMP at City Hall Council Chambers, 555 Washington Street. Notices were provided to City of Tehama, Tehama County FCWCD, Caltrans, El Camino Irrigation District, Los Molinos Mutual Water Company, and the public. The public hearing provided an opportunity for the public to provide input to the plan before it was adopted. Additionally, the public hearing provided an opportunity for the City's customers, residents, and employees to learn and ask questions about the current and future water supply of the City.

10.2.1 Notice to Cities and Counties

> *10621(b) Every urban water supplier required to prepare a plan shall… at least 60 days prior to the public hearing on the plan… notify any city or county within which the supplier provides water supplies that the urban water supplier will be reviewing the plan and considering amendments or changes to the plan.*
>
> *10642… The urban water supplier shall provide notice of the time and place of hearing to any city or county within which the supplier provides water supplies. A privately owned water supplier shall provide an equivalent notice within its service area…*

The City does not provide water supplies to other cities or counties. City of Tehama and Tehama County FCWCD, as shown in Table 10-1, were provided 60-day notification (prior to the public hearing) that the City was in the process of preparing the 2020 UWMP. The 60-day notification letters are included in Appendix A. City of Tehama and Tehama County FCWCD were provided a notice of public hearing, including the time and location. The notices of public hearing are included in Appendix A.

Submittal Table 10-1 Retail: Notification to Cities and Counties		
City Name	60 Day Notice	Notice of Public Hearing
Add additional rows as needed		
Tehama	Yes	Yes
County Name *Drop Down List*	60 Day Notice	Notice of Public Hearing
Add additional rows as needed		
Tehama County	Yes	Yes

10.2.2 Notice to the Public

> *10642… Prior to adopting a plan, the urban water supplier shall make the plan available for public inspection… Prior to the hearing, notice of the time and place of hearing shall be published within the jurisdiction of the publicly owned water supplier pursuant to Section 6066 of the Government Code…*

The UWMPA requires that the UWMP show the water agency solicited public participation. The notice to the public was included in a local newspaper as prescribed in Government Code 6066. This notice included the time and location of the public hearing, in addition to the location of where the UWMP was available for public inspection. The notice of public hearing to the public is included in Appendix A.

On July 14, 2022, and July 18, 2022, the City placed a notice in the Red Bluff Daily News (local newspaper) stating that its UWMP was being updated and that a public hearing was to be conducted to address comments and concerns from members of the community. The notice stated that a public review period would be scheduled through August 1, 2022. A copy of this notification is included in Appendix A.

The Draft 2020 UWMP was available for public inspection at City Hall, located at 555 Washington Street, Tehama County Library located at 545 Diamond Avenue, as well as the City website (www.cityofredbluff.org).

10.2.3 Notice to Agencies and Organizations

The following agencies and organizations were provided notice that the City was in the process of preparing the 2020 UWMP:

- Caltrans.
- El Camino Irrigation District.
- Los Molinos Mutual Water Company.

The agencies and organizations were provided 60-day notification (prior to the public hearing) and a notice of public hearing, including the time and location. The 60-Day Notification letters and the notices of public hearing are included in Appendix A.

10.3 Public Hearing and Adoption

> *10642… Prior to adopting a plan, the urban water supplier shall hold a public hearing thereon.*
>
> *10608.26(a). In complying with this part, an urban retail water supplier shall conduct at least one public hearing to accomplish all of the following:*
>
> *(1) Allow community input regarding the urban retail water supplier's implementation plan for complying with this part.*
>
> *(2) Consider the economic impacts of the urban retail water supplier's implementation plan for complying with this part.*
>
> *(3) Adopt a method, pursuant to subdivision (b) of Section 10608.20 for determining its urban water use target.*
>
> *10642… After the hearing, the plan shall be adopted as prepared or as modified after the hearing.*

The plan was adopted by City Council at a public hearing on August 2, 2022. The City Resolution is included in Appendix N. The hearing provided an opportunity for the City's customers, residents, and employees to learn and ask questions about the current and future water supply of the City. At the hearing, the UWMP, water use targets, and conservation implementation plan were discussed.

10.3.1 Adoption

After the public hearing, the 2020 UWMP was adopted as prepared.

10.4 Plan Submittal

The public hearing will be followed by submittal of the UWMP to the California DWR, the California State Library, and City of Tehama and Tehama County (see Commitment to Distribute in Appendix A).

10.4.1 Submission to DWR

The 2020 UWMP will be submitted to DWR within 30 days of adoption.

10.4.2 Electronic Data Submission

The 2020 UWMP, in addition to tabular data, will be submitted using WUE data submittal tool.

10.4.3 Submission to the California State Library

The 2020 UWMP will be submitted in CD or hardcopy format to the California State Library within 30 days of adoption.

10.4.4 Submission to Cities and Counties

The 2020 UWMP will be submitted in electronic format to City of Tehama and Tehama County within 30 days of adoption.

10.5 Public Availability

Within 30 days of submitting the UWMP to DWR, the adopted UWMP will be available for public review during normal business hours at the locations specified herein.

10.6 Amending and Adopted UWMP

The plan may be updated at any time when the urban water supplier believes significant changes have occurred in population, land use, and/or water sources that may affect the contents of the plan. Copies of amendments or changes to the plan shall be submitted electronically to DWR, the California State Library, and any cities or counties which the City provides water supplies within 30 days of adoption.

Appendix A

OUTREACH DOCUMENTS

CITY OF RED BLUFF

555 Washington Street, Red Bluff, California 96080
(530) 527-2605; Fax (530) 529-6878
www.cityofredbluff.org

September 28, 2021

City of Tehama
250 Cavalier Drive
Tehama, CA 96090

Attention: Carolyn Steffan

Subject: **Notice of Preparation of the 2020 City of Red Bluff Urban Water Management Plan**

Dear Carolyn:

Pursuant to the requirements of the California Water Code, Division 6, Part 2.6 Urban Water Management Planning, Section 10621 (b), every urban water supplier required to prepare a plan pursuant to this part shall, at least 60 days prior to the public hearing on the plan required by Section 10642, notify any city or county within which the supplier provides water supplies that the urban water supplier will be reviewing the plan and considering amendments or changes to the plan.

This letter is intended to notify your agency that the City of Red Bluff (City) is in process of preparing the 2020 Urban Water Management Plan (UWMP). Based on the City's current schedule, we expect to have a public review draft of the 2020 UWMP available for review in December 2021, at which point your agency will receive a notification letter that the draft UWMP is available for public review.

If your agency would like to submit comments or provide input to the City in anticipation of the development of the 2020 UWMP, please submit written copies to R. Scott Miller at the below address.

Sincerely,

R. Scott Miller
City of Red Bluff
Assistant Public Works Director and Airport Manager
555 Washington Street
Red Bluff, CA 96080
(530) 527-2605 ext. 3063
smiller@cityofredbluff.org

CITY OF RED BLUFF

555 Washington Street, Red Bluff, California 96080
(530) 527-2605; Fax (530) 529-6878
www.cityofredbluff.org

September 28, 2021

Tehama County Flood Control and Water Conservation District
9380 San Benito Avenue
Gerber, CA 96035

Attention: Jim Simon

Subject: **Notice of Preparation of the 2020 City of Red Bluff Urban Water Management Plan**

Dear Jim:

Pursuant to the requirements of the California Water Code, Division 6, Part 2.6 Urban Water Management Planning, Section 10621 (b), every urban water supplier required to prepare a plan pursuant to this part shall, at least 60 days prior to the public hearing on the plan required by Section 10642, notify any city or county within which the supplier provides water supplies that the urban water supplier will be reviewing the plan and considering amendments or changes to the plan.

This letter is intended to notify your agency that the City of Red Bluff (City) is in process of preparing the 2020 Urban Water Management Plan (UWMP). Based on the City's current schedule, we expect to have a public review draft of the 2020 UWMP available for review in December 2021, at which point your agency will receive a notification letter that the draft UWMP is available for public review.

If your agency would like to submit comments or provide input to the City in anticipation of the development of the 2020 UWMP, please submit written copies to R. Scott Miller at the below address.

Sincerely,

R. Scott Miller
City of Red Bluff
Assistant Public Works Director and Airport Manager
555 Washington Street
Red Bluff, CA 96080
(530) 527-2605 ext. 3063
smiller@cityofredbluff.org

CITY OF RED BLUFF

555 Washington Street, Red Bluff, California 96080
(530) 527-2605; Fax (530) 529-6878
www.cityofredbluff.org

September 28, 2021

California Department of Transportation
1490 George Drive
Redding, CA 96003

Attention: Mike Farrar

Subject: **Notice of Preparation of the 2020 City of Red Bluff Urban Water Management Plan**

Dear Mike:

Pursuant to the requirements of the California Water Code, Division 6, Part 2.6 Urban Water Management Planning, Section 10621 (b), every urban water supplier required to prepare a plan pursuant to this part shall, at least 60 days prior to the public hearing on the plan required by Section 10642, notify any city or county within which the supplier provides water supplies that the urban water supplier will be reviewing the plan and considering amendments or changes to the plan.

This letter is intended to notify your agency that the City of Red Bluff (City) is in process of preparing the 2020 Urban Water Management Plan (UWMP). Based on the City's current schedule, we expect to have a public review draft of the 2020 UWMP available for review in December 2021, at which point your agency will receive a notification letter that the draft UWMP is available for public review.

If your agency would like to submit comments or provide input to the City in anticipation of the development of the 2020 UWMP, please submit written copies to R. Scott Miller at the below address.

Sincerely,

R. Scott Miller
City of Red Bluff
Assistant Public Works Director and Airport Manager
555 Washington Street
Red Bluff, CA 96080
(530) 527-2605 ext. 3063
smiller@cityofredbluff.org

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September 28, 2021

El Camino Irrigation District
8451 Hwy. 99-W
Gerber, CA 96035

Attention: Linda Lovelace

Subject: **Notice of Preparation of the 2020 City of Red Bluff Urban Water Management Plan**

Dear Linda:

Pursuant to the requirements of the California Water Code, Division 6, Part 2.6 Urban Water Management Planning, Section 10621 (b), every urban water supplier required to prepare a plan pursuant to this part shall, at least 60 days prior to the public hearing on the plan required by Section 10642, notify any city or county within which the supplier provides water supplies that the urban water supplier will be reviewing the plan and considering amendments or changes to the plan.

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September 28, 2021

Los Molinos Mutual Water Company
25162 Josephine Street
Los Molinos, CA 96055

Attention: Darrell Mullins

Subject: **Notice of Preparation of the 2020 City of Red Bluff Urban Water Management Plan**

Dear Darrell:

Pursuant to the requirements of the California Water Code, Division 6, Part 2.6 Urban Water Management Planning, Section 10621 (b), every urban water supplier required to prepare a plan pursuant to this part shall, at least 60 days prior to the public hearing on the plan required by Section 10642, notify any city or county within which the supplier provides water supplies that the urban water supplier will be reviewing the plan and considering amendments or changes to the plan.

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www.cityofredbluff.org

July 12, 2022

City of Tehama
250 Cavalier Drive
Tehama, CA 96090

Attention: Carolyn Steffan

Subject: **Public Hearing Notice**

Dear Carolyn:
Pursuant to the California Water Code section 10642, the City Council of the City of Red Bluff will conduct a Public Hearing to take testimony regarding the adoption of the updated Urban Water Management Plan (UWMP) for the City of Red Bluff. The hearing is scheduled for August 2, 2022 at 6:00 PM in the City Hall Council Chambers at 555 Washington Street, Red Bluff. A copy of the UWMP can be reviewed by visiting the City's web site at www.cityofredbluff.org. Also, if you wish to direct questions or comments to the City Council, please attend the Public Hearing or send your written comments to the City Council. You may leave your written comments at City Hall, present them at the Public Hearing or mail them to the Contact noted below. City staff cannot forward verbal comments or questions to the City Council, verbal comments or questions must come from you during the Public Hearing. In compliance with the ADA, if you need assistance to participate in this meeting, you should contact the City at (530) 527-2605. Notification 72 hours prior to the meeting will enable the City to make reasonable arrangements to assure accessibility to this meeting. Council Chambers are handicapped accessible.

Please submit questions or written comments to R. Scott Miller at the below address by the close of business on August 1, 2022.

Sincerely,

R. Scott Miller

R. Scott Miller
City of Red Bluff, Assistant Public Works Director and Airport Manager
555 Washington Street
Red Bluff, CA 96080
(530) 527-2605 ext. 3063
smiller@cityofredbluff.org

CITY OF RED BLUFF

555 Washington Street, Red Bluff, California 96080
(530) 527-2605; Fax (530) 529-6878
www.cityofredbluff.org

July 12, 2022

Tehama County Flood Control and Water Conservation District
9380 San Benito Avenue
Gerber, CA 96035

Attention: Jim Simon

Subject: **Public Hearing Notice**

Dear Jim:

Pursuant to the California Water Code section 10642, the City Council of the City of Red Bluff will conduct a Public Hearing to take testimony regarding the adoption of the updated Urban Water Management Plan (UWMP) for the City of Red Bluff. The hearing is scheduled for August 2, 2022 at 6:00 PM in the City Hall Council Chambers at 555 Washington Street, Red Bluff. A copy of the UWMP can be reviewed by visiting the City's web site at www.cityofredbluff.org. Also, if you wish to direct questions or comments to the City Council, please attend the Public Hearing or send your written comments to the City Council. You may leave your written comments at City Hall, present them at the Public Hearing or mail them to the Contact noted below. City staff cannot forward verbal comments or questions to the City Council, verbal comments or questions must come from you during the Public Hearing. In compliance with the ADA, if you need assistance to participate in this meeting, you should contact the City at (530) 527-2605. Notification 72 hours prior to the meeting will enable the City to make reasonable arrangements to assure accessibility to this meeting. Council Chambers are handicapped accessible.

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R. Scott Miller

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City of Red Bluff, Assistant Public Works Director and Airport Manager
555 Washington Street
Red Bluff, CA 96080
(530) 527-2605 ext. 3063
smiller@cityofredbluff.org

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555 Washington Street, Red Bluff, California 96080
(530) 527-2605; Fax (530) 529-6878
www.cityofredbluff.org

July 12, 2022

California Department of Transportation
1490 George Drive
Redding, CA 96003

Attention: Mike Farrar

Subject: **Public Hearing Notice**

Dear Mike:

Pursuant to the California Water Code section 10642, the City Council of the City of Red Bluff will conduct a Public Hearing to take testimony regarding the adoption of the updated Urban Water Management Plan (UWMP) for the City of Red Bluff. The hearing is scheduled for August 2, 2022 at 6:00 PM in the City Hall Council Chambers at 555 Washington Street, Red Bluff. A copy of the UWMP can be reviewed by visiting the City's web site at www.cityofredbluff.org. Also, if you wish to direct questions or comments to the City Council, please attend the Public Hearing or send your written comments to the City Council. You may leave your written comments at City Hall, present them at the Public Hearing or mail them to the Contact noted below. City staff cannot forward verbal comments or questions to the City Council, verbal comments or questions must come from you during the Public Hearing. In compliance with the ADA, if you need assistance to participate in this meeting, you should contact the City at (530) 527-2605. Notification 72 hours prior to the meeting will enable the City to make reasonable arrangements to assure accessibility to this meeting. Council Chambers are handicapped accessible.

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July 12, 2022

El Camino Irrigation District
8451 Hwy. 99-W
Gerber, CA 96035

Attention: Linda Lovelace

Subject: **Public Hearing Notice**

Dear Linda:

Pursuant to the California Water Code section 10642, the City Council of the City of Red Bluff will conduct a Public Hearing to take testimony regarding the adoption of the updated Urban Water Management Plan (UWMP) for the City of Red Bluff. The hearing is scheduled for August 2, 2022 at 6:00 PM in the City Hall Council Chambers at 555 Washington Street, Red Bluff. A copy of the UWMP can be reviewed by visiting the City's web site at www.cityofredbluff.org. Also, if you wish to direct questions or comments to the City Council, please attend the Public Hearing or send your written comments to the City Council. You may leave your written comments at City Hall, present them at the Public Hearing or mail them to the Contact noted below. City staff cannot forward verbal comments or questions to the City Council, verbal comments or questions must come from you during the Public Hearing. In compliance with the ADA, if you need assistance to participate in this meeting, you should contact the City at (530) 527-2605. Notification 72 hours prior to the meeting will enable the City to make reasonable arrangements to assure accessibility to this meeting. Council Chambers are handicapped accessible.

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(530) 527-2605 ext. 3063
smiller@cityofredbluff.org

CITY OF RED BLUFF

555 Washington Street, Red Bluff, California 96080
(530) 527-2605; Fax (530) 529-6878
www.cityofredbluff.org

July 12, 2022

Los Molinos Mutual Water Company
P.O. Box 211
Los Molinos, CA 96055

Attention: William Hardwick

Subject: **Public Hearing Notice**

Dear William:
Pursuant to the California Water Code section 10642, the City Council of the City of Red Bluff will conduct a Public Hearing to take testimony regarding the adoption of the updated Urban Water Management Plan (UWMP) for the City of Red Bluff. The hearing is scheduled for August 2, 2022 at 6:00 PM in the City Hall Council Chambers at 555 Washington Street, Red Bluff. A copy of the UWMP can be reviewed by visiting the City's web site at www.cityofredbluff.org. Also, if you wish to direct questions or comments to the City Council, please attend the Public Hearing or send your written comments to the City Council. You may leave your written comments at City Hall, present them at the Public Hearing or mail them to the Contact noted below. City staff cannot forward verbal comments or questions to the City Council, verbal comments or questions must come from you during the Public Hearing. In compliance with the ADA, if you need assistance to participate in this meeting, you should contact the City at (530) 527-2605. Notification 72 hours prior to the meeting will enable the City to make reasonable arrangements to assure accessibility to this meeting. Council Chambers are handicapped accessible.

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R. Scott Miller

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City of Red Bluff, Assistant Public Works Director and Airport Manager
555 Washington Street
Red Bluff, CA 96080
(530) 527-2605 ext. 3063
smiller@cityofredbluff.org

Advertising Order Confirmation

ENTERPRISE-RECORD MERCURY-REGISTER PARADISE POST RED BLUFF DAILY NEWS

Ad Order Number	Customer	Payor Customer	PO Number
0006682304	RED BLUFF, CITY OF	RED BLUFF, CITY OF	
Sales Representative	**Customer Account**	**Payor Account**	**Ordered By**
House NVRB	2120920	2120920	
Order Taker	**Customer Address**	**Payor Address**	**Customer Fax**
Kellie Landini	555 WASHINGTON ST RED BLUFF, CA 96080	555 WASHINGTON ST RED BLUFF, CA 96080	
Order Source	**Customer Phone**	**Payor Phone**	**Customer EMail**
Select Source	530-527-2605 x 3066	530-527-2605 x 3066	accountspayable@cityofredbluff.org

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Ready	

Tear Sheets	Affidavits	Blind Box	Materials	Promo Type	Special Pricing
0	0				

Ad Number	Color	Production Color	Ad Attributes	Production Method	Production Notes
0006682304-01				AdBooker	

External Ad Number	Pick Up	Ad Type	Released for Publication
		Legal Liner	

CITY OF RED BLUFF
PUBLIC NOTICE OF PUBLIC HEARING
UPDATED URBAN WATER MANAGEMENT PLAN

Pursuant to the California Water Code section 10642, the City Council of the City of Red Bluff will conduct a Public Hearing to take testimony regarding the adoption of the updated Urban Water Management Plan for the City of Red Bluff. The hearing is scheduled for **Tuesday August 2, 2022 at 6:00 PM** in the City Council Chambers at 555 Washington Street, Red Bluff.

Any person may appear and be heard at the public hearing and interested parties are encouraged to submit written comments on the above noted project. If you have any questions or wish to review the project information, please feel free to contact Public Works Staff at City Hall (530) 527-2605 x 3067. Also, if you wish to direct questions or comments to the City Council, please attend the Public Hearing or send your written comments to the City Council. You may leave your written comments at City Hall, present them at the Public Hearing or mail them to the Contact noted below. City staff cannot forward verbal comments or questions to the City Council, verbal comments or questions must come from you during the Public Hearing. In compliance with the ADA, if you need assistance to participate in this meeting, you should contact the City at (530) 527-2605. Notification 72 hours prior to the meeting will enable the City to make reasonable arrangements to assure accessibility to this meeting. Council Chambers are handicapped accessible.

A copy of the Urban Water Management Plan can be reviewed by visiting the City's web site at www.cityofredbluff.org.

All written comments should be to the City of Red Bluff, Public Works Department, 555 Washington Street, Red Bluff, CA 96080.

Publish: July 14, 2022 and July 19, 2022

Product	Requested Placement	Requested Position	Run Dates	# Inserts
Red Bluff Daily News	Legals CLS NC	Notice of Hearing NC - 1076~	07/14/22, 07/19/22	2

Order Charges:

Net Amount	Tax Amount	Total Amount	Payment Amount	Amount Due
186.28	0.00	186.28	0.00	**$186.28**

Please note: If you pay by bank card, your card statement will show "CAL NEWSPAPER ADV" or "CALIFORNIA NEWSPAPER ADVERTISING SERVICES", depending on the type of card used.

Commitment to Distribute the 2020 Urban Water Management Plan (UWMP)

The documentation currently included in these appendices satisfies California Water Code (CWC) parts 10621(b) and 10642.

Two other sections of the CWC specify UWMP documentation that must take place after the submission of the supplier's UWMP to the California Department of Water Resources (DWR). These parts are as follows:

- Part 10644(a), requiring documentation that within 30 days of submitting the UWMP to DWR, the adopted UWMP has been or will be submitted to the California State Library and any city or county to which the supplier provides water.
- Part 10645, requiring documentation that the supplier will make the UWMP available for public review no later than 30 days after submission to DWR.

In order to satisfy these requirements, the City will perform the following actions:

- The City will submit its 2020 UWMP to DWR.
- The City will send a printed or electronic copy of its 2020 UWMP to the California State Library and to the cities and counties within which it provides water. The City will do this within 30 days from filing with DWR.
- The City will make their 2020 UWMP available for public review within 30 days from filing with DWR.

Appendix B

DEPARTMENT OF WATER RESOURCES POPULATION TOOL

Please print this page to a PDF and include as part of your UWMP submittal.

Confirmation Information

Generated By	Water Supplier Name	Confirmation #	Generated On
Nicola Fontaine	Red Bluff City Of	4738889396	12/17/2021 1:10:56 PM

Boundary Information

Census Year	Boundary Filename	Internal Boundary ID
1990	Carollo_Assumed_Boundary.kml	1219
2000	Carollo_Assumed_Boundary.kml	1219
2010	Carollo_Assumed_Boundary.kml	1219

Baseline Period Ranges

10 to 15-year baseline period

Number of years in baseline period:	10
Year beginning baseline period range:	2001
Year ending baseline period range[1]:	2010

5-year baseline period

Year beginning baseline period range:	2006
Year ending baseline period range[2]:	2010

[1] The ending year must be between December 31, 2004 and December 31, 2010.

[2] The ending year must be between December 31, 2007 and December 31, 2010.

Persons per Connection

Year	Census Block Level Total Population	Number of Connections *	Persons per Connection
1990	11,617	3100	3.75
1991	-	-	3.71
1992	-	-	3.67
1993	-	-	3.64
1994	-	-	3.60
1995	-	-	3.56
1996	-	-	3.52
1997	-	-	3.48
1998	-	-	3.45
1999	-	-	3.41
2000	12,488	3701	3.37
2001	-	-	3.37
2002	-	-	3.37
2003	-	-	3.37
2004	-	-	3.37
2005	-	-	3.37
2006	-	-	3.36
2007	-	-	3.36
2008	-	-	3.36
2009	-	-	3.36
2010	13,386	3988	3.36
2011	-	-	3.36
2012	-	-	3.36
2013	-	-	3.35
2014	-	-	3.35
2015	-	-	3.35
2020	-	-	3.34 **

Population Using Persons-Per-Connection

Year		Number of Connections *	Persons per Connection	Total Population
10 to 15 Year Baseline Population Calculations				
Year 1	2001	3658	3.37	12,324
Year 2	2002	3565	3.37	12,007
Year 3	2003	3698	3.37	12,451
Year 4	2004	3944	3.37	13,276
Year 5	2005	3931	3.37	13,228
Year 6	2006	4241	3.36	14,267
Year 7	2007	3729	3.36	12,541
Year 8	2008	3766	3.36	12,661
Year 9	2009	4029	3.36	13,541
Year 10	2010	3988	3.36	13,386
5 Year Baseline Population Calculations				
Year 1	2006	4241	3.36	14,267
Year 2	2007	3729	3.36	12,541
Year 3	2008	3766	3.36	12,661
Year 4	2009	4029	3.36	13,541
Year 5	2010	3988	3.36	13,386
2020 Compliance Year Population Calculations				
2020		4309	3.34 **	14,391

Hide Print Confirmation

Appendix C

SB X7-7 VERIFICATION AND COMPLIANCE FORMS

SB X7-7 Table 0: Units of Measure Used in UWMP* *(select one from the drop down list)*
Acre Feet
**The unit of measure must be consistent with Table 2-3*
NOTES:

SB X7-7 Table-1: Baseline Period Ranges			
Baseline	**Parameter**	**Value**	**Units**
10- to 15-year baseline period	2008 total water deliveries	5,198	Acre Feet
	2008 total volume of delivered recycled water	58	Acre Feet
	2008 recycled water as a percent of total deliveries	1.12%	Percent
	Number of years in baseline period[1, 2]	10	Years
	Year beginning baseline period range	2001	
	Year ending baseline period range[3]	2010	
5-year baseline period	Number of years in baseline period	5	Years
	Year beginning baseline period range	2006	
	Year ending baseline period range[4]	2010	

[1] If the 2008 recycled water percent is less than 10 percent, then the first baseline period is a continuous 10-year period. If the amount of recycled water delivered in 2008 is 10 percent or greater, the first baseline period is a continuous 10- to 15-year period. *[2] The Water Code requires that the baseline period is between 10 and 15 years. However, DWR recognizes that some water suppliers may not have the minimum 10 years of baseline data.*

[3] The ending year must be between December 31, 2004 and December 31, 2010.

[4] The ending year must be between December 31, 2007 and December 31, 2010.

NOTES:

SB X7-7 Table 2: Method for Population Estimates	
Method Used to Determine Population (may check more than one)	
☐	**1. Department of Finance** (DOF) DOF Table E-8 (1990 - 2000) and (2000-2010) and DOF Table E-5 (2011 - 2015) when available
☐	**2. Persons-per-Connection Method**
☑	**3. DWR Population Tool**
☐	**4. Other** DWR recommends pre-review
NOTES:	

SB X7-7 Table 3: Service Area Population		
Year		**Population**
10 to 15 Year Baseline Population		
Year 1	2001	12,324
Year 2	2002	12,007
Year 3	2003	12,451
Year 4	2004	13,276
Year 5	2005	13,228
Year 6	2006	14,267
Year 7	2007	12,541
Year 8	2008	12,661
Year 9	2009	13,541
Year 10	2010	13,386
Year 11		
Year 12		
Year 13		
Year 14		
Year 15		
5 Year Baseline Population		
Year 1	2006	14,267
Year 2	2007	12,541
Year 3	2008	12,661
Year 4	2009	13,541
Year 5	2010	13,386
2015 Compliance Year Population		
2015		14,414
NOTES:		

SB X7-7 Table 4: Annual Gross Water Use *

Baseline Year *Fm SB X7-7 Table 3*		Volume Into Distribution System *This column will remain blank until SB X7-7 Table 4-A is completed.*	Deductions					Annual Gross Water Use
			Exported Water	Change in Dist. System Storage (+/-)	Indirect Recycled Water *This column will remain blank until SB X7-7 Table 4-B is completed.*	Water Delivered for Agricultural Use	Process Water *This column will remain blank until SB X7-7 Table 4-D is completed.*	
10 to 15 Year Baseline - Gross Water Use								
Year 1	2001	4,404			-		-	4,404
Year 2	2002	4,576			-		-	4,576
Year 3	2003	4,619			-		-	4,619
Year 4	2004	4,706			-		-	4,706
Year 5	2005	4,762			-		-	4,762
Year 6	2006	4,969			-		-	4,969
Year 7	2007	5,538			-		-	5,538
Year 8	2008	5,230			-		-	5,230
Year 9	2009	5,278			-		-	5,278
Year 10	2010	5,556			-		-	5,556
Year 11	0	-			-		-	-
Year 12	0	-			-		-	-
Year 13	0	-			-		-	-
Year 14	0	-			-		-	-
Year 15	0	-			-		-	-
10 - 15 year baseline average gross water use								**4,964**
5 Year Baseline - Gross Water Use								
Year 1	2006	4,969			-		-	4,969
Year 2	2007	5,538			-		-	5,538
Year 3	2008	5,230			-		-	5,230
Year 4	2009	5,278			-		-	5,278
Year 5	2010	5,556			-		-	5,556
5 year baseline average gross water use								**5,314**
2015 Compliance Year - Gross Water Use								
2015		3,166	-		-		-	**3,166**

* NOTE that the units of measure must remain consistent throughout the UWMP, as reported in Table 2-3

NOTES: Units of measure are acre-feet (AF).

SB X7-7 Table 4-A: Volume Entering the Distribution System(s)

Complete one table for each source.

Name of Source	Groundwater
This water source is:	
☑	The supplier's own water source
☐	A purchased or imported source

Baseline Year *Fm SB X7-7 Table 3*		Volume Entering Distribution System	Meter Error Adjustment* *Optional (+/-)*	Corrected Volume Entering Distribution System
10 to 15 Year Baseline - Water into Distribution System				
Year 1	2001	4,404		4,404
Year 2	2002	4,576		4,576
Year 3	2003	4,619		4,619
Year 4	2004	4,706		4,706
Year 5	2005	4,762		4,762
Year 6	2006	4,969		4,969
Year 7	2007	5,538		5,538
Year 8	2008	5,230		5,230
Year 9	2009	5,278		5,278
Year 10	2010	5,556		5,556
Year 11	0			-
Year 12	0			-
Year 13	0			-
Year 14	0			-
Year 15	0			-
5 Year Baseline - Water into Distribution System				
Year 1	2006	4,969		4,969
Year 2	2007	5,538		5,538
Year 3	2008	5,230		5,230
Year 4	2009	5,278		5,278
Year 5	2010	5,556		5,556
2015 Compliance Year - Water into Distribution System				
2015		3,166		3,166

** Meter Error Adjustment - See guidance in Methodology 1, Step 3 of Methodologies Document*

NOTES: Units of measure are acre-feet (AF). Source: Large Water Systems Annual Reports to the Drinking Water Program. 2001 volume based on Field Log Totals.

SB X7-7 Table 4-B: Indirect Recycled Water Use Deduction *(For use only by agencies that are deducting indirect recycled water)*

Baseline Year *Fm SB X7-7 Table 3*		Surface Reservoir Augmentation					Groundwater Recharge			**Total Deductible Volume of Indirect Recycled Water Entering the Distribution System**
		Volume Discharged from Reservoir for Distribution System Delivery	Percent Recycled Water	Recycled Water Delivered to Treatment Plant	Transmission/ Treatment Loss	Recycled Volume Entering Distribution System from Surface Reservoir Augmentation	Recycled Water Pumped by Utility*	Transmission/ Treatment Losses	Recycled Volume Entering Distribution System from Groundwater Recharge	
10-15 Year Baseline - Indirect Recycled Water Use										
Year 1	2001			-		-			-	-
Year 2	2002			-		-			-	-
Year 3	2003			-		-			-	-
Year 4	2004			-		-			-	-
Year 5	2005			-		-			-	-
Year 6	2006			-		-			-	-
Year 7	2007			-		-			-	-
Year 8	2008			-		-			-	-
Year 9	2009			-		-			-	-
Year 10	2010			-		-			-	-
Year 11	0			-		-			-	-
Year 12	0			-		-			-	-
Year 13	0			-		-			-	-
Year 14	0			-		-			-	-
Year 15	0			-		-			-	-
5 Year Baseline - Indirect Recycled Water Use										
Year 1	2006			-		-			-	-
Year 2	2007			-		-			-	-
Year 3	2008			-		-			-	-
Year 4	2009			-		-			-	-
Year 5	2010			-		-			-	-
2015 Compliance - Indirect Recycled Water Use										
2015				-		-			-	-

**Suppliers will provide supplemental sheets to document the calculation for their input into "Recycled Water Pumped by Utility". The volume reported in this cell must be less than total groundwater pumped - See Methodology 1, Step 8, section 2.c.*

NOTES: Units of measure are acre-feet (AF).

SB X7-7 Table 4-C: Process Water Deduction Eligibility *(For use only by agencies that are deducting process water) Choose Only One*	
☐	**Criteria 1**- Industrial water use is equal to or greater than 12% of gross water use. Complete SB X7-7 Table 4-C.1
☐	**Criteria 2** - Industrial water use is equal to or greater than 15 GPCD. Complete SB X7-7 Table 4-C.2
☐	**Criteria 3** - Non-industrial use is equal to or less than 120 GPCD. Complete SB X7-7 Table 4-C.3
☐	**Criteria 4** - Disadvantaged Community. Complete SB x7-7 Table 4-C.4
NOTES:	

SB X7-7 Table 4-C.1: Process Water Deduction Eligibility

Criteria 1

Industrial water use is equal to or greater than 12% of gross water use

Baseline Year *Fm SB X7-7 Table 3*		Gross Water Use Without Process Water Deduction	Industrial Water Use	Percent Industrial Water	**Eligible for Exclusion Y/N**
10 to 15 Year Baseline - Process Water Deduction Eligibility					
Year 1	2001	4,404		0%	NO
Year 2	2002	4,576		0%	NO
Year 3	2003	4,619		0%	NO
Year 4	2004	4,706		0%	NO
Year 5	2005	4,762		0%	NO
Year 6	2006	4,969		0%	NO
Year 7	2007	5,538		0%	NO
Year 8	2008	5,230		0%	NO
Year 9	2009	5,278		0%	NO
Year 10	2010	5,556		0%	NO
Year 11	0	-			NO
Year 12	0	-			NO
Year 13	0	-			NO
Year 14	0	-			NO
Year 15	0	-			NO
5 Year Baseline - Process Water Deduction Eligibility					
Year 1	2006	4,969		0%	NO
Year 2	2007	5,538		0%	NO
Year 3	2008	5,230		0%	NO
Year 4	2009	5,278		0%	NO
Year 5	2010	5,556		0%	NO
2015 Compliance Year - Process Water Deduction Eligiblity					
2015		3,166		0%	NO

NOTES:

SB X7-7 Table 4-C.2: Process Water Deduction Eligibility					
Criteria 2 Industrial water use is equal to or greater than 15 GPCD					
Baseline Year *Fm SB X7-7 Table 3*		Industrial Water Use	Population	Industrial GPCD	**Eligible for Exclusion Y/N**
10 to 15 Year Baseline - Process Water Deduction Eligibility					
Year 1	2001		12,324	-	NO
Year 2	2002		12,007	-	NO
Year 3	2003		12,451	-	NO
Year 4	2004		13,276	-	NO
Year 5	2005		13,228	-	NO
Year 6	2006		14,267	-	NO
Year 7	2007		12,541	-	NO
Year 8	2008		12,661	-	NO
Year 9	2009		13,541	-	NO
Year 10	2010		13,386	-	NO
Year 11	0		-		NO
Year 12	0		-		NO
Year 13	0		-		NO
Year 14	0		-		NO
Year 15	0		-		NO
5 Year Baseline - Process Water Deduction Eligibility					
Year 1	2006		14,267	-	NO
Year 2	2007		12,541	-	NO
Year 3	2008		12,661	-	NO
Year 4	2009		13,541	-	NO
Year 5	2010		13,386	-	NO
2015 Compliance Year - Process Water Deduction Eligibility					
2015			14,414	-	NO
NOTES:					

SB X7-7 Table 4-C.3: Process Water Deduction Eligibility							
Criteria 3 Non-industrial use is equal to or less than 120 GPCD							
Baseline Year *Fm SB X7-7 Table 3*		Gross Water Use Without Process Water Deduction *Fm SB X7-7 Table 4*	Industrial Water Use	Non-industrial Water Use	Population *Fm SB X7-7 Table 3*	Non-Industrial GPCD	**Eligible for Exclusion Y/N**
10 to 15 Year Baseline - Process Water Deduction Eligibility							
Year 1	2001	4,404		4,404	12,324	319	NO
Year 2	2002	4,576		4,576	12,007	340	NO
Year 3	2003	4,619		4,619	12,451	331	NO
Year 4	2004	4,706		4,706	13,276	316	NO
Year 5	2005	4,762		4,762	13,228	321	NO
Year 6	2006	4,969		4,969	14,267	311	NO
Year 7	2007	5,538		5,538	12,541	394	NO
Year 8	2008	5,230		5,230	12,661	369	NO
Year 9	2009	5,278		5,278	13,541	348	NO
Year 10	2010	5,556		5,556	13,386	371	NO
Year 11	0	-		-	-		NO
Year 12	0	-		-	-		NO
Year 13	0	-		-	-		NO
Year 14	0	-		-	-		NO
Year 15	0	-		-	-		NO
5 Year Baseline - Process Water Deduction Eligibility							
Year 1	2006	4,969		4,969	14,267	311	NO
Year 2	2007	5,538		5,538	12,541	394	NO
Year 3	2008	5,230		5,230	12,661	369	NO
Year 4	2009	5,278		5,278	13,541	348	NO
Year 5	2010	5,556		5,556	13,386	371	NO
2015 Compliance Year - Process Water Deduction Eligiblity							
2015		3,166		3,166	14,414	196	NO
NOTES:							

SB X7-7 Table 4-C.4: Process Water Deduction Eligibility

Criteria 4

Disadvantaged Community. A "Disadvantaged Community" (DAC) is a community with a median household income less than 80 percent of the statewide average.

SELECT ONE

"Disadvantaged Community" status was determined using one of the methods listed below:

☐ **1. IRWM DAC Mapping tool**
http://www.water.ca.gov/irwm/grants/resources_dac.cfm

If using the IRWM DAC Mapping Tool, include a screen shot from the tool showing that the service area is considered a DAC.

☑ **2. 2010 Median Income**

	California Median Household Income		Service Area Median Household Income	Percentage of Statewide Average	**Eligible for Exclusion? Y/N**
2015 Compliance Year - Process Water Deduction Eligibility					
	2010	$60,883	$32,782	54%	YES

NOTES:

SB X7-7 Table 4-D: Process Water Deduction - Volume *Complete a separate table for each industrial customer with a process water exclusion*						
Name of Industrial Customer		*Industrial Customer 1*				
Baseline Year *Fm SB X7-7 Table 3*		Industrial Customer's Total Water Use	Total Volume Supplied by Water Agency	% of Water Supplied by Water Agency	Customer's Total Process Water Use	Volume of Process Water Eligible for Exclusion for this Customer
10 to 15 Year Baseline - Process Water Deduction						
Year 1	2001					-
Year 2	2002					-
Year 3	2003					-
Year 4	2004					-
Year 5	2005					-
Year 6	2006					-
Year 7	2007					-
Year 8	2008					-
Year 9	2009					-
Year 10	2010					-
Year 11	0					-
Year 12	0					-
Year 13	0					-
Year 14	0					-
Year 15	0					-
5 Year Baseline - Process Water Deduction						
Year 1	2006					-
Year 2	2007					-
Year 3	2008					-
Year 4	2009					-
Year 5	2010					-
2015 Compliance Year - Process Water Deduction						
2015						-
NOTES:						

SB X7-7 Table 5: Gallons Per Capita Per Day (GPCD)				
Baseline Year *Fm SB X7-7 Table 3*		Service Area Population *Fm SB X7-7 Table 3*	Annual Gross Water Use *Fm SB X7-7 Table 4*	Daily Per Capita Water Use (GPCD)
10 to 15 Year Baseline GPCD				
Year 1	2001	12,324	4,404	319
Year 2	2002	12,007	4,576	340
Year 3	2003	12,451	4,619	331
Year 4	2004	13,276	4,706	316
Year 5	2005	13,228	4,762	321
Year 6	2006	14,267	4,969	311
Year 7	2007	12,541	5,538	394
Year 8	2008	12,661	5,230	369
Year 9	2009	13,541	5,278	348
Year 10	2010	13,386	5,556	371
Year 11	0	-	-	
Year 12	0	-	-	
Year 13	0	-	-	
Year 14	0	-	-	
Year 15	0	-	-	
10-15 Year Average Baseline GPCD				**342**
5 Year Baseline GPCD				
Baseline Year *Fm SB X7-7 Table 3*		Service Area Population *Fm SB X7-7 Table 3*	Gross Water Use *Fm SB X7-7 Table 4*	Daily Per Capita Water Use
Year 1	2006	14,267	4,969	311
Year 2	2007	12,541	5,538	394
Year 3	2008	12,661	5,230	369
Year 4	2009	13,541	5,278	348
Year 5	2010	13,386	5,556	371
5 Year Average Baseline GPCD				**358**
2015 Compliance Year GPCD				
2015		14,414	3,166	**196**

NOTES: Units of measure are acre-feet (AF).

SB X7-7 Table 6: Gallons per Capita per Day *Summary From Table SB X7-7 Table 5*	
10-15 Year Baseline GPCD	342
5 Year Baseline GPCD	358
2015 Compliance Year GPCD	196
NOTES: Units are gallons per capita per day (GPCD).	

SB X7-7 Table 7: 2020 Target Method *Select Only One*		
Target Method		Supporting Documentation
☑	Method 1	SB X7-7 Table 7A
☐	Method 2	SB X7-7 Tables 7B, 7C, and 7D *Contact DWR for these tables*
☐	Method 3	SB X7-7 Table 7-E
☐	Method 4	Method 4 Calculator
NOTES:		

SB X7-7 Table 7-A: Target Method 1 20% Reduction	
10-15 Year Baseline GPCD	**2020 Target GPCD**
342	**274**

NOTES: Units are gallons per capita per day (GPCD).

SB X7-7 Table 7-B: Target Method 2 Target Landscape
Water Use

Tables for Target Method 2 (SB X7-7 Tables 7-B, 7-C, and 7-D) are not included in the SB X7-7 Verification Form, but are still required for water suppliers using Target Method 2. These water suppliers should contact Gwen Huff at (916) 651-9672 or gwen.huff@water.ca.gov

SB X7-7 Table 7-C: Target Method 2

Target CII Water Use

Tables for Target Method 2 (SB X7-7 Tables 7-B, 7-C, and 7-D) are not included in the SB X7-7 Verification Form, but are still required for water suppliers using Target Method 2. These water suppliers should contact Gwen Huff at (916) 651-9672 or gwen.huff@water.ca.gov

SB X7-7 Table 7-D: Target Method 2 Summary

Tables for Target Method 2 (SB X7-7 Tables 7-B, 7-C, and 7-D) are not included in the SB X7-7 Verification Form, but are still required for water suppliers using Target Method 2. These water suppliers should contact Gwen Huff at (916) 651-9672 or gwen.huff@water.ca.gov

SB X7-7 Table 7-E: Target Method 3				
Agency May Select More Than One as Applicable	Percentage of Service Area in This Hydrological Region	Hydrologic Region	"2020 Plan" Regional Targets	Method 3 Regional Targets (95%)
☐		North Coast	137	130
☐		North Lahontan	173	164
☑	100%	Sacramento River	176	167
☐		San Francisco Bay	131	124
☐		San Joaquin River	174	165
☐		Central Coast	123	117
☐		Tulare Lake	188	179
☐		South Lahontan	170	162
☐		South Coast	149	142
☐		Colorado River	211	200
Target *(If more than one region is selected, this value is calculated.)*				**167**

NOTES: Units are gallons per capita per day (GPCD).

SB X7-7 Table 7-F: Confirm Minimum Reduction for 2020 Target			
5 Year Baseline GPCD *From SB X7-7 Table 5*	Maximum 2020 Target[1]	Calculated 2020 Target[2]	**Confirmed 2020 Target**
358	341	274	**274**

[1] Maximum 2020 Target is 95% of the 5 Year Baseline GPCD except for suppliers at or below 100 GPCD.

[2] 2020 Target is calculated based on the selected Target Method, see SB X7-7 Table 7 and corresponding tables for agency's calculated target.

NOTES: Units are gallons per capita per day (GPCD).

SB X7-7 Table 8: 2015 Interim Target GPCD		
Confirmed 2020 Target *Fm SB X7-7 Table 7-F*	10-15 year Baseline GPCD *Fm SB X7-7 Table 5*	**2015 Interim Target GPCD**
274	342	**308**
NOTES: Units are gallons per capita per day (GPCD).		

SB X7-7 Table 9: 2015 Compliance								
Actual 2015 GPCD	2015 Interim Target GPCD	Optional Adjustments *(in GPCD)* Enter "0" if Adjustment Not Used: Extraordinary Events	Weather Normalization	Economic Adjustment	TOTAL Adjustments	Adjusted 2015 GPCD	2015 GPCD *(Adjusted if applicable)*	**Did Supplier Achieve Targeted Reduction for 2015?**
196	308	*From Methodology 8 (Optional)*	*From Methodology 8 (Optional)*	*From Methodology 8 (Optional)*	-	196	196	**YES**

NOTES: Units are gallons per capita per day (GPCD).

SB X7-7 Table 0: Units of Measure Used in 2020 UWMP* *(select one from the drop down list)*
Acre Feet
**The unit of measure must be consistent throughout the UWMP, as reported in Submittal Table 2-3.*
NOTES:

SB X7-7 Table 1 pertains to baselines and targets and is not used in the SB X7-7 2020 Compliance Form.

SB X7-7 Table 2: Method for 2020 Population Estimate	
Method Used to Determine 2020 Population (may check more than one)	
☐	**1. Department of Finance** (DOF) or **American Community Survey** (ACS)
☐	**2. Persons-per-Connection Method**
☑	**3. DWR Population Tool**
☐	**4. Other** DWR recommends pre-review
NOTES:	

SB X7-7 Table 3: 2020 Service Area Population	
2020 Compliance Year Population	
2020	14,391
NOTES:	

SB X7-7 Table 4: 2020 Gross Water Use							
Compliance Year 2020	**2020 Volume Into Distribution System** *This column will remain blank until SB X7-7 Table 4-A is completed.*	**2020 Deductions**					**2020 Gross Water Use**
		Exported Water *	**Change in Dist. System Storage*** (+/-)	**Indirect Recycled Water** *This column will remain blank until SB X7-7 Table 4-B is completed.*	**Water Delivered for Agricultural Use***	**Process Water** *This column will remain blank until SB X7-7 Table 4-D is completed.*	
	4,077	-	-	-	-	-	**4,077**

*** Units of measure (AF, MG , or CCF)** must remain consistent throughout the UWMP, as reported in SB X7-7 Table 0 and Submittal Table 2-3.

NOTES: Units of measure are acre-feet (AF).

SB X7-7 Table 4-A: 2020 Volume Entering the Distribution System(s), Meter Error Adjustment

Complete one table for each source.

