

10. SAFETY

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A. INTRODUCTION

This section identifies potential hazards in the City of Clearlake (City), including risks of injury, death, and property damage resulting from both naturally occurring and man-made hazards. Addressing the potential threats to human and environmental safety provides a starting point for recommending corrective or preventative actions that will minimize public exposure to harm. As stated in California Government Code Section 65302, the Safety Element shall address seismic, geologic, fire, and flood hazards, and should address hazards relevant to the local area, such as hazardous material, citywide emergencies and crime rates.

The Safety Element identifies locations inappropriate for certain land uses due to the presence of hazards that would deteriorate human or environmental health. Although a number of safety issues in the City are addressed in different chapters of the General Plan, this chapter focuses on the risks and hazards as required or recommended in the OPR guidelines, while remaining consistent with city documents and state law.

This chapter covers:

- Fire Hazards
- Flood Hazards
- Seismic & Geologic Hazards
- Volcanic Hazards
- Hazardous Materials
- Citywide Emergencies
- Crime

B. EXISTING CONDITIONS

Clearlake is bounded by Clear Lake to the west, Cache Creek to the south, and is enclosed by foothills to the north and east. The City is primarily exposed to hazards from fire and flooding. Clearlake is surrounded by rural and undeveloped foothills that are designated as moderate to very high fire severity zones. Heavy precipitation could cause flooding along streambeds and the Lake. The area is also vulnerable to seismic activity and the associated secondary impacts of shaking. There are no mapped active faults running through the City; however, smaller faults are directly west of Clearlake and the more distant Rodgers Creek, Hayward, and San Andreas faults could all produce large enough earthquakes to impact the City. Volcanic activity, hazardous materials, and crime are the remaining potential safety concerns. Acknowledgement of both natural and manmade hazardous conditions within the City can encourage consideration of deleterious impacts when planning for future development and can provide information for the development of mitigation measures designed to minimize the adverse effects of a hazard.

1. Fire

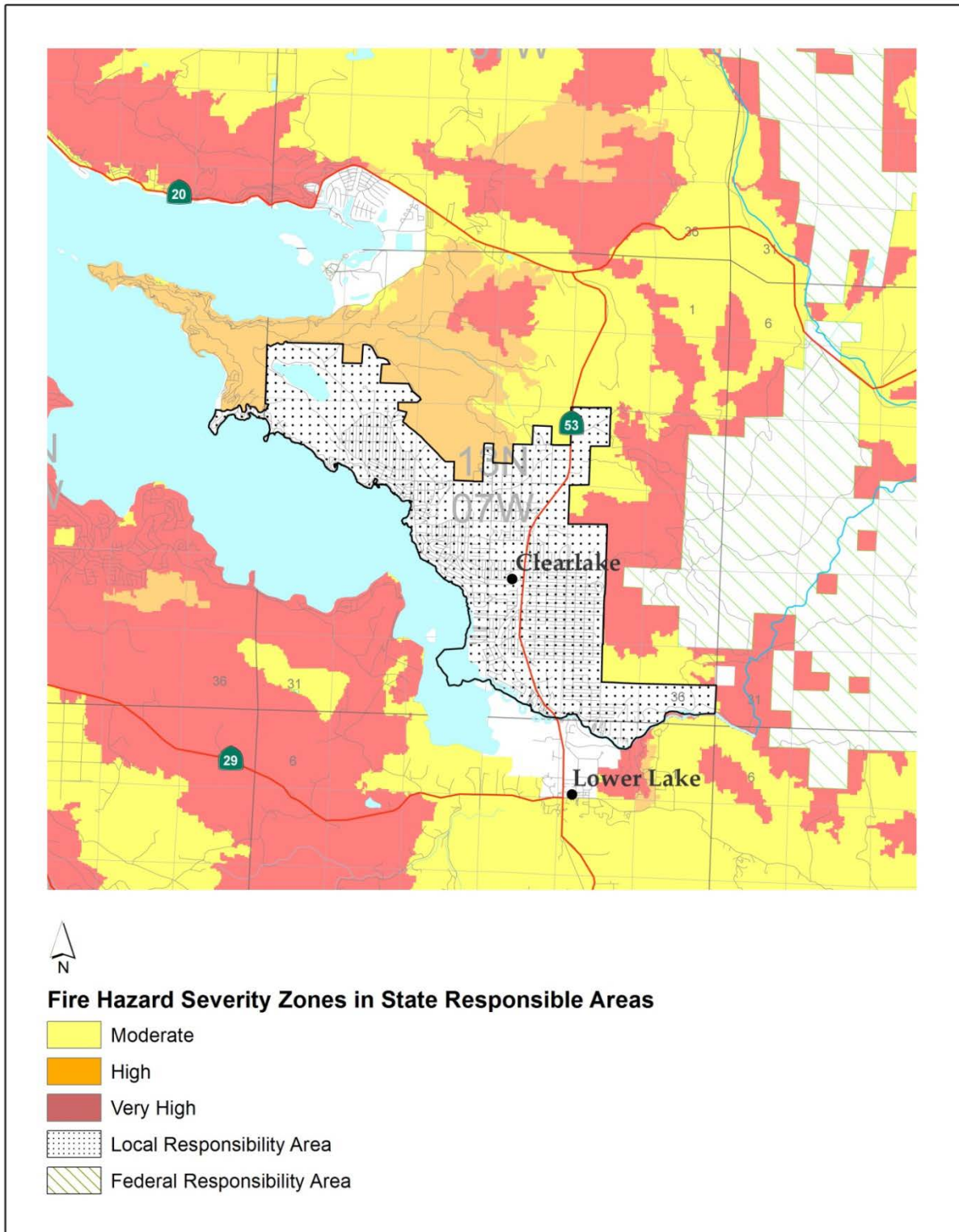
Fire is one of Clearlake's greatest safety hazards. The California Department of Forestry and Fire Protection (Cal Fire) has mapped areas at risk of fires in the eastern hills surrounding Clearlake as shown in Figure 10.1. Cal Fire has also designated the majority of land within City limits east of SR 53 as a very high fire hazard zone, Cal Fire's highest fire hazard designation as shown in Figure 10.2. The periphery of Clearlake is a wild land urban interface (WUI) area where structures are at significant risk of fire exposure. Poor road conditions and inadequate water suppression infrastructure can limit the ability of fire crews from successfully fighting fires. An abundance of dead vegetation on the property paired with construction using non-fire-resistant building materials can also increase the potential for structural losses in fires. A number of environmental variables influence home and business exposure to wildfires. Extended periods of hot and dry weather combined with wind are often key variables determining the duration and severity of fires. Climate models predict the fire risk in the County to increase slightly by 2050, with a much greater fire risk possible by 2085 as shown in Figure 10.3.

2. Flood

Various factors and environmental conditions contribute to flood hazards in the City. Heavy precipitation and inadequacy of existing infrastructure to accommodate the flow of water may lead to inundation. Additionally, log-jams and excess debris can block creek flow during storms and can cause micro-flooding in areas with excessive storm water runoff. Improper maintenance or design of levees and dams may lead to a mechanical failure that will result in flooding.

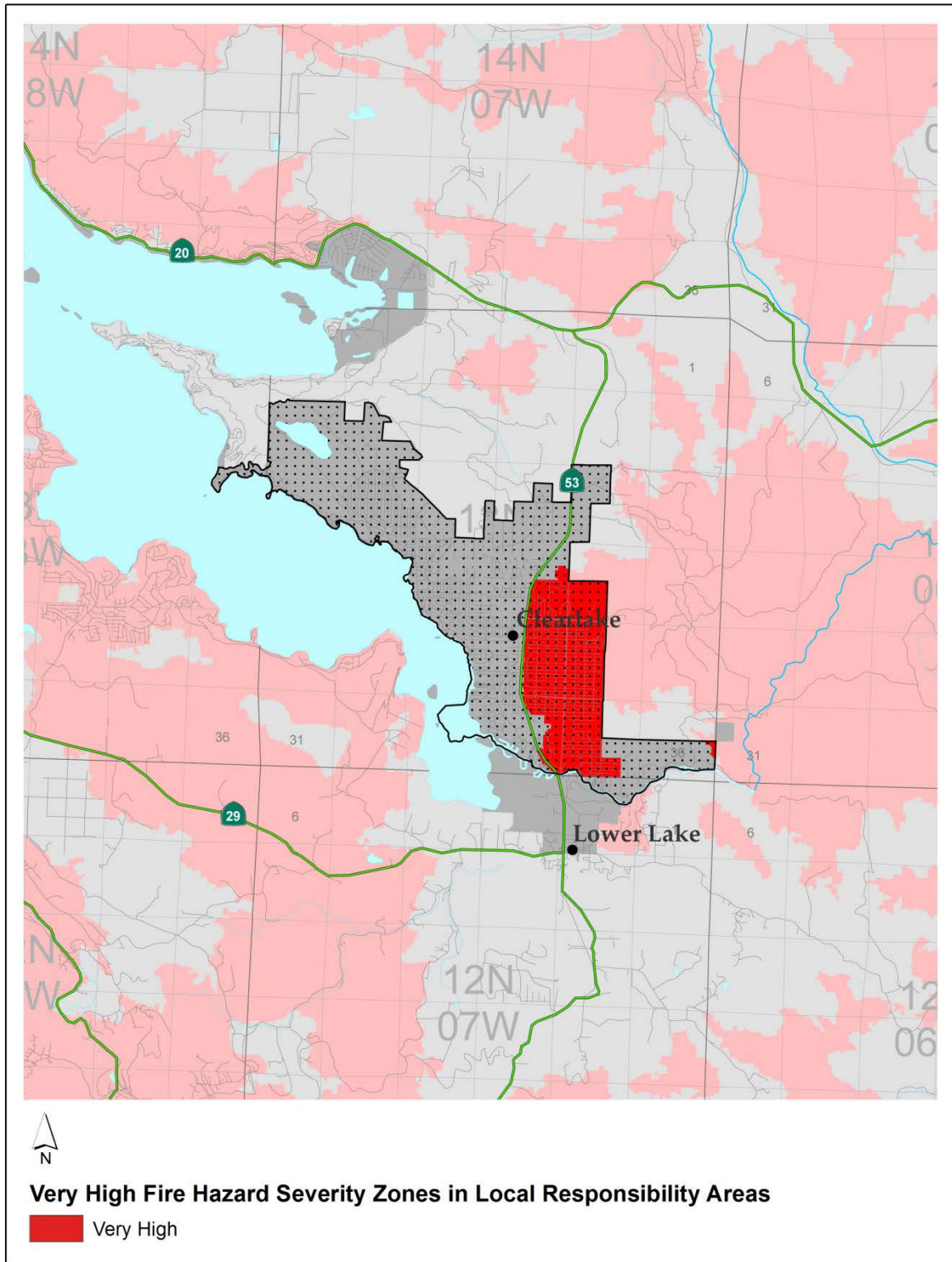
In general, highest flood risks exist in locations adjacent to streams, creeks, tributaries, and waterways. Figure 10.4 shows that Clearlake has a number of permanent and seasonal creeks which flow into and out of Clear Lake. The largest is Cache Creek, which is the only river that flows out of Clear Lake. When the outflow of Cache Creek is less than all the drainage flow into

Figure 10.1 Unincorporated Fire Hazard Risk Zones



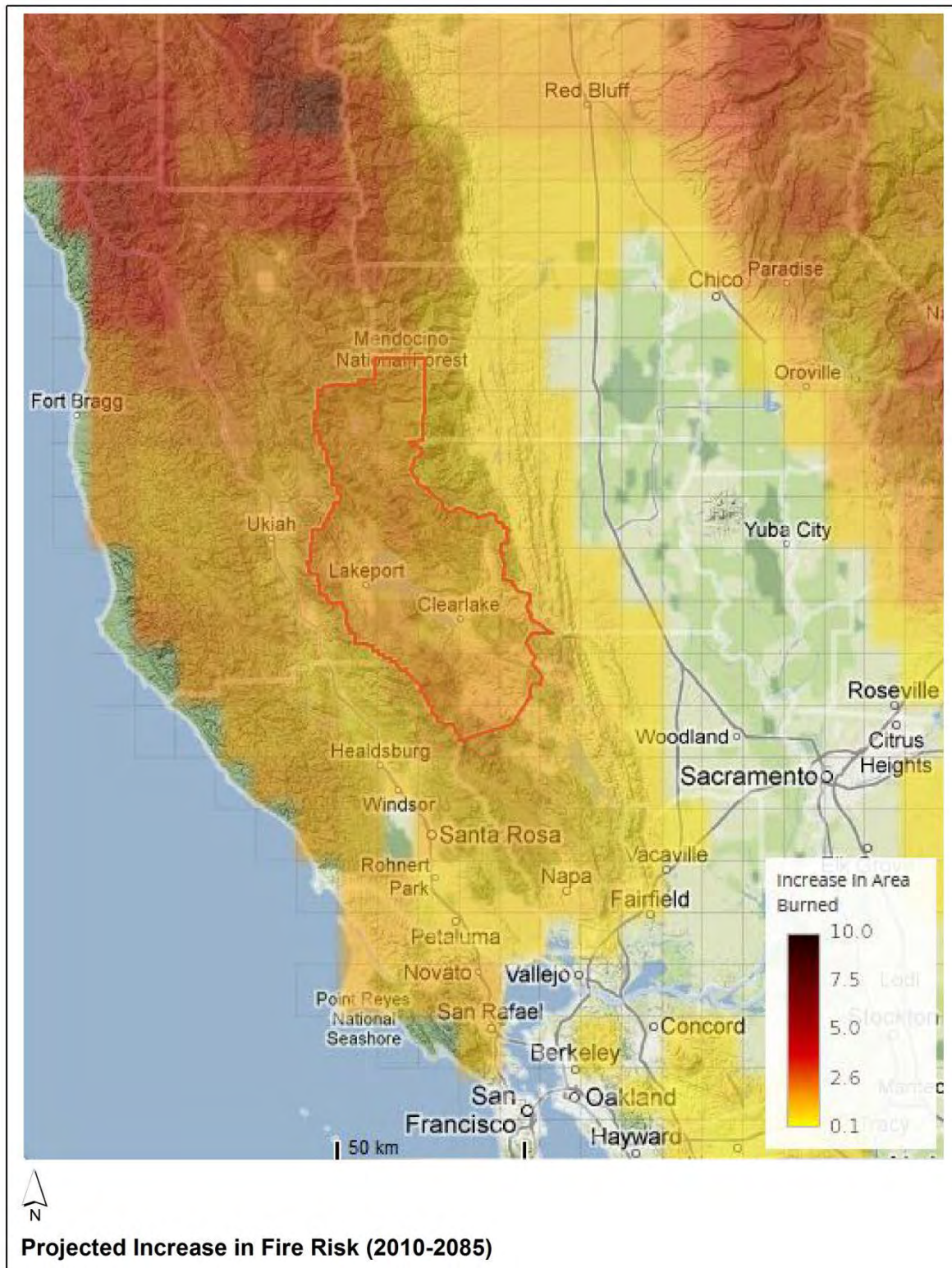
California Department of Forestry and Fire Protection, 2012

