BELLA VISTA WATER DISTRICT
URBAN WATER MANAGEMENT PLAN

APPENDIX P – UWMP SUBMITTAL VERIFICATION

Owen Kubit

From: DO-NOT-REPLY <donotreply@ecointeractive.com>
Sent: Thursday, July 1, 2021 1:49 PM
To: Owen Kubit
Subject: WUEdata - UWMP Submittal Confirmation

This serves as confirmation that the following UWMP was electronically submitted to DWR:

Water Supplier Name: Bella Vista Water District
Submitted by: Owen Kubit
Email Address: okubit@ppeng.com
Submitted Date: 7/1/2021 1:48:43 PM
Confirmation Number: 1801557242

Click the link below to view the submitted plan on WUEdata:

View Submitted UWMP on WUEdata

DWR staff reviews plans in the order they are received. Upon the completion of the review, DWR will send a status letter to the people you listed on the contact sheet. This will contain the results of the review. The DWR reviwer may contact you if they have questions.

If you have any questions or would like to discuss the review of 2020 Urban Water Management Plan, please contact us at (916) 651-0740 or (UWMPHelp@water.ca.gov).
Send a request to UWMPHelp@water.ca.gov if you require an expedited review.

Email auto-generated by WUEdata on 7/1/2021

BELLA VISTA WATER DISTRICT
URBAN WATER MANAGEMENT PLAN

APPENDIX Q – DISTRICT WATER RATES

BELLA VISTA WATER DISTRICT

11368 E. STILLWATER WAY
REDDING, CA 96003
(530) 241-1085 ♦ (530) 241-8354
www.bvwd.org

SCHEDULE OF BIMONTHLY WATER RATES

RESIDENTIAL, RURAL, COMMERCIAL, PUBLIC INSTITUTIONAL AND LANDSCAPE IRRIGATION

Meter Class	Base Rates
20	$43.13
30	$46.22
50	$51.01
100	$59.54
160	$67.05
200	$71.22
300	$79.94
450	$90.39
900	$113.35
1200	$125.20
1500	$135.50
2000	$150.39
2500	$163.37
3300	$181.42
4500	$204.45
6000	$228.88

The commodity rate is $0.64 per HCF (One hundred cubic foot).

Water Treatment Plant Improvement Loan Repayment

$14.00 bimonthly charge for all customers.

Fire Service Rates

Line Size	Base Rate
2	$27.60
3	$37.54
4	$53.00
6	$72.87
8	$91.64
10	$114.83

WATER EQUIVALENTS TABLE

1 Cubic Foot = 7.48 gallons	=	62.4 pounds of water
1 Acre Foot = 43,560 cubic feet	=	325,900 gallons

An acre foot covers (1) acre of land (1) foot deep

1 cubic foot per second (cfs) = 450 gallons per minute or 646,320 gallons per day

For 24 hours = 1.983 acre feet   For 30 days = 59.5 acre feet   For one year = 724 acre feet

PROCEDURE FOR METER READING

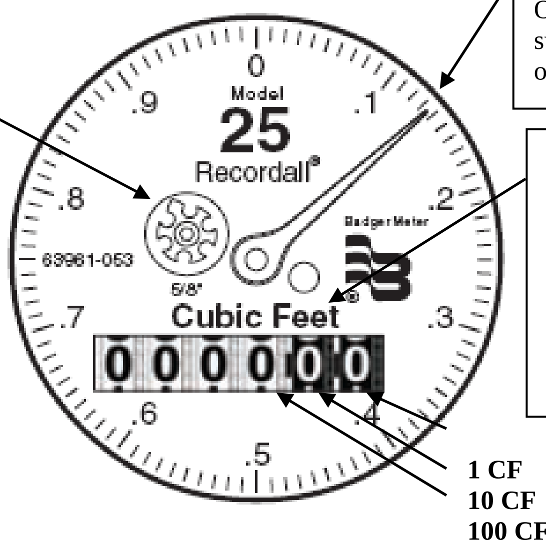
If register lens is dirty, a light wipe with a damp cloth will clear lens for an accurate reading. Always remember to close the register cover after reading meter to avoid exposure to cracking or scratching of lens.

One of the most important factors in a correct reading is to note the proper number of digits. Read the meter register from left to right.

EXAMPLE OF A CUBIC FOOT METER:

Low Flow Indicator, aka Leak Indicator

This small dial will rotate if water is passing through the meter. It is an indication of very small flows that would be visually undetectable on the regular sweep hand. If no one is using water, but the dial is turning, you may have an undiscovered leak in your plumbing system.