Name of Source	Groundwater
This water source is *(check one)* **:**	
☑	The supplier's own water source
☐	A purchased or imported source

Compliance Year 2020	Volume Entering Distribution System [1]	Meter Error Adjustment [2] *Optional (+/-)*	Corrected Volume Entering Distribution System
	4,077	-	4,077

[1] ***Units of measure (AF, MG , or CCF)*** *must remain consistent throughout the UWMP, as reported in SB X7-7 Table 0 and Submittal Table 2-3.*

[2] ***Meter Error Adjustment*** *- See guidance in Methodology 1, Step 3 of Methodologies Document*

NOTES: Units of measure are acre-feet (AF). Sources: Annual Report to the Drinking Water Program and AWWA Water Audit Worksheet.

SB X7-7 Table 4-B: 2020 Indirect Recycled Water Use Deduction *(For use only by agencies that are deducting indirect recycled water)*

2020 Compliance Year	2020 Surface Reservoir Augmentation					2020 Groundwater Recharge			Total Deductible Volume of Indirect Recycled Water Entering the Distribution System
	Volume Discharged from Reservoir for Distribution System Delivery[1]	Percent Recycled Water	Recycled Water Delivered to Treatment Plant	Transmission/ Treatment Loss[1]	Recycled Volume Entering Distribution System from Surface Reservoir Augmentation	Recycled Water Pumped by Utility[1,2]	Transmission/ Treatment Losses[1]	Recycled Volume Entering Distribution System from Groundwater Recharge	
			-		-			-	-

[1] ***Units of measure (AF, MG , or CCF)*** *must remain consistent throughout the UWMP, as reported in SB X7-7 Table 0 and Submittal Table 2-3.*

[2] *Suppliers will provide supplemental sheets to document the calculation for their input into "Recycled Water Pumped by Utility". The volume reported in this cell must be less than total groundwater pumped - See Methodology 1, Step 8, section 2.c.*

Data from this table will not be entered into WUEdata.
Instead, the entire table will be uploaded to WUEdata as a separate upload in Excel format.

SB X7-7 Table 4-C: 2020 Process Water Deduction Eligibility **(For use only by agencies that are deducting process water) Choose Only One**	
☐	**Criteria 1**- Industrial water use is equal to or greater than 12% of gross water use. Complete SB X7-7 Table 4-C.1
☐	**Criteria 2** - Industrial water use is equal to or greater than 15 GPCD. Complete SB X7-7 Table 4-C.2
☐	**Criteria 3** - Non-industrial use is equal to or less than 120 GPCD. Complete SB X7-7 Table 4-C.3
☑	**Criteria 4** - Disadvantaged Community. Complete SB x7-7 Table 4-C.4
NOTES:	

Data from this table will not be entered into WUEdata.
Instead, the entire table will be uploaded to WUEdata as a separate upload in Excel format.

SB X7-7 Table 4-C.1: 2020 Process Water Deduction Eligibility *(For use only by agencies that are deducting process water using Criteria 1)*

Criteria 1
Industrial water use is equal to or greater than 12% of gross water use

2020 Compliance Year	2020 Gross Water Use Without Process Water Deduction	2020 Industrial Water Use	Percent Industrial Water	**Eligible for Exclusion Y/N**
	4,077		0%	NO

NOTES: Units of measure are acre-feet (AF).

Data from this table will not be entered into WUEdata.
Instead, the entire table will be uploaded to WUEdata as a separate upload in Excel format.

SB X7-7 Table 4-C.2: 2020 Process Water Deduction Eligibility *(For use only by agencies that are deducting process water using Criteria 2)*

Criteria 2
Industrial water use is equal to or greater than 15 GPCD

2020 Compliance Year	2020 Industrial Water Use	2020 Population	2020 Industrial GPCD	**Eligible for Exclusion Y/N**
		14,391	-	NO

NOTES:

Data from this table will not be entered into WUEdata.
Instead, the entire table will be uploaded to WUEdata as a separate upload in Excel format.

SB X7-7 Table 4-C.3: 2020 Process Water Deduction Eligibility *(For use only*
by agencies that are deducting process water using Criteria 3)

Criteria 3
Non-industrial use is equal to or less than 120 GPCD

2020 Compliance Year	2020 Gross Water Use Without Process Water Deduction *Fm SB X7-7 Table 4*	2020 Industrial Water Use	2020 Non-industrial Water Use	2020 Population *Fm SB X7-7 Table 3*	Non-Industrial GPCD	**Eligible for Exclusion Y/N**
	4,077		4,077	14,391	253	NO

NOTES: Units of measure are acre-feet (AF).

Data from this table will not be entered into WUEdata.
Instead, the entire table will be uploaded to WUEdata as a separate upload in Excel format.

SB X7-7 Table 4-C.4: 2020 Process Water Deduction Eligibility ***(For** use only by agencies that are deducting process water using Criteria 4)*

Criteria 4

Disadvantaged Community. A "Disadvantaged Community" (DAC) is a community with a median household income less than 80 percent of the statewide average.

SELECT ONE

"Disadvantaged Community" status was determined using one of the methods listed below:

1. IRWM DAC Mapping tool https://gis.water.ca.gov/app/dacs/

☐	If using the IRWM DAC Mapping Tool, include a screen shot from the tool showing that the service area is considered a DAC.

2. 2020 Median Income

	California Median Household Income*		Service Area Median Household Income	Percentage of Statewide Average	**Eligible for Exclusion? Y/N**
☑	**2020**	**$75,235**	$31,450	42%	YES

*California median household income 2015 -2019 as reported in US Census Bureau QuickFacts.

NOTES

Data from these tables will not be entered into WUEdata. Instead, the entire tables will be uploaded to WUEdata as a separate upload in Excel format.

This table(s) is only for Suppliers that deduct process water from their 2020 gross water use.

SB X7-7 Table 4-D: 2020 Process Water Deduction - Volume *Complete a separate table for each industrial customer with a process water exclusion*

Name of Industrial Customer	*Enter Name of Industrial Customer 1*				
Compliance Year 2020	Industrial Customer's Total Water Use *	Total Volume Provided by Supplier*	% of Water Provided by Supplier	Customer's Total Process Water Use*	Volume of Process Water Eligible for Exclusion for this Customer
					-

*** Units of measure (AF, MG , or CCF)** must remain consistent throughout the UWMP, as reported in SB X7-7 Table 0 and Submittal Table 2-3.

NOTES:

SB X7-7 Table 5: 2020 Gallons Per Capita Per Day (GPCD)		
2020 Gross Water *Fm SB X7-7 Table 4*	**2020 Population** *Fm SB X7-7 Table 3*	**2020 GPCD**
4,077	14,391	**253**
NOTES: Units of measure are acre-feet (AF).		

SB X 7-7 Table 6 pertains to baselines and targets and is not used in the SB X7-7 2020 Compliance Form.

SB X7-7 Table 7 applies to baseline and target calculations and is not included in the SB X7-7 2020 Compliance Form.

SB X7-7 Table 8 was used for the 2015 Interim Target and is not used in the 2020 UWMP.

SB X7-7 Table 9: 2020 Compliance							
Actual 2020 GPCD[1]	Optional Adjustments to 2020 GPCD Enter "0" if Adjustment Not Used			TOTAL Adjustments[1]	Adjusted 2020 GPCD [1] *(Adjusted if applicable)*	2020 Confirmed Target GPCD [1, 2]	**Did Supplier Achieve Targeted Reduction for 2020?**
	Extraordinary Events[1]	Weather Normalization[1]	Economic Adjustment[1]				
253	-	-	-	-	253	274	**YES**

[1] *All values are reported in GPCD*

[2] ***2020 Confirmed Target GPCD*** *is taken from the Supplier's SB X7-7 Verification Form Table SB X7-7, 7-F.*

NOTES: Units are gallons per capita per day (GPCD).

Appendix D

AWWA WATER AUDITS

AWWA Free Water Audit Software:
Reporting Worksheet

WAS v5.0

? Click to access definition
+ Click to add a comment

Water Audit Report for: City of Red Bluff (CA521004)
Reporting Year: 2016 (1/2016 - 12/2016)

Please enter data in the white cells below. Where available, metered values should be used; if metered values are unavailable please estimate a value. Indicate your confidence in the accuracy of the input data by grading each component (n/a or 1-10) using the drop-down list to the left of the input cell. Hover the mouse over the cell to obtain a description of the grades

All volumes to be entered as: MILLION GALLONS (US) PER YEAR

To select the correct data grading for each input, determine the highest grade where the utility meets or exceeds all criteria for that grade and all grades below it.

Master Meter and Supply Error Adjustments

WATER SUPPLIED

<---------- Enter grading in column 'E' and 'J' ----------> | Pcnt: | Value:

Volume from own sources:	8	1,056.230	MG/Yr	2	0.50%		MG/Yr
Water imported:	n/a	0.000	MG/Yr				MG/Yr
Water exported:	n/a	0.000	MG/Yr				MG/Yr

Enter negative % or value for under-registration
Enter positive % or value for over-registration

WATER SUPPLIED: 1,050.975 MG/Yr

AUTHORIZED CONSUMPTION

Click here: ? for help using option buttons below

Pcnt: | Value:

Billed metered:	8	1,009.894	MG/Yr			
Billed unmetered:	n/a	0.000	MG/Yr			
Unbilled metered:	1	31.463	MG/Yr			
Unbilled unmetered:		13.137	MG/Yr	1.25%		MG/Yr

Default option selected for Unbilled unmetered - a grading of 5 is applied but not displayed

Use buttons to select percentage of water supplied **OR** value

AUTHORIZED CONSUMPTION: 1,054.494 MG/Yr

Check input values; WATER SUPPLIED should be greater than AUTHORIZED CONSUMPTION

WATER LOSSES (Water Supplied - Authorized Consumption) -3.519 MG/Yr

Apparent Losses

Pcnt: | Value:

Unauthorized consumption:		2.627	MG/Yr	0.25%		MG/Yr

Default option selected for unauthorized consumption - a grading of 5 is applied but not displayed

Customer metering inaccuracies:	6	2.610	MG/Yr	0.25%		MG/Yr
Systematic data handling errors:		2.525	MG/Yr	0.25%		MG/Yr

Default option selected for Systematic data handling errors - a grading of 5 is applied but not displayed

Apparent Losses: 7.762 MG/Yr

Check input values; APPARENT LOSSES should be less than WATER LOSSES

Real Losses (Current Annual Real Losses or CARL)

Real Losses = Water Losses - Apparent Losses: -11.281 MG/Yr

WATER LOSSES: -3.519 MG/Yr

NON-REVENUE WATER

NON-REVENUE WATER: 41.081 MG/Yr

= Water Losses + Unbilled Metered + Unbilled Unmetered

SYSTEM DATA

Length of mains:	5	81.0	miles
Number of active AND inactive service connections:	5	4,870	
Service connection density:		60	conn./mile main

Are customer meters typically located at the curbstop or property line? Yes

Average length of customer service line: (length of service line, beyond the property boundary, that is the responsibility of the utility)

Average length of customer service line has been set to zero and a data grading score of 10 has been applied

Average operating pressure:	7	63.0	psi

COST DATA

Total annual cost of operating water system:	7	$ 1,720,334.04	$/Year
Customer retail unit cost (applied to Apparent Losses):	5		
Variable production cost (applied to Real Losses):	3		$/Million gallons

☐ Use Customer Retail Unit Cost to value real losses

WATER AUDIT DATA VALIDITY SCORE:

***** YOUR SCORE IS: 62 out of 100 *****

A weighted scale for the components of consumption and water loss is included in the calculation of the Water Audit Data Validity Score

PRIORITY AREAS FOR ATTENTION:

Based on the information provided, audit accuracy can be improved by addressing the following components:

1: Volume from own sources
2: Unbilled metered
3: Variable production cost (applied to Real Losses)

AWWA Free Water Audit Software:
Reporting Worksheet

WAS v5.0

? Click to access definition
+ Click to add a comment

Water Audit Report for: City of Red Bluff (CA5210004)
Reporting Year: 2017 1/2017 - 12/2017

Please enter data in the white cells below. Where available, metered values should be used; if metered values are unavailable please estimate a value. Indicate your confidence in the accuracy of the input data by grading each component (n/a or 1-10) using the drop-down list to the left of the input cell. Hover the mouse over the cell to obtain a description of the grades

All volumes to be entered as: MILLION GALLONS (US) PER YEAR

To select the correct data grading for each input, determine the highest grade where the utility meets or exceeds all criteria for that grade and all grades below it.

Master Meter and Supply Error Adjustments

WATER SUPPLIED

<---------- Enter grading in column 'E' and 'J' ---------->

					Pcnt:	Value:	
Volume from own sources:	8	1,160	MG/Yr	2	0.50%		MG/Yr
Water imported:	n/a	0.000	MG/Yr				MG/Yr
Water exported:	n/a	0.000	MG/Yr				MG/Yr

Enter negative % or value for under-registration
Enter positive % or value for over-registration

WATER SUPPLIED: 1,154.030 MG/Yr

AUTHORIZED CONSUMPTION

Click here: ? for help using option buttons below

				Pcnt:	Value:	
Billed metered:	8	1,093.600	MG/Yr			
Billed unmetered:	n/a	0.000	MG/Yr			
Unbilled metered:	1	37.572	MG/Yr			
Unbilled unmetered:		14.425	MG/Yr	1.25%		MG/Yr

Use buttons to select percentage of water supplied **OR** value

Default option selected for Unbilled unmetered - a grading of 5 is applied but not displayed

AUTHORIZED CONSUMPTION: 1,145.597 MG/Yr

WATER LOSSES (Water Supplied - Authorized Consumption) 8.432 MG/Yr

Apparent Losses

				Pcnt:	Value:	
Unauthorized consumption:		2.885	MG/Yr	0.25%		MG/Yr
Customer metering inaccuracies:	6	2.835	MG/Yr	0.25%		MG/Yr
Systematic data handling errors:		2.734	MG/Yr	0.25%		MG/Yr

Default option selected for unauthorized consumption - a grading of 5 is applied but not displayed

Default option selected for Systematic data handling errors - a grading of 5 is applied but not displayed

Apparent Losses: 8.454 MG/Yr

Check input values; APPARENT LOSSES should be less than WATER LOSSES

Real Losses (Current Annual Real Losses or CARL)

Real Losses = Water Losses - Apparent Losses: -0.022 MG/Yr

WATER LOSSES: 8.432 MG/Yr

NON-REVENUE WATER

NON-REVENUE WATER: 60.430 MG/Yr

= Water Losses + Unbilled Metered + Unbilled Unmetered

SYSTEM DATA

Length of mains:	5	81.0	miles
Number of active AND inactive service connections:	5	4,870	
Service connection density:		60	conn./mile main

Are customer meters typically located at the curbstop or property line? Yes

Average length of customer service line: (length of service line, beyond the property boundary, that is the responsibility of the utility)

Average length of customer service line has been set to zero and a data grading score of 10 has been applied

Average operating pressure: 7 63.0 psi

COST DATA

Total annual cost of operating water system:	7	$ 2,356,928.00	$/Year
Customer retail unit cost (applied to Apparent Losses):	5		
Variable production cost (applied to Real Losses):	3		$/Million gallons

☐ Use Customer Retail Unit Cost to value real losses

WATER AUDIT DATA VALIDITY SCORE:

***** YOUR SCORE IS: 62 out of 100 *****

A weighted scale for the components of consumption and water loss is included in the calculation of the Water Audit Data Validity Score

PRIORITY AREAS FOR ATTENTION:

Based on the information provided, audit accuracy can be improved by addressing the following components:

1: Volume from own sources
2: Unbilled metered
3: Variable production cost (applied to Real Losses)

AWWA Free Water Audit Software:
Reporting Worksheet

WAS v5.0

? Click to access definition
+ Click to add a comment

Water Audit Report for: City of Red Bluff (CA5210004)
Reporting Year: 2018 | 1/2018 - 12/2018

Please enter data in the white cells below. Where available, metered values should be used; if metered values are unavailable please estimate a value. Indicate your confidence in the accuracy of the input data by grading each component (n/a or 1-10) using the drop-down list to the left of the input cell. Hover the mouse over the cell to obtain a description of the grades

All volumes to be entered as: MILLION GALLONS (US) PER YEAR

To select the correct data grading for each input, determine the highest grade where the utility meets or exceeds all criteria for that grade and all grades below it.

Master Meter and Supply Error Adjustments

WATER SUPPLIED

<---------- Enter grading in column 'E' and 'J' ----------> | Pcnt: | Value:

Volume from own sources:	8	1,216	MG/Yr	2	0.50%		MG/Yr
Water imported:	n/a	0.000	MG/Yr				MG/Yr
Water exported:	n/a	0.000	MG/Yr				MG/Yr
WATER SUPPLIED:		**1,210.028**	MG/Yr				

Enter negative % or value for under-registration
Enter positive % or value for over-registration

AUTHORIZED CONSUMPTION

Click here: ? for help using option buttons below

				Pcnt:	Value:
Billed metered:	8	1,127.642	MG/Yr		
Billed unmetered:	n/a	0.000	MG/Yr		
Unbilled metered:	1	39.337	MG/Yr		
Unbilled unmetered:		15.125	MG/Yr	1.25%	MG/Yr
AUTHORIZED CONSUMPTION:		**1,182.104**	MG/Yr		

Default option selected for Unbilled unmetered - a grading of 5 is applied but not displayed

Use buttons to select percentage of water supplied **OR** value

WATER LOSSES (Water Supplied - Authorized Consumption)

27.924 MG/Yr

Apparent Losses

				Pcnt:	Value:
Unauthorized consumption:		3.025	MG/Yr	0.25%	MG/Yr
Customer metering inaccuracies:	6	2.925	MG/Yr	0.25%	MG/Yr
Systematic data handling errors:		2.819	MG/Yr	0.25%	MG/Yr
Apparent Losses:		**8.769**	MG/Yr		

Default option selected for unauthorized consumption - a grading of 5 is applied but not displayed

Default option selected for Systematic data handling errors - a grading of 5 is applied but not displayed

Real Losses (Current Annual Real Losses or CARL)

Real Losses = Water Losses - Apparent Losses: **19.155** MG/Yr

WATER LOSSES: **27.924** MG/Yr

NON-REVENUE WATER

NON-REVENUE WATER: **82.386** MG/Yr

= Water Losses + Unbilled Metered + Unbilled Unmetered

SYSTEM DATA

Length of mains:	5	81.0	miles
Number of active AND inactive service connections:	5	4,870	
Service connection density:		60	conn./mile main

Are customer meters typically located at the curbstop or property line? Yes

Average length of customer service line: (length of service line, beyond the property boundary, that is the responsibility of the utility)

Average length of customer service line has been set to zero and a data grading score of 10 has been applied

Average operating pressure: 7 | 70.0 psi

COST DATA

Total annual cost of operating water system:	7	$ 2,511,329.00	$/Year
Customer retail unit cost (applied to Apparent Losses):	5		
Variable production cost (applied to Real Losses):	3		$/Million gallons

☐ Use Customer Retail Unit Cost to value real losses

WATER AUDIT DATA VALIDITY SCORE:

***** YOUR SCORE IS: 62 out of 100 *****

A weighted scale for the components of consumption and water loss is included in the calculation of the Water Audit Data Validity Score

PRIORITY AREAS FOR ATTENTION:

Based on the information provided, audit accuracy can be improved by addressing the following components:

1: Volume from own sources
2: Unbilled metered
3: Variable production cost (applied to Real Losses)

AWWA Free Water Audit Software:
Reporting Worksheet

WAS v5.0

? Click to access definition
+ Click to add a comment

Water Audit Report for: City of Red Bluff (CA5210004)
Reporting Year: 2019 1/2019 - 12/2019

Please enter data in the white cells below. Where available, metered values should be used; if metered values are unavailable please estimate a value. Indicate your confidence in the accuracy of the input data by grading each component (n/a or 1-10) using the drop-down list to the left of the input cell. Hover the mouse over the cell to obtain a description of the grades

All volumes to be entered as: MILLION GALLONS (US) PER YEAR

To select the correct data grading for each input, determine the highest grade where the utility meets or exceeds all criteria for that grade and all grades below it.

<---------- Enter grading in column 'E' and 'J' ---------->

Master Meter and Supply Error Adjustments

WATER SUPPLIED

					Pcnt:	Value:	
Volume from own sources:	8	1,196	MG/Yr	2	0.50%		MG/Yr
Water imported:	n/a	0.000	MG/Yr				MG/Yr
Water exported:	n/a	0.000	MG/Yr				MG/Yr

Enter negative % or value for under-registration
Enter positive % or value for over-registration

WATER SUPPLIED: 1,190.050 MG/Yr

AUTHORIZED CONSUMPTION

Click here: ? for help using option buttons below

				Pcnt:	Value:	
Billed metered:	8	1,037.500	MG/Yr			
Billed unmetered:	n/a	0.000	MG/Yr			
Unbilled metered:	1	29.101	MG/Yr			
Unbilled unmetered:		14.876	MG/Yr	1.25%		MG/Yr

Default option selected for Unbilled unmetered - a grading of 5 is applied but not displayed

AUTHORIZED CONSUMPTION: 1,081.477 MG/Yr

Use buttons to select percentage of water supplied **OR** value

WATER LOSSES (Water Supplied - Authorized Consumption) 108.573 MG/Yr

Apparent Losses

				Pcnt:	Value:	
Unauthorized consumption:		2.975	MG/Yr	0.25%		MG/Yr

Default option selected for unauthorized consumption - a grading of 5 is applied but not displayed

Customer metering inaccuracies:	6	2.673	MG/Yr	0.25%		MG/Yr
Systematic data handling errors:		2.594	MG/Yr	0.25%		MG/Yr

Default option selected for Systematic data handling errors - a grading of 5 is applied but not displayed

Apparent Losses: 8.242 MG/Yr

Real Losses (Current Annual Real Losses or CARL)

Real Losses = Water Losses - Apparent Losses: 100.331 MG/Yr

WATER LOSSES: 108.573 MG/Yr

NON-REVENUE WATER

NON-REVENUE WATER: 152.550 MG/Yr

= Water Losses + Unbilled Metered + Unbilled Unmetered

SYSTEM DATA

Length of mains:	5	81.0	miles
Number of active AND inactive service connections:	5	4,870	
Service connection density:		60	conn./mile main

Are customer meters typically located at the curbstop or property line? Yes

Average length of customer service line: (length of service line, beyond the property boundary, that is the responsibility of the utility)

Average length of customer service line has been set to zero and a data grading score of 10 has been applied

Average operating pressure:	7	65.0	psi

COST DATA

Total annual cost of operating water system:	7	$ 2,356,928.50	$/Year	
Customer retail unit cost (applied to Apparent Losses):	5			
Variable production cost (applied to Real Losses):	3		$/Million gallons	☐ Use Customer Retail Unit Cost to value real losses

WATER AUDIT DATA VALIDITY SCORE:

***** YOUR SCORE IS: 62 out of 100 *****

A weighted scale for the components of consumption and water loss is included in the calculation of the Water Audit Data Validity Score

PRIORITY AREAS FOR ATTENTION:

Based on the information provided, audit accuracy can be improved by addressing the following components:

1: Volume from own sources
2: Unbilled metered
3: Variable production cost (applied to Real Losses)

AWWA Free Water Audit Software:
Reporting Worksheet

WAS v5.0

? Click to access definition
+ Click to add a comment

Water Audit Report for: City of Red Bluff (CA5210004)
Reporting Year: 2020 1/2020 - 12/2020

Please enter data in the white cells below. Where available, metered values should be used; if metered values are unavailable please estimate a value. Indicate your confidence in the accuracy of the input data by grading each component (n/a or 1-10) using the drop-down list to the left of the input cell. Hover the mouse over the cell to obtain a description of the grades

All volumes to be entered as: MILLION GALLONS (US) PER YEAR

To select the correct data grading for each input, determine the highest grade where the utility meets or exceeds all criteria for that grade and all grades below it.

<---------- Enter grading in column 'E' and 'J' ---------->

Master Meter and Supply Error Adjustments

WATER SUPPLIED

					Pcnt:	Value:	
Volume from own sources:	8	1,329	MG/Yr	2	0.50%		MG/Yr
Water imported:	n/a	0.000	MG/Yr				MG/Yr
Water exported:	n/a	0.000	MG/Yr				MG/Yr

Enter negative % or value for under-registration
Enter positive % or value for over-registration

WATER SUPPLIED: 1,322.388 MG/Yr

AUTHORIZED CONSUMPTION

Click here: ? for help using option buttons below

				Pcnt:	Value:	
Billed metered:	8	1,205.700	MG/Yr			
Billed unmetered:	n/a	0.000	MG/Yr			
Unbilled metered:	1	36.305	MG/Yr			
Unbilled unmetered:		16.530	MG/Yr	1.25%		MG/Yr

Default option selected for Unbilled unmetered - a grading of 5 is applied but not displayed

AUTHORIZED CONSUMPTION: 1,258.535 MG/Yr

Use buttons to select percentage of water supplied **OR** value

WATER LOSSES (Water Supplied - Authorized Consumption) 63.853 MG/Yr

Apparent Losses

				Pcnt:	Value:	
Unauthorized consumption:		3.306	MG/Yr	0.25%		MG/Yr

Default option selected for unauthorized consumption - a grading of 5 is applied but not displayed

Customer metering inaccuracies:	6	3.113	MG/Yr	0.25%		MG/Yr
Systematic data handling errors:		3.014	MG/Yr	0.25%		MG/Yr

Default option selected for Systematic data handling errors - a grading of 5 is applied but not displayed

Apparent Losses: 9.433 MG/Yr

Real Losses (Current Annual Real Losses or CARL)

Real Losses = Water Losses - Apparent Losses: 54.420 MG/Yr

WATER LOSSES: 63.853 MG/Yr

NON-REVENUE WATER

NON-REVENUE WATER: 116.688 MG/Yr

= Water Losses + Unbilled Metered + Unbilled Unmetered

SYSTEM DATA

Length of mains:	5	81.0	miles
Number of active AND inactive service connections:	5	4,870	
Service connection density:		60	conn./mile main

Are customer meters typically located at the curbstop or property line? Yes

Average length of customer service line: (length of service line, beyond the property boundary, that is the responsibility of the utility)

Average length of customer service line has been set to zero and a data grading score of 10 has been applied

Average operating pressure:	7	65.0	psi

COST DATA

Total annual cost of operating water system:	7	$ 2,815,899.50	$/Year	
Customer retail unit cost (applied to Apparent Losses):	5			
Variable production cost (applied to Real Losses):	3		$/Million gallons	☐ Use Customer Retail Unit Cost to value real losses

WATER AUDIT DATA VALIDITY SCORE:

***** YOUR SCORE IS: 62 out of 100 *****

A weighted scale for the components of consumption and water loss is included in the calculation of the Water Audit Data Validity Score

PRIORITY AREAS FOR ATTENTION:

Based on the information provided, audit accuracy can be improved by addressing the following components:

1: Volume from own sources
2: Unbilled metered
3: Variable production cost (applied to Real Losses)

Appendix E

DEPARTMENT OF WATER RESOURCES BULLETIN 118

Sacramento Valley Groundwater Basin, Red Bluff Subbasin

- Groundwater Basin Number: 5-21.50
- County: Tehama
- Surface Area: 266,750 acres (416 square miles)

Basin Boundaries and Hydrology

The Red Bluff Subbasin is bounded on the west by the Coast Ranges, on the north by the Red Bluff Arch, on the south by Thomes Creek and on the east by the Sacramento River. The Red Bluff Arch is a hydrologic divide between the Redding Basin to the north and the Sacramento Valley. The Red Bluff Subbasin is likely contiguous with the Corning Subbasin at depth. Annual precipitation in the subbasin ranges from 19- to 27-inches with higher precipitation occurring to the north.

Hydrogeologic Information

Water-Bearing Formations

The Red Bluff Subbasin aquifer system is composed of continental deposits of late Tertiary to Quaternary age. The Quaternary deposits include Holocene stream channel deposits and Pleistocene Modesto and Riverbank formations. The Tertiary deposits consist of Pliocene Tehama and Tuscan formations.

Holocene Stream Channel Deposits. These deposits consist of unconsolidated gravel, sand, silt and clay derived from the erosion, reworking, and deposition of adjacent Tehama Formation and Quaternary stream terrace deposits found at or near the surface along stream and river channels. The thickness varies from 1-to 80-feet (Helley and Harwood 1985). This unit represents the upper part of the unconfined zone of the aquifer. Although it is moderately to highly permeable it is not a significant contributor to groundwater because of its limited areal extent.

Pleistocene Modesto Formation. The Modesto Formation (deposited between 14,000 to 42,000 years ago) consists of poorly indurated gravel and cobbles with sand, silt, and clay derived from reworking and deposition of the Tehama and Riverbank formations. The deposit ranges from less than 10 feet to nearly 200 feet across the valley floor (Helley and Harwood 1985). The terrace deposits are observed along Thomes, Elder, and Red Bank Creeks.

Pleistocene Riverbank Formation. The Riverbank Formation (deposited between 130,000 to 450,000 years ago) consists of poorly-to-highly permeable pebble and small cobble gravels interlensed with reddish clay sands and silt. The formation ranges from less than one foot to over 200 feet thick depending on location (Helley and Harwood 1985). Riverbank terrace deposits are observed along Thomes, Pine, Dibble, Reeds, Red Bank, Oat and Elder Creeks.

Pliocene Tehama Formation. The Tehama Formation consists of sediments originating from the Coast Range and Klamath Mountains, and is the primary

source of groundwater for the subbasin. The majority of the Tehama Formation consists of fine-grained sediments indicative of deposition under floodplain conditions (McManus 1993). The thickness of coarse-grained beds of sand and gravel, as indicated by drill log data, are typically no more than 5- to 10-feet. The majority of both coarse and fine-grained sediments appears unconsolidated or moderately consolidated. The thickness of the formation is estimated to be up to 1,200 feet north of the City of Corning (DWR 2000).

Pliocene Tuscan Formation. The Tuscan Formation consists of volcanic gravel and tuff-breccia, fine- to coarse-grained volcanic sandstone, conglomerate and tuff, and tuffaceous silt and clay; derived predominantly from andesitic and basaltic sources of the Cascade Range. In the subsurface the Tuscan Formation is found juxtaposed with the Tehama Formation in the axis of the valley near the Sacramento River. Permeability is moderate to high with yields ranging from 100 to 1,000 gpm, excluding areas where beds of the impermeable tuff-breccia exist.

Restrictive Structures

The Red Bluff Arch is a hydrologic divide between the Redding Basin to the north and the Sacramento Valley.

Groundwater Level Trends

Review of hydrographs for long-term comparison of spring-spring groundwater levels indicates a decline of 3- to 7-feet associated with the 1976-77 and 1987-94 droughts, followed by a recovery to pre-drought conditions of the early 1970's and 1980's. Generally, groundwater level data show a seasonal fluctuation ranging from 5- to 10-feet for unconfined, semi-confined, and composite wells. Wells constructed in confined aquifers can fluctuate up to 50 feet. Overall, there does not appear to be any increasing or decreasing trends in the groundwater levels.

Groundwater Storage

The storage capacity of the subbasin was estimated based on estimates of specific yield for the Sacramento Valley as developed in DWR (1978). Estimates of specific yield, determined on a regional basis, were used to obtain a weighted specific yield conforming to the subbasin boundary. The estimated specific yield for the subbasin is 7.9 percent. The estimated storage capacity to a depth of 200 feet is approximately 4,208,851 acre-feet.

Groundwater Budget (Type B)

Estimates of groundwater extraction for the Red Bluff Subbasin are based on a survey conducted by the California Department of Water Resources in 1994. The survey included landuse and sources of water. The estimate of groundwater extraction for agricultural use is estimated to be 81,000 acre-feet. Groundwater extraction for municipal and industrial uses is 8,900 acre-feet. Deep percolation from applied water is estimated to be 20,000 acre-feet.

Groundwater Quality

Characterization. Calcium-magnesium bicarbonate and magnesium-calcium bicarbonate are the predominant groundwater types in the subbasin. Total dissolved solids (TDS) concentrations range from 120- to 500-mg/L and average 207 mg/L (DWR unpublished data).

Impairments. Impairments include high magnesium, TDS, calcium, ASAR, and phosphorus.

Water Quality in Public Supply Wells

Constituent Group[1]	Number of wells sampled[2]	Number of wells with a concentration above an MCL[3]
Inorganics – Primary	41	2
Radiological	33	0
Nitrates	41	0
Pesticides	23	0
VOCs and SVOCs	16	0
Inorganics – Secondary	41	4

[1] A description of each member in the constituent groups and a generalized discussion of the relevance of these groups are included in *California's Groundwater – Bulletin 118* by DWR (2003).
[2] Represents distinct number of wells sampled as required under DHS Title 22 program from 1994 through 2000.
[3] Each well reported with a concentration above an MCL was confirmed with a second detection above an MCL. This information is intended as an indicator of the types of activities that cause contamination in a given basin. It represents the water quality at the sample location. It does not indicate the water quality delivered to the consumer. More detailed drinking water quality information can be obtained from the local water purveyor and its annual Consumer Confidence Report.

Well Characteristics

	Well yields (gal/min)	
Municipal/Irrigation	Range: 50 – 1,200	Average: 363 (4 Well Completion Reports)
	Total depths (ft)	
Domestic	Range: 20 – 780	Average: 197 (3293 Well Completion Reports)
Municipal/Irrigation	Range: 22 – 465	Average: 207 (18 Well Completion Reports)

Active Monitoring Data

Agency	Parameter	Number of wells /measurement frequency
DWR	Groundwater levels	29 wells semi-annually
USBR	Groundwater levels	1 well semi-annually
DWR	Miscellaneous water quality	10 wells biennially
Department of Health Services and cooperators	Miscellaneous water quality	56

Basin Management

Groundwater management:	Tehama County adopted a groundwater management ordinance in 1994. Tehama County adopted a countywide AB 3030 plan in 1996.
Water agencies	
Public	Tehama County Flood Control and Water Conservation District. El Camino ID, Elder Creek WD, Gerber-Los Flores Community Service District, Gerber Water Works Inc., Tehama Ranch M.W.C., Proberta WD, Rawson WD, Thomes Creek WD, City of Red Bluff.
Private	

Selected References

California Department of Water Resources. 1978. Evaluation of Groundwater Resources: Sacramento Valley. Department of Water Resources in cooperation with the United States Geological Survey. Appendix A. Bulletin 118-6.

California Department of Water Resources (DWR). 2000. Geology and Hydrogeology of the Freshwater Bearing Aquifer Systems of the Northern Sacramento Valley, California. In Progress.

McManus D. 1993. Groundwater Resource Evaluation of the West-Side of the Upland Area: Sacramento Valley [M.S.]: California State University, Chico.

Helley EJ, Harwood DS. 1985. Geologic Map of the Late Cenozoic Deposits of the Sacramento Valley and Northern Sierran Foothills, California. USGS Map MF-1790.

Bibliography

Bailey EH. 1966. Geology of Northern California. California Division of Mines and Geology. Bulletin 190.

Berkstressor CF. 1973. Base of Fresh Water in the Sacramento Valley and Sacramento-San Joaquin Delta, California. U.S. Geological Survey in Cooperation with California Department of Water Resources.

Bertoldi G. 1976. Chemical Quality of Ground Water in the Tehama - Colusa Canal Service Area, Sacramento Valley, California. USGS. Water Resources Investigations 76-92.

Bertoldi GT, Johnson RH, Evenson KD. 1991. Groundwater in the Central Valley, California -- A Summary Report. Regional Aquifer System Analysis--Central Valley, California. USGS. Professional Paper 1401-A.

Beyer LA. 1993. Sacramento Basin Province. USGS.

Blake MC, Jayko AS, Murchey BL, Jones DL. 1987. Structure, Age, and Tectonic Significance of the Coast Range Ophiolite and Related Rocks Near Paskenta, California. Geological Society of America.

Bryan K. 1923. Geology and Ground-water Resources of Sacramento Valley, California. USGS. 495.

California Department of Pesticide Regulation. 1993. Sampling for Pesticide Residues in California Well Water, 1993 Well Inventory Database. California Environmental Protection Agency.

California Department of Water Resources. 1958. Ground Water Conditions in Central and Northern California 1957-58. California Department of Water Resources. Bulletin 77-58.

California Department of Water Resources. 1964. Quality of Ground Water in California 1961-62, Part 1: Northern and Central California. California Department of Water Resources. Bulletin 66-62.

California Department of Water Resources. 1964. Groundwater Conditions in Central and Northern California,1961-62. California Dept. of Water Resources.

California Department of Water Resources. 1966. Precipitation in the Central Valley. Coordinated Statewide Planning Program. California Department of Water Resources, Sacramento District. Office Report.

California Department of Water Resources. 1975. California's Ground Water. California Department of Water Resources. Bulletin 118.

California Department of Water Resources. 1975. Progress Report Sacramento And Redding Basins Groundwater Study. California Department of Water Resources, Northern and Central Districts, in cooperation with the U.S. Geological Survey. Bulletin 118.

California Department of Water Resources. 1976. Progress Report in Ground Water Development Studies, North Sacramento Valley. California Department of Water Resources, Northern District. Memorandum Report.

California Department of Water Resources. 1980. Ground Water Basins in California. California Department of Water Resources. Bulletin 118-80.

California Department of Water Resources. 1987. Progress Report Sacramento and Redding Basins Ground Water Study. California Department of Water Resources, Northern and Central Districts, in cooperation with the U.S. Geological Survey.

California Department of Water Resources. 1993. Ground Water Levels in the Sacramento Valley Ground Water Basin; Tehama County. California Department of Water Resources, Northern District.

California Department of Water Resources. 1995. Sacramento Valley Groundwater Quality Investigation. California Department of Water Resources, Northern District.

California Department of Water Resources. 1998. California Water Plan Update. California Department of Water Resources. Bulletin 160-98 Volumes 1 and 2.

Cherven VB, Edmondson WF. 1992. Structural Geology of the Sacramento Basin: Annual Meeting, Pacific Section AAPG, Sacramento, California, April 27, 1992-May 2,1992.

Dickinson WR, Ingersoll RV, Grahm SA. 1979. Paleogene Sediment Dispersal and Paleotectonics in Northern California. Geological Society of America Bulletin 90:1458-1528.

Fogelman RP. 1976. Descriptions and Chemical Analysis for Selected Wells in the Central Sacramento Valley, California. USGS. OF-76-472.

Fogelman RP. 1978. Chemical Quality of Ground Water in the Central Sacramento Valley, California. USGS. Water Resources Investigations77-133.

Fogelman RP. 1982. Dissolved-solids Concentrations of Groundwater in the Sacramento Valley, California. USGS. HA-645.

Fogelman RP. 1983. Ground Water Quality in the Sacramento Valley, California, Water Types and Potential Nitrate and Boron Problem Areas. USGS. HA-651.

Fogelman RP, Rockwell GL. 1977. Descriptions and Chemical Analysis for Selected Wells in the Eastern Sacramento Valley, California. USGS. OF-77-486.

Graham SA, Lowe DR, editors. 1993. Advances in Sedimentary Geology of the Great Valley Group, Sacramento Valley, California.

Harwood DS, Helley EJ. 1982. Preliminary Structure Contour Map of the Sacramento Valley, California, Showing Major Late Cenozoic Structural Features and Depth to Basement. USGS.

Harwood DS, Helley EJ. 1987. Late Cenozoic Tectonism of the Sacramento Valley. USGS.

Helley EJ, Harwood DS. 1985. Geologic Map of the Late Cenozoic Deposits of the Sacramento Valley and Northern Sierra Foothills, California. USGS. Map MF-1790.

Helley EJ, Jaworowski C. 1985. The Red Bluff Pediment; A Datum Plane for Locating Quaternary Structures in the Sacramento Valley, California. USGS.

Hull LC. 1984. Geochemistry of Groundwater in the Sacramento Valley, California. Central Valley of California RASA Project. USGS. Professional Paper 1401-B.

Ingersoll RV, Rich EI, Dickerson WR. 1977. Field Guide: Great Valley Sequence, Sacramento Valley.

Mankinen EA. 1978. Paleomagnetic Evidence for a Late Cretaceous Deformation of the Great Valley Sequence, Sacramento Valley, California. USGS.

Mitten HT. 1972. Estimated Ground-water Pumpage in the Northern Part of the Sacramento Valley, California,1966-69. USGS.

Mitten HT. 1973. Estimated Ground-water Pumpage in the Northern Part of the Sacramento Valley, California, 1970-71. USGS.

Olmsted FH, Davis GH. 1961. Geologic Features and Ground Water Storage Capacity of the Sacramento Valley, California. USGS. Water Supply Paper 1497.

Page RW. 1974. Base and Thickness of the Post-Eocene Continental Deposits in the Sacramento Valley, California. U.S. Geological Survey in cooperation with California Department of Water Resources. Water Resources Investigations 45-73.

Page RW. 1986. Geology of the Fresh Groundwater Basin of the Central Valley, California, with Texture Maps and Sections. Regional Aquifer System Analysis. USGS. Professional Paper 1401-C.

Planert M, Williams JS. 1995. Ground Water Atlas of the United States, Segment 1, California, Nevada. USGS. HA-730-B.

Poland JF, Evenson RE. 1966. Hydrogeology and Land Subsidence, Great Central Valley, California, Geology of Northern California. California Division of Mines and Geology. 239-247 p.

Russell RD. 1931. The Tehama Formation of Northern California [Ph.D]: University of California.

Steele WC. 1980. Quaternary Stream Terraces in the Northwestern Sacramento Valley, Glenn, Tehama, and Shasta Counties, California. USGS.

Tehama County Flood Control and Water Conservation District. 1996. Coordinated AB 3030 Groundwater Management Plan. Tehama County Flood Control and Water Conservation District.

Tehama County Flood Control and Water Conservation District. 1999. Coordinated AB 3030 Groundwater Management Plan, First Annual Report. Tehama County Flood Control and Water Conservation District.

U.S.Geogolgical Survey. 1981. Water Resources Data for California; Volume 4, Northern Central Valley Basins and the Great Basin from Honey Lake Basin to Oregon State Line. USGS.

Williamson AK, Prudic DE, Swain LA. 1985. Groundwater Flow in the Central Valley, California. USGS. USGS OF-85-345.

Williamson AK, Prudic DE, Swain LA. 1989. Groundwater Flow in the Central Valley, California. Regional Aquifer-System Analysis--Central Valley, California. USGS. Professional Paper 1401-D.

Errata

Changes made to the basin description will be noted here.

Sacramento Valley Groundwater Basin, Antelope Subbasin

- Groundwater Basin Number: 5-21.54
- County: Tehama
- Surface Area: 18,710 acres (29 square miles)

Basin Boundaries and Hydrology

The Antelope Subbasin comprises the portion of the Sacramento Valley Groundwater Basin bounded on the west by the Sacramento River, on the north by the Red Bluff Arch, on the northeast by the Cascade Range, and the southeast by Antelope Creek. The Antelope Subbasin is contiguous with the Dye Creek Subbasin to the south. Annual precipitation in the subbasin ranges from 23- to 27-inches, increasing to the east.

Hydrogeologic Information

Water-Bearing Formations

The aquifer system in this subbasin is comprised of continental deposits of Tertiary to late Quaternary age. The Quarternary deposits include Pleistocene Modesto and Riverbank Formations. The Tertiary deposits include the Pliocene Tehama Formation and the Tuscan Formation. The Tuscan Formation is the primary water producing zone in the basin.

Pleistocene Modesto Formation. The Pleistocene Modesto Formation (deposited between 14,000 to 42,000 years ago) consists of poorly indurated gravel and cobbles with sand, silt and clay derived from reworking and deposition of the Tehama, Tuscan, and Riverbank Formations. Well logs for wells drilled on the floodplain east of Red Bluff indicate that coarse grained clean sand and gravel extend to a depth of approximately 50 feet below the surface. Below this depth, cemented gravel, sandstone, and hard clay of the Tehama and Tuscan Formations are encountered (Omsted and Davis 1961). The Modesto Formation yields limited groundwater due to its limited thickness (DWR 1987).

Pleistocene Riverbank Formation. The Pleistocene Riverbank Formation (deposited between 130,000 and 450,000 years ago) is observed in the far northern extents of the subbasin. The Riverbank Formation yields limited groundwater due to its limited thickness and areal extents.

Pliocene Tuscan Formation. The Tuscan Formation is composed of volcanic breccia, tuff, tuff breccia, volcanic sandstone and conglomerate, basalt flows, and tuffaceous silt and clay. The formation is mostly consolidated tuff in the area of exposure east of the valley in the Cascade Range foothills. From there tuff breccias grade westerly into volcanic sands, gravels, and clay (DWR 1978). The Tuscan Formation is the major water-bearing aquifer in the northeastern portion of the Sacramento Valley. Thickness of the formation within the subbasin is approximately 1,500 feet (DWR 1987).

Pliocene Tehama Formation. The Tehama Formation interfingers with the Tuscan Formation along the Sacramento River and is exposed in westside

Sacramento River banks. The formation consists of fluvial deposits of predominantly silt and clay with gravel and sand interbeds (DWR 1987). The formation is identified within the subbasin at depths ranging from 100- to 150- feet (DWR 1987).

Recharge Areas

Recharge is from inflow from the Sacramento River, Salt Creek, and Antelope Creek. In an investigation conducted by U.S. Bureau of Reclamation, the upper and intermediate aquifer zones (located between the local groundwater elevation and 150 feet in depth) intercept the Sacramento River. Diurnal fluctuations in river stage produce diurnal water level fluctuations in the deeper aquifer zone (Ely 1994).

Restrictive Structures

The Inks Creek fold system is a series of northeast-trending folds north of the Antelope Subbasin. The system isolates the Redding Groundwater Basin from the Sacramento Valley Basin. The fold system is a hydrologic drainage divide and separates the Red Bluff Arch from the Chico Monocline (DWR 1987).

Groundwater Level Trends

Review of hydrographs for long-term comparison of spring-spring groundwater levels indicates a decline of 5- to 10-feet associated with the 1976-77 and 1987-94 droughts, followed by a recovery to pre-drought conditions of the early 1970's and 1980's. Generally, groundwater level data show a seasonal fluctuation of approximate 2- to 15-feet for normal and dry years. Overall, there does not appear to be any increasing or decreasing trends in groundwater levels.

Groundwater Storage

The storage capacity of the subbasin was estimated based on estimates of specific yield for the Sacramento Valley as developed in DWR (1978). Estimates of specific yield, determined on a regional basis, were used to obtain a weighted specific yield conforming to the subbasin boundary. The estimated specific yield for the subbasin is 7.2 percent. The estimated storage capacity to a depth of 200 feet is approximately 269,179 acre-feet.

Groundwater Budget (Type B)

Estimates of groundwater extraction for the Antelope Subbasin are based on a survey conducted by the California Department of Water Resources in 1994. The survey included landuse and sources of water. Estimates of groundwater extraction for agricultural and municipal/industrial uses are 17,000 and 2,100 acre-feet respectively. Deep percolation of applied water is estimated to be 3,800 acre-feet.

Groundwater Quality

Characterization. Groundwater in the subbasin is characterized as calcium-magnesium bicarbonate and magnesium-calcium bicarbonate. Total dissolved solids (TDS) range from 119- to 558- mg/L, averaging 280 mg/L (DWR unpublished data).