Figure 10.2 Clearlake Very High Fire Risk Zones



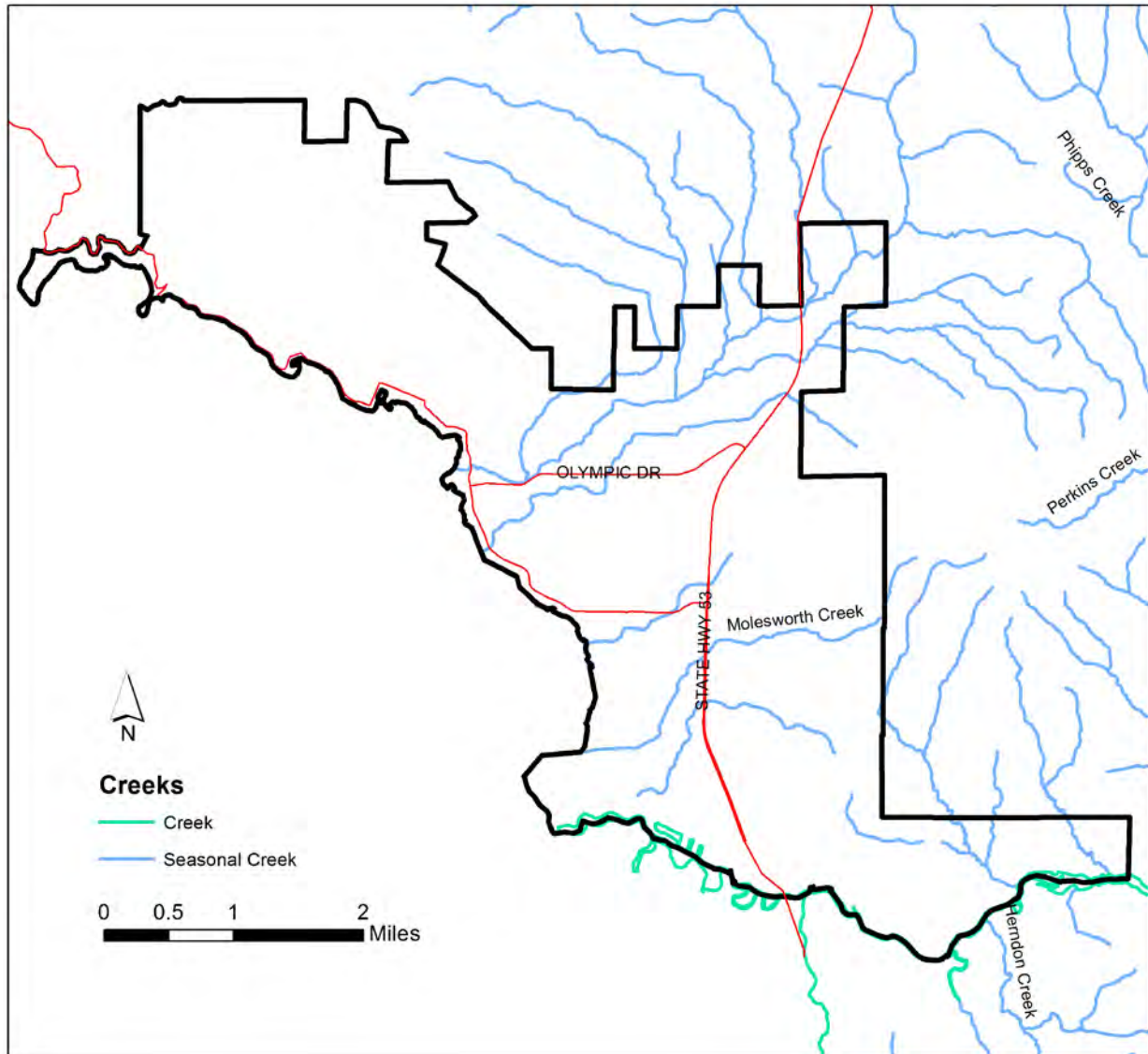
California Department of Forestry and Fire Protection, 2012

Figure 10.3 Climate Change Fire Impact



California Energy Commission, 2011

Figure 10.4 Rivers



County of Lake, 2012

Clear Lake, it has the potential to flood. Due to its large size, the Lake is only at risk of flooding during prolonged storms. “Contrary to popular belief, the Clear Lake Dam [on Cache Creek] does not cause Clear Lake to flood. The dam can actually release water much faster than Cache Creek can flow. It is the narrow, shallow Cache Creek channel that slows the release of water from Clear Lake during a flood” (County of Lake, 2010). The Lake has flooded in 1983, 1986, 1995, and 1998, with floodwaters often lasting for weeks (Siemer, 2009).

Areas located in Special Flood Hazard Zones established by the Federal Emergency Management Agency (FEMA) have a 1 percent chance of flooding each year. Flood Insurance Rate Maps issued by FEMA show areas in the City that are subject to flood risks. Figure 10.5

shows the 100-year flood zones in Clearlake. Cities can reduce exposure to flood hazards and minimize impacts by distancing any new development from flood zones or by requiring mitigation through development standards and flood control engineering.

Dam Failure

Dam failure presents a small risk of potential flooding in Clearlake. An earthen dam above Pond Road offers the only inundation within Clearlake. The expected flooding has no impact on structures or infrastructure. Structural failure in the Indian Valley Reservoir, a reservoir ten miles to the northeast, would not lead contents to drain towards Clearlake but could cause significant damage to Highway 20. Yolo County Flood Control & Water Conservation District controls both the Cache Creek Dam and Indian Valley Dam. Proper engineering and maintenance of dams can reduce the possibility of failure resulting from ground shaking. Although dams are continually maintained, potential dam failure inundation zones are shown in Figure 10.5.

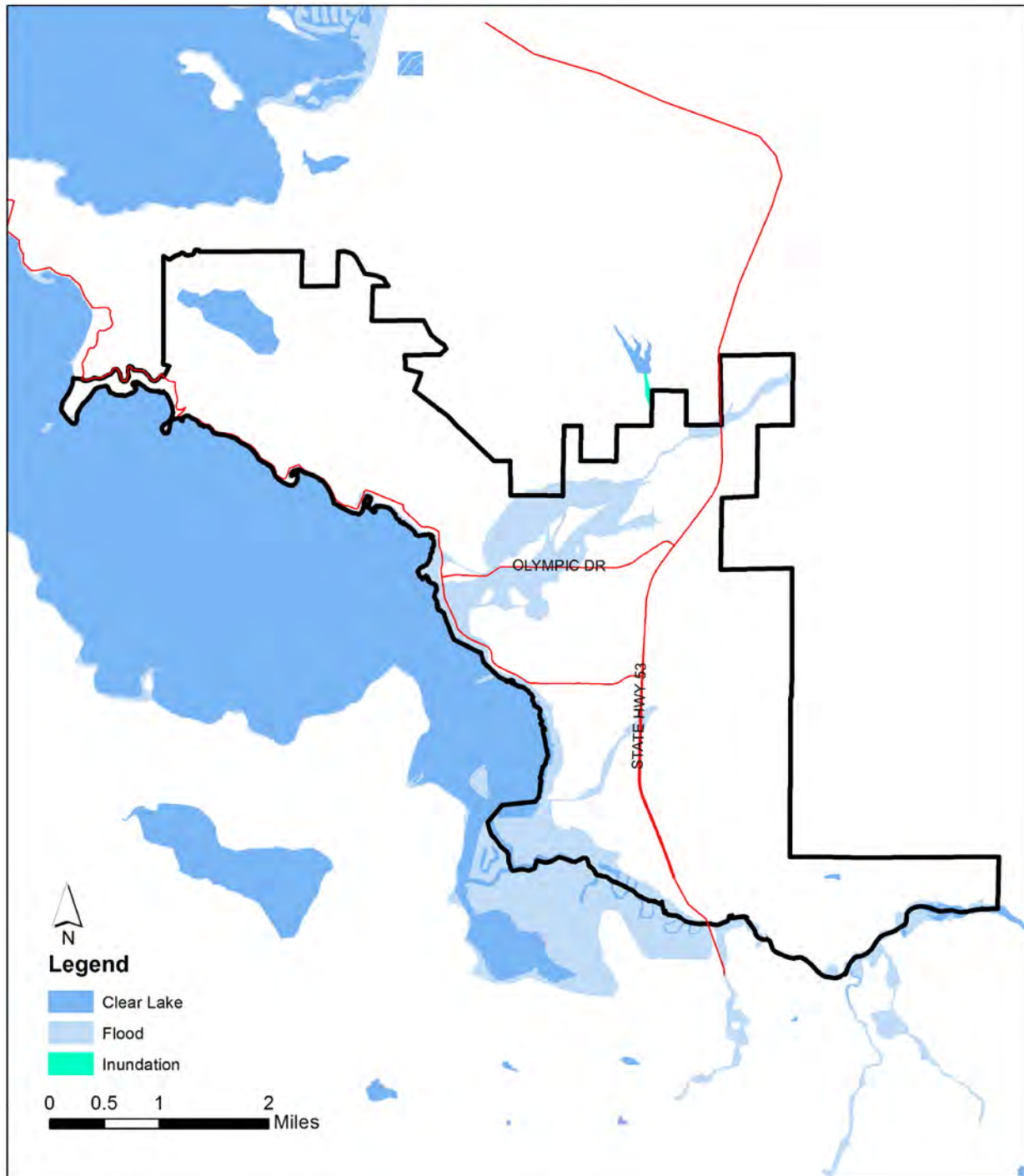
Seiche

A seiche is the equivalent of a tsunami on a lake, which could occur in Clearlake following an earthquake either near or far from the City. The level of inundation from a potential Clearlake seiche has not been studied. Should a seiche occur, inundation in low-lying areas around the lake will experience fast moving water. As a precaution during an earthquake, residents should wait for shaking to stop, and then proceed to higher ground if they are near the Lake.

Regulatory Framework

The policies and regulations that protect the Clearlake ecosystem and people from flood hazards are directed by FEMA, the U.S. Army Corp of Engineers, cities, counties, and flood control districts. The Flood Insurance Map Act of 1968 created the National Flood Insurance Program, which established the use of flood zones known as Special Flood Hazard Areas. These flood hazard zones, published in Flood Insurance Rate Maps by FEMA, restrict development in areas with a 1 percent or greater chance of annual flooding, also known as the 100-year flood plain. Restricting development in these areas reduces the need for large, publicly funded flood control infrastructure.

Figure 10.5 FEMA Flood Map and Dam Inundation



County of Lake, 2012

3. Seismic/Geologic

Within a seismically active area, earthquakes pose hazards to development. Earthquakes occur when a slip in the fault releases built up energy. Energy travels in waves through the earth's crust and causes ground shaking. Secondary hazards resulting from seismic activity include ground rupture along the fault, liquefaction of soils, settlement from sinking soils, and seismically induced landslides. The geologic conditions along streambeds and the lake suggest these areas are most likely to be affected by liquefaction and settlement.

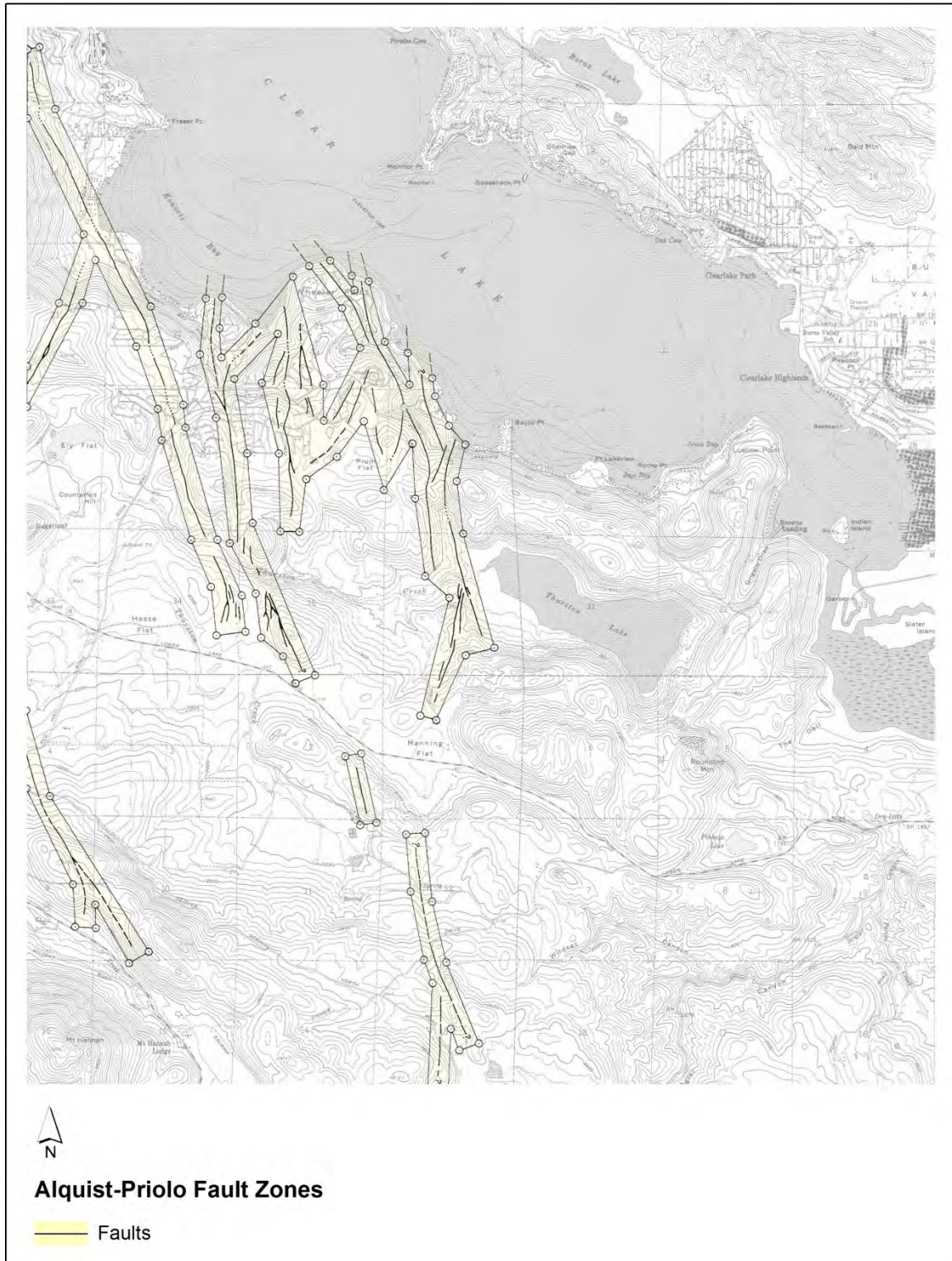
In comparison to many other regions of California, Clearlake does not have as high of a seismic hazard threat. Clearlake can be affected by earthquakes in two potential scenarios. The first is in a nearby earthquake. Directly west of Clearlake are a number of potentially active faults. Figure 10.6 shows that the Collayomi (<130,000 years), Big Valley (<150 years), and Konocti Bay (<15,000 years) faults are all within 15 miles of the City. The second scenario is caused by an earthquake on a larger fault, upwards of 100 miles away. Figure 10.7 graphically shows the faults nearest Clearlake that present the greatest risk. A smaller earthquake near Clearlake would cause more damage compared to a larger earthquake further away, on the San Andreas or Rogers Creek faults. While seismologists have advanced the knowledge within the field greatly, there is still considerable uncertainty about both the size and frequency with which faults will rupture. Therefore, calculations of seismic probability are used to predict the risk. Within the next 30 years, there is a 40 percent chance that Clearlake will be within 50 kilometers of a magnitude six earthquake (see Figure 10.8).

Figure 10.9 shows the regional probabilistic seismic hazard. Clearlake is between two active seismic corridors. There is a 10 percent chance that Clearlake will experience ground shaking equivalent to 0.3g sometime in the next 50 years. In this scenario; structures, people, and everything else on the ground will experience horizontal forces from side to side at a strength equivalent to 30 percent the force of gravity. The 10 percent in 50-year probability simply means that, on average, Clearlake will experience this level of shaking every 500 years. It is worth noting, however, that there is large uncertainty, and that the force could be much greater or smaller, and occurs more or less frequently. Understanding the geological conditions of the City, the various hazards associated with seismic activity, potential damage of seismic activity due to location, and the likelihood of seismic risks in areas helps inform preventative measures.

Expansive Soils

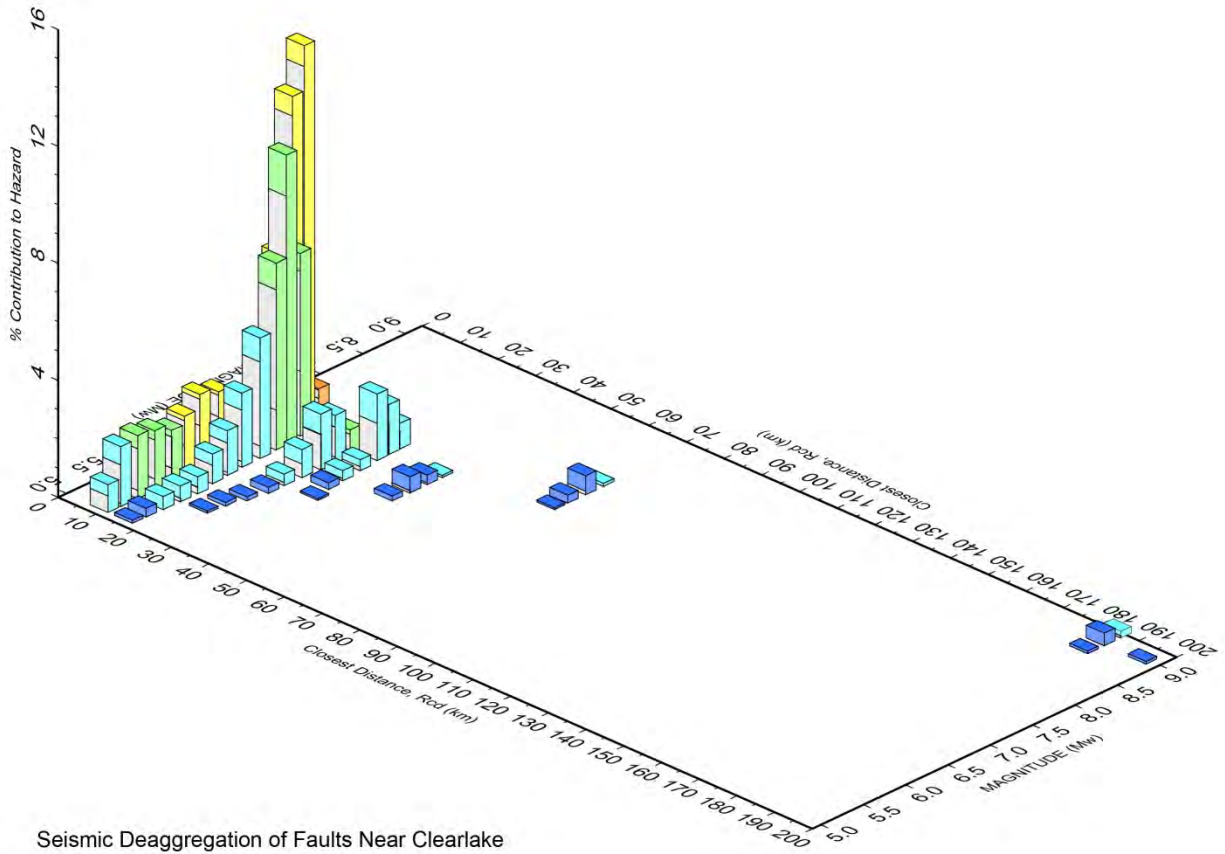
The swelling and shrinking qualities of adobe clay soils pose problems for development in the City. Clay minerals swell when moisture level increases. When moisture levels decrease and the ground dries, the adobe content in the soil causes the soil to crack. Movement and cracking of soils creates unstable foundations for development. Chapter 7, Conservation discusses the variety of soils in Clearlake.

Figure 10.6 Alquist-Priolo Fault Zones



California Geologic Survey, 2010

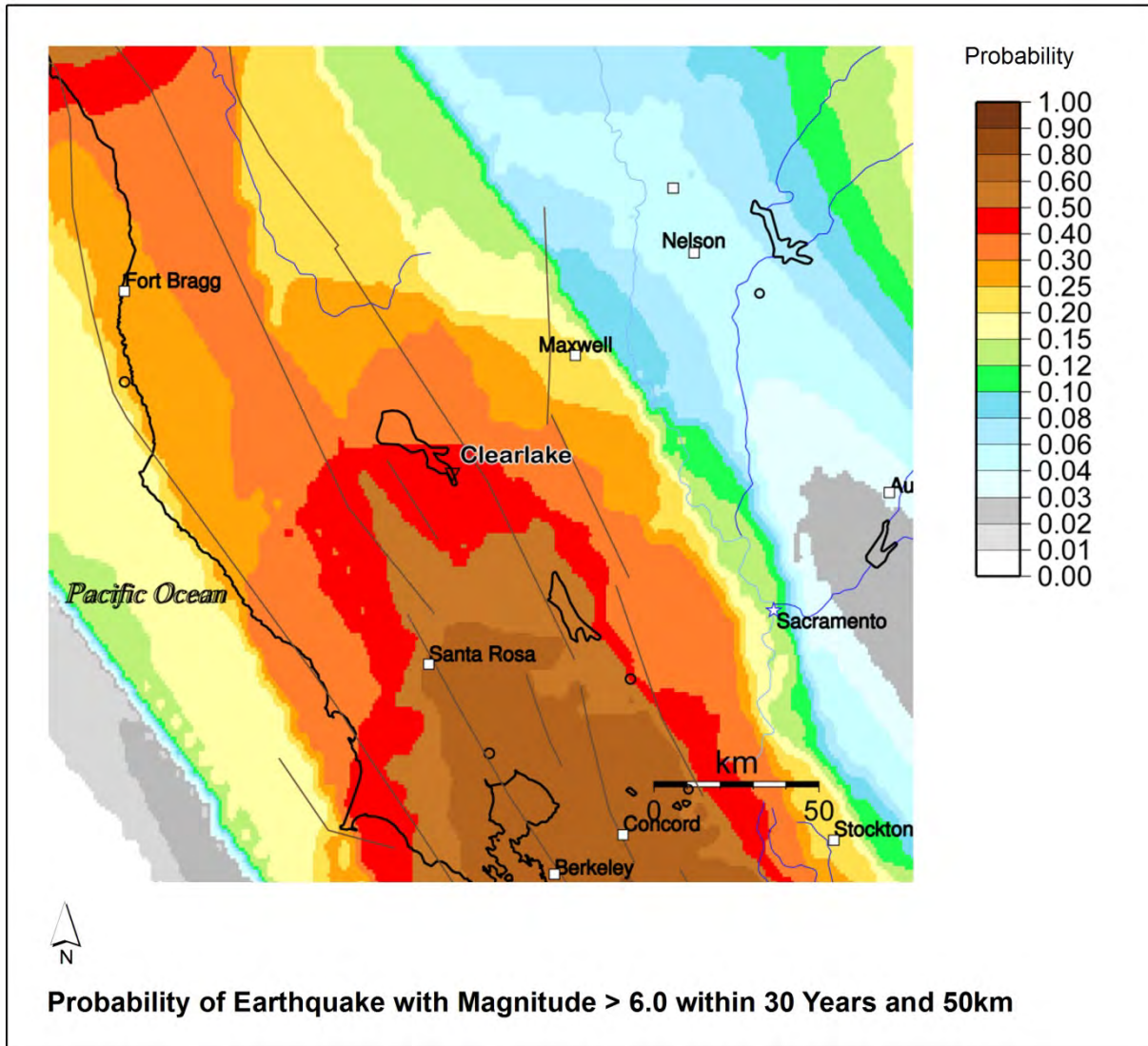
Figure 10.7 Deaggregated Seismic Hazard



United States Geologic Survey, 2008

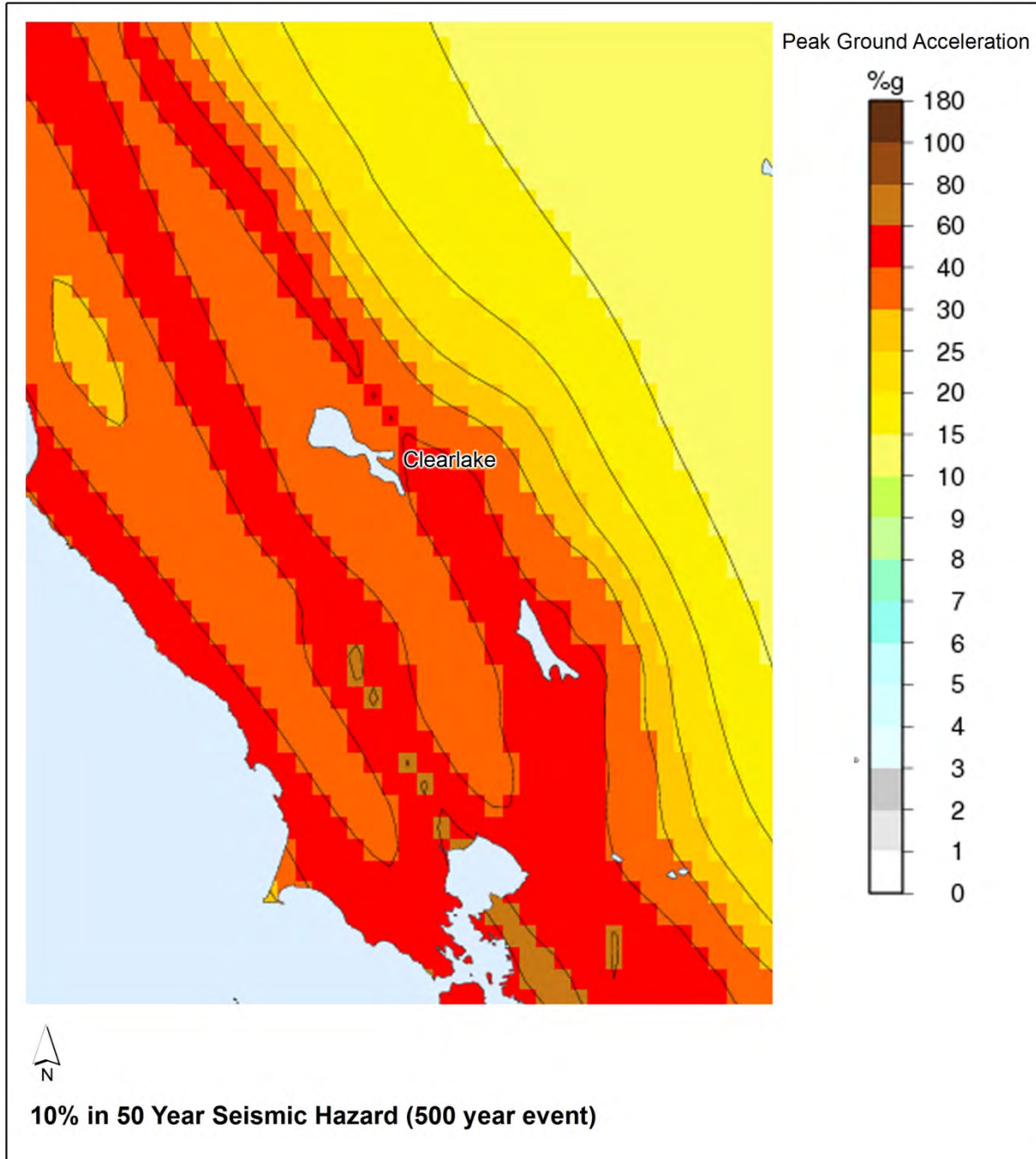
The graphic above is a disaggregation of the seismic hazard. The graph combines the distance of faults from Clearlake with their potential magnitudes and relates them to determine which faults are of most concern for Clearlake. Above the faults between 10km and 30km of Clearlake represent nearly 99% of the hazard.

Figure 10.8 Seismic Hazard Probability



United States Geologic Survey, 2009

Figure 10.9 Seismic Hazard Accelerations



United States Geologic Survey, 2008

Ground Shaking

Four major factors influence the degree of ground shaking; the release of energy at its source, the distance that energy travels, bedrock type and geometry, and soil properties. Figure 10.9 shows the intensity of ground shaking as percent (g). The maps are probabilistic and general. In a future earthquake, there will be pockets of more or less intense shaking caused by the factors described above. The structural construction type also influences the degree of damage caused by earthquakes. The California Seismic Safety Commission has designated unreinforced masonry (URM) structures as especially vulnerable to collapse in an earthquake. In 2006, Clearlake had five unreinforced masonry (URM) structures, one of which is historic. As of 2006 none have been seismically retrofitted (Seismic Safety Commission, 2006).

Ground Rupture

Ground rupture occurs along active faults. There are no known active faults through Clearlake. The faults west of the City shown on Figure 10.6 could cause ground rupture outside the city limits of Clearlake.

Landslide

The USGS and California Geological Survey (CGS) have not yet developed detailed landslide maps for the County. Landslides can be expected in areas with steep slopes and weak soils. Based only on slopes, the most susceptible landslide area is around Borax Lake. The foothills on the eastern side of the City along with other steeper slopes within the City may also be susceptible to landslides. Landslides can be induced by sustained rainfall as well as earthquake shaking.

Regulatory Framework

The Seismic Hazard Mapping Act of 1990 (Public Resource Code, Chapter 7.8, Section 2690-2699.6) requires identification and mitigation of seismic hazards to reduce the risk of property damage and loss of life. The California Geological Survey, under the California Department of Conservation, maps areas at risk of amplified shaking, liquefaction, and earthquake-induced landslides. Cities and counties are directed to reference the seismic hazard maps in the planning and permitting process. Development permits are withheld until a geologic investigation of soil conditions is reported and any necessary mitigation measures are included in the projected plan.

The Alquist-Priolo Earthquake Fault Zoning Act (Public Resource Code 2621), passed in 1972, identifies active faults and prohibits construction on fault lines. Earthquake Fault Zones are established around surface traces of active faults that have the potential for surface rupture. A geologic report may be required before an undeveloped parcel is subdivided or a structure is placed on the site. A project proposed within an Earthquake Fault Zone requires further geologic investigation (Seismic Safety Commission, 2003). Structures for human occupation, such as homes, offices, hospitals, and public buildings, cannot be placed on an active fault and typically must be buffered at least 50 feet from the fault. If a property exists in a fault zone, the owner must disclose its location to the buyer at the time of the transaction. The State Board of

Mines and Geology sets the policies and land uses for development in Alquist-Priolo Zones, but local jurisdictions regulate projects in the zones.

Unreinforced Masonry Law (Public Resources Code 8875), passed in 1986, requires jurisdictions in Zone 4, the zone of highest seismicity identified in the Uniform Building Code, to create an inventory of unreinforced masonry buildings and establish programs to reduce risks associated with these buildings

4. Volcanic and Geysers

Clearlake is less than ten miles from Mt. Konocti, a dormant Volcano northwest of the City. There is a low probability of an eruption in the County; however, if the volcano were to erupt the consequences would be severe. The USGS is unable to provide eruption predictions, as the region's activity has been irregular in the past. An eruption would likely take place under Clear Lake, or northeast of the Lake. A future eruption would likely be signaled by heightened earthquake activity. Ash-fall and wave hazards would be the two largest hazards for Clearlake residents in the event of a volcanic eruption (United States Geologic Survey, 2012).

5. Hazardous Materials

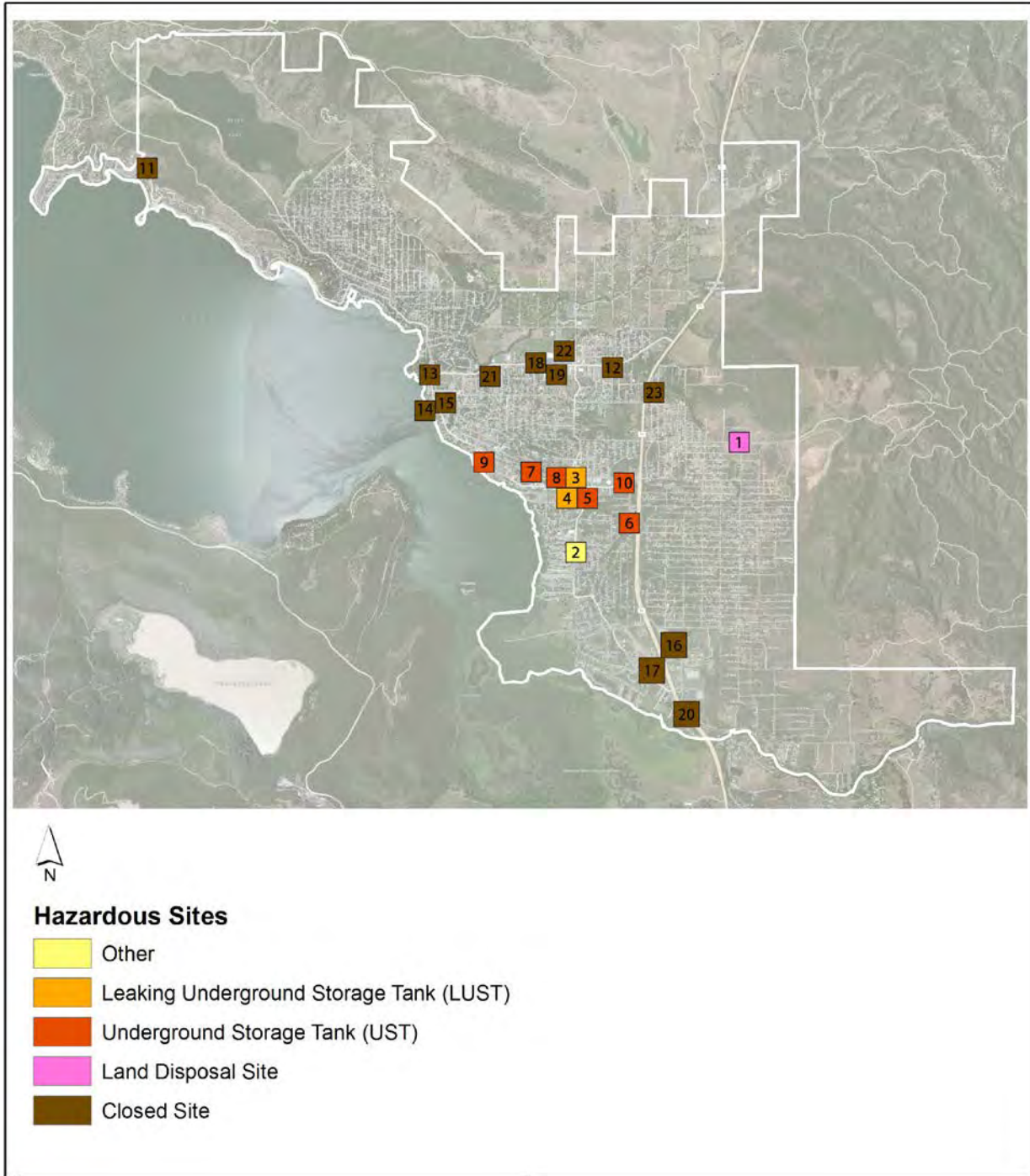
The California Department of Toxic Substances Control (DTSC) maintains a Hazardous Waste and Substance Sites List. Table 10.1 and Figure 10.10 show the past and current sites within Clearlake. There are 23 sites in Clearlake but only 4 are currently monitored or undergoing remediation. The hazards of the other sites have been successfully mitigated or now have uses permitted.

The greatest hazardous material threat in Clearlake is the Sulphur Bank Mercury Mine Site, located just north of the City (Environmental Protection Agency, 2012). The site was mined from 1865-1957. The soils at the mine property and adjacent property are contaminated with high levels of mercury and arsenic. Surface water and groundwater that discharge from the site contain high levels of mercury and arsenic and contaminate the natural wetlands and sediments of Clear Lake. One of the major health threats associated with the site is human exposure to levels of mercury that are in excess of the federally recommended limit for human consumption by eating fish from Clear Lake. In addition, people who come into direct contact with contaminated soils, surface water, and sediments may incidentally ingest mercury and arsenic at levels that may cause adverse health effects. Contaminants that leach into the nearby wetland expose biota to harmful discharges of mercury and arsenic.

Regulatory Framework

The California OPR General Plan Guidelines do not outline specific recommendations, policies, or hazard reduction measures in regards to hazardous materials. The State Health and Safety Code establishes the regulatory framework for hazardous material storage. Hazardous materials are defined by Title 22 of the California Code of Regulations and are governed by the

Figure 10.10 Hazardous Materials



Water Resources Control Board, 2012

Table 10.1 Hazardous Materials Sites in Clearlake

#	Site Name	Address	Status	Category
1	Eastlake Landfill	16015 Davis Avenue	Open	Disposal Site
2	Redwood Oil Company (Former)	5200 Old Highway 53	Open	Other
3	Beacon #3693 (Former)	15010 Lakeshore Dr	Open	LUST
4	Dale's Shell & Automotive	15021 Lakeshore Dr	Open	LUST
5	Mobile #234	15010 Lakeshore Drive	Permitted	UST
6	SBC Pacific Bell #Tdv66	2510 Old State Hwy 53	Permitted	UST
7	SBC Pacific Bell #Tdo58	14892 Palmer Ave	Permitted	UST
8	Nott's Liquor	14772 Lakeshore	Permitted	UST
9	Time To Shop	14091 Lakeshore Dr	Permitted	UST
10	Price Rite	15413 Lakeshore Dr	Permitted	UST
11	Beacon Station #36963	Lakeshore Drive	Closed	Other
12	The Village Store	15265 Old Hwy 53	Closed	LUST
13	Tru-Lube (Austin's Resort)	14067 Lakeshore Dr	Closed	LUST
14	Food & Liquor #177 (Former)	14091 Lakeshore Dr	Closed	LUST
15	Clearlake Union 76	14090 Lakeshore Dr	Closed	LUST
16	Konocti School Bus Yard	Center Dr S	Closed	LUST
17	Former Pearce Aero	7140 Old Hwy 53	Closed	LUST
18	Peavey Rentals (Former)	14765 Olympic Dr	Closed	LUST
19	Lakeshore Fire Department	14815 Olympic Dr	Closed	LUST
20	Shaw's Shady Acres	7805 Hwy 53	Closed	LUST
21	Sheriff's Substation	7000 Hwy 53	Closed	LUST
22	Chandler's Truck & Van Wash	14800 Olympic Dr	Closed	LUST
23	Burns Valley Elem. School	3620 Pine Street	Closed	LUST

State Water Resources Control Board, 2012
Notes: LUST – Leaking Underground Storage Tank, UST – Underground Storage Tank

Federal Hazardous Materials Transportation Act (42 USC Section 1801 et seq.) and the Resource Conservation and Recovery Act (42 USC Sections 6901 et seq.).

The transportation, storage and disposal of hazardous materials are subject to a variety of Federal, State and local regulations. The Federal Hazardous Materials Transportation Act (49 USC Section 1801 et seq.) aims to ensure the safe transport of hazardous materials via water, rail, highway, air or pipeline transport. Subtitle C addresses hazardous waste generation, storage, treatment, and disposal. Subtitle I requires monitoring and containment systems for underground storage tanks that hold hazardous materials.

The State Health and Safety Code (Chapter 6.5), regulates the transport, treatment, and disposal of hazardous wastes. Chapters 6.67 and 6.75, respectively, deal with above ground and underground petroleum storage tanks, while Chapter 6.7 regulates underground storage of other hazardous substances. The Department of Toxic Substances Control issues policies and regulations concerning hazardous materials (State Water Resources Control Board, 2012).

6. City Emergency

The Lake County Board of Supervisors approved the Natural Hazard Mitigation Plan on August 22, 2006 by Resolution 2006-148. The plan was approved by FEMA-US Department of Homeland Security on September 21, 2006. Because the City does not have a separate mitigation plan, it follows the direction of the Lake County Natural Hazard Mitigation Plan. The purpose of this document is to ensure an effective allocation of resources in the event of a natural or manmade disaster. A second goal is to utilize these resources to protect the people and property as much as possible.

According to the Lake County Natural Hazard Mitigation Plan, the Lake County Office of Emergency Services is deemed the responsible organizing entity. Emergency planning shall be in coordination with the Lake County Emergency Operations Plan. Coordination between county and surrounding city governments is vital to expedite the activities in the occurrence of an emergency.

The County is in the process of developing a toolkit to aid in emergency preparedness. The Community Assessment for Public Health Emergency Preparedness will evaluate the neighborhoods based on certain parameters.

7. Crime

Crime is identified as a top priority in Clearlake. There are 21 sworn staff members on the police force in 2012. This number includes the Chief, Lieutenant, Detective Sergeant, four patrol Sergeants, two full time detectives, part time investigators, and patrol staff. The national average for police coverage is 3.42 officers per 1,000 residents. Clearlake employs 1.36 officers per 1,000 residents, well below the national average. There were 1.29 police for every 1,000 residents in the City as of 2011.

In 2011, crime in Clearlake was up 1.2 percent, with a large number of these cases being violent crimes (as defined by the Federal Bureau of Investigation as murder, non-negligent manslaughter, forcible rape, robbery, or aggravated assault). In particular, aggravated assault cases have more than doubled since 2010. Tables 10.2 through table 10.4 present historical crime statistics on Clearlake. There has been a significant increase in violent crimes while property crime levels have remained close to constant. Table 10.5 shows that law enforcement personnel fluctuated with a downward trend in officer employment between 2005 and 2011.

Table 10.2 Violent Crime Statistics: City of Clearlake, CA

Year	Murder & Non-negligent Manslaughter	Forcible Rape	Robbery	Aggravated Assault	Violent Crime Subtotal
2004	0	4	11	65	80
2005	0	0	5	47	52
2006	0	4	7	61	75
2007	2	9	7	49	67
2008	2	14	17	48	81
2009	2	13	21	42	78
2010	0	9	20	44	73
2011	2	14	21	106	143

Federal Bureau of Investigation, Crime Statistics, Table 8, 2011

Table 10.3 Property Crime Statistics: City of Clearlake, CA

Year	Burglary	Larceny-Theft	Motor Vehicle Theft	Arson	Property Crime Subtotal
2004	198	557	117	1	872
2005	159	305	60	12	524
2006	162	267	78	8	507
2007	211	345	98	7	654
2008	181	269	82	11	532
2009	166	307	84	4	557
2010	188	310	86	2	584
2011	251	367	81	15	699

Federal Bureau of Investigation, Crime Statistics, Table 8, 2011

Table 10.4 Total Crime Statistics: City of Clearlake, CA

Year	Population	Violent Crime Subtotal	Property Crime Subtotal	Total Crime
2004	14,389	80	872	952
2005	14,609	52	524	576
2006	14,861	75	507	582
2007	15,133	67	654	721
2008	15,117	81	532	613
2009	15,261	78	557	635
2010	15,352	73	584	657
2011	15,429	143	699	842

Federal Bureau of Investigation, Crime Statistics, Table 8, 2012

Year	Population	Total Law Enforcement Employees	Total Officers	Total Civilians	Officers per 1,000 residents
2005	14,609	33	25	8	1.71
2006	14,861	29	24	5	1.61
2007	15,133	31	22	9	1.45
2008	15,117	29	20	9	1.32
2009	15,261	30	22	8	1.44
2010	15,352	27	18	9	1.17
2011	15,429	28	20	8	1.29

Source: Federal Bureau of Investigation, Police Employee Data, Table 78, 2012

C. EMERGING DIRECTIONS

Community input received through a series of public meetings, along with public data and collaboration with police and fire staff, helped capture the main safety concerns and emerging directions for the City of Clearlake. The production, selling, and use of drugs along with insufficient police resources to deal with these issues was the most discussed safety concern in the community meetings. Animal control and code enforcement were also discussed as primary issues. It is important to note that a number of people listed the safe and neighborly feel as one of Clearlake's top traits that should be cherished and maintained, while also improving current conditions.

These issues were reiterated and further discussed in the second meeting when residents were asked to provide more insight on safety concerns. During a prioritization exercise, community members were asked to discuss areas where they felt safe and those where they felt unsafe. It was stated that Austin Park and areas surrounding Olympic Drive were the safest areas within the City, and the area surrounding the Walmart shopping center and scattered neighborhoods throughout the City were unsafe and needed to be considered when updating the Safety Element. A few key themes should be addressed in the updated Safety Element

- Drug use, violence and animal control
- Flood, fire and other natural hazards
- Neighborhood safety mitigation

D. REFERENCES

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