City of Chico

Community Wildfire Protection Plan

PUBLIC DRAFT FOR REVIEW AND COMMENT

Prepared for:

City of Chico

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Chico, CA

TABLE OF CONTENTS

LIST OF FIGURES

EXECUTIVE SUMMARY

The City of Chico, located where the Northern Sacramento Valley meets the foothills of the Southern Cascade mountains, is not unfamiliar with catastrophic wildfire. The deadly and destructive Camp Fire in 2018 nearly burned into city limits, and many other large fires have burned in the foothills east of town in the past. Recent urban conflagrations including the 2017 Tubbs Fire and 2021 Marshall fire have illuminated the potential for high-consequence wildfire events to occur in densely-built urban landscapes.

The 2003 Healthy Forest Restoration Act encourages communities like Chico to collaboratively develop Community Wildfire Protection Plans (CWPPs) to assess their wildfire threats and identify specific areas for targeted vegetation management to reduce exposure to destructive wildfires. CWPPs can also propose improvements in wildland firefighting capacity, public engagement, or other activities which improve community wildfire resilience. The primary administrative function of CWPPs is to act as a living 'project list'. State and Federal agencies prioritize public funding of wildfire hazard mitigation projects which have been published in an adopted CWPP.

Developed via an evidence-based, collaborative process, this CWPP assesses wildfire risks, community preparedness, defensibility, and potential hazard mitigation measures for the City of Chico and surrounding areas. The goals of this CWPP process are to:

- Describe and assess the greater Chico area's general wildfire risk
- Simulate potential wildfire disasters in the urban area using predictive computer models
- Identify areas of critical risk, where a wildfire could potentially spread into residential areas, damage property or critical infrastructure, or damage natural resources
- Identify specific fuel treatment projects and policy enforcement specifications to directly reduce the risk of wildfire in these critical areas
- Develop targeted outreach to residents living in the high risk areas
- Recommend potential policy improvements and public outreach initiatives to effectively increase wildfire preparedness and elevate the community's relationship with wildfire risk

This project reaffirms the need for previously-proposed fuels management projects identified in the city's 2021 Vegetation and Fuels Management Plan (VFMP). In addition, our analysis identifies 3,155 private and city-owned parcels which face elevated wildfire hazards. These areas are considered high priority for regular fuels reduction (mowing or brush cutting) due to their capacity to allow wildfires to spread across them and deeper into the city under critical wildfire conditions. This report also identifies several potential policy shifts and preparedness upgrades that can elevate Chico's ability to meet growing concerns and increasing risk of catastrophic wildfire.

DISCLAIMER: This document analyzes wildfire hazard across the Chico Urban Area and makes recommendations on ways that residents in the area can reduce their collective exposure to wildfire-caused losses.

Within this document, areas were prioritized for hazard reduction based upon a number of factors including: potential wildfire behavior, density of homes, proximity to wildland vegetation, and prevailing fire-season weather and winds. The fact that an area may be mapped as lower hazard in this document does NOT mean that that particular area is safe from wildfires – rather, it just means that there were other areas where targeted wildfire hazard reduction projects or public education might benefit a greater number of residents.

Under typical summer wildfire burning conditions, any area with tall dead grass or un-mowed weeds has the potential to support rapid rates of wildfire spread and high intensity burning. While this report focuses primarily on the north and east portions of Chico, there are NO low-priority areas for annual weed abatement or fire hazard mitigation in the Chico Urban Area.

Wildfire behavior is the product of numerous factors, some of which are weather-dependent and difficult or impossible to quantify. The suggestions in this assessment are based upon field surveys, technical analysis, and the professional experience of the authors. Errors may exist in this analysis and could include inproper recording of field data due to GPS accuracy or surveyor error, computational errors, data entry mistakes and any other conceivable cause. This data comprises a simplification of the physical environment intended to allow the authors to make general recommendations about reducing potential fire behavior at the community scale.

While this data is useful in assessing relative risk between the many micro-climates and vegetation-types present in the Chico Urban Area area, site-specific changes in fuel hazard and wildfire risk (such as annual mowing, grazing, and weed clearance, the growth of flammable ornamental plants and native vegetation, and other changes in the physical environment) will quickly render this data inaccurate.

THIS DATA IS DESCRIBES VEGETATION AND WILDFIRE HAZARD CONDITIONS IN THE CHICO URBAN AREA AT A SINGLE POINT OF TIME, SPRING 2022. ANY FUTURE USE OF THIS DATA FOR OTHER PLANNING, CODE ENFORCEMENT, OR HAZARD MITIGATION WORK IS NOT RECOMMENDED WITHOUT FIRST CHECKING PHYSICAL CONDITIONS ON THE GROUND.

1. INTRODUCTION

1.1 Purpose of This Document - Adapting to a 'New Normal'.

The City of Chico is a municipality of 121,475 residents in the Northern Sacramento Valley of California. With substantial exposure to wildfire threats, and an unfortunate, recent familiarity with devastating wildfires, the city is making determined efforts to better understand specific wildfire hazards within its community. This Community Wildfire Protection Plan (CWPP) marks a significant step in that process. The recommendations in this document constitute an action plan for elevating wildfire preparedness and response capabilities, enhancing protections of citizens, property and infrastructure, and educating the public on wildfire threats and issues, including fire's natural role and utility in maintaining the ecology of Butte County's wildlands.

This document provides a comprehensive assessment of wildfire risk, preparedness, defensibility, and potential hazard mitigation measures for the city and surrounding areas. Developed via a collaborative and science-based process, this CWPP provides a framework for increasing the wildfire resilience of the community in the face of rapidly-accelerating risk.

Butte County has a long history of destructive wildfires, but losses have grown dramatically over the past several years. Before 2008, the County's most destructive wildfire had burned fewer than 100 structures. In contrast, the 2018 Camp Fire burned more than 18,000 buildings, and the 2020 North Complex fire, over 2,000. Combined, these two conflagrations killed 100 Butte County residents. The five largest wildfires in recorded California state history have all taken place within the past four years. Though only a small fraction of wildfires cause catastrophic losses, the high consequences of these major fires—combined with the difficulty to predict and control these events—make wildfire risk planning crucial in mitigating future losses.

In the past five years, the American West has seen several wildland fires burn into urban areas, destroying hundreds or thousands of structures. Examples include the 2017 Tubbs Fire, in Santa Rosa, the 2018 Camp Fire, and recently (during the preparation of this document), the 2021 Marshall Fire, in Colorado. All three of these disasters occurred when a wildfire entered a densely populated urban area, and became an urban conflagration (a fire which is primarily driven by burning structures, not vegetation). Prior to 2018, it was hard to imagine a similar disaster unfolding within Chico. However, when the Camp Fire raced over 17 miles on November 8th, 2018, it burned right up to the eastern boundary of the city. The wildfire response system that had protected Paradise from catastrophe for over 60 years collapsed in the face of extreme conditions. Air tankers could not fly due to high winds, the major access routes to the foothills were choked with evacuees, and very little defensive firefighting occurred for most of the day, as firefighters fought to evacuate the area or rescue trapped people. Had the strong winds not subsided, the fire likely would have made its way deep into the Chico urban area.

While orchards protect Chico from wildfires on the west and south sides, grasslands and other wildland vegetation surround the city to the north and east. As fire seasons extend later into the fall, when dry north and east winds typically blow, another major wildfire approaching from the northeast is increasingly likely. This risk is amplified by vegetation changes in the aftermath of the 2008 and 2018 fires between Chico and the North Fork Feather River. Much of the landscape to the northeast of Chico

has converted from conifer forest to grass and brushlands over the past 20 years, and heavy loadings of dead trees and brush cover much of the Camp Fire footprint.

This CWPP planning effort identifies over 3,000 specific parcels, mainly east of Highway 99, with elevated wildfire risks. Targeting these properties for wildfire education and ensuring they are maintained in a firesafe condition will greatly decrease the likelihood of a wind-driven wildfire burning deep into the Chico urban area. It is important to note that not all of these lots are in areas which have traditionally been viewed as Chico's most fire-prone places.

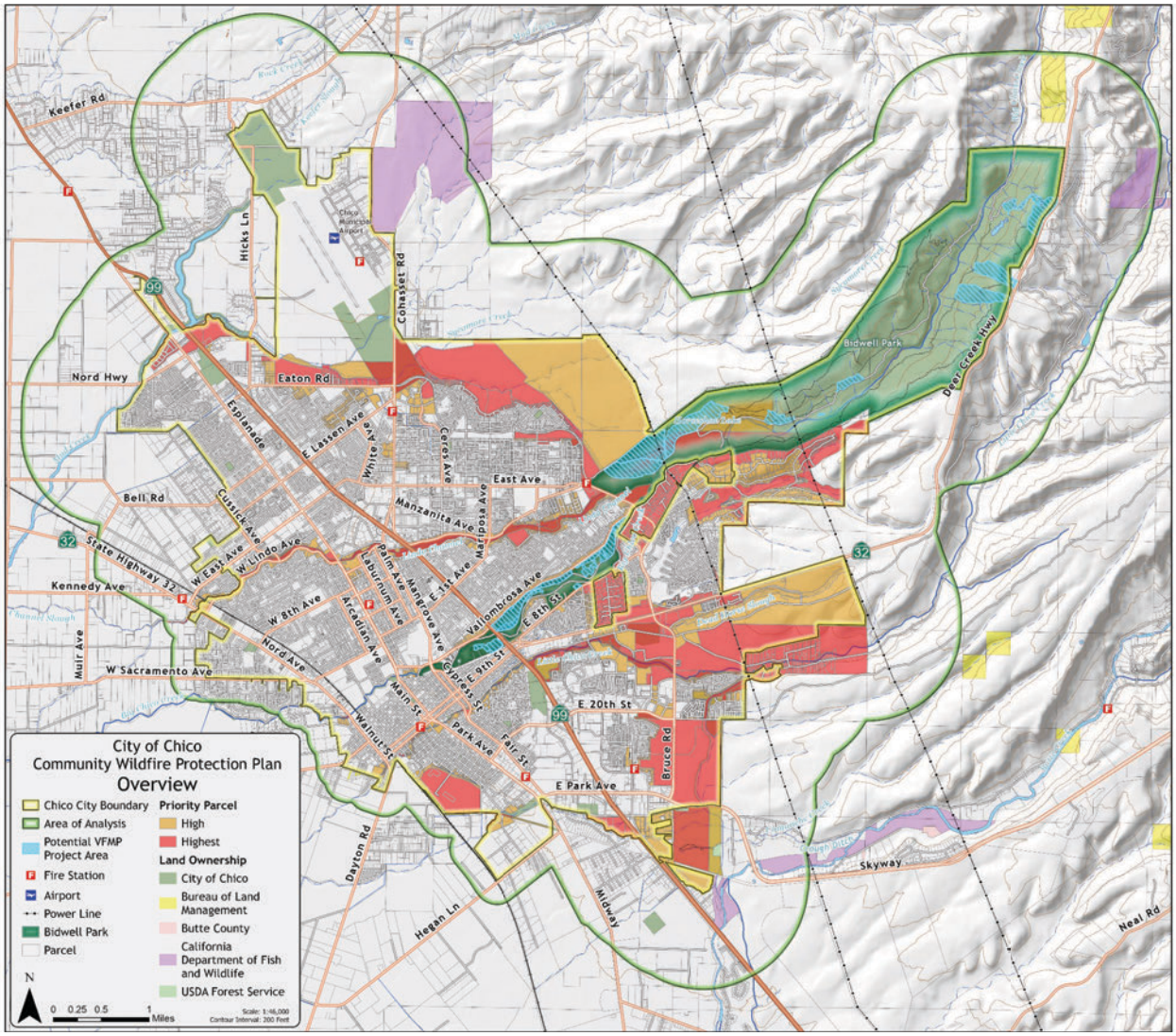

Figure 1. Study area overview.