Impairments. High concentrations of boron, chloride, and TDS are found in groundwater in the vicinity of Salt Creek and Little Salt Creek. Nitrate concentrations of 20- to 45- mg/L have been observed within the west-central portion of the basin (DWR 1987).

Water Quality in Public Supply Wells

Constituent Group[1]	Number of wells sampled[2]	Number of wells with a concentration above an MCL[3]
Inorganics – Primary	17	0
Radiological	10	0
Nitrates	17	0
Pesticides	6	0
VOCs and SVOCs	3	0
Inorganics – Secondary	17	3

[1] A description of each member in the constituent groups and a generalized discussion of the relevance of these groups are included in *California's Groundwater – Bulletin 118* by DWR (2003).
[2] Represents distinct number of wells sampled as required under DHS Title 22 program from 1994 through 2000.
[3] Each well reported with a concentration above an MCL was confirmed with a second detection above an MCL. This information is intended as an indicator of the types of activities that cause contamination in a given basin. It represents the water quality at the sample location. It does not indicate the water quality delivered to the consumer. More detailed drinking water quality information can be obtained from the local water purveyor and its annual Consumer Confidence Report.

Well Characteristics

	Well yields (gal/min)	
Municipal/Irrigation	Range: 300 – 800	Average: 575 (4 Well Completion Report)
	Total depths (ft)	
Domestic	Range: 40 - 450	Average: 104 (702 Well Completion Reports)
Municipal/Irrigation	Range: 40 - 600	Average: 176 (92 Well Completion Reports)

Active Monitoring Data

Agency	Parameter	Number of wells /measurement frequency
DWR	Groundwater levels	4 wells semi-annually
DWR	Miscellaneous water quality	5 wells biennially
Department of Health Services	Miscellaneous water quality	22

Basin Management

Groundwater management:	Tehama County adopted a groundwater ordinance in 1994. Tehama County adopted a countywide AB3030 plan in 1996.
Water agencies	
Public	Tehama County Flood Control and Water Conservation District, City of Red Bluff
Private	

Selected References

California Department of Water Resources (DWR) in cooperation with the United States Geological Survey (USGS). 1978. Evaluation of Groundwater Resources: Sacramento Valley.

California Department of Water Resources. 1978. Evaluation of Groundwater Resources: Sacramento Valley. Department of Water Resources in cooperation with the United States Geological Survey. Appendix A. Bulletin 118-6.

California Department of Water Resources. April 1987. Antelope Groundwater Study. Northern District.

California Department of Water Resources. 2000. Geology and Hydrogeology of the Freshwater Bearing Aquifer Systems of the Northern Sacramento Valley, California. In Progress.

Helley EJ, Harwood DS. 1985. Geologic Map of the Late Cenozoic Deposits of the Sacramento Valley and Northern Sierran Foothills, California. USGS Map MF-1790.

Olmsted FH, Davis GH. 1961. Geologic Features and Ground Water Storage Capacity of the Sacramento Valley, California. USGS. Water Supply Paper 1497.

Bibliography

Bailey EH. 1966. Geology of Northern California. California Division of Mines and Geology. Bulletin 190.

Berkstressor CF. 1973. Base of Fresh Water in the Sacramento Valley and Sacramento-San Joaquin Delta, California. U.S. Geological Survey in Cooperation with California Department of Water Resources.

Bertoldi GT, Johnson RH, Evenson KD. 1991. Groundwater in the Central Valley, California -- A Summary Report. Regional Aquifer System Analysis--Central Valley, California. USGS. Professional Paper 1401-A.

Beyer LA. 1993. Sacramento Basin Province. USGS.

Bryan K. 1923. Geology and Ground-water Resources of Sacramento Valley, California. USGS. 495.

California Department of Pesticide Regulation. 1993. Sampling for Pesticide Residues in California Well Water, 1993 Well Inventory Database. California Environmental Protection Agency.

California Department of Water Resources. 1958. Ground Water Conditions in Central and Northern California 1957-58. California Department of Water Resources. Bulletin 77-58.

California Department of Water Resources. 1964. Groundwater Conditions in Central and Northern California,1961-62. California Department of Water Resources.

California Department of Water Resources. 1964. Quality of Ground Water in California 1961-62, Part 1: Northern and Central California. California Department of Water Resources. Bulletin 66-62.

California Department of Water Resources. 1966. Precipitation in the Central Valley. Coordinated Statewide Planning Program. California Department of Water Resources, Sacramento District. Office Report.

California Department of Water Resources. 1975. California's Ground Water. California Department of Water Resources. Bulletin 118.

California Department of Water Resources. 1975. Progress Report Sacramento And Redding Basins Groundwater Study. California Department of Water Resources, Northern and Central Districts, in cooperation with the U.S. Geological Survey. Bulletin 118.

California Department of Water Resources. 1980. Ground Water Basins in California. California Department of Water Resources. Bulletin 118-80.

California Department of Water Resources. 1987. Progress Report Sacramento and Redding Basins Ground Water Study. California Department of Water Resources, Northern and Central Districts, in cooperation with the U.S. Geological Survey.

California Department of Water Resources. 1993. Ground Water Levels in the Sacramento Valley Ground Water Basin; Tehama County. California Department of Water Resources, Northern District.

California Department of Water Resources. 1995. Sacramento Valley Groundwater Quality Investigation. California Department of Water Resources, Northern District.

California Department of Water Resources. 1998. California Water Plan Update. California Department of Water Resources. Bulletin 160-98, Volumes 1 and 2.

Cherven VB, Edmondson WF. 1992. Structural Geology of the Sacramento Basin: Annual Meeting, Pacific Section AAPG, Sacramento, California, April 27, 1992-May 2,1992.

Dickinson WR, Ingersoll RV, Grahm SA. 1979. Paleogene Sediment Dispersal and Paleotectonics in Northern California. Geological Society of America Bulletin 90:1458-1528.

Fogelman RP. 1976. Descriptions and Chemical Analysis for Selected Wells in the Central Sacramento Valley, California. USGS. OF-76-472.

Fogelman RP. 1978. Chemical Quality of Ground Water in the Central Sacramento Valley, California. USGS. Water Resources Investigations 77-133.

Fogelman RP. 1982. Dissolved-solids Concentrations of Groundwater in the Sacramento Valley, California. USGS. HA-645.

Fogelman RP. 1983. Ground Water Quality in the Sacramento Valley, California, Water Types and Potential Nitrate and Boron Problem Areas. USGS. HA-651.

Fogelman RP, Rockwell GL. 1977. Descriptions and Chemical Analysis for Selected Wells in the Eastern Sacramento Valley, California. USGS. OF-77-486.

Harwood DS, Helley EJ. 1982. Preliminary Structure Contour Map of the Sacramento Valley, California, Showing Major Late Cenozoic Structural Features and Depth to Basement. USGS.

Harwood DS, Helley EJ. 1987. Late Cenozoic Tectonism of the Sacramento Valley. USGS.

Harwood DS, Helley EJ, Doukas MP. 1981. Geologic Map of the Chico Monocline and Northeastern Part of the Sacramento Valley, California. USGS.

Hull LC. 1984. Geochemistry of Groundwater in the Sacramento Valley, California. Central Valley of California RASA Project. USGS. Professional Paper 1401-B.

Lydon PA. 1969. Geology and Lahars of the Tuscan Formation, Northern California. The Geological Society of America.

Mankinen EA. 1978. Paleomagnetic Evidence for a Late Cretaceous Deformation of the Great Valley Sequence, Sacramento Valley, California. USGS.

Mitten HT. 1972. Estimated Ground-water Pumpage in the Northern Part of the Sacramento Valley, California,1966-69. USGS.

Mitten HT. 1973. Estimated Ground-water Pumpage in the Northern Part of the Sacramento Valley, California, 1970-71. USGS.

Page RW. 1974. Base and Thickness of the Post-Eocene Continental Deposits in the Sacramento Valley, California. U.S. Geological Survey in cooperation with California Department of Water Resources. Water Resources Investigations 45-73.

Page RW. 1986. Geology of the Fresh Groundwater Basin of the Central Valley, California, with Texture Maps and Sections. Regional Aquifer System Analysis. USGS. Professional Paper 1401-C.

Planert M, Williams JS. 1995. Ground Water Atlas of the United States, Segment 1, California, Nevada. USGS. HA-730-B.

Poland JF, Evenson RE. 1966. Hydrogeology and Land Subsidence, Great Central Valley, California, Geology of Northern California. California Division of Mines and Geology. 239-247 p.

Steele WC. 1980. Quaternary Stream Terraces in the Northwestern Sacramento Valley, Glenn, Tehama, and Shasta Counties, California. USGS.

Tehama County Flood Control and Water Conservation District. 1996. Coordinated AB 3030 Groundwater Management Plan. Tehama County Flood Control and Water Conservation District.

Tehama County Flood Control and Water Conservation District. 1999. Coordinated AB 3030 Groundwater Management Plan, First Annual Report. Tehama County Flood Control and Water Conservation District.

U.S.Geological Survey. 1981. Water Resources Data for California; Volume 4, Northern Central Valley Basins and the Great Basin from Honey Lake Basin to Oregon State Line. USGS.

Williamson AK, Prudic DE, Swain LA. 1985. Groundwater Flow in the Central Valley, California. USGS. OF-85-345.

Williamson AK, Prudic DE, Swain LA. 1989. Groundwater Flow in the Central Valley, California. Regional Aquifer-System Analysis--Central Valley, California. USGS. Professional Paper 1401-D.

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Appendix F

CLIMATE CHANGE VULNERABILITY ASSESSMENT

The Climate Change Vulnerability Assessment is taken from the Climate Change Handbook for Regional Water Planning, USEPA and DWR, 2011. The vulnerability assessment highlights those water-related resources that are important to a region and are sensitive to climate change.

I. Water Demand

☐ *Are there major industries that require cooling/process water in your planning region?*

- As average temperatures increase, cooling water needs may also increase.
- Identify major industrial water users in your region and assess their current and projected needs for cooling and process water.

☒ *Does water use vary by more than 50% seasonally in parts of your region?*

- Seasonal water use, which is primarily outdoor water use, is expected to increase as average temperatures increase and droughts become more frequent.
- Where water use records are available, look at total monthly water uses averaged over the last five years (if available). If maximum and minimum monthly water uses vary by more than 25%, then the answer to this question is "yes"
- Where no water use records exist, is crop irrigation responsible for a significant (say >50%) percentage of water demand in parts of your region?

☐ *Are crops grown in your region climate-sensitive? Would shifts in daily heat patterns, such as how long heat lingers before night-time cooling, be prohibitive for some crops?*

- Fruit and nut crops are climate-sensitive and may require additional water as the climate warms.

☐ *Do groundwater supplies in your region lack resiliency after drought events?*

- Droughts are expected to become more frequent and more severe in the future. Areas with a more hardened demand may be particularly vulnerable to droughts and may become more dependent on groundwater pumping.

☒ *Are water use curtailment measures effective in your region?*

- Droughts are expected to become more frequent and more severe in the future. Areas with a more hardened demand may be particularly vulnerable to droughts.

☐ *Are some instream flow requirements in your region either currently insufficient to support aquatic life, or occasionally unmet?*

- Changes in snowmelt patterns in the future may make it difficult to balance water demands. Vulnerabilities for ecosystems and municipal/agricultural water needs may be exacerbated by instream flow requirements that are:
    1. not quantified,
    2. not accurate for ecosystem needs under multiple environmental conditions including droughts, and
    3. not met by regional water managers.

II. Water Supply

☐ *Does a portion of the water supply in your region come from snowmelt?*

- Snowmelt is expected to decrease as the climate warms. Water systems supplied by snowmelt are therefore potentially vulnerable to climate change.
- Where watershed planning documents are available, refer to these in identifying parts of your region that rely on surface water for supplies; if your region contains surface water supplies originating in watersheds where snowpack accumulates, the answer to this question is "Yes."
- Where planning documents are not available, identify major rivers in your region with large users. Identify whether the river's headwaters are fed by snowpack.

☐ *Does part of your region rely on water diverted from the Delta, imported from the Colorado River, or imported from other climate-sensitive systems outside your region?*

- Some imported or transferred water supplies are sources from climate-sensitive watersheds, such as water imported from the Delta and the Colorado River.

☐ *Does part of your region rely on coastal aquifers? Has salt intrusion been a problem in the past?*

- Coastal aquifers are susceptible to salt intrusion as sea levels rise, and many have already observed salt intrusion due to over-extraction, such as the West Coast Basin in southern California.

☐ *Would your region have difficulty in storing carryover supply surpluses from year to year?*

- Droughts are expected to become more severe in the future. Systems that can store more water may be more resilient to droughts.

☐ *Has your region faced a drought in the past during which it failed to meet local water demands?*

- Droughts are expected to become more severe in the future. Systems that have already come close to their supply thresholds may be especially vulnerable to droughts in the future.

☐ *Does your region have invasive species management issues at your facilities, along conveyance structures, or in habitat areas?*

- As invasive species are expected to become more prevalent with climate change, existing invasive species issues may indicate an ecological vulnerability to climate change.

III. Water Quality

☒ *Are increased wildfires a threat in your region? If so, does your region include reservoirs with fire-susceptible vegetation nearby which could pose a water quality concern from increased erosion?*

- Some areas are expected to become more vulnerable to wildfires over time. To identify whether this is the case for parts of your region, the California Public Interest Energy Research (PIER)Program has posted wildfire susceptibility projections as a Google Earth application at: *http://cal-adapt.org/fire/*. These projections are only the results of a single study and are not intended for analysis, but can aid in qualitatively answering this question. Read the application's disclaimers carefully to be aware of its limitations.

☐ *Does part of your region rely on surface water bodies with current or recurrent water quality issues related to eutrophication, such as low dissolved oxygen or algal blooms? Are there other water quality constituents potentially exacerbated by climate change?*

- Warming temperatures will result in lower dissolved oxygen levels in water bodies, which are exacerbated by algal blooms and in turn enhance eutrophication. Changes in streamflows may alter pollutant concentrations in water bodies.

☐ *Are seasonal low flows decreasing for some waterbodies in your region? If so, are the reduced low flows limiting the waterbodies' assimilative capacity?*

- In the future, low flow conditions are expected to be more extreme and last longer. This may result in higher pollutant concentrations where loadings increase or remain constant.

☐ *Are there beneficial uses designated for some water bodies in your region that cannot always be met due to water quality issues?*

- In the future, low flows are expected decrease, and to last longer. This may result in higher pollutant concentrations where loadings increase or remain constant.

☐ *Does part of your region currently observe water quality shifts during rain events that impact treatment facility operation?*

- While it is unclear how average precipitation will change with temperature, it is generally agreed that storm severity will probably increase. More intense, severe storms may lead to increased erosion, which will increase turbidity in surface waters. Areas that already observe water quality responses to rainstorm intensity may be especially vulnerable.

IV. Sea Level Rise

☐ *Has coastal erosion already been observed in your region?*

- Coastal erosion is expected to occur over the next century as sea levels rise.

☐ *Are there coastal structures, such as levees or breakwaters, in your region?*

- Coastal structures designed for a specific mean sea level may be impacted by sea level rise.

☐ *Is there significant coastal infrastructure, such as residences, recreation, water and wastewater treatment, tourism, and transportation) at less than six feet above mean sea level in your region?*

- Coastal flooding will become more common, and will impact a greater extent of property, as sea levels rise. Critical infrastructure in the coastal floodplain may be at risk.
- Digital elevation maps should be compared with locations of coastal infrastructure.

☐ *Are there climate-sensitive low-lying coastal habitats in your region?*

- Low-lying coastal habitats that are particularly vulnerable to climate change include estuaries and coastal wetlands that rely on a delicate balance of freshwater and salt water.

☐ *Are there areas in your region that currently flood during extreme high tides or storm surges?*

- Areas that are already experiencing flooding during storm surges and very high tides, are more likely to experience increased flooding as sea levels rise.

☐ *Is there land subsidence in the coastal areas of your region?*

- Land subsidence may compound the impacts of sea level rise.

☐ *Do tidal gauges along the coastal parts of your region show an increase over the past several decades?*

- Local sea level rise may be higher or lower than state, national, or continental projections.
- Planners can find information on local tidal gauges at *http://tidesandcurrents.noaa.gov/sltrends/sltrends_states.shtml?region=ca*

V. Flooding

☒ *Does critical infrastructure in your region lie within the 200-year floodplain? DWR's best available floodplain maps are available at: http://www.water.ca.gov/floodmgmt/lrafmo/fmb/fes/best_available_maps/*

- While it is unclear how average precipitation will change with temperature, it is generally agreed that storm severity will probably increase. More intense, severe storms may lead to higher peak flows and more severe floods.
- Refer to FEMA floodplain maps and any recent FEMA, US Army Corps of Engineers, or DWR studies that might help identify specific local vulnerabilities for your region. Other follow-up questions that might help answer this question:

    1. What public safety issues could be affected by increased flooding events or intensity? For example, evacuation routes, emergency personnel access, hospitals, water treatment and wastewater treatment plants, power generation plants and fire stations should be considered.
    2. Could key regional or economic functions be impacted from more frequent and/or intense flooding?

☒ *Does part of your region lie within the Sacramento-San Joaquin Drainage District?*

- The SSJDD contains lands that are susceptible to overflows from the Sacramento and San Joaquin Rivers, and are a key focus of the Central Valley Flood Protection Plan. (*http://www.water.ca.gov/cvfmp/program.cfm*).

☐ *Does aging critical flood protection infrastructure exist in your region?*

- Levees and other flood protection facilities across the state of California are aging and in need of repair. Due to their overall lowered resiliency, these facilities may be particularly vulnerable to climate change impacts.
- DWR is evaluating more than 300 miles of levees in the San Joaquin and Sacramento Rivers Valleys and the Delta (http://www.water.ca.gov/levees/).

☐ *Have flood control facilities (such as impoundment structures) been insufficient in the past?*

- Reservoirs and other facilities with impoundment capacity may be insufficient for severe storms in the future. Facilities that have been insufficient in the past may be particularly vulnerable.

☒ *Are wildfires a concern in parts of your region?*

- Wildfires alter the landscape and soil conditions, increasing the risk of flooding within the burn and downstream areas. Some areas are expected to become more vulnerable to wildfires over time. To identify whether this is the case for parts of your region, the California Public Interest Energy Research Program (PIER) has posted wildfire susceptibility projections as a Google Earth application at: http://cal-adapt.org/fire/. These projections are the results of only a single study and are not intended for analysis, but can aid in qualitatively answering this question. Read the application's disclaimers carefully to be aware of its limitations.

VI. Ecosystem and Habitat Vulnerability

☐ *Does your region include inland or coastal aquatic habitats vulnerable to erosion and sedimentation issues?*

- Erosion is expected to increase with climate change, and sedimentation is expected to shift. Habitats sensitive to these events may be particularly vulnerable to climate change.

☐ *Does your region include estuarine habitats which rely on seasonal freshwater flow patterns?*

- Seasonal high and low flows, especially those originating from snowmelt, are already shifting in many locations.

☐ *Do climate-sensitive fauna or flora populations live in your region?*

- Some specific species are more sensitive to climate variations than others.

☒ *Do endangered or threatened species exist in your region? Are changes in species distribution already being observed in parts of your region?*

- Species that are already threatened or endangered may have a lowered capacity to adapt to climate change.

☐ *Does the region rely on aquatic or water-dependent habitats for recreation or other economic activities?*

- Economic values associated with natural habitat can influence prioritization.

☒ *Are there rivers in your region with quantified environmental flow requirements or known water quality/quantity stressors to aquatic life?*

- Constrained water quality and quantity requirements may be difficult to meet in the future.

☐ *Do estuaries, coastal dunes, wetlands, marshes, or exposed beaches exist in your region? If so, are coastal storms possible/frequent in your region?*

- Storm surges are expected to result in greater damage in the future due to sea level rise. This makes fragile coastal ecosystems vulnerable.

☐ *Does your region include one or more of the habitats described in the Endangered Species Coalition's Top 10 habitats vulnerable to climate change http://www.endangered.org/its-getting-hot-out-there/ ?*

- These ecosystems are particularly vulnerable to climate change.

☐ *Are there areas of fragmented estuarine, aquatic, or wetland wildlife habitat within your region? Are there movement corridors for species to naturally migrate? Are there infrastructure projects planned that might preclude species movement?*

- These ecosystems are particularly vulnerable to climate change.

VII. Hydropower

☒ *Is hydropower a source of electricity in your region?*

- As seasonal river flows shift, hydropower is expected to become less reliable in the future.

☐ *Are energy needs in your region expected to increase in the future? If so, are there future plans for hydropower generation facilities or conditions for hydropower generation in your region?*

- Energy needs are expected to increase in many locations as the climate warms. This increase in electricity demand may compound decreases in hydropower production, increasing its priority for a region.

Appendix G

ENERGY INTENSITY FORM

Urban Water Supplier: *City of Red Bluff*

Water Delivery Product (If delivering more than one type of product use Table O-1C)

Retail Potable Deliveries

Table O-1B: Recommended Energy Reporting - Total Utility Approach				
Enter Start Date for Reporting Period	1/1/2020	**Urban Water Supplier Operational Control**		
End Date	12/31/2020			
☐ Is upstream embedded in the values reported?		**Sum of All Water Management Processes**	**Non-Consequential Hydropower**	
Water Volume Units Used	*AF*	Total Utility	Hydropower	Net Utility
Volume of Water Entering Process (volume unit)		*4,077*		*4,077*
Energy Consumed (kWh)		*1,610,957*		*1,610,957*
Energy Intensity (kWh/vol. converted to MG)		*1,213*	*0.0*	*1,213*

Quantity of Self-Generated Renewable Energy

0 kWh

Data Quality *(Estimate, Metered Data, Combination of Estimates and Metered Data)*

Metered Data

Data Quality Narrative:

Energy consumption data for retail potable water deliveries. The City does not have any hydropower.

Narrative:

The energy consumed was obtained from the electric power bills that are based on electric meter reads.

Appendix H

2020 CONSUMER CONFIDENCE REPORT

2020 CITY OF RED BLUFF CONSUMER CONFIDENCE REPORT

PUBLIC WATER SYSTEM #5210004

The City of Red Bluff operates a public water system under a permit issued by the State Water Resources Control Board (State Board). The permit was first issued in 1971 and is amended as improvements are added to the system. The State makes routine inspections of the water system and is the recipient of **all** test results. The City is regulated by Title 22 of the California Code of Regulations. This annual report includes water quality data through December 31, 2019. For additional information concerning this Consumer Confidence Report, contact **Public Works (530) 527-2605 extension 3067.**

Este informe contiene informatión muy importante sobre su agua potable. Tradúzcalo o hable con alguien que lo entienda bien.

THE FOLLOWING ARE DEFINITIONS OF SOME OF THE TERMS USED IN THIS REPORT:

Maximum Contaminant Level (MCL): The highest level of a contaminant that is allowed in drinking water. Primary MCLs are set as close to the PHGs (or MCLGs) as is economically and technologically feasible. Secondary MCLs are set to protect the odor, taste, and appearance of drinking water.

Maximum Contaminant Level Goal (MCLG): The level of a contaminant in drinking water below which there is no known or expected risk to health. MCLGs are set by the U.S. Environmental Protection Agency (USEPA).

Public Health Goal (PHG): The level of a contaminant in drinking water below which there is no known or expected risk to health. PHGs are set by the California Environmental Protection Agency.

Minimum Reporting Level (MRL): The smallest measured concentration of a substance that can be reliably measured by using a given analytical method.

Primary Drinking Water Standards (PDWS): MCLs and MRDLs for contaminants that affect health along with their monitoring and reporting requirements, and water treatment requirements.

ppm: parts per million or milligrams per liter (mg/L). One ppm or mg/l is equal to: One inch in 16 miles, One second in 11.5 days or One minute in two years.

ppb: parts per billion or micrograms per liter (ug/L) One ppb or ug/l is equal to: One second in nearly 32 years, Single penny in $10,000,000 or One pinch of salt in 10 tons of potato chips.

pCi/L: Pico curies per liter (a measure of radiation)

AL: Action Level

SOURCE OF WATER

The City currently operates 11 wells, varying in depth from 250' to 625' and varying in capacity from 480 to 2,400 gallons per minute. The water supplied by the 13 wells is not altered or treated prior to distribution. The City currently has two 3-million-gallon water storage facilities.

An assessment of the drinking water sources for the City of Red Bluff Water System was completed in February 2003. A copy of this assessment is available by contacting the Public Works Dept. at 530-527-2605 ext. 3067. April of 2019 the City tested all source wells for IOC (inorganic compounds) such as metals including arsenic.voc (volatile organic chemicals), water quality, TCP (trichloro propane). The tests were conducted by independent laboratories and the results were all below the MCL or AL limits. All standards are set by the state or federal government.

WATER QUALITY ANALYSIS

The following "range of test values", reflect the most recent analysis of the 11 well sites. All chemicals reported have no Public Health Goal (PHG).

DISTRIBUTION SYSTEM MICROBIOLOGICAL QUALITY OF WATER

CONTAMINANT	SAMPLE DETECTIONS	MCL	SOURCE OF BACTERIA
Total Coliform Bacteria	2	< 2	Naturally present in environment
Fecal Coliform or E. coli	0	A routine sample and a repeat sample detect total coliform and either sample also detects fecal coliform or E. coli	Human and animal fecal waste

Coliforms are bacteria that are naturally present in the environment and are used as an indicator that other, potentially harmful, bacteria may be present. Fecal coliforms and *E. coli* are bacteria whose presence indicates that the water may be contaminated with human or animal wastes. Microbes in these wastes can cause short-term effects, such as diarrhea, cramps, nausea, headaches, or other symptoms. They may pose a special health risk for infants, young children, some of the elderly, and people with severely compromised immune systems. The City tests four samples from the distribution system on a weekly basis for coliform organisms. The State Board regulations specify that no more than one routine sample is to be positive for coliform in a month.

In January 2020, one sample tested positive at the Washington St sample station. Retests of the station and samples upstream and downstream all returned negative. However, the city was issued a citation by the SWRCB for not following the Revised Coliform Rule retest procedures by not testing the source water supply. Source supplies were later tested, and the results were Negative. The cause of the positive sample is unknown.

In July 2020, the Washington St. sample station again tested positive. All retesting procedures were correctly followed, and all results returned negative. As a precautionary measure, The City took corrective action by rebuilding the sample station and retrofitting one of the source wells closest to the river with two sand separators, and extensively flushing the area. The City will continue to monitor the situation very closely.

INDIVIDUAL TAP MONITORING FOR LEAD AND COPPER

Monitoring of individual customer's taps from locations within the water system is performed for lead and copper. This monitoring is done periodically to verify that the delivered water does not contain lead or copper. Triennial testing for lead and copper is required by the State Board on a varied schedule. **Thirty** samples were collected in June 2019. The State allows monitoring for some contaminants less than once per year because the concentrations of these contaminants do not change frequently.

LEAD / COPPER	# OF SAMPLES	90th PERCENTILE	# OF SAMPLES OVER AL	AL
Lead	30	0.0001 **mg/l**	0	.015 **mg/l**
Copper	30	0.0091 **mg/l**	0	1.3 **mg/l**

If present, elevated levels of lead can cause serious health problems, especially for pregnant women and young children. Lead in drinking water is primarily from materials and components associated with service lines and home plumbing. The City of Red Bluff is responsible for providing high quality drinking water but cannot control the variety of materials used in plumbing components. When your water has been sitting for several hours, you can minimize the potential for lead exposure by flushing your tap for 30 seconds to 2 minutes before using water for drinking or cooking. If you are concerned about lead in your water, you may wish to have your water tested. Information on lead in drinking water, testing methods, and steps you can take to minimize exposure is available from the Safe Drinking Water Hotline or at http://www.epa.gov/safewater/lead. In March of 2019 the City of Red Bluff assisted the state by testing all public Schools in the water district for lead. The results were below the MCL or AL Limits. Results are available on written request to the city.

SAMPLING RESULTS FOR US EPA UNREGULATED MONITORING RULE (UCMR3) (UCMR4)

All public water systems serving 10,000 customers or more which includes the City of Red Bluff are required by the USEPA to participate in this program. This data serves as a primary source of occurrence and exposure information uses to develop regulatory decisions. Large water systems pay for their own testing costs. More information on ucmr3 and ucmr4 testing can be found on the EPA web site.

CONTAMINANT	RANGE DETECTED	AVERAGE	MRL	MCL SET BY STATE	DATE SAMPLED
Manganese	0-1.8 ug/L	.29 ug/L	.4 ug/L	50 ug/L	August 21, 2018
Chromium, Total	1.2—5.9 ug/L	3.87 ug/L	0.20 ug/L	N/A	December 2015
Strontium, Total	140—280 ug/L	218.46 ug/L	0.30 ug/L	N/A	December 2015
Vanadium, Total	4.2—18 ug/L	12.89 ug/L	0.20 ug/L	N/A	December 2015

Unregulated contaminant monitoring helps USEPA and the State Water Resources Control Board to determine where certain contaminants occur and if it is necessary to regulate them.

RADIOLOGICAL WATER QUALITY

Results of water sample analyses performed to measure radiological constituents. The water system is in compliance if the level does not exceed 5 Pico Curies per liter (pCi/l). Results of 3/31/2016 test for constituents were <1.0 to <3.0 (pCi/l). Composite Sampling test for Gross Alpha, Radium 226, Radium 228 and Uranium met the new regulations mandated by the State.

SODIUM AND HARDNESS

Although sodium and hardness do not have MCL's they are of interest to many consumers who are concerned about sodium intake and may believe that the hardness of the water could affect their health.

CONTAMINANT	RANGE DETECTED	MCL	DEGREE
Sodium	12. – 26. mg/L	N/A	Considered low
Hardness	67.1 – 98.5 mg/L	N/A	0-50/soft, 300-up/very hard

ARSENIC

While your drinking water meets the current Federal & State standard for arsenic, it does contain low levels of arsenic. The standard balances the current understanding of arsenic's possible health effects against the costs of removing arsenic from drinking water. The California Department of Health Services continues to research the health effects of low levels of arsenic, which is a mineral known to cause cancer in humans at high concentrations and is linked to other health effects such as skin damage and circulatory problems.

CONTAMINANT	RANGE DETECTED	MCL	SAMPLED
Arsenic	0.--4. Ug/L	10 ug/L	March 2019

GENERAL INFORMATION ON DRINKING WATER

CONTAMINANT	RANGE DETECTED	MCL	SAMPLED
Copper (Cu)	.004--.01 ug/L	1.3 ug/L	2014
Fluoride(F) Natural Source	0.0--0.01 mg/L	2.0 mg/L	2014
Nitrate N (nitrogen)	0.4-2.6 mg/L	10 mg. L	2019
Nitrate (AS NO3)	0.5-2.6 mg/L	45 mg/L	2018
Sulfate (SO4)	1.8--6.0 mg/L	500 mg/L	2014

Nitrate in drinking water at levels above 10 mg/l is a health risk for infants of less than six months of age. Such nitrate levels in drinking water can interfere with the capacity of the infant's blood to carry oxygen, resulting in a serious illness; symptoms include shortness of breath and blueness of the skin. Nitrate levels above 10 mg/l may also affect the ability of the blood to carry oxygen in other individuals, such as pregnant women and those with certain specific enzyme deficiencies. If you are caring for an infant, or you are pregnant, you should ask advice from your health care provider.

All drinking water, including bottled water, may reasonably be expected to contain at least small amounts of some contaminants. The presence of contaminants does not necessarily indicate that the water poses a health risk. More information about contaminants and potential health effects can be obtained by calling the USEPA Safe Drinking Water Hotline at 1-800-426-4791.

Some people may be more vulnerable to contaminants in drinking water than the general population. Immuno-compromised persons such as persons with cancer undergoing chemotherapy, persons who have undergone organ transplants, people with HIV/AIDS or other immune system disorders, some elderly individuals, and infants can be particularly at risk from infections. These people should seek advice about drinking water from their health care providers.
The USEPA/Center for Disease Control (CDC) guidelines on appropriate means to lessen the risk of infection by Cryptosporidium and other microbiological contaminants are available from the Safe Drinking Water Hotline at 1-800-426-4791.

In order to ensure that tap water is safe to drink, USEPA and the SWRCB (State Water Resources Control Board) prescribe regulations that limit the number of certain contaminants in water provided by public water systems. SWRCB regulations also establish limits for contaminants in bottled water that must provide the same protection for public health.

Water customers reviewing this report are asked to share this information with any tenant or water user on their premises. We think it is important for you, our customer, to have current and factual information about your water supply.

Information that deals with decisions about our water system is announced during the Red Bluff City Council meetings on the first and third Tuesdays of every month at 7 p.m. in the Council Chambers at 555 Washington Street. Agendas are posted at City Hall and on our website www.cityofredbluff.org. An online version of this report is also available at www.cityofredbluff.org/public notices.

Appendix I

HAZARD MITIGATION PLAN

AGENDA REPORT

Meeting Date: July 17, 2018
Agenda Item #
City Manager Approval:
Adopted / Approved / Informational
Vote:

_____ _____
Deputy Clerk Date

TO: **Honorable Mayor and Members of the City Council**

FROM: **Robin Kampmann, Public Works Director**

SUBJECT: **Hazard Mitigation Plan Acceptance**

RECOMMENDED COUNCIL ACTION:

City Council to adopt Resolution No. 20-2018 adopting those portions of the Tehama County Multi-Jurisdictional Hazard Mitigation Plan 2018 Update applicable to the City of Red Bluff.

SUMMARY:

The City of Red Bluff Staff has been working with Dynamic Planning + Science (DPS), Tehama County, the City of Corning and the City of Tehama to update the Tehama County Multi-Jurisdictional Hazard Mitigation Plan (HMP). The Federal Emergency Management Agency (FEMA) and the California Office of Emergency Services (Cal OES) require that the HMP be updated every 5 years.

The 2018 update of the Tehama County Multi-Jurisdiction Hazard Mitigation Plan has been completed and FEMA is prepared to grant final approval of the plan once it has been formally adopted by your jurisdiction. The adoption by a resolution of the local board in each participating City is necessary to obtain final FEMA approval of the plan, which then makes your community eligible to apply for mitigation project grant funding.

PREVIOUS COUNCIL ACTION:

On October 3, 2017 the City Council reviewed the Draft Hazard Mitigation Plan, provided comments and authorized a letter of support to the Tehama County board of Supervisors in support of the submittal of the County of Tehama Multi-Jurisdictional Hazard Mitigation Plan to Cal OES and FEMA.

DISCUSSION:

The federal Disaster Mitigation Act of 2000 (Public Law 106-390) required state and local governments to develop hazard mitigation plans as a condition for federal disaster grant assistance. FEMA requires that Hazard Mitigation Plans be updated every 5 years with current regulations and statistical data.

Tehama County completed a Multi-Jurisdictional Hazard Mitigation Plan in October 2012 that included the Cities of Corning, Red Bluff, and Tehama along with several Special Purpose Districts. The plan includes risk assessments of local hazards including, fire, flood, drought, dam failure, and several others. The plan also lists mitigation initiatives that can be used to implement proactive risk-reduction measures.

Due to the large document, I have only included a copy of the executive summary and a copy of the City of Red Bluff specific HMP to this staff report for your review and comments. If you would like to see a copy of the full document, it can be obtained at City Hall or at the following links:
http://www.cityofredbluff.org/publicnotices/publicnoticespdfs/Tehama-2017-MJHMP-VOLUME%201%20V2.pdf

http://www.cityofredbluff.org/publicnotices/publicnoticespdfs/Tehama-2017-MJHMP-VOLUME%202%20V2.pdf

CITY FISCAL IMPACT:

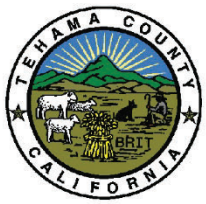
None

ATTACHMENTS:

Exhibit A – Tehama County HMP Executive Summary
Exhibit B - City of Red Bluff Specific HMP
Exhibit C – Resolution 20-2018

Exhibit A

EXECUTIVE SUMMARY



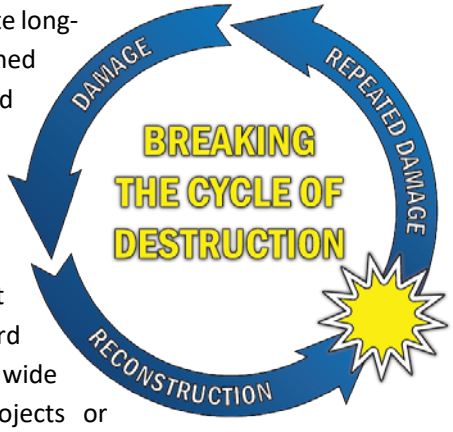
Tehama County

MULTI-JURISDICTIONAL HAZARD MITIGATION PLAN
2018 PLAN UPDATE

Executive Summary

Tehama County prepared this hazard mitigation plan to guide County and City Officials to protect the people and property of the County from the effects of natural disasters and hazard events. This plan demonstrates Tehama County's commitment to reducing risks from hazards through mitigation and serves as a tool to direct County resources to achieve optimum results with available administrative, technical and financial resources.

The term **"hazard mitigation"** refers to actions or strategies that can reduce or eliminate long-term risks caused by natural disasters. Mitigation activities can be developed, planned and executed before a disaster occurs or after. Oftentimes after disasters, repairs and reconstruction are completed in such a way as to simply restore damaged property to pre-disaster conditions. These efforts may return property and infrastructure to "the norm", but the replication of pre-disaster conditions may result in a repetitive cycle of damage and reconstruction. Hazard mitigation planning in Tehama County can break this repetitive cycle by producing less vulnerable conditions through smart construction, proper planning of future development and critical infrastructure. Hazard mitigation activities can also reduce risk around residents and infrastructure through a wide variety of mitigation strategies like construction of regional flood control projects or implementing fuel reduction around buildings within high wildfire risk areas.



What is a hazard mitigation plan?

This hazard mitigation plan provides an explanation of prevalent hazards within the County and how hazards may affect population and property differently across the County. The plan also contains information on natural hazard threats within Tehama County which identifies risks to vulnerable assets (people and property). Most importantly the mitigation strategy presented in this plan responds to the particular vulnerabilities and provides prescriptions or actions to achieve the greatest reduction of vulnerability, which results in saved lives, reduced injuries, reduced property damage, and protection for the environment in the event of a natural hazard. This plan provides information for the following natural hazard threats:

Dam Failure

Drought

Earthquake

Flooding

Slope Failure

Severe Weather

Wildfire

Why have a hazard mitigation plan?

The purpose of the plan is twofold. First, it provides the County and participating jurisdictions continued access to grant funding from the Federal Emergency Management Agency (FEMA) to conduct hazard mitigation activities for County and City owned facilities. Secondly, it provides resources (fiscal and technical) for residents wishing to conduct hazard mitigation efforts. The passage of the Disaster Mitigation Act in 2000 (DMA 2000) requires proactive pre-disaster planning as a condition of receiving certain financial assistance under the Robert T. Stafford Act. DMA 2000 encourages state and local authorities to work together on pre-disaster planning to assist local governments to accurately assess mitigation needs, resulting in faster allocation of funding and more cost-effective risk reduction projects.

Why is the plan updated so often?

As a DMA 2000 requirement, the plan must be updated every five (5) years to remain in compliance with federal mitigation grant conditions. Federal regulations require hazard mitigation plans to include a plan for monitoring, evaluating, and updating the hazard mitigation plan. An update process provides an opportunity to reevaluate recommendations, monitor the impacts of actions that have been accomplished, and determine if there is a need to change the focus of mitigation strategies over time. Grant compliance is contingent on meeting the plan update requirements that are contained in the code of federal regulations (44 CFR §201.6.). Jurisdictions that allow a plan to expire are not able to pursue funding under the Robert T. Stafford Act for which a current hazard mitigation plan is a prerequisite.

Participating Jurisdictions

The Tehama County Hazard Mitigation Plan is a multi-jurisdictional plan that geographically covers the entire area within Tehama County's jurisdictional boundaries (hereinafter referred to as the planning area). A planning partnership was formed to develop and steer content in this plan. This partnership consists of Tehama County and local government planning partners who worked together to create the goals, objectives, mitigation strategies and implementation methods to reduce risk. Any jurisdiction or organization may participate in the planning process. However, to obtain FEMA approval, each of the local jurisdictions must meet all requirements of 44 CFR §201.6. The following jurisdictions have elected to become participating jurisdictions as part of this plan update:

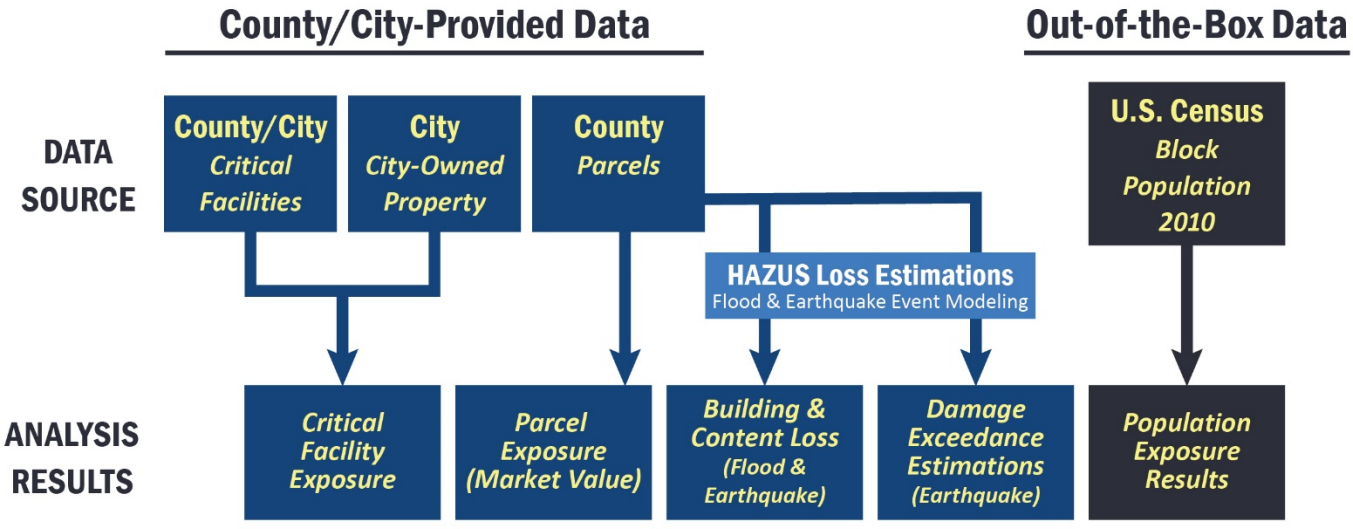
Tehama County	**Umbrella Plan:** **VOLUME 1**
City of Corning	**Participating Jurisdictions:** **Volume 2**
City of Red Bluff	
City of Tehama	

2018 Plan Development and Update Methodology

Hazard mitigation planning is the process through which hazards that threaten communities are identified, likely impacts determined, mitigation goals set, and appropriate mitigation strategies determined, prioritized, and implemented. This plan documents the hazard mitigation planning process and identifies relevant hazards and vulnerabilities and strategies the County and participating jurisdictions will use to decrease vulnerability and increase resiliency and sustainability in the community. Tehama County followed a six phase process to develop this 2018 update. This included a re-organization of planning partners, development of a new risk assessment, revaluation of goals and objectives, development of new mitigation actions, new enhancements for implementing mitigation actions, updates to all sections of the 2012 plan, and a new website for stakeholder involvement and public information.

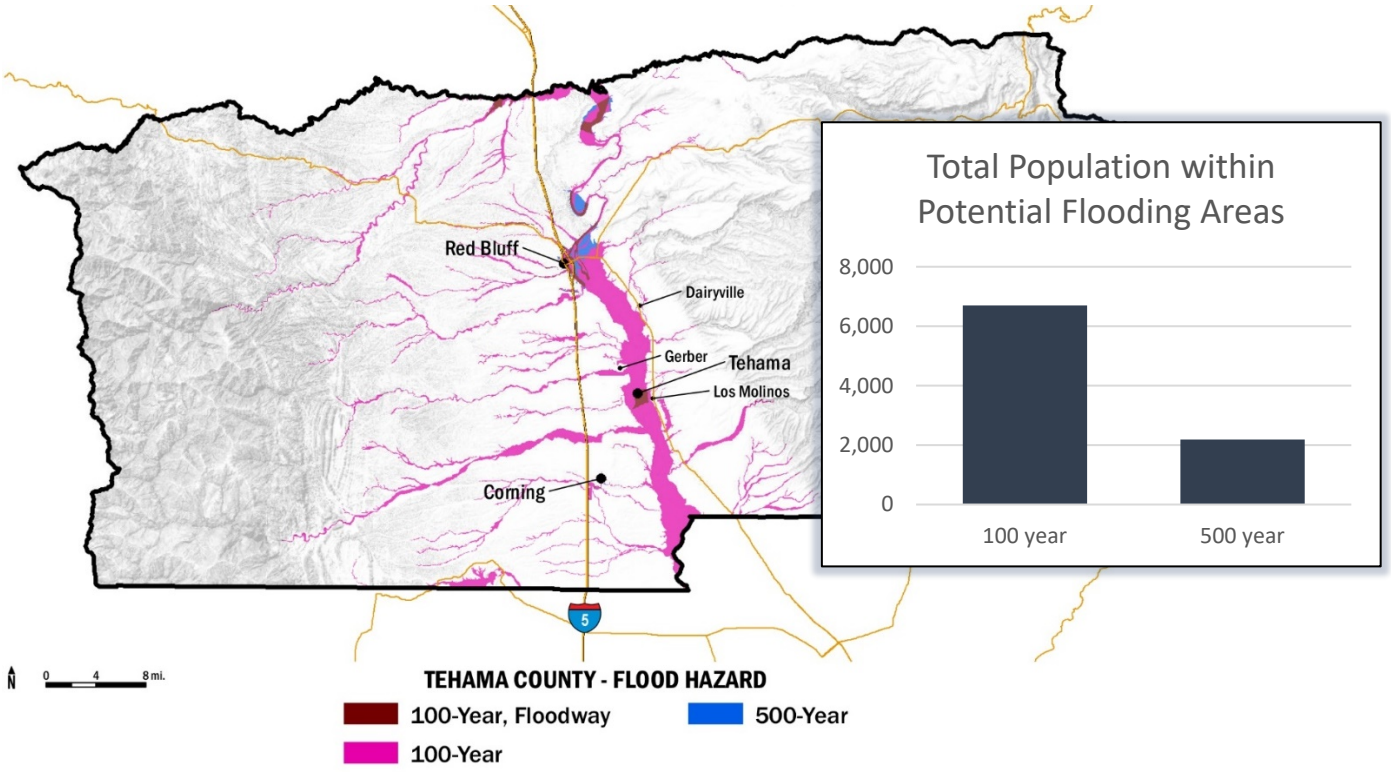
2018 Risk Assessment

A new risk assessment was conducted for each of the identified priority hazards. Geospatial data is essential in determining population and assets exposed to particular hazards. Geospatial analysis can be conducted if a natural hazard has a particular spatial footprint that can be overlaid against the locations of people and assets. In Tehama County earthquakes, flooding, slope failure, dam failure and wildfire have known geographic extents and corresponding spatial information about each hazard. The below graphic represents GIS data sources and analysis results for the 2018 risk assessment methodology.