Sweep Hand

On This meter, one rotation of the sweep hand is equal to one cubic foot or 7.48 gallons

Cubic Foot Odometer

Usually, the last numbers (in black) on the odometer are non-rotating or printed. For every 100 rotations of the sweep hand, the white digits on the odometer will increase by one to reflect 100 cubic feet of water use (748 gallons)

BILLING: You will be billed for water service bimonthly; thus, the water meter will be read as nearly as possible on the same day every two (2) months. The bills are due and payable on the date of receipt and become delinquent twenty-two (22) days thereafter. Payments can be made to the District office by mail, in person, or online at: www.invoicecloud.com/bvwd. The District is currently using Invoice Cloud which allows for automatic payment deductions and only charges a small service fee of $0.95 if utilizing (e-checks) your checking account or $2.95 if you would like to continue to utilize your credit or debit cards. All fees are charged by Invoice Cloud and you will no longer see an adjustment on your Bella Vista Utility Billing for any charges.

OFFICE HOURS: The district office is open from 8:00 a.m. to 5:00 p.m., Monday through Thursday, and 8:00 a.m. to 4:00 p.m. on Fridays, except holidays. For after-hour emergencies, there is an answering service.

BELLA VISTA WATER DISTRICT

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SCHEDULE OF BIMONTHLY WATER RATES

AGRICULTURAL

Meter Class	Base Rates
50	$70.11
100	$78.66
160	$86.17
200	$90.33
300	$99.04
450	$109.50
900	$132.46
1200	$144.30
1500	$154.60
2000	$169.51
2500	$182.47
3300	$200.52
4500	$223.55
6000	$247.98

The commodity rate is $87.69 per acre-foot ($0.2013 per HCF)

Water Treatment Plant Improvement Loan Repayment

$14.00 bimonthly charge for all customers.

NDU Credit

Agricultural accounts that have no domestic use will receive a $4.00 bimonthly base charge reduction referred to as a NDU credit.

WATER EQUIVALENTS TABLE

1 Cubic Foot = 7.48 gallons = 62.4 pounds of water
1 Acre Foot = 43,560 cubic feet = 325,900 gallons

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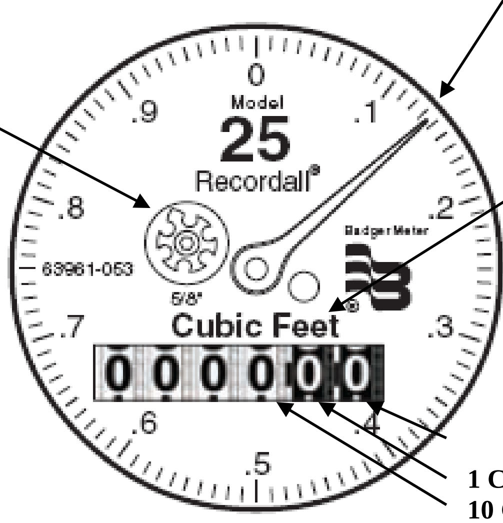

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1 CF
10 CF
100 CF

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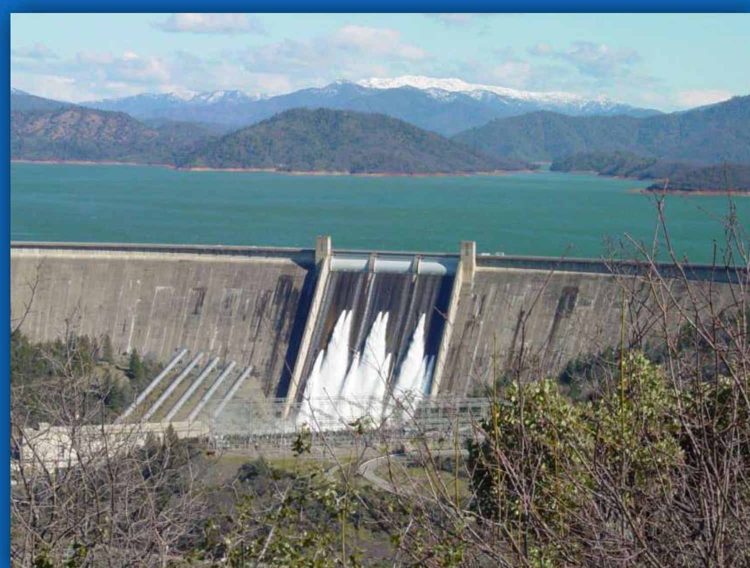
BELLA VISTA WATER DISTRICT
URBAN WATER MANAGEMENT PLAN

APPENDIX R – SEISMIC RISK ASSESSMENT

Shasta County and City of Anderson

Multi-Jurisdictional Hazard Mitigation Plan November 16, 2017



A Hazard Mitigation Plan is a pre-disaster strategic plan to guide how a community will lower its risk and exposure to disasters. Local agencies may receive Federal Emergency Management Agency (FEMA) funds for natural and technological hazards.

Prepared by: Shasta County Department of Public Works
1855 Placer Street
Redding, CA 96001
Phone: (530) 225-5661 Fax: (530)225-5667

4.3.4 Earthquake

4.3.4.1 Hazard Definition

Earthquakes represent the most destructive source of hazards, risk and vulnerability, both in terms of recent state history and the probability of future destruction of greater magnitudes than previously recorded.

California has thousands of recognized faults. Only some are known to be active and pose significant hazards. The motion between the Pacific and North American plates occurs primarily on the faults of the San Andreas system and the eastern California shear zone. Faults are more likely to have future earthquakes on them if they have more rapid rates of movement, have had recent earthquakes along them, experience greater total displacements, and are aligned so that movement can relieve the accumulating tectonic stresses. Geologists classify faults by their relative hazards. Shasta County's earthquake fault zones are shown in Figure 4.3-4.A.

Active faults represent the highest hazards which have ruptured to the ground surface during the Holocene period (about the last 11,000 years). Potentially active faults are those that displaced layers of rock from the Quaternary period (the last 1.8 million years). Nearly all movement between the two plates is on active faults.

There are fault lines located in southern and eastern Shasta County that could produce low to moderate ground shaking (Figure 4.3-4.C). Ground shaking is the principal cause of damage in a seismic event and could catalyze dam failures, landslides and fires. According to the USGS, factors that affect the potential damage of structures and systems as a result of severe ground shaking include epicenter location and depth, the proximity to a fault, the direction of the rupture, the magnitude, the existing soil and geologic conditions and the structure-type. Newer structures are more resistant to ground shaking than older structures because of improved building codes. Manufactured housing is very susceptible to damage because the foundation systems are rarely braced for seismic activity. Lifeline systems such as highways, bridges, water and gas pipelines, railroads, and utility services, can experience substantial damage from ground shaking. Structure damage is considered likely when ground motion average peak acceleration reaches 10 percent and 15 percent of gravity.

According to the California Geological Survey's (CGS) Probabilistic Seismic Hazards Assessment, the area is subject to low and moderate ground shaking and lies within the 10 percent to 30 percent gravity zone (CGS 2003). The region within the boundaries of the County and has not sustained damages attributed to earthquakes, dam failures or landslides as far as records have been maintained and the County has not proclaimed a state of emergency due to earthquakes events.

4.3.4.2 History of Earthquakes

Shasta County has a low level of historic seismic activity. In the past 120 years there has been no significant property damage or loss of life due to earthquakes occurring within or near Shasta County. Maximum recorded intensities have reached MM VII, with possibly one instance of MM VIII. Most of the stronger intensity seismic activity in Shasta County has occurred in the eastern half of the county near Lassen Peak. Redding is located in the less seismically active western half of Shasta County, referred to as an area of moderate seismicity. Earthquake activity has not been a serious hazard in Shasta County's history, nor is it probable that it will become a serious hazard in the future. Research of historical earthquakes indicates that Redding has experienced several moderate sized earthquakes, magnitude 4.0 to 4.5 (estimated) in 1904, 1915, 1919, 1920 and 1930 (See Figure 4.3-4.B).

On November 26, 1998, Shasta County experienced a local magnitude ML 5.2 earthquake that was centered three miles north-northwest of the city of Redding near Keswick Dam. This was the largest recorded earthquake since the USGS began monitoring Shasta County in 1981 and believed to be the largest earthquake in the Redding area since 1878. No structural damage was reported in Redding. Nonstructural damage that was reported consisted of broken merchandise, loss of power due to a damaged electrical panel, a fire sprinkler break in a mechanical room and two operating rooms at Mercy Medical Center, and non-structural cracks at expansion joints in a highway overpass. Outside of the Redding city limits; a four million gallon water tank in Bella Vista lifted about an inch off its foundation, resulting in bent anchor bolt washers; and a PG&E transformer caught fire resulting in temporary power outage for 7,500 customers.

4.3.4.3 Risk Assessment – Vulnerability and Potential Losses

Earthquake vulnerability is primarily based upon population and the built environment. Urban areas in high hazard zones tend to be the most vulnerable, while uninhabited areas generally are less vulnerable.

Ground Shaking

The exposure to strong seismic shaking in Shasta County is considered to be relatively low. The maximum earthquake intensity is expected to be between MM VI & MM VII (see Table 18 below). These ground accelerations correspond to the earthquake that has a 10 percent probability of exceeding in 50 years, or the earthquake that has a return interval of 475 years.

Table 18. Modified Mercalli Intensity and Peak Ground Acceleration (PGA)

The National Earthquake Hazards Reduction Program rates soils from hard to soft, and give the soils ratings from Type A through Type E, with the hardest soils being Type A, and the softest soils rated at Type E. Liquefaction risk is considered high if there were soft soils (Types D or E) present within an active fault zone. The majority of the soils in the County are types A-C, with some areas having type D. No type E soils were identified, nor was consistent mapping of soil types. For these reasons, combined with a lack of liquefaction history, liquefaction was not addressed in a manner separate from earthquake. It should be considered in subsequent updates to the Plan as better data becomes available.

Damage in Shasta County resulting from earthquakes would most likely be from ground shaking, and less likely from related ground failure. The effects of ground shaking are best mitigated by adequate design for the maximum probable earthquake for Shasta County. The effects of ground failure are best mitigated by adequate geotechnical investigations of specific sites. The County enforces the California Building Code, which establishes building requirements for all new structures based on predicted earthquake intensities. The risk of loss of life and property damage due to seismic activity is assumed to be minimized if the California Building Code is enforced.

Instrumental Intensity	Acceleration (g)	Velocity (cm/s)	Perceived Shaking	Potential Damage
I	< 0.0017	< 0.1	Not felt	None
II-III	0.0017 - 0.014	0.1 - 1.1	Weak	None
IV	0.014 - 0.039	1.1 - 3.4	Light	None
V	0.039 - 0.092	3.4 - 8.1	Moderate	Very light
VI	0.092 - 0.18	8.1 - 16	Strong	Light
VII	0.18 - 0.34	16 - 31	Very strong	Moderate
VIII	0.34 - 0.65	31 - 60	Severe	Moderate to heavy
IX	0.65 - 1.24	60 - 116	Violent	Heavy
X+	> 1.24	> 116	Extreme	Very heavy

The City of Redding has run earthquake scenarios based on expected PGA of 18 percent over the entire county. Building Damage Ratios were estimated at six percent for older structures located in the immediate downtown area of Redding, and three percent for all other areas within the Redding city limits. The Building Damage Ratio represents an estimate of the ratio, as a percentage, of the repair cost divided by the replacement cost. The higher damage ratio in the downtown area was chosen since these structures are typically older and less likely to have been constructed with any seismic code design provisions (i.e. pre seismic code buildings). The total damage was estimated at $198 million for Redding as a whole, which is less than one percent of the damage estimates from the 1994 Northridge earthquake.

Unlike other hazards discussed in this section, where census, building and critical facilities data were extracted from the HAZUS-MH model for spatial analysis for exposure and/or loss based on other GIS layers, for earthquake, the model was used to evaluate vulnerability for specific events in Shasta County. How the model was used is discussed in more detail in the subsections below.

Critical facilities and the amount of damage they would be expected to receive in the modeled events are addressed in the tables that follow. Residential and commercial buildings were not inventoried in terms of aggregate exposure as the unpredictable nature of this hazard would arguably put all structures in Shasta County at some risk. How vulnerable a particular building is to a particular event includes many variables, including construction type, date of construction, etc.

The **HAZUS software model**, which was developed for FEMA by the National Institute of Building Sciences as a tool to determine earthquake loss estimates, was used for this assessment. This software program integrates with GIS to facilitate the manipulation of data on building stock, population and the regional economy with hazard models. The scenarios used in the earthquake hazard assessment were a 500- and 2000- year return period USGS probabilistic hazards. The analysis was limited to damage caused by ground-shaking. In addition, a default soil map was used to simplify the modeling process, in absence of better soils data. Anticipated losses were modeled. Loss is that portion of the exposure that is expected to be lost to a hazard, and is estimated by referencing frequency and severity of previous hazards. Hazard risk assessment methodologies embedded in HAZUS, FEMA's loss estimation software, were applied to earthquake hazards in Shasta County.

The software contains economic and structural data on infrastructure and critical facilities, including replacement value costs with 2002 square footage and valuation parameters to use in loss estimation assumptions. This approach provides estimates for the potential impact by using a common, systematic framework for evaluation. The HAZUS risk assessment methodology is parametric, in that distinct hazard and inventory parameters (e.g. ground shaking and building types) were modeled to determine the impact (damages and losses) on the built environment. The model was used to estimate losses from earthquake hazards to critical facilities, infrastructure and residential and commercial properties, as well as economic losses on two return period events (500 year and 2000 year). Loss estimates used available data, and the methodologies applied resulted in an approximation of risk. These estimates should be used to understand relative risk from hazards and potential losses. Uncertainties are inherent in any loss estimation methodology, arising in part from incomplete scientific knowledge concerning natural hazards and their effects on the built environment. Uncertainties also result from approximations and simplifications that are necessary for a comprehensive analysis (such as incomplete inventories, demographics, or economic parameters).

Loss estimates are presented for (1) the residential and commercial occupancies, and (2) the critical infrastructure at risk (schools, hospitals, airports, bridges, and other facilities of critical nature). In addition, potential shelter needs and casualties were estimated. Table 19 provides breakdowns of potential losses due to a 100-year earthquake event for residential and commercial properties.

Detailed results of the 500-year and 100-year earthquake hazards are located in Appendix 4.B.

Table 19. Expected Building Damage by Occupancy										
	None		Slight		Moderate		Extensive		Complete	
	Count	(%)	Count	(%)	Count	(%)	Count	(%)	Count	(%)
Agriculture	237	0.40	33	0.44	19	0.75	4	1.31	0	2.17
Commercial	2,658	4.46	409	5.52	235	9.29	45	15.21	3	25.12
Education	106	0.18	12	0.16	7	0.27	1	0.41	0	0.75
Government	143	0.24	21	0.28	12	0.49	2	0.62	0	1.39
Industrial	771	1.29	129	1.74	82	3.25	17	5.83	1	8.45
Other Residential	13,015	21.82	2,392	32.25	1,390	54.89	170	57.83	6	59.96
Religion	205	0.34	28	0.38	15	0.61	2	0.78	0	1.72
Single Family	42,507	71.27	4,393	59.23	771	30.47	53	18.01	0	0.44
Total	**59,642**		**7,417**		**2,531**		**294**		**10**	

ShakeCast. In conjunction with the USGS, the State of California's Department of Transportation (Caltrans) recently announced its launch of ShakeCast V3, which will bolster its statewide response to an earthquake. Because the health of bridges and other infrastructure is critical to emergency response, ShakeCast V3 will allow Caltrans to identify and address earthquake damages with unprecedented speed and efficiency.

ShakeCast V3 is an application that uses earthquake-shaking data and analyzes that data against performance characteristics for bridges and other structures. It uses a suite of powerful tools to alert first responders to the location and probable severity of impacts during a seismic event, including email alerts, an interactive website and analysis results, all of which are delivered to first responders within minutes of a seismic event.

V3 nearly doubled the list of existing bridges in the analysis database, adding 13,082 local bridges to the existing 13,157 state-owned bridges in the system. This means that all 26,239 bridges in the state of California are now monitored by ShakeCast. Caltrans now has the capability to alert, or make the assessment data available, to local agencies of possible seismic impacts to those critical structures. V3 also added to the database nearly 400 Caltrans building sites, all of which have their unique characteristics modeled into it so ShakeCast can assess the likelihood of adverse seismic affects to Caltrans facilities.

Moving forward, Caltrans is taking the lead to bring together state departments of transportation nationwide with Shakecast through a transportation pooled fund study. This effort will enable departments of transportation to achieve an advanced level of earthquake response, while raising situational awareness and coordination for earthquakes that cross state borders.

4.3.4.4 Current Earthquake Hazard Mitigation Efforts

Fires Following Earthquake

While ground shaking may be the predominant agent of damage in most earthquakes, fires following earthquakes can also lead to catastrophic damage depending on the combination of building characteristics and density, meteorological conditions, and other factors. Fire department response is often impacted by impaired communications as well as water supply and transportation together with other emergency demands such as structural collapses, hazardous materials releases and emergency medical aid.

Fires following earthquakes may result from multiple causes (e.g., overturned burning candles, electrical sparking from downed power lines and broken natural gas pipelines). Numerous instances of serious fires following earthquakes have occurred in major urban areas. Fires following earthquakes can occur immediately after an earthquake or may be delayed. Causes of fires occurring immediately after include: power lines are fused or broken and the resulting arcing comes into contact with combustible fuel; water heaters, stoves, and lighting fixtures/lamps are dislodged and come into contact with combustible fuel; natural gas mains, lines and service are severed and the released gas finds a source of ignition; combustible liquids can leak and find a source of ignition.

Mitigation of Fires Following Earthquakes

A general framework for fire mitigation includes the following components provided in advance of an earthquake disaster:

- Reduction in damage through advance planning and preparation.
- Presence of functioning automatic sprinklers or other suppression systems.
- Citizens able to extinguish the fire if water is available or to call the fire department.
- Functioning communications (telephone) required to contact fire departments.
- Available fire department personnel and their assets (apparatus).
- Functioning transportation networks (roads).
- Adequate water supply.
- Advance provision of firebreaks via the urban planning process.

In addition, mitigation for the prevention of natural gas system leakage has included localized upgrading of natural gas pipelines and automatic seismic shut-off switches which cut off natural gas to customers. It is critical that restoration of gas service following an earthquake be coordinated through the local gas utility and the fire department to ensure that service is not restored until leak detection and minimum safety requirements are met on the distribution side of the gas meter. Restoration of gas and electrical services for areas known or suspected to have sustained damage may not be restored until the utilities and the fire department are prepared to have service restored.

An additional mitigation technique is the use of seismic pressure wave-triggered automatic garage door openers and alarms at fire stations. These devices help ensure that firefighters and fire equipment are not trapped in damaged fire stations following earthquakes.

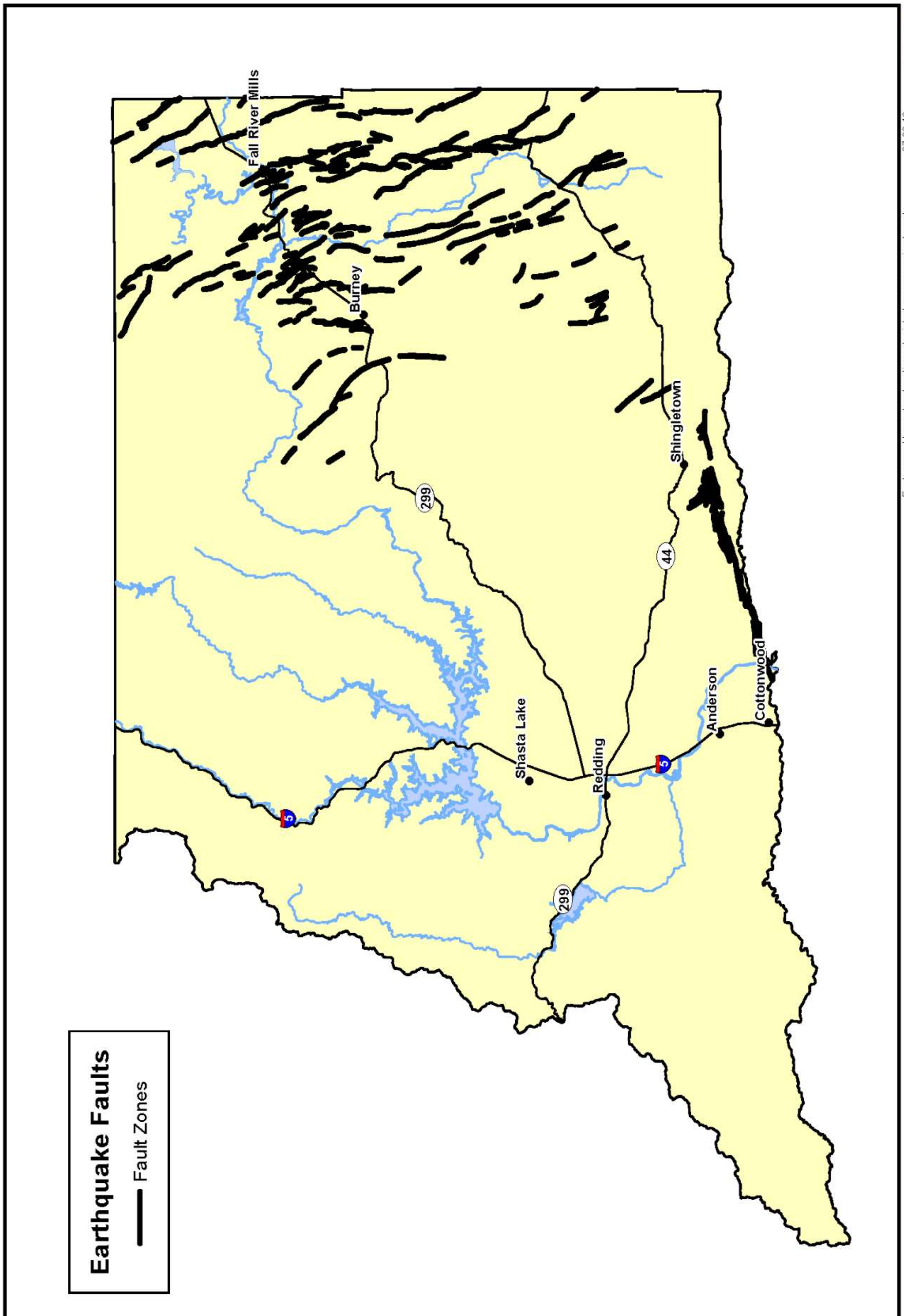


Figure 4.3-4.A
Shasta County Earthquake Faults

0 10 Miles

Feature and boundary locations depicted are approximate only.

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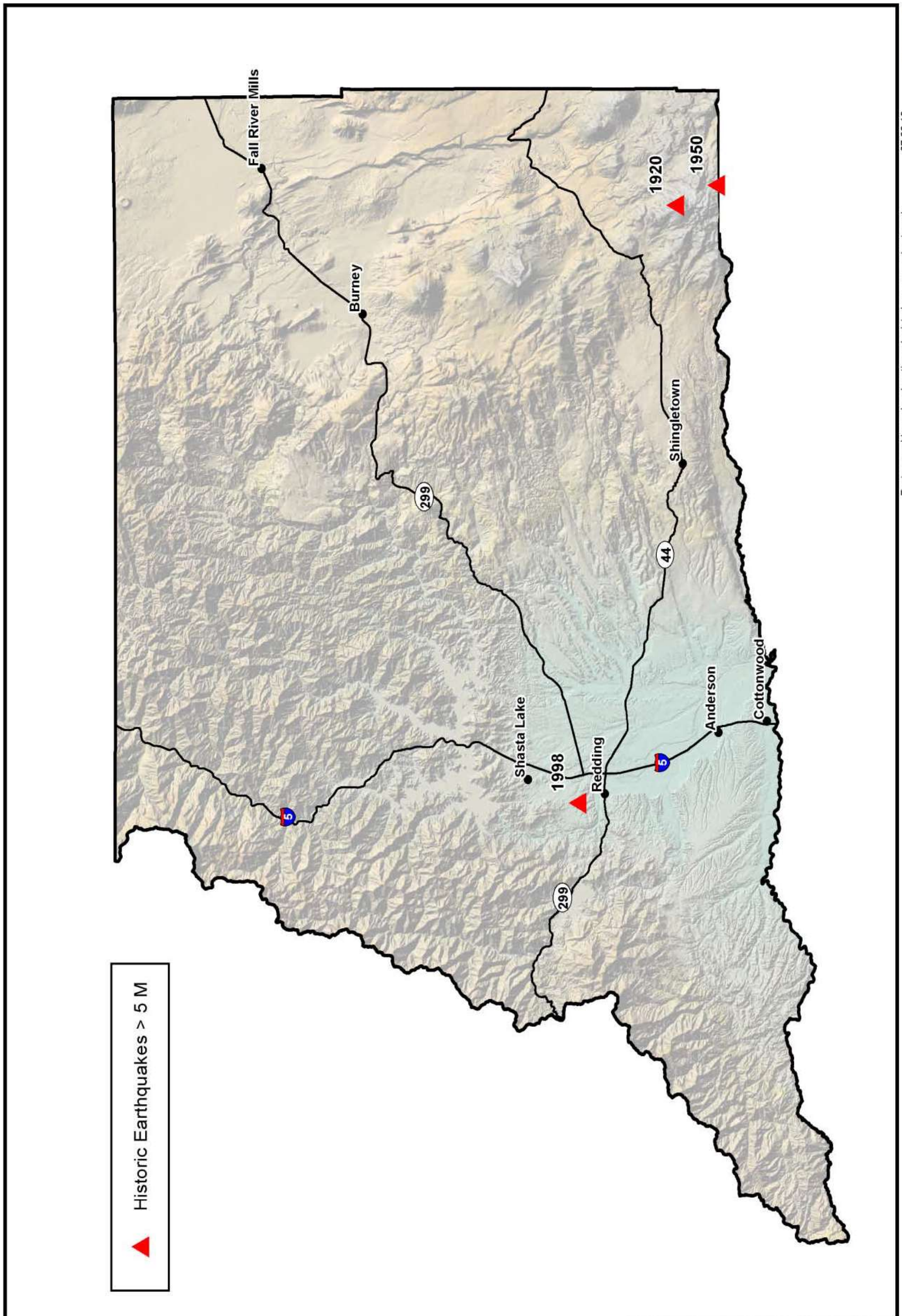

Feature and boundary locations depicted are approximate only.

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Figure 4.3-4.B
Historic Shasta County Earthquakes

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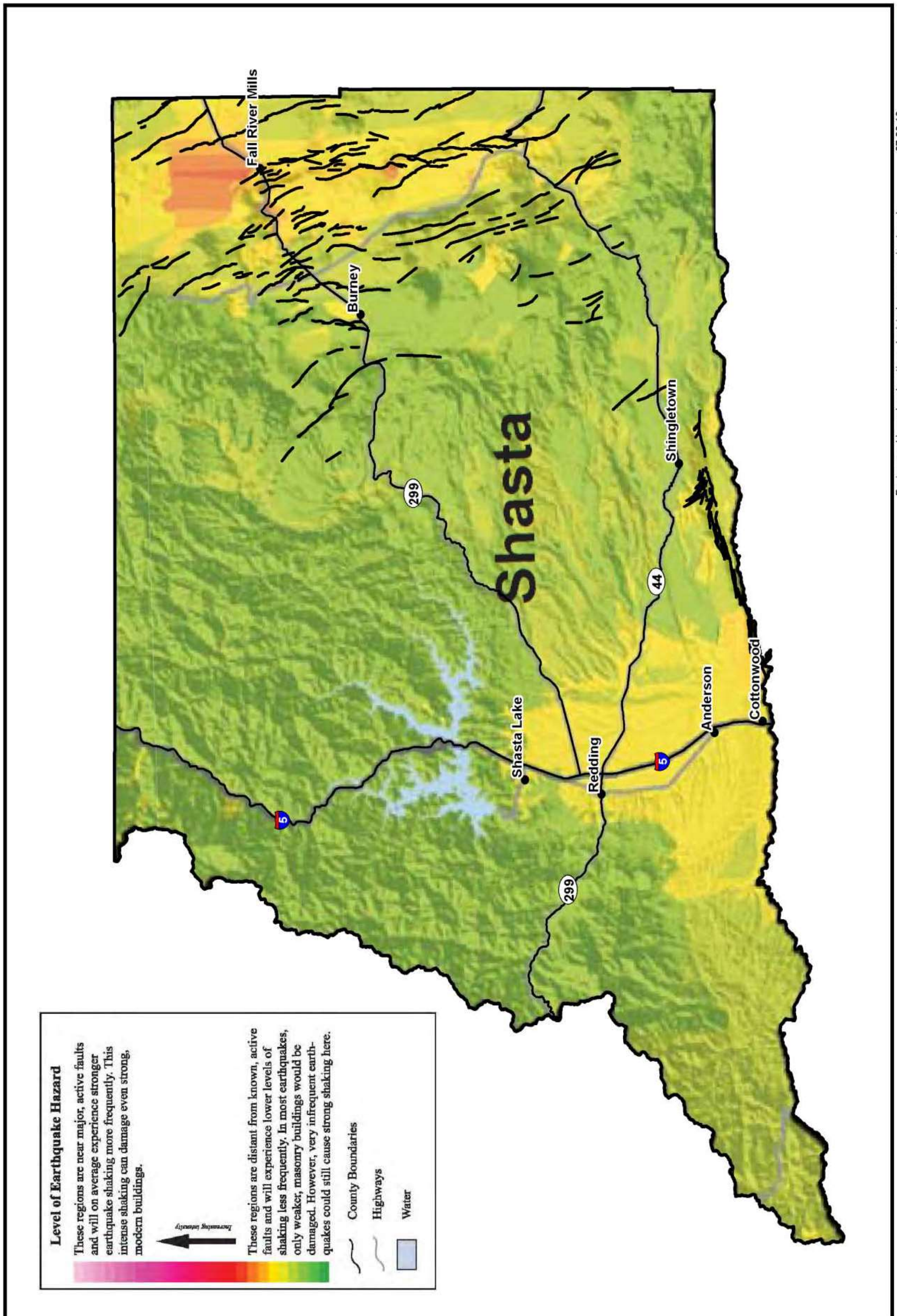

Feature and boundary locations depicted are approximate only.

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Figure 4.3-4.C
Earthquake Ground Shaking Potential