1.2 Requirements of a Wildfire Community Protection Plan (CWPP)

Community Wildfire Protection Plans (CWPPs) use a collaborative, stakeholder-driven process to prepare responses to—and mitigation of—community wildfire risk. The CWPP process helps

communities identify and prioritize wildfire risk mitigation projects. Most state and federal agencies will not fund local wildfire hazard mitigation projects unless they have been vetted by the community and identified specifically in an adopted CWPP.

Integration with Federal Policy
CWPPs are required to be consistent with The Healthy Forest Reforestation Act (HFRA) of 2003. The HFRA directed the USDA Forest Service to implement a collaborative approach for working with partners across jurisdictions to reduce wildfire risk to people, communities, and natural resources while sustaining and restoring healthy, resilient fire-adapted forests.

According to the HFRA, a CWPP should involve local fire departments, governments and state forest management agencies to meet the following minimum requirements:

1. **Collaboration:** A CWPP must be collaboratively developed by local and state government representatives, in consultation with federal agencies and other interested parties.

2. **Prioritized Fuel Reduction:** A CWPP must identify and prioritize areas for hazardous fuel reduction treatments and recommend the types and methods of treatment that will protect one or more at-risk communities and essential infrastructure.

3. **Treatment of Structural Ignitability:** A CWPP must recommend measures that homeowners and communities can take to reduce the ignitability of structures throughout the area addressed by the plan.

The Healthy Forest Restoration Act (HFRA) (U.S. Congress, 2003) specifies that:

"At-risk communities are a group of homes and other structures with basic infrastructure and services within or adjacent to Federal land (HFRA sec. 101 [a2]) for which a significant threat to human life or property exists as a result of a wildland fire disturbance event (HFRA sec. 101 [c]). The CWPP will identify and prioritize areas for hazardous fuel reduction treatments (HFRA sec. 101 [b3]) and recommend measures to reduce structural ignitability throughout the at-risk community (HFRA sec. 101 [c3]). Fuel-reduction projects identified by the CWPP will receive priority for funding on federal land (HFRA sec. 103 [d1]) and will receive priority for funding on non-federal land (HRFA sec. 103 [d2])."

Related Initiatives in Wildfire Resilience
The USDA Forest Service has created (January 2022) the 10-Year Wildfire Crisis Implementation Plan, keeping consistent with the purposes of the HFRA, "this implementation plan builds on a national strategy for confronting the wildfire crisis facing the Nation. The strategy calls for an unprecedented paradigm shift in land management to increase fuels and forest health treatments across jurisdictions to match the actual scale of wildfire risk to people, communities, and natural resources, especially in the Western United States " (Wildfire Crisis Implementation Plan, 2022).

Integration with State of California Policy
The purpose of The City of Chico's CWPP is consistent with, and supported by, the findings in Sec. 3.3 of CAL FIRE's California Forests and Rangelands 2010 Strategy Report.

"When planning occurs at the community level, greater community awareness can lead to better compliance with laws and regulations (such as defensible space and fire safe building codes) designed to improve the ability of a community to face a wildfire with as few losses as possible. California encourages the formation of local and community Fire Safe Councils, as well as participation in the national Firewise/USA program, with a goal of creating a CWPP. A CWPP or its equivalent (such as a countywide fire plan with substantial community input) focuses a community on the nature of wildfire hazards and risks, and necessary proactive action. The process of creating a CWPP also forges a strong partnership with local, state and federal fire services." (California Department of Forestry and Fire Protection, Fire and Resource Assessment Program, 2010)

California's Wildfire and Forest Resilience Action Plan, states the following:

"The 2018 Strategic Fire Plan, which addressed wildfire threats across California communities, lays out eight goals, including maintenance of fire-resilient natural environments, increasing the number of fire-resistant buildings and infrastructure, and raising public awareness of wildfire threats. It also calls for creating local, state, federal, tribal, and private partnerships to achieve these goals." (California's Wildfire and Forest Resilience Action Plan, 2021)

These state plans share the theme of reducing risk of wildfire by taking actions long before a fire starts. State agencies plan to increase their assistance programs and partnerships with local communities to reduce risk, improve preparedness, and foster resilience. Basic principles prioritized by State Plans include the following goals:

- Assess community risk by identifying public and private resources (natural and manmade) which could be damaged by wildfire
- Create defensible space in high-risk communities and develop home hardening guidance
- Increase the number of communities directly involved in coordinated wildfire planning, and the number of Community Wildfire Protection Plans where needed in order to reduce wildfire risks

Integration with Butte County CWPP

The Butte County CWPP is the product of a collaborative effort amongst agencies, community, and Fire Safe Councils. Plans developed for Butte County included priorities for the City of Chico listed as follows:

- Explore opportunities to complete the projects outlined in the City of Chico's Vegetation Fuels Management Plan
- Increase awareness within the planning area by continuing to educate and inform the community
- Continue working with home builders and developers on compliance with all fire

codes and setbacks for new construction

- Community outreach/education at community events

While the current Butte County CWPP has served as an overview of County efforts, the need to develop a more comprehensive CWPP with greater detail for the City of Chico has been recognized.

1.3 Collaborators and Authors

The City of Chico CWPP was developed collaboratively by a multitude of stakeholders in the greater Chico community. Additionally, many of the vegetation management objectives referenced here for City-owned lands were developed through a multi-year public process during the development of the City of Chico Vegetative Fuels Management Plan (VFMP 2020), and accompanying EIR document (City of Chico 2021).

Table 1. Collaborators and roles.

Agency	Collaborators
City of Chico	Steve Standridge - Fire Chief, City of Chico Fire Department
Deer Creek Resources	Zeke Lunder - Hazard assessment team leader, report editor. Carson West - Project management Spencer Holmes - Cartography, data management Noemi Karako - Cartography, report preparation, survey management Nikki Inglis - Data processing, wildfire behavior modeling, report preparation James Balcomb - Data processing, modeling

1.4 Goals and Objectives

The overall intention of this CWPP is to develop an ‘Action Plan’ for increasing wildfire resilience of the community.

Table 2. Goals and objectives.

Goals and objectives	CWPP section

Describe and assess the greater Chico area's general wildfire risk by characterizing fuel conditions, the nature of the region's wildland-urban interface, known weather and climate conditions, past wildfire activity, and existing wildfire policy and community preparedness	Sections 2 and 3
Simulate fire behavior in the study area based on the previously described fuel conditions, weather, climate and land cover	Section 4
Identify areas of critical risk, where a wildfire could potentially spread into residential areas; model potential fire spread for these specific ignition scenarios	Section 4
Synthesize the intersection of wildfire risk related to human lives, property, critical infrastructure, and land and resource management.	Section 5
Identify specific fuel treatment projects and policy enforcement specifications that directly reduce the risk of wildfire in these critical areas	Section 5
Identify areas with critical, high-risk for wildfire and develop targeted outreach to residents, informing them of wildfire risks and encouraging them to undertake hazard-reduction activities like annual mowing and brush clearing.	Appendix B
Recommend potential policy improvements and public outreach initiatives to effectively increase wildfire preparedness and elevate the community's relationship with wildfire risk	Section 5 and 6

2. STUDY AREA OVERVIEW

2.1 Geography

This CWPP evaluates wildfire hazards for lands within the City of Chico (including Upper Bidwell Park) and surrounding lands within one mile on the east side of Highway 99 and 0.25 mile on the west side (Figure 1). Chico is located in the northern Sacramento Valley at the toe of foothills to the southern Cascade Mountains. Home to 121,475 people, Chico is the most populous city in Butte County (US Census Bureau 2020). The project area encompasses 45,000 total acres, and includes areas outside the city that pose a known wildfire threat to Chico, its assets at risk and critical infrastructure. One-third (14,822 acres) of the project area is considered Wildland-Urban Interface (WUI) *(*SILVIS, 2019), in which residential areas are intermixed with wildland vegetation including grass and/or brush (Figure 1).

2.2 Vegetation, Soils, and Land Cover

The project area covers a diverse landscape including urban, agricultural, forest and grassland areas. Soil depth and fertility are major determinants of the structure of the urban forest. Areas of the city built in the early and mid-twentieth century generally are underlain with very fertile alluvial soils, and landscaping and urban forest can form dense pockets of vegetation. These older neighborhoods are generally south of East Avenue, Manzanita Ave, and Bruce Road. Neighborhoods to the east of these streets, and in the area of the 'New Mall' are generally newer (built in the last 40 years) and underlain with poorer soils, so the urban forest in these areas is less vigorous and not as well-established. To the north and east of the urban area, poorer soils support grasslands and blue oak trees, but these areas have very little shrub vegetation except in deeper soils along creeks. With increasing elevation, grasslands give way to mixed shrubs, live oak and pine forests. Elevations range from 141 feet above sea level in the western portion of the city to 1,945 feet in the foothills to the east (Figure 2). Much of the Chico urban area is built on gentle slopes of the valley, but several housing developments exist on the lower slopes of the foothills. These include: Canyon Oaks, California Park, Falcon's Point, and portions of the Doe Mill neighborhood.