Population and Asset Exposure

In order to describe vulnerability for each hazard, it is important to understand the "total" population and "total" assets at risk. The exposure for each hazard described in this section will refer to the percent of total population or percent of total assets. This provides the possible significance or vulnerability to people and assets for the natural hazard event and the estimated damage and losses expected during a "worst case scenario" event for each hazard. The sections below provide a description of the total population, critical facilities, and parcel exposure inputs.

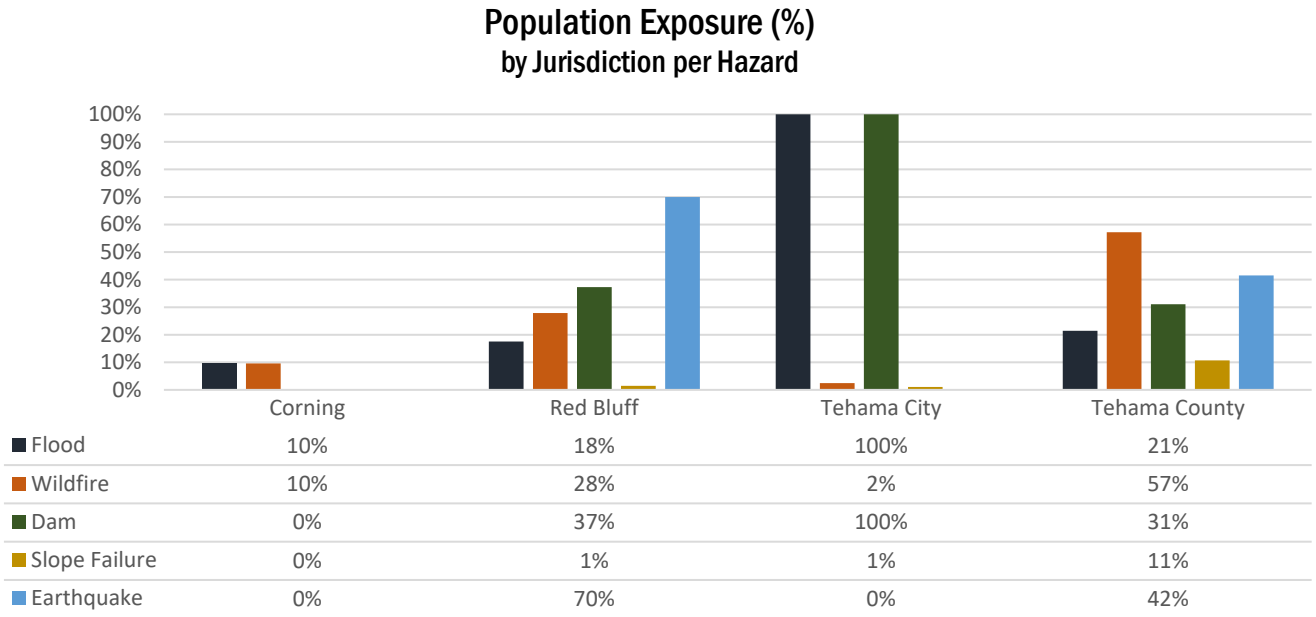


Summary of Vulnerable Assets (People, Value and Infrastructure)

Hazards with spatial boundaries can be evaluated to demonstrate the amount of population, critical infrastructure and parcel data within each hazard's footprint. At-risk populations, critical infrastructure, improved parcels, and loss results for each hazard category are provided in bar chart summary tables throughout this plan to evaluate the percentage of assets exposed to different types of hazards. The side-by- side comparison allows officials to evaluate the impacts of potential hazards to determine what hazards to direct energy and financial resource for mitigation activities. For detailed vulnerabilities assessment information see the individual hazard specific sections presented in the 2018 MJHMP.

Populations

Figure ES- 1 exhibits the percentage of total population of Tehama County residents by jurisdiction living within a known high hazard area such as flood zones, wildfire, dam failure, earthquake and potential areas of slope failure. Earthquake has the largest spatial footprint and could potentially affect more than people within the County and municipalities. However, casualties or injuries to the population is highly unlikely with the earthquake scenarios described in this plan. Potential for casualties is minimized due to date of building construction and type of structures within the County.

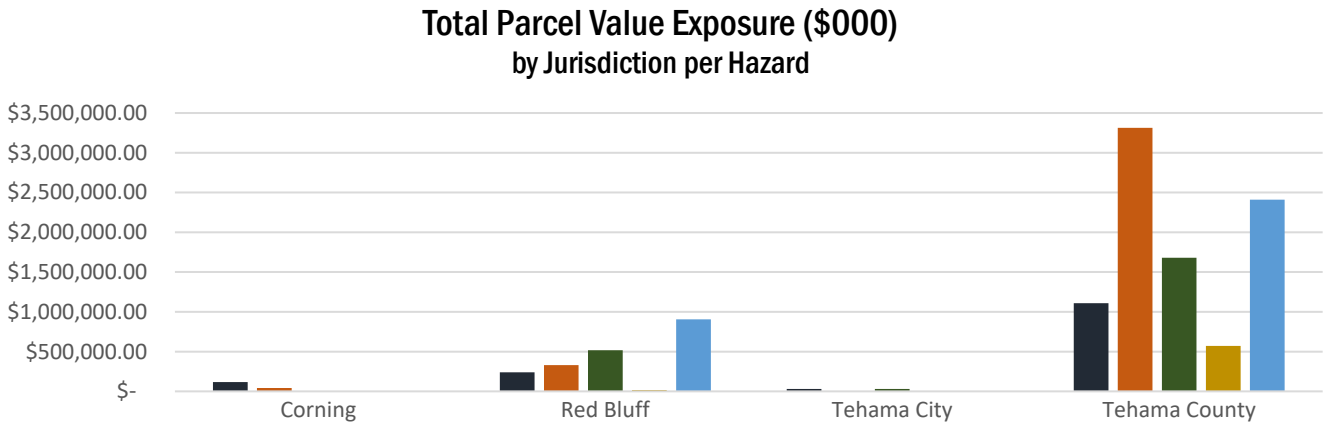


	Corning	Red Bluff	Tehama City	Tehama County
Flood	10%	18%	100%	21%
Wildfire	10%	28%	2%	57%
Dam	0%	37%	100%	31%
Slope Failure	0%	1%	1%	11%
Earthquake	0%	70%	0%	42%

Figure ES- 1: Population Exposure Summary Graphic

Improved Parcel Values at Risk

Parcel exposure by hazard comparison summaries are provided in Figure ES- 2 and Figure ES- 3. Figure ES- 2 provides total parcel values in areas within known hazard risk. Figure ES- 3 provides a percentage of total improved value within a known hazard based on the parcel information by hazard.



	Corning	Red Bluff	Tehama City	Tehama County
Flood	$116,773.81	$240,282.20	$30,459.26	$1,109,285.65
Wildfire	$43,059.82	$330,393.80	$891.52	$3,312,976.80
Dam	$-	$516,516.16	$30,459.26	$1,680,518.56
Slope Failure	$-	$16,253.86	$1,875.67	$572,494.88
Earthquake	$-	$905,560.00	$-	$2,410,983.56

Figure ES- 2: Total Parcel Values vs. Hazard Summary Graphic

Mitigation Guiding Principle, Goals and Objectives

The following guided the steering committee and the planning partnership in selecting the initiatives contained in this plan:

GUIDING PRINCIPLE

Through mitigation, reduce the vulnerability to natural hazards in order to protect the health, safety, welfare and economy of the residents and communities.

GOALS

GOAL #1
Enable residents to mitigate the impacts of hazards and disasters.

GOAL #2
Improve coordination of stakeholders to reduce risk through mitigation planning on a continual basis.

GOAL #3
Implement long-term, cost-effective, mitigation activities for the current and future built environment.

OBJECTIVES

1. Educate the public on the risk from natural hazards.
2. Support and encourage mitigation measures for homeowners in high-risk areas.
3. Maintain and make available maps of identified risk areas, and improve early warning emergency response systems.
4. Increase resilience of infrastructure and critical facilities.
5. Establish partnerships among government, businesses and communities to implement mitigation activities
6. Consider the impacts of natural hazards for future development.

Mitigation Strategy

The mitigation strategies and actions are the vital outcomes of a mitigation planning process. It is through the implementation of these initiatives that will enable Tehama County and participating communities to become disaster-resistant. Although one of the driving influences for preparing this plan was grant funding eligibility, its purpose is more than just access to federal funding. Some of the initiatives outlined in this plan are not geared toward grant eligibility under HMGP. Rather, the focus was the initiatives' effectiveness in achieving the goals of the plan and whether they are within each jurisdiction's capabilities. This planning process resulted in the identification of County and City specific mitigation actions to be targeted for implementation. Mitigation actions are located in the Documents here:

County Specific Mitigation Strategy: Volume 1, Section 5.5

City of Corning Mitigation Strategy: Volume 2, Section 1.5

City of Red Bluff Mitigation Strategy: Volume 2, Section 2.5

City of Tehama Mitigation Strategy: Volume 2, Section 3.5

Mitigation Action Implementation

Despite the County's efforts, no amount of planning or mitigation can prevent disasters from occurring or eliminate the risk and impacts of such events all together. Natural disasters will continue to occur; the County will take actions to reduce the risks and impacts these hazards pose to life, property, and economy. While this Hazard Mitigation Plan seeks to identify opportunities for reasonable mitigation actions, each individual has a responsibility to be aware of the potential hazards where they live and to minimize their own household's vulnerability.

The County's ability to carry out mitigation actions is limited to those facilities it has authority over. The County does not have direct authority over schools, fire, water and sanitation districts, private gas, electric and communication utilities, state and federal highways and facilities, private hospitals, neighboring cities and tribes. The County will focus on things it is empowered to do while still seeking to cooperatively work with other entities to address mutual areas of vulnerability and interdependence.

Full implementation of the recommendations of this plan will take time and resources. The measure of the plan's success will be the coordination and pooling of resources within the planning partnership. Keeping this coordination and communication intact will be the key to the successful implementation of this plan. Teaming together to seek financial assistance at the state and federal level will be a priority to initiate projects that are dependent on alternative funding sources. This plan was built upon the effective leadership of a multi-disciplined steering committee and a process that relied heavily on public input and support. The plan will succeed for the same reasons.

Exhibit B

CITY OF RED BLUFF

Tehama County

MULTI-JURISDICTIONAL HAZARD MITIGATION PLAN

2018 PLAN UPDATE

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CITY OF RED BLUFF ADOPTION RECORDS

To comply with DMA 2000, the Corning City Council has officially adopted the 2018 Tehama County Multi-Jurisdictional Hazard Mitigation Plan Volume 1 and the City of Corning Volume 2 Annex. The adoption of the 2018 MJHMP in its entirety recognizes the City's commitment to reducing the impacts of natural hazards within the City and County. See below record of Adoption.

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Section 2. City of Red Bluff Annex

This Annex details the hazard mitigation planning elements specific to the City of Red Bluff, a previously participating jurisdiction to the Tehama County Hazard Mitigation Plan. 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 Red Bluff, with a focus on providing additional details on the planning process, risk assessment, and mitigation strategy for this community.

Hazard Mitigation Plan Point of Contact

Primary Point of Contact
R. Scott Miller, Associate Civil Engineer & Airport Manager
City of Red Bluff / Public Works, Engineering Division
555 Washington Street
Red Bluff, CA. 96080
Telephone: (530) 527-2605 x3063
e-mail Address: smiller@cityofredbluff.org

Alternate Point of Contact
Robin Kampmann, PE
Public Works Director
555 Washington Street
Red Bluff, CA. 96080
Telephone: (530) 527-2605 Ext. 3067

2.1 Introduction

The county seat of Tehama County, Red Bluff is on the northern edge of the Sacramento Valley, and is the third largest city in the Shasta Cascade region. The City of Red Bluff serves an immediate population of approx. 14,076 and an additional population of approximately 5,000 in the surrounding area. Red Bluff is located on Interstate 5 at the junction of State Highways 36/ 99.

Agriculture and tourism are the primary industries of the area along with a growing commercial base. The local economy fluctuates accordingly with the cycles of these industries. The following is a summary of key information about the jurisdiction and its history:

- **Date of Incorporation—**March 31, 1876
- **Current Population—**14,076 as of 2010 Census
- **Population Growth—**Since the City's incorporation and first census in 1880 through the 2010 Census the City's population growth rates have fluctuated, but on average has maintained a 1.46% growth rate.

2.1.1 Location and Description

Red Bluff is an incorporated city in, and the county seat of Tehama County, California. Centrally located on the Sacramento River in Northern California, Red Bluff is 30 miles (48 km) south of Redding, 40 miles (64 km) northwest of Chico, and 125 miles (201 km) north of Sacramento, 190 miles west of Reno/Tahoe, and 155 miles south of the Oregon border (see Figure 2-1). Red Bluff is a hub where Highway 36, 99, and Interstate 5 meet. Red Bluff also serves as the gateway to Lassen Volcanic National Park and is the third largest city in the Shasta Cascades.

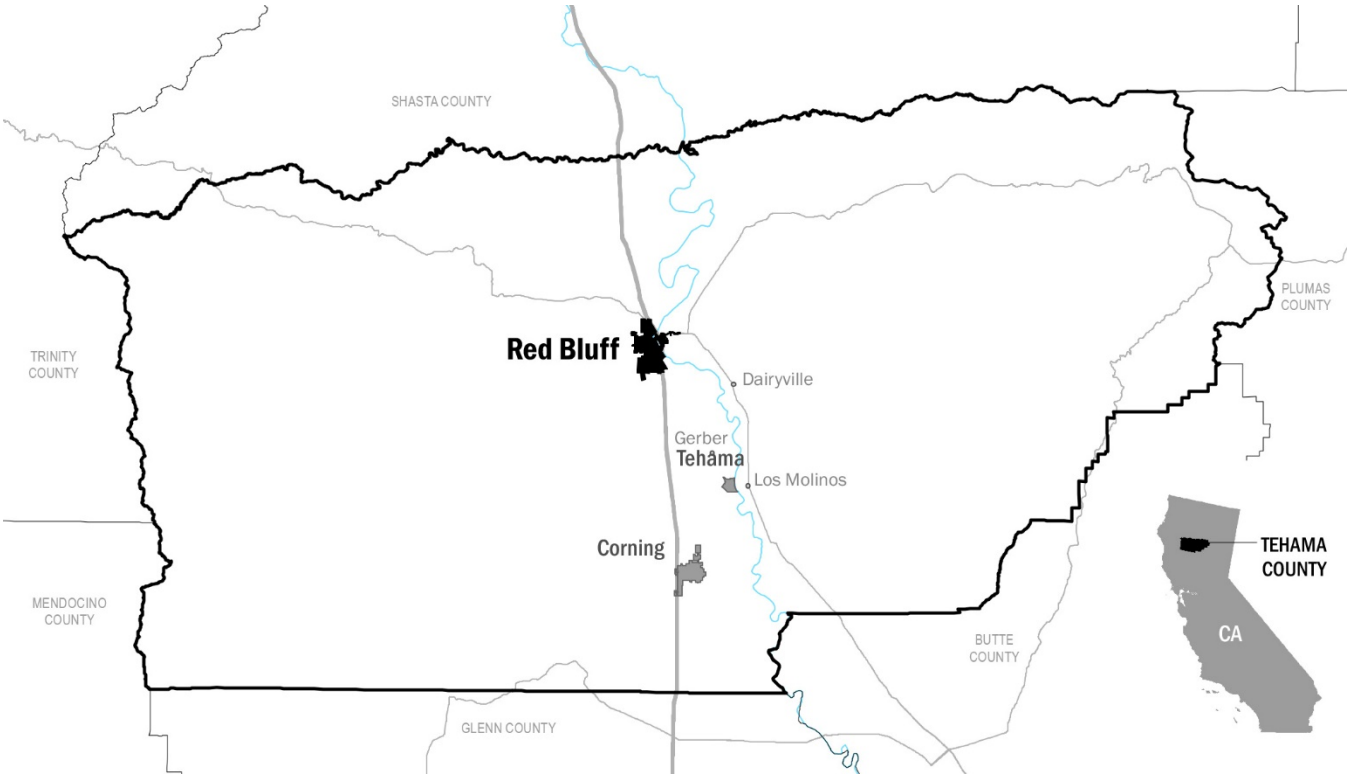


Figure 2-1: City of Red Bluff Location

2.1.2 Climate

Red Bluff has cool, wet winters and hot, dry summers. Average temperatures in January are a maximum of 54.7°F (12.6°C) and a minimum of 37.0°F (2.8°C). Average temperatures in July are a maximum of 97.9°F (36.6°C) and a minimum of 65.6°F (18.7°C). There is an average of 100.1 days annually with highs of 90°F (32°C) or higher and an average of 21.5 days with lows of 32°F (0°C) or lower. The record highest temperature was 121°F (49°C) on August 7, 1981, and the record lowest temperature was 17°F (−8°C) on January 9, 1937. Annual precipitation averages 23.21 inches (59.0 cm) with measurable precipitation falling of an average of 71 days. The wettest year was 1983 with 52.98 inches (134.6 cm) and the driest year was 1976 with 7.20 inches (18.3 cm). The most rainfall in one month was 21.47 inches (54.5 cm) in January 1995 and the most rainfall in 24 hours was 3.55 inches (9.0 cm) on January 8, 1995. Snowfall averages 2.1 inches (5.3 cm) a year. The year with the most snowfall on record was 1972 with 15.6 inches (40 cm). The most snowfall in one month was 15.0 inches (38 cm) in January 1937.

2.1.3 Historical Overview (From Chamber of Commerce Website)

Red Bluff derives its name from its location on a high vertical bank at the bend of the Sacramento River. Although never a mining camp, Red Bluff ranks with the celebrated towns of the gold rush days in age, exciting history, colorful personalities, and in present day importance.

The story of Red Bluff begins seven or eight years before the community came into existence with the comings and goings and projects of Peter Lassen, whose name was given to a county, a national park, a volcano, and a highway. At the very beginning, Red Bluff became the marketing and distributing center for a large area and its scope in that role widened steadily. By 1853 it was the chief commercial city in the northern part of the Sacramento Valley, and its streets continually thronged with pack trains operating to and from points as far away as Oregon, Nevada and Idaho.

In 1843, Lassen and two fellow pioneers were in Red Bluff tracking down horse thieves. He was so impressed by the land that he sought and received from the Mexican Government a grant of 25,000 acres, a few miles south of where the city now stands. On that tract in early 1847, he laid out a town site and named it Benton City in honor of Senator Thomas H. Benton of Missouri. Then he journeyed to Missouri to induce settlers to come out and also to obtain a charter for a Masonic Lodge which he wished to establish in his settlement.

Lassen returned to his town site in the summer of 1849 with a party of settlers and with the Masonic Charter. On reaching California, the members of the party learned about the discovery of gold, gave up their original idea, and headed or the mining area. So, the town site died suddenly and as a result, the lodge charter was transferred to Shasta. However, the publicity given to Lassen's colonization plan attracted many others to the territory, including several who helped found and build Red Bluff.

Red Bluff achieved and retained commercial importance because, for more than a century, it was the head of navigation on the Sacramento River. The initial attempt at river shipping in the area was made by Lassen in 1849 when he was still to put over Benton City. But the last trip was a losing venture and he abandoned the plan. The following year steamers commenced regular and frequent trips between San Francisco and Red Bluff and soon arrivals and departures were almost a daily occurrence. The service continued until after the turn of the century.

Another pioneer of Red Bluff was William B. Ide, commander of the group of Americans who, in the summer of 1846, revolted against Mexican rule, seized control of Sonoma, raised the Bear Flag and proclaimed the Republic of California. Ide was "President of the Republic" from June 10 to July 8, 1846, when couriers brought word that two days previously Commodore John Drake Sloat had taken over California in the name of the United States. Ide's home on the river bank about two miles north of Red Bluff in now under the State Park System.

2.1.4 Structure of Government

The City of Red Bluff operates as a general law city under the Council-Manager form of government. The Council establishes the policies for the City and appoints a trained and experienced City Manager to administer the affairs of the City. The City Council is the governing board with responsibility for the adoption and implementation of this Plan.

2.1.5 Development Trends

Red Bluff is centrally located between Redding to the north and Chico to the south, as well as, a regional recreation hub through SR 99/SR 36 and Interstate 5 that provide access to the Sacramento River, Lake Almanor, Eagle Lake, Reno, Lassen National Forest, Mount Shasta and the Shasta-Trinity National Forests.

Based on these attractive features of the region (both natural and manmade) and current development activity, the City of Red Bluff continues to experience construction for both commercial and residential development. This trend is expected to continue over the next decade as Red Bluff did not experience a massive construction boom bust, but rather a moderate uptick in development during the periods of 2004 through 2008. As a result, the development in Red Bluff, while slower paced, still remains consistent and continues to experience diversified growth in Residential (Single Family) along with Goods & Services.

2.2 What's New

The 2012 MJHMP Mitigation Actions were reviewed and have been changed, updated, and revised to reflect new priorities overtime. The sections below describe the background and planning process for changes and updates reflected in the 2018 MJHMP update.

2.2.1 Plan Consolidation and Focus

When choosing the priority hazards to be profiled for this 2018 MJHMP Update, the City of Red Bluff's planning team discussed the impact of wildfire, earthquake/slope failure, flood, severe weather and hazardous materials spills as hazards that affect the City. It was agreed that the impacts from severe weather would be minor and the planning team decided to omit severe weather in this 2018 MJHMP Update. Hazardous material spills were also omitted as the HMGP program is meant to evaluate and mitigate natural, not manmade, hazards.

Since the 2012 HMP was adopted, there were no changes to the built environment that have increased or decreased vulnerability to the City.

2.2.2 5 Year Mitigation Action Review and Update

During the 2018 MJHMP update process, each of the 2012 "County Wide" and "City of Red Bluff" specific mitigation actions were examined for relevancy, future implementation and evaluated for potential follow-on effort. Many of the City's 2012 mitigation actions were completed or are currently on-going. Upon review of the updated vulnerability assessment data, new mitigation actions were created in order to reflect changes in priorities.

The 2018 MJHMP mitigation actions located in Figure 2-1 of this annex provides a listing of 2012 mitigation actions and an explanation of why each action was completed, deleted, or deferred. Mitigation Actions previously developed under the 2012 HMP have been refreshed as a result of the newly completed risk assessment, planning process and implementation strategy.

Table 2-1: MJHMP Mitigation Action Record of Revision Review

Program/ Project	Completed, Deleted or Deferred	Explanation
Flood Hazard Mitigation		
Ensure that new development is designed to reduce or eliminate flood damage by requiring lots and rights-of-way to be laid out for the provisions of approved sewer and drainage facilities, providing on-site detention facilities as required.	Deferred, to be completed.	This project is ongoing.
Make sandbags available to residents in anticipation of severe rainstorms or flood events, deliver materials to critical infrastructure and provide public information on where these materials are stored and how to obtain them.	Deferred, to be completed.	This project is ongoing.
Clear drainage facilities of trash, debris, overgrown vegetation, dead and downed trees and shrubs prior to rainy season.	Deferred, to be completed.	This project is ongoing.
Retrofit and maintain existing storm drain system to insure full capacity is utilized	Deferred, to be completed.	This project is on-going.
Maintain compliance and good standing under the National Flood Insurance Program (NFIP)	On-Going	The City of Red Bluff is a member in good standing under NFIP.
Consider participation in the NFIP, Community Rating System (CRS)	On-Going	A CRS Cost Benefit Analysis was performed as part of this 2018 MJHMP Update.
Continue outreach program to provide information needed to increase awareness and modify actions to reduce flood damage, encourage flood insurance coverage and protect natural functions of floodplains.	New	New for 2018 mitigation plan update.
Work with Cal DFW to develop programmatic permit to remove vegetation and to conducted regular maintenance in stream channels.	New	New for 2018 mitigation plan update.
Reduce potential I & I issues in City infrastructure due to more frequent and heavy rain events.	New	New for 2018 mitigation plan update.
Earthquake Hazard Mitigation		
Construct Seismic Upgrades to city owned infrastructure not meeting current seismic standards.	New	New for 2018 mitigation plan update.

Program/ Project	Completed, Deleted or Deferred	Explanation
Develop Seismic Upgrade/ Retrofit Program for local business / gathering facilities that were built before benchmark years.	New	New for 2018 mitigation plan update.
Wildfire Hazard Mitigation		
Increase efforts to reduce hazards in existing development in Very High Fire Hazard Fire Severity Zones through improving engineering design and vegetation management standards for mitigation, appropriate code enforcement and public education on defensible space mitigation strategies.	Deleted	This mitigation action was deleted and divided into more detailed mitigation actions for Wildfire Hazards.
Clear fuels/overgrowth/dead and downed vegetation in City Parks and Open Space.	On-Going	This project is on-going.
Extend/ add domestic water fire lines to areas of known wildland fire risk.	New	New for 2018 mitigation plan update.
Construct new Fire Station near southern end of Red Bluff to decrease response times and suppress potential wildland fires in open grasslands near airport.	New	New for 2018 mitigation plan update.
Slope Failure Hazard Mitigation		
Install hillside stabilization and river bank armoring, rip-rap/gabion improvements on Red Bluff Hill and in the Sacramento River from Union Street along Rio Street north of Cedar Street to Hickory Street south of Cedar Street along Rio Street to prevent future mudslides/landslides, property slumping, road failure and infrastructure collapse.	On-Going	This project is on-going.
Hazardous Materials Spills Mitigation		
Investigate, inform and seek funding for the construction of Diamond Avenues Secondary Public Access to mitigate life, health and safety hazards of reoccurring Hazardous Materials spills, Rail road and Industrial accidents.	Delete	Not a natural Hazard event. Planning Committee chose to not profile hazardous material spill as hazard in the natural hazard mitigation plan.

Program/ Project	Completed, Deleted or Deferred	Explanation
Investigate, inform and seek funding partnerships for the construction Diamond Avenues Secondary Public Access to mitigate life, health and safety hazards of reoccurring Hazardous Materials spills, Rail road and Industrial accidents.	Delete	Not a natural Hazard event. Planning Committee chose to not profile hazardous material spill as hazard in the natural hazard mitigation plan.
All Hazard Mitigation		
Continue to participate not only in general mutual-aid agreements, but also in agreements with adjoining jurisdictions for cooperative response to all hazards and disasters	**Deleted**	**This mitigation action is vague, difficult to implement and is completed as a part of mitigation plan implementation.**
Where appropriate, support retrofitting, purchase, or relocation of structures located in hazard-prone areas to protect structures from future damage, with repetitive loss and severe repetitive loss properties as priority.	**Deleted**	**This mitigation action is vague, difficult to implement and is completed as a part of mitigation plan implementation.**
Integrate Local Hazard Mitigation Plan into the Safety Element of the General Plan	**Deleted**	**This mitigation action is vague, difficult to implement and is completed as a part of mitigation plan implementation.**
Support County-wide initiatives identified in Volume 1.	**Deleted**	**This mitigation action is vague, difficult to implement and is completed as a part of mitigation plan implementation.**
Continue to support the implementation, monitoring, maintenance, and updating of this Plan, as defined in Volume 1.	**Deleted**	**This mitigation action is vague, difficult to implement and is completed as a part of mitigation plan implementation.**

2.2.3 Implementation into Other Planning Mechanisms

The 2012 Tehama County HMP (Red Bluff Annex) has not been formally incorporated into any City planning mechanisms. This is because the City of Red Bluff has not updated any regulatory documents or ordinances during this time period.

2.2.4 Successful Mitigation Activities Since 2012

The 2012 Red Bluff HMP Annex has been implemented through various on-going projects, plans and programs. With respect to the mitigation action items and strategy developed in 2012, the City has been making improvements toward reducing natural hazard risk to life and property within the City limits. Significant risk reduction efforts have been made for floodplain management, flood damage prevention, and fire hazard abatement. These successful policies, programs, and projects are summarized below.

2.2.4.1 Red Bluff Urban Water Management Plan

Related 2012 HMP Initiative:

Ensure that new development is designed to reduce or eliminate flood damage by requiring lots and rights-of-way to be laid out for the provisions of approved sewer and drainage facilities, providing on-site detention facilities as required.

The Urban Water Management Plan (UWMP) has been prepared pursuant to the State of California's Urban Water Management Planning Act (ACT), which is contained in the California Water Code, Division 6, Part 2.6, Section 10610. The Act requires that urban water suppliers serving more than 3,000 customers or providing more than 3,000 acre-feet of water annually to develop an UWMP every fifth year ending in five and zero. Consistent with the purpose of the Act, the 2010 UWMP facilitates local and regional water planning activities and support the City of Red Bluff's long-term water resource planning goals. The UWMP also helps ensure adequate water supplies are available to meet community water needs of today and the future.

2.3 Planning Methodology

As described above, the City of Red Bluff followed the planning process detailed in Section 3 of the base plan. In addition to providing representation on the Tehama County Hazard Mitigation Planning Committee (HMPC) and Steering Committee, 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 2-2.

Table 2-2: 2018 MJHMP Update Stakeholder List

Planning Committee Dept. / Members	Position / Role	CRS Category
R. Scott Miller, Public Works	Planning Lead, Steering Committee Rep.	Structural Projects
Robin Kampmann, Public Works	Plan Review and Documentation, Presentation and staff reports.	Structural Projects
Scott Friend, Community Development Director and Floodplain Administrator	Document Review, Mitigation Plan Development	Preventative Measures
Kyle Sanders, Police Chief	Document Review, Mitigation Plan Development	Emergency Services

2.4 Risk Assessment

The intent of this section is to profile City of Red Bluff's hazards and assess the City's vulnerability separate from that of the planning area as a whole, which has already been assessed in Section 4 (Risk Assessment) in Volume One. The hazard profiles in Volume One discuss overall impacts to the planning area and describes the hazard problem description, hazard extent, magnitude/severity, previous occurrences of hazard events and the likelihood of future occurrences. Hazard profile information specific to the City of Red Bluff is included in this section of the Annex. This vulnerability assessment analyzes the property, population, critical facilities, and other assets at risk to hazards specific to the City of Red Bluff. For more information about how hazards affect the County as a whole, see Section 4 Risk Assessment in the base plan.

Each hazard vulnerability assessment for the City of Red Bluff Annex includes a hazard profile/problem description as to how each medium or high significant hazard affects the City and includes information on past hazard occurrences. The intent of this section is to provide jurisdictional specific information on hazards and further describe how the hazards and risks differ across the planning area.

2.4.1 Hazard Screening Criteria

Per FEMA Guidance, the first step in developing the Risk Assessment is identifying the hazards. The City Planning Committee reviewed a number of previously prepared hazard mitigation plans and other relevant documents to determine the universe of natural hazards that have the potential to affect the County and the nearby region. Table 2-3 provides a crosswalk of hazards identified in the 2012 Tehama County HMP, 2012 City of Red Bluff HMP Annex, the City of Red Bluff General Plan and 2013 California State HMP. Thirteen different hazards were identified based on a thorough document review. The crosswalk was used to develop a preliminary hazards list providing a framework for City of Red Bluff HMP Planning Team members to evaluate which hazards were truly relevant to the City and which ones are not. For example, levee failure was considered to have no relevance to the City, while earthquake, flood and wildfire were indicated in every hazard documentation.

Table 2-3: Document Review Crosswalk

Hazards	2012 Tehama County HMP	2012 City of Red Bluff HMP Annex	City of Red Bluff General Plan	2009 Tehama County General Plan	2013 CA State HMP
Natural Hazards					
Avalanche	■				■
Climate Change	■				■
Dam Failure	■				■
Drought	■				■
Earthquake	■	■	■	■	■
Flood	■	■	■	■	■
Landslide	■	■	■		■
Levee Failure					■
Severe Weather	■	■			■
Tsunami			■		■

Hazards	2012 Tehama County HMP	2012 City of Red Bluff HMP Annex	City of Red Bluff General Plan	2009 Tehama County General Plan	2013 CA State HMP
Volcanoes			■		■
Wildfire	■	■	■	■	■
Human Caused Hazards					
Hazardous Materials		■			

2.4.2 Climate Change

Climate refers to patterns of temperature, precipitation, humidity, wind and seasons. Climate shapes natural ecosystems and the human economies and cultures that depend on them. "Climate change" refers to changes over a long period of time. It is generally perceived that climate change will have a measurable impact on the occurrence and severity of natural hazards around the world. Impacts include the following:

- Snow cover losses will continue, and declining snowpack will affect snow-dependent water supplies and stream flow levels around the world.
- Drought and the frequency, intensity, and duration of heat waves are expected to increase.
- More extreme precipitation is likely, increasing the risk of flooding.
- The world's average temperature is expected to increase.

Climate change will affect communities in a variety of ways. Impacts could include an increased risk for extreme events such as drought, storms, flooding, and forest fires; more heat-related stress; and the spread of existing or new vector-born disease into a community. In many cases, communities are already facing these problems to some degree. Climate change can affect the frequency, intensity, extent and/or magnitude of the problems.

This hazard mitigation plan addresses climate change as a secondary impact for each identified hazard of concern. Each chapter addressing one of the hazards of concern includes a section with a qualitative discussion on the probable impacts of climate change for that hazard.

2.4.3 Vulnerability Assessment and Total Assets at Risk

This section presents the vulnerability assessment for Red Bluff and identifies Red Bluff's total assets at risk, including people, values at risk, critical facilities and infrastructure. Growth and development trends are also presented for the community. This data is not hazard specific, but is representative of total assets at risk within the community.

2.4.4 Population and Asset Inventory

In order to describe vulnerability for each hazard, it is important to understand the "total" population and "total" assets at risk within the City. The exposure for each hazard described in this section will refer to the percent of total population or percent of total assets similar to Volume 1. This provides the possible significance or vulnerability to people and assets for the natural hazard event and the estimated damage and losses expected during a "worst case scenario" event for each hazard. Sections below provide a description of the total population, critical facilities, and parcel exposure inputs.

2.4.4.1 Population

In order to develop hazard-specific vulnerability assessments, populations near natural hazard risks have been determined to understand the total "at risk" population. We can understand how geographically defined hazards may affect the City by analyzing the extent of the hazard in relation to the location of population. For purposes of the vulnerability assessment approximately 14,076[2] (100%) of the City's population is exposed to one or more hazards within or near the City boundaries. Each natural hazard scenario affects the City residents differently depending on the location of the hazard and the population density of where the hazard could occur. Vulnerability assessment sections presented later in this section summarize the population exposure for each natural hazard.

2.4.4.2 Vulnerable Populations

The severity of a disaster depends on both the physical nature of the extreme event and the socioeconomic nature of the populations affected by the event. Important socioeconomic factors tend to influence disaster severity. A core concept in a vulnerability analysis is that different people, even within the same region, have a different vulnerability to natural hazards.

2.4.4.2.1 Income and Housing Condition

Income or wealth is one of the most important factors in natural hazard vulnerability. This economic factor affects vulnerability of low income populations in several ways. Lower income populations are less able to afford housing and other infrastructure that can withstand extreme events. Low income populations are less able to purchase resources needed for disaster response and are less likely to have insurance policies that can contribute to recovery efforts. Lower income elderly populations are less likely to have access to medical care due to financial hardship. Because of these and other factors, when disaster strikes, low income residences are far more likely to be injured or left without food and shelter during and after natural disasters.

Figure 2-2 shows the median household income distribution for the City of Red Bluff in 2015. The "median" is the value that divides the distribution of household income into two equal parts (e.g., the middle). The median household income in in Red Bluff in 2015 was estimated to be $31,239. In the United States during the same period, the median house household income was $53,889 (Bureau U. S., 2015). The most vulnerable residents (in terms of income and housing condition) to natural hazards are located in the downtown area of Red Bluff.

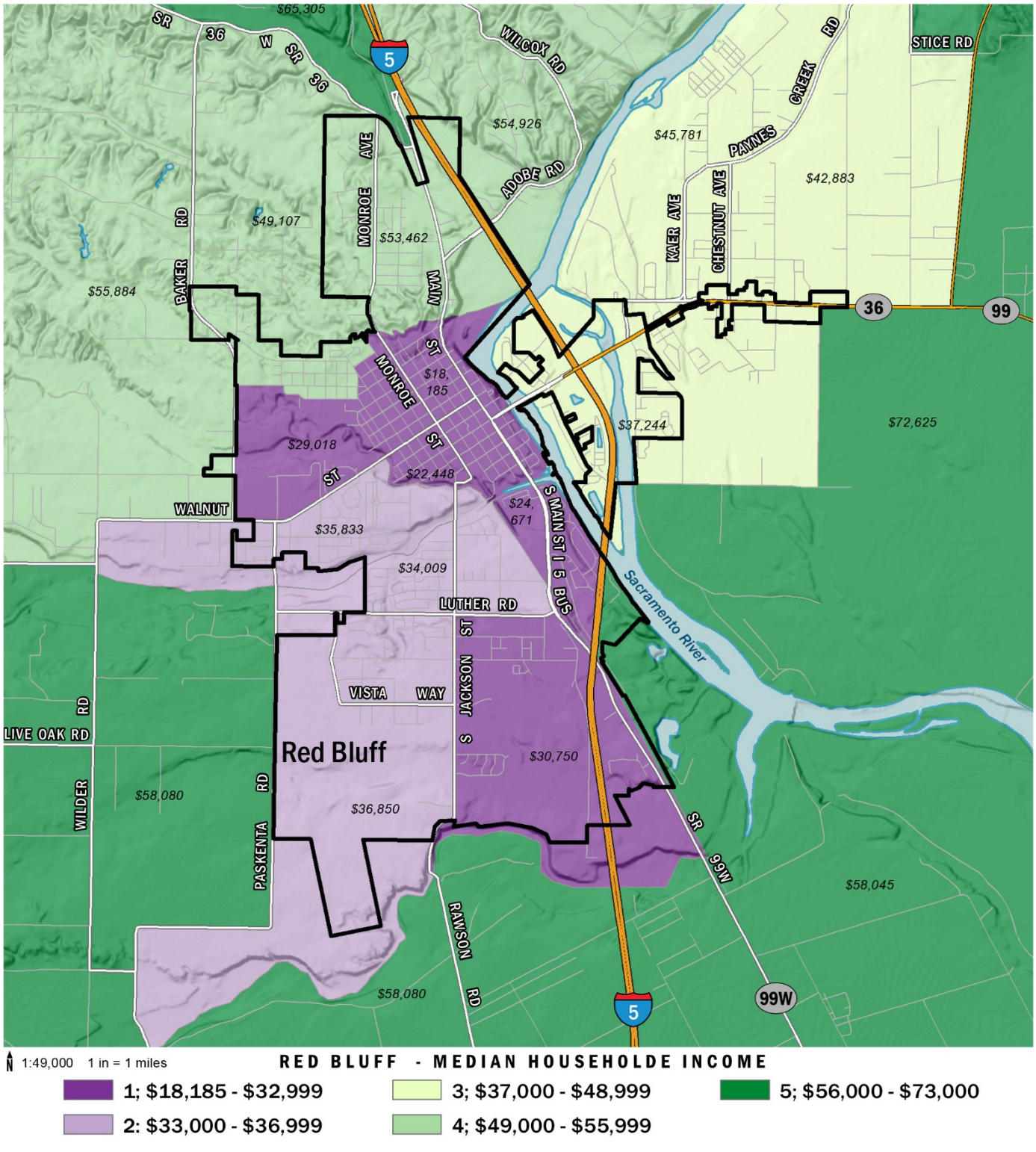
2.4.4.2.2 Age

Children and the elderly tend to be more vulnerable during an extreme natural disaster. They have less physical strength to survive disasters and are often more susceptible to certain diseases. The elderly often also have declining vision and hearing and often miss reports of upcoming natural hazard events. Children, especially young children, have the inability to provide for themselves. In many cases, both children and the elderly depend on others to care for them during day to day life.

[2] According to the 2010 U.S. Census Block pre-joined TIGER spatial data, the total population for the City in 2010 was 14,076.

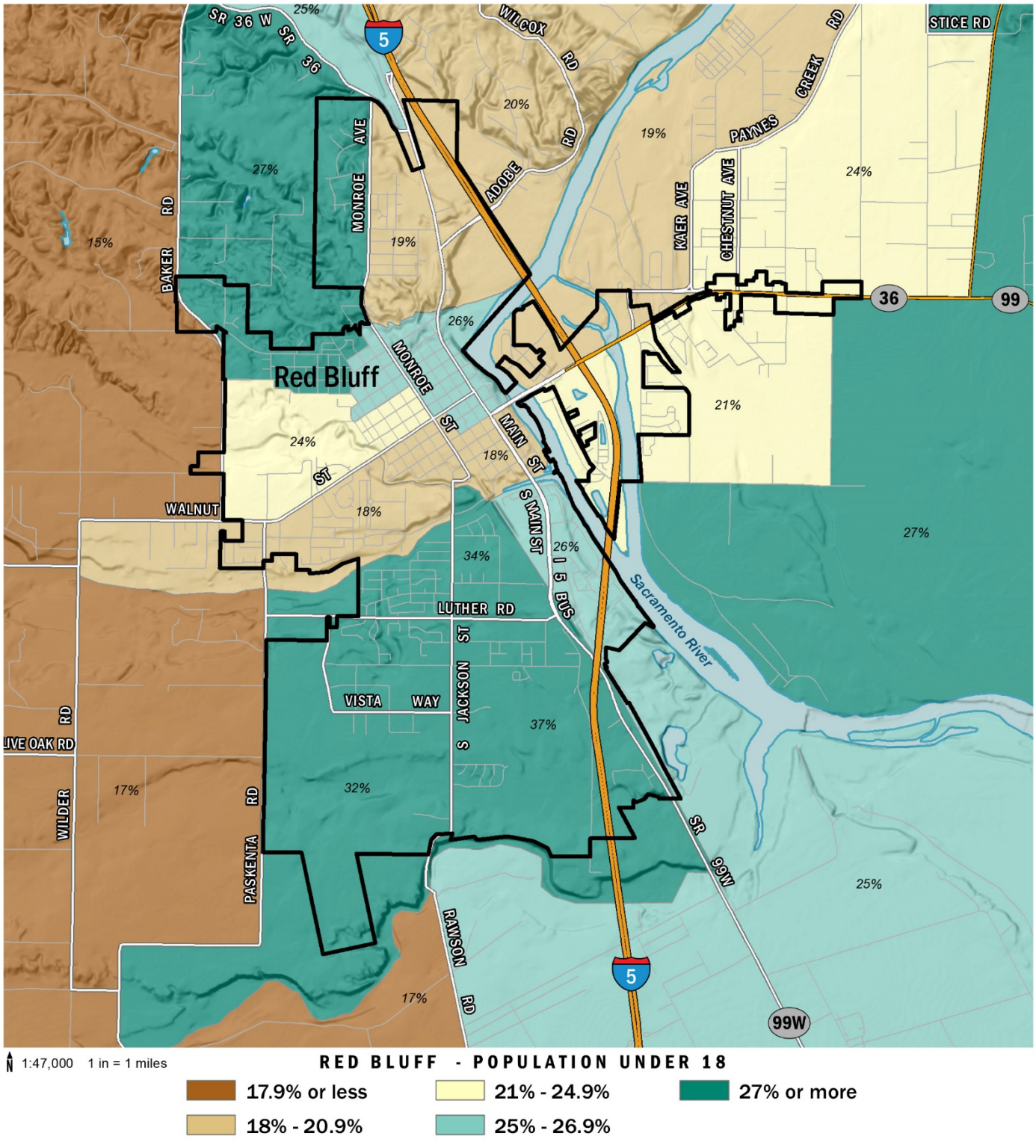
Finally, both children and the elderly have fewer financial resources and are frequently dependent on others for survival. In order for these populations to remain resilient before and after a natural hazard event, it may be necessary to augment city residents with resources provided by the City, state and federal emergency management agencies and organizations.

As seen in Figure 2-3, the block groups with the highest concentration of people under 18 years old are located in the southern portion of the city as well as the northwest portion of the city along the Red Bluff border. Figure 2-4 shows that the highest concentration of people over the age of 65 is in the western portion of the City west of Monroe Street.



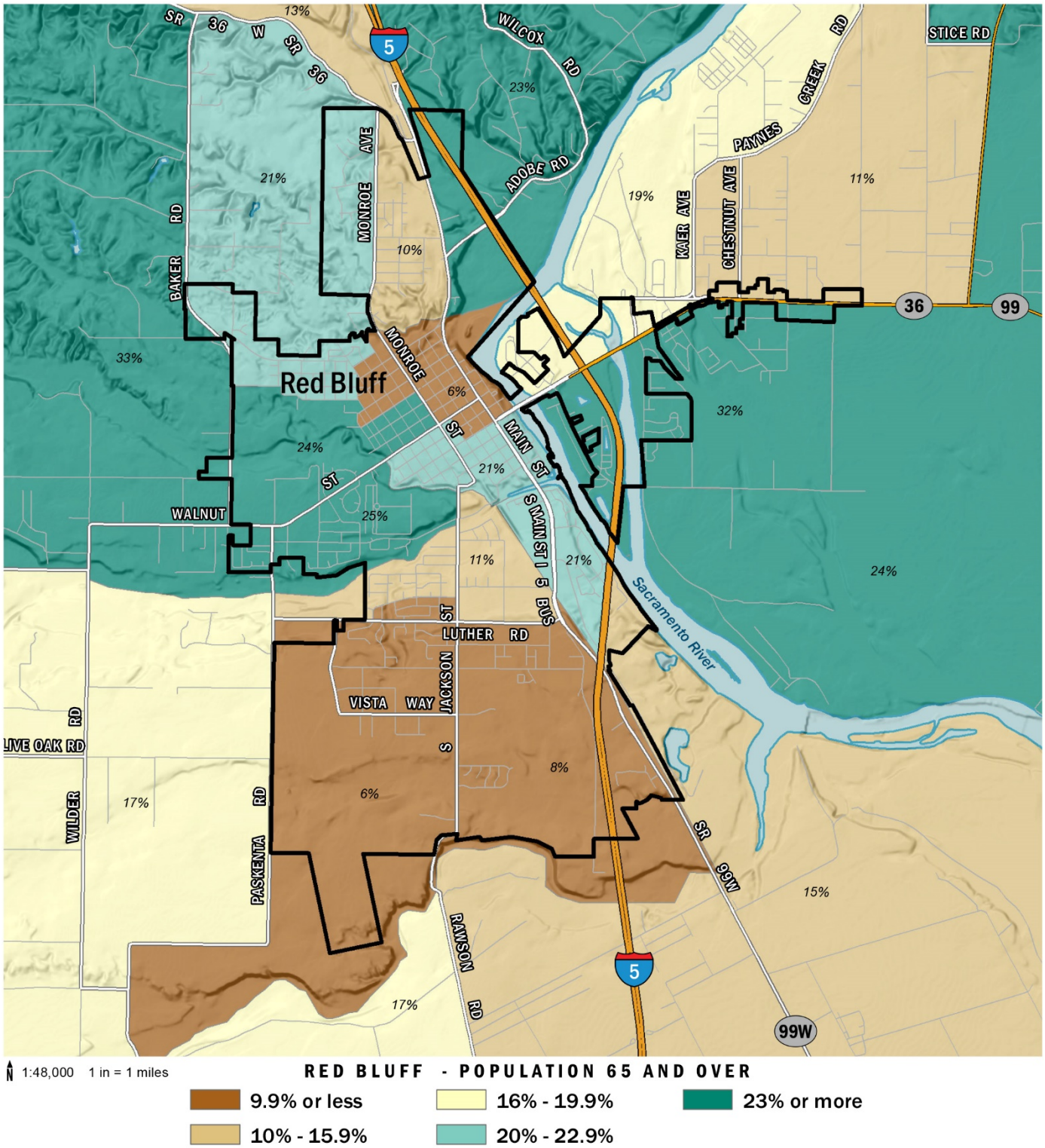
Data Source: Census ACS 2015 3-year estimates, median income in last 12 mo., quantile classification from countywide sampling

Figure 2-2: Median Household Income in Red Bluff



Data Source: Census ACS 2015 3-year estimates, percentage of total population, quantile classification from countywide sampling

Figure 2-3: Red Bluff Population Under Age 18



Data Source: Census ACS 2015 3-year estimates, percentage of total population, quantile classification from countywide sampling

Figure 2-4: City of Red Bluff Residents Over Age 65

2.4.5 Critical Facilities Inventory

Critical facilities are of particular concern when conducting hazard mitigation planning. Critical facilities are defined as essential services, and if damaged, would result in severe consequences to the health, safety, and welfare of the public.

