CITY OF TULELAKE
SAFETY ELEMENT

OCTOBER 21, 2025

CITY OF TULELAKE
591 MAIN STREET
TULELAKE, CA 96134

Figures*

* The maps included herein are provided for information purposes only and are subject to change. Lines, roads, topography, and other planimetric features shown on the maps are compiled from different sources and may not be current or reliable. The City of Tulelake assumes no liability for the accuracy of the data shown on the maps.

7.1 INTRODUCTION

The purpose of the Safety Element is to promote public safety and the protection of residents and property in the City through identification of natural and human-derived hazards with the potential to impact Tulelake, by incorporating identified hazard and risk considerations into the land use planning process, and through the inclusion of strategies to mitigate such hazards to the extent feasible.

7.2 STATUTORY REQUIREMENTS

California Government Code Section 65302(g) requires that each city and county develop a Safety Element, "… for the protection of the community from any unreasonable risks associated with the effects of seismically induced surface rupture, ground shaking, ground failure, tsunami, seiche, and dam failure; slope instability leading to mudslides and landslides; subsidence; liquefaction; other seismic hazards … and other geologic hazards known to the legislative body; flooding; and wildland and urban fires." The Safety Element must also identify residential developments in hazard areas lacking sufficient emergency egress; include mapping of known fire, flood, and seismic and other geologic hazards; and address evacuation routes, military installations, water supply requirements, and minimum road widths and clearances around structures as they relate to fire and geologic hazards.[1] Climate change impacts and adaptation strategies must be addressed in the Safety Element or through adoption of a Local Hazard Mitigation Plan or other document that includes this information.

7.3 EMERGENCY SERVICES

7.3.1 Law Enforcement

Police protection services are provided by the City of Tulelake Police Department. The Police Department is centrally located at 470 C Street. Dispatch services are provided under contract by the Siskiyou County Sheriff's Office (SCSO). In 2025, the Police Department consists of the Chief and two sworn officers. Other assignments within the Department include D.A.R.E, field training, Narcotics Task Force, and animal control. In addition to providing for law enforcement in the City, the Police Department maintains mutual aid agreements with the Siskiyou County Sheriff's Office, California Highway Patrol (CHP), and the City of Malin, Oregon Police Department. CHP provides law enforcement along State Route 139 (SR 139).

7.3.2 Fire Protection

Fire protection services for the City of Tulelake and surrounding area are provided under contract by the Tulelake Fire Protection District, an independent volunteer fire department with a service area of approximately 120 square miles. The Fire Protection District maintains two stations, one in Siskiyou County and a second in Modoc County. The District's primary station is located at 1 Ray Oehlerich Way in Tulelake. In 2025, the Fire Protection District has 25 volunteer firefighters, two paid staff, and one auxiliary staff for a total of 25 personnel. The District maintains automatic and mutual aid agreements with adjoining jurisdictions, including the Modoc National Forest, Lava Beds National Monument, and fire protection agencies in Klamath County, Oregon.

[1] The nearest military installation is approximately 17 miles northwest of the City of Tulelake. The City is not affected by operations at, or associated with, the installation, including aircraft training routes or special use airspace. Consequently, the Safety Element does not discuss hazards relative to these types of facilities.

The Fire Suppression Rating Schedule (FSRS) is a scoring system used by the Insurance Services Office (ISO) to rank a community's fire protection capabilities on a scale of 1 to 10. A high score of 1 is awarded to communities with superior fire protection capabilities and a classification of 10 is assigned to communities with fire protection capabilities that do not meet minimum criteria for ISO recognition. At the time of the most recent ISO rating in 2023, the Tulelake Fire Protection District received a Public Protection Classification (PPC) score of 5/5Y. Split ratings are used to differentiate between properties within five road miles of a fire station and within 1,000 feet of a water supply and properties that are within five road miles of a fire station but more than 1,000 feet from a water supply.

7.3.3 Medical Services

The nearest hospital to the City of Tulelake is the Sky Lakes Medical Center, located approximately 33 road miles northwest of the City in Klamath Falls, Oregon. Sky Lakes Medical Center is a community-owned medical center that provides a variety of healthcare services, including emergent, medical, surgical, and ancillary services, such as laboratory and imaging. The 176-bed hospital includes a 23-bed emergency department, a Level III Trauma Center, and a FAA LID: 9OR3 Heliport on its campus. Medical air transport is provided by AirLink Critical Care Transport, which maintains fixed-wing aircraft and a helicopter at the nearby Crater Lake-Klamath Regional Airport. Located further away (87 road miles) to the southwest in Mt. Shasta is Dignity Health's Mercy Medical Center (MMC), a 25-bed hospital offering similar healthcare services as Sky Lakes Medical Center as well as its own Level III Trauma Center. Patients brought to MMC requiring a Level II Trauma Center are taken by air ambulance to Dignity Health's MMC in Redding. Medical air transport is provided by REACH Air Medical Services and PHI Air Medical, both of which operate air ambulances out of the Redding Municipal Airport. Depending upon the type of care needed, there are additional hospitals in Ashland, Medford, and Redding. The Basin Volunteer Ambulance Service provides advanced life support and emergency medical transport services in Tulelake and the surrounding area.

7.3.4 Disaster Management

The Siskiyou County Office of Emergency Services (OES), located in the City of Yreka, is the primary disaster management agency for Siskiyou County. Siskiyou County OES coordinates with local, state, and federal agencies to prepare for, respond to, and recover from emergencies and disasters. This includes helping communities like Tulelake develop the resources to mitigate risks, such as emergency preparedness plans, and supporting training for first responders.

Through the Ready Siskiyou program, Siskiyou County OES makes resources for disaster preparation and response available to the public. During large-scale events, Siskiyou County OES activates and maintains the Emergency Operations Center that is used to coordinate and support responses among the various agencies. Following major incidents, Siskiyou OES facilitates post-disaster response and recovery by providing technical advice, assisting with emergency declarations, and working with the California Governor's Office of Emergency Services to obtain Presidential proclamations.

7.4 EMERGENCY PREPAREDNESS

7.4.1 Local Hazard Mitigation Plan

In addition to the information contained herein, the City of Tulelake participated in the development of the Siskiyou County Local Hazard Mitigation Plan (LHMP). The LHMP was developed in accordance with the Disaster Mitigation Act of 2000 (DMA 2000) and followed

FEMA's Local Hazard Mitigation Plan guidance. The LHMP incorporates a process where hazards are identified and profiled, the people and facilities at risk are analyzed, and mitigation actions are developed to reduce or eliminate hazard risk. The implementation of these mitigation actions, which include both short- and long-term strategies, involve planning, policy changes, programs, projects, and other activities. The current LHMP is incorporated into the City of Tulelake General Plan Safety Element by reference and is available on the City's website.

7.4.2 Community Wildfire Protection Plan

The primary purpose of the Community Wildfire Protection Plan for Siskiyou County (CWPP) is to provide guidance that enhances protection of human life and to help Siskiyou County communities become more adaptable to wildfire, while reducing the wildfire threat to community values such as structures, critical infrastructure, businesses, and natural and historic resources. The CWPP is designed to guide future actions by residents, property owners, business owners, homeowners associations, fire safe councils, agencies, and citizens. It provides an understanding of how to plan and implement specific actions to reduce wildfire threat, live more safely in a wildfire prone environment, and build more resilient communities.

7.4.3 Water Conservation Program

California Water Code Section 375 authorizes water suppliers to adopt and enforce a comprehensive water conservation program to reduce water consumption and conserve supplies. The purpose of Section 375 is to help local water suppliers manage and conserve their water supplies, especially in the context of California's recurring droughts and the constitutional mandate to prevent the waste or unreasonable use of water. Adoption of a water conservation program allows water suppliers to better manage potable water supplies and avoid or mitigate the effects of drought and supply shortages. For cities with water supplies vulnerable to drought, water conservation programs can be essential to ensuring a reliable and sustainable minimum supply of water for the public health, safety, and welfare. As of 2025, the City of Tulelake has not yet adopted a water conservation program.

7.4.4 Evacuation and Preparedness Plan

The Siskiyou County Local Transportation Commission (SCLTC) is in the process of developing the Siskiyou County Evacuation and Preparedness Plan in coordination with the County of Siskiyou, tribal governments, and the nine cities in Siskiyou County, including Tulelake. The objectives of the Evacuation and Preparedness Plan are to:

- Develop an understanding of current emergency preparedness plans and how transportation organizations, assets, and services are included in them.
- Analyze infrastructure deficiencies and recommend improvements to help mitigate risks related to natural disasters.
- Create and adopt a region-wide evacuation and preparedness plan detailing standardized practices and protocols for transportation services and evacuation centers for use by Siskiyou County OES, local and regional fire departments, local law enforcement personnel, transit and other transportation providers, the County, cities, and other local jurisdictions.
- Work to ensure regional cooperation, coordination, and capacity building with respect to emergency plans.

- Educate the public, with an emphasis on vulnerable communities, on related emergency protocols developed in the plan (e.g., designated locations for transportation evacuation, emergency shelters, etc.).

7.4.5 CAL FIRE Unit Plans

CAL FIRE utilizes strategic plans to guide its operations and resource allocation in wildfire prevention and suppression, as well as natural resource management. These plans are developed collaboratively with input from various stakeholders and focus on reducing wildfire risk, protecting lives and property, and managing California's forests. CAL FIRE's unit plans are specific to each of CAL FIRE's administrative units and focus on pre-fire management, hazard reduction, and wildfire response within their respective areas. They complement other planning documents like community wildfire protection plans and general plan safety elements. Unit fire plans often address issues like ingress/egress routes, operational training, and fuels reduction. The Unit Strategic Fire Plan for CAL FIRE's Siskiyou Unit was most recently updated in May 2025 and includes the following goals:

- Identify and evaluate wildland fire hazards and recognize life, property, and natural resource assets at risk, including watershed, habitat, social, and other values of functioning ecosystems.
- Promote and support local land use planning processes as they relate to individual landowner objectives and responsibilities and the protection of life, property, and natural resources from risks associated with wildland fire.
- Facilitate the collaborative development and sharing of all analyses and data collection across all ownerships for consistency in type and kind.
- Support and participate in the collaborative development and implementation of local, county, and regional plans that address fire protection and landowner objectives.
- Increase fire prevention awareness, knowledge, and actions implemented by individuals and communities to reduce human loss, property damage, and impacts to natural resources from wildland fires.
- Integrate fire and fuels management practices with landowner/land manager priorities across jurisdictions.
- Determine the level of resources necessary to effectively identify, plan, and implement fire prevention using adaptive management strategies.
- Determine the level of fire suppression resources necessary to protect the values and assets at risk identified during planning processes.
- Implement post-fire assessments and programs for the protection of life, property, and natural resource recovery.

7.4.6 Other Disaster Preparedness Resources

7.4.6.1 Emergency Preparedness Guidebook

The Siskiyou County Department of Public Health and Siskiyou County OES collaboratively developed The Siskiyou County Emergency Preparedness Guidebook to help prepare and keep Siskiyou County residents safe in the event of an emergency. The Guidebook includes a list of resources for staying informed prior to and during an incident, it details the steps to take when planning to evacuate, it describes the evacuation process, and it includes instructions for

preparing for wildfires, smoke-related hazards, contaminated water supplies, earthquakes, volcanic eruptions, flood hazards, and power outages. Opportunities and programs for public involvement to increase a community's emergency response capacity are also identified. The Siskiyou County Department of Public Health prints and makes hardcopies of the Guidebook available to the public, and it publishes a digital version to the Department's website along with other resources, such as an Access and Functional Needs registry that is used to identify individuals who require additional assistance during emergencies or disasters.

7.4.6.2 ReadySiskiyou

ReadySiskiyou is a public notification system utilized by Siskiyou County OES that allows the public to sign up for and receive time-sensitive phone, text, and email alerts about emergencies and other important community information, including severe weather, evacuations, unexpected road closures, and missing persons.

7.4.6.3 Genasys Protect

Genasys Protect (formerly Zonehaven Aware) is an evacuation management tool utilized by Siskiyou County OES that helps first responders and communities more effectively plan, communicate, and execute evacuations through evacuation zones developed and approved in close collaboration with law, fire, and emergency service agencies. Using Genasys Protect, emergency responders and the public can identify Siskiyou County addresses and evacuation zones on an online map and view current evacuation information for the area. The current evacuation zones in and around the City of Tulelake, as identified by Genasys Protect, are shown on **Figure 7-1, Evacuation Zones** at the end of the Safety Element.

7.4.7 Evacuation Routes

The City of Tulelake strives to be prepared for natural disasters or other emergency events requiring evacuation in partnership with surrounding jurisdictions and Siskiyou County OES. In accordance with California Government Code Section 65302.15(a), which requires that cities and counties identify evacuation routes and their capacity, safety, and viability under a range of emergency scenarios, the City of Tulelake has identified State Route 139 (SR 139) as the City's evacuation route, and E Street as an alternate route should SR 139 become blocked or compromised (see **Figure 7-2, Evacuation Routes**).[2] These roadways were identified by the City due to their higher capacity relative to other streets in the City in accordance with the functional classifications assigned to them by the California Department of Transportation (Caltrans). As discussed in the Circulation Element, Caltrans has classified SR 139 as an "other principal arterial" and E Street as a "major collector." The areas adjacent to these roadways are largely free of significant fuel loading, congestion, and overhead vegetation. Ongoing coordination with the County and Caltrans will be necessary to ensure evacuation routes under their ownership and control provide sufficient capacity, safety, and viability for evacuations under a range of emergency scenarios.

Which direction evacuations will proceed will depend upon the specific disaster, but in general evacuations are expected to move people out of the City and away from the specific hazard on SR 139. SR 139 has the highest capacity of any roadway in the planning area and it quickly leads out of Tulelake through irrigated farmland to Newell six miles to the southeast or the City of Klamath Falls 30 miles to the northwest. The nearest hospital is in Klamath Falls, and the Klamath

[2] The use of SR 139 as the City's evacuation route is consistent with the Siskiyou County General Plan Safety Element.

County Fairgrounds in Klamath Falls regularly serves as an evacuation center during emergencies. For this reason, evacuations are likely move northward when possible. Though less direct than SR 139, E Street leads west through irrigated farmland to connect with Hill Road, another major collector, which in turn connects with SR 161, a minor arterial, at the California-Oregon state line approximately six miles northwest of Tulelake. SR 161 provides access to US Hwy 97 in the west and SR 139 in the east.

The use of SR 139 as the City's evacuation route under a variety of scenarios is discussed below.

- Following a volcanic eruption, or in advance of an eruption if there is sufficient warning, residents will be directed to either evacuate of shelter in place depending upon the nature of the eruption and distance to the hazard. For ash fall, the most likely direct impact to the City from an eruption of either the Medicine Lake or Mount Shasta volcanoes, sheltering in place is likely to be sufficient. However, if there are or secondary effects, such as a fast moving wildfire sparked by lava flows, the Incident Commander will make an assessment of areas at risk in close coordination with other agencies, and the Tulelake Police Department and other responding agencies will direct the evacuation, if needed, accordingly.
- Earthquakes occur suddenly and for the most part without warning. Evacuation may be necessary post-disaster if the ground shaking causes a secondary disaster, such as a fire or hazardous materials spill. The direction of the evacuation would be determined by the Tulelake Police Department based on an assessment of which areas are at risk from secondary hazards.
- No portion of Tulelake is identified as Wildland Urban Interface and no areas of the City are located in a High or Very Fire Hazard Severity Zone. Nevertheless, should winds spread a wildfire into the City or quickly spread a house fire to surrounding properties, evacuation of potentially affected neighborhoods is likely. The direction to evacuate would be determined by the Tulelake Police Department based on an assessment of the areas at risk.
- Localized flooding due to storm events can and does occur within the planning area, typically where low spots in the topography capture storm water. The appropriate evacuation routes to use in the event of flooding will depend on where flooding is more severe and on the evacuee's destination. Evacuation may involve merely getting out of the low spots and onto higher ground. However, if flooding is widespread in the community and area, the evacuation route(s) to follow would be determined by the Tulelake Police Department and other responding agencies based on an assessment of affected areas.
- Releases of hazardous materials, either as a result of a leak or due to an accidental spill, generally will require the evacuation of a relatively small area, generally within a one- to two-mile radius of the release. However, due to the small size of the City, that potentially encompasses all of Tulelake. The direction to evacuate would be designated by the Tulelake Police Department based on an assessment of the leak location, prevailing wind directions, traffic flow, and location of the emergency shelter, if any, opened for the event.