The western and southern edges of Chico are primarily agricultural lands covered in almond or walnut orchards (Figure 3). These areas have low wildfire hazard except in scattered areas of grass and weeds, primarily on vacant parcels. The City of Chico itself consists of impervious cover mixed with annual grasses and ornamental species. Bidwell Park, one of the largest municipal parks in the United States, bisects the city. Some areas within the park have significant wildfire hazards, especially in Lower Bidwell Park, where dense riparian jungle grows right up against residential areas. Bidwell Park creates a contiguous strip of wildland vegetation, extending from downtown Chico over 9 miles to the northeast near 10 Mile House Road. Sensitive habitats within the project area include vernal pools on the valley's edge, chaparral and oak woodlands in Bidwell Park, and riparian areas along Big and Little Chico creeks, Lindo Channel, Sycamore Creek, and other smaller drainages. The natural areas provide numerous ecosystem services, such as wildlife habitat, water filtration, and nutrient cycling.

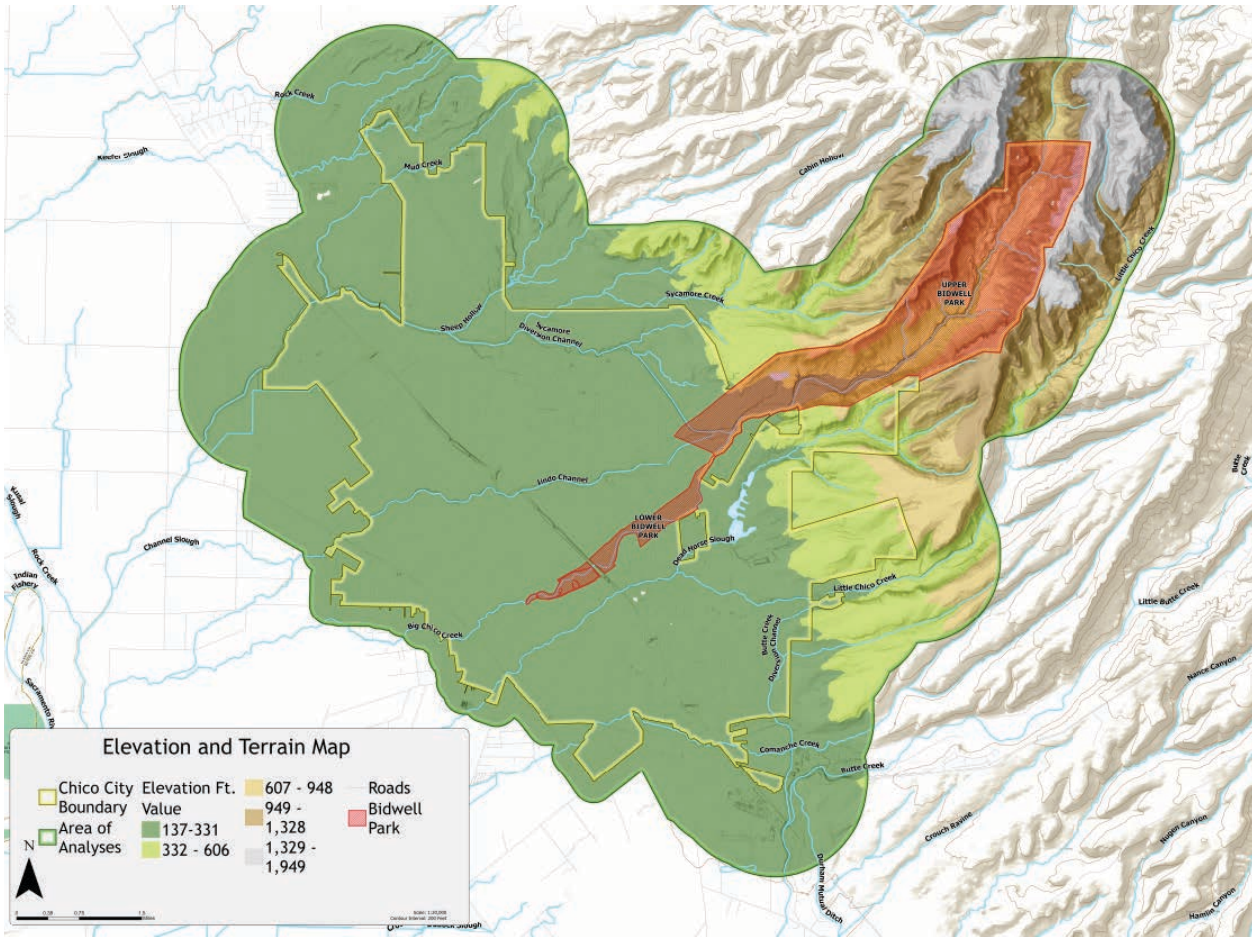

Figure 2. Elevation, hydrography and terrain of the greater Chico region.

The City of Chico manages almost ten square miles of land. All these lands are described in greater detail in Chapters 2 and 3 of the City's Vegetative Fuels Management Plan (VFMP, 2021), which also includes maps and historical detail on the lands. Readers are encouraged to familiarize themselves with the VFMP to gain a deeper understanding of current City policy direction on vegetation management. Below is a description of these lands from the City's recent 'City of Chico Vegetative Fuels Management Plan Environmental Impact Report':

"The City of Chico manages almost 6,400 acres… spanning a variety of vegetation communities, including grassland, riparian forest, valley oak woodland, blue-oak-gray-pine woodlands, and the mixed oak-chaparral community known here as Upland Mix. All these vegetation communities, like the rest of the Sierra-Cascade foothills, are fire-adapted. That means each acre managed by the City needs fire of some kind in order to be optimally healthy, biodiverse, and safe to live in. Every vegetation community in Butte County has a native fire return interval. Some vegetation communities have a shorter fire return interval, some longer. If fire cannot be safely applied to these lands before their fire return interval runs out, then a fire surrogate will need to be applied in order to do some of the work fire would have done. Fire surrogates include almost any technique that reduces or kills vegetation, including hand cutting,

mechanical mastication, grazing, mowing, or herbicide use.

A trait shared by fire and all fire surrogates is that a single entry (treatment) is not enough. Follow-up treatments (i.e, maintenance) are crucial to keeping land healthy. This work is never done. The ongoing nature of vegetation management work makes it a program of work, not merely a collection of projects. Therefore, it is best reviewed and authorized as a program."

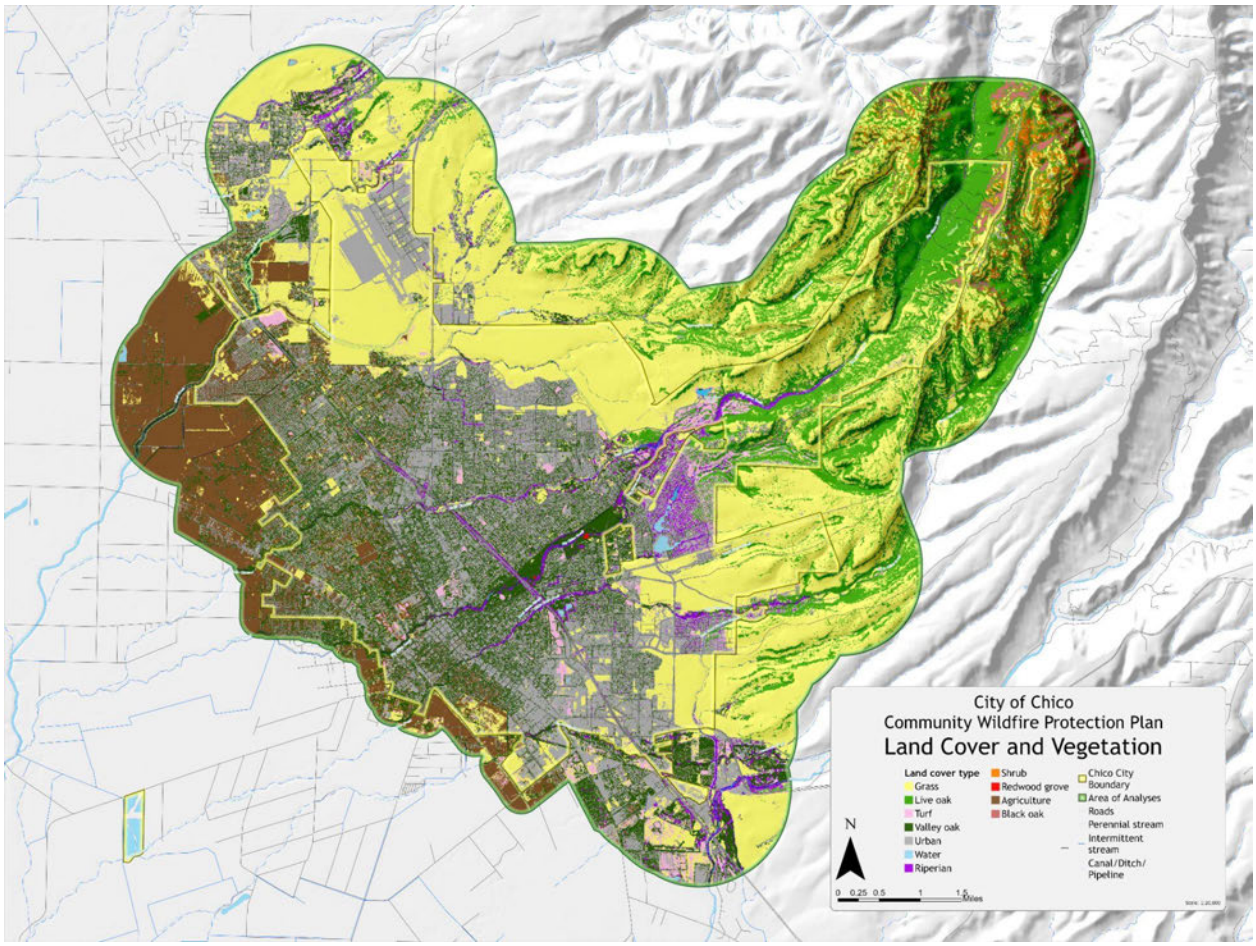

Figure 3. Vegetation and land cover in the CWPP analysis area. This vegetation data was derived from aerial LiDAR surveys and aerial photographs.

2.3 Weather and Climate

The Chico area has a Mediterranean climate characterized by hot and dry summers, and mild, somewhat wetter winters. High temperatures in July average 96 F, while highs in January average 56 F. Precipitation falls primarily in winter, averaging 4.4, 3.9 and 3.6 inches in the three wettest months: January, February and March (National Weather Service).

Winds average 8 mph annually, most commonly from the east and the south in summer, and from the north and east in the winter. Red Flag Warnings are sometimes issued when wildland fuels are critically dry and a relative humidity of 15% or less coincides with sustained winds of 25 mph. However,

contributing factors such as extended drought, dry thunderstorms and lightning activity can trigger Red Flag Warnings in a range of conditions, for example during significant downslope wind events which are characterized by warm, dry winds from the north, northeast and east (Figure 4).

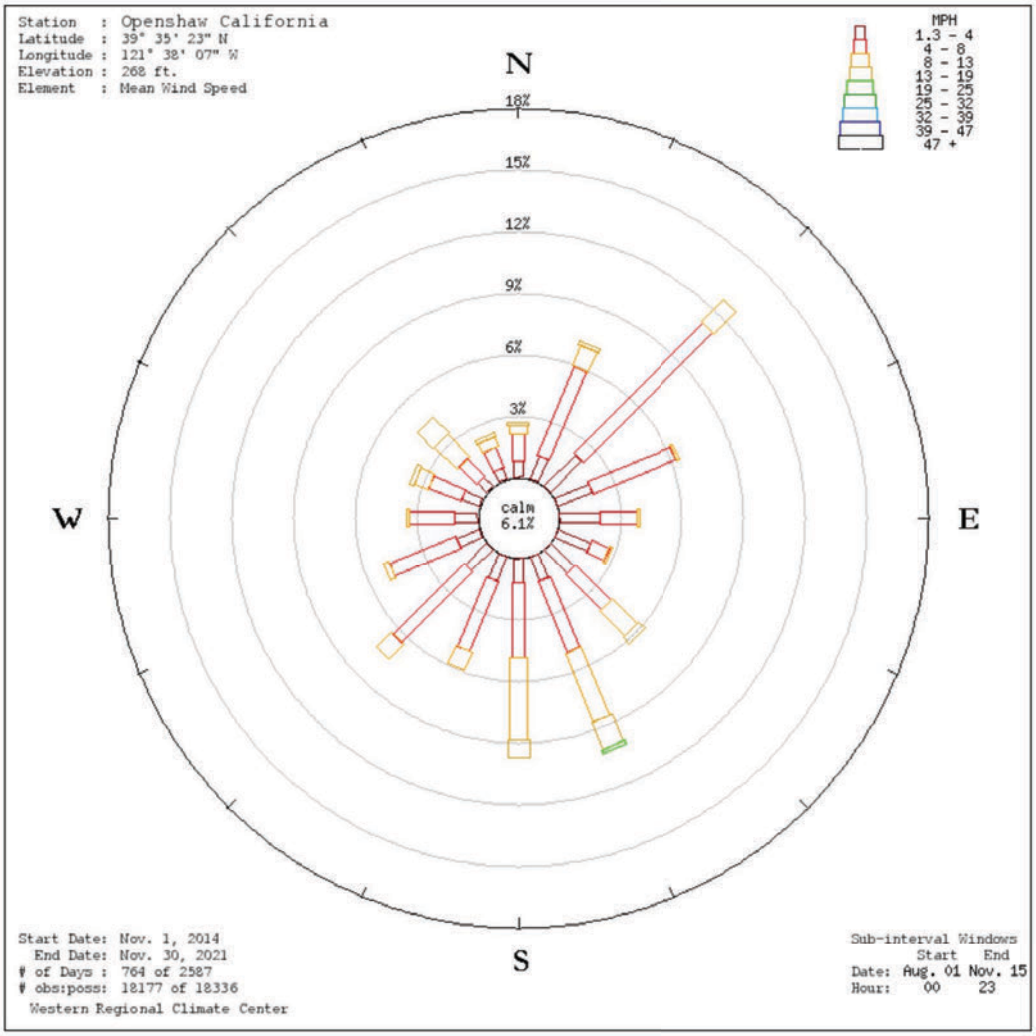

Figure 4. Wind speed and direction history from the Openshaw RAWS station. Data is an aggregation of historic winds from August through November, 2014 to 2021. The length of the bar shows frequency, and color shows wind speed. In the fall, winds primarily come from the northeast, often gusting between 4 and 13 mph, and occasionally, over 25 mph. This weather station over-emphasizes the role of the NE wind, but was used because it was the most complete/recent weather dataset for fire behavior modeling efforts.

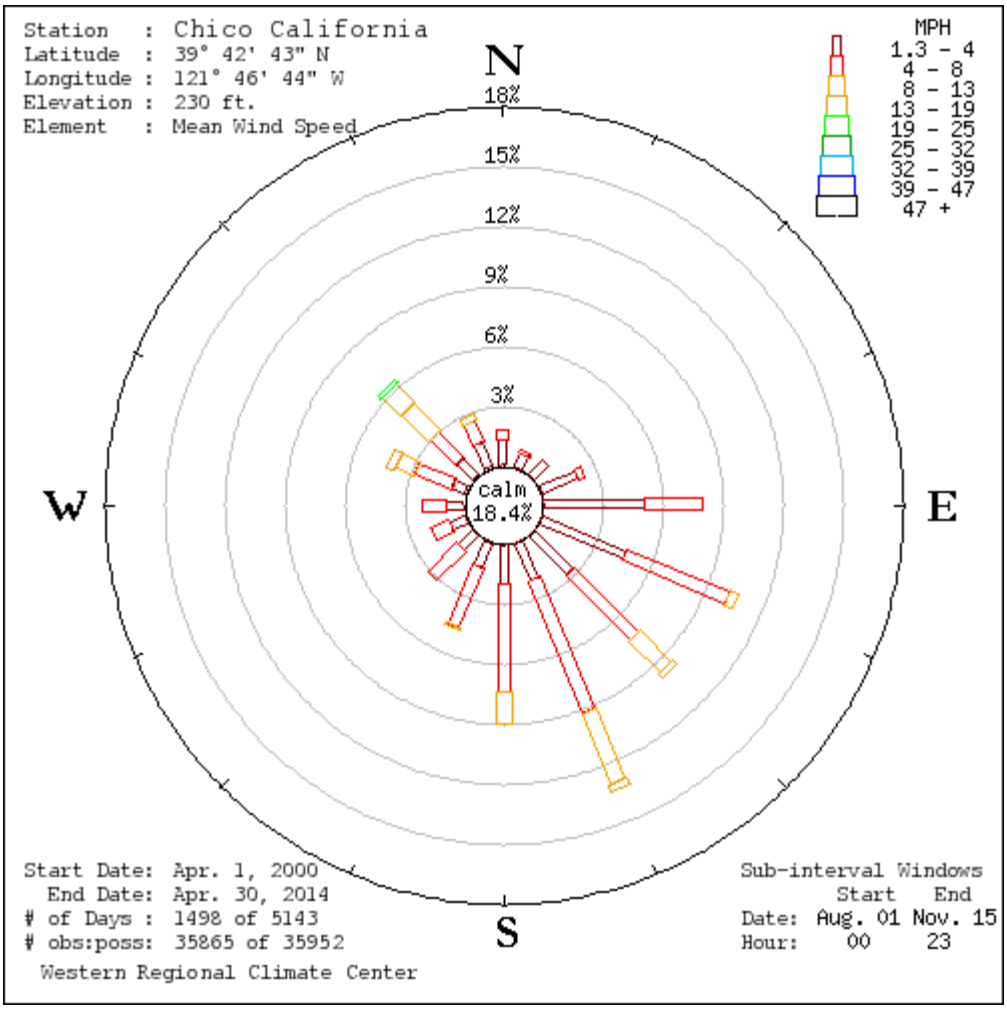

Figure 5 - Wind speed and direction history for August thru mid-November from the now unused Chico RAWS station, 2000-2014, located at the base of the Skyway. This data also shows the east wind influence in the autumn.

Climate change poses multiple risks to the City of Chico and surrounding areas, both directly and indirectly threatening lives and property through increased temperature and decreased precipitation (CSU-Chico, 2018). Annual average temperatures are projected to rise 4 to 7 F degrees over the next 50 years (based on a low emission scenario (RCP4.5) to high emissions (RCP 8.5)). Higher temperatures can contribute to decreased fuel moistures, and increased risk of wildfire ignition. Combined with a drier Sierra Nevada snowpack and climate-driven vegetation cover changes, climate change will have a compounding effect on fire regimes and will add to an increased risk of catastrophic wildfire (CSU-Chico 2018; Cal-Adapt 2019). A later arrival of the first wetting rains in the fall means the city is more likely to have wildfires which coincide with strong NE winds in September through November.

2.4 Fire Ecology, Fire History, Fire's Land Management Context

Fire plays a vital role in maintaining natural landscape processes and resiliency. Local vegetation is adapted to, and depends on, both natural and human-caused wildland fires at regular intervals. As a

result of long-term fire suppression strategies since the 20th century, there are large accumulations of vegetation in some areas in the foothills east of the city (VFMP, 2021). In addition, much of the new development in Chico in the past 40 years has occurred on the east side of town.

In the past three decades, the foothills to the east of Chico have had many major wildfires (Figure 5). These have included the 1999 Musty fire (18,000 acres, smoke and ecological impacts, burned entire north side of Upper Bidwell Park), the 1999 Doe Mill fire (11,000 acres, evacuation and smoke impacts, burned entire north side of Butte Creek Canyon from the Valley to Helltown), the 2008 Humboldt Fire (23,000 acres, 250+ structures destroyed south of Town of Paradise urban area; evacuation and smoke impacts, 10 injuries), the 2018 Stoney Fire (950 acres, evacuation in Canyon Oaks, road and trail closures, smoke impacts), and the 2018 Camp Fire.

The Camp Fire

On Thursday, November 8, 2018, around 6:30am, a fire started underneath a transmission tower near the town of Pulga, 18 miles east of Chico, in the Feather River Canyon. Critical fire weather conditions with low relative humidity's, historically dry fuels, and strong gusty winds created extreme fire growth conditions. Within the first 45 minutes, the fire had moved 7 miles. By 10 pm, the fire had advanced all the way to the edge of Chico, killing 86 people, destroying over 18,000 structures in Paradise, Magalia, Concow, Butte Valley, and Butte Creek Canyon. While no structures were lost in Chico, 200 acres within the City limits burned. Extreme smoke impacts from the Camp Fire affected Chico as well as the entire Central Valley and Bay Area for more than a week. Tens of thousands of displaced persons sought shelter in Chico, among other places. The Camp Fire highlighted the community's vulnerability to catastrophic wildfire.

The Park Fire

More recently, less catastrophic wildfires have illustrated the potential for wildfires to spread quickly on city-managed wildlands, and how interagency coordination is key in controlling WUI fires. In June of 2021, the 402-acre Park Fire started just after 9 p.m. near Bear Hole, in Upper Bidwell Park. Driven by steady downslope winds in the night (common in the canyons of Butte County), the fire spread rapidly to 15-acres within 15 minutes. Two agencies, the Chico Fire Department and CAL FIRE-Butte Unit, worked in unified command on the fire, with the fire eventually burning out of the park and into unincorporated Butte County rangelands. A total of 212 personnel worked the fire on the second day: One helicopter, eight hand crews, two bulldozers, 18 engines, five chief officers, overhead personnel, and three water tenders.

The Park Fire caused very little lasting damage to the park's ecosystem. Most of the oak trees in the burned area survived the fire; six months later, it might be difficult for someone who didn't know the fire had occurred to know it had even happened.

Figure 6. The Park Fire burned the upper half of the landscape in this photo. This image was taken eight months post-fire, in January of 2022.

Fire as a Management Tool

The Park Fire posed little threat of spreading to the Chico urban area because the Chico Fire Department had intentionally burned a large area of grasslands at the entrance to Upper Park, just a month prior. This burning project was intended to help control infestations of star thistle and other invasive grasses. It effectively created a buffer between the Park Fire and the City.

In fire adapted landscapes, major wildfires are not inherently destructive to the natural environment. Fires provide a regular natural disturbance necessary for the health and resilience of many species and related ecosystem processes. Throughout human history prescribed and/or cultural fires have been used as a tool to pursue specific landscape objectives. There are opportunities to use fire to achieve land management and public safety objectives while protecting assets and infrastructure. This project recommends the City develop a detailed wildfire response pre-plan for Bidwell Park and other wildland areas with their jurisdiction.

Figure 7. 100-acre prescribed burn accomplished in 2021 at the entrance to Upper Park. 2021 Park Fire on upper-right.

The Maidu people, including the Mechoopda Tribe, have used deliberate fire for many thousands of years to manage lands in the Chico area. It is now widely recognized that the suppression of cultural burning and of natural wildfires - coupled with drought and climate change - is a primary factor in California's wildfire crisis. Fire has a major role to play in the maintenance of wildlands in Butte County.

Figure 8. With proper pre-planning and preparation, fire suppression tactics can be adjusted during fires in the Park to maximize resource benefits, for example backing off to roads or trails instead of directly attacking wildfires, allowing fires to burn through known noxious weed infestations. This topic is addressed in greater detail in the Bidwell Park Section of Chapter 5.

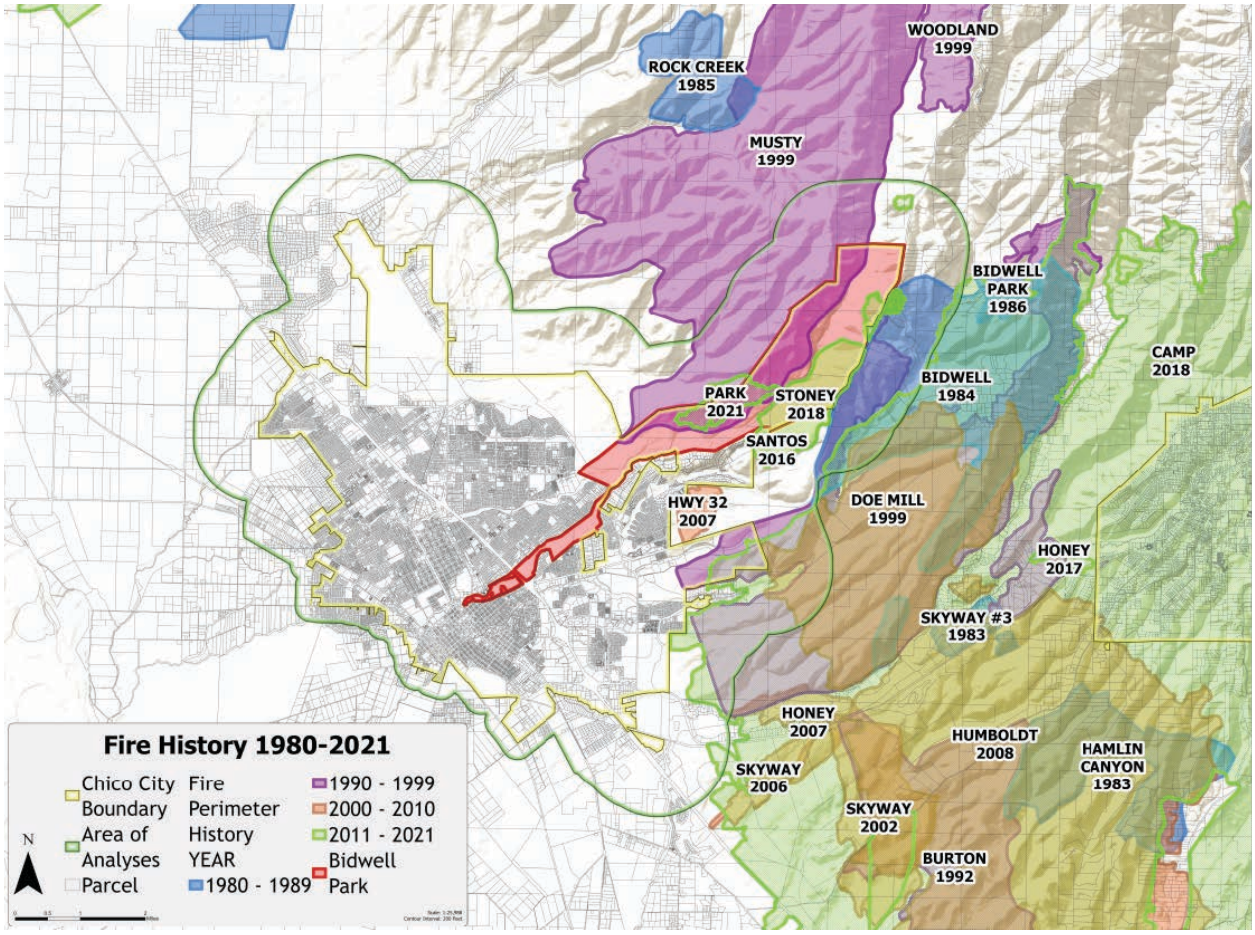

Figure 9. Chico area wildfire history, 1980-2021.

2.5 Demographics and socioeconomics

Chico is the largest city in Butte County with a population of 121,219. The median age is 29.8 which is 17% lower than the California average. The racial composition of Chico is 81.95% White, 4.7% Asian, and 2.09% Black. A total of 83.73% of Chico residents speak only English, while 16.27% speak other languages. The non-English language spoken by the largest group is Spanish, which is spoken by 10.35% of the population. 92.39% of Chico residents were born in the United States, with 73.21% having been born in California. Approximately 3.88% of residents are not US citizens. The average household income in Chico is $76,118; this figure varies by neighborhood ranging from $11,252 to a high of $148,586 in some areas. Higher income areas are typically found in the northeast and southeast parts of the city, and lower-income areas are in the south and central portions of the city.

This indicates that those who are in the high wildfire risk area are likely to have higher household incomes.

California State University Chico

CSU-Chico is a campus of the California State University system. The public university offers 126 bachelor's degree programs, 35 master's degree programs, and four types of teaching credentials. It is also the largest employer in Chico, with 3,540 staff. CSU Chico's student population of 16,630 considerably affects the city's business, education, recreation, government, and culture. The CSU Chico grounds consist of a 119-acre main campus, an 800-acre Paul L. Byrne Memorial University Farm, and the Big Chico Creek Ecological Reserve (BCCER). BCCER is owned by the University Research Foundation aka Chico State Enterprises, and abuts Upper Bidwell Park to the north. Portions of BCCER fall within the area of this CWPP's risk analysis. With the majority of CSU Chico's students living in Chico and surrounding areas, the university is likely to temporarily shut down in the event of a large disruptive wildfire within the region - this happened during the Camp Fire in 2018.

Economics

Economic development is one of Chico's top priorities. The industries that drive Chico's economy include education, health, and social services (30.3%), retail trade (14.9%), and arts, entertainment, recreation, accommodation, and food services (12.6%). Beginning in 2020, the two significant multi-year initiatives to support long-term economic growth of Chico include tourism programs, and agriculture and technology programs. Key tourism assets include Bidwell Park, downtown, university property, entertainment, and recreational venues. Wildfire poses a threat to the tourism component of economic development, as a substantial degree of the tourist opportunities are located in areas at high risk to wildfire. Past wildfires have forced business to close temporarily due to hazardous air quality and evacuation mandates.

Agriculture: Almonds, Walnuts, Rice, Fruit

Agriculture is a significant part of Chico's economy. The city is surrounded by thousands of acres of land used for agricultural purposes. Almonds, rice, olives, plums are the major crops. Almonds are the number one crop in the surrounding area, recently edging out rice. In February and early May, thousands of almond trees bloom with pink and white flowers; in late August the nuts are harvested. Walnuts are another major agricultural product in the area north and west of town, but they do not have the same aesthetic appeal as almonds, as they don't bloom in the spring. Chico's local agriculture makes for a great farmers market on Saturday mornings (year-round) and Thursday nights (seasonal) with a street-fair atmosphere important for community networking. Wildfire impacts Chico's agriculture industry both directly and indirectly. Farmer workers can be impacted by hazardous air quality even when wildfires are burning in other parts of the region, and the smoke itself can impact crop quality or yield.

2.6 Critical Infrastructure

The City of Chico, along with public utility companies, maintain a variety of infrastructure. When considering future wildfire risk, it's important to gain insight into the spatial distribution of this infrastructure, its vulnerability to wildfire and, in the case of power lines, its potential to ignite a fire.

Two major electrical transmission lines run through the Chico urban area: A pair of 500 kV PG&E lines run north-south over Canyon Oaks and Upper Bidwell Park (Figure 6). To the west, a single tower set of 230 kV power lines operated by the Western Area Power Administration (WAPA) crosses Upper Park around the North Rim Parking Lot, providing electricity to thousands of people as well as an inherent risk during hazardous wildfire conditions. Both the 2018 Camp Fire and nearly million-acre 2021 Dixie Fire were sparked by transmission lines. The large transmission lines are not routinely de-energized during Public Safety Power Shutoff (PSPS) periods, which occur during high-wind events that coincide with periods of critical fire danger. One hundred and fifteen-volt lines operated by PG&E run along Bruce Road, Manzanita Ave, and portions of Eaton Road.

In 2021, PG&E announced that they would bury more than 10,000 miles of power lines in high-risk areas in order to reduce both fire ignitions and the need for vegetation management around lines. There are currently three line-burying projects underway in the Chico region including on the eastern edge of the wildland-urban interface along Bruce Road, crossing Little Chico Creek.

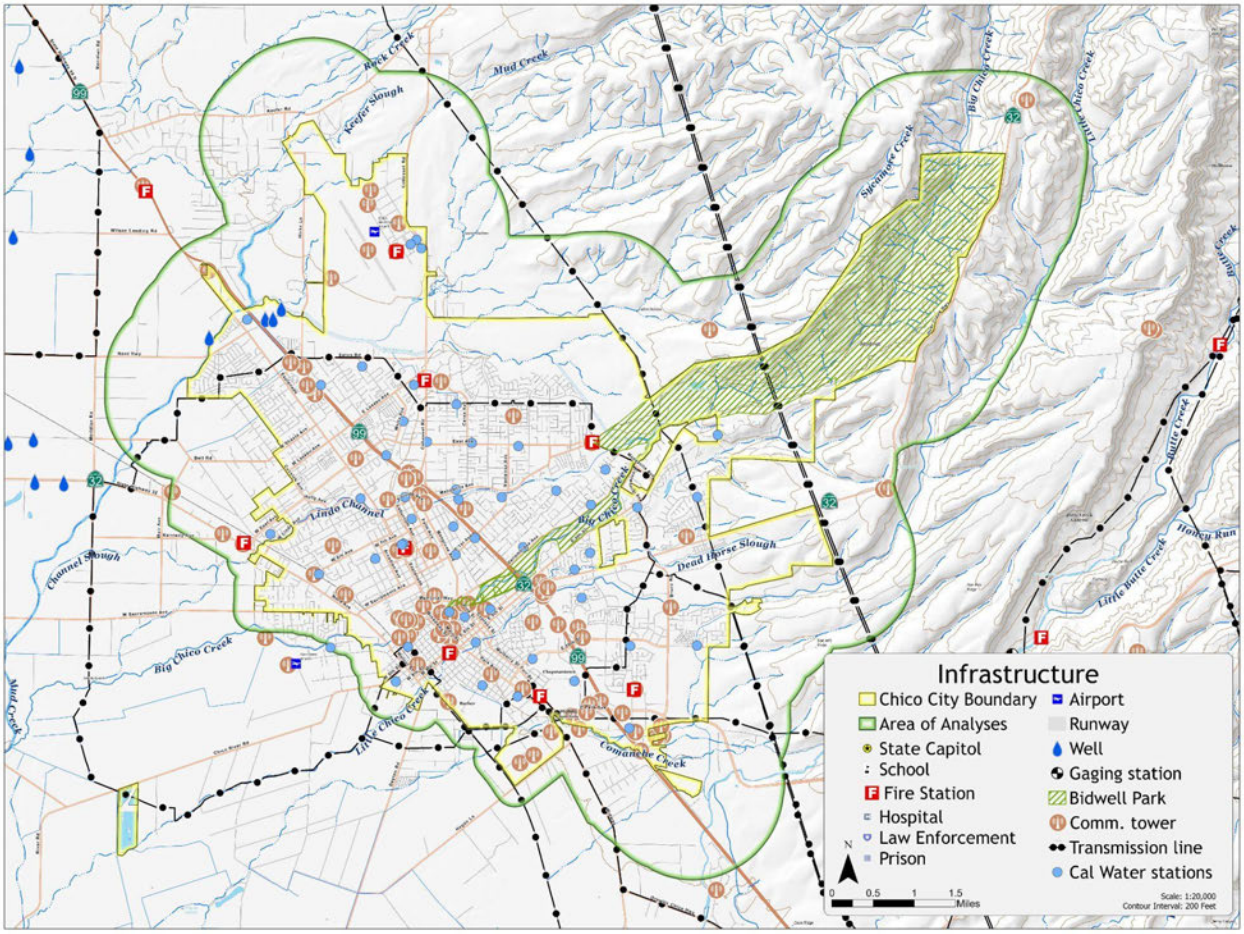

Figure 10. Critical infrastructure in the greater Chico area.

There are 113 communication towers within Chico boundaries, and 19 outside of the city but within the area of analysis. Forty-four of those towers are in the wildland–urban interface.

The Chico Municipal Airport is located to the northwest of the city surrounded by grasslands.

The city's water is provided by Cal Water via 65 wells throughout the region. Four of those wells are located in the study area of this report, all of them at the northwest boundary of the city. In case of a wildfire or a power outage, Cal Water has backup power generators at their sites and portable power generators ready for emergencies. Cal Water also has a wildfire task force that works with wildfire operations to ensure their facilities are protected to track fire spread. Cal Water sites follow CAL FIRE defensible space regulations and have an Emergency Response Plan that is updated annually.

The natural flood patterns of local creeks have resulted in deep, fertile soils over much of the Chico area. Due to the area's inherent flood patterns, active flood control is necessary. In the 1960s, the Lindo Channel was modified for flood control purposes, and is still used as a diversion channel to relieve Big Chico Creek's flood flows. Lindo Channel is a natural ephemeral stream that runs parallel to Big Chico Creek for nearly eight miles prior to rejoining Big Chico Creek 2.5 miles from the confluence

with the Sacramento River. Moreover, Lindo Channel is important for groundwater recharge, and it also provides key riparian and aquatic habitat. Wildland vegetation along Lindo Channel, the Sycamore Creek Diversion Channel, Little Chico Creek, the Little Chico Creek Diversion Channel in the Picholine/Doe Mill Neighborhood, and other minor flood control channels can increase wildfire threats to adjacent properties. Flood control projects and facilities are maintained by variety of agencies, including Butte County, and the California Department of Water Resources. Beside from occasional mowing on the levees themselves, most flood control structures in the project area receive minimal annual vegetation management.

2.7 Environmental/Natural/Park Resources

Streams, parks and recreation
Major waterways include the perennial waterways of Big Chico Creek, Mud Creek, and Butte Creek. Other significant streams in the city include Little Chico Creek, Dead Horse Slough, Sycamore Creek, Comanche Creek, and Lindo Channel. Some of these streams have recreational uses such as wildland swimming holes. A number of community and neighborhood parks are available for use, the most popular being Bidwell Park, which has an array of hiking and mountain biking trails, picnic areas, and swimming holes. Chico's parklands and open spaces are used by a wide variety of recreationists including hikers, runners, mountain bikers, dog-walkers, equestrians, golfers, kite enthusiasts, anglers, birders, botanizers, disc golfers, swimmers, playground caperers, tree-climbers, rock climbers, and stargazers. Upper Bidwell Park alone, with its 65+ miles of formal and informal trails, was visited by 450,000 cars in 2018 (TrailLabs 2020) not including recreationists who accessed the park by foot, bicycle, or other means (City of Chico VFMP, 2021).

Wildfire hazards exist on many of the open space and park lands within the city. Also, there is currently a large amount of unauthorized camping occurring on City-owned lands, and campers have started many accidental fires in the past several years (City of Chico 2020b). Management of wildfire hazards on city-owned lands is covered in great detail in the City's Vegetative Fuels Management Plan (VFMP, 2021). It is important for property owners adjacent to wildland open spaces to recognize they live in areas of elevated wildfire hazard, and that they need to manage fire hazards on their property as if they live in the country, not in a city.

3. COMMUNITY PREPAREDNESS

3.1 Current Wildfire Mitigation Policies

Wildfire hazard mitigation code enforcement has been focused on enforcing weed abatement regulations on vacant lots. However, this CWPP has identified many high-hazard built parcels, mainly in the east part of Chico. The City should expand its weed abatement inspection and code enforcement program to cover high-priority parcels identified in this report. California State Law provides provisions for enforcing removal of weeds on all private parcels where they pose a nuisance or wildfire hazard. https://law.justia.com/codes/california/2016/code-hsc/division-12/part-5/

In 2021 the City prepared a Vegetative Fuels Management Plan (VFMP) for vegetation management activities across 6,400 acres of publicly-owned parks, greenways, and open spaces. A major objective

of much of this work regarded minimizing the risk of catastrophic wildfire. The VFMP establishes vegetation management techniques, including hand labor, mechanical processes (e.g., mowing), herbicide use, prescribed fire, and grazing; all of which may be implemented depending on site conditions. The VFMP also recommends vegetation clearance around City-owned buildings in parks, greenways, and open spaces that meet the requirements of the State's Public Resource Code (PRC 4291) regulations for vegetation management, summarized here:

Maintain defensible space of 100 feet from each side and from the front and rear of the structure, but not beyond the property line. The amount of fuel modification necessary shall consider the flammability of the structure as affected by building material, building standards, location, and type of vegetation. Fuels shall be maintained in a condition so that a wildfire burning under average weather conditions would be unlikely to ignite the structure. Trees and shrubs should be pruned to a crown base height of 8 feet and maintained to effectively manage fuels and not form a means of rapidly transmitting fire from other nearby vegetation to a structure or from a structure to other nearby vegetation. The intensity of fuels management may vary within the 100-foot perimeter of the structure, the most intense being within the first 30 feet around the structure. Where possible, the first 2 feet out from a structure should be bare dirt, gravel, concrete, or lawn, and free of wood chips or mulch. Maintain any tree, shrub, or other plant adjacent to or overhanging a building free of dead or dying wood. Maintain the roof of a structure free of leaves, needles, or other vegetative materials. (California Public Resource Code Sec 4291)

This CWPP assessment recommends enhanced inspections and weed abatement enforcement on over 3,000 individual parcels, mainly east of Highway 99. Maps of these areas are shown in Chapter 4 and Appendix A. These inspections should focus on ensuring annual mowing of tall dead grass and weeds on private lots. Of special concern are several neighborhoods with large lots where large contiguous areas of standing weeds have the potential to carry a wind-driven wildfire burning from the northeast deep into the City, with potential of entering Bidwell Park. Generally, these neighborhoods border Bidwell Park on the South, stretching from Forest Ave on the southwest, through Centennial Ave and Chico Canyon Road and into the neighborhood of Canyon Oaks.

Private home owners can find information on how to create defensible space in the "Emergency Preparedness" section of the city's website (available in English and Spanish).Those unsure if their property meets the requirements can fill out a "Defensible Space Inspection Request" form. They may also file a Fire Hazard Complaint Form if they believe another homeowner is in violation of the defensible space regulations.

Butte County's Fire Prevention and Protection Ordinance, Chapter 38A applies to all parcels within the project area. It requires vacant lots < 1.25 acre to be completely cleared of flammable weeds or grass each year. Vacant lots greater than 1.25 acre must clear a 30 foot perimeter. All buildings within Butte County must have defensible space within 100 feet, regardless of property lines. Property owners are required to clear vegetation from the edge of private roadways a distance of 20 feet horizontally and 14 feet vertically.

Figure 11. Annual mowing of grass is required within a 30’ perimeter on all vacant lots over 1.25 acres.

Property owners who fail to comply with Defensible Space and fuel reduction requirements are in violation of and may be subject to administrative abatement procedures. The City of Chico has received funding through grants to work with private landowners and CFD to ensure homeowners continue to have defensible space.

The City of Chico enforces codes and ordinances to reduce fire risk. This includes Uniform Fire Code inspections, an enforcement of city fireworks, issuance of citations and related judicial proceedings for violations on fire safety regulations, as well as a weed abatement and lot clearing program. Code Enforcement staff are responsible for the identification of vacant properties that contain weeds; those staff also work with property owners and City Council to ensure abatement: https://chico.ca.us/fire-prevention-life-safety

3.2 Local preparedness and response capabilities

Chico has two emergency related programs in place; CodeRED, and Community Connect. CodeRED sends notifications to phones during emergency events, and Community Connect is a program where citizens provide critical household information available to first responders in the case of an emergency. In addition, a fire assistance center is available during fire emergencies. Chico’s designated emergency evacuation routes are Highway 99 and State Route 32.

City of Chico Fire Department Capabilities:
The City of Chico has four staffed fire stations. Engine 15 and OES 8332 are type-3 engines designed to fight fire in the wildland-urban interface. During the summer months, these engines are routinely dispatched to vegetation fires around Chico.

Table 3. City of Chico Fire Department resources and personnel.

Chico Fire Department Personnel	Number of Resources
Floor Personnel (Sworn)	65
Chief Officers (Sworn)	4
Prevention Personnel	3
Administrative Support Staff	2
Volunteer Firefighters CFD Resources	7
Engines	4
Truck	1
Squad	1
Type II Medium Rescue	1
Rescue Support Trailer	1
Hazmat	1
Air Trailer	1
Crash Rescue Apparatus	2
Foam Trailer	1

Chico's municipal fire department (CFD) has 60 employees (57 uniformed) and operates four fire stations. There are 4,311 fire hydrants located throughout the city. In the first half of 2018 (the most recent figures available), the CFD responded to 174 fires, arriving on scene within 8 minutes and 30 seconds 90% of the time (CFD 2018). The CFD's goal is is to cut that response time by two minutes - to six minutes and thirty seconds - a target it met 69% of the time in early 2018. Fire response is challenged when two or more calls come in at the same time, known as concurrent incidents. In 2018, concurrent incidents accounted for 8.2% of Station 5's workload, 4.8 % of Station 4's, 11.75% of Station 2's, and 16.4% of Station 1's. Some of the CFD's workload is based in Chico's parklands. In a six-week period in fall 2020 (9/2/20-10/17/20), CFD responded to human-started fires in the parks at least 16 times (City of Chico 2020b).

4. POTENTIAL WILDFIRE BEHAVIOR AND COMMUNITY RISK ANALYSIS

Context for Community Risk Analysis

In the past century, no wildfires have caused significant home losses within the core urban area of the city. Cal Fire maintains an air tanker base at the City Airport, and helitack station in Vina, about

10 miles north of town, ensuring a rapid and robust to grass fires burning to the north or east of the city. Under most circumstances, unless they are up in the inaccessible areas of the canyons, fires burning in flatter grassland areas near Chico have a fairly low resistance to control.

However, wildfire risk around the West has been steadily increasing over the past several decades. Prolonged drought, climate change, and a later arrival of autumn rains are lengthening fire seasons. This is significant because a lack of precipitation during critical autumn weather periods increases the likelihood Chico will have fires when strong east winds are affecting the area in September, October, and even into November. During recent large fires including the Camp, Bear, and Dixie Fires, firefighting forces have been overwhelmed by the scale of the disasters or outmatched by high winds, and unable to prevent fires from entering communities including Paradise, Berry Creek, and Greenville. During these wildland urban interface disasters, firefighters have had to fall back and focus on rescue and evacuations, as the fires have burned freely from house to house.

Because of the extreme difficulty in combating urban conflagrations once they are actively burning, it is critical to focus weed abatement and other wildfire hazard mitigation work on the eastern boundary of Chico in places where wildland vegetation extends into neighborhoods and intermixes with flammable landscaping plants and dense urban vegetation. Toward this end, the CWPP project team surveyed the entire eastern boundary of the city and then used detailed vegetation mapping and predictive wildfire spread computer models to map areas within the city which have vegetation which can support the spread of wildfires from lot to lot.

Goals of the community risk analysis:

- Identify areas of potential high-intensity wildfire or critical rates of spread
- Identify critical ignition points where fires could spread into the city
- Identify places where larger region-scale wildfire activity has the potential to spread into urban areas
- Test the effects of potential fuel treatment projects on fire behavior and spread

4.1 Fire behavior potential

Fire behavior potential was modeled for moderate and extreme weather scenarios based on past weather patterns and modeled fuel moistures. Surface fuels were mapped using aerial photography and LiDAR analysis, as well as ground surveys. The fuel modeling and weather parameters used for this analysis are available in Appendix B.

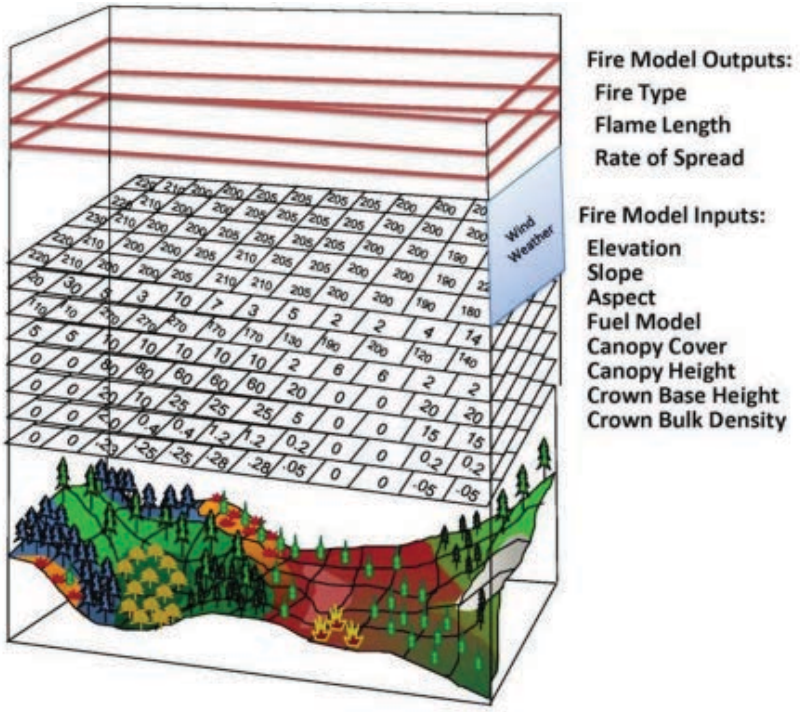

Figure 12. Example terrain, vegetation and canopy inputs used for fire behavior modeling

4.2 Results of Community Risk Assessment

The map below synthesizes our wildfire hazard assessment work for this project. More detailed maps of this information are in Appendix A. Generally, parcels along the northern and eastern edges of the city are most exposed to wildfire hazards. In some places, for instance in neighborhoods with large lots and dense landscaping, grass fires burning with strong NE winds have the potential to hopscotch from lot to lot, reaching deep into the city, or even into Bidwell Park.

Parcels shown in red are the highest priority for wildfire education, hazard mitigation including annual mowing of grasses and weeds once they are done growing in the late spring, and pruning of ornamental shrubs which have potential to catch fire or spread fire to a structure. Also, residents in the red and orange areas on these maps should consider home hardening projects to reduce the likelihood of their buildings catching on fire. Mitigation activities should be directed around ALL BUILDINGS, not just occupied structures.

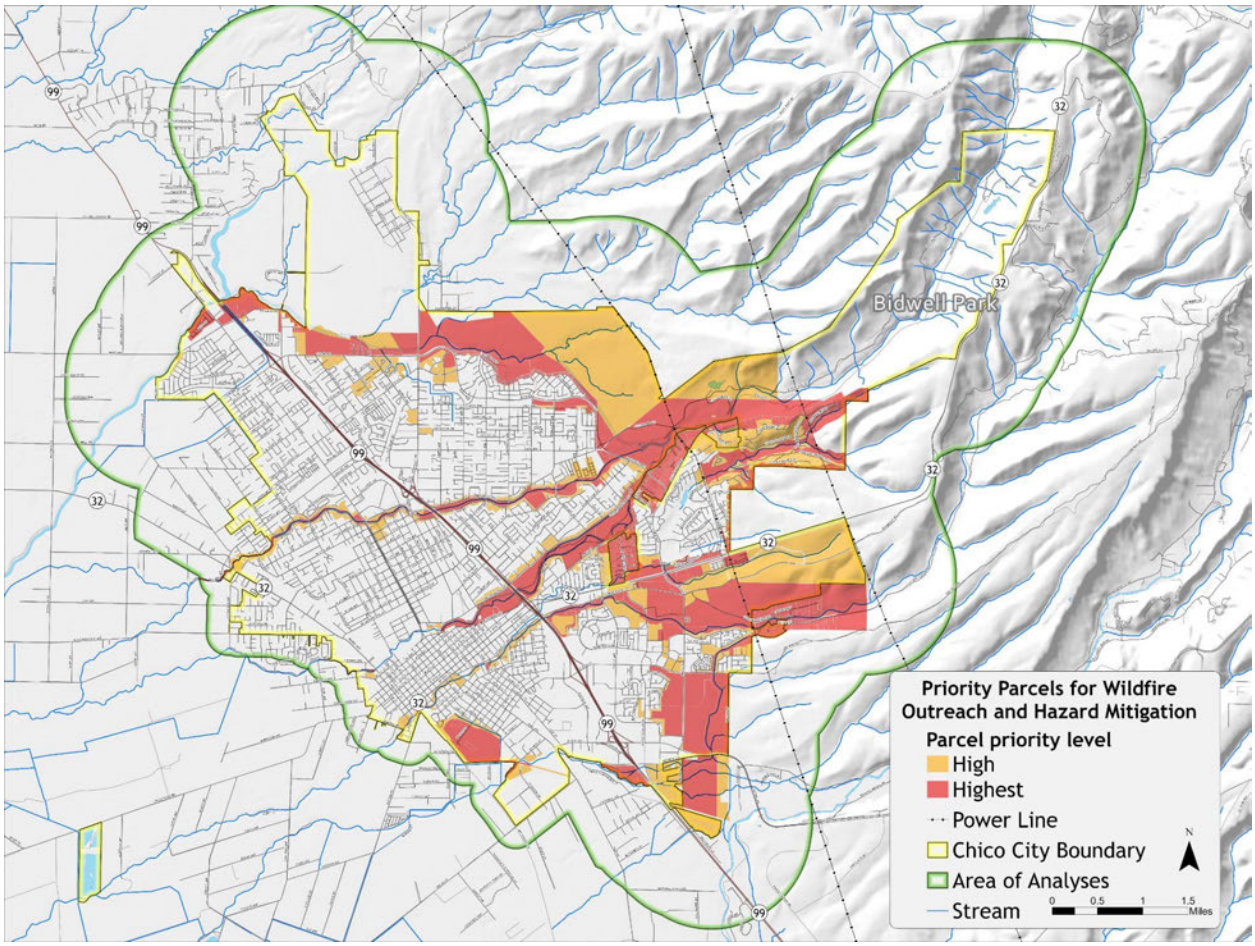

Figure 13. Overview of priority parcels for targeted code enforcement and fuel treatment projects. A detailed series of maps highlighting these priority parcels is provided in Appendix 1.

4.3 Detailed Findings of Community Risk Analysis

The modeling work conducted for this CWPP highlighted the potential for fire to spread through landscaping vegetation, reaching deep into portions of the city, especially in larger lots in neighborhoods including El Monte Ave and Centennial Ave. Of special concern is a scenario where a fire starts in Little Chico Creek Canyon around or east of Stilson Canyon and spreads SW to the west of Marsh Junior High and into the (unincorporated) El Monte neighborhood.

While not officially within the city limits, the Stilson Canyon neighborhood has major exposure to wildfire losses, and heavy vegetation here could help fires spread south toward the Picholine neighborhood. It is imperative the city work with partners at Cal Fire Butte County Fire Department to ensure even application of inspections and weed abatement code enforcement across the city/County boundaries.

Figure 14. Looking southwest over Stilson Canyon toward Picholine neighborhood. High fire hazard conditions exist in the Stilson Canyon neighborhood.

It is important to note the southeastern edge of the city is growing quickly (along Bruce Road corridor, including Meriam Park), and the risk profile of the El Monte/Forest Ave area between Highway 32 and Lower Bidwell Park will decrease as weedy vacant lots to the east are turned into commercial buildings, apartments, homes, and parking lots.

Figure 15. Looking west over Marsh Junior High toward El Monte Neighborhood (upper-center). Fire could spread from bottom toward top-center of map. Red parcels are high priority for weed abatement.

Built across several major drainages, the Canyon Oaks neighborhood has potentially high exposure to wildfires. The homeowners association there has recently funded extensive brush cutting and chipping work. As such, the area was in a low-hazard condition when surveyed for this project, in fall of 2021, but like all vegetation management project, will need regular maintenance, including annual mowing after grasses have stopped growing in late spring.

Figure 16. Looking southwest over Canyon Oaks. Red areas show parcels with a high priority for weed abatement. Butte County requires parcels 1.25 acres or less to have 100% weed abatement, and large parcels require a 30 foot mowed buffer around edges.

Figure 17. The Falcon's Point neighborhood (adjacent to South Rim Trailhead) has significant wildland fuels running through the middle of it. Neighbors are collaborating on becoming a Firewise community.

Houses between Glacier Peak Land and East Lassen Ave and the bike path along Sycamore Creek Diversion Channel (east of East Lassen, just south of Cohasset Road) are exposed to potentially high-intensity wildfire.

Figure 18. Large lots and contiguous strips of landscaping create somewhat elevated wildfire hazards in the Burnap/Morseman Ave area, north of E. Lassen Ave. The drainage canal running

along East Eaton toward the burnt-out bridge on the Airport Bike Path (top center of map, below) is a high priority for annual weed abatement.

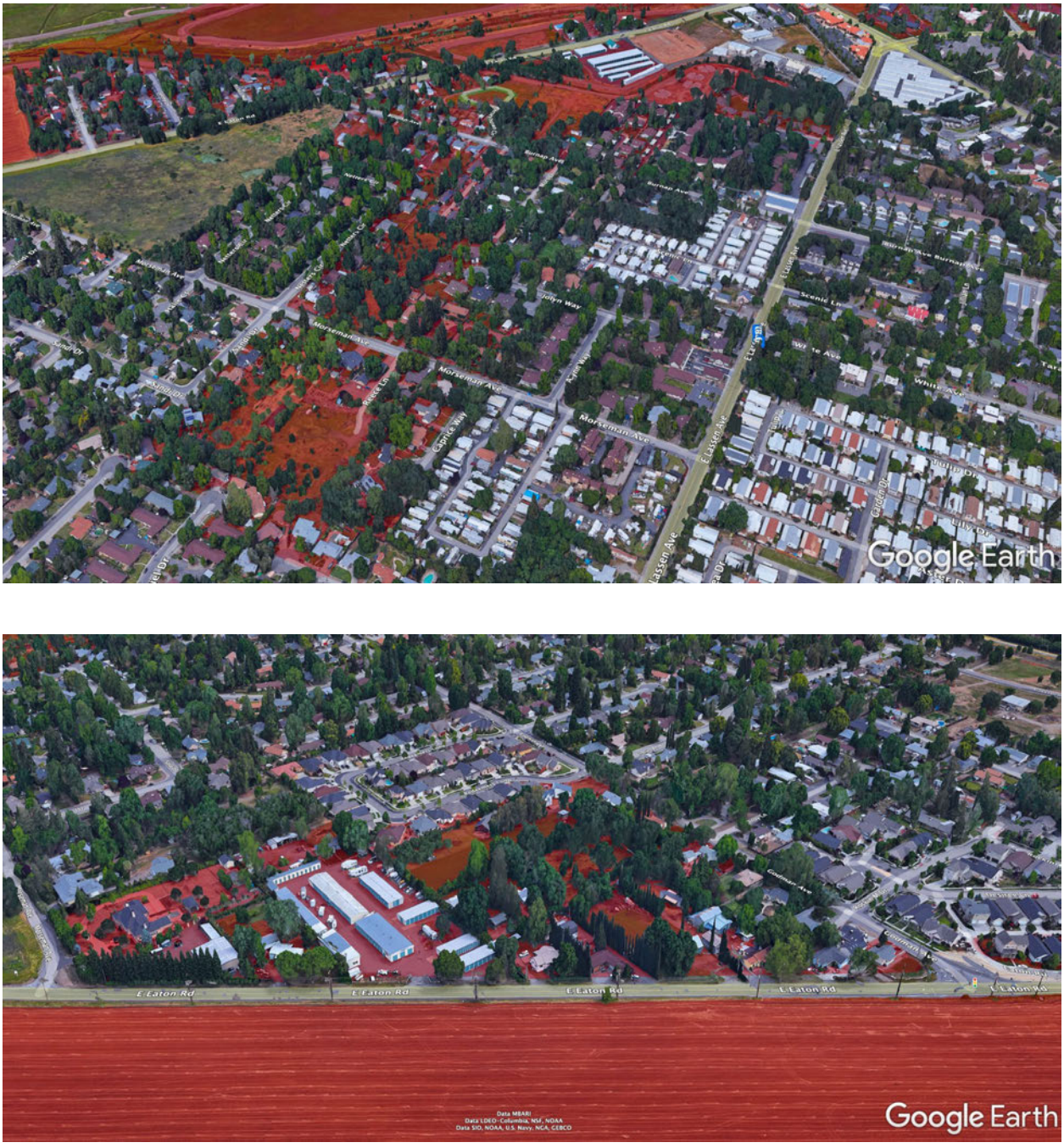

Figure 19. North winds howl into this North Chico neighborhood between Morseman and Godman Ave, at East Eaton. Large lots increase hazards to denser housing to the south. Agricultural field in foreground has had good weed abatement in past years, and is often 100% mowed.

The neighborhood west of the Mendocino National Forest Genetic Resource and Conservation Center (Also known as the ‘Tree Farm’ off of Morro Lane) is a high priority for weed abatement. The Tree Farm is generally well-maintained but fires could spread through the heavy vegetation in the riparian areas of Comanche Creek. The houses directly to the west off of Morro Lane are in Butte County.

Figure 20. Looking west over the Mendocino National Forest Genetic Resource and Conservation Center toward Highway 99. Red areas show parcels with a high priority for weed abatement.

Figure 21. Areas directly adjacent to Little Chico Creek, Bidwell Park and Lindo Channel (including thousands of private lots) have a high priority for weed abatement. View to southwest, over Manzanita Ave at Centennial Ave.

Potential Wildfire Behavior in Bidwell Park

Given the fact that many areas of Bidwell Park are characterized by high fuel loads and steep, irregular topography, it should not be surprising that many parts of the Park have the potential for extreme wildfire events (CAL FIRE 2007, VFMP, 2021). Potential wildfire behavior in Bidwell Park is summarized in the table below. Notice that Lower Park actually has more potential for torching fire behavior than Upper Park does. Torching is referred to as 'problem fire behavior' as it tends to cause large amounts of embers to be lofted high into the air, increasing the probability of spot fires igniting downwind.

Table 4. Potential for wildfire in Bidwell Park by wildfire type and park region.

	LOWER PARK	MIDDLE PARK	UPPER PARK
Surface Fire	0	60%	25%
Torching Fire	73%	35%	45%

Crown Fire	16%	5%	30%

Source: Deer Creek Resources/City of Chico VFMP EIR (2021)

Community Risk Assessment Conclusion

The lots shown in red in the maps above were identified during extensive ground surveys, informed by modeling of low-probability/high-consequence wildfire events. This risk assessment exercise necessarily assumes lots WILL NOT be maintained in a fire safe condition. Community wildfire resiliency is a group effort. The safety of the entire community relies on every resident doing their part to reduce hazards on their individual property. It may be difficult for some residents living on red parcels to perceive that they live in an area with high potential wildfire hazard, but if they keep their property in a well-maintained condition, with weeds and grass mowed, and flammable materials and debris kept to