An inventory of critical facilities based on data from the City of Red Bluff, Tehama County and other publicly sourced information were used to develop a comprehensive inventory of facility points and lifelines for the City. Critical facility points include fire stations, schools, transportation, utilities, and government buildings. Lifelines include communication, electric power, liquid fuel, natural gas, and transportation routes. A current representation of the critical facilities and lifelines in the City of Red Bluff are provided in Table 2-4 and Table 2-5. The Tehama County Public Works Department manages and maintains a complete list of critical facilities.

Table 2-4: City of Red Bluff Critical Facility Counts

Infrastructure Type	Total Feature Count
Essential Facility	44
EOC	-
Fire Station	1
Government Facility	30
Hospital	1
Police Station	1
School	11
High Potential Loss	67
Residential Child Care	1
Adult Residential Care	24
Child Care	19
Foster/Home Care	1
Home Care	1
Foster Care	3
Elder Care	6
Hotel	12
Transportation and Lifeline	28
Airport	1
Bridge	20
Bus Facility	1
FCC AM Tower	-
FCC Cell Tower	-
FCC FM Tower	3
Natural Gas Station	1
Substation	1
Waste Water Facility	1
Grand Total	**139**

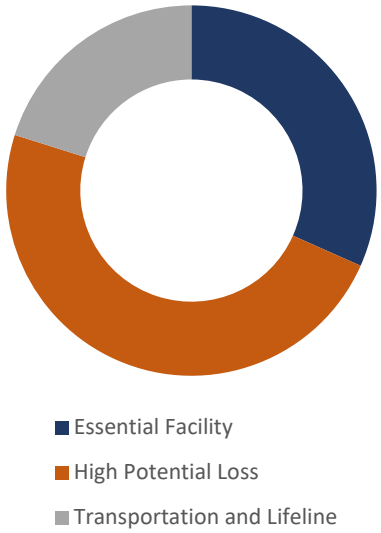


Table 2-5: City of Red Bluff Linear Utilities

Infrastructure Type (Linear)	Total Linear Mileage
Transportation and Lifeline	**101.6**
FEMA Levee	-
USACE Levee	-
Natural Gas Pipeline	2.6
Transmission Line	5.8
Railroad	5.2
Street	88.0
-Interstate	7.4
-Primary Highway	3.3
-State/County Highway	15.3
-Local Road	57.1
-Other Road	4.8
-4WD Road	-
Grand Total	**101.6**

2.4.6 Parcel Value Inventory

Total count and value of parcels within the City of Red Bluff which could be exposed to a hazard event is referred to as parcel exposure in this annex. A standardized hazard overlay was conducted to develop hazard exposure results for improved city parcels presented later in this section. For more information on this exposure method see Volume 1, Section 4. 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 total loss and structures can be rebuilt. The Tehama County Assessor's data is pivotal to developing parcel values exposed to each hazard and includes current fair market value of assets at risk. City of Red Bluff parcel information is summed and provided in Table 2-6. Both the market value and content value are the total value in the community at risk to a particular hazard.

Table 2-6: City of Red Bluff Parcel Counts and Values

	Total Parcels	Total Market Value Exposure ($)	Total Content Value Exposure ($)	Total Value ($)
Red Bluff Parcel Totals	5,207	$ 737,733,448	$ 502,236,755	$ 1,239,970,203

2.4.7 Hazus Structure and Content Value Inventory

FEMA's loss estimation software, Hazus-MH 4.0, was used to analyze the City's building risk to flood and earthquake hazards. A Hazus level II assessment was performed leveraging county-wide assessor's data in lieu of default Hazus data aggregated to the Census Block or Tract level. Hazus software operates on structure square footage, structure replacement, and content replacement costs to estimate potential losses specific to a modeled flood or earthquake scenario. Table 2-7 and Figure 2-5 provide value data for building categories at the census block and census tract levels for the City of Red Bluff. Census block and census tracts are used to provide input information for the Hazus analysis presented in this City annex. It is important to note that the full inventory basis within the Hazus software is different than the sum of values

from the assessor's data due to a variance in replacement cost calculations. If a parcel has no market value or assessment value, Hazus calculates a default value based on construction type and year built.

Note: Data Source: Tehama County Assessor. Building values reflect fair market value where available. If no fair market value is available, this value reflects the assessed improvement value. Content replacement costs are calculated based on assessor's use codes translated to Hazus occupancy classes. Each HAZUS occupancy class prescribes a specific content cost multiplier used to calculate the content cost values shown above. Use codes including a "vacant" description have been removed along with agricultural use codes with no improvement value.

Table 2-7: Parcel-Based Hazus Input Values (City of Red Bluff)

Building Type	Building Value ($)	Building Value (% of grand total)	Content Value ($)	Content Value (% of grand total *)	Total Value ($)	Proportion of Value (%)
Agricultural	$ 47,799	0.0%	$ 47,799	0.0%	$ 95,598	0%
Commercial	$ 226,553,387	17.0%	$ 250,380,313	18.8%	$ 476,933,700	36%
Education	$ 4,277,833	0.3%	$ 4,277,833	0.3%	$ 8,555,666	1%
Governmental	$ 223,517	0.0%	$ 223,517	0.0%	$ 447,034	0%
Industrial	$ 17,953,694	1.3%	$ 22,888,214	1.7%	$ 40,841,908	3%
Religion	$ 10,663,158	0.8%	$ 10,663,158	0.8%	$ 21,326,316	2%
Residential	$ 523,669,536	39.3%	$ 261,834,807	19.6%	$ 785,504,343	59%
Total	**$ 783,388,924**	**59%**	**$ 550,315,641**	**41%**	**$ 1,333,704,565**	

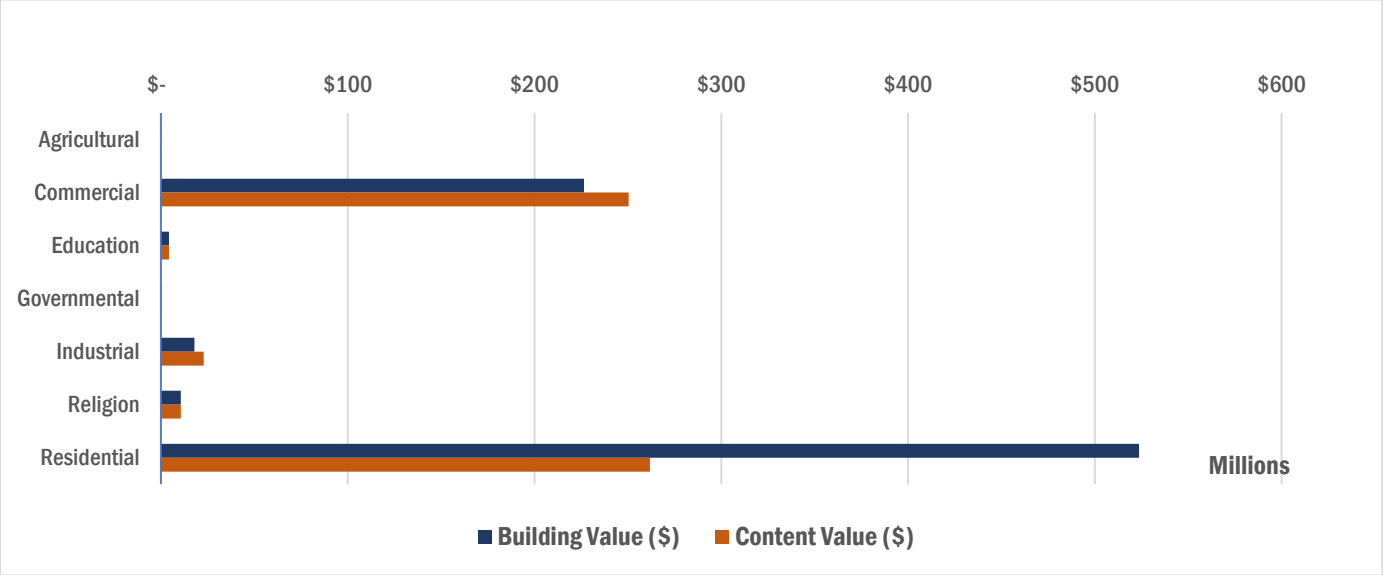


Figure 2-5: Hazus Inventory (Parcel-based) Building and Content Exposure Values

2.4.8 Vulnerability to Specific Hazards

This section provides the vulnerability assessment, including any quantifiable loss estimates, for those hazards identified as high or medium significance hazards within the City Limits. Impacts of past events and vulnerability of the City to specific hazards are further discussed below (see Section 4.1 Hazard Identification in the base plan for more detailed information about these hazards and their impacts on the Tehama County planning area).

Methodologies for calculating loss estimates are the same as those described in Section 3.4 of the base plan. In general, the most vulnerable structures are those located within the flood risk areas, wildfire risk areas, and vulnerable buildings within violent earthquake shake zones. An estimate of the vulnerability of the City to each identified priority hazard, in addition to the estimate of risk of future occurrence, is provided in each of the hazard-specific sections that follow.

This Annex provides an explanation of prevalent hazards within the City and how hazards may affect population and property within the jurisdiction. Most importantly the mitigation strategy presented in this plan responds to the particular vulnerabilities and provides prescriptions or actions to achieve the greatest reduction of vulnerability, which results in saved lives, reduced injuries, reduced property damage, and protection for the environment in the event of a natural hazard. This City Annex provides information for the following natural hazard threats:

Flooding
SECTION 2.4.9

Earthquake
SECTION 2.4.10

Wildfire
SECTION 2.4.11

Slope Failure
SECTION 2.4.12

Severe Weather
SECTION 2.4.13

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2.4.9 Flood Hazard

Seasonal flooding is a concern within the City of Red Bluff. The construction of Shasta Dam was part of the Central Valley Project, a flood control system which involves twenty dams and reservoirs, as well as canals, power plants, and other facilities. Shasta Dam was intended by the U.S. Bureau of Reclamation to be a major flooding control storage facility, thus lessening the threat of natural winter-spring flooding to communities downstream, such as Red Bluff. (City of Red Bluff General Plan Safety Element)

For general information regarding flooding, see the flood hazard profile located in Section 9, Volume 1 of the Base Plan.

2.4.9.1 Regulatory Oversight

2.4.9.1.1 National Flood Insurance Program (NFIP)

The City of Red Bluff has participated in the NFIP since 1982. The City of Red Bluff is currently in good standing with the provisions of the NFIP. Compliance is monitored by FEMA regional staff and by the California Department of Water Resources under a contract with FEMA. Maintaining compliance under the NFIP is an important component of flood risk reduction. See the Base Plan for general information on the NFIP.

See Table 2-8 for more information on the City's policies and historic flood insurance claims. Properties that fall within a Flood Plain are required to obtain pre- and post-construction elevation certificates and to maintain flood insurance policies and any other requirements contained in Chapter 26 "Flood Damage Prevention" of the Red Bluff City Code.

Table 2-8: NFIP Status Table (City of Red Bluff)

NFIP Status	Participating since 05/17/1982
Policies in Force	168
Policies in SFHA	138
Policies in non-SFHA	30
Total Claims Paid	37
Paid Losses	$ 370,549
Repetitive Loss Properties	N/A
Severe Repetitive Loss Properties	N/A
Repetitive Loss Payment by NFIP on Building	$ 0
Repetitive Loss Payment by NFIP on Contents	$ 0

See Volume 1, Section 9.2.1 of the Base Plan for more information on the NFIP.

2.4.9.1.2 Community Rating System (CRS)

The City of Red Bluff does not currently participate in FEMA's CRS Program.

See Volume 1, Section 9.2.2 of the Base Plan of the Base Plan for general information on CRS.

2.4.9.1.3 Flood Damage Prevention

Chapter 26 of the Red Bluff Code of Ordinances 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; and
- Prevent or regulate the construction of flood barriers which will unnaturally divert floodwaters or which may increase flood hazards in other areas.

(`61 Code, § 26.1-4) (Ord. 913, passed 4-18-2000)

2.4.9.2 Past Events

Damage has been reported in the City of Red Bluff from Flood Events. During January, March, and December 1983 Reeds Creek overflowed its banks along the lower mile of its course through Red Bluff. These flood events flooded 65 homes and involved considerable emergency efforts by local agencies. Floodwaters were estimated to be between 3 – 4 feet deep inside homes in the affected areas. Table 2-29 summarizes flood events in Red Bluff since 1969.

Table 2-9: Historic Flood Events in Red Bluff

Date	Declaration #	Type of event
2/17/17		Storms brought additional rain and widespread flooding and debris flows, as well as mountain snow.
12/11/14		Heavy Rain
12/6/14		Flash Flooding caused by heavy rain.
1983		Rain
1969		Rain

Source: National Oceanic and Atmospheric Administration and 2004 City of Red Bluff LHMP

2.4.9.3 Location

The Sacramento River causes the major flood problems in Red Bluff As the water level rises, Paynes Creek Slough, Samson Slough, and East Sand Slough start flowing, causing flooding to residential areas along their lengths. Several roads that cross through these sloughs become closed during flooding. Also, homes built on the banks of the river and sloughs are subject to flooding when the Sacramento River reaches approximately 138,000 cfs, a IO-percent annual chance flood event. (FEMA, 2011)

Flooding threat in the City of Red Bluff is most notable along the following streams: Red Bank, Grasshopper, Reeds, Brickyard, Brewery, Dibble, and Blue Tent Creeks. The main stream flowing into Lake Red Bluff causes flooding of the east-side lowland areas and the City of Red Bluff parks on the western side, along with erosion of the high bluffs. Figure 2-6 shows the flood zones in Red Bluff. Local flooding problems occur in the following areas:

- Most homes on Musick Avenue and along Aloha Street from South Jackson Street to Aloha Court are located in the 100-YR plain.
- Vista School at Vista Way and South Jackson Street suffer from drainage problems.
- An area east of Airport Boulevard and north of Kimball Road suffers from runoff backup.
- A potential exists for some inundation of Forward Park.
- Mobile Home Park on Gilmore Road.

Table 2-10 provides a summary of FEMA identified 100-YR and 500-YR flood hazard areas and Table 2-11 provides further detail regarding the source/location of the City's flood plains.

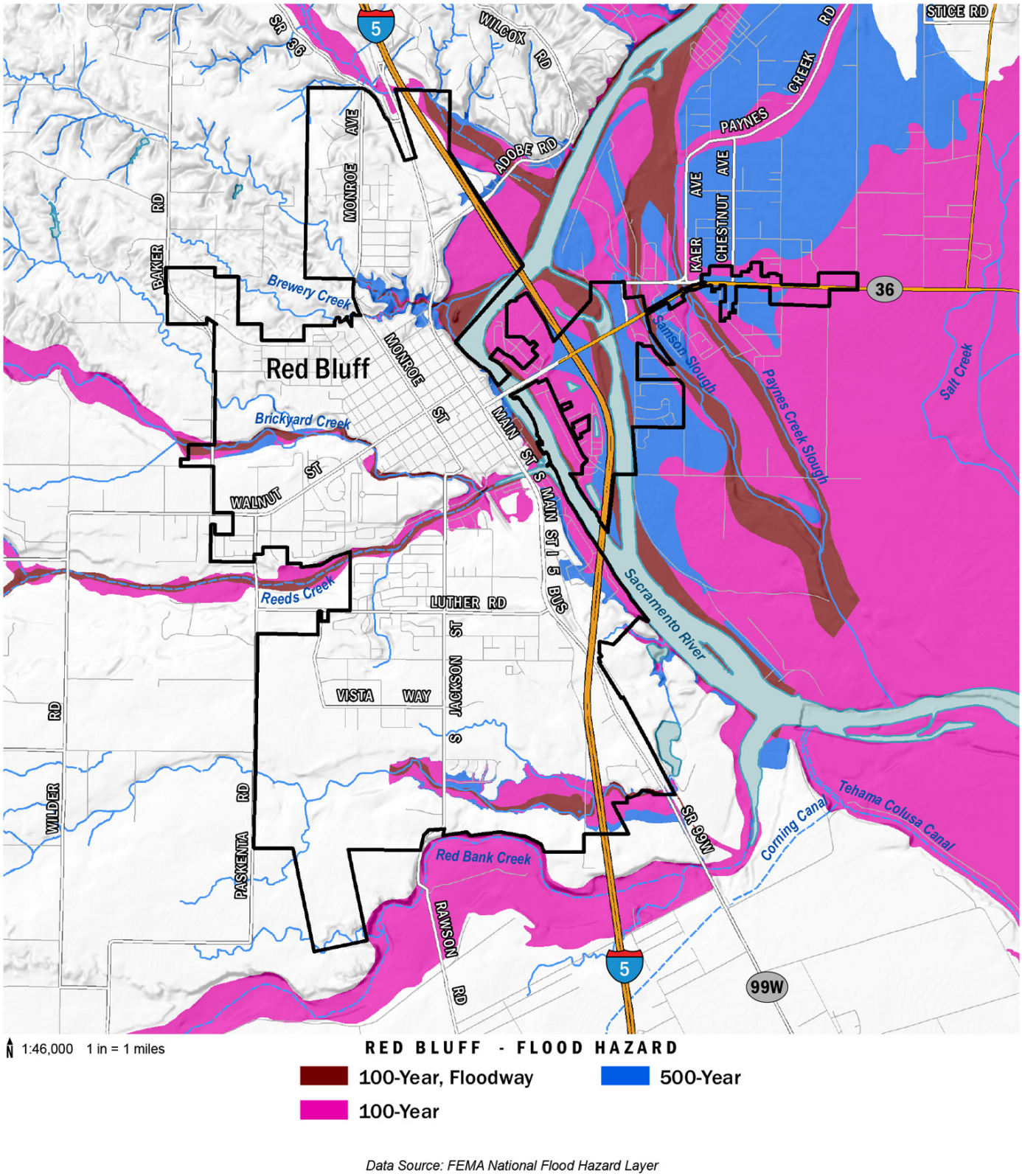


Figure 2-6: City of Red Bluff Flood Zones

Table 2-10: Flood Hazard Area Summary

Flood Hazard Type	Sum of Acres	Sum of Square Miles
100-YR Flood	429.6	0.7
100-YR Flood, Floodway	282.9	0.4
500-YR Flood	251.6	0.4
Total	**964.1**	**1.5**

Source: 09/29/2011 effective Countywide FEMA DFIRM data (5/29/2012 LOMR included)

Table 2-11: Local Drainage Peak Discharge Estimates – City of Red Bluff

	Drainage (SQ. MI)	Discharge (cubic feet/second)			
Source/Location	**Area**	**10-Year**	**50-Year**	**100-YR**	**500-YR**
Sacramento River					
At Red Bluff Diversion Dam	9,150	141,000	194,000	220,000	546,000
Downstream confluence of Reeds Creek	8,900	140,000	192,000	217,500	541,000

Source: Table 5 Summary of Discharges from FEMA FIS Text, 2011

2.4.9.4 Frequency

Natural seasonal flooding is the most common type of flooding in the City and can be expected at least annually.

2.4.9.5 Severity

Human activities in the water-shed upstream from Red Bluff play a significant role in sedimentation, peaks of water flow, and erosional capacity streams as they flow downstream across the City of Red Bluff. Since the city lies at the eastern ends of these drainages and has areas of high residential densities and paved streets, runoff from these urban surfaces represent an additional source of water for the channels. At times of peak discharge, this can lead to localized flooding and the backup of urban drainage systems. There is a partial levee system along the lower portion of Reeds Creek, which helps to protect the adjacent urban area from overbank flooding during periods of high stream flow.

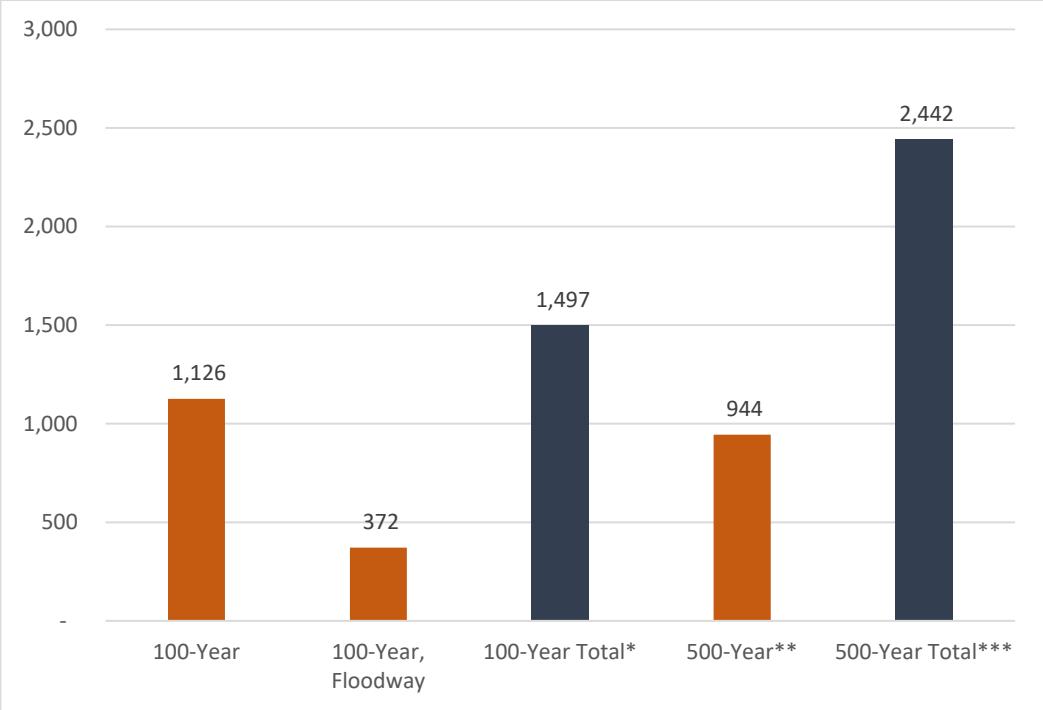
2.4.9.6 Flood Hazard Vulnerability

2.4.9.6.1 Population

Population counts of those living in the floodplain were generated by analyzing County assessor and parcel data that intersect with the 100-YR and 500-YR floodplains identified on FIRMs within the City of Red Bluff. Using GIS, U.S. Census Bureau information was used to intersect the FEMA identified floodplains within the City limits. An estimate of population was calculated by weighting the population within each census block. The exposure results indicate the percentage of total population living within a flood risk area. Using this approach, it was estimated that the total exposed population is 1,497 within the 100-YR floodplain (10.8% of total population) and 2,442 within the 500-YR floodplain (17.6% of total population), as shown in Figure 2-7.

Population Exposure

Population Count in the 100-Year and 500-YR Floodplains



**Total 100-year floodplain*
***Includes only additional area outside of 100-year floodplain*
****Total 500-YR floodplain, includes 100-year floodplain*

Figure 2-7: Population Exposure to Flood

2.4.9.6.2 Property

GIS was used to determine the possible impacts of flooding within the City of Red Bluff. The methodology described in Volume 1, Section 4.7.6.2 of the base plan was followed in determining structures and values at risk to the FEMA identified 1% (100-YR) and 0.2% (500-YR) annual chance flood event.

Table 2-12 summarizes the number of parcels and property value within the City of Red Bluff's FEMA identified floodplains. GIS models determined that there are 489 parcels within the 100-YR floodplain, 142 parcels within the 100-YR floodway and 282 parcels within the 500-YR floodplain. This methodology also estimated $154,135,468 worth of building-and-contents exposure to the 100-YR flood, representing 12.4 percent of the total assessed value within the City of Red Bluff and $8,092,164 worth of building and content exposure to the 100-YR floodway representing .7% of the total assessed value within the City. An estimated $78,054,573 worth of building-and-contents are exposed to the 500-YR flood, representing 6.3 percent of the total assessed value within the City of Red Bluff.

Table 2-12: City of Red Bluff- Parcels Exposed to NFIP Flood Zones

	Total Parcels	Total Market Value Exposure ($)	Total Content Value Exposure ($)	Total Value ($)
Red Bluff	5,207	$ 737,733,448	$ 502,236,755	$ 1,239,970,203

Flood Hazard Zone	Improved Parcel Count	% of Total	Market Value Exposure ($)	Content Value Exposure ($)	Total Exposure ($)	% of Total
100-YR Flood	489	*9.4%*	$ 88,389,643	$ 65,745,825	$ 154,135,468	*12.4%*
100-YR Flood, Floodway	142	*2.7%*	$ 4,830,409	$ 3,261,755	$ 8,092,164	*0.7%*
100-YR Total*	**631**	**12.1%**	**$ 93,220,052**	**$ 69,007,579**	**$ 162,227,631**	**13.1%**
500-YR Flood**	282	*5.4%*	$ 48,370,966	$ 29,683,607	$ 78,054,573	*6.3%*
500-YR Total***	**913**	**17.5%**	**$ 141,591,018**	**$ 98,691,186**	**$ 240,282,204**	**19.4%**

**Total 100-year floodplain*
***Includes only additional area outside of 100-year floodplain*
****Total 500-YR floodplain, includes 100-year floodplain*

Note: The table above does not display loss estimation results; the table exhibits total value at risk based upon the hazard overlay and Tehama County Assessor data.

2.4.9.6.3 Flood Damage Estimation

FEMA's HAZUS-MH software models the possible damage of flooding within the City of Red Bluff. The methodology described in Volume 1, Section 4.7.6.3 of the base plan was followed in determining potential damage associates with the 1% (100-YR) and 0.2% (500-YR) annual chance flood event.

The HAZUS-MH software calculates losses to structures from flooding by analyzing the depth of flooding and type of structure. Using historical flood insurance claim data, HAZUS-MH estimates the percentage of damage to structures and their contents by applying established damage functions to an inventory. For this analysis, all non-vacant parcels with current market values were used instead of the default inventory data provided with HAZUS-MH software. The analysis for the City of Red Bluff is summarized in Table 2-13 and Figure 2-8 for the 100-YR flood events and Table 2-14 and Figure 2-9 for 500-YR flood events. It is estimated that there "could" be up to $33,760,727 of flood loss from a 100-YR flood event in the planning area and $38,097,138 of flood loss from a 500-YR flood event. This modeled loss is assuming all tributaries in the area collect 100-YR event precipitation levels in the watershed. The estimated loss represents 20.1% of the total value exposed to the 100-YR flood and 15.9% of the total value exposed to the 500-YR event.

Table 2-13: 100-YR Flood Loss Estimation (Based on Depth) in NFIP Flood Zones by Occupancy Type

Building Type	Building Damage ($)	Building Damage (% of grand total)	Content Damage ($)	Content Damage (% of grand total)	Total Damage ($)	Proportion of Loss (%)
Agricultural	$ -	0.0%	$ -	0.0%	$ -	0%
Commercial	$ 2,348,133	6.2%	$ 7,790,872	20.5%	$ 10,139,005	30%
Education	$ -	0.0%	$ -	0.0%	$ -	0%
Governmental	$ -	0.0%	$ -	0.0%	$ -	0%
Industrial	$ -	0.0%	$ -	0.0%	$ -	0%
Religion	$ 19,592	0.1%	$ 154,759	0.4%	$ 174,351	1%
Residential	$ 15,245,515	40.0%	$ 8,201,856	21.5%	$ 23,447,371	69%
Total	**$ 17,613,240**	**52%**	**$ 16,147,487**	**48%**	**$ 33,760,727**	

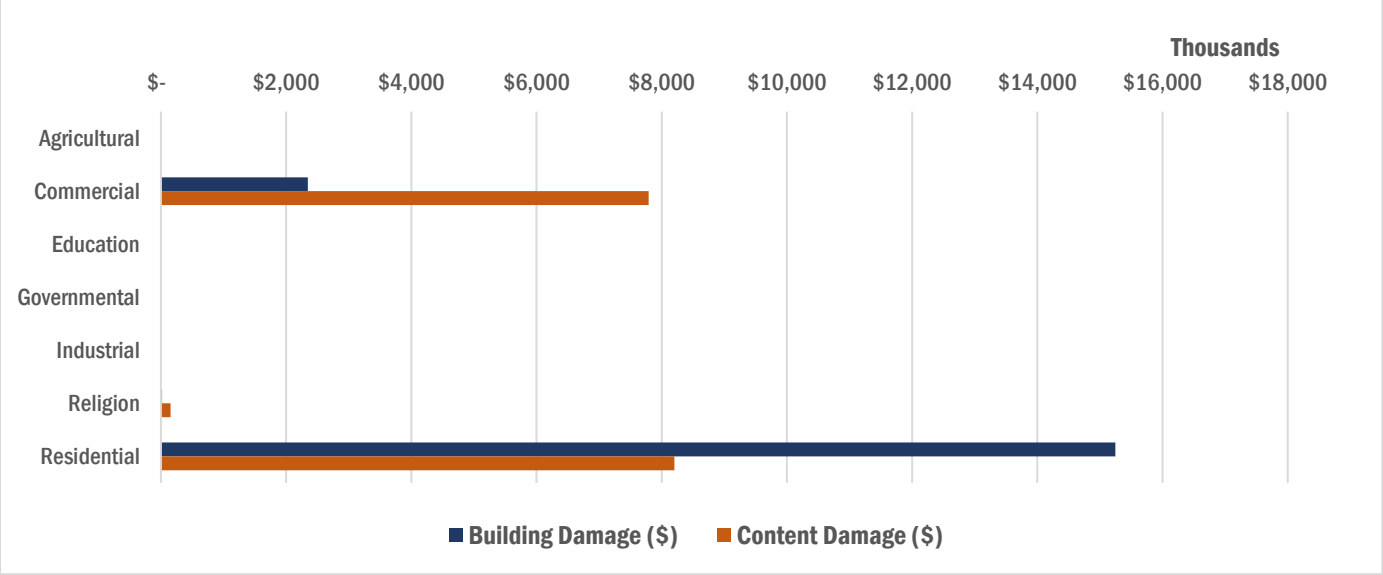


Figure 2-8: Estimated Building and Content Loss in the 100-YR floodplain by Occupancy Type

Table 2-14: 500-YR Flood Loss Estimation (Based on Depth) in NFIP Flood Zones by Occupancy Type

Building Type	Building Damage ($)	Building Damage (% of grand total)	Content Damage ($)	Content Damage (% of grand total)	Total Damage ($)	Proportion of Loss (%)
Agricultural	$ -	0.0%	$ -	0.0%	$ -	0%
Commercial	$ 2,290,935	6.0%	$ 7,522,067	19.7%	$ 9,813,002	26%
Education	$ -	0.0%	$ -	0.0%	$ -	0%
Governmental	$ -	0.0%	$ -	0.0%	$ -	0%
Industrial	$ -	0.0%	$ -	0.0%	$ -	0%
Religion	$ 19,592	0.1%	$ 154,656	0.4%	$ 174,248	0%
Residential	$ 18,248,455	47.9%	$ 9,861,433	25.9%	$ 28,109,888	74%
Total	**$ 20,558,982**	**54%**	**$ 17,538,156**	**46%**	**$ 38,097,138**	

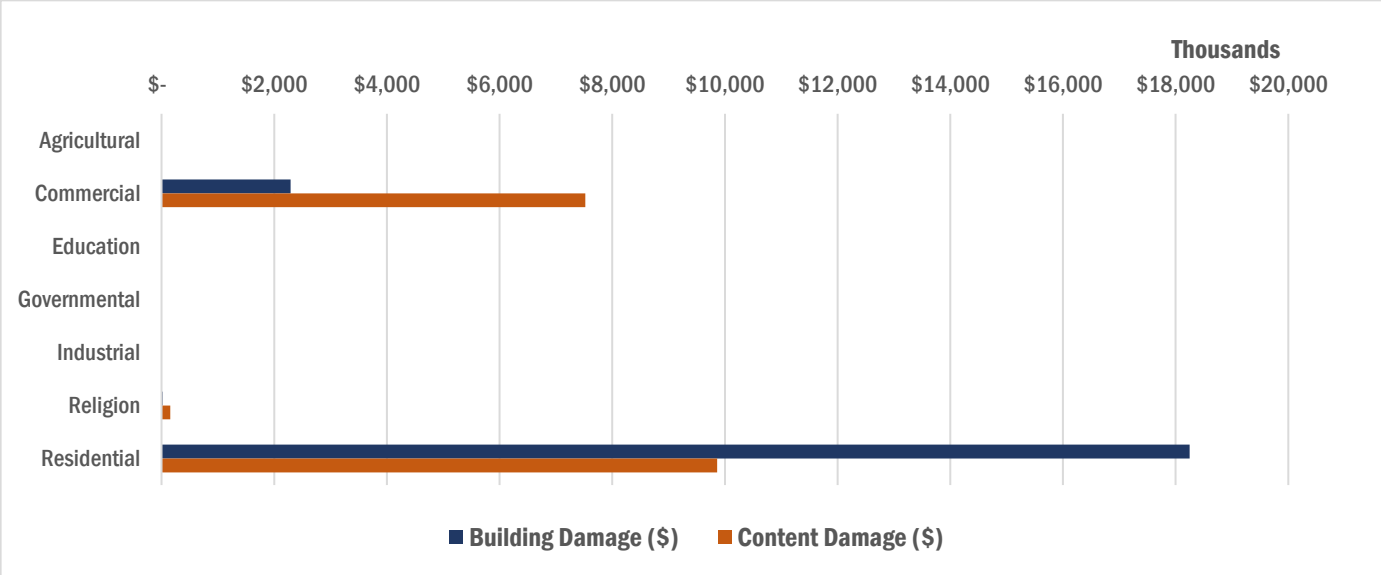


Figure 2-9: Estimated Building and Content Loss in the 500-YR floodplain by Occupancy Type

2.4.9.6.4 Critical Facilities and Infrastructure

It is important to determine who may be at risk if infrastructure is damaged by flooding. Roads or railroads that are blocked or damaged can isolate residents and can prevent access throughout the county, including for emergency service providers needing to get to vulnerable populations or to make repairs. Bridges washed out or blocked by floods or debris also can cause isolation. Water and sewer systems can be flooded or backed up, causing health problems. Underground utilities can be damaged. Dikes can fail or be overtopped, inundating the land that they protect. The following sections describe specific types of critical infrastructure.

Table 2-15 summarizes the critical facilities and infrastructure at risk to the 100-YR, 100-YR floodway and 500-YR floodplains within the City of Red Bluff.

Table 2-15: Critical Facility Points in the Floodplain – City of Red Bluff

Infrastructure Type	100-YR Flood Zone	Floodway	100-YR Total	500-YR, Outside 100-YR	500-YR Total
Essential Facility	4	0	4	1	5
EOC	0	0	0	0	0
Fire Station	0	0	0	0	0
Government Facility	4	0	4	1	5
Hospital	0	0	0	0	0
Police Station	0	0	0	0	0
School	0	0	0	0	0
High Potential Loss	8	1	9	3	12
Residential Child Care	0	0	0	0	0
Adult Residential Care	1	0	1	1	2
Child Care	2	0	2	0	2
Foster/Home Care	0	0	0	0	0
Home Care	0	0	0	0	0
Other Care Facility	0	0	0	0	0
Elder Care	2	1	3	0	3
Dam	0	0	0	0	0
Hotel	3	0	3	2	5
Transportation and Lifeline	4	4	8	3	11
Airport	0	0	0	0	0
Bridge	3	4	7	3	10
Bus Facility	0	0	0	0	0
FCC AM Tower	0	0	0	0	0
FCC Cell Tower	0	0	0	0	0
FCC FM Tower	0	0	0	0	0
Natural Gas Station	0	0	0	0	0
Power Plant	0	0	0	0	0
Substation	0	0	0	0	0
Waste Water Facility	1	0	1	0	1
Grand Total	**16**	**5**	**21**	**7**	**28**

Critical Facilities Damage Estimates

As mentioned previously, FEMA's HAZUS-MH software was used to estimate the flood loss potential to critical facilities exposed to the flood risk. The City of Red Bluff has not established building values for City Owned facilities (essential facilities) for purposes of this effort. Table 2-16 summarizes the results of potential damage estimates as a result of the 100-YR Flood event to high potential loss facilities in the city.

Table 2-16: 100-YR Flood Event High Potential Loss Facility Damage Estimation

High Potential Loss Facility	Building Value	Content Value	Potential Building Damage ($)	Potential Content Damage ($)	Total Damage ($)
High Potential Loss	**$7,819,737**	**$3,909,867**	**$458,346**	**$563,629**	**$1,021,975**
Child Care Centers	**$58,579**	**$29,290**	**$10,365**	**$6,062**	**$16,427**
RED BLUFF HEAD START CENTER	$58,579	$29,290	$10,365	$6,062	$16,427
Hotel	**$6,922,204**	**$3,461,101**	**$222,266**	**$413,815**	**$636,082**
Comfort Inn	$4,752,137	$2,376,068	$124,870	$228,928	$353,798
Motel 6 Red Bluff	$1,513,297	$756,648	$63,613	$119,660	$183,273
Riverbank Inn	$656,770	$328,385	$33,783	$65,228	$99,011
Res Elder Care Facility	**$838,954**	**$419,476**	**$225,714**	**$143,752**	**$369,466**
AQUINO SHADY OAKS REST HOME	$419,477	$209,738	$112,857	$71,876	$184,733
GILMORE PLACE	$419,477	$209,738	$112,857	$71,876	$184,733

Linear Utilities

It is important to determine who may be at risk if infrastructure is damaged by flooding. Roads or railroads that are blocked or damaged can isolate residents and can prevent access throughout the city and county, including for emergency service providers needing to get to vulnerable populations or to make repairs. Bridges washed out or blocked by floods or debris also can cause isolation. Water and sewer systems can be flooded or backed up, causing health problems. Underground utilities can be damaged. Levees can fail or be overtopped, inundating the land that they protect. Table 2-17 shows the linear critical facilities in the floodplain.

Table 2-17: Critical Facilities (Linear) in the Floodplain – City of Red Bluff

Infrastructure Type (Linear)	100-YR	100-YR, Floodway	500-YR	Total Mileage
Transportation and Lifeline	**10.8**	**2.0**	**11.0**	**23.8**
FEMA Levee	-	-	-	-
USACE Levee	-	-	-	-
Natural Gas Pipeline	0.1	-	0.1	0.2
Transmission Line	0.3	0.1	0.1	0.5
Railroad	0.1	0.0	-	0.1
Street	10.3	1.9	10.8	23.0
-Interstate	0.5	0.2	3.4	4.2
-Primary Highway	1.7	0.6	1.6	3.9
-State/County Highway	0.8	0.5	0.9	2.1
-Local Road	6.8	0.6	3.3	10.6
-Other Road	0.5	0.0	1.6	2.2
-4WD Road	-	-	-	-
Grand Total	**10.8**	**2.0**	**11.0**	**23.8**

2.4.9.7 Future Trends in Development

Limiting land uses in the floodplain to those that can sustain periodic flooding will have the greatest long-term benefits. Appropriate uses would be open space and recreation. Developments already occurring in the floodplain should be encouraged to undertake appropriate development to mitigate potential impacts, upstream and especially downstream. No development should be allowed, which would raise the level of the 100-YR flood. Surface runoff from areas that drain into streams should be controlled by measures, which prevent erosion, and soil erosion during construction should likewise be carefully monitored and controlled. Since localized flooding may occur where immediate access to stream channels is not feasible for runoff, or, if runoff is blocked by existing development project, storm drainage improvements will be required.

2.4.10 Earthquake

According to FEMA, an earthquake is "a sudden, rapid shaking of the Earth caused by the breaking and shifting of rock beneath the Earth's surface." Earthquakes can be one of the earth's most damaging hazards because the shaking of the earthquake may cause buildings and bridges to collapse; disrupt gas, electric, and phone service; and sometimes trigger landslides, avalanches, and structure fires as result of ruptured gas lines. See Volume 1, Section 4.6: Earthquake Hazard Profile in the Base Plan for more information on earthquakes and vulnerabilities to utilities.

2.4.10.1 Regulatory Oversight

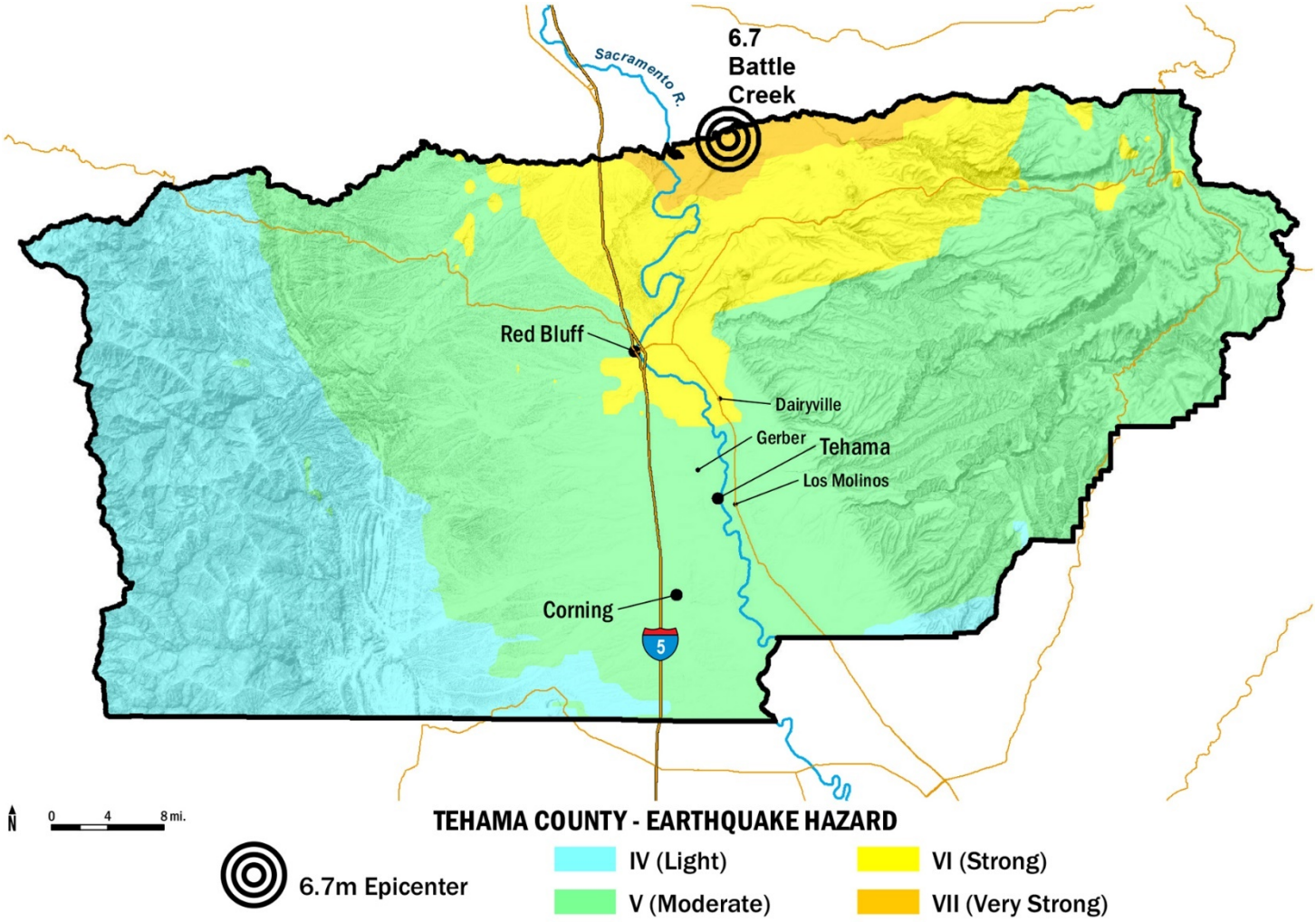
Numerous building and zoning codes exist at a state and local level to decrease the impact of an earthquake event and resulting liquefaction on residents and infrastructure. The City of Red Bluff's building codes are the same as Tehama County's. Detail about the County/ State's building codes can be found in Volume 1, Section 4.6.1 of the Base Plan.

2.4.10.2 Past Events

No events or damage has been reported in the City of Red Bluff from Earthquake Events; probability and potential occurrences are low. (City of Red Bluff General Plan Safety Element). Tehama County does not have an extensive earthquake history. For more information on past earthquake events in Tehama County, refer to Volume 1, Section 4.6 of the Base Plan.

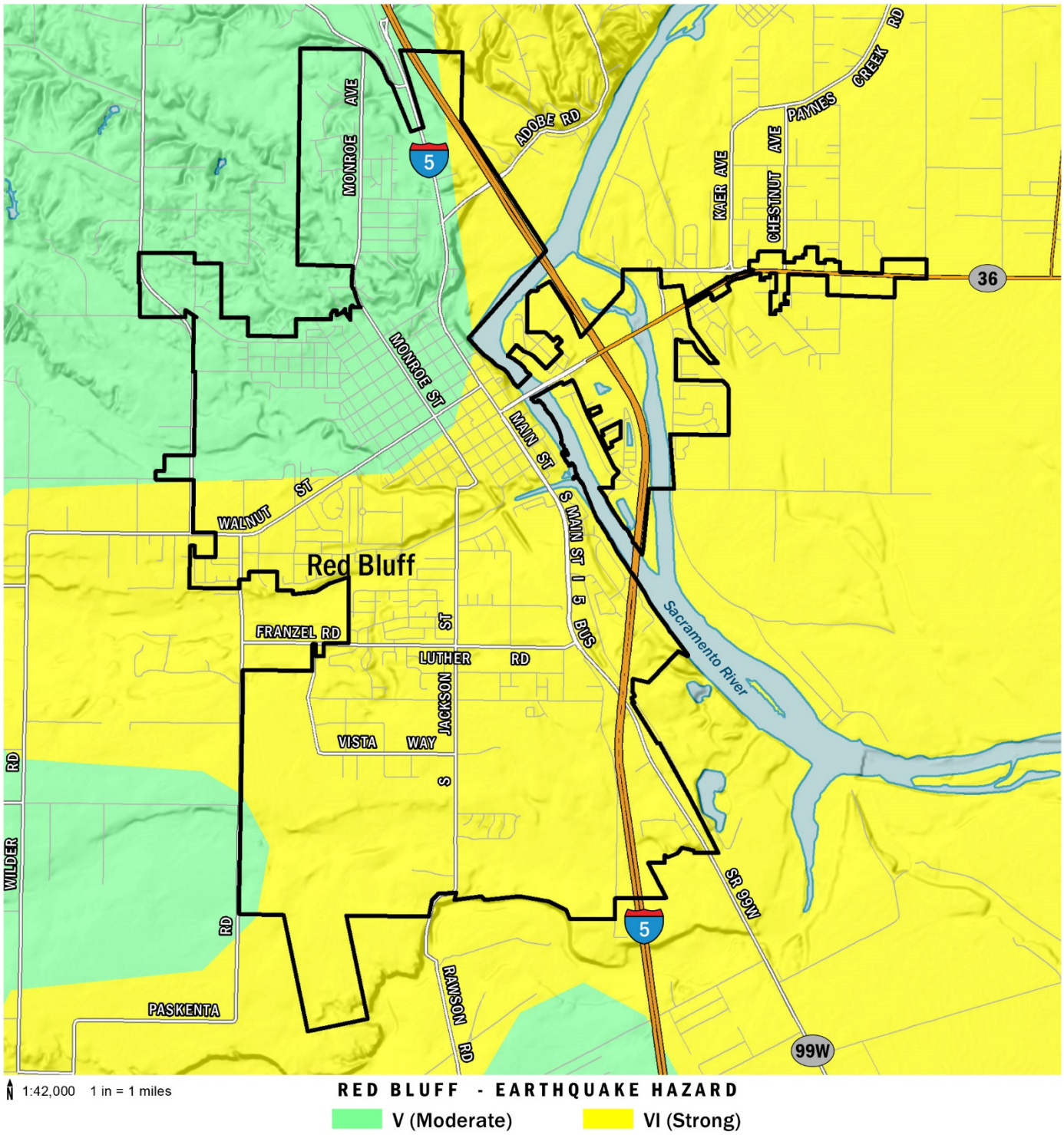
2.4.10.3 Location

A shake map shows the extent and variation of ground shaking in a region immediately following significant earthquakes. A probabilistic seismic hazard map shows the hazard from earthquakes that geologists and seismologists agree could occur. The maps are expressed in terms of probability of exceeding a certain ground motion, such as the 10-percent probability of exceedance in 50 years. This level of ground shaking has been used for designing buildings in high seismic areas. Figure 2-10 and Figure 2-11 show the estimated ground motion for the Battle Creek Scenario in Red Bluff and Tehama County. As shown in Figure 2-11, most of the City would be in the Strong shake zone in the Battle Creek Earthquake Scenario. The northwestern most portion of the City would be in a Moderate Shake Zone. The fault nearest to the City of Red Bluff Is the Corning Fault, shown in Figure 2-12.



Data Source: USGS ShakeMap, Battle Creek 6.7 M Scenario

Figure 2-10: Tehama County Earthquake Shake Map



Data Source: USGS ShakeMap, Battle Creek 6.7 M Scenario

Figure 2-11: Earthquake Hazard Map for the City of Red Bluff

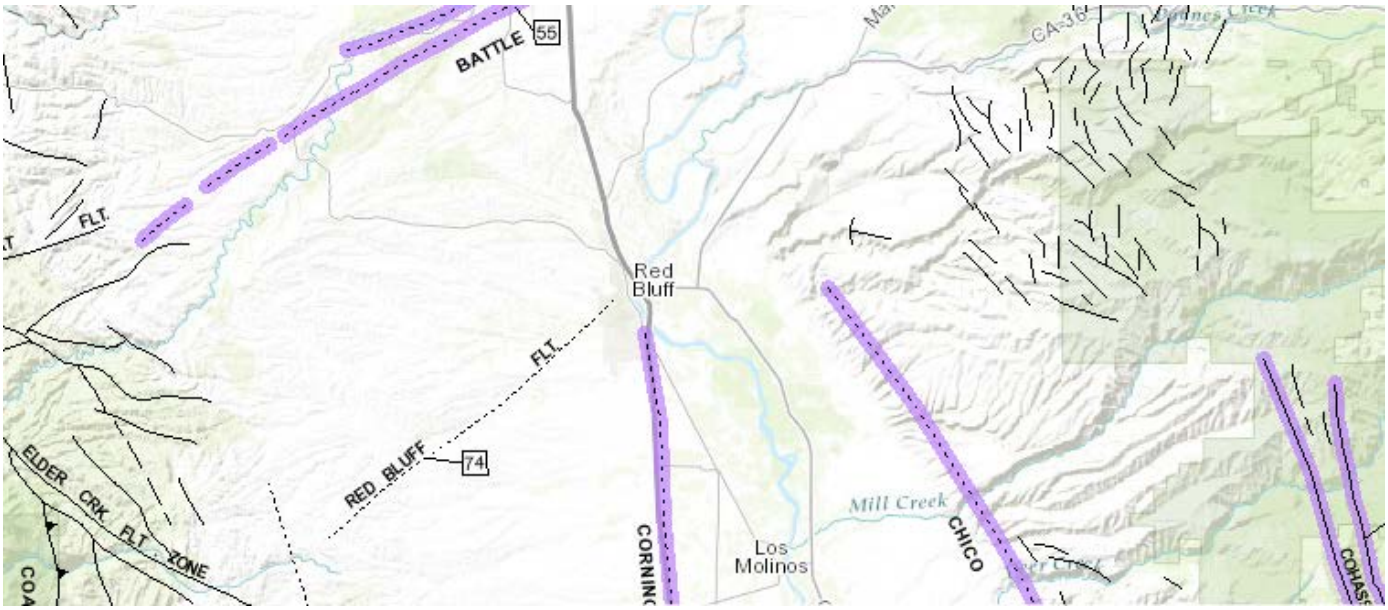


Figure 2-12: Earthquake Faults Near Red Bluff (2010)

Source: http://maps.conservation.ca.gov/cgs/fam/

2.4.10.4 Frequency

While earthquake activity in California as a whole is frequent, the activity in Tehama County is not. Although no active faults are mapped in the county, there exists the potential for minor, localized earthquake events as precursors to eruptive activity of Mount Lassen or other smaller localized faults. For more information on the frequency of earthquakes in Tehama County, see Volume 1, Section 4.6.2.3 of the Base Plan.

2.4.10.5 Severity

If a 6.7 magnitude earthquake were to occur along the Battle Creek fault, the City of Red Bluff would experience moderate to strong shaking, as shown in Figure 2-11. For more information on magnitude and severity of shaking, see Volume 1, Section 4.6.2.4 of the Base Plan.

2.4.10.6 Earthquake Vulnerability

2.4.10.6.1 Population

As shown in Table 2-18, the entire population of the City of Red Bluff is potentially exposed to direct and indirect impacts from earthquakes. The degree of exposure is dependent on many factors, including the age and construction type of the structures people live in, the soil type their homes are constructed on, their proximity to fault location, etc. Whether directly or indirectly impacted, the entire population will have to deal with the consequences of earthquakes to some degree. Business interruption could keep people from working, road closures could isolate populations, and loss of utilities could impact populations that suffered no direct damage from an event itself.

Table 2-18: Population Exposure to Battle Creek Earthquake Scenario

	Total Population
Red Bluff	13,905

Shake Severity Zone	Population Count	% of Total
V - Moderate	4,176	30.03%
VI - Strong	9,729	69.97%
VII - Very Strong	-	0.00%
Total	**13,905**	**100.00%**

2.4.10.6.2 Property

The County Assessor's parcel data was used as the basis for the inventory of current market values and content value summaries. GIS was used to create centroids, or points, to represent the center of each parcel polygon – this is assumed to be the location of the structure for analysis purposes. The centroids were then overlaid with the shaking severity zones of the Battle Creek 6.7 magnitude earthquake severity zones to determine the at-risk structures. This methodology assumed that every parcel with a current net value or assessed value was an improved parcel. Building exposure was calculated based on current net values or when absent, assessor's values as provided by the assessor's office. Building content exposure was calculated based on occupancy type multipliers and improvement value. Table 2-19 shows the count of at-risk parcels and their associated building and content exposure values to earthquake.

Table 2-19: City of Red Bluff Total Parcel Value Exposure from Battle Creek Scenario

Total Parcels	Total Market Value Exposure ($)	Total Content Value Exposure ($)	Total Value ($)
5,207	$ 737,733,448	$502,236,755	$ 1,239,970,203

Shake Severity Zone	Improved Parcel Count	% of Total	Market Value Exposure ($)	Content Value Exposure ($)	Total Exposure ($)	% of Total
V - Moderate	1,805	34.7%	$ 207,556,757	$ 126,853,450	$ 334,410,207	26.97%
VI - Strong	3,402	65.3%	$ 530,176,691	$ 375,383,305	$ 905,559,996	73.03%
VII -Very Strong	-	0.0%	$ -	$ -	$ -	0.000%
Total	**5,207**	**100.0%**	**$ 737,733,448**	**$ 502,236,755**	**$ 1,239,970,203**	**100.0%**

Earthquake Damage Estimation

Table 2-20 and Figure 2-13 demonstrates building loss estimation results from the Battle Creek 6.7 magnitude earthquake scenario. If the modeled earthquake were to occur, damages are estimated at approximately $130,427,087, or 5.31% percent of the total modeled value improvements within the City. FEMA's HAZUS-MH software classifies potential damage in five categories: no damage, slight damage, moderate damage, extensive damage, or complete damage. FEMA's software also predicts the possibility of exceedance for particular damage categories. As demonstrated in the table, the probability of extensive damage is minimal based upon the Battle Creek Earthquake Scenario. For further explanation of the earthquake damage estimation, please refer to Volume 1, Section 4.6.5.2.4 in the Base Plan.

Table 2-20: City of Red Bluff EQ Damage Estimates

Building Type	Average of Potential Damage to Exceed "Slight"	Average of Potential Damage to Exceed "Moderate"	Average of Potential Damage to Exceed "Extensive"	Average Economic Loss for Each Building Category	Sum of Economic Loss	Proportion of Loss (%)
Agricultural	29%	12%	2%	$ 3,591	$ 3,591	0%
Commercial	29%	12%	3%	$ 39,193	$ 17,127,483	29%
Education	29%	12%	2%	$ 81,077	$ 324,309	1%
Governmental	31%	13%	3%	$ 17,991	$ 17,991	0%
Industrial	28%	11%	2%	$ 36,405	$ 1,310,586	2%
Religion	28%	11%	2%	$ 28,948	$ 781,600	1%
Residential	29%	12%	2%	$ 9,899	$ 38,990,836	67%
Total	**29%**	**12%**	**2%**	**$ 13,174**	**$ 58,556,396**	

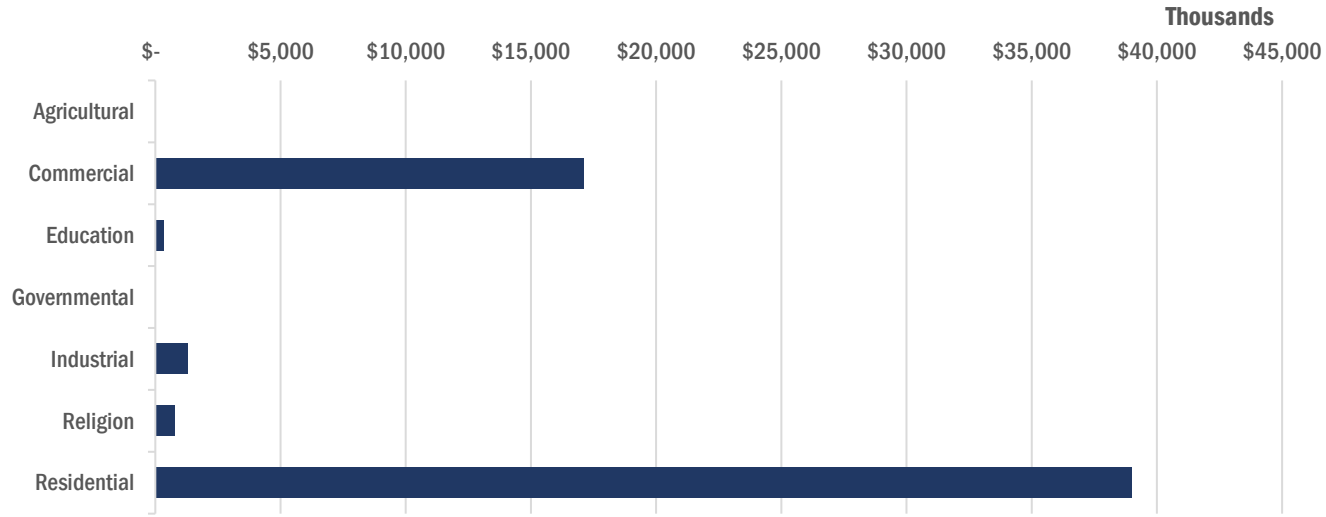


Figure 2-13: Economic Loss by Occupancy

2.4.10.6.3 Critical Facilities and Infrastructure

All critical facilities in the City of Red Bluff are exposed to the earthquake hazard. Hazardous materials releases can occur during an earthquake from fixed facilities or transportation-related incidents. Transportation corridors can be disrupted during an earthquake, leading to the release of materials to the surrounding environment. Facilities holding hazardous materials are of particular concern because of possible isolation of neighborhoods surrounding them. During an earthquake, structures storing these materials could rupture and leak into the surrounding area or an adjacent waterway, having a disastrous effect on the environment.

As mentioned previously, FEMA's HAZUS-MH software classifies potential damage in five categories: no damage, slight damage, moderate damage, extensive damage, or complete damage. The model was used to assign a vulnerability category to each essential and high potential loss structure. Damage functions to transportation and lifelines have not been established for this project. Table 2-21 summarizes the results.

Table 2-21: City of Red Bluff Critical Infrastructure Damage Estimation

Infrastructure Type	Average Probability of Potential Damage Exceedance			Sum of Economic Loss
	Slight	Moderate	Extensive	
Essential Facilities	***28%***	***12%***	***2%***	***$ 1,488,593***
Hospital	***28%***	***11%***	***2%***	***$ 1,131,107***
St Elizabeth Community Hospital	*28%*	*11%*	*2%*	*$ 1,131,107*
School	***29%***	***12%***	***2%***	***$ 357,486***
Mercy High School	*30%*	*13%*	*3%*	*$ 119,330*
Sacred Heart School	*29%*	*12%*	*2%*	*$ 186,716*
Tehama eLearning Academy	*27%*	*11%*	*2%*	*$ 51,440*
High Potential Loss	***29%***	***12%***	***2%***	***$ 3,892,414***
Hotel	***29%***	***12%***	***2%***	***$ 2,192,103***
Americas Best Value Inn - Red Bluff	*29%*	*12%*	*2%*	*$ 19,650*
BEST WESTERN Antelope Inn	*30%*	*13%*	*3%*	*$ 205,390*
Classic Inn	*27%*	*11%*	*2%*	*$ 42,839*
Comfort Inn	*30%*	*13%*	*3%*	*$ 381,169*
Crystal Motel	*29%*	*12%*	*2%*	*$ 77,917*
Gateway Inn	*29%*	*12%*	*2%*	*$ 41,679*
Hampton Inn & Suites Red Bluff	*29%*	*12%*	*2%*	*$ 677,618*
Holiday Inn Express Red Bluff - South Redding Area	*29%*	*12%*	*2%*	*$ 534,168*
Motel 6 Red Bluff	*30%*	*13%*	*3%*	*$ 120,398*
Riverbank Inn	*30%*	*13%*	*3%*	*$ 52,253*
Sky Terrace Motel	*29%*	*12%*	*2%*	*$ 38,684*
Triangle Motel	*29%*	*12%*	*2%*	*$ 338*
Res Elder Care Facility	***29%***	***12%***	***2%***	***$ 346,166***
ALL ABOUT SENIORS - WALNUT STREET	*27%*	*11%*	*2%*	*$ 38,539*
AQUINO SHADY OAKS REST HOME	*30%*	*13%*	*3%*	*$ 33,374*
BROOKDALE RED BLUFF	*29%*	*12%*	*2%*	*$ 113,181*
EMERITUS AT LASSEN HOUSE	*29%*	*12%*	*2%*	*$ 113,181*
GILMORE PLACE	*30%*	*13%*	*3%*	*$ 33,374*
PRS-SOUTHPOINTE RETREAT	*29%*	*12%*	*2%*	*$ 14,518*
Adult Res Facility	***28%***	***12%***	***2%***	***$ 198,098***
CASA SERENITY LLC 2	*27%*	*11%*	*2%*	*$ 15,443*
D & S CARE HOMES LLC	*29%*	*12%*	*2%*	*$ 9,180*
DIAMOND VIEW	*29%*	*12%*	*2%*	*$ 11,592*

Infrastructure Type	Average Probability of Potential Damage Exceedance			Sum of Economic Loss
	Slight	Moderate	Extensive	
HOLLIDAY HOMES LARKSPUR	*29%*	*12%*	*2%*	*$ 9,108*
JEWEL RESIDENTIAL - ALDER	*29%*	*12%*	*2%*	*$ 5,687*
JEWEL RESIDENTIAL - LOCUST	*29%*	*12%*	*2%*	*$ 3,678*
JEWEL RESIDENTIAL - SCOTTSDALE	*29%*	*12%*	*2%*	*$ 6,900*
JEWEL RESIDENTIAL INC. (ALDER)	*29%*	*12%*	*2%*	*$ 5,687*
JEWEL RESIDENTIAL INC. (LOCUST)	*29%*	*12%*	*2%*	*$ 3,678*
JEWEL RESIDENTIAL INC. (SCOTTSDALE)	*29%*	*12%*	*2%*	*$ 6,900*
KROGAN HOUSE RESIDENTIAL	*27%*	*11%*	*2%*	*$ 6,370*
LEGACY HOUSE II	*27%*	*11%*	*2%*	*$ 18,704*
LYFORD FAMILY HOME	*29%*	*12%*	*2%*	*$ 10,911*
MASON'S RESIDENCE	*27%*	*11%*	*2%*	*$ 8,018*
MASON'S RESIDENCE II	*29%*	*12%*	*2%*	*$ 8,029*
MASON'S RESIDENTIAL HOMES II	*29%*	*12%*	*2%*	*$ 8,029*
NORTH VALLEY SERVICES - DAYTIME ACTIVITY CENTER	*28%*	*11%*	*2%*	*$ 15,372*
PRS - SOUTHPOINTE HOUSE	*29%*	*12%*	*2%*	*$ 12,099*
PRS - WALBRIDGE HOUSE	*27%*	*11%*	*2%*	*$ 9,924*
STONYBROOK RESIDENTIAL	*29%*	*12%*	*2%*	*$ 10,341*
STONYBROOK RESIDENTIAL INC. (HOWARD)	*29%*	*12%*	*2%*	*$ 12,446*
Home Care Organization	***27%***	***11%***	***2%***	***$ 25,968***
INTERIM HEALTHCARE PERSONAL CARE & SUPPORTIVE	*27%*	*11%*	*2%*	*$ 25,968*
Other Care Facility	***29%***	***12%***	***2%***	***$ 251,209***
CHILDREN FIRST FOSTER FAMILY AGENCY	*30%*	*13%*	*3%*	*$ 112,621*
CHILDREN FIRST THPP/THP+FC	*30%*	*13%*	*3%*	*$ 112,621*
INTERIM HEALTHCARE PERSONAL CARE & SUPPORTIVE	*27%*	*11%*	*2%*	*$ 25,968*
Child Care Centers	***28%***	***12%***	***2%***	***$ 653,630***
BIDWELL STATE PRESCHOOL	*27%*	*11%*	*2%*	*$ 6,752*
BIG APPLE PRESCHOOL & CHILD CARE CENTER	*29%*	*12%*	*2%*	*$ 186,716*
DOUGLAS STREET STATE PRESCHOOL	*27%*	*11%*	*2%*	*$ 4,290*
FIRST CHURCH OF GOD PRESCHOOL	*29%*	*12%*	*2%*	*$ 4,247*
JACKSON HEIGHTS STATE PRESCHOOL	*29%*	*12%*	*2%*	*$ 7,106*
LACEY'S LIL LEARNERS CHILD CARE CENTER	*30%*	*13%*	*3%*	*$ 15,574*
LITTLE SCHOLARS PRESCHOOL	*29%*	*12%*	*2%*	*$ 13,513*
LITTLE SCHOLARS PRESCHOOL 2	*29%*	*12%*	*2%*	*$ 186,716*
METTEER STATE PRESCHOOL	*29%*	*12%*	*2%*	*$ 9,007*
OUR LITTLE HOUSE	*27%*	*11%*	*2%*	*$ 8,580*
PRESBYTERIAN CHURCH PRESCHOOL	*27%*	*11%*	*2%*	*$ 20,049*
RED BLUFF HEAD START CENTER	*29%*	*12%*	*2%*	*$ 4,361*
SACRED HEART PARISH PRESCHOOL & DAY CARE	*29%*	*12%*	*2%*	*$ 186,716*

Infrastructure Type	Average Probability of Potential Damage Exceedance			Sum of Economic Loss	
	Slight	Moderate	Extensive		
24hr Res Child Care	***30%***	***13%***	***3%***	***$***	***112,621***
CHILDREN FIRST THPP/THP+FC	*30%*	*13%*	*3%*	*$*	*112,621*
Foster Family Agencies	***30%***	***13%***	***3%***	***$***	***112,621***
CHILDREN FIRST FOSTER FAMILY AGENCY	*30%*	*13%*	*3%*	*$*	*112,621*

2.4.10.7 Future Trends

Land use in the City of Red Bluff will be directed by a general plan adapted under California's General Planning Law. The Safety Element of the General Plan establishes standards and plans for the protection of the community from hazards. The information in this plan provides the participating partners a tool to ensure that there is no increase in exposure in areas of high seismic risk. Development in the planning area will be regulated through building standards and performance measures so that the degree of risk will be reduced. The geologic hazard portions of the planning area are heavily regulated under California's General Planning Law. The California Building Code establishes provisions to address seismic risk.

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2.4.11 Wildfire

Wildfires continue to pose significant threat to most Northern California communities, including Red Bluff. Wildland fires are common in open space areas with vegetation that exhibits low fuel moisture. High winds can also contribute to the severity of the fire. Generally, the undeveloped portions of the City do not pose a high-risk due to existing vegetation management practices on the land. However, grass fires can occur particularly where there is native vegetation, such as the riparian corridors near local water courses. Fire hazards can also occur in urbanized areas of the City. Residential and commercial structure fires can occur particularly in older neighborhoods. Additionally, some industrial processes can include the use or storage of flammable liquids or farming bi-products. The storage of propane gas can also create a fire hazard.

For more information on how wildfires affect Tehama County, see Volume 1, Section 4.10 in the Base Plan.

2.4.11.1 Regulatory Oversight

2.4.11.1.1 City of Red Bluff Code of Ordinances

Chapter 8 Section 8.15 establishes requirements for fire apparatus access roads.

- Fire apparatus access roads in residential areas, public or private, shall have an unobstructed minimum width of 40', curb-to-curb.
- Fire apparatus access roads within multi-family developments shall have an unobstructed minimum width of 30 feet.
- Cul-de-sac turning radius shall be 50', or 100' curb-to-curb minimum.

(Ord. 974, passed 11-20-2007; Am. Ord. 1007, passed 1-4-2011; Am. Ord. 1046, passed 12-20-2016)

Chapter 8 Section 8.17 establishes regulations on burning, including open burning/residential, land clearing, and special events.

Chapter 8 Section 8.20 sets standards for weed abatement in the City. It states “Persons owning, leasing, renting, in legal control of the property; and operating or maintaining buildings or structures in, upon or adjoining hazardous fire areas; and persons owning, leasing or controlling land adjacent to such buildings or structures, shall at all times maintain an effective firebreak, as stipulated in this code. When property lines are adjacent to roadways, the hazard shall be cleared to the center of the roadway.”

2.4.11.2 Past Events

No damage has been reported in the City of Red Bluff from Wildland Fire Events. There have been only 4 wildfire occurrences within the City since 2000. These events are summarized in Table 2-22.

Table 2-22: Wildfire Events in the City of Red Bluff since 2000

Date	Event Name	Cause
7/16/12	Cody Fire	Unknown
9/29/00	Weinstein	Unknown

Source: 2004 Red Bluff Hazard Mitigation Plan* and Cal Fire

2.4.11.3 Location

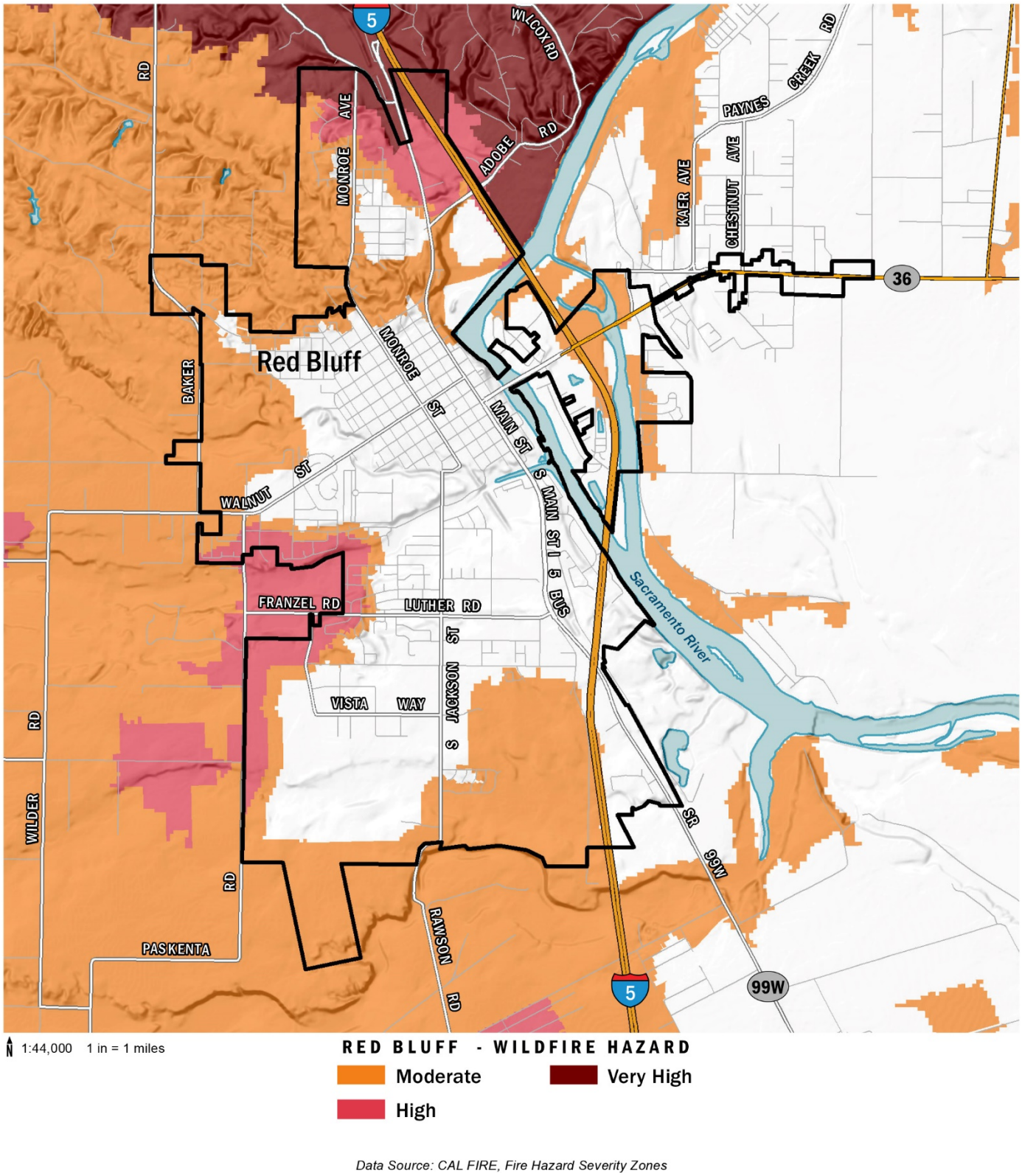
CAL FIRE adopted Fire Hazard Severity Zone maps for the Local Responsibility Area (LRA) in June 2008. Fire hazard mapping is a way to measure the physical fire behavior to predict the damage a fire is likely to cause. Fire hazard measurement includes vegetative fuels, probability of speed at which a wildfire moves the amount of heat the fire produces, and most importantly, the burning fire embers that the fire sends ahead of the flaming front.

The model used to develop the information in accounts for topography, especially the steepness of the slopes (fires burn faster as they burn up-slope.). Weather (temperature, humidity, and wind) also has a significant influence on fire behavior. The areas depicted as moderate, high and very high are of particular concern and potential fire risk in these areas are constantly increasing as human development and the wildland urban interface areas expand.

Approximately 2 percent of the land area in Red Bluff is at very high risk from wildland fires. Table 2-23 shows the sum of acres and square miles in each wildfire hazard severity zone. Table 2-14 illustrates the Fire Hazard Severity Zones for the City. Very High and High Fire Hazard Severity Zones have been identified along the northern borders of the City due to heavily forested areas such as those near Ayer Park and Forward Park. High Fire Hazard Zones have also been identified on both sides of Franzel Road. Construction in the Moderate, High and Very High Fire Hazard Severity Zone will be required to meet the requirements of Chapter 7A of the California Building Code relating to fire resistant rated construction.

Table 2-23: Total Area with Wildfire Risk (City of Red Bluff)

Wildfire Hazard Severity Zone	Sum of Acres	Sum of Square Miles
Very High	88.8	0.1
High	323.2	0.5
Moderate	1,448.1	2.3
Non-Wildland/Non-Urban	121.8	0.2
Urban Unzoned	2,361.9	3.7
Total	**4,343.7**	**6.8**



Data Source: CAL FIRE, Fire Hazard Severity Zones

Figure 2-14: Fire Hazard Severity Zones in Red Bluff

2.4.11.4 Frequency

Data suggests a trend toward increasing acres burned statewide, with particular increases in conifer vegetation types. This trend is supported in part by the fact that the three largest fire years since 1950 have all occurred within the last 10 years. However, the potential of having a wild land fire affecting the City is minimal. The City of Red Bluff Fire Department and the Cal Fire respond rapidly to contain fires resulting in less damage.

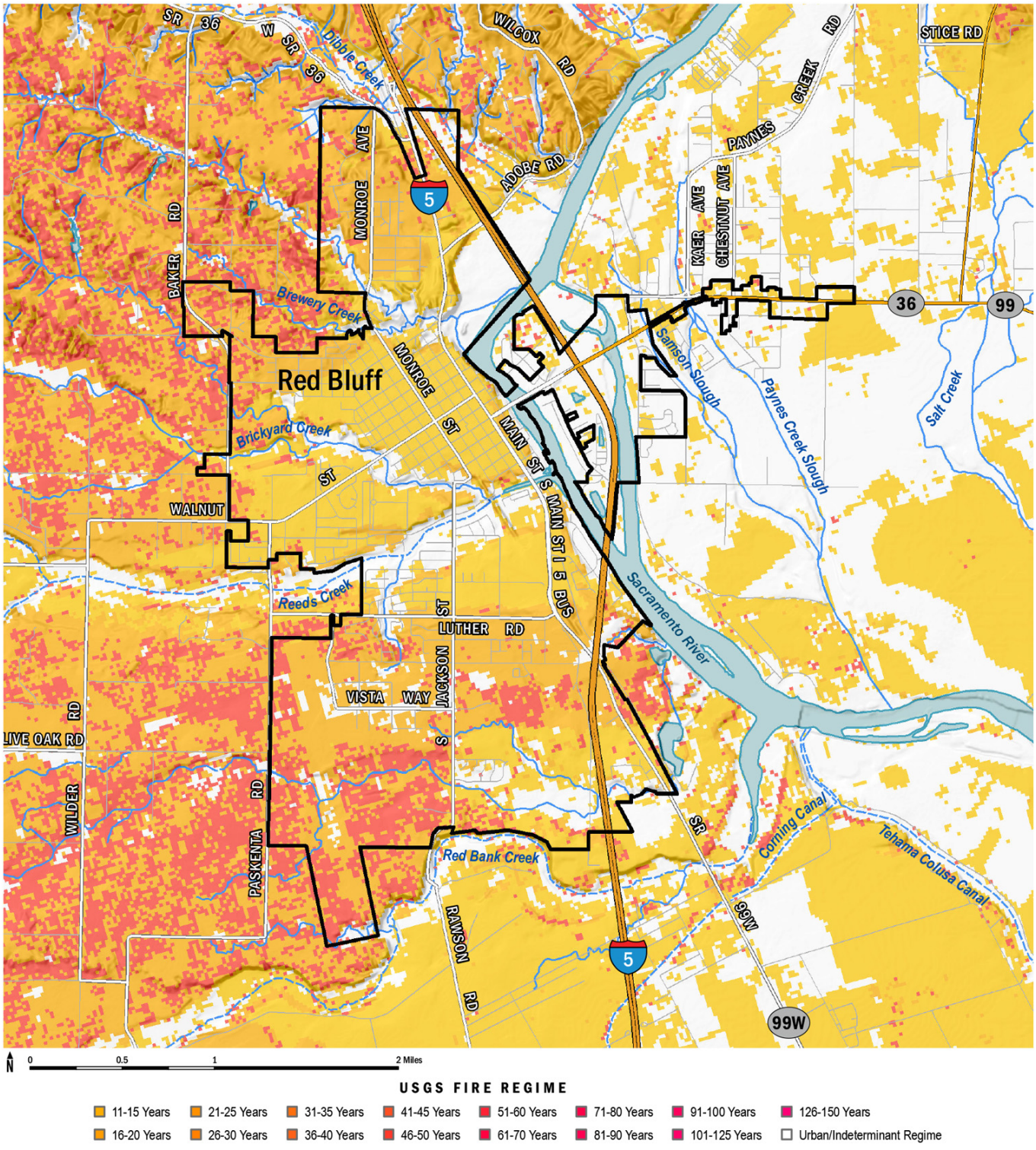
USGS LANDFIRE (Landscape Fire and Resource Management Planning Tools), is a shared program between the wildland fire management programs of the U.S. Department of Agriculture Forest Service and U.S. Department of the Interior, providing landscape scale geo-spatial products to support cross-boundary planning, management, and operations. Historical fire regimes, intervals, and vegetation conditions are mapped using the Vegetation Dynamics Development Tool (VDDT). This USGS data supports fire and landscape management planning goals in the National Cohesive Wildland Fire Management Strategy, the Federal Wildland Fire Management Policy, and the Healthy Forests Restoration Act.

As part of the USGS Landfire data sets, the Mean Fire Return Interval (MFRI) layer quantifies the average period between fires under the presumed historical fire regime. MFRI is intended to describe one component of historical fire regime characteristics in the context of the broader historical time period represented by the LANDFIRE Biophysical Settings (BPS) layer and BPS Model documentation.

MFRI is derived from the vegetation and disturbance dynamics model VDDT (Vegetation Dynamics Development Tool) (LF_1.0.0 CONUS only used the vegetation and disturbance dynamics model LANDSUM). This layer is created by linking the BpS Group attribute in the BpS layer with the Refresh Model Tracker (RMT) data and assigning the MFRI attribute. This geospatial product should display a reasonable approximation of MFRI, as documented in the RMT. See Figure 2-15 for predicted fire return interval for the City.

2.4.11.5 Severity

Most of the City lies in the urban unzoned areas and has no direct risk to wildfire, however citizens may be affected by wildfires in the County or region. Smoke and air pollution from wildfires can be a health hazard, especially for sensitive populations including children, the elderly and those with respiratory and cardiovascular diseases. Wildfire may also threaten the health and safety of those fighting the fires. First responders are exposed to the dangers from the initial incident and after-effects from smoke inhalation and heat stroke. In addition, wildfire can lead to ancillary impacts such as landslides in steep ravine areas and flooding due to the impacts of silt in local watersheds.



Data Source: USGS Landfire Fire Regime

Figure 2-15: USGS Fire Regime Map for the City of Red Bluff

2.4.11.6 Wildfire Hazard Vulnerability

2.4.11.6.1 Population

Wildfire is of greatest concern to populations residing in the moderate, high and very high fire hazard severity zones. U.S. Census Bureau block data was used to estimate populations within the Cal Fire identified hazard zones. As seen in Figure 2-16, 2,886 residents (20% of the total population) live in areas considered to be of moderate risk to wildfires, 934 residents (7% of the total population) live in areas considered to have high wildfire risk and 56 residents (.4% of the total population) live in areas considered to have very high risk to wildfires.

Population Exposure

Population Count by Wildfire Hazard Zone

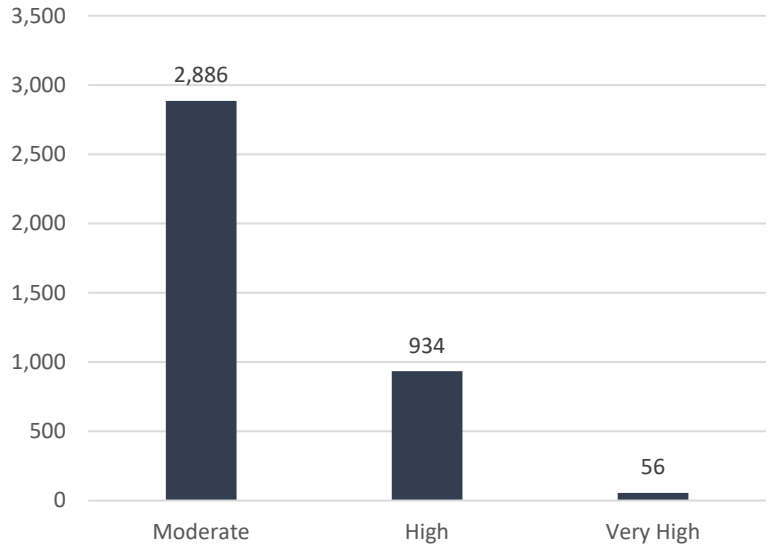


Figure 2-16: Red Bluff Population at risk from wildfire hazards

2.4.11.6.2 Property

The County's parcel layer was used as the basis for the inventory of improved residential parcels for the City of Red Bluff. In some cases, a parcel will be within in multiple fire threat zones. GIS was used to create centroids, or points, to represent the center of each parcel polygon – this is assumed to be the location of the structure for analysis purposes. The centroids were then overlaid with the fire threat layer to determine the risk for each structure. The fire threat zone in which the centroid was located was assigned to the entire parcel. This methodology assumed that every parcel with a square footage value greater than zero was developed in some way. Only improved parcels were analyzed.

Table 2-24 displays the number of homes in the very high, high and moderate wildfire hazard zones within the City of Red Bluff jurisdictional boundaries and values for each. Twenty nine percent of homes in Red Bluff lie within "Moderate" or higher Fire Hazard Severity Zones (FHSZ).

Table 2-24: Residential Buildings and Content within Cal Fire Wildfire Severity Zones

	Total Parcels	Total Market Value Exposure ($)	Total Content Value Exposure ($)	Total Value ($)
City of Red Bluff Totals	5,206	$ 675,030,475	$ 337,515,238	$ 1,012,545,713

Fire Hazard Severity Hazard Zone	Improved Parcel Count	% of Total	Market Value Exposure ($)	Content Value Exposure ($)	Total Exposure ($)	% of Total
Very High	4	*0.1%*	$ 2,448,093	$ 1,224,047	$ 3,672,140	*0.3627%*
High	392	*7.5%*	$ 68,735,772	$ 34,367,886	$ 103,103,658	*10.1826%*
Moderate	1,089	*20.9%*	$ 122,216,387	$ 61,108,194	$ 183,324,581	*18.1053%*
Total	**1,485**	**29%**	**$ 193,400,252**	**$ 96,700,126**	**$ 290,100,378**	**29%**

2.4.11.6.3 Critical Facilities and Infrastructure

Critical facilities data was superimposed with fire hazard severity zone data to determine the type and number of facilities within each risk classification. Table 2-25 and Table 2-26 list the critical facilities in the moderate, high and very high wildfire hazard zones for Red Bluff. As demonstrated in the tables, a very small portion of critical facilities are within very high wildfire risk areas.

Table 2-25: Critical Facility Exposure to Wildfire

Infrastructure Type	Moderate	High	Very High	Total Feature Count
Essential Facility	3	0	0	3
EOC	0	0	0	0
Fire Station	0	0	0	0
Government Facility	0	0	0	0
Hospital	0	0	0	0
Police Station	0	0	0	0
School	3	0	0	0
High Potential Loss	14	5	0	19
Residential Child Care	0	0	0	0
Adult Residential Care	4	4	0	0
Child Care	6	0	0	0
Foster/Home Care	0	0	0	0
Home Care	1	0	0	0
Other Care Facility	1	0	0	0
Elder Care	0	0	0	0
Dam	0	0	0	0
Hotel	2	1	0	0
Transportation and Lifeline	7	1	2	10
Airport	0	0	0	0
Bridge	5	1	2	0

Infrastructure Type	Moderate	High	Very High	Total Feature Count
Bus Facility	0	0	0	0
FCC AM Tower	0	0	0	0
FCC Cell Tower	0	0	0	0
FCC FM Tower	0	0	0	0
Natural Gas Station	1	0	0	0
Power Plant	0	0	0	0
Substation	1	0	0	0
Waste Water Facility	0	0	0	0
Grand Total	**24**	**6**	**2**	**32**

Table 2-26: Lifelines with Wildfire Risk

Infrastructure Type (Linear)	Moderate	High	Very High	Total Mileage
Transportation and Lifeline	**24.7**	**7.8**	**1.3**	**33.9**
FEMA Levee	-	-	-	-
USACE Levee	-	-	-	-
Natural Gas Pipeline	1.7	-	-	1.7
Transmission Line	3.4	0.6	0.5	4.5
Railroad	0.7	0.6	-	1.3
Street	18.9	6.6	0.9	26.4
-Interstate	2.1	1.6	0.7	4.4
-Primary Highway	0.7	-	-	0.7
-State/County Highway	3.2	1.2	0.2	4.7
-Local Road	11.1	3.1	0.0	14.2
-Other Road	1.8	0.7	-	2.5
-4WD Road	-	-	-	-
Grand Total	**24.7**	**7.8**	**1.3**	**33.9**

2.4.11.7 Future Trends

Fire Department concerns relative to land use planning and future development projects within the urban area are addressed in the City of Red Bluff General Plan. (City of Red Bluff General Plan Safety Element) Urbanization tends to alter the natural fire regime and can create the potential for the expansion of urbanized areas into wildland areas. The expansion of the wildland urban interface can be managed with strong land use and building codes. The planning area is well equipped with these tools and this planning process has asked each planning partner to assess its capabilities with regards to the tools. As Red Bluff experiences future growth, it is anticipated that the exposure to this hazard will remain as assessed or decrease over time due to these capabilities.

2.4.12 Slope Failure (Slumping / Erosion)

FEMA describes a landslide as the downward movement of a slope and the materials under the force of gravity. A wide variety of ground movement can be categorized as a landslide, including; rock falls, deep failure of slopes and shallow debris flows. Landslides can be caused by human activities and natural geological factors, such as precipitation and topography. For more general information on slope failure, see Section 4.8 in the Base Plan. For purposes of this Annex, the City will focus on Slumping and bank erosion near in certain portions of the City especially along the Sacramento River Corridor.

2.4.12.1 Regulatory Oversight

2.4.12.1.1 California Building Code

The City of Red Bluff has adopted California Building Code (CBC) 2016 Edition which establishes the minimum requirements to safeguard the public health, safety and general welfare through structural strength, means of egress facilities, stability, access to persons with disabilities, sanitation, safety to life and property from fire and other hazards attributed to the built environment, and to provide safety to fire fighters and emergency responders during emergency operations. For information on the CBC, erosion control measures and grading plans and inspections, see Section 4.8.1.1.1 of the Base Plan.

2.4.12.1.2 City of Red Bluff General Plan

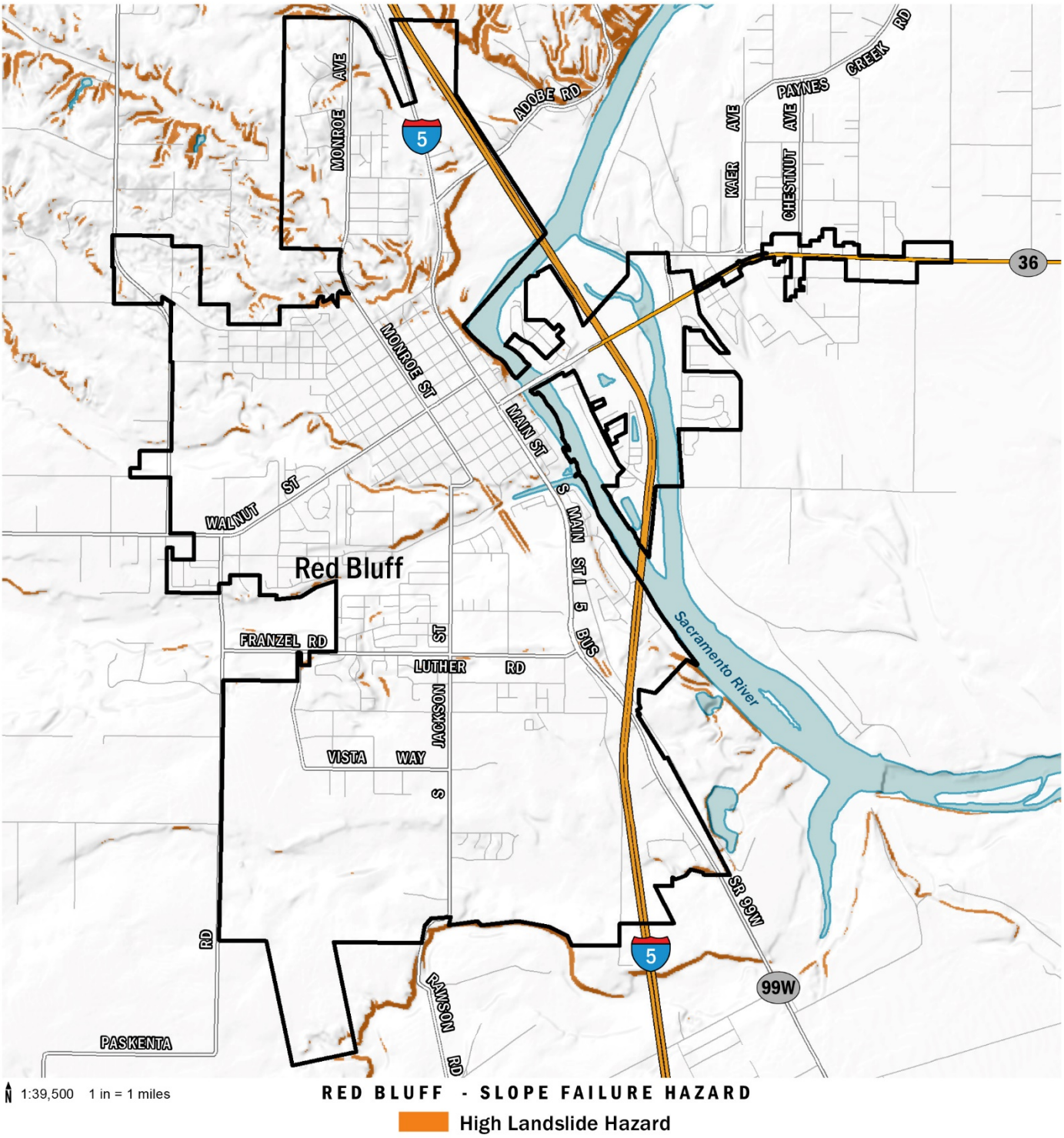
The City of Red Bluff's General Plan Land Use Element establishes policies to promote site development practices that will preserve the natural physical site characteristics of development sites in especially sensitive areas of the City of Red Bluff. These include hillsides, greenways, wooded areas, streams and drainage-ways. These policies address issues including maintenance of natural topography, vegetation, erosion control and the off-site environmental impacts of development. Grading policies are established in the Land Use Element as well as policies pertaining to drainage and vegetation preservation, replacement and new species introduction.

2.4.12.2 Past Events

Slope failure occasionally occurs along the banks of the Sacramento River as well as along the north side of Brickyard Creek. (City of Red Bluff General Plan Safety Element).

2.4.12.3 Location

Figure 2-17 shows the high slope failure areas within the City of Red Bluff. Areas of concern for slope failure include the areas surrounding the Sacramento River, Reeds Creek and Brickyard Creek. Aerial photographic surveys reveal that large-scale landslides are rare in the 75 square miles of the Reeds Creek drainage basin; however, several large earthflows occur outside the city limits along the north side of Brickyard Creek. (City of Red Bluff General Plan Safety Element)



Data Source: California Geological Survey, Deep-Seated Landslide Susceptibility, DP+S slope & elevation calculations - USGS 10m NED

Figure 2-17: Red Bluff High Slope Failure Risk Areas

2.4.12.4 Frequency

The majority of steep slopes shown in Figure 2-18 are heavily vegetated and have a smaller chance of failing than if they were to be exposed.

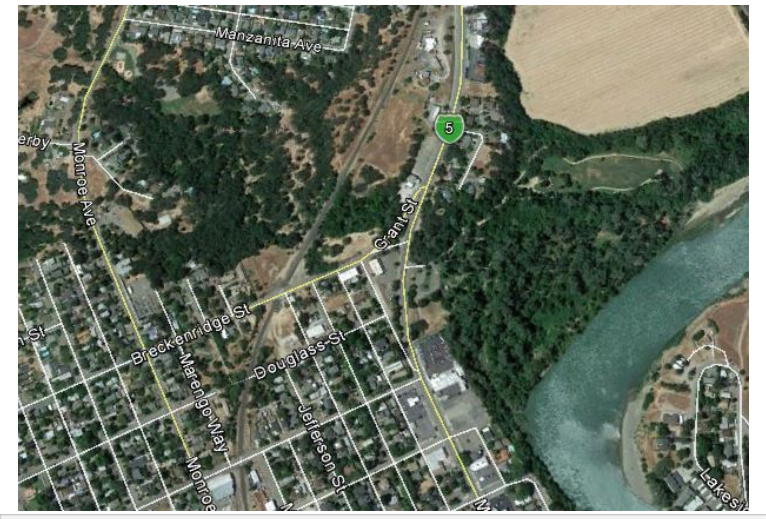


Figure 2-18: High landslide areas in Red Bluff are covered with dense vegetation.

2.4.12.5 Severity

Slope failure along the Sacramento River or Aloha Street (Brickyard Creek) may result in erosion and sediment buildup in the waterways but would likely not have a direct impact on residents or parcels. If slope failure were to occur along Main Street (5), it would have minimal impact on the road and would not likely impact travel. Slope failure bordering the residential neighborhood south of Walnut Street and west of Monroe Street would also not impact residents or parcels.

2.4.12.6 Slope Failure Vulnerability

2.4.12.6.1 Population

As shown in Table 2-27, 1.48% of Red Bluff's population (205 residents) could be exposed to some type of slope failure issues or erosion control problems.

Table 2-27: City of Red Bluff Population Exposure to Slope Failure

Risk Type	Population Count	% of Total
Landslide	205	1.48%
Avalanche	-	0.00%
Total	**205**	**1.48%**

2.4.12.6.2 Property

As shown in Table 2-28, 2.4% of the total parcels in Red Bluff could be exposed to some type of slope failure issues or erosion control problems equating to $14,199,774 in total exposure (1.4% of the total value of improved parcels).

Table 2-28: City of Red Bluff Total Parcel Exposure to Slope Failure

Total Parcels	Total Market Value Exposure ($)	Total Content Value Exposure ($)	Total Value ($)
5,206	$ 675,030,475	$ 337,515,238	$ 1,012,545,713

Risk Type	Improved Parcel Count	% of Total	Market Value Exposure ($)	Content Value Exposure ($)	Total Exposure ($)	% of Total
Landslide	123	2.4%	$ 9,466,516	$ 4,733,258	$ 14,199,774	1.402%
Avalanche	-	0.0%	$ -	$ -	$ -	0.000%
Total	**123**	**2.4%**	**$ 9,466,516**	**$ 4,733,258**	**$ 14,199,774**	**1.4%**

2.4.12.6.3 Critical Facilities and Infrastructure

Three critical facilities and .7% of the total linear mileage of critical facilities were identified as being exposed to the landslide hazard to some degree. A more in-depth analysis of mitigation measures taken by these facilities to prevent damage from mass movements should be done to determine if they are exposed to erosion issues or ground mass movements.

At this time all infrastructure and transportation corridors identified as exposed to the landslide hazard are considered vulnerable until more information becomes available. Table 2-29 and Table 2-30 summarize the critical facilities exposed to the slope failure hazard.

Table 2-29: Critical Facility Points with Slope Failure Hazard Risk

Infrastructure Type	Landslide	Avalanche	Total Feature Count
Essential Facility	0	0	0
EOC	0	0	0
Fire Station	0	0	0
Government Facility	0	0	0
Hospital	0	0	0
Police Station	0	0	0
School	0	0	0
High Potential Loss	0	0	0
Residential Child Care	0	0	0
Adult Residential Care	0	0	0
Child Care	0	0	0
Foster/Home Care	0	0	0
Home Care	0	0	0
Other Care Facility	0	0	0
Elder Care	0	0	0
Dam	0	0	0
Hotel	0	0	0
Transportation and Lifeline	3	0	3
Airport	0	0	0
Bridge	1	0	0
Bus Facility	0	0	0
FCC AM Tower	0	0	0
FCC Cell Tower	0	0	0
FCC FM Tower	1	0	0
Natural Gas Station	0	0	0
Power Plant	0	0	0
Substation	0	0	0
Waste Water Facility	1	0	0
Grand Total	**3**	**-**	**3**

Table 2-30: Critical Facilities (Linear) with Slope Failure Hazard Risk

Infrastructure Type (Linear)	Landslide Hazard	Avalanche Hazard	Total Mileage
Transportation and Lifeline	**0.7**	**-**	**0.7**
FEMA Levee	-	-	-
USACE Levee	-	-	-
Natural Gas Pipeline	0.1	-	0.1
Transmission Line	0.2	-	0.2
Railroad	0.1	-	0.1
Street	0.3	-	0.3
-Interstate	-	-	-
-Primary Highway	0.0	-	0.0
-State/County Highway	0.1	-	0.1
-Local Road	0.1	-	0.1
-Other Road	0.0	-	0.0
-4WD Road	-	-	-
Grand Total	**0.7**	**-**	**0.7**

2.4.12.7 Future Trends

The City of Red Bluff continues to experience construction for both commercial and residential above both the statewide and county wide average. This trend is expected to continue over the next decade as Red Bluff did not experience a massive construction boom bust, but rather a moderate uptick in development during the periods of 2004 through 2008. (Tehama County Hazard Mitigation Plan, 2012) For all existing and future development in especially sensitive areas of the City (hillsides, greenways, wooded areas, streams and drainage-ways), policies set forth by the City of Red Bluff General Plan Land Use Element will be followed. These policies and corresponding suggested implementation measures will mitigate the risk of slope failure and erosion to the built environment.

In addition, the City of Red Bluff has adopted the California Building Code (CBC) 2016 Edition. The State of California has adopted the 2016 International Building Code (IBC) by reference in its California Building Standards Code. The IBC includes provisions for geotechnical analyses in steep slope areas that have soil types considered susceptible to landslide hazards. These provisions assure that new construction is built to standards that reduce the vulnerability to landslide risk.

2.4.13 Severe Weather

In the past, severe weather events having an effect on Red Bluff have included tornadoes, heavy rain and hail. For more information on severe weather events, see Section 4.9 in the Base Plan.

2.4.13.1 Regulatory Oversight

The ability to withstand impacts lies in sound land use practices and consistent enforcement of codes and regulations for new construction. The City of Red Bluff has adopted the International Building Code in response to California mandates. This code is equipped to deal with the impacts of severe weather events. Land use policies identified in the General Plan also address many of the secondary impacts (flood and landslide) of the severe weather hazard. With these tools, the City of Red Bluff is equipped to deal with future growth and the associated impacts of severe weather.

2.4.13.2 Past Events

Past severe weather events in the City of Red Bluff are summarized in Table 2-31. No injuries or property damage has occurred as a result of a severe weather event in the City. Heavy rain is the most common type of severe weather event.

Table 2-31: Past Severe Weather Events in the City of Red Bluff

Date	Type	Deaths or Injuries	Property Damage
1/23/16	Funnel Cloud	0	0
Description: *Funnel cloud spotted moving east at 10 mph toward Richfield.*			
10/18/15	Heavy Rain	0	0
Description: *Locally heavy rain from a thunderstorm, with 1.25 inches measured in about 30 minutes.*			
4/4/13	Tornado	0	0
Description: *Public reported a brief tornado with visible debris cloud in an empty field south of Shasta College. Tornado duration was approximately 2 minutes. This tornado was rated an EF0 with no known damage.*			
10/13/09	Heavy Rain	0	0
Description: *Red Bluff Airport recorded 1.95 inches of rainfall on the 13th. Strong, gusty winds peaking at 53 mph brought down numerous trees, large branches, and power lines which resulted in power outages in Tehama County.*			
1/25/08	Heavy Rain	0	0
Description: *Rainfall at Red Bluff airport totaled 2.14 inches on January 25th, which broke the previous record for the date of 1.38 inches set in 1997.*			
7/18/07	Heavy Rain	0	0
Description: *A new daily and monthly rainfall record of 0.86 inches was set at Red Bluff Airport. The old daily record was only a trace of rain, which last occurred in 2004. The old monthly record was 0.70 inches set in 2000.*			

Date	Type	Deaths or Injuries	Property Damage
8/6/06	Heavy Rain	0	0
Description: *A late night shower produced a rare rainfall event for early August in Red Bluff when 0.01 inches of rain fell at the airport. This breaks the old daily record of a trace set in 1945.*			
2/22/01	Hail	0	0
Description: *One-inch hail was reported in Red Bluff.*			
7/4/00	Hail	0	0
Description: *A line of thunderstorms developed rapidly off the Trinity Mountains and moved across northern Tehama and southern Shasta counties. Many reports were received of widespread large hail and several minor car accidents were reported on I-5 and local highways. Localized street flooding was reported in the town of Cottonwood.*			
5/15/00	Funnel Cloud	0	0
Description: *A funnel cloud developed 10 miles west of Red Bluff. It dissipated after 2-3 minutes.*			

Source: noaa.gov

2.4.13.3 Location

Generally, the entire planning area for the City of Red Bluff can be affected by a Severe Weather Hazard. Areas with trees, power and light poles, large signs, communications towers and other structures with exposed surface areas are all vulnerable to the effects of severe weather. Severe weather events have the potential to happen anywhere in the City. Wind events such as funnel clouds or tornados are most damaging to areas that are heavily treed.

2.4.13.4 Frequency

The planning area can expect to experience exposure to some type of severe weather event at least annually. Climate change presents a significant challenge for risk management associated with severe weather. The frequency of severe weather events has increased steadily over the last century. The number of weather-related disasters during the 1990s was four times that of the 1950s, and cost 14 times as much in economic losses. Historical data shows that the probability for severe weather events increases in a warmer climate. The changing hydrograph caused by climate change could have a significant impact on the intensity, duration and frequency of storm events. All of these impacts could have significant economic consequences.

2.4.13.5 Severity

The most common severe weather event in the City is heavy rain which has not caused any injuries, fatalities or property damage in recent history. Tornadoes are potentially the most dangerous of local storms, but they are not common in the planning area. If a major tornado were to strike within the populated areas of the City, damage could be widespread. Businesses could be forced to close for an extended period or permanently, fatalities could be high, many people could be homeless for an extended period, and routine services such as telephone or power could be disrupted. Buildings may be damaged or destroyed. California ranks 32nd among states for frequency of tornadoes, 44th for the frequency of tornados per square mile, 36th for injuries, and 31st for cost of damage. The state has no reported deaths from tornadoes.

2.4.13.6 Warning Time

Meteorologists can often predict the likelihood of a severe storm within a region. This can give several days of warning time to City of Red Bluff staff. However, meteorologists cannot predict the exact time of onset or severity of the storm. Some storms may come on more quickly and have only a few hours of warning time.

The Tehama County Sheriff's Office uses the Tehama Alert system to notify residents of a potential fire, gas leak, flood or other natural or man-caused incident in the County that would prompt an immediate evacuation or shelter in place protocols.

2.4.13.7 Severe Weather Vulnerability

The most common problems associated with severe storms are immobility and loss of utilities. Fatalities are uncommon, but can occur. Roads may become impassable due to flooding, downed trees, ice or snow, or a landslide. Power lines may be downed due to high winds or ice accumulation, and services such as water or phone may not be able to operate without power. Lightning can cause severe damage and injury.

The most significant secondary hazards associated with severe local storms are floods, falling and downed trees, landslides and downed power lines. Rapidly melting snow combined with heavy rain can overwhelm both natural and man-made drainage systems, causing overflow and property destruction. Landslides occur when the soil on slopes becomes oversaturated and fails.

2.4.13.7.1 Population

It can be assumed that the entire City is exposed to some extent to severe weather events. Certain areas are more exposed due to geographic location and local weather patterns. Vulnerable populations are the elderly, low income or linguistically isolated populations, people with life-threatening illnesses, and residents living in areas that are isolated from major roads. Power outages can be life threatening to those dependent on electricity for life support. Isolation of these populations is a significant concern. These populations face isolation and exposure during severe weather events and could suffer more secondary effects of the hazard.

2.4.13.7.2 Property

All property is vulnerable during severe weather events, but properties in poor condition or in particularly vulnerable locations may risk the most damage. Those that are located under or near overhead lines or near large trees may be vulnerable to falling ice or may be damaged in the event of a collapse.

Structures built without the influence of a structure building code with provisions for wind loads are considered to be exposed to the severe weather hazard, but structures in poor condition or in particularly vulnerable locations (located on hilltops or exposed open areas) may risk the most damage. The frequency and degree of damage will depend on specific locations.

2.4.13.7.3 Critical Facilities and Infrastructure

All critical facilities are exposed to severe weather. The most common critical facilities problems associated with severe weather are loss of utilities. Downed power lines can cause blackouts, leaving large areas isolated. Phone, water and sewer systems may not function. Roads may become impassable due to ice or snow or from secondary hazards such as landslides.

Incapacity and loss of roads are the primary transportation failures resulting from severe weather, mostly associated with secondary hazards. Landslides caused by heavy prolonged rains can block roads. High winds can cause significant damage to trees and power lines, blocking roads with debris, incapacitating transportation, isolating population, and disrupting ingress and egress.

Severe windstorms, downed trees, and ice can create serious impacts on power and above-ground communication lines. Freezing of power and communication lines can cause them to break, disrupting electricity and communication. Loss of electricity and phone connection would leave certain populations isolated because residents would be unable to call for assistance.

2.4.13.8 Future Trends

All future development will be affected by severe storms. The ability to withstand impacts lies in sound land use practices and consistent enforcement of codes and regulations for new construction. The City of Red Bluff has adopted the International Building Code in response to California mandates. This code is equipped to deal with the impacts of severe weather events. Land use policies identified in the general plan also address many of the secondary impacts (flood and landslide) of the severe weather hazard. With these tools, the City of Red Bluff is equipped to deal with future growth and the associated impacts of severe weather.

2.4.14 Drought

Drought hazards in the City of Red Bluff are the same as Tehama County as a whole. For a complete hazard profile and vulnerability assessment for drought, refer to Section 4.5 of Volume 1.

2.4.15 Hazard Risk Ranking

The City of Red Bluff's Planning Team used the same hazard prioritization process as the Tehama County Planning Committee. This process is described in detail in Section 13 of the base plan. Table 2-32 shows the results of the hazard risk ranking exercise.

Table 2-32: City of Red Bluff Prioritized Hazard Assessment Matrix

		Impact			
		Catastrophic	Critical	Limited	Minor
Probability	Highly Likely				
	Likely				Severe Weather
	Possible				Flood, Wildfire, Slope Failure
	Unlikely				Earthquake

2.5 Mitigation Strategy

The intent of the mitigation strategy is to provide the City with a guidebook to future hazard mitigation administration. The mitigation strategy is intended to reduce vulnerabilities outlined in the previous section with a prescription of policies and physical projects. This will assist County staff to achieve compatibility with existing planning mechanisms, and ensures that mitigation activities provide specific roles and resources for implementation success.

The City of Red Bluff followed the same mitigation strategy as Tehama County for this 2018 MJHMP Update. The mitigation strategy is explained in detail in Section 5 of the Base Plan.

2.5.1 Identifying the Problem

As part of the mitigation actions identification process, the Red Bluff Planning Committee identified issues and/or weaknesses as a result of the risk assessment and vulnerability analysis. By combining common issues and weaknesses developed by the Planning Committee, the realm of resources needed for mitigating each can be understood. Community issues and weaknesses are presented by individual hazard in Table 2-33. Projects or actions have been developed to mitigate each problem identified.

Table 2-33: City of Red Bluff Problem Statements by Hazard

Hazard	Problem No.	Problem Description	Mitigation Alternative	Mitigation Action No.	County Wide	City of Red Bluff
Dam Failure	DF-01	There is often limited warning time for dam failure. These events are frequently associated with construction methodology and or severe weather, which limits predictability of dam failure and compounds flood risk. Protocol for notification of downstream citizens of imminent failure needs to be tied to local emergency response planning.	ES, PE&A	TC-23-2018, RB-06-2018, CoT-24-2018	x	x
Dam Failure	DF-02	Mapping that estimates inundation depths for federally regulated dams is already required and available; however, mapping for non-federal-regulated dams is needed to better assess the risk associated with failure of these facilities. Also, access to inundation zones is not readily available to residents area wide.	ES	TC-24-2018, TC-23-2018, RB-06-2018	x	x
Drought	DR-03	The probability of increased drought frequencies and durations due to climate change.	PRV	CoT-25-2018, RB-07-2018, TC-27-2018, TC-28-2018, CC-23-2018	x	x

Hazard	Problem No.	Problem Description	Mitigation Alternative	Mitigation Action No.	County Wide	City of Red Bluff
Drought	DR-04	The lack of promotion of active water conservation during drought and non-drought periods.	PRV, PE&A	TC-26-2018, CoT-18-2012, RB-08-2018	x	x
Earthquake	EQ-01	More information is needed on the exposure and performance of soft-story construction within the planning area. There are many undocumented unreinforced masonry buildings.	PPRO	CC-21-2018, CC-22-2018, CoT-16-2012, RB-04-2018, RB-05-2018		x
Flood	FL-02	Climate change impacts flood conditions in Tehama County. More severe weather events could compromise local drainage and flood control.	SP	CC-10-2012, CoT-06-2012, CoT-07-2012, CoT-08-2012, CoT-09-2012, CoT-20-2018, RB-03-2018, RB-09-2012, TC-22-2018, CC-08-2012, CC-09-2012, CC-12-2012, CC-16-2018	x	x
Flood	FL-16	Watershed streams show rapid responses to storms, and flow levels fluctuate or flash between storm periods in a localized environment.	SP	TC-22-2018, CC-08-2012, CC-09-2012, CC-12-2012, CC-13-2012, CC-16-2018, RB-06-2012, CC-10-2012	x	x
Flood	FL-17	Multi Residential Care and Assisted Living Facilities are located within the 100 YR Flood Plain.	PPRO	CC-14-2012, RB-03-2012		x
Flood	FL-03	Residents need more education about flood preparedness, flood insurance and the resources available during and after floods on a continual basis.	PEA	TC-06-2018, CC-02-2012, CoT-03-2012, CoT-04-2012, CoT-11-2012, CoT-12-2012, CoT-14-2012, RB-03-2012	x	x

Hazard	Problem No.	Problem Description	Mitigation Alternative	Mitigation Action No.	County Wide	City of Red Bluff
Flood	FL-30	Many small tributaries in the watersheds have high levels of siltation and diminished flood-carrying capacity due to vegetation (due to Arundo and Tamarisk) overgrowth. Debris-clearing is a challenge due to environmental permitting restrictions from Fish and Game/Fish and Wildlife. The establishment of Arundo in the streams in Tehama County has seriously limited their conveyance capacity.	PRV	TC-13-2018, CC-05-2018, CoT-06-2012, RB-02-2018	x	x
Severe Storm	SS-01	Older building stock in the planning area do not meet code standards. These structures could be highly vulnerable to severe weather events such as windstorms.	PPRO	TC-30-2018, TC-33-2018	x	x
Severe Storm	SS-06	Many large trees result in damages from storms (high winds). There are currently limitations due to local tree trimmer capacities..	PRV	CC-20-2018, CoT-15-2012, RB-11-2018, TC-30-2018	x	x
Slope Failure	SF-01	There are existing homes and businesses along the west bank of the Sacramento River that are at risk to erosion and landslides due to river channel migration.	PPRO	CoT-26-2018, RB-02-2012		x
Slope Failure	SF-02	Slope stability issues are present along Rio Street and the river bend as well as Antelope Bridge and other areas along the Sacramento River.	SP	RB-02-2012		x
Wildfire	WF-13	Portions WUI areas are not covered by Fire Hydrants or have exposure due fire department response times.	ES	RB-09-2018, RB-10-2018		x

Hazard	Problem No.	Problem Description	Mitigation Alternative	Mitigation Action No.	County Wide	City of Red Bluff
Wildfire	WF-14	High wildfire risk within the Reeds Creek CWPP Planning Unit. This includes populations and structures at risk near the wildland urban interface near Red Bluff. Red Bluff areas of concern including areas near S. Jackson Street, Monroe Ave @ Walton Ave, and Monroe Ave @ HWY 36.	PPRO	RB-08-2012		x

2.5.2 Capability Assessment

The City of Red Bluff identified current capabilities available for implementing hazard mitigation activities. The Capability Assessment portion of the hazard mitigation plan identifies administrative, technical, legal and fiscal capabilities. This includes a summary of departments and their responsibilities associated to hazard mitigation planning as well as codes, ordinances, and plans already in place associated to hazard mitigation planning. The second part of the assessment provides fiscal capabilities that may be applicable to providing financial resources to implement identified mitigation action items.

2.5.2.1 Existing Institutions, Plans, Policies and Ordinances

The following is (1) a summary of existing positions their responsibilities related to hazard mitigation planning and implementation; and (2) a list of existing planning documents and regulations related to mitigation efforts within the City. The administrative and technical capabilities the City, as shown in Table 2-34, provides an identification of the staff, personnel, and department resources available to implement the actions identified in the mitigation section of the Plan. Specific resources reviewed include those involving technical personnel such as planners/engineers with knowledge of land development and land management practices, engineers trained in construction practices related to building and infrastructure, planners and engineers with an understanding of natural or human-caused hazards, floodplain managers, surveyors, personnel with GIS skills and scientists familiar with hazards in the community.

2.5.2.2 Administrative and Technical Capacity

Table 2-34: Red Bluff's Administrative and Technical Ability

Staff/Personnel Resources	Available	Department/Agency Position
Planners or engineers with knowledge of land development and land management practices	Y	Planning and Public Works Departments
Engineers or professionals trained in building or infrastructure construction practices	Y	Building and Safety, Public Works Departments
Planners or engineers with an understanding of natural hazards	Y	Planning Department and Public Works Department
Staff with training in benefit/cost analysis	Y	Can contract for this service
Flood Plain Manager	Y	The Flood Damage Prevention Ordinance identifies the Community Development Director as the Flood Plain Administrator
Surveyors	Y	Contract for services
Personnel skilled or trained in GIS applications	Y	Planning and Public Works Departments. Can also contract for services
Scientist familiar with natural hazards in local area	Y	Contract for services
Emergency Manager	Y	Fire Chief, Police Chief and Public Works Department. This capability could be expanded by providing training to staff to provide outreach to communities on mitigation activities people can perform on their homes and businesses.
Grant Writers	Y	City contracts for services

2.5.2.2.1 Administration

The City Manager serves as the "administrative head of the City Government, under the direction and control of the City Council". The Manager is responsible to the City Council for the day-to-day management of all City affairs and the leadership of City Department Heads.

The City Manager also serves as the Finance Director. The Manager is directly responsible for continual review and analysis of all City administrative operations including budget preparation and control, organizational and procedural studies together with staffing. The City Manager's responsibilities, authority and limits on authority are clearly defined in city law in City Code chapter 2.44.

2.5.2.2.2 Engineering Design

Led by the Public Works Director, staff provide engineering design services, provides plans, develops and constructs public facilities, roadways, and capital improvement projects. The staff prepares plans, specifications, and cost estimates for many projects within City boundaries such as:

- Airport Facilities
- Sewer Design
- Street Realignment
- Traffic Signal Installation
- Storm Drains
- Other Public Facilities

2.5.2.2.3 Planning Department

The Planning Director is the primary staff to the Red Bluff Planning Commission, a five-member commission appointed by the Mayor and City Council to review development projects.

The Planning Department is responsible for implementing and updating the land use goals and policies of the City Council as detailed in the City's General Plan, Zoning Code, Specific Plans, and various development ordinances and standards. Additionally, the department is responsible for assuring compliance with numerous state statutes including the California Environmental Quality Act, The Planning and Zoning Law, and the Subdivisions Map Act

The department receives and processes development applications for land use permits including parcel maps, subdivisions, use permits, rezoning, variances, general plan amendments and annexations. Planning staff regularly meets and confers with the City's Technical Advisory Committee (including the Building, Fire, Police and Public Works Departments) to discuss development inquiries and applications, and to coordinate the efficient provisions of services to new homes and businesses.

2.5.2.2.4 Public Works Department

Public Works includes Airport Management, Land Development, Design, and Construction Management. The City of Red Bluff Street Department, Waste Water Treatment Facilities and Water Department are under the direction of the Public Works Director.

Public Works secures funding for projects from outside agencies, State and Federal sources and prepares all required project documentation and regulatory agency reports.

Public Works Responsibilities:

- Airport Management
- Conducts land development project review and inspections
- Advertises projects, reviews bids and awards projects
- Initiates State Transportation Improvement Program (STIP) projects and administers contracts
- Responds to public inquiries
- Develops technical reports
- Maintains the City's Design Standards Manual
- Maintains improvement records and maps
- Street Banners--look under Public Notices for the banner application

2.5.2.2.5 Police Department

The Operations Division is comprised of the Patrol Unit and Dispatch Unit whose primary function is to deliver initial police services to the community 24 hours a day, 365 days a year. The Operations Division consists of uniformed police officers and public safety dispatchers who work together to provide police response to calls for service as well as the initial response to an emergency or report of a crime. This division accounts for most of the Department's measurable workload and is the most visible as they are usually the first point of contact for persons seeking police services.

The Operations Division is currently commanded by one Captain and staffed with four sergeants, nine police officers, one dispatch supervisor and four dispatchers. These personnel work diligently every day to make the City of Red Bluff a great place to live.

2.5.2.2.6 Fire Department

The Red Bluff Fire Department currently has 1 station and consists of 12 career personnel, 18 reserve personnel and 3 administrative staff personnel. The Fire Department has 3 engines, 1 ladder truck, 2 rescue/squads and 1 OES engine. Typical daily staffing includes 3 personnel for the Engine and 2 personnel for the truck.

2.5.2.3 Regulatory Tools

The legal and regulatory capabilities of local, state, and federal jurisdictions are shown in Table 2-35, which presents existing ordinances and codes that can regulate the physical or built environment of the City. Examples of legal and/or regulatory capabilities can include: building codes, zoning ordinances, subdivision ordnances, special purpose ordinances, growth management ordinances, site plan review, general plans, capital improvement plans, economic development plans, emergency response plans, and real estate disclosure plans. The City's General Plan is the constitution guiding new development.

Table 2-35: City of Red Bluff's Land and Regulatory Capability

	Local Authority	State or Federal Prohibitions	Other Jurisdictional Authority	State Mandated	Comments
Codes, Ordinances & Requirements					
Building Code	Y	N	N	Y	Section 5.20-1 adopts the 2016 Edition of the California Building Code
Zoning Code	Y	N	N	Y	Chapter 25 Article 1 adopts the zoning ordinance
Subdivisions	Y	N	N	N	Chapter 20
Post Disaster Recovery	Y	N	N	N	SEP Section 11
Real Estate Disclosure	N	N	N	Y	
Growth Management	Y	N	N	Y	City of Red Bluff General Plan Land Use/ Circulation Elements
Site Plan Review	Y	N	N	N	Chapter 5 Section 5.45
Special Purpose (flood management, critical areas)	Y	N	N	N	Chapter 26: Flood Damage Prevention Floodplain Protection, City of Red Bluff General Plan Land Use Element
Planning Documents					
General Plan	Y	N	N	Y	City of Red Bluff General Plan. During the next update cycle, the approved local hazard mitigation plan will be adopted into the Safety Element of the General Plan.
Capital Improvement Plan	Y	N	N	N	2011 DRAFT Capital Improvement Plan
Economic Development Plan	Y	N	N	N	City of Red Bluff General Plan Economic Development Element, Approved 4/2/02
Flood Plain or Basin Plan	Y	Y	N	N	2015 Urban Water Management Plan Update, City of Red Bluff, California
Storm Water Plan	N	N	N	N	
Habitat Conservation Plan	Y	N	N	N	City of Red Bluff General Plan Natural Resource Conservation Element

	Local Authority	State or Federal Prohibitions	Other Jurisdictional Authority	State Mandated	Comments
Shoreline Management Plan	N	N	N	N	
Emergency Response Plan	Y	Y	Y	Y	City of Red Bluff Emergency/Disaster Response Plan
Continuity of Operations Plan	N	N	N	N	
Post Disaster Recovery Plan	N	N	N	N	
Terrorism Plan	N	N	N	N	

2.5.2.3.1 Fiscal Resources

Table 2-36 shows specific financial and budgetary tools available to the City such as community development block grants; capital improvements project funding; authority to levy taxes for specific purposes; fees for water, sewer, gas, or electric services; impact fees for homebuyers or developers for new development; ability to incur debt through general obligations bonds; and withholding spending in hazard-prone areas.

Table 2-36: City of Red Bluff's Fiscal Resources

Financial Resources	Accessible or Eligible to Use?
Community Development Block Grants	Y
Capital Improvements Project Funding	Y
Authority to Levy Taxes for Specific Purposes	Y (voter approval, prop 218 regulated)
User Fees for Water, Sewer, Gas or Electric Service	Y
Incur Debt through General Obligations Bonds	N
Incur Debt through Special Tax Bonds	N
Incur Debt through Private Activity Bonds	Unknown
Withhold Public Expenditures in Hazard-Prone Areas	N
State Sponsored Grant Programs	Y
Development Impact Fees for Homebuyers or Developers	Y
Other	YES: HMGP, PDM, FMA, RFC, SRL

2.5.2.3.2 Community Classifications

Table 2-37 summarizes classifications under various community mitigation programs.

Table 2-37: City of Red Bluff's Community Classifications

Program	Participating	Classification	Date Classified
Community Rating System	No	N/A	N/A
Building Code Effectiveness Grading Schedule	Yes	N/A	N/A
Public Protection (ISO Class)	Yes	3	2004
Storm Ready	No	N/A	N/A
Firewise	Yes	3	2006

2.5.3 Guiding Principle, Goals and Objectives

Hazard mitigation plans must identify goals for reducing long-term vulnerabilities to identified hazards (44 CFR Section 201.6(c)(3)(i)). Together with the County Planning Committee, the steering committee established a guiding principle, a set of goals and measurable objectives for this plan, based on data from the preliminary risk assessment and the results of the public involvement strategy. This information is located in Section 5.4 of Volume One.

2.5.4 Mitigation Action Plan

Based upon planning committee priorities, risk assessment results, and mitigation alternatives, mitigation actions were developed. Most importantly, the newly developed mitigation actions acknowledge updated risk assessment information outlined in Section 2.4. Mitigation actions presented in Table 2-38 establish 16 possible mitigation actions. Some mitigation actions support ongoing City activities, while other actions are intended to be completed when funding is available. For this Plan, time frames are defined as follows:

- Short Term- 1-3 years
- Mid Term- 3-5 years
- Long Term- 5 years or more

Regardless, mitigation actions will be part of an annual review.

2.5.4.1 Benefit/Cost Review

The City of Red Bluff Planning Team used the same benefit/cost parameters as Tehama County. This exercise is described in detail in Section 16.3 of the Base Plan.

Cost ratings were defined as follows:

- **High**—Existing funding will not cover the cost of the project; implementation would require new revenue through an alternative source (for example, bonds, grants, and fee increases).
- **Medium**—The project could be implemented with existing funding but would require a re-apportionment of the budget or a budget amendment, or the cost of the project would have to be spread over multiple years.
- **Low**—The project could be funded under the existing budget. The project is part of or can be part of an ongoing existing program.

Benefit ratings were defined as follows:

- **High**—Project will provide an immediate reduction of risk exposure for life and property.
- **Medium**—Project will have a long-term impact on the reduction of risk exposure for life and property, or project will provide an immediate reduction in the risk exposure for property.
- **Low**—Long-term benefits of the project are difficult to quantify in the short term.

2.5.4.2 Mitigation Action Plan

The City of Red Bluff's Planning Team used the same mitigation action prioritization method as described in the Section 5.8.3 of the Base Plan Volume 1. Based upon the City of Red Bluff Planning Committee consensus, Table 2-38 lists each priority mitigation action. For Priority mitigation actions Implementation plans are made available in the Action Planner Annex. Implementation plans in Action Planner Annex identify the responsible party, time frame, potential funding source, implementation steps and resources need to implementation. The detail in the Action Planners Annex meet the regulatory requirements of FEMA and DMA 2000.

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Table 2-38: Mitigation Action Abbreviated List

Action No.	Hazard Type	Specific Mitigation Action	Mitigation Alternatives	Responsible Party	Potential Funding Source	Time Frame	Benefit Cost Rating	Planning Mechanism	Implementation Plan / Priority
RB-01-2018	**Flood**	Continue outreach program to provide information needed to increase awareness and modify actions to reduce flood damage, encourage flood insurance coverage and protect natural functions of floodplains.	**PE&A**	City of Red Bluff Public Works	General Fund, Pre-Disaster Mitigation Grant Program (PDM)	Short Term	**LOW/LOW**	Implementation has been occurring for several years and this is an on-going action.	**1**
RB-02-2012	**Slope Failure**	Install hillside stabilization and river bank armoring, rip-rap or gabion improvements on Red Bluff Hill and in the Sacramento River from Union Street along Rio Street north of Cedar Street to Hickory Street south of Cedar Street along Rio Street to prevent future mudslides/landslides, property slumping, road failure and infrastructure collapse.	**SP**	City of Red Bluff Public Works	Hazard Mitigation Grant Program (HMGP)	Mid Term	**HIGH/LOW**		
RB-02-2018	**Flood**	Work with Cal DFW to develop programmatic permit to remove vegetation and to conducted regular maintenance in stream channels.	**PRV**	City of Red Bluff Public Works	General Fund	Short Term	**LOW/HIGH**	Water/ Flood Management Plans	**7**
RB-03-2012	**Flood**	Ensure that new development is designed to reduce or eliminate flood damage by requiring lots and rights-of-way to be laid out for the provisions of approved sewer and drainage facilities, providing on-site detention facilities as required.	**PRV, PPRO**	City of Red Bluff Planning Department	General Fund	Mid Term	**LOW/LOW**	Building/ Development Codes and Zoning Ordinances	
RB-03-2018	**Flood**	Reduce potential inflow & infiltration issues in City infrastructure due to more frequent and heavy rain events as a result of Climate Change.	**SP, PRV**	City of Red Bluff Public Works	Flood Mitigation Assistance Program (FMA)	Mid Term	**MEDIUM/MEDIUM**	Water/ Flood Management Plans	**5**
RB-04-2012	**Flood**	Make sandbags available to residents in anticipation of severe rainstorms or known flood events, deliver materials to critical infrastructure and provide public information on where these materials are stored and how to obtain them.	**PRV**	City of Red Bluff Public Works	General Fund, Pre-Disaster Mitigation Grant Program (PDM)	Short Term	**LOW/LOW**	Water/ Flood Management Plans	**6**
RB-04-2018	**Earthquake**	Construct Seismic Upgrades to city owned infrastructure not meeting current seismic standards.	**SP, PRV**	City of Red Bluff Public Works	Hazard Mitigation Grant Program (HMGP)	Long Term	**HIGH/LOW**	Building/ Development Codes and Zoning Ordinances	**9**
RB-05-2018	**Earthquake**	Develop Seismic Upgrade Program for local business / gathering facilities that were built before benchmark years.	**PRV**	City of Red Bluff Building Department	General Fund	Mid Term	**MEDIUM/LOW**	Building/ Development Codes and Zoning Ordinances	**4**
RB-06-2012	**Flood**	Clear drainage facilities of trash, debris, overgrown vegetation, dead and downed trees and shrubs prior to rainy season.	**PRV**	City of Red Bluff Public Works	General Fund	Short Term	**LOW/MEDIUM**	Water/ Flood Management Plans	**2**
RB-06-2018	**Dam Failure**	Educate public on evacuation procedures for dam failure and other hazards.	**PE&A**	City of Red Bluff Public Works	General Fund, Pre-Disaster Mitigation Grant Program (PDM)	Short Term	**LOW / MEDIUM**	General Plan Update	

Action No.	Hazard Type	Specific Mitigation Action	Mitigation Alternatives	Responsible Party	Potential Funding Source	Time Frame	Benefit Cost Rating	Planning Mechanism	Implementation Plan / Priority
RB-07-2018	**Drought**	Construct new ground water recharge facilities / drainage facilities to offset drought years and to recharge ground water aquifers.	**SP, PRV**	City of Red Bluff Public Works	General Fund	Long Term	**HIGH/MEDIUM**	Water/ Flood Management Plans	
RB-08-2012	**Wildfire**	Clear fuels/overgrowth/dead and downed vegetation in City / school district owned properties.	**PRV**	City of Red Bluff Fire Department	General Fund	Short Term	**LOW/LOW**	Community Wildfire Protection Plans (CWPPs).	**8**
RB-08-2018	**Drought**	Develop and promote water conservation programs.	**NRP, PRV**	City of Red Bluff Public Works- Water Department	General Fund	Short Term	**LOW/MEDIUM**	Water/ Flood Management Plans	**9**
RB-09-2012	**Flood**	Retrofit and maintain existing storm drain system to insure full capacity is utilized.	**SP**	City of Red Bluff Public Works	General Fund	Short Term	**MEDIUM/ MEDIUM**	Water/ Flood Management Plans	
RB-09-2018	**Wildfire**	Extend/ add domestic water fire lines to areas of known wildland fire risk.	**SP, ES**	City of Red Bluff Fire Department, City of Red Bluff Public Works	General Fund, Hazard Mitigation Grant Program (HMGP)	Mid Term	**HIGH/LOW**	Community Wildfire Protection Plans (CWPPs).	**2**
RB-10-2018	**Wildfire**	Construct new Fire Station near southern end of Red Bluff to decrease response times and suppress potential wildland fires in open grasslands near airport.	**SP**	City of Red Bluff Fire Department	Hazard Mitigation Grant Program (HMGP)	Long Term	**HIGH/ LOW**	Community Wildfire Protection Plans (CWPPs).	
RB-11-2018	**Severe Storm**	Create a hazard tree maintenance and replacement program for aging street trees.	**PRV**	City of Red Bluff Public Works	General Fund, Pre-Disaster Mitigation Grant Program (PDM)	Short Term	**LOW/ MEDIUM**	General Plan Update	

2.6 Plan Implementation and Maintenance Strategy

The City of Red Bluff Planning Team will follow the same implementation and maintenance strategy as Tehama County. This strategy is described in detail in Section 6 of the Base Plan.

2018 Tehama County Multi-Jurisdictional Hazard Mitigation Plan

City Adoption Resolution

Resolution No. 20-2018

City of Red Bluff, California

City of Red Bluff
City Council
555 Washington St.
Red Bluff, CA 96080

WHEREAS, the City of Red Bluff is a local unit of government and is an officially participating jurisdiction of the 2018 Tehama County Multi-Jurisdictional Plan.

WHEREAS, the City of Red Bluff recognizes the 2018 Tehama County Multi-Jurisdictional Plan as the official hazard mitigation plan for the County and participating jurisdictions.

WHEREAS, the City of Red Bluff, with the assistance from Tehama County, has gathered information and prepared the 2018 Tehama County Multi-Jurisdictional Plan; and

WHEREAS, the City of Red Bluff Annex to the 2018 Tehama County Multi-Jurisdictional Hazard Mitigation Plan recognizes the threat that natural hazards pose to people and property within our community; and

WHEREAS, the City of Red Bluff have reviewed the "2018 Tehama County Multi-Jurisdictional Hazard Mitigation Plan" and affirms that the plan actions in the City of Red Bluff Annex will reduce the potential for harm to people and property from future hazard occurrences with our community; and;

WHEREAS, the federal Disaster Mitigation Act of 2000 emphasizes the need for pre- disaster mitigation of potential natural hazards; and

WHEREAS, an adopted Local Hazard Mitigation Plan is required as a condition of future funding for mitigation projects under multiple Federal Emergency Management Agency (FEMA) pre- and post-disaster mitigation grant programs; and

WHEREAS, a public involvement process consistent with the requirements of DMA 2000 was conducted by the City to develop the 2018 Tehama County Multi-Jurisdictional Hazard Mitigation Plan and Jurisdictional Annexes, and

NOW THEREFORE, BE IT RESOLVED by City Council that City of Red Bluff adopts the 2018 Tehama County Multi-Jurisdictional Plan and the City's jurisdictional annex as this jurisdiction's Natural Hazard Mitigation Plan, and resolves to execute the actions in the Plan.

ADOPTED this 17th day of July, 2018 at the meeting of the City Council.

_____
Mayor Eyestone

ATTEST:

_____
City Clerk

The City of Red Bluff is an Equal Opportunity Provider

Appendix J

CITY CODE CONSERVATION AND RATIONING STAGES SECTION

§ 24.18 INTENT.

It is the intent of the city to encourage the conservation of the city's water supply for the greatest public benefit, to minimize the wasteful use of water, and to make provisions for emergency rationing of water when necessary.

The provisions of this chapter shall apply to all persons, customers, and property served by the city, wherever situated, and for all types of water provided by the city. In situations where a property is serviced by both the city and a private well, no city water may be used for activities that are prohibited by any regulations set forth in this chapter.

The prohibited uses of water are not applicable to water necessary for public health and safety.

In the event any provision of this chapter conflicts or overlaps with any mandatory state regulation related to water conservation, the most stringent shall apply.

(Ord. 956, passed 1-4-2005; Am. Ord. 958, passed 3-1-2005; Am. Ord. 961, passed 8-16-2005; Am. Ord. 966, passed 2-7-2006; Am. Ord. 1037, passed 5-19-2015; Am. Ord. 1067, passed 7-5-2022)

§ 24.18-1 DECLARATION OF WATER SHORTAGE EMERGENCY.

Stage I is the normal operating stage for the water system and is always in effect. The Director of Public Works, with the concurrence of the City Manager, may declare a Stage II, Stage III, Stage IV, Stage V, or Stage VI water system operation for water conservation and rationing for a period not to exceed 15 calendar days. Any declared stage to be extended beyond 15 days must be approved by the City Council.

(Ord. 956, passed 1-4-2005; Am. Ord. 958, passed 3-1-2005; Am. Ord. 961, passed 8-16-2005; Am. Ord. 966, passed 2-7-2006; Am. Ord. 1037, passed 5-19-2015; Am. Ord. 1067, passed 7-5-2022)

§ 24.18-2 CONSERVATION AND RATIONING STAGES.

(A) The City Council of the city is vested with the authority to invoke the various "stages" of action described in this chapter, which serves as the city's water shortage contingency plan, based upon the recommendation of the Director of Public Works.

(B) The city has developed a six stage rationing plan to invoke during declared water shortages. The action stages trigger levels have been developed to implement the water shortage contingency plan. The rationing plan includes voluntary and mandatory rationing, depending on the causes, severity, and anticipated duration of the water supply shortage. Stages will be implemented when circumstances warrant as determined by the Director of Public Works, City Manager and the City Council, or as the state mandates water use restrictions.

(C) The Director of Public Works will recommend an appropriate action stage. All restrictions under each applicable action stage will be implemented immediately upon declaration of such stage. Lifting of an emergency action stage and resumption to the normal operating stage will be determined by the City Council, based upon the

recommendation of the Director of Public Works and based on current conditions affecting the water supply. The rationing stages are described in detail below.

(1) *Stage I - Conservation measures (up to 10% supply reduction).* This is the normal operating stage for the water system.

The following practices shall be prohibited:

(a) Hosing off sidewalks, driveways, and other hardscapes.

(b) Washing automobiles with hoses not equipped with a shut-off nozzle.

(c) Using non-recirculated water in a fountain or other decorative water feature.

(d) Watering lawns in a manner that causes runoff, or within 48 hours after measurable precipitation.

(e) Irrigating ornamental turf on public street medians.

The city may initiate a water conservation program to provide public information on ways to reduce water use. Customers are encouraged to reduce water usage by taking the following voluntary water conservation measures:

(i) Refrain from landscape watering except between the hours of 9:00 pm until 8:00 am.

(ii) Equip any hose with a shutoff nozzle.

(iii) Promptly repair all leaks in plumbing fixtures, water lines, and sprinkler systems.

(2) *Stage II - Moderate water shortage (up to 20% supply reduction).* Mandatory implementation of conservation measures. Voluntary conservation measures in Stage I become mandatory. Includes all Stage I measures, plus the following:

(a) Equip new commercial car washes with a water recycling system.

(b) All new construction must install low flow shower heads, low flush toilets, and faucet aerators.

(c) Construction projects and industrial use: Water service for construction projects and industrial use shall be addressed on a case-by-case basis.

Customers will be notified via news media and other methods of this stage of water shortage emergency and implementation of mandatory conservation measures.

(3) *Stage III - Serious water shortage (up to 30% supply reduction).* Mandatory conservation. Includes all of the Stage II measures plus the following:

(a) Landscape watering by any means, including automatic irrigation systems, hose-end sprinklers, drip irrigation, hand-held hose, or bucket is prohibited except on the following days between the hours of 9:00 pm until 8:00 am.

1. Customers whose street addresses end with an odd number may water only on Wednesday and Sunday and only within the permitted time period.

2. Customers whose addresses end with an even number may water only on Tuesday and Saturday and only within the permitted time period.

(b) Operation of ornamental fountains, waterfalls, ponds or lakes is prohibited without a water recycling system. An ornamental or decorative water feature is defined as a design element where artificially supplied open water performs solely an aesthetic function. Ornamental water features do not include recreational water features, such as swimming pools, spas, and water parks.

(c) Operators of restaurants must provide on each table a notice of water emergency and refrain from serving drinking water except upon specific request of a customer.

(d) Operators of hotels and motels must provide in each room a notice of water emergency and the option to choosing not to have towels and linens laundered daily.

(e) Public facilities: Water service to parks, cemeteries and other public facilities shall comply with the restrictions set forth in this section.

Customers will be notified via news media and other methods of this stage of water shortage emergency and implementation of mandatory conservation measures.

(4) *Stage IV - Severe water shortage (up to 40% supply reduction).* Mandatory reduction. Includes all Stage III measures plus the following:

(a) City staff will make every attempt to keep the industrial users informed of the status of a water emergency prior to the declaration of a Stage IV water emergency so they can prepare for a possible shutdown of production.

(b) The following potable water uses will be prohibited for all water users:

1. Landscape irrigation or watering of lawns or gardens.

2. Washing of cars, boats, trailers, or other vehicles other than at commercial facilities with water recycling.

3. Washing down of driveways, sidewalks, buildings, windows, or any outdoor surface.

4. Filling of swimming pools, spas, or hot tubs.

5. Serving of drinking water at restaurants unless requested.

6. Filling or operating ornamental fountains, waterfalls, ponds, or lakes.

7. Sewer system maintenance, fire protection training, or flushing of hydrants.

8. Street cleaning.

9. Use of hydrant meters for construction purposes.

Customers will be notified via news media and other methods of this stage of water shortage emergency. Industrial users will be notified specifically via telephone and will be asked to voluntarily shutdown production during a Stage IV water emergency.

(5) *Stage V – Critical water shortage (up to 50% supply reduction).* Mandatory reduction. Includes all Stage IV measures plus the following:

(a) No new residential development shall be permitted unless the developer has submitted a complete building permit application to the City prior to the Stage V declaration. Building permit applications may proceed with a deferral of landscape installation, until the water shortage level has been lifted.

(b) No new landscape shall be installed. Exceptions are replacing landscaping with drought tolerant landscape material.

Customers will be notified via news media and other methods of this stage of water shortage emergency and water use restrictions.

(6) *Stage VI - Disaster shortage/rationing (greater than 50% supply reduction).* Major catastrophe, including flooding, major fire emergencies, earthquakes, regional power outages, and emergencies other than water shortage, resulting in major water contamination of the City water system necessitating rationing. Priorities for all water use will be for human consumption, sanitation, and fire protection.

(a) All water users will be limited to amounts required for human consumption, sanitation, and fire protection. No water will be available for nonessential use or for commercial or industrial processes. Exceptions are livestock and food production.

Customers will be notified via news media and other methods of this stage of water shortage emergency and water use restrictions.

(Ord. 956, passed 1-4-2005; Am. Ord. 958, passed 3-1-2005; Am. Ord. 961, passed 8-16-2005; Am. Ord. 966, passed 2-7-2006; Am. Ord. 1037, passed 5-19-2015; Am. Ord. 1067, passed 7-5-2022)

§ 24.18-3 ENFORCEMENT.

Any customer violating the water conservation and rationing provisions regulations set forth in this chapter, shall receive a written warning for the first violation. Upon a second violation, the customer shall receive a second written warning and the city may, at its discretion, install a flow-restricting device on the customer's water service. All costs to install and remove the flow-restricting device shall be paid by the violating customer. Any willful violation after issuance of the second written warning shall constitute a misdemeanor and the city may, at its discretion, disconnect the water service.

(Ord. 956, passed 1-4-2005; Am. Ord. 958, passed 3-1-2005; Am. Ord. 961, passed 8-16-2005; Am. Ord. 966, passed 2-7-2006; Am. Ord. 1037, passed 5-19-2015; Am. Ord. 1067, passed 7-5-2022)

§ 24.18-4 WATER SERVICE PENALTY.

In addition to those provisions set forth in § 24.18-3, any violator receiving a second written notice will be assessed a water service penalty for any “excessive use of water” which is defined as water use that exceeds the average water use for the account for the prior 12 months. The penalty for the “excessive use of water” shall be double the account billing rate.

(Ord. 956, passed 1-4-2005; Am. Ord. 958, passed 3-1-2005; Am. Ord. 961, passed 8-16-2005; Am. Ord. 966, passed 2-7-2006; Am. Ord. 1037, passed 5-19-2015; Am. Ord. 1067, passed 7-5-2022)

§ 24.18-5 TERMINATION OF SERVICE.

For violations resulting in third written notices and continued excessive use of water, the city may, at its discretion, disconnect water service and not reinstate service until a specific water conservation plan has been developed with the violating customer.

(Ord. 956, passed 1-4-2005; Am. Ord. 958, passed 3-1-2005; Am. Ord. 961, passed 8-16-2005; Am. Ord. 966, passed 2-7-2006; Am. Ord. 1037, passed 5-19-2015; Am. Ord. 1067, passed 7-5-2022)

§ 24.18-6 APPEALS.

Any decision or declaration made by the Director of Public Works under this section may be appealed to the City Manager. Any decision made by the City Manager under this section may be appealed to the City Council. Any appeal shall be made in writing, setting forth the nature of the disagreement with the decision or declaration made, the reasons to support the disagreement, and the relief sought. Any determination by the City Council shall be final.

(Ord. 956, passed 1-4-2005; Am. Ord. 958, passed 3-1-2005; Am. Ord. 961, passed 8-16-2005; Am. Ord. 966, passed 2-7-2006; Am. Ord. 1037, passed 5-19-2015; Am. Ord. 1067, passed 7-5-2022)

§ 24.18-7 CUMULATIVE REMEDIES.

The remedies available to the city to enforce §§ 24.18*et seq.* are in addition to any other remedies available under the city’s municipal code or any state statutes or regulations and do not replace or supplant any other remedy but are cumulative.

(Ord. 956, passed 1-4-2005; Am. Ord. 958, passed 3-1-2005; Am. Ord. 961, passed 8-16-2005; Am. Ord. 966, passed 2-7-2006; Am. Ord. 1037, passed 5-19-2015; Am. Ord. 1067, passed 7-5-2022)

Appendix K

CITY CODE PREVENTION OF WASTE SECTION

§ 24.11 PREVENTION OF WASTE.

Each consumer is responsible to keep his or her water system free from leakage or waste. Upon failure to do so, the Director of Public Works may shut off the water supply to the premises. The water may be shut off only after 24 hours notice is given to the occupant pursuant to § 24.22.

(`61 Code, § 24.12) (Ord. 304, passed 5-21-1956; Am. Ord. 359, passed 3-18-1986; Am. Ord. 908, passed 6-20-2000; Am. Ord. 958, passed 3-1-2005; Am. Ord. 966, passed 2-7-2006)

Appendix L

WATER AND SEWER RATE SCHEDULES

City of Red Bluff Water Rates:

Rates effective July 15, 2012

BASE METER RATES		
3/4"	Meter	15.04
1"	Meter	25.78
1 1/2"	Meter	48.33
2"	Meter	60.24
3"	Meter	82.69
4"	Meter	205.81
6"	Meter	454.39

CONSUMPTION RATES	
VOLUME	PRICE
Cubic Feet	Per 100 Cubic Feet
1 - 2,500	0.79
2,501 - 4,000	0.74
4,001 - 6,000	0.69
6,001 - 8,000	0.66
8,001 - 12,000	0.62
12,001 - 20,000	0.61
20,001 - 36,000	0.55
36,001 - 68,000	0.54
Greater than 68,001	0.48

City of Red Bluff Sewer Rates:

Pursuant to City Ordinance 832, the following is a list of Sanitary Sewer Service Fees

Rates effective July 15, 2012

User Class	*Monthly Rate*
Single Family	$34.00
Mobile Homes on individual lots	$24.00
Condominiums	$34.00
Townhouses	$34.00
Mobile Homes (in park), per unit	$24.00
Apartment, per unit	$24.00
Commercial:	
Minimum*	$34.00
Bakery	$3.63 per 100 cubic ft**
Restaurant	$2.99 per 100 cubic ft**
All Others	$2.69 per 100 cubic ft**

Gallons per cubic foot

1 cubic foot = 7.48051945 US gallons

1 US gallon = 0.133680556 cubic feet

* The minimum rate for sewage service is based upon the sewer discharge of 400 cubic feet per month for bakeries, 500 cubic feet per month for restaurants and 1,100 cubic feet per month for all other commercial users.

** Per 100 cubic feet of sewage discharge, or fraction thereof, exceeding the minimum discharge allowance.

Appendix M

UWMP CHECKLIST

UWMP Checklist

Retail	Wholesale	2020 Guidebook Location	Water Code Section	Summary as Applies to UWMP	Subject	2020 UWMP Location (Optional Column for Agency Review Use)
x	x	Chapter 1	10615	A plan shall describe and evaluate sources of supply, reasonable and practical efficient uses, reclamation and demand management activities.	Introduction and Overview	Section 1.1
x	x	Chapter 1	10630.5	Each plan shall include a simple description of the supplier's plan including water availability, future requirements, a strategy for meeting needs, and other pertinent information. Additionally, a supplier may also choose to include a simple description at the beginning of each chapter.	Summary	Section 1.1
x	x	Section 2.2	10620(b)	Every person that becomes an urban water supplier shall adopt an urban water management plan within one year after it has become an urban water supplier.	Plan Preparation	Section 2.1

Retail	Wholesale	2020 Guidebook Location	Water Code Section	Summary as Applies to UWMP	Subject	2020 UWMP Location (Optional Column for Agency Review Use)
x	x	Section 2.6	10620(d)(2)	Coordinate the preparation of its plan with other appropriate agencies in the area, including other water suppliers that share a common source, water management agencies, and relevant public agencies, to the extent practicable.	Plan Preparation	Section 2.4
x	x	Section 2.6.2	10642	Provide supporting documentation that the water supplier has encouraged active involvement of diverse social, cultural, and economic elements of the population within the service area prior to and during the preparation of the plan and contingency plan.	Plan Preparation	Section 2.4
x		Section 2.6, Section 6.1	10631(h)	Retail suppliers will include documentation that they have provided their wholesale supplier(s) - if any - with water use projections from that source.	System Supplies	N/A

Retail	Wholesale	2020 Guidebook Location	Water Code Section	Summary as Applies to UWMP	Subject	2020 UWMP Location (Optional Column for Agency Review Use)
	x	Section 2.6	10631(h)	Wholesale suppliers will include documentation that they have provided their urban water suppliers with identification and quantification of the existing and planned sources of water available from the wholesale to the urban supplier during various water year types.	System Supplies	N/A
x	x	Section 3.1	10631(a)	Describe the water supplier service area.	System Description	Section 3.1
x	x	Section 3.3	10631(a)	Describe the climate of the service area of the supplier.	System Description	Section 3.2
x	x	Section 3.4	10631(a)	Provide population projections for 2025, 2030, 2035, 2040 and optionally 2045.	System Description	Section 3.3.1
x	x	Section 3.4.2	10631(a)	Describe other social, economic, and demographic factors affecting the supplier's water management planning.	System Description	Section 3.3.2
x	x	Sections 3.4 and 5.4	10631(a)	Indicate the current population of the service area.	System Description and Baselines and Targets	Section 3.3.1
x	x	Section 3.5	10631(a)	Describe the land uses within the service area.	System Description	Section 3.4

Retail	Wholesale	2020 Guidebook Location	Water Code Section	Summary as Applies to UWMP	Subject	2020 UWMP Location (Optional Column for Agency Review Use)
x	x	Section 4.2	10631(d)(1)	Quantify past, current, and projected water use, identifying the uses among water use sectors.	System Water Use	Section 4.2
x	x	Section 4.2.4	10631(d)(3)(C)	Retail suppliers shall provide data to show the distribution loss standards were met.	System Water Use	Section 4.3
x	x	Section 4.2.6	10631(d)(4)(A)	In projected water use, include estimates of water savings from adopted codes, plans, and other policies or laws.	System Water Use	Section 4.4
x	x	Section 4.2.6	10631(d)(4)(B)	Provide citations of codes, standards, ordinances, or plans used to make water use projections.	System Water Use	Section 4.2
x	optional	Section 4.3.2.4	10631(d)(3)(A)	Report the distribution system water loss for each of the 5 years preceding the plan update.	System Water Use	Section 4.3
x	optional	Section 4.4	10631.1(a)	Include projected water use needed for lower income housing projected in the service area of the supplier.	System Water Use	Section 4.5
x	x	Section 4.5	10635(b)	Demands under climate change considerations must be included as part of the drought risk assessment.	System Water Use	Section 4.6

Retail	Wholesale	2020 Guidebook Location	Water Code Section	Summary as Applies to UWMP	Subject	2020 UWMP Location (Optional Column for Agency Review Use)
x		Chapter 5	10608.20(e)	Retail suppliers shall provide baseline daily per capita water use, urban water use target, interim urban water use target, and compliance daily per capita water use, along with the bases for determining those estimates, including references to supporting data.	Baselines and Targets	Chapter 5 (see SB X7-7 forms in Appendix C)
x		Chapter 5	10608.24(a)	Retail suppliers shall meet their water use target by December 31, 2020.	Baselines and Targets	Section 5.6
	x	Section 5.1	10608.36	Wholesale suppliers shall include an assessment of present and proposed future measures, programs, and policies to help their retail water suppliers achieve targeted water use reductions.	Baselines and Targets	N/A
x		Section 5.2	10608.24(d)(2)	If the retail supplier adjusts its compliance GPCD using weather normalization, economic adjustment, or extraordinary events, it shall provide the basis for, and data supporting the adjustment.	Baselines and Targets	Section 5.6

Retail	Wholesale	2020 Guidebook Location	Water Code Section	Summary as Applies to UWMP	Subject	2020 UWMP Location (Optional Column for Agency Review Use)
x		Section 5.5	10608.22	Retail suppliers' per capita daily water use reduction shall be no less than 5 percent of base daily per capita water use of the 5-year baseline. This does not apply if the suppliers base GPCD is at or below 100.	Baselines and Targets	Section 5.5
x		Section 5.5 and Appendix E	10608.4	Retail suppliers shall report on their compliance in meeting their water use targets. The data shall be reported using a standardized form in the SBX7-7 2020 Compliance Form.	Baselines and Targets	Section 5.6 (See SB X7-7 forms in Appendix C)
x	x	Sections 6.1 and 6.2	10631(b)(1)	Provide a discussion of anticipated supply availability under a normal, single dry year, and a drought lasting five years, as well as more frequent and severe periods of drought.	System Supplies	Section 7.4
x	x	Sections 6.1	10631(b)(1)	Provide a discussion of anticipated supply availability under a normal, single dry year, and a drought lasting five years, as well as more frequent and severe periods of drought, *including changes in supply due to climate change.*	System Supplies	Section 7.4

Retail	Wholesale	2020 Guidebook Location	Water Code Section	Summary as Applies to UWMP	Subject	2020 UWMP Location (Optional Column for Agency Review Use)
x	x	Section 6.1	10631(b)(2)	When multiple sources of water supply are identified, describe the management of each supply in relationship to other identified supplies.	System Supplies	Chapter 6
x	x	Section 6.1.1	10631(b)(3)	Describe measures taken to acquire and develop planned sources of water.	System Supplies	Chapter 6
x	x	Section 6.2.8	10631(b)	Identify and quantify the existing and planned sources of water available for 2020, 2025, 2030, 2035, 2040 and optionally 2045.	System Supplies	Section 6.9
x	x	Section 6.2	10631(b)	Indicate whether groundwater is an existing or planned source of water available to the supplier.	System Supplies	Section 6.2
x	x	Section 6.2.2	10631(b)(4)(A)	Indicate whether a groundwater sustainability plan or groundwater management plan has been adopted by the water supplier or if there is any other specific authorization for groundwater management. Include a copy of the plan or authorization.	System Supplies	Section 6.2
x	x	Section 6.2.2	10631(b)(4)(B)	Describe the groundwater basin.	System Supplies	Section 6.2

Retail	Wholesale	2020 Guidebook Location	Water Code Section	Summary as Applies to UWMP	Subject	2020 UWMP Location (Optional Column for Agency Review Use)
x	x	Section 6.2.2	10631(b)(4)(B)	Indicate if the basin has been adjudicated and include a copy of the court order or decree and a description of the amount of water the supplier has the legal right to pump.	System Supplies	Section 6.2
x	x	Section 6.2.2.1	10631(b)(4)(B)	For unadjudicated basins, indicate whether or not the department has identified the basin as a high or medium priority. Describe efforts by the supplier to coordinate with sustainability or groundwater agencies to achieve sustainable groundwater conditions.	System Supplies	Section 6.2
x	x	Section 6.2.2.4	10631(b)(4)(C)	Provide a detailed description and analysis of the location, amount, and sufficiency of groundwater pumped by the urban water supplier for the past five years	System Supplies	Section 6.2
x	x	Section 6.2.2	10631(b)(4)(D)	Provide a detailed description and analysis of the amount and location of groundwater that is projected to be pumped.	System Supplies	Section 6.2
x	x	Section 6.2.7	10631(c)	Describe the opportunities for exchanges or transfers of water on a short-term or long- term basis.	System Supplies	Section 6.7

Retail	Wholesale	2020 Guidebook Location	Water Code Section	Summary as Applies to UWMP	Subject	2020 UWMP Location (Optional Column for Agency Review Use)
x	x	Section 6.2.5	10633(b)	Describe the quantity of treated wastewater that meets recycled water standards, is being discharged, and is otherwise available for use in a recycled water project.	System Supplies (Recycled Water)	Section 6.5.2
x	x	Section 6.2.5	10633(c)	Describe the recycled water currently being used in the supplier's service area.	System Supplies (Recycled Water)	Section 6.5.3
x	x	Section 6.2.5	10633(d)	Describe and quantify the potential uses of recycled water and provide a determination of the technical and economic feasibility of those uses.	System Supplies (Recycled Water)	Section 6.5.4
x	x	Section 6.2.5	10633(e)	Describe the projected use of recycled water within the supplier's service area at the end of 5, 10, 15, and 20 years, and a description of the actual use of recycled water in comparison to uses previously projected.	System Supplies (Recycled Water)	Section 6.5.4
x	x	Section 6.2.5	10633(f)	Describe the actions which may be taken to encourage the use of recycled water and the projected results of these actions in terms of acre-feet of recycled water used per year.	System Supplies (Recycled Water)	Section 6.5.5

Retail	Wholesale	2020 Guidebook Location	Water Code Section	Summary as Applies to UWMP	Subject	2020 UWMP Location (Optional Column for Agency Review Use)
x	x	Section 6.2.5	10633(g)	Provide a plan for optimizing the use of recycled water in the supplier's service area.	System Supplies (Recycled Water)	Section 6.5.5
x	x	Section 6.2.6	10631(g)	Describe desalinated water project opportunities for long-term supply.	System Supplies	Section 6.6
x	x	Section 6.2.5	10633(a)	Describe the wastewater collection and treatment systems in the supplier's service area with quantified amount of collection and treatment and the disposal methods.	System Supplies (Recycled Water)	Section 6.5.2
x	x	Section 6.2.8, Section 6.3.7	10631(f)	Describe the expected future water supply projects and programs that may be undertaken by the water supplier to address water supply reliability in average, single-dry, and for a period of drought lasting 5 consecutive water years.	System Supplies	Section 6.8
x	x	Section 6.4 and Appendix O	10631.2(a)	The UWMP must include energy information, as stated in the code, that a supplier can readily obtain.	System Suppliers, Energy Intensity	Section 6.11

Retail	Wholesale	2020 Guidebook Location	Water Code Section	Summary as Applies to UWMP	Subject	2020 UWMP Location (Optional Column for Agency Review Use)
x	x	Section 7.2	10634	Provide information on the quality of existing sources of water available to the supplier and the manner in which water quality affects water management strategies and supply reliability	Water Supply Reliability Assessment	Section 7.2.1
x	x	Section 7.2.4	10620(f)	Describe water management tools and options to maximize resources and minimize the need to import water from other regions.	Water Supply Reliability Assessment	Section 7.2.3
x	x	Section 7.3	10635(a)	Service Reliability Assessment: Assess the water supply reliability during normal, dry, and a drought lasting five consecutive water years by comparing the total water supply sources available to the water supplier with the total projected water use over the next 20 years.	Water Supply Reliability Assessment	Section 7.4
x	x	Section 7.3	10635(b)	Provide a drought risk assessment as part of information considered in developing the demand management measures and water supply projects.	Water Supply Reliability Assessment	Section 7.5

Retail	Wholesale	2020 Guidebook Location	Water Code Section	Summary as Applies to UWMP	Subject	2020 UWMP Location (Optional Column for Agency Review Use)
x	x	Section 7.3	10635(b)(1)	Include a description of the data, methodology, and basis for one or more supply shortage conditions that are necessary to conduct a drought risk assessment for a drought period that lasts 5 consecutive years.	Water Supply Reliability Assessment	Section 7.3
x	x	Section 7.3	10635(b)(2)	Include a determination of the reliability of each source of supply under a variety of water shortage conditions.	Water Supply Reliability Assessment	Section 7.4
x	x	Section 7.3	10635(b)(3)	Include a comparison of the total water supply sources available to the water supplier with the total projected water use for the drought period.	Water Supply Reliability Assessment	Section 7.4
x	x	Section 7.3	10635(b)(4)	Include considerations of the historical drought hydrology, plausible changes on projected supplies and demands under climate change conditions, anticipated regulatory changes, and other locally applicable criteria.	Water Supply Reliability Assessment	Sections 6.10 and 7.2.2
x	x	Chapter 8	10632(a)	Provide a water shortage contingency plan (WSCP) with specified elements below.	Water Shortage Contingency Planning	See Chapter 8 and Appendix J

Retail	Wholesale	2020 Guidebook Location	Water Code Section	Summary as Applies to UWMP	Subject	2020 UWMP Location (Optional Column for Agency Review Use)
x	x	Chapter 8	10632(a)(1)	Provide the analysis of water supply reliability (from Chapter 7 of Guidebook) in the WSCP	Water Shortage Contingency Planning	Section 7.4
x	x	Section 8.10	10632(a)(10)	Describe reevaluation and improvement procedures for monitoring and evaluation the water shortage contingency plan to ensure risk tolerance is adequate and appropriate water shortage mitigation strategies are implemented.	Water Shortage Contingency Planning	Section 8.9
x	x	Section 8.2	10632(a)(2)(A)	Provide the written decision-making process and other methods that the supplier will use each year to determine its water reliability.	Water Shortage Contingency Planning	Section 8.5
x	x	Section 8.2	10632(a)(2)(B)	Provide data and methodology to evaluate the supplier's water reliability for the current year and one dry year pursuant to factors in the code.	Water Shortage Contingency Planning	Section 8.5

Retail	Wholesale	2020 Guidebook Location	Water Code Section	Summary as Applies to UWMP	Subject	2020 UWMP Location (Optional Column for Agency Review Use)
x	x	Section 8.3	10632(a)(3)(A)	Define six standard water shortage levels of 10, 20, 30, 40, 50 percent shortage and greater than 50 percent shortage. These levels shall be based on supply conditions, including percent reductions in supply, changes in groundwater levels, changes in surface elevation, or other conditions. The shortage levels shall also apply to a catastrophic interruption of supply.	Water Shortage Contingency Planning	See Section 8.2 and Appendix J
x	x	Section 8.3	10632(a)(3)(B)	Suppliers with an existing water shortage contingency plan that uses different water shortage levels must cross reference their categories with the six standard categories.	Water Shortage Contingency Planning	N/A
x	x	Section 8.4	10632(a)(4)(A)	Suppliers with water shortage contingency plans that align with the defined shortage levels must specify locally appropriate supply augmentation actions.	Water Shortage Contingency Planning	Section 8.4
x	x	Section 8.4	10632(a)(4)(B)	Specify locally appropriate demand reduction actions to adequately respond to shortages.	Water Shortage Contingency Planning	Section 8.3

Retail	Wholesale	2020 Guidebook Location	Water Code Section	Summary as Applies to UWMP	Subject	2020 UWMP Location (Optional Column for Agency Review Use)
x	x	Section 8.4	10632(a)(4)(C)	Specify locally appropriate operational changes.	Water Shortage Contingency Planning	Section 8.9
x	x	Section 8.4	10632(a)(4)(D)	Specify additional mandatory prohibitions against specific water use practices that are in addition to state-mandated prohibitions are appropriate to local conditions.	Water Shortage Contingency Planning	Section 8.3
x	x	Section 8.4	10632(a)(4)(E)	Estimate the extent to which the gap between supplies and demand will be reduced by implementation of the action.	Water Shortage Contingency Planning	Section 8.3
x	x	Section 8.4.6	10632.5	The plan shall include a seismic risk assessment and mitigation plan.	Water Shortage Contingency Plan	Section 8.7
x	x	Section 8.5	10632(a)(5)(A)	Suppliers must describe that they will inform customers, the public and others regarding any current or predicted water shortages.	Water Shortage Contingency Planning	See Appendix J
x	x	Section 8.5 and 8.6	10632(a)(5)(B) 10632(a)(5)(C)	Suppliers must describe that they will inform customers, the public and others regarding any shortage response actions triggered or anticipated to be triggered and other relevant communications.	Water Shortage Contingency Planning	See Appendix J

Retail	Wholesale	2020 Guidebook Location	Water Code Section	Summary as Applies to UWMP	Subject	2020 UWMP Location (Optional Column for Agency Review Use)
x		Section 8.6	10632(a)(6)	Retail supplier must describe how it will ensure compliance with and enforce provisions of the WSCP.	Water Shortage Contingency Planning	See Appendix J
x	x	Section 8.7	10632(a)(7)(A)	Describe the legal authority that empowers the supplier to enforce shortage response actions.	Water Shortage Contingency Planning	See Appendix J
x	x	Section 8.7	10632(a)(7)(B)	Provide a statement that the supplier will declare a water shortage emergency Water Code Chapter 3.	Water Shortage Contingency Planning	See Appendix J
x	x	Section 8.7	10632(a)(7)(C)	Provide a statement that the supplier will coordinate with any city or county within which it provides water for the possible proclamation of a local emergency.	Water Shortage Contingency Planning	See Appendix J
x	x	Section 8.8	10632(a)(8)(A)	Describe the potential revenue reductions and expense increases associated with activated shortage response actions.	Water Shortage Contingency Planning	Section 8.8
x	x	Section 8.8	10632(a)(8)(B)	Provide a description of mitigation actions needed to address revenue reductions and expense increases associated with activated shortage response actions.	Water Shortage Contingency Planning	Section 8.8

Retail	Wholesale	2020 Guidebook Location	Water Code Section	Summary as Applies to UWMP	Subject	2020 UWMP Location (Optional Column for Agency Review Use)
x		Section 8.8	10632(a)(8)(C)	Retail suppliers must describe the cost of compliance with Water Code Chapter 3.3: Excessive Residential Water Use During Drought	Water Shortage Contingency Planning	Section 8.8
x		Section 8.9	10632(a)(9)	Retail suppliers must describe the monitoring and reporting requirements and procedures that ensure appropriate data is collected, tracked, and analyzed for purposes of monitoring customer compliance.	Water Shortage Contingency Planning	Section 8.9
x		Section 8.11	10632(b)	Analyze and define water features that are artificially supplied with water, including ponds, lakes, waterfalls, and fountains, separately from swimming pools and spas.	Water Shortage Contingency Planning	See Appendix J
x	x	Sections 8.12 and 10.4	10635(c)	Provide supporting documentation that Water Shortage Contingency Plan has been, or will be, provided to any city or county within which it provides water, no later than 30 days after the submission of the plan to DWR.	Plan Adoption, Submittal, and Implementation	Section 10.4.4 (See Commitment to Distribute in Appendix A)

Retail	Wholesale	2020 Guidebook Location	Water Code Section	Summary as Applies to UWMP	Subject	2020 UWMP Location (Optional Column for Agency Review Use)
x	x	Section 8.14	10632(c)	Make available the Water Shortage Contingency Plan to customers and any city or county where it provides water within 30 after adopted the plan.	Water Shortage Contingency Planning	Section 10.4.4 (See Commitment to Distribute in Appendix A)
	x	Sections 9.1 and 9.3	10631(e)(2)	Wholesale suppliers shall describe specific demand management measures listed in code, their distribution system asset management program, and supplier assistance program.	Demand Management Measures	N/A
x		Sections 9.2 and 9.3	10631(e)(1)	Retail suppliers shall provide a description of the nature and extent of each demand management measure implemented over the past five years. The description will address specific measures listed in code.	Demand Management Measures	Chapter 9
x		Chapter 10	10608.26(a)	Retail suppliers shall conduct a public hearing to discuss adoption, implementation, and economic impact of water use targets (recommended to discuss compliance).	Plan Adoption, Submittal, and Implementation	Section 10.3

Retail	Wholesale	2020 Guidebook Location	Water Code Section	Summary as Applies to UWMP	Subject	2020 UWMP Location (Optional Column for Agency Review Use)
x	x	Section 10.2.1	10621(b)	Notify, at least 60 days prior to the public hearing, any city or county within which the supplier provides water that the urban water supplier will be reviewing the plan and considering amendments or changes to the plan. Reported in Table 10-1.	Plan Adoption, Submittal, and Implementation	Section 10.2.1
x	x	Section 10.4	10621(f)	Each urban water supplier shall update and submit its 2020 plan to the department by July 1, 2021.	Plan Adoption, Submittal, and Implementation	Section 10.4.1
x	x	Sections 10.2.2, 10.3, and 10.5	10642	Provide supporting documentation that the urban water supplier made the plan and contingency plan available for public inspection, published notice of the public hearing, and held a public hearing about the plan and contingency plan.	Plan Adoption, Submittal, and Implementation	Section 10.2.2, Section 10.3, See Appendix A
x	x	Section 10.2.2	10642	The water supplier is to provide the time and place of the hearing to any city or county within which the supplier provides water.	Plan Adoption, Submittal, and Implementation	Section 10.2.1
x	x	Section 10.3.2	10642	Provide supporting documentation that the plan and contingency plan has been adopted as prepared or modified.	Plan Adoption, Submittal, and Implementation	See Section 10.3, Appendix N

Retail	Wholesale	2020 Guidebook Location	Water Code Section	Summary as Applies to UWMP	Subject	2020 UWMP Location (Optional Column for Agency Review Use)
x	x	Section 10.4	10644(a)	Provide supporting documentation that the urban water supplier has submitted this UWMP to the California State Library.	Plan Adoption, Submittal, and Implementation	Section 10.4.3 (See Commitment to Distribute in Appendix A)
x	x	Section 10.4	10644(a)(1)	Provide supporting documentation that the urban water supplier has submitted this UWMP to any city or county within which the supplier provides water no later than 30 days after adoption.	Plan Adoption, Submittal, and Implementation	Section 10.4.4 (See Commitment to Distribute in Appendix A)
x	x	Sections 10.4.1 and 10.4.2	10644(a)(2)	The plan, or amendments to the plan, submitted to the department shall be submitted electronically.	Plan Adoption, Submittal, and Implementation	Section 10.4.2 and 10.6
x	x	Section 10.5	10645(a)	Provide supporting documentation that, not later than 30 days after filing a copy of its plan with the department, the supplier has or will make the plan available for public review during normal business hours.	Plan Adoption, Submittal, and Implementation	Section 10.5 (See Commitment to Distribute in Appendix A)
x	x	Section 10.5	10645(b)	Provide supporting documentation that, not later than 30 days after filing a copy of its water shortage contingency plan with the department, the supplier has or will make the plan available for public review during normal business hours.	Plan Adoption, Submittal, and Implementation	Section 10.5 (See Commitment to Distribute in Appendix A)

Retail	Wholesale	2020 Guidebook Location	Water Code Section	Summary as Applies to UWMP	Subject	2020 UWMP Location (Optional Column for Agency Review Use)
x	x	Section 10.6	10621(c)	If supplier is regulated by the Public Utilities Commission, include its plan and contingency plan as part of its general rate case filings.	Plan Adoption, Submittal, and Implementation	N/A
x	x	Section 10.7.2	10644(b)	If revised, submit a copy of the water shortage contingency plan to DWR within 30 days of adoption.	Plan Adoption, Submittal, and Implementation	Section 10.6

Appendix N

CITY ADOPTION RESOLUTIONS

RESOLUTION NO. 31-2022

A RESOLUTION OF THE CITY COUNCIL OF THE CITY OF RED BLUFF ADOPTING THE 2020 URBAN WATER MANAGEMENT PLAN

WHEREAS, the City Council of the City of Red Bluff has prepared and made available to the public for review, an Urban Water Management Plan, dated July 2022, in compliance with the requirements contained in part 2.6 of Division 6 of the Water Code of the State of California; and

WHEREAS, the City Council of the City of Red Bluff held a public meeting to receive comments from the public on the plan prior to adoption; and

WHEREAS, the City Council of the City of Red Bluff coordinated closely with the California Department of Water Resources and the United States Bureau of Reclamation on the completion of this document.

NOW, THEREFORE, BE IT RESOLVED, THAT THE CITY COUNCIL OF THE CITY OF RED BLUFF APPROVES THE FOLLOWING:

1. The 2020 Urban Water Management Plan is hereby adopted; and
2. The preparation and adoption of the 2020 Urban Water Management Plan are exempt from the California Environmental Quality Act pursuant to Water Code Section 10652 and CEQA Guidelines Section 15282(v); and
3. The City Manager or his designee is hereby authorized and directed to file this Plan with the California Department of Water Resources.

The foregoing resolution was adopted at a regular meeting of the City Council of the City of Red Bluff held on August 2, 2022, by the following vote:

RESULT:	**ADOPTED [UNANIMOUS]**
MOVER:	Clay Parker, Mayor Pro Tem
SECONDER:	J.R. Gonzales, Council Member
AYES:	Deiters, Eyestone, Gonzales, Parker, Jones

Kris Deiters, Mayor

ATTEST:

Anita Rice, Deputy City Clerk

ORDINANCE NO. 1067

ORDINANCE NO. 1067 AN ORDINANCE OF THE CITY OF RED BLUFF AMENDING CERTAIN SECTION OF CHAPTER 24 OF THE CITY CODE OF ORDINANCES REGARDING WATER CONSERVATION AND RATIONING STAGES

WHEREAS, new legislation in 2018, as a result of severe drought of 2012-2016, created a Water Shortage Contingency Plan (WSCP) mandate replacing the water shortage contingency analysis under former law; and

WHEREAS, the new requirements of the WSCP, listed below, are addressed in the revised City ordinance and the 2020 Urban Water Management Plan:

- Six standard water shortage levels or equivalent (10%, 20%, 30%, 40%, 50%, and greater than 50%).
- Shortage response actions (local supply augmentation actions, demand reduction actions, operational changes, reduction mandates, etc.).
- Effectiveness of demand reduction components for given demand reduction targets in a staged cutback scenario.
- Emergency response plans/procedures for catastrophic supply interruption.
- Communication protocols and procedures.
- Compliance, enforcement, appeal, and exemption procedures.
- Legal authority.
- Financial consequence.
- Monitoring and reporting requirements and procedures.
- Reevaluation and improvement procedures.
- New Water Shortage Demand Assessment (WSDA) procedures necessary for subsequent development of the Annual Water Shortage Assessment Reports.
- Seismic risk assessment; and

WHEREAS, On June 21, 2022 the City Council heard this item and by a 5-0-0 vote, recommended the amendments to the ordinance noted herein.

NOW THEREFORE BE IT RESOLVED THAT THE CITY COUNCIL OF THE CITY OF RED BLUFF DOES ORDAIN AS FOLLOWS:

The City Council of the City of Red Bluff adopts and finds as true and correct the aforementioned recitals and incorporates the changes set forth below.

The City Council of Red Bluff does ordain as follows:

Chapter 24, Article I, amended to read as follows:

§ 24.18 INTENT.

It is the intent of the city to encourage the conservation of the city's water supply for the greatest public benefit, to minimize the wasteful use of water, and to make provisions for emergency rationing of water when necessary.

The provisions of this chapter shall apply to all persons, customers, and property served by the city, wherever situated, and for all types of water provided by the city. In

situations where a property is serviced by both the city and a private well, no city water may be used for activities that are prohibited by any regulations set forth in this chapter.

The prohibited uses of water are not applicable to water necessary for public health and safety.

In the event any provision of this chapter conflicts or overlaps with any mandatory state regulation related to water conservation, the most stringent shall apply.

(Ord. 956, passed 1-4-2005; Am. Ord. 958, passed 3-1-2005; Am. Ord. 961, passed 8-16-2005; Am. Ord. 966, passed 2-7-2006; Am. Ord. 1037, passed 5-19-2015)

§ 24.18-1 DECLARATION OF WATER SHORTAGE EMERGENCY.

Stage I is the normal operating stage for the water system and is always in effect. The Director of Public Works, with the concurrence of the City Manager, may declare a Stage II, Stage III, Stage IV, Stage V, or Stage VI water system operation for water conservation and rationing for a period not to exceed 15 calendar days. Any declared stage to be extended beyond 15 days must be approved by the City Council.

(Ord. 956, passed 1-4-2005; Am. Ord. 958, passed 3-1-2005; Am. Ord. 961, passed 8-16-2005; Am. Ord. 966, passed 2-7-2006; Am. Ord. 1037, passed 5-19-2015)

§ 24.18-2 CONSERVATION AND RATIONING STAGES.

(A) The City Council of the city is vested with the authority to invoke the various "stages" of action described in this chapter, which serves as the city's water shortage contingency plan, based upon the recommendation of the Director of Public Works.

(B) The city has developed a six stage rationing plan to invoke during declared water shortages. The action stages trigger levels have been developed to implement the water shortage contingency plan. The rationing plan includes voluntary and mandatory rationing, depending on the causes, severity, and anticipated duration of the water supply shortage. Stages will be implemented when circumstances warrant as determined by the Director of Public Works, City Manager and the City Council, or as the state mandates water use restrictions.

(C) The Director of Public Works will recommend an appropriate action stage. All restrictions under each applicable action stage will be implemented immediately upon declaration of such stage. Lifting of an emergency action stage and resumption to the normal operating stage will be determined by the City Council, based upon the recommendation of the Director of Public Works and based on current conditions affecting the water supply. The rationing stages are described in detail below.

(1) *Stage I - Conservation measures (up to 10% supply reduction).* This is the normal operating stage for the water system.

The following practices shall be prohibited:

(a) Hosing off sidewalks, driveways, and other hardscapes.

(b) Washing automobiles with hoses not equipped with a shut-off nozzle.

(c) Using non-recirculated water in a fountain or other decorative water feature.

(d) Watering lawns in a manner that causes runoff, or within 48 hours after measurable precipitation.

(e) Irrigating ornamental turf on public street medians.

The city may initiate a water conservation program to provide public information on ways to reduce water use. Customers are encouraged to reduce water usage by taking the following voluntary water conservation measures:

(i) Refrain from landscape watering except between the hours of 9:00 pm until 8:00 am.

(ii) Equip any hose with a shutoff nozzle.

(iii) Promptly repair all leaks in plumbing fixtures, water lines, and sprinkler systems.

(2) *Stage II - Moderate water shortage (up to 20% supply reduction).* Mandatory implementation of conservation measures. Conservation measures in Stage I become mandatory. Includes all Stage I measures plus the following:

(a) Equip new commercial car washes with a water recycling system.

(b) All new construction must install low flow shower heads, low flush toilets, and faucet aerators.

(c) Construction projects and industrial use: Water service for construction projects and industrial use shall be addressed on a case-by-case basis.

Customers will be notified via news media and other methods of this stage of water shortage emergency and implementation of mandatory conservation measures.

(3) *Stage III - Serious water shortage (up to 30% supply reduction).* Mandatory conservation. Includes all of the Stage II measures plus the following:

(a) Landscape watering by any means, including automatic irrigation systems, hose-end sprinklers, drip irrigation, hand-held hose, or bucket is prohibited except on the following days between the hours of 9:00 pm until 8:00 am.

1. Customers whose street addresses end with an odd number may water only on Wednesday and Sunday and only within the permitted time period.

2. Customers whose addresses end with an even number may water only on Tuesday and Saturday and only within the permitted time period.

(b) Operation of ornamental fountains, waterfalls, ponds or lakes is prohibited without a water recycling system. An ornamental or decorative water feature is defined as a design element where artificially supplied open water performs solely an aesthetic function. Ornamental water features do not include recreational water features, such as swimming pools, spas, and water parks.

(c) Operators of restaurants must provide on each table a notice of water emergency and refrain from serving drinking water except upon specific request of a customer.

(d) Operators of hotels and motels must provide in each room a notice of water emergency and the option to choosing not to have towels and linens laundered daily.

(e) Public facilities: Water service to parks, cemeteries and other public facilities shall comply with the restrictions set forth in this section.

Customers will be notified via news media and other methods of this stage of water shortage emergency and implementation of mandatory conservation measures.

(4) *Stage IV - Severe water shortage (up to 40% supply reduction).* Mandatory reduction. Includes all Stage III measures plus the following:

(a) City staff will make every attempt to keep the industrial users informed of the status of a water emergency prior to the declaration of a Stage IV water emergency so they can prepare for a possible shutdown of production.

(b) The following potable water uses will be prohibited for all water users:

1. Landscape irrigation or watering of lawns or gardens.

2. Washing of cars, boats, trailers, or other vehicles other than at commercial facilities with water recycling.

3. Washing down of driveways, sidewalks, buildings, windows, or any outdoor surface.

4. Filling of swimming pools, spas, or hot tubs.

5. Serving of drinking water at restaurants unless requested.

6. Filling or operating ornamental fountains, waterfalls, ponds, or lakes.

7. Sewer system maintenance, fire protection training, or flushing of hydrants.

8. Street cleaning.

9. Use of hydrant meters for construction purposes.

Customers will be notified via news media and other methods of this stage of water shortage emergency. Industrial users will be notified specifically via telephone and will be asked to voluntarily shutdown production during a Stage IV water emergency.

(5) *Stage V – Critical water shortage (up to 50% supply reduction).* Mandatory reduction. Includes all Stage IV measures plus the following:

(a) No new residential development shall be permitted unless the developer has submitted a complete building permit application to the City prior to the Stage V declaration. Building permit applications may proceed with a deferral of landscape installation, until the water shortage level has been lifted.

(b) No new landscape shall be installed. Exceptions are replacing landscaping with drought tolerant landscape material.

Customers will be notified via news media and other methods of this stage of water shortage emergency and water use restrictions.

(6) *Stage VI - Disaster shortage/rationing (greater than 50% supply reduction).* Major catastrophe, including flooding, major fire emergencies, earthquakes, regional power outages, and emergencies other than water shortage, resulting in major water contamination of the City water system necessitating rationing. Priorities for all water use will be for human consumption, sanitation, and fire protection.

(a) All water users will be limited to amounts required for human consumption, sanitation, and fire protection. No water will be available for nonessential use or for commercial or industrial processes. Exceptions are livestock and food production.

Customers will be notified via news media and other methods of this stage of water shortage emergency and water use restrictions.

(Ord. 956, passed 1-4-2005; Am. Ord. 958, passed 3-1-2005; Am. Ord. 961, passed 8-16-2005; Am. Ord. 966, passed 2-7-2006; Am. Ord. 1037, passed 5-19-2015)

§ 24.18-3 ENFORCEMENT.

Any customer violating the water conservation and rationing provisions regulations set forth in this chapter, shall receive a written warning for the first violation. Upon a second violation, the customer shall receive a second written warning and the city may, at its discretion, install a flow-restricting device on the customer's water service. All costs to install and remove the flow-restricting device shall be paid by the violating customer. Any willful violation after issuance of the second written warning shall constitute a misdemeanor and the city may, at its discretion, disconnect the water service.

(Ord. 956, passed 1-4-2005; Am. Ord. 958, passed 3-1-2005; Am. Ord. 961, passed 8-16-2005; Am. Ord. 966, passed 2-7-2006; Am. Ord. 1037, passed 5-19-2015)

§ 24.18-4 WATER SERVICE PENALTY.

In addition to those provisions set forth in § 24.18-3, any violator receiving a second written notice will be assessed a water service penalty for any "excessive use of water" which is defined as water use that exceeds the average water use for the account for the prior 12 months. The penalty for the "excessive use of water" shall be double the account billing rate.

(Ord. 956, passed 1-4-2005; Am. Ord. 958, passed 3-1-2005; Am. Ord. 961, passed 8-16-2005; Am. Ord. 966, passed 2-7-2006; Am. Ord. 1037, passed 5-19-2015)

§ 24.18-5 TERMINATION OF SERVICE.

For violations resulting in third written notices and continued excessive use of water, the city may, at its discretion, disconnect water service and not reinstate service until a specific water conservation plan has been developed with the violating customer.

(Ord. 956, passed 1-4-2005; Am. Ord. 958, passed 3-1-2005; Am. Ord. 961, passed 8-16-2005; Am. Ord. 966, passed 2-7-2006; Am. Ord. 1037, passed 5-19-2015)

§ 24.18-6 APPEALS.

Any decision or declaration made by the Director of Public Works under this section may be appealed to the City Manager. Any decision made by the City Manager under this section may be appealed to the City Council. Any appeal shall be made in writing, setting forth the nature of the disagreement with the decision or declaration made, the reasons to support the disagreement, and the relief sought. Any determination by the City Council shall be final.

(Ord. 956, passed 1-4-2005; Am. Ord. 958, passed 3-1-2005; Am. Ord. 961, passed 8-16-2005; Am. Ord. 966, passed 2-7-2006; Am. Ord. 1037, passed 5-19-2015)

§ 24.18-7 CUMULATIVE REMEDIES.

The remedies available to the city to enforce §§ 24.18*et seq.* are in addition to any other remedies available under the city's municipal code or any state statutes or regulations and do not replace or supplant any other remedy but are cumulative.

(Ord. 956, passed 1-4-2005; Am. Ord. 958, passed 3-1-2005; Am. Ord. 961, passed 8-16-2005; Am. Ord. 966, passed 2-7-2006; Am. Ord. 1037, passed 5-19-2015)

THE CITY COUNCIL OF THE CITY OF RED BLUFF DOES ORDAIN AS FOLLOWS:

IN COUNCIL, RED BLUFF, CALIFORNIA, July 5, 2022

RESULT:	**ADOPTED [UNANIMOUS]**
MOVER:	Johnna Jones, Council Member
SECONDER:	Daniele Eyestone, Council Member
AYES:	Deiters, Eyestone, Gonzales, Parker, Jones

Kris Deiters, Mayor

ATTEST:

Anita Rice, Deputy City Clerk

carollo

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