7.4.7.1 Single-Access Roadways

A key element of being able to safely evacuate is having access to multiple ingress and egress routes in case one roadway becomes blocked. Therefore, in an effort to ensure safe access to all areas of the City, an assessment of dead-end roadways throughout Tulelake was prepared. As part of the assessment, single-access roadways longer than 800 feet were noted separate from

roadways 800 feet or less. This is because Section 1273.08 (Dead End Roads) of the State's Minimum Fire Safe Regulations (Title 14 of the California Code of Regulations (CCR), Division 1.5, Chapter 7. Subchapter 2, Articles 1-5) limits roads without more than one access point to 800 feet in length when they serve parcels zoned for less than one acre, which are most lots in the City. Although the State's Minimum Fire Safe Regulations do not apply to development in the City, they serve as valuable guidelines for evaluating roadways and other development in the City for purposes of fire safety.

As determined through the City's assessment, no single-access roads in Tulelake exceed 800 feet in length. This is because Tulelake was designed with and has historically developed with an interconnected, grid-based road network. Moreover, the only "dead-end" roads are the four cul-de-sacs off Ridgeview Street, all of which are 200 feet in length and paved, and the western ends of A Street and B Street, which are also 200 feet in length and paved (see **Figure 7-3, Single-Access Roadways**). Although A and B streets terminate at the western edge of city limits without connection to a paved roadway, the roads are connected by an unpaved, single-lane access road. The access road is approximately 385 feet in length, does not serve as the primary point of ingress/egress for any land use in the City, and is located outside city limits.

7.4.8 Road Minimum Widths and Turnouts

Minimum road widths and turnouts are essential for designing a safe environment so that emergency vehicles can access all areas of the City. At present, the City has adopted limited street standards. These are included in the City's 2024 Subdivision Ordinance and do not include standards for minimum road widths or turnouts. Although Tulelake has yet to adopt standards for road widths and turnouts, the streets in Tulelake have historically been developed within 60 to 90-foot rights-of-way and include two 10-foot paved travel lanes that are sufficient for emergency access. Because no one-way roads have been established in the City, no turnouts exist or are needed.[3]

7.4.9 Municipal & Emergency Water Supplies

Water is provided to all residential, commercial, institutional, and industrial customers, and for fire protection services. The City of Tulelake obtains its water from three wells. The groundwater is conveyed via booster pump to two elevated tanks with a combined storage capacity of 175,000 gallons. In 2018, the City completed repairs to many of its old water lines, thereby reducing system losses and improving water storage capacity. However, the current storage capacity remains inadequate to supply the minimum fire flows of 1,500 gallons per minute (GPM) for two hours. To address the issue, the City has been working with the State to obtain grant funding for construction of two additional 125,000-gallon storage tanks.

In addition to the City's municipal water supply, the Tulelake Irrigation District (TID) maintains a series of irrigation canals in and around the City. The majority of the TID's surface water supply is from the Klamath River, which is directed to TID through an intertie between the Klamath River and the Lost River, known as the Lost River Diversion Channel. TID does not provide water to the City of Tulelake or to any properties or land uses in the City.

[3] The only single-lane roads are unpaved access roads outside city limits. Although these access roads do not serve as the primary access to any properties in the City, they should nevertheless be evaluated in coordination with the Tulelake Fire Protection District and Tulelake Irrigation District and improved for safety, as necessary.

7.4.10 Defensible Space

Defensible space is the area around a structure where vegetation and other combustible materials are managed to slow or stop the spread of wildfire. Defensible space can protect structures from direct flame impingement and radiant heat, as well as reduce the number of burning embers. It also helps to safeguard fire fighters who may be attempting to save the structure during a fire. It is considered crucial for structure survivability during wildfires.

California Government Code Section 51182 requires that any person owning, leasing, controlling, operating, or maintaining an occupied structure in a Very High Fire Hazard Severity Zone maintain 100 feet of defensible space around that structure. Because no area of the City is designated as being in a Very High Fire Hazard Severity Zone, California Government Code Section 51182 does not apply and the creation of defensible space, while advisory, has never been a requirement inside city limits. For this reason, the City works with the County, other agencies, and the community to improve resident awareness of the benefits of defensible space and home hardening and to encourage their creation.

7.5 HAZARDS

Emergency preparedness measures in the City of Tulelake and elsewhere are driven by the hazards and risks affecting the area. For Tulelake, vulnerabilities include the City's climate and setting, seismic and geologic hazards, urban fires and wildfires, hazardous materials spills, and the effects of climate change, such as increased drought frequency and extreme weather.

7.5.1 Climate and Setting

The City of Tulelake is located at an elevation of 4,030 feet above sea level on the Modoc Plain of the Modoc-Oregon Lava Plateau, a volcanic table land that ranges from 4,000 to 6,000 feet in elevation and is cut by several north-south trending faults. The Plateau is characterized by broad valleys, such as the Tule Lake Basin, that frequently contain marshy ground and, in many areas, shallow lakes. The region is rich in evidence of recent volcanism, with most formations the result of lava flows.

The City is situated in an area that is predominately flat plain surrounded by hills and bluffs. The land underlying Tulelake is former lakebed. The lake, Tule Lake, is an intermittent shallow lake that once covered an area that stretched from Sheepy Peak Ridge four miles west of the City to the ridges 13 miles to the east. Before it was drained, Tule Lake, comprised over 100,000 acres during wet years and about half of that in dryer periods. About 60,000 acres of this area has been reclaimed and converted to extensive agricultural farmlands. As part of the reclamation, irrigation and drainage ditches were developed throughout the area, including within and adjacent to the City. This creates a high ground water table in Tulelake that typically averages approximately one to two feet below ground level during the four-month growing season and four feet below ground during the nongrowing seasons. Further because the land is former lakebed, the soils underlying the City are predominantly a mucky silty clay loam. This soil type is very poorly drained, has moderate shrink-swell potential, slow permeability, very low runoff, a slight hazard of wind erosion, and moderate hazard of water erosion. The high water table and soil type affects the type of construction that can be utilized in Tulelake.

The climate in the Tulelake basin is relatively dry and ranges from moderate to severe in winter months. The length of the frost-free growing season ranges from 90 to 140 days. Some severe frost can be expected any time during most years. The region's climate is characterized by hot,

dry summers, cold winters, and little precipitation. The average high temperature in Tulelake in July is 84.7°F and the average low temperature in January is 20.1°F. Most precipitation falls over a roughly five-month period from late October/early November until late March/early April, with snowfall common between late November and early March. The City receives 10.76 inches of total annual average precipitation and 21.3 inches of total average snowfall. The least amount of precipitation occurs during the summer months, with July receiving an average of 0.28 inch. When precipitation does fall during the summer, it typically arrives in a thunderstorm.

Tulelake's geographical setting presents several unique public safety concerns:

- The City of Tulelake is susceptible to impacts resulting from volcanic activity at the Medicine Lake and Mount Shasta volcanoes. The most likely impacts would be from tephra ash, which are fine fragments of volcanic rock formed in an explosive eruption.
- The predominant soil type in the City is a poorly drained silty clay loam that exhibits moderate shrink swell potential and slow permeability. This can result in displacement of foundations and localized flooding.
- The City could be subject to severe to violent shaking due to active and potentially active faults in the region. Coupled with a shallow ground water table and local soil types, liquefaction and increased damage to buildings and infrastructure could result.
- Following years of drought, curtailed water deliveries by the Bureau of Reclamation, and increased reliance on groundwater pumping in the region, subsidence is being observed in the Upper Klamath Basin.
- Wildfires are a regular occurrence in the region.
- A toxic or hazardous chemical accident on SR 139, the railroad, or elsewhere in the City could have serious and immediate implications in Tulelake.

7.5.2 Seismic and Geologic Hazards

The Modoc Plateau, where the City of Tulelake is located, is a volcanic table land cut by several north-south trending faults with extensive lava flows and smaller volcanic features, like cinder cones, formed by extensional tectonics. The Cascade Range, located a short distance west of Tulelake, is known for its large and recently active volcanoes, primarily composite and shield volcanoes formed by subduction.

7.5.2.1 Volcanic Hazards

The two Cascade Range volcanoes nearest to the City of Tulelake are the Medicine Lake and Mount Shasta volcanoes. Though Mount Shasta has not been active for more than two centuries and Medicine Lake for almost a millennium, both volcanoes are only dormant and will almost certainly erupt again. Experience with Cascade Range volcanoes, including Mount St. Helens (1980 to present) and Mt. Lassen (1911-1920), demonstrates that eruptive episodes can and do occur in present time involving volcanoes that are generally considered inactive. The Mount Shasta and Medicine Lake volcanoes and the potential hazards associated with them are discussed below.

Mount Shasta

Mount Shasta is a 14,179-foot-high stratovolcano located approximately 52 miles southwest of Tulelake. The current volcano formed on the remnants of an older volcano that collapsed

sometime roughly 380,000 to 330,000 years ago. The collapse created one of the largest landslides known on Earth, depositing volcanic rock and other materials across approximately 260 square miles of the Shasta Valley. Since the collapse, Mount Shasta has had long lulls in eruptive activity punctuated by brief periods of many eruptions. Eruptions around 11,000 years ago built nearby Black Butte and the Shastina dome on the west flank of Mount Shasta. In the last few millennia, there have been eruptions at the volcano's summit and from vents on Mount Shasta's east flank. The most recent well-documented eruption occurred around 3,000 years ago. According to the United States Geological Survey (USGS), small, short-lived blasts of steam and ash may have occurred as recently as 1,800 to 200 years ago, but additional field verification is required.

Research published to date suggest that Mount Shasta may have erupted about once every 800 to 600 years over the last 10,000 years. This corresponds to a 3.5 percent chance of eruption within the next 30 years. USGS seismometers and GPS receivers operated by EarthScope Consortium, formerly UNAVCO, form the monitoring network for Mount Shasta. The volcano has been relatively quiet for at least the past few decades, with only a handful of small-magnitude earthquakes and no demonstrable ground deformation. Although geophysically quiet, periodic geochemical surveys indicate that volcanic gas emanates from a fumarole at the summit of Mount Shasta from a deep-seated reservoir of partly molten rock. According to USGS, Mount Shasta is the most likely Cascade Range volcano to produce an explosive eruption of very large volume. Future eruptions, like those of the last 10,000 years, are likely to produce deposits of ash, lava flows, domes, and pyroclastic flows, and could endanger infrastructure and lives within several miles of the volcano. It is ranked by USGS as the fifth highest threat volcano in the United States.

Medicine Lake

Medicine Lake volcano is a large, shield volcano located roughly 25 miles south of Tulelake. Located at the volcano's summit (elevation 7,913 feet) is a water-filled caldera formed by withdrawal of magma during eruptions. The caldera is eight miles wide and 14 miles across. The hundreds of mostly nonexplosive eruptions over the last half million years produced expansive lava flows, some covering as much as 100 square miles. The volcano has erupted nine times during the past 5,200 years, and seven of those eruptions began with an explosive phase. The two youngest eruptions produced ash clouds that drifted tens of miles downwind before explosions ceased and thick, glassy lava flows began oozing from the vents forming Little Glass Mountain (1,000 years ago) and Glass Mountain (950 years ago).

Medicine Lake volcano has one of the highest eruptive frequencies among Cascade volcanoes. Overall, the pattern of eruptions over the past 12,500 years suggests the likelihood of a future eruption from Medicine Lake volcano is one in 3,600 annually, which corresponds to about a one percent chance of eruption within the next 30 years. Seismometers and GPS receivers provide a modest volcano monitoring network at Medicine Lake volcano. Volcanic gas emissions suggest that partly molten rock lies beneath the volcano, which provides heat for a robust geothermal system underlying the caldera. Sporadic earthquake swarms are detected by the monitoring network as well as ground subsidence owing to motions on regional faults and "sagging" of rock softened by volcanic heat. The character of a future eruption is most likely to be effusive, with fountains of lava potentially rising hundreds of feet in the air. Over the course of weeks to months, a circular mound of cinder would form around the vent and slow-moving lava flows could impact areas many miles away. It is ranked by USGS as the 45th highest threat volcano in the United States.

Volcanic Activity

Several USGS reports describe the characteristics of volcanic activity likely to affect areas near each volcano, including Volcanic Hazards at Mount Shasta, California (1989), Volcano Hazards Assessment for Medicine Lake Volcano, Northern California (2007), and California's Exposure to Volcanic Hazards (2019). These characteristics are discussed below along with their possible impact to the City of Tulelake. The hazard areas associated with the two volcanos are shown on USGS's "Mount Shasta, CA Simplified Hazards Map" and USGS's "Medicine Lake, CA Simplified Hazards Map," which have been incorporated into the Safety Element as **Figures 7-4, Mount Shasta Volcanic Hazards** and **7-5, Medicine Lake Volcanic Hazards**. An additional graphic that identifies infrastructure potentially affected by an eruption of the Medicine Lake volcano is included as **Figure 7-6, Medicine Lake Volcanic Hazard Zones & Infrastructure**. The maps do not show areas potentially affected by volcanic ash, which is often influenced by wind direction and distance from the source. Because the City of Tulelake is not shown on the USGS maps, the City's location is approximated on the maps included herein.

Pyroclastic Flows: Pyroclastic flows are streams of hot ash and rock fragments, mixed with hot air and other gases, that move rapidly along the ground surface during an eruption. These flows are especially dangerous due to their high temperatures and their high speeds which may exceed 100 miles per hour. Due to the speed of pyroclastic flows, escape is nearly impossible. They are best avoided by evacuation of threatened areas before an eruption. Tulelake is located outside of the pyroclastic flow zones of both volcanoes.

Lateral Blasts: This type of blast is a sideways-directed volcanic explosion that carries large pieces of rock and ash at a very high speed along and above the ground surface. The rock debris carried by the lateral blast of Mount St. Helens in 1980 had an initial speed of more than 250 miles per hour, and it was still moving about 60 miles per hour near its outer limit about 15 miles from the volcano. Lateral blasts may cause fatalities as the result of impact, burial, or heat. Mount Shasta, like Mount St. Helens, is potentially subject to lateral blasts. Tulelake is located outside of the area potentially affected by lateral blasts at Mount Shasta.

Lava Flows: Lava flows are rarely life-threatening because they move slowly enough for people to get out of their way and seldom occur at the outset of an eruption. Tulelake's distance from both volcanoes is sufficient that lava flows are not considered directly life threatening from either volcano; however, lava flows can affect critical infrastructure and transportation corridors, such as SR 139, and can ignite wildfires in the region.

Lahars/Volcanic Mudflows: A lahar, or volcanic mudflow, is a mass of water-saturated rock debris that moves downslope generally as a fluid. Lahars can form when lava flows, pyroclastic flows, or hot lateral blasts melt snow on the side of a volcano. Mudflows tend to follow stream valleys and can travel long distances generally at a rate of 10 to 20 miles per hour, but faster on steep slopes. The USGS does not identify lahars from either volcano as being a potential hazard to Tulelake.

Landslides: A volcanic explosion, severe earthquake, or heavy rains could start landslides of rock debris from the side of Mount Shasta. A landslide triggered by an earthquake at Mount St. Helens on May 18, 1980, traveled about 14 miles beyond the volcano, and the collapse of ancestral Mount Shasta thousands of years ago filled the Shasta Valley with debris deposits. More recently, Mount Shasta has been subject to smaller but significant mudflows triggered by rain-on-snow events and glacial melt during late summer. According to USGS, there is no known way to predict the location, size, or time of future catastrophic landslides at Mount Shasta, or even if any will

occur. The likelihood of a landslide is greatest during a period of eruptive activity, especially if that activity is accompanied by earthquakes. Nevertheless, Tulelake is sufficiently distant from Mount Shasta that even if a landslide were to occur, the City is unlikely to be affected.

Volcanic Ash: Ash resulting from an eruption of Mount Shasta could cover a large area and reach a depth of one inch or less in and around Tulelake, depending on the amount of ash released into the atmosphere and the direction of wind at the time. Because prevailing winds near Mount Shasta are from the northwest and southwest, some ash fall on Tulelake should be anticipated. Based on recent behavior, however, it is not likely that Mount Shasta will erupt catastrophic volumes of tephra and ash in the near future. Tephra accompanying eruptions of Medicine Lake volcano could also be regionally widespread if the eruption column rises into the air high enough, which is expected. Although the prevailing wind direction at Medicine Lake is from the west, should the wind direction shift, the City of Tulelake, surrounding communities, and roads and highways could be impacted for days or weeks.

7.5.2.2 Surface Rupture

As shown on **Figure 7-7, Fault Activity Map** there are several faults in the region. The closest of these are the Gillem Fault that runs along Sheepy Ridge approximately 4.5 miles west of the City of Tulelake, the Saddle Blanket Fault approximately seven miles east of Tulelake, and Big Crack Fault approximately eight miles to the south. Though these faults surround the City and are potentially active (i.e., they show evidence of displacement during the past 1.6 million years), the closest active fault, one which shows evidence of surface displacement along one or more of its segments or branches during the past 10,000 to 12,000 years, is located approximately 23 miles west in the Cedar Mountain fault system. The Cedar Mountain fault system is a 27-mile-long complex group of generally north- to north-northwest-striking normal faults along the boundary between the Cascade Ranges and the Modoc Plateau.

7.5.2.3 Ground Shaking

Regions of California near major active faults experience, on average, stronger earthquake shaking more frequently. According to USGS, the nearest recorded earthquakes affecting Tulelake in the past 125 years was a series of four earthquakes with magnitudes of 1.9, 1.5, 1.4, and 1.2 that occurred approximately 0.35 mile west of city limits on September 6, 2021. The earthquakes, although close, had little impact inside city limits. Outside the City, ground settlement, or subsidence, was observed in several locations. The largest recorded earthquake to affect Tulelake was a doublet earthquake (i.e., an earthquake sequence having two main shocks of similar magnitude) with magnitudes of 6.0 and 5.9 that occurred roughly 41 miles northwest of city limits on September 21, 1993. The earthquakes, known as the Klamath Falls earthquakes, resulted in two deaths and millions of dollars in damage, predominantly in the nearby City of Klamath Falls. After the initial shocks, tremors continued to be felt for more than two months. Due to their distance from the City, the larger of the two earthquakes had an estimated Modified Mercalli Intensity (MMI) of VI in Tulelake, which is classified as strong.[4] The earthquakes resulted in sufficient damage to compromise some of the older, unreinforced masonry buildings in Tulelake. Through the use of state and federal grants, the City has been able to safely remove several of the damaged structures and facilitate redevelopment.

According to the California Geological Survey, there is a 2.0 percent chance of shaking in Tulelake exceeding a MMI of VIII or IX within the next 50 years (see **Figure 7-7, Earthquake Shaking**

[4] The Modified Mercalli Intensity scale describes perceived earthquake shaking and correlates strongly with earthquake-induced damage.

Potential). This is considered severe to violent shaking with the potential to crack the ground and cause considerable damage to structures and underground utilities.

7.5.2.4 Slope Instability

Slope failure is the movement of soil, rock, or other earth materials downhill in response to gravity. Slope failure includes rockfalls, debris flows, debris avalanches, earthflows, mudflows, landslides, and erosion. While slope failure can result from erosive activity, especially as climate change increases the occurrence of severe weather events, the planning area is flat and sufficiently distant from potentially unstable slopes that slope instability is not a hazard to the City.

According to the California Department of Conservation, the nearest reported landslides occurred in February 2025 on State Route 263 more than 50 miles west of Tulelake. The landslides were rockfall, a type of landslide where rocks, boulders, and other materials become detached from steep slopes or cliffs and tumble downslope. Whereas rockfall are abrupt movements of surficial rock and other materials, deep-seated landslides are a type of slower moving landslide where the depth of the plane failure ranges from ten feet to several hundreds of feet below the surface. These types of slides tend to result from changes in the geologic and hydrologic processes in the area of the landslide, such as earthquakes and increased groundwater levels. Once formed, deep-seated landslides can persist for a few years, or even centuries. The relative likelihood of deep-seated landslides, based on estimates of rock strength and steepness of slopes, in the vicinity of Tulelake is shown on **Figure 7-9, Deep Seated Landslide Susceptibility**.

7.5.2.5 Liquefaction

Liquefaction occurs when loose sand and silt that is saturated with water behaves like a liquid when shaken by an earthquake. Liquefaction can result in the following types of seismic-related ground failure:

- Loss of bearing strength – soils liquefy and lose the ability to support structures.
- Lateral spreading – soils slide down gentle slopes or toward stream banks.
- Flow failures – soils move down steep slopes with large displacement.
- Ground oscillation – surface soils, riding on a buried liquefied layer, are moved back and forth by shaking.
- Flotation – floating of light buried structures to the surface.
- Settlement – settling of ground surface as soils reconsolidate.
- Subsidence – compaction of soil and sediment.

Three factors are required for liquefaction to occur: (1) loose, granular sediment; (2) saturation of the sediment by groundwater; and (3) strong shaking.

To better inform local governments about potential hazards, the California Geological Survey designates areas of the State that are subject to potential liquefaction. Although no areas within or adjacent to Tulelake have yet been mapped or designated by the California Geological Survey as being subject to potential liquefaction, the water table in the City is high due to surrounding irrigation and drainage ditches; the predominant soil type is a poorly drained silty clay loam; and there is a two percent chance of severe to violent shaking within the next 50 years. This combination of factors could result in liquefaction and substantial damage to structures and underground utilities. To mitigate the hazard, the City limits private development to a height of 30

feet and two stories and requires additional review of proposed structures that would exceed the height.

7.5.2.6 Subsidence

Subsidence is the sinking of the ground due the underground movement of material. It is frequently caused by extracting water, oil, natural gas, and mineral resources by means of pumping, fracking, and mining activities. However, subsidence can also be caused by natural events, including earthquakes, soil compaction, glacial isostatic adjustment, erosion, sinkhole formation, and adding water to fine soils deposited by wind. It can happen over very large areas, such as a region of the State, or over very small areas, such as within a single parcel.

The USGS identifies areas of recorded subsidence, both historical and current, across California. Although the USGS does not identify the City or region as being affected by current or historical subsidence, subsidence has recently been observed in the Upper Klamath Basin that surrounds the City following years of drought, curtailed water deliveries by the Bureau of Reclamation, and increased reliance on groundwater pumping. According to the Local Hazard Mitigation Plan, Tulelake has seen over two feet of subsidence due to groundwater usage and withdrawal. While not formally quantified, impacts on subsurface utilities and building foundations have been anecdotally reported. Following a series of four small earthquakes adjacent to and west of Tulelake in September 2021, considerable ground settlement, including damage to county roads, was observed outside the City.

7.5.3 Wildland and Urban Fire Hazards

Wildfires are a regular feature of the landscape throughout much of California and Oregon, including in the nearby Modoc, Klamath, and Freemont-Winema National Forests, all of which typically experience dozens of new fire starts each year. The fires are primarily the result of the region's warm, dry summer climate and recurrent afternoon and evening thunderstorms that form over the hills and mountains in unstable air during the heat of summer and early fall. For example, thunderstorms in the Modoc National Forest during the last few weeks of July 2025 sparked 38 fires. The Forest Service reports that approximately 80 percent of the wildfires in the Klamath National Forest each year are lightning caused, while the remaining 20 percent are due to human-related activities, such as unattended burn piles, improperly extinguished campfires, and mowing. Other potential wildfire ignition sources include downed power lines, vehicle accidents, equipment malfunctions, and arson. According to CAL FIRE, which annually reports on large (i.e., 300 acres or more) fires in the State, approximately 84 percent of California's wildfires in 2024 were human caused, three percent had a natural source (e.g., lightning), and the source for 12 percent of the wildfires could not be determined.

Regardless of how a fire starts, once it has begun, strong winds can carry burning embers several miles from the main fire, allowing them to ignite new fires. This makes embers the primary cause of structural damage and home loss during wildfires, with some estimates suggesting they are responsible for up to 90 percent of homes destroyed. Structures within the wildland urban interface are particularly at risk.

When communities are impacted by wildfire, the destruction can be unimaginable. During the fire, residents may be given only moments to evacuate, and roadways can become blocked by flames and/or fallen debris, making it extremely difficult for residents to safely evacuate and for emergency responders to protect life and property. When residential, commercial, and industrial properties are damaged or destroyed by fire, a mess of dangerous debris and hazardous waste

is left behind that must be cleaned up and removed before property owners can rebuild. Electrical transmission lines and communications equipment can be badly damaged or destroyed in a fire, leaving areas without power and/or phone service until facilities and equipment can be replaced and the power safely restored. Even when communities are spared from a fire's destruction and the wildfire is limited to wildlands, the air quality over large areas is badly impaired with the toxic particulate matter found in smoke.

The record of wildfires in the immediate vicinity of Tulelake since 1878 is shown on **Figure 7-10, Historic Fire Perimeters**. As shown on **Figure 7-10**, the largest fire occurred in 2020 and burned 81,225 acres in and around the Lava Beds National Monument approximately seven miles south of Tulelake. The nearest fire to the City also occurred in 2020, burning 43 acres adjacent to the Tule Lake National Wildlife Refuge less than two miles south of the City. While it appears wildfires near Tulelake have principally burned in the surrounding hills, CAL FIRE cautions that the dataset reflected on **Figure 7-10** is incomplete, and that users should be cautious when drawing conclusions based on the data. Further, not shown on **Figure 7-10** are recent large wildfires that have burned in the region beyond the boundaries of the map. These include the 145,632-acre Antelope Fire, which burned within 13 miles of city limits in 2021, and the 413,715-acre Bootleg Fire, which burned within 41 miles of Tulelake in 2017. Several other recent wildfires in Siskiyou County (2016-2024) are identified in the Siskiyou County Local Hazard Mitigation Plan. Areas outside of the boundaries of the map, including the rest of the State, are shown on CAL FIRE's Fire and Resource Assessment Program (FRAP) website. A link to the FRAP website and the most up-to-date fire perimeters map is included in Section 7.8, Resources. In addition, the National Interagency Fire Center (NIFC) publishes a fire perimeters map on its website that also includes Oregon and the rest of the nation. A link to the NIFC map is included in Section 7.8, Resources.

In addition to wildfires, house fires are a hazard due to the increased densities of development inside city limits that facilitate an urban fire to spread. They are less predictable but also less frequent than wildfires in the region, with almost half of all house fires caused by cooking accidents. Heating equipment, electrical malfunctions, smoking, and candles are among the other common causes. Older homes and dwellings occupied by socioeconomically disadvantaged households are at elevated risk. If not promptly extinguished, small house fires can grow quickly and spread to neighboring structures and properties, placing entire neighborhoods at risk.

7.5.3.1 Wildland Urban Interface

The wildland urban interface (WUI) is the zone where houses and other development meet or intermingle with undeveloped wildland vegetation. The two types of WUI, interface and intermix, differ in whether there is a clear demarcation of wildland vegetation and development (interface) or whether the two are intermingled (intermix). Because of the convergence of humans and the environment in the WUI, the WUI is a zone in which fire can move readily between structures and vegetation, potentially resulting in massive fires, or conflagrations, and widespread evacuations.

In an effort to provide a framework for scientific inquiries into the effects of housing growth on the environment, as well as inform national policymakers and local land managers about the WUI and associated issues, the US Forest Service prepares detailed assessments of WUI across the United States. **Figure 7-10, Wildland Urban Interface** reflects the findings of the Forest Service's 2020 WUI assessment relative to the City of Tulelake. As shown on **Figure 7-10**, the Forest Service does not identify any area of the City as WUI. Rather, most of Tulelake is designated as non-vegetated or agricultural, with a small area near the railroad designated as non-WUI vegetated.

7.5.3.2 Wildfire Hazard Severity Zones

California law requires the State Fire Marshal to designate areas, or make recommendations for local agency designation of areas, that are at risk from significant fire hazards based on fuels, terrain, weather, and other relevant factors. The State Fire Marshal does so through the publication and regular update of Fire Hazard Severity Zone (FHSZ) maps, which local agencies must adopt in compliance with state law.

According to the Office of the State Fire Marshal, the FHSZ maps are developed using a science-based and field-tested model that assigns a hazard score based on the factors that influence fire likelihood and fire behavior, such as fire history, existing and potential fuel (natural vegetation), predicted flame length, blowing embers, terrain, and typical fire weather for the area. There are three levels of fire hazard assigned: moderate, high, and very high. **Figure 7-11, Fire Hazard Severity Zones** shows the designated fire hazard severity zone ratings within and surrounding the City. The Office of the State Fire Marshal makes these maps publicly available on CAL FIRE's FRAP website. A link to the FRAP website and the most up-to-date FHSZ maps is included in Section 7.8, Resources. As shown on **Figure 7-11**, there are no designated fire hazard severity zones in or adjacent to the City. The nearest designated fire hazard severity zones (Moderate and High) are located on and adjacent to Sheepy Ridge four miles west of Tulelake.

As previously noted, if an area of Tulelake were designated as being in a Very High Fire Hazard Severity Zone, the State Minimum Fire Safe Regulations for ingress/egress, signing and building numbering, emergency water standards, building siting, setbacks, and fuel modification would apply to development in that area, as would the defensible space requirements in California Government Code Section 51182. While these regulations do not apply, they are discussed herein because they serve as as valuable guidelines for evaluating roadways and other development for purposes of fire safety.

It is important to note that the FHSZ maps evaluate "hazard," not "risk". In doing so, they are like FEMA flood maps where the probability level of a particular area being inundated by floodwaters is shown, not the potential impacts of the flooding. The degree of "hazard" is based on the physical conditions that create a likelihood and expected fire behavior over a 30 to 50-year period without consideration of mitigation measures, such as home hardening, recent wildfires, or fuel reduction efforts. "Risk" is the potential damage a fire can have on an area under existing conditions, accounting for any modifications, such as fuel reduction, defensible space, and use of ignition resistant construction materials and methods.

7.5.3.3 Wildfire Risk

To help communities better understand and reduce their wildfire risk, the USDA Forest Service developed Wildfire Risk to Communities, a publicly accessible online resource of interactive maps, charts, and other information developed using the best available science. Wildfire Risk to Communities allows users to determine how likely wildfire is in their area relative to other communities in California and the nation, areas of their community where homes are most at risk of fire, which actions are most effective to reduce wildfire risk in the community, and where vulnerable populations exist in the community and how they can be reached.

According to the Wildfire Risk to Communities website, the likelihood of wildfire in Tulelake is lower than nearly all other California communities and lower than 77 percent of communities in the United States, and the wildfire risk to homes in the City is lower than nearly all other California communities and lower than 80 percent of communities in the United States. In general, areas of

Tulelake with the greatest risk and likelihood of wildfire, which are still considered low, are the Elementary School, Otis Roper Park, and small pockets north of E Street and much of the City south of E Street. No area of Tulelake is identified as having a concentration of vulnerable residents. Most of the homes in the City (65%) are identified as being subject to minimal wildfire exposure, 24 percent of homes are subject to indirect wildfire exposure, or possible ignition by embers or home-to-home ignition, and the other homes (11%) subject to direct exposure, or potential ignition by adjacent vegetation, flying embers, and nearby structures. To reduce indirect and direct exposure risks, the Forest Service indicates that land use planning and use of wildfire-resistant building materials/landscaping should be employed. In areas of possible direct exposure, the Forest Service identifies hazardous fuel management and the ability to respond as also being critically important.

7.5.3.4 Fire Prevention and Resident Safety

Fire prevention, fire severity reduction, and resident safety are significant concerns for the City and region. Outside city limits, the Forest Service has been actively implementing strategies in the surrounding national forests to mitigate fire risks and create more resilient landscapes, such as prescribed fire and thinning. The US Fish and Wildlife Service has likewise been employing prescribed fire as part of its management efforts in the Tule Lake National Wildlife Refuge south of Tulelake. Presently key strategies being employed by the City to reduce fire risk and improve public safety in Tulelake include:

- Contracting with and supporting a well-trained and staffed fire department.
- Coordinating and cooperating with other public agencies with responsibility for public safety.
- Ensuring adequate infrastructure for new development, including water supplies for structural fire suppression, safe access for emergency response vehicles, and visible street signs.
- Public education, including but not limited to, working with the County, Fire Protection District, and other agencies to inform property owners about the benefits of defensible space and use of construction materials and methods that reduce the potential for ignition.

7.5.4 Flood and Dam Inundation Hazards

Flooding can cause significant harm to buildings, people, and infrastructure. Floodwaters can be deep and fast enough to prevent passage, erode roadways, and carry away people and large objects. Flooding can be caused by heavy rainfall, moderate rainfall over long periods, or even inadequate or clogged storm drains. In rarer instances, a break in a water main or breach of a dam can also cause flooding.

7.5.4.1 FEMA Flood Hazard Zones

According to the Federal Emergency Management Agency (FEMA), which identifies and maps flood hazard areas throughout the United States, there are no floodplains within or adjacent to Tulelake. The nearest FEMA mapped floodplain is the Lost River's floodplain, which is located approximately 0.75 mile west of the City. Flood hazard areas in the vicinity of Tulelake are shown on **Figure 7-12, FEMA Flood Hazards** at the end of the Safety Element.[5]

[5] The 2025 Local Hazard Mitigation Plan identifies riverine flooding as a potential hazard to the City. The discrepancy with the LHMP is due to the use of flood hazard data for an area that encompasses the entire Butte Valley during development of the LHMP.

7.5.4.2 Dam Failure Inundation Hazards

Although dam failures are rare, when they do occur, they can result in significant damage and death since they may fail unexpectedly with little or no warning. To address this hazard, dams are regulated by state and federal agencies for safety, a process that includes routine inspections and classifying dams as low, significant, high, and extremely high hazard dams depending upon the type and severity of anticipated damage that may result from their failure. The hazard potential is not based on the condition of the dam or the risk of the dam failing. Owners of dams that pose significant, high, and extremely high hazards, are required to develop and maintain Emergency Action Plans (EAPs). These plans are crucial for minimizing potential loss of life and property damage during dam failures or other emergencies. The EAPs are based on inundation maps approved by the respective agency and include specific details on notification procedures, response actions, and roles and responsibilities.

There are no dams that pose a significant hazard to the City. The nearest dams to Tulelake regulated by the State of California are roughly 50 miles distant to the southeast and southwest, sufficiently distant that neither's failure would affect the City. The nearest dam to Tulelake regulated by the State of Oregon is Reservoir Gulch Dam, located approximately 7.5 miles northeast of the City. The dam is a low hazard dam operated by the Malin Irrigation District for irrigation purposes. The nearest federally operated dam is located approximately 5.3 miles north/northwest of Tulelake on the Lost River. This is the Anderson-Rose Diversion Dam (formerly the Lower Lost River Diversion Dam), a low hazard dam operated by the Bureau of Reclamation for the purpose of serving reclaimed lands.

7.5.4.3 Localized Flooding

Localized flooding can also occur in or around the City's limited stormwater drainage facilities or in low-lying, poorly drained areas during intense rainstorms. The primary cause of localized flooding in Tulelake is the lack of a true storm drain network. Curb and gutter have yet to be constructed along several city streets and the storm drain system that exists consists of water running into street drains, onto rock, and into a pocket drain, which holds water until it soaks into the ground. While this approach has adequately served the City in the past, increased storm intensities resulting from climate change may eventually require that the City plan for and develop a true storm drain system to accommodate increased stormwater runoff.

7.5.5 Hazardous Materials

A material is considered hazardous if it appears on a list of hazardous materials prepared by a federal, state, or local agency, or if it has characteristics defined as hazardous by such an agency. A hazardous material is defined in Title 22 of the California Code of Regulations (CCR), Title 22, Section 662601.10, as follows:

> A substance or combination of substances which, because of its quantity, concentration, or physical, chemical, or infectious characteristics, may either (1) cause, or significantly contribute to, an increase in mortality or an increase in serious irreversible, or incapacitating reversible, illness; or (2) pose a substantial present or potential hazard to human health or environment when improperly treated, stored, transported or disposed of or otherwise managed.

Most hazardous material regulation and enforcement in Siskiyou County is managed by the Siskiyou County Community Development Department - Environmental Health Division, which

refers large cases of hazardous materials contamination or violations to the North Coast Regional Water Quality Control Board (RWQCB) and the California Department of Toxic Substances Control (DTSC). When issues of hazardous materials arise, it is not at all uncommon for other agencies to become involved, such as the Siskiyou County Air Pollution Control District and both the federal and state Occupational Safety and Health Administrations.

7.5.5.1 Hazardous Materials Sites

Pursuant to Government Code Section 65962.5, both DTSC and the State Water Resources Control Board (SWRCB) are required to maintain lists of sites known to have hazardous substances present in the environment. The agencies make these lists available on their websites. According to DTSC Envirostor and SWRCB GeoTracker databases, which were reviewed in August 2025, there are seven DTSC cases and four SWRCB cases in the City.

The seven DTSC cases are all evaluation sites identified by the City as part of a DTSC Round 1 Equitable Community Revitalization Grant awarded to the City of Tulelake in 2022. Evaluation sites include: 347 Modoc Avenue (the former Mallard), 359 Main Street (the former Tulelake Hardware & Sporting Goods Store), 325 Main Street (the former Marcha Theatre), 319 Main Street (the former Mix Tienda), 375 Main Street (the former barbershop), 507 Main Street (the former Tule Lanes bowling alley), and 800 G Street (an approximately 12-acre commercial property used, at least in part, to store fertilizer). The former Hardware Store is the only property under private ownership and the other sites are city owned. A Phase 1 Environmental Site Assessment (ESA) has been completed for each of the evaluation sites, and Phase 2 ESAs have been completed or are in the process of being completed for those sites with recognized environmental conditions.

Of the four SWRCB cases, three of the cases involve Leaking Underground Storage Tanks (LUSTs) and two are Cleanup Program sites. Two of the three LUST cases have been remediated and the cases closed, and the other case has been open since 1991, remains open subject to further remediation, and involved a leak of diesel fuel at the Siskiyou County Public Works property at 647 Main Street. The Cleanup Program site involved a leak of gasoline at the Staub Oil/Chevron facility on Union Pacific Railroad property at the corner of Main Street and SR 139. The leak was first reported in 1990 and the case remains open and subject to remediation by current and past operators and monitoring by RWQCB. The location of each case and its status in 2025 are shown on **Figure 7-14, Hazardous Materials Cleanup Sites** at the end of the Safety Element.

7.5.5.2 Hazardous Materials Transport

Being located on two transportation routes (i.e., SR 139 and the Union Pacific Railroad), there is the potential for hazardous materials, including flammable and non-flammable gases, corrosives, oxidizers, and flammable liquids, to be transported through Tulelake. Concerning the transport of materials on SR 139 and city roadways, traffic on SR 139 is not subject to any unusual hazards or design constraints through the planning area, and there have so far been no reported hazardous materials spills in the City resulting from improper transport or a vehicle accident. To reduce the hazard, the City has established a designated system of truck routes that direct heavy truck traffic and possible hazardous materials transport away from residential areas and other sensitive land uses. Regarding hazardous materials transport on the railroad, the line is primarily used to transport grain from Newell a few times each week and train speeds through the City are kept under 25 mph. The railroad also follows a linear alignment, with the nearest stretch of track with elevated rates of derailment more than 50 miles distant. At-grade crossings on Main Street,

E Street, and Ray Oehlerich Way, and the potential for vehicle-train collisions are perhaps a greater vulnerability. To alert drivers and other users of the roadway of train hazards, railroads employ active and passive traffic control devices at at-grade crossings. Active traffic control devices provide advance warning of an approaching train at the crossing, typically by means of flashing lights, audible alarms, and the lowering of gates across the roadway. Passive traffic control devices are simply signs and pavement markings that alert drivers and other users of the road that they must look for an approaching train and take appropriate action. For this reason, at-grade crossings with passive traffic control are particularly dangerous and trains are required to issue a warning via the horn as they approach all crossings regardless of traffic control type. The crossings on E Street and Main Street are active crossings, though the Main Street crossing lacks gates, and the crossing Ray Oehlerich Way is passive.

When hazardous material spills occur on state highways, such as SR 139, the California Highway Patrol serves as the statewide information, assistance, and notification coordinator. CHP and Union Pacific Railroad each maintain hazardous material response units, however, these units are not locally based. Accordingly, the Tulelake Police Department and Tulelake Fire Protection District are likely to be the first to respond to accidents involving hazardous materials in the City and surrounding area.

7.5.6 Climate Change

Over the past two hundred years, the Earth's climate has slowly been changing in response to increasing levels of heat trapping gases in the atmosphere. This long-term shift in temperature and weather is now well documented, as is the need to prepare for and adapt to the anticipated effects of climate change. Most people experience climate change as warmer temperatures and extreme weather events. This is true for residents of Tulelake and elsewhere in Siskiyou County as well, however, climate change has also been intensifying the impacts of other the climate-related hazards in the region, including drought, wildfire, extreme weather, and flooding. Potential impacts to water supply, water quality, public health, infrastructure, wildlife, and critical habitats also exist.

Because the level of impact from climate change-related events varies and is largely beyond the control of the City of Tulelake, a vulnerability assessment was prepared as part of the Siskiyou County Local Hazard Mitigation Plan for each climate change-related impact. The assessment was completed using data available from California's Fourth Climate Change Assessment, FEMA's National Risk Index, and the California Energy Commission's Cal-Adapt data center. The vulnerability assessment estimates the impact of climate change and the City's capacity to adapt to and moderate the impacts climate change, known as "adaptive capacity." The impacts of climate change and adaptive capacity are combined to determine climate change vulnerability and prioritize mitigation actions consistent with the California Adaptation Planning Guide. The results of the assessment are summarized below.

7.5.6.1 Extreme Heat

Heat-related illnesses are a concern when it comes to extreme heat forecasts. That's because without the ability to stay cool and adequately hydrated during periods of prolonged heat exposure, health impacts that begin with fatigue and cramping can quickly escalate to heat stroke and death. Exposure to extreme heat can affect everyone, however, health risks are greater for vulnerable members of society, including pregnant women, persons with a pre-existing chronic disease, the elderly and very young, and persons who are economically disadvantaged. Because

of increased exposure to the environment, persons who work outdoors (e.g., farmworkers) are also at elevated risk.

Cities with highly modified urban landscapes may also be disproportionately affected during periods of extreme heat. That's because in addition to typically having fewer shade trees and less evapotranspiration than surrounding less developed areas, urban landscapes also tend to have higher concentrations of dark, thermally absorptive surfaces, such as roads, rooftops, parking lots, and buildings. After absorbing the sun's heat throughout the day, the asphalt and concrete used in urban areas continue to radiate heat long after sundown, such that nighttime temperatures are generally warmer in cities. This phenomenon, known as urban heat island effect, can result in temperatures in cities that are as much as 10°F warmer than in surrounding areas.

According to the vulnerability assessment prepared for the Local Hazard Mitigation Plan, the extreme heat risk index for Tulelake is in the 27.6 percentile relative to the rest of the nation, which is considered relatively low. Nevertheless, due to current and projected summer temperatures for the City and region, which could increase by as much as 5.4°F over historic conditions by the middle of the century, both the Circulation Element and Open Space & Conservation Element recommend trees planting, where appropriate, as an effective, low technology means of staying cool during summer, reducing energy demand, and achieving other social, environmental, and economic benefits.

7.5.6.2 Drought

It is the forecast of drought that generates more concern than any other climate change impact. This is because droughts can diminish water levels in lakes, reservoirs, streams, and groundwater basins, and have the potential to rapidly spread fire, create food shortages, hurt economies, and dramatically alter the living environment and people's lives. Further, despite little variability in the frequency of droughts around the world for several decades, this century has already seen record droughts on every continent outside of Antarctica. However, not all droughts are the result of climate change. In many areas of the world, such as California, droughts are a natural part of the climate's inherent variability. In fact, climate scientists believe that the prolonged drought that gripped California between 2011 and 2017 was not due to climate change, but a recurring natural phenomenon that entailed a high-pressure ridge parking over the Pacific similar to historic droughts, albeit for an extended period of time. A study by climate scientists with the University of California Los Angeles and the National Oceanic and Atmospheric Administration, however, found that during California's 2020-2022 drought, "the higher temperatures caused by anthropogenic climate change made an ordinary drought into an exceptional drought."

As temperatures in the region continue to rise throughout the 21st century, they are expected to influence the frequency and severity of droughts in several ways, such as extended dry seasons, decreased snowpack, earlier snowmelt, increased evapotranspiration, greater variability in runoff and recharge, and increased water demand. Although nobody knows for certain how much more often droughts will occur, drought frequency in the region could increase approximately 50 percent by the end of the century. But it isn't simply the incidence of drought-like conditions that matters when it comes to understanding how this could affect Tulelake and the region. This is because some droughts aren't as severe or long lasting as others, and it is the persistent strain of a drought or sequential droughts on communities, the environment, and agriculture that is so potentially detrimental. According to the vulnerability assessment prepared for the Local Hazard Mitigation Plan, the drought risk index for Tulelake is in the 99.9 percentile relative to the rest of the nation, which is considered very high.

7.5.6.3 Wildfire

There are several factors that affect the size and frequency of wildfires. The progressively warmer temperatures and associated drought stress projected for the City and region are expected to contribute to an increase in wildfire size and frequency that climate models predict will worsen over time, with some scientists noting that the probability of fire over a 30-year period is expected to increase across the region on average by 40 percent by the end of the century. Given that 19 of California's 20 largest wildfires on record have occurred since 2000, it is not surprising that climate scientists believe that the combined effects of increased heat and drought are already contributing to larger and more frequent wildfires in California. Nevertheless, a 2012 study of the Klamath, Mendocino, Shasta-Trinity, and Six Rivers National Forests found that despite wildfire size and frequency trending upward, the severity of wildfires has not been. This led the study's authors to conclude that, under appropriate conditions, fire could be more extensively used in the region to achieve management objectives. As previously noted, it is currently used to successfully reduce fuels in the nearby Tule Lake National Wildlife Refuge and Modoc National Forest. While the use of prescribed fire may not be appropriate inside city limits, the City's green waste disposal site serves a similar purpose and allows the City to more safely reduce fire risk. The Local Hazard Mitigation Plan indicates the risk index for Tulelake from wildfire is in the 89.8 percentile for the nation, which is relatively moderate.

7.5.6.4 Extreme Weather

Extreme weather events are often cited as a likely outcome of climate change. This is because for each 1.8°F of warming, the atmosphere can hold approximately seven percent more water vapor, and with increased warming there is more water evaporating from the Earth's surface for the atmosphere to hold. Because this water vapor contains energy in the form of latent heat, more water in the atmosphere means there is more energy to feed the atmospheric instability that drives large storms. The effect of a warming climate on extreme weather is not consistent around the globe. This is because wetter areas of the planet have more water available to feed storms than drier areas. For this reason, the greatest observed increases in storm severity in the United States have been in the wetter areas of the country.

Extreme winter weather encompasses multiple effects caused by winter storms and conditions, including strong winds, ice storms, heavy or prolonged snow, sleet, and extreme cold. In areas and regions that only see intermittent winter storms, such as Siskiyou County, winter storms may become increasingly hazardous. According to climate models, the region is likely to experience normal to slightly wetter winters as a result of climate change. While that alone is not expected to result in substantial increases in extreme weather, as the climate warms, more of the precipitation that does fall is expected to fall as rain. Further, climate models project less precipitation for the region during the spring and fall, essentially condensing the period of time that the region receives its annual precipitation. When these predicted shifts in the timing of runoff are combined with atmospheric rivers that already deliver most of the state's annual precipitation during relatively few days each year, increased localized flooding in the City due to winter storm events becomes more likely. According to the Local Hazard Mitigation Plan, the risk index for Tulelake from winter weather (e.g., snow, sleet, and freezing rain) is relatively low (25.7 percentile nationwide), while the risk index for the City from cold waves is in the 90.8 percentile nationwide, which is relatively high.

7.6 CORRELATION WITH OTHER PLANS AND ELEMENTS

Many Safety Element policies are interrelated with topics in the Land Use, Circulation, Housing, and Open Space & Conservation Elements. For example, the Land Use Element seeks to

minimize impacts as a result of future development in hazard-prone areas and to separate sensitive land uses, such as residential neighborhoods, from incompatible uses. It is important to remember, however, that policies in the Safety Element are tailored to address health and safety-related issues. The Safety Element is also closely related to the Local Hazard Mitigation Plan, which plans for mitigation of hazards in more detail and is required for access to federal and state financial assistance programs. The LHMP and this element discuss specific hazards with a high likelihood of occurrence or high impact severity that could potentially affect the City of Tulelake, including seismic and geologic hazards, wildfire, and climate change. For these reasons, the most recent LHMP is incorporated as part of the Safety Element by reference.

7.7 SAFETY ELEMENT GOALS, POLICIES & PROGRAMS

GOAL S-1: A city prepared for necessary action, including evacuation if needed, due to disasters, and primed for recovery following a disaster.

GOAL S-2: A city that has reduced, to the extent feasible, the threat to life and property caused by fire.

GOAL S-3: A city that has minimized, to the extent feasible, potential impacts to people, structures, and the environment resulting from flood.

GOAL S-4: A city that has minimized, to the extent feasible, potential impacts to life and property caused by geologic and seismic hazards.

GOAL S-5: A city that has minimized, to the extent feasible, risks to life and property resulting from hazardous materials spills.

GOAL S-6: A city that has minimized, to the extent feasible, the risks to life and property resulting from climate change.

GOAL S-1: A city prepared for necessary action, including evacuation if needed, due to disasters, and primed for recovery following a disaster.

Policy S-1.1: The City creates and maintains a safe environment for its residents.

Policy S-1.2: The City plans for and strives to provide adequate facilities, equipment, and personnel to respond to emergencies.

Policy S-1.3: The City takes appropriate measures to prepare for natural and human-caused disasters and to protect residents should one occur.

Policy S-1.4: The City endeavors to minimize impacts to life, structures, and the environment should a disaster strike.

Policy S-1.5: The City takes appropriate measures to ensure that critical and essential city facilities remain operational during emergencies.

Policy S-1.6: The City participates in agreements for automatic and mutual aid with other local, state, federal, and nongovernmental emergency service providers to improve protection services and emergency response throughout the county.

Policy S-1.7: The City coordinates with and encourages the use of community-based networks to aid vulnerable populations prepare for emergencies and provide assistance with evacuation and recovery.

Policy S-1.8: The City engages with the community to increase awareness of and preparedness for emergencies and natural disasters.

Policy S-1.9: The City commits to the goals, objectives, and actions in the Local Hazard Mitigation Plan and subsequent amendments thereto.

Policy S-1.10: The City continues to assess and improve evacuation capacity, safety, and viability under a range of emergency evacuation scenarios.

Policy S-1.11: The City requires new development that requires additional levels of law enforcement and fire protection services to participate in offsetting costs for the additional services.

Policy S-1.12: The City strives to maintain adequate emergency response times for all existing and planned development within city limits, and for lands proposed for annexation.

Program S-1A: Coordinate with state, county, and other local agencies to build mutual aid capacity for emergency events, especially through disaster preparedness training. Develop and maintain mutual aid agreements with appropriate agencies.

Program S-1B: Periodically review, and update as necessary, plans that advise city staff, first responders, and residents on actions that should be taken in the event of an emergency. Plans should be distributed to and made readily available to the public.

Program S-1C: Expand emergency training and local expertise for emergency event response and recovery, including through volunteer roles.

Program S-1D: Establish minimum levels of service thresholds for fire protection and law enforcement services and maintain services at or above those thresholds.

Program S-1E: Provide rapid and timely response to all law enforcement, fire, and other emergencies. Work to maintain minimum average response times.

Program S-1F: Work with SCLTC and other partners on the development of the countywide evacuation and preparedness plan and educate the public on related emergency protocols developed in the plan.

Program S-1G: Maintain evacuation routes free of hazards and other obstructions that have the potential to hinder an evacuation or emergency response.

Program S-1H: Coordinate with SCLTC, Caltrans, the County Road Department, Siskiyou County Sheriff's Office, Siskiyou OES, CAL FIRE, and other local, state and federal agencies to identify strategies that ensure the maintenance and reliability of evacuation and supply transportation routes potentially compromised during an emergency.

Program S-1I: Adopt road standards that provide adequate ingress and egress during an emergency.

Program S-1J: Identify and publicize emergency shelters and sign and control evacuation routes for use during emergencies, working with Caltrans and the County of Siskiyou, as appropriate, for signs along SR 139 and county roadways.

Program S-1K: Continue to promote and support the use of early warning notification systems (text messages, telephone calls, etc.) to notify residents by wireless emergency

alert of the need to evacuate in the event of an emergency and the location of evacuation routes, points, and critical facilities such as schools and day care centers, particularly residents of vulnerable areas and neighborhoods with constrained emergency access.

Program S-1L: Ensure that applications for projects that will house infirmed, non-ambulatory persons, seniors, and children in high hazard areas include adequate provisions to mitigate known hazards.

Program S-1M: Work with community groups, faith-based organizations, and other institutions to develop a network of conveniently located community resilience hubs (e.g., public facilities, businesses, and community-oriented facilities) that are centrally located, accessible, and equipped to provide aid to vulnerable populations during emergency events, periods of poor air quality, utility disruptions, and/or climate change-related hazards.

Program S-1N: Coordinate with the Siskiyou County Office of Emergency Services, the County of Siskiyou, and other cities in Siskiyou County to implement and regularly update the LHMP and stay in compliance with relevant FEMA and state requirements.

Program S-1O: Forward all land divisions and development applications that have the potential for public safety impacts to the Tulelake Police Department and Tulelake Fire Protection District for review.

Program S-1P: Ensure developed properties are easily identifiable by emergency responders from the street.

Program S-1Q: Work with utility companies to determine the feasibility of undergrounding utility lines during construction of new developments, and to identify funding mechanisms to support undergrounding activities.

Program S-1R: Prioritize the needs of at-risk, vulnerable, and disadvantaged populations during emergency response and disaster recovery efforts, including increasing awareness of the benefits of defensible space and promoting understanding of evacuation routes.

GOAL S-2: A city that has reduced, to the maximum extent feasible, the threat to life and property caused by fire.

Policy S-2.1: The City endeavors to prevent fires, reduce fire severity, and safeguard residents, in part by:

- Contracting with and supporting a well-trained and staffed fire department.
- Coordinating and cooperating with other public agencies with responsibility for public safety.
- Ensuring adequate infrastructure for new development, including water supplies for structural fire suppression, safe access for emergency response vehicles, and visible street signs.
- Public education, including but not limited to, working with the County, Fire Protection District, and other agencies to inform property owners about the benefits of defensible space and use of construction materials and methods that reduce the potential for ignition.

Policy S-2.2: The City desires to sustain and grow the ability of the Tulelake Fire Protection District to respond to fires in and around the City.

Policy S-2.3: The City coordinates with and supports the efforts of Fire Safe Councils throughout the region.

Policy S-2.4: The City supports programs to prevent and prepare for urban fires and wildfires.

Program S-2A: Take appropriate measures to support a well-trained, equipped, and staffed volunteer fire protection district.

Program S-2B: Ensure proposed development provides adequate infrastructure and access for fire and emergency response vehicles and equipment.

Program S-2C: Conduct proactive vegetation management/hazard abatement to reduce fire hazards on existing public properties, along evacuation routes, and other land where applicable.

Program S-2D: Work with private property owners, Siskiyou County, and Caltrans to conduct roadside vegetation clearance along evacuation routes outside the City, as needed. Ensure that fuel reductions provide an appropriate fuel buffer for evacuees should the roadways become congested during an emergency incident.

Program S-2E: Continue to monitor fire flow capabilities throughout the City and make improvements at any locations with flow considered inadequate for fire protection.

Program S-2F: Ensure adequate fire flow is maintained within city limits through ongoing maintenance, capital improvement public infrastructure upgrades, and improvements required in association with development projects and in compliance with applicable regulations.

Program S-2G: Maintain adequate fire flow during scheduled and unscheduled power outages and interruptions through incorporation of power source resiliency and redundancy within the City's water supply, treatment, and distribution infrastructure.

Program S-2H: Approve discretionary development proposals only when adequate fire suppression services and facilities are available or will be made available concurrent with development, considering the setting, type, intensity, and form of the proposed development.

Program S-2I: Continue to inform residents about fire hazards, appropriate responses to fire, evacuation routes, plans to reach at-risk populations, and ways to prevent loss, including defensible space, home hardening, and landscaping improvements that can reduce the impact of fire.

Program S-2J: Identify residential areas that do not have at least two routes for emergency egress, lack adequate emergency water supply, or need vegetative fuel modification to reduce fire risk. Work with affected residents and the Tulelake Fire Protection District to identify potential area-specific solutions to ensure risk reduction.

Program S-2K: Work with the Siskiyou County Department of Public Health and Siskiyou County Air Pollution Control District to ensure residents are educated on wildfire smoke hazards and how to protect themselves and their homes from smoke impacts.

Program S-2L: Ensure that new development projects include adequate measures to minimize fire hazards while remaining in compliance with housing laws regarding objective design standards and discretionary review.

Program S-2M: Strive to improve the Tulelake Fire Protection District's current Insurance Service Office (ISO) rating for public safety and associated benefits.

Program S-2N: Following revisions to the fire hazard severity zones maps by the Office of the State Fire Marshal, maintain compliance with Government Code Sections 51179 and 65302(g)(3) by updating fire hazard severity zone designations and the Safety Element, as needed.

GOAL S-3: A city that has minimized, to the extent feasible, potential impacts to people, structures, and the environment resulting from flood.

Policy S-3.1: The City supports efforts to protect public health and safety from flooding through sustainable and environmentally responsible floodplain management.

Policy S-3.2: The City strives to minimize localized flooding through ongoing improvements to the City's storm drain network.

Program S-3A: Continue to coordinate with local, regional, state, and federal agencies to maintain an adequate flood management information base, prepare risk assessments, and identify strategies to mitigate flooding impacts.

Program S-3B: Support and participate in the preparation of a countywide flood control plan to minimize impacts from existing and future flooding in the region.

Program S-3C: Work with the Siskiyou County Flood Control District, resource conservation districts, watershed councils, and landowners to design or approve flood control measures that avoid, to the extent feasible, the alteration of creeks, wetlands, and riparian buffer areas.

Program S-3D: In designing flood control facilities, ensure the protection of special-status species and downstream ecosystems.

Program S-3E: Continue to improve and to apply for funding to improve the City's storm drain network.

GOAL S-4: A city that has minimized, to the extent feasible, potential impacts to life and property caused by geologic and seismic hazards.

Policy S-4.1: The City strives to ensure a high level of safety and minimize the loss of life injury, and property damage from earthquake, volcanic activity, subsidence, liquefaction, and other geologic hazards.

Policy S-4.2: The City requires that new development be designed to minimize the risk of damage from seismically induced ground shaking, ground failure, and other seismic hazards.

Program S-4A: Identify and prioritize seismic retrofits needed on existing public buildings.

Program S-4B: Encourage upgrading of privately-owned, unreinforced masonry buildings to prevent earthquake damage.

Program S-4C: Continue to implement programs, enforce regulations, and harden critical infrastructure to reduce geologic and seismic hazard vulnerability.

Program S-4D: Continue to participate in the sustainable groundwater planning process for the Tule Lake Subbasin, working toward solutions that ensure subsidence does not result from the overextraction of groundwater.

Program S-4E: Secure grant funding, as needed, to facilitate the removal and replacement of buildings damaged by seismic events and other geologic hazards.

Program S-4F: Coordinate with county, state, and federal agencies monitoring volcanic activity and hazards.

GOAL S-5: A city that has minimized, to the extent feasible, risks to life and property resulting from hazardous materials spills.

Policy S-5.1: The City takes necessary steps to prevent and prepare for hazardous materials spills, as well as protect its residents should one occur.

Policy S-5.2: To diminish the likelihood of hazardous materials spills along SR 139 and the railroad, the City advocates for its concerns regarding highway and rail safety.

Program S-5A: Maintain an open dialogue with Caltrans and the California Highway Patrol to ensure those agencies are aware of and responsive to the City's concerns about vehicle safety and hazardous materials transport along SR 139.

Program S-5B: Ensure that the Union Pacific Railroad and Federal Railroad Administration are aware of and responsive to the City's concerns about rail safety through the City.

Program S-5C: Continue to enforce designated truck routes through the City and prohibit routes that pass through residential neighborhoods to the maximum extent feasible.

Program S-5D: Identify necessary steps to be taken to protect residents in the case of a hazardous materials spill and be prepared to quickly implement these measures in the event of an accident.

Program S-5E: Maintain an up-to-date list of emergency contacts that are to be notified in the event of a hazardous materials spill, make the list readily available to city staff and first responders to facilitate a rapid response, and work with the Tulelake Police Department and California Highway Patrol to ensure rapid notification of residents in the event of a spill.

Program S-5F: Continue to promote the training of, and the provision of appropriate protection equipment for, local first responders who would respond to hazardous material spills in the Tulelake area.

Program S-5G: Secure grant funding, as needed, to facilitate and support the remediation of hazardous materials cleanup sites.

GOAL S-6: A city that has minimized the risks to life and property resulting from climate change.

Policy S-6.1: The City integrates regional collaboration as a key component of the City's climate adaptation planning strategy, recognizing the regional nature of climate impacts and climate adaptation strategies.

Policy S-6.2: The City incorporates climate change considerations into city processes and planning efforts, utilizing best available data to understand climate predictions and the potential impacts on community resources and facilities.

Program S-6A: Actively participate in regional discussions on infrastructure improvements and adaptation strategies related to climate resiliency and addressing potential community impacts.

Program S-6B: Continue to collaborate with Siskiyou County, other local communities, and community organizations to establish and maintain shelters in Tulelake and the surrounding area to reduce public exposure to extreme heat, cold, and smoke.

Program S-6C: Assess existing public infrastructure systems vulnerable to changes in key climate variables and incorporate upgrades to critical infrastructure in the City's Capital Improvement Program planning process.

Program S-6D: When updating the Capital Improvement Program, engineering specifications and standards, and planning documents, incorporate climate projection data, risk modeling, and adaptive management, as appropriate, to account for future changes in key climate variables (e.g., changes in precipitation and flooding behavior, fire and smoke risk, maximum daily temperatures, etc.).

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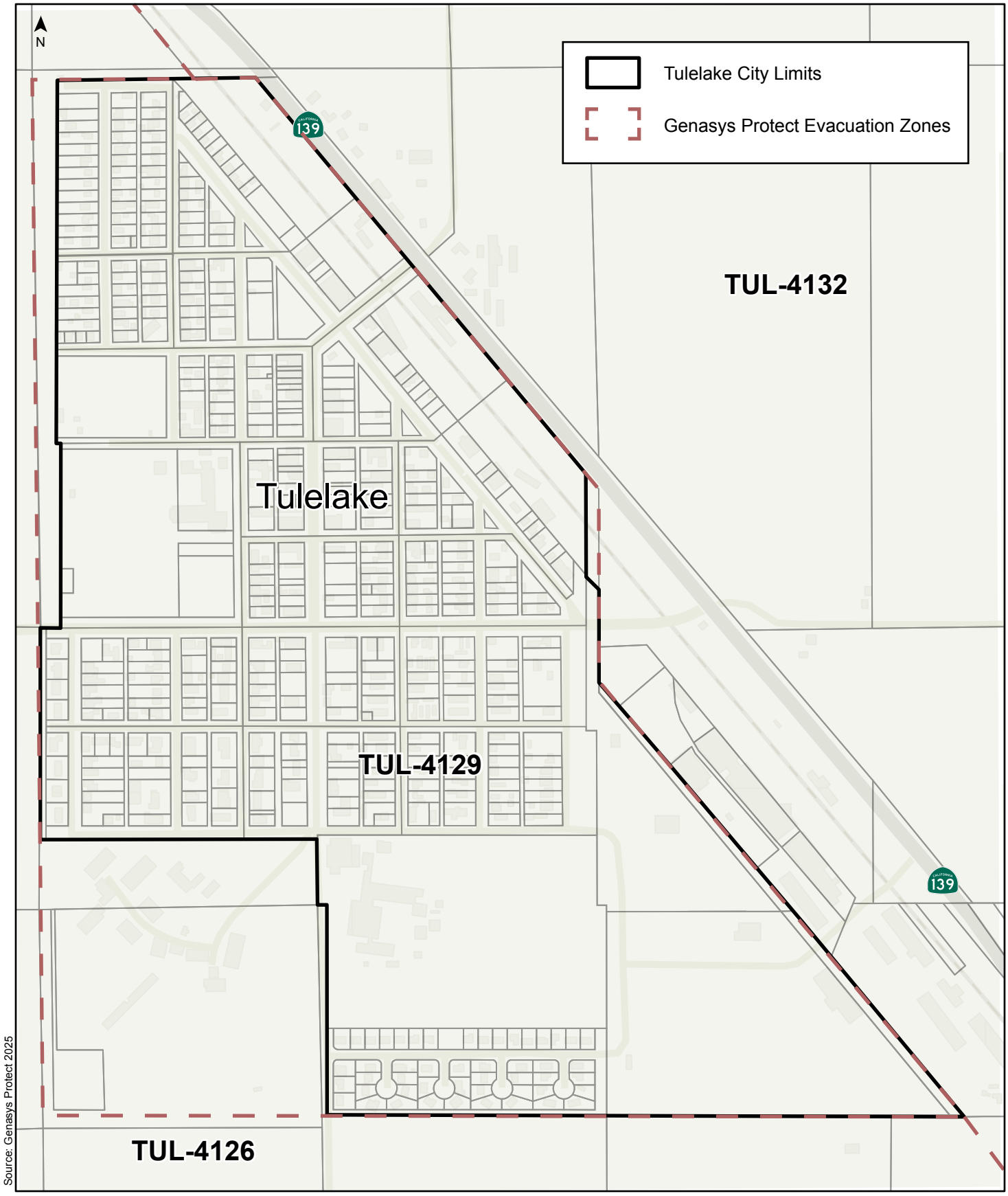


Figure 7-1, Evacuation Zones

Figure 7-2, Evacuation Routes

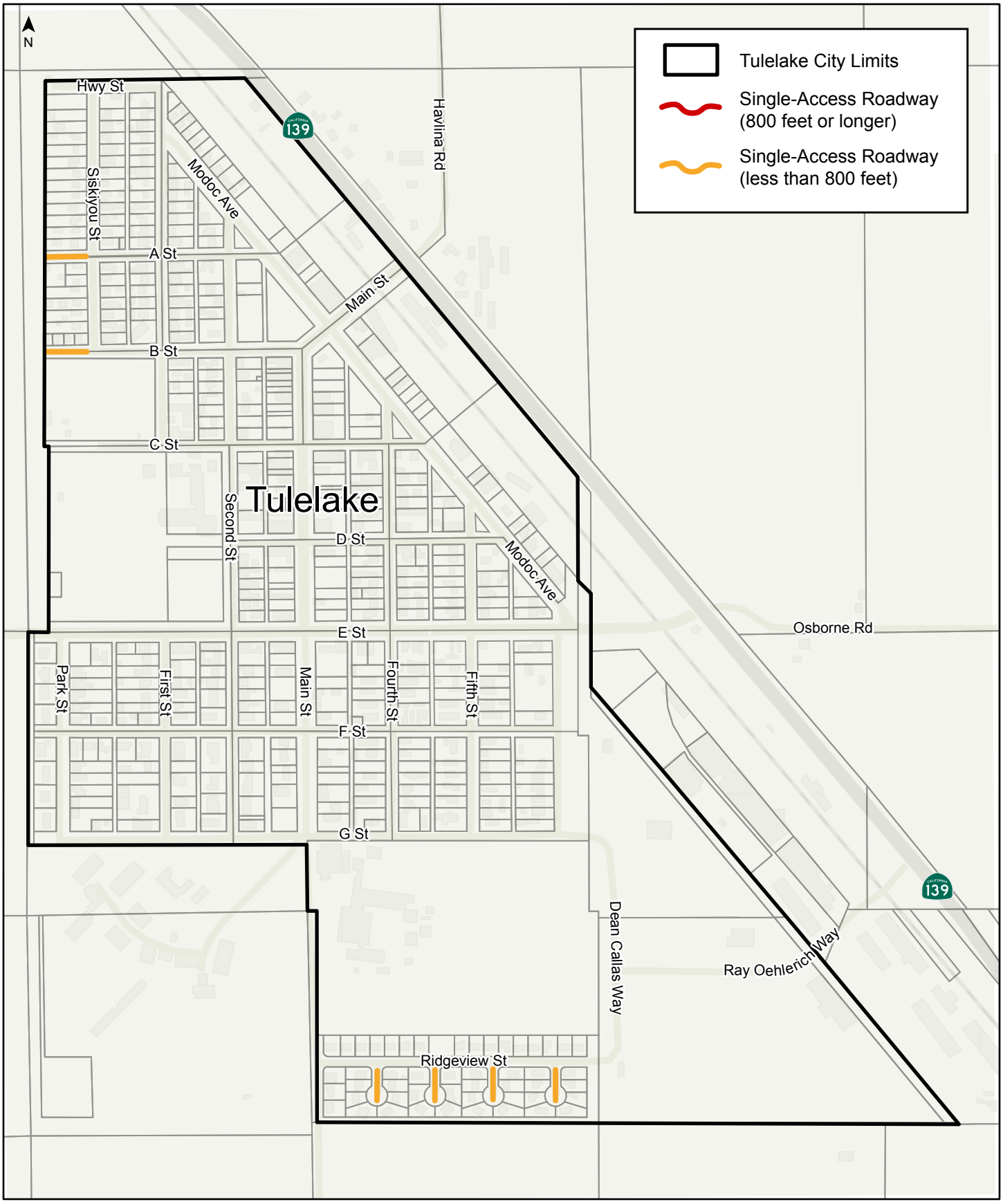


Figure 7-3, Single-Access Roadways

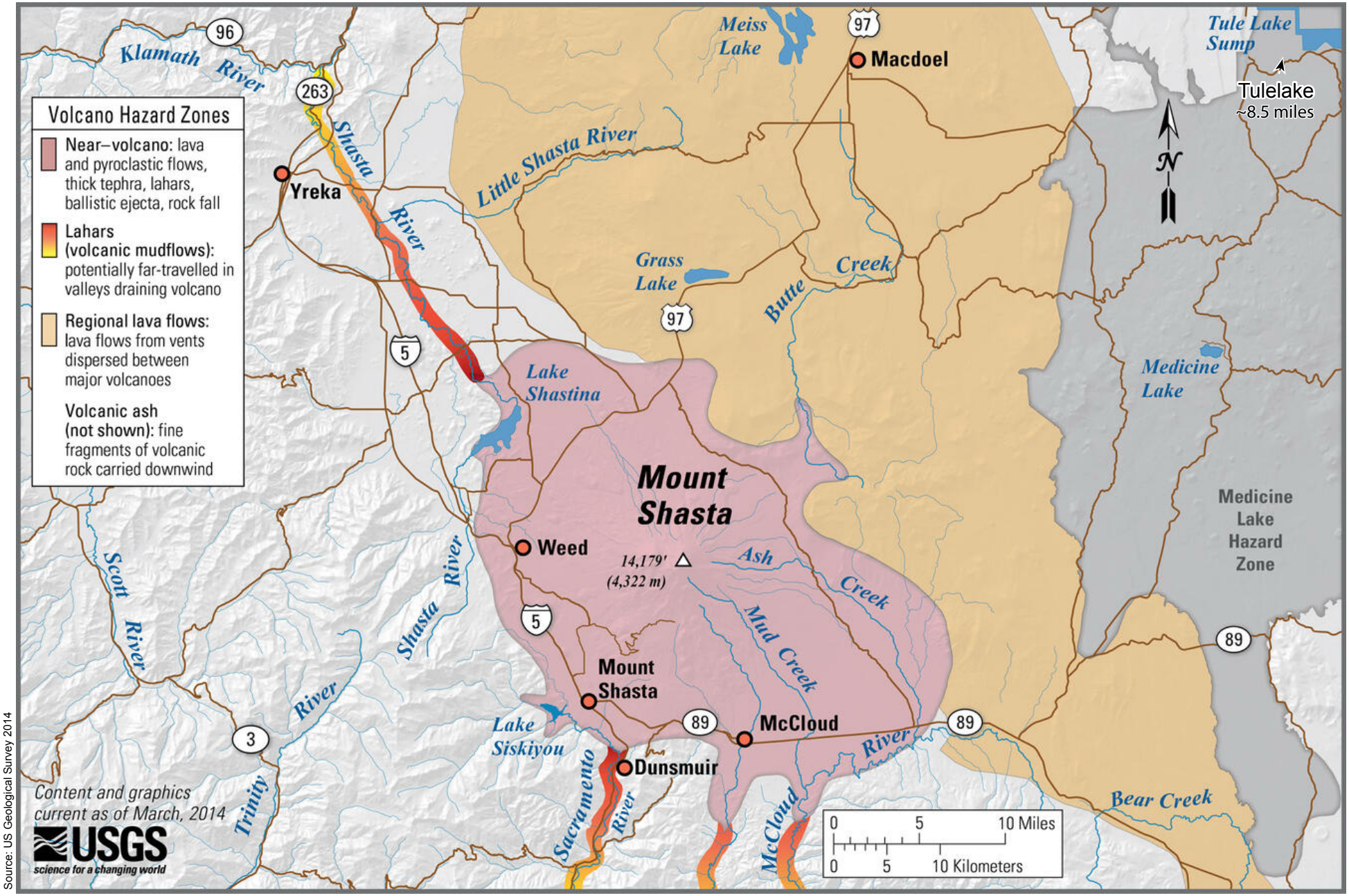
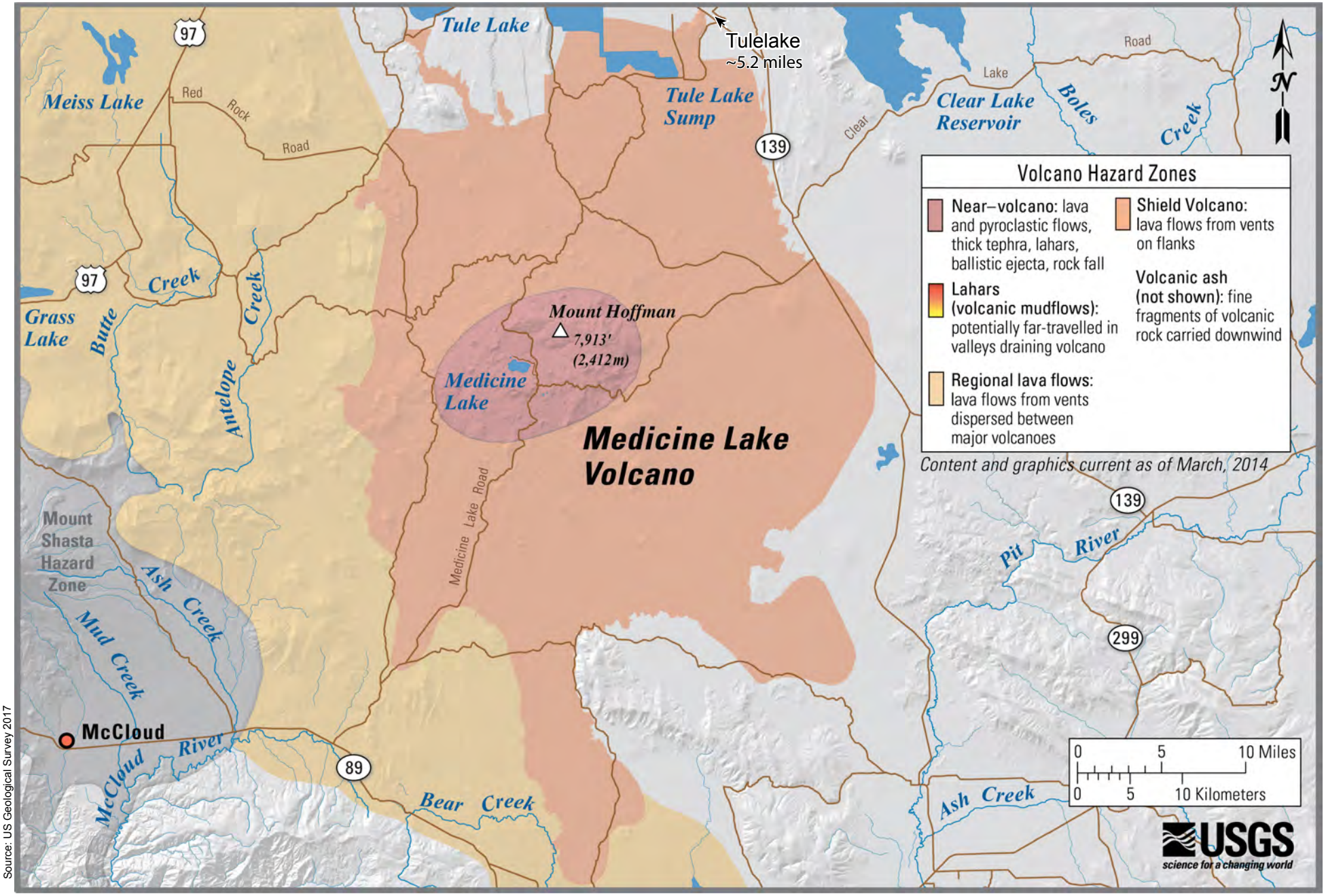
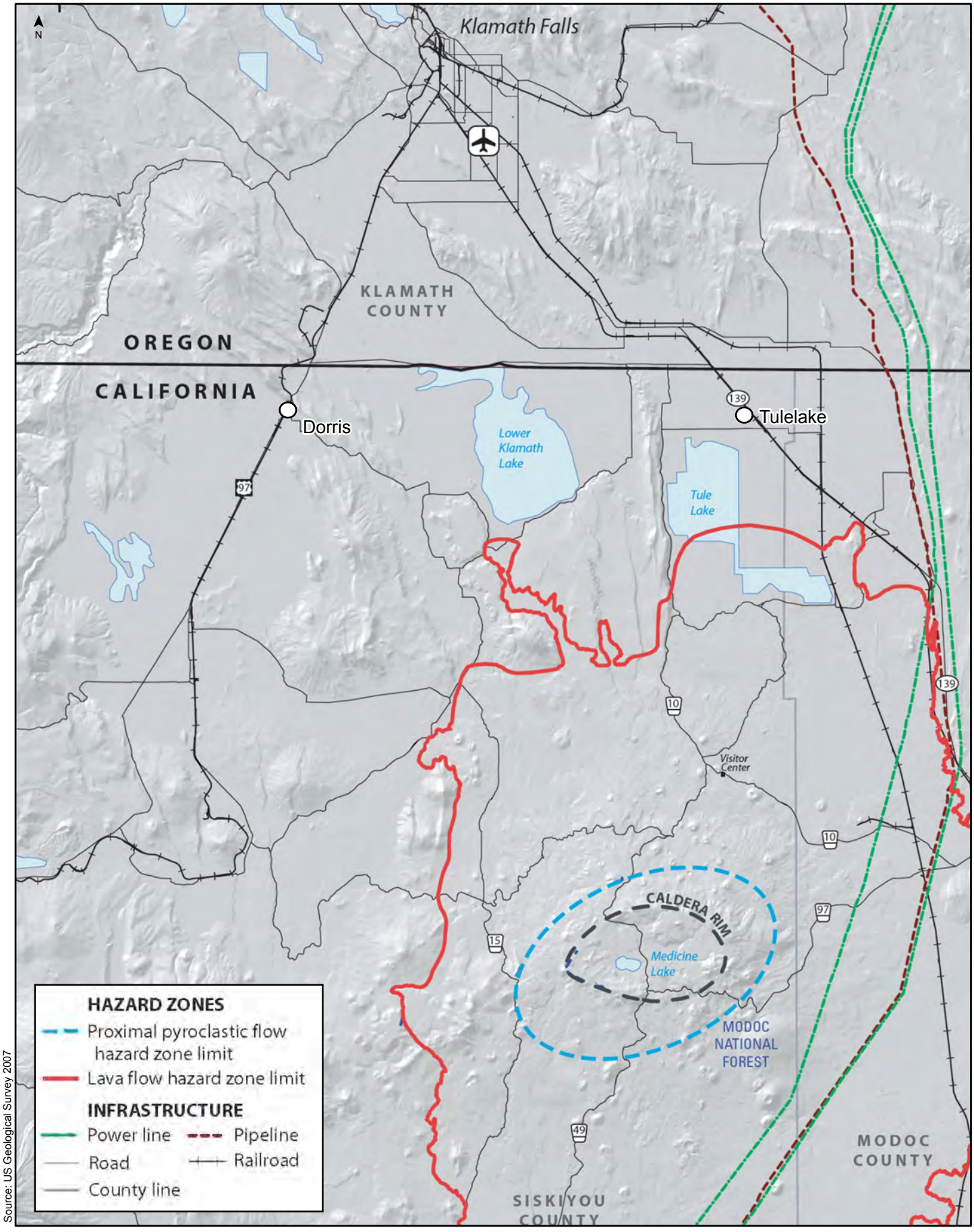


Figure 7-4, Mount Shasta Simplified Volcanic Hazards



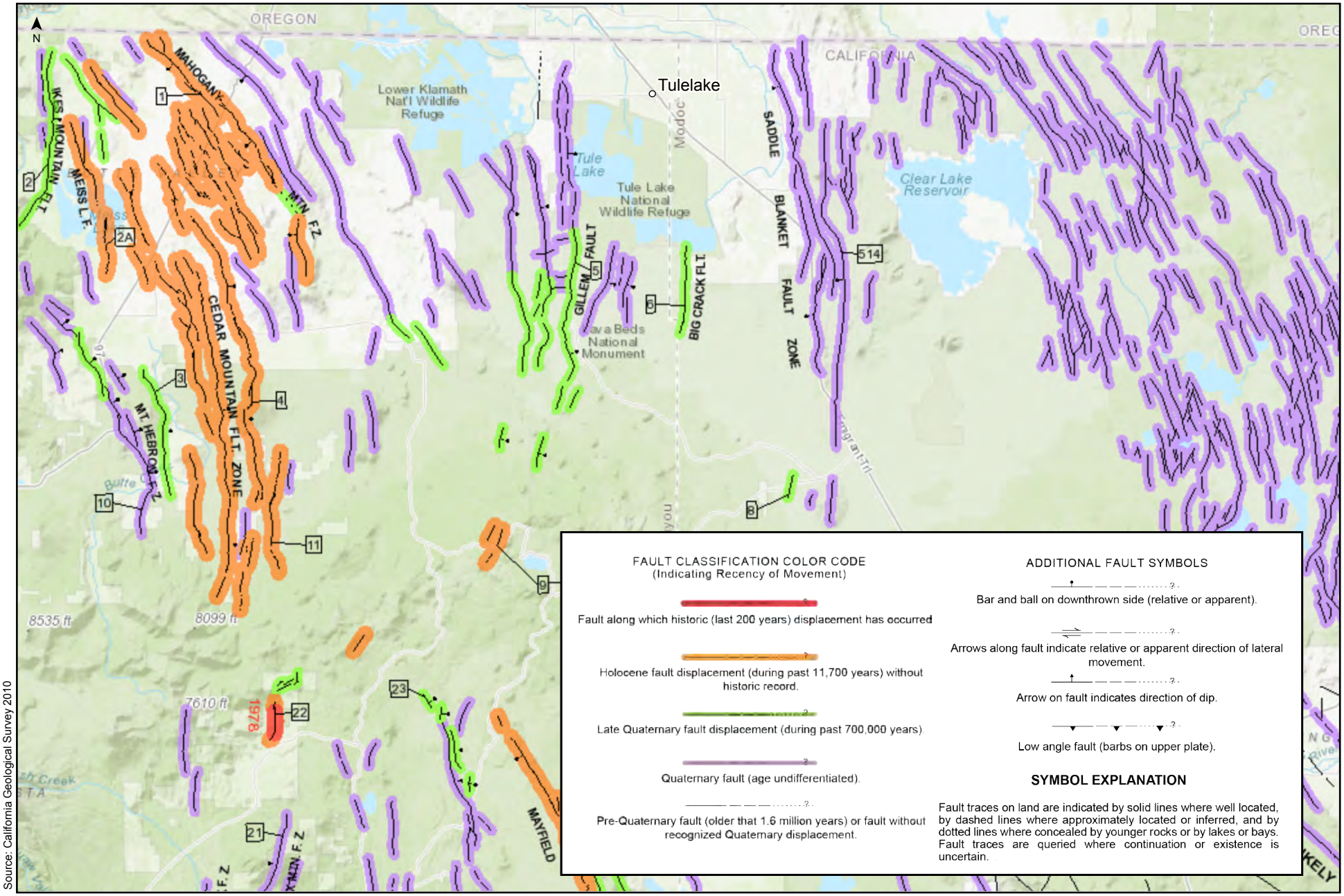
Source: US Geological Survey 2017

Figure 7-5, Medicine Lake Simplified Volcanic Hazards



Source: US Geological Survey 2007

Figure 7-6, Medicine Lake Volcanic Hazard Zones & Infrastructure



Source: California Geological Survey 2010

Figure 7-7, Fault Activity Map

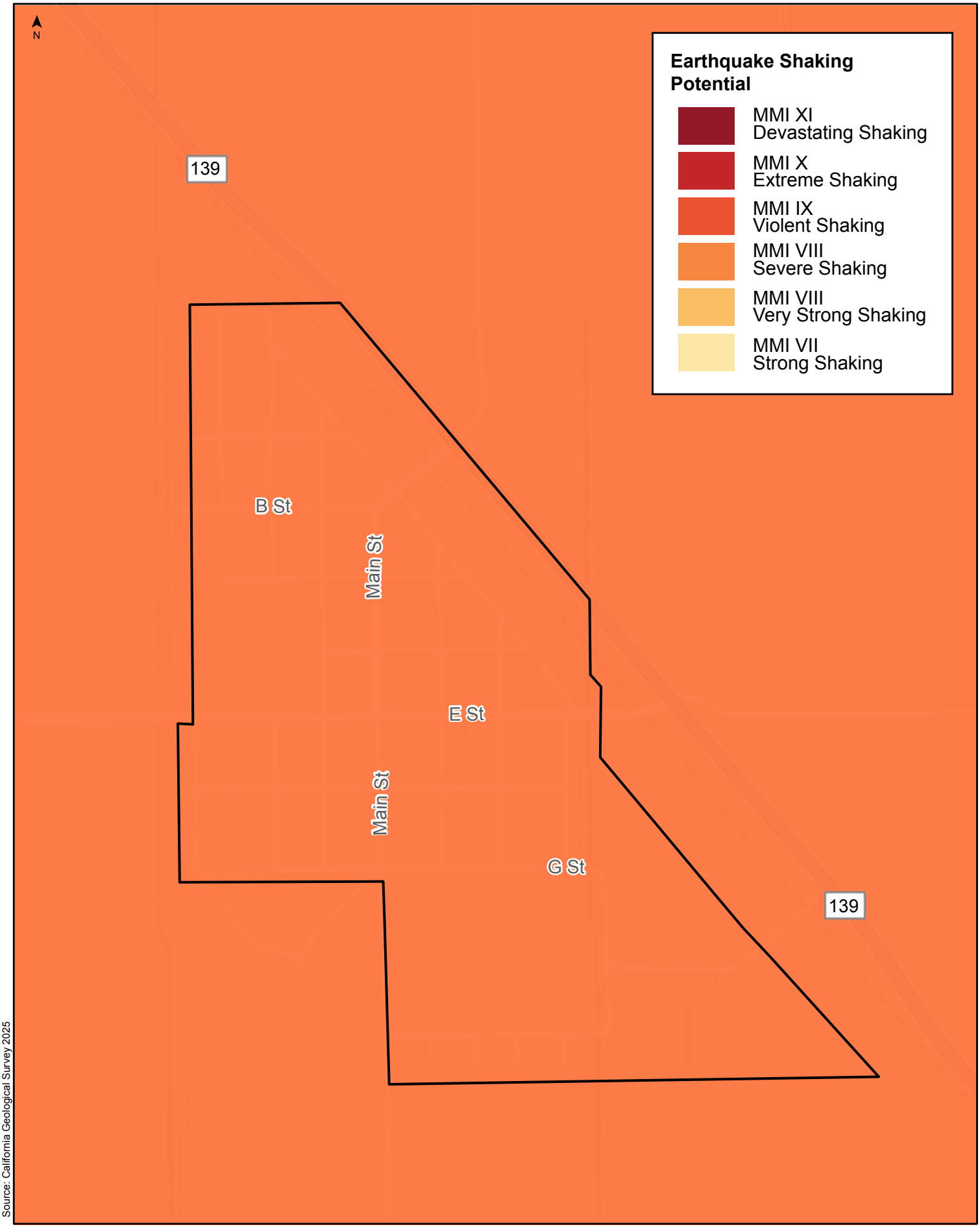


Figure 7-8, Earthquake Shaking Potential

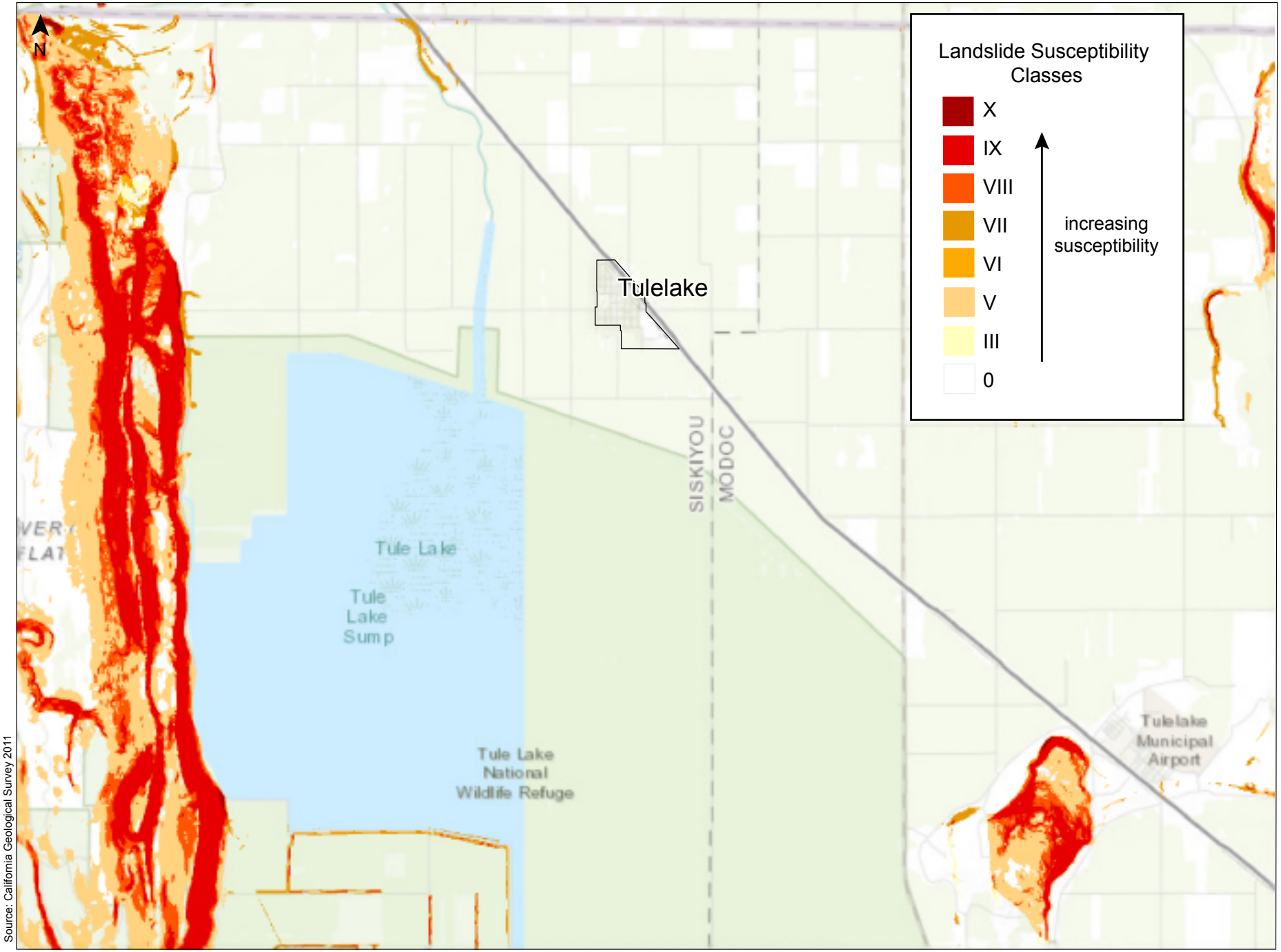
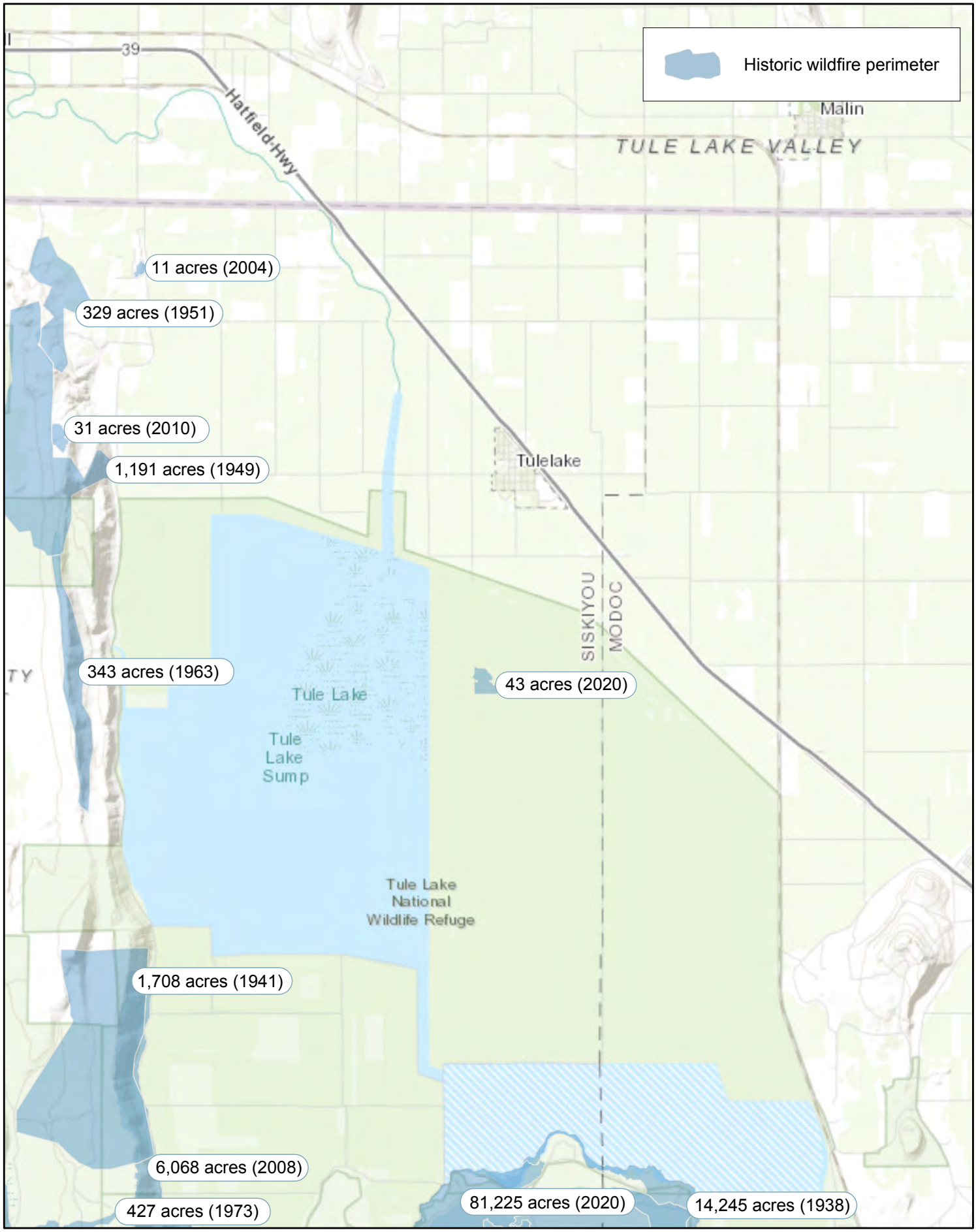


Figure 7-9, Deep-Seated Landslide Susceptibility



Source: CAL FIRE 2025

Figure 7-10, Historic Wildfire Perimeters

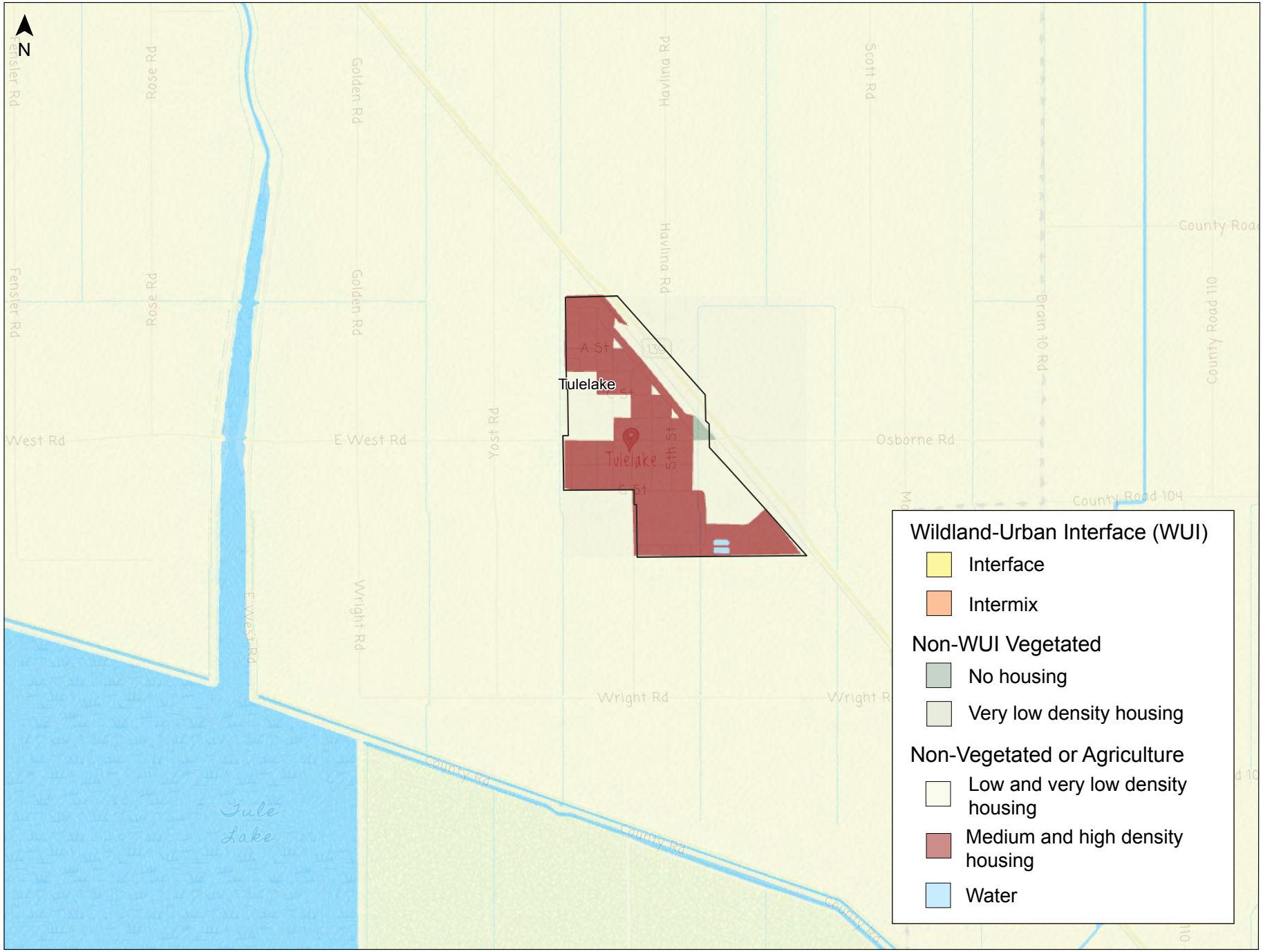


Figure 7-11, Wildland Urban Interface

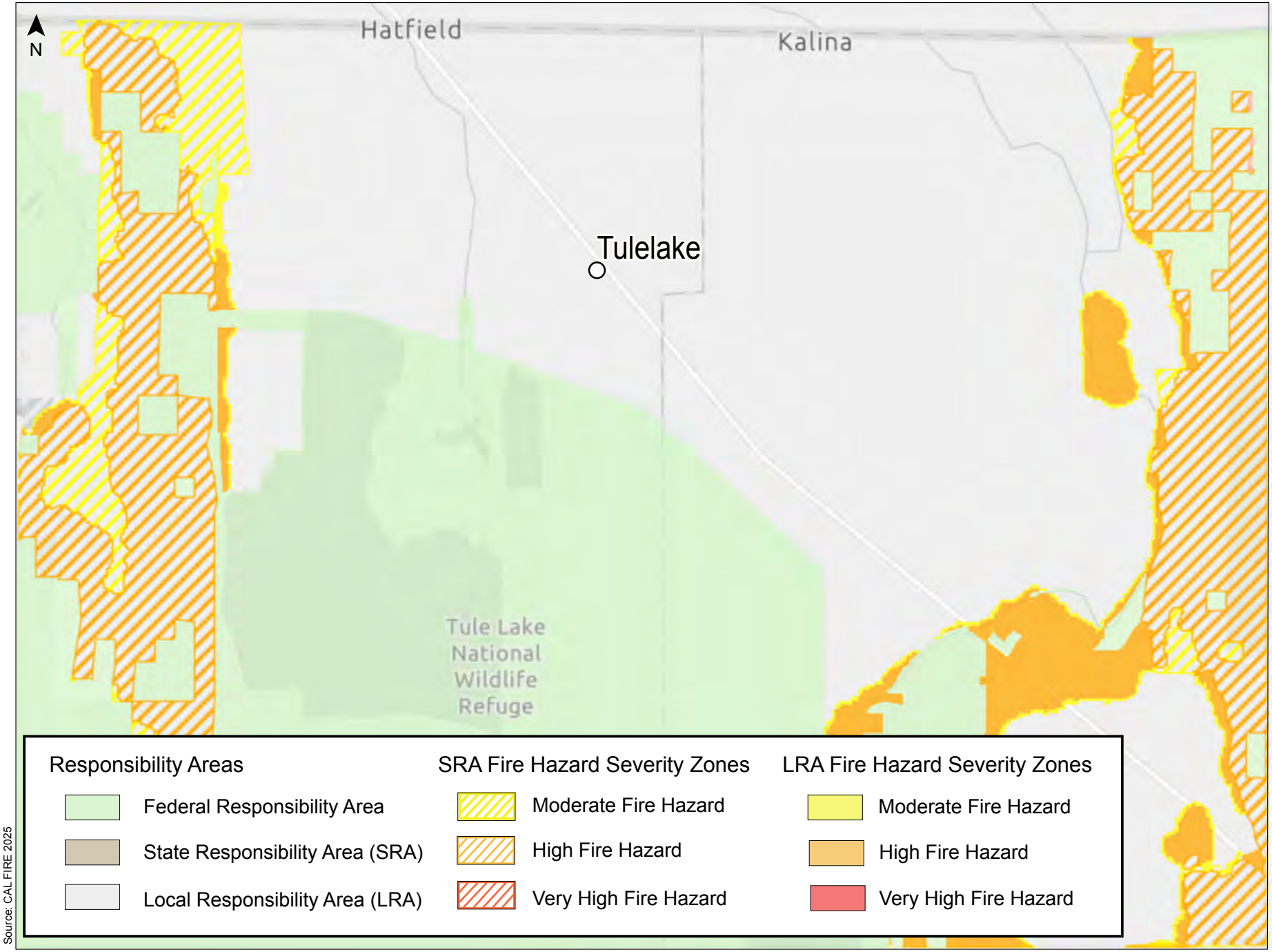
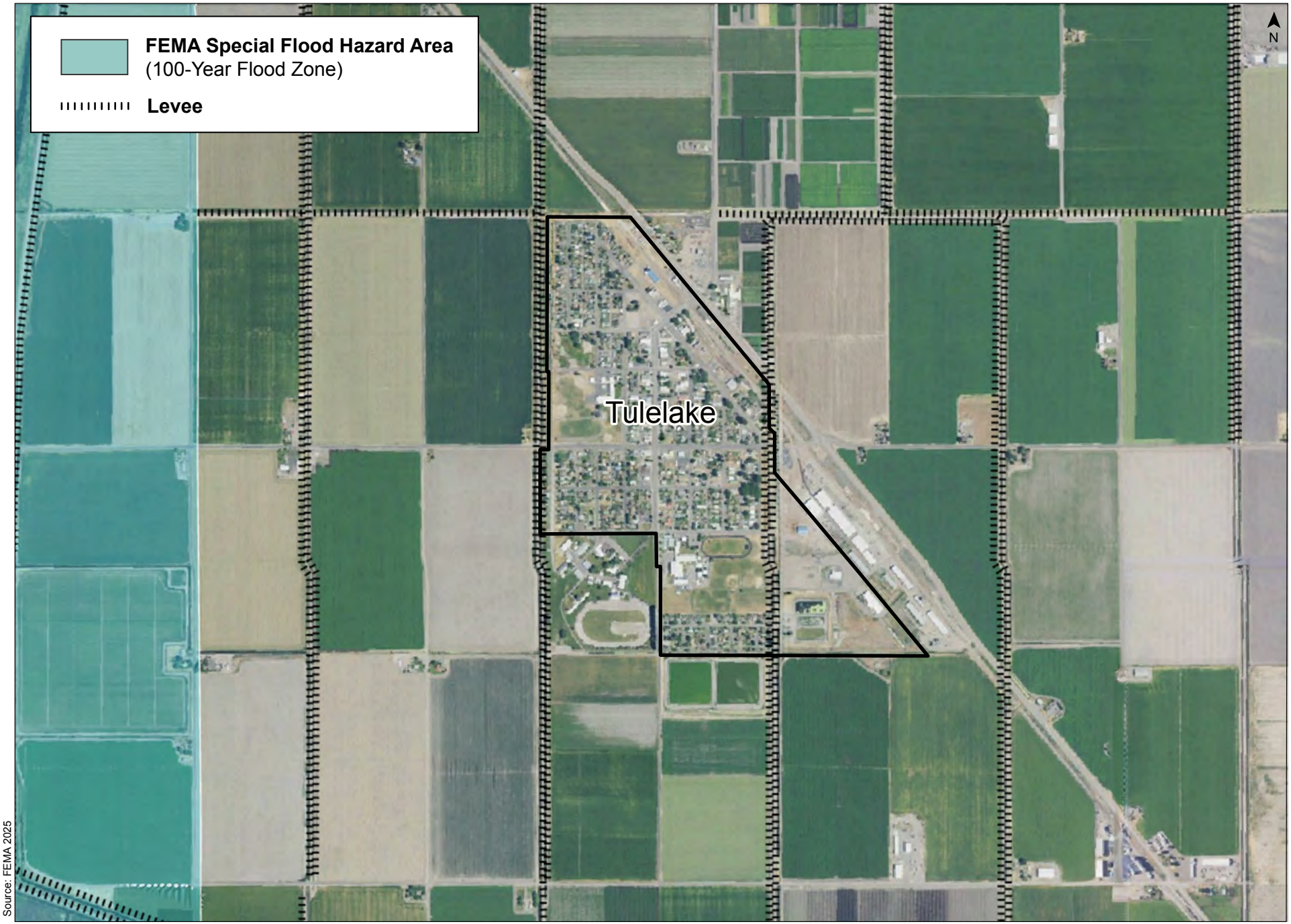


Figure 7-12, Wildfire Hazard Severity Zones



Source: FEMA 2025

Figure 7-13, FEMA Flood Hazards

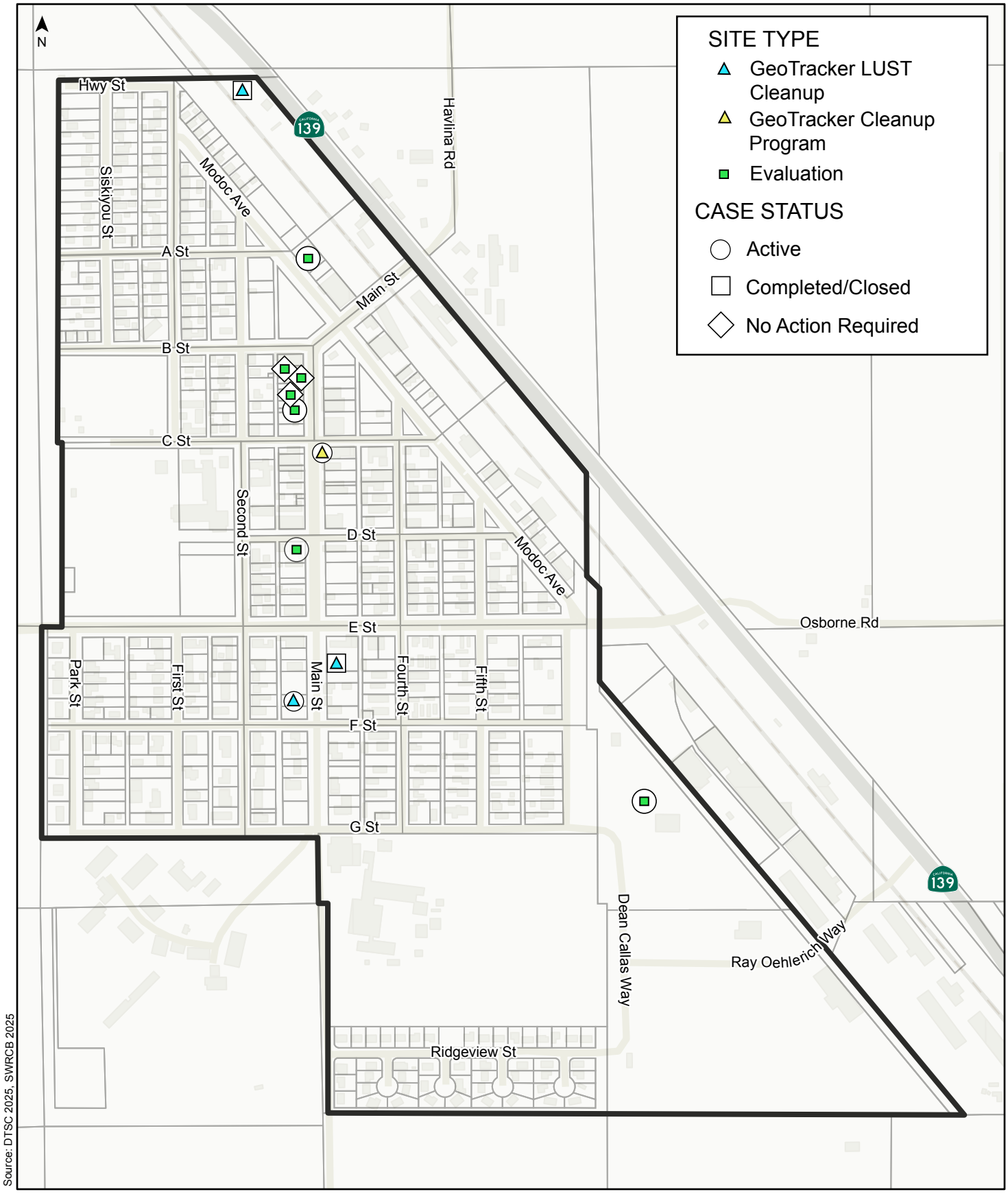


Figure 7-14, Hazardous Materials Evaluation & Cleanup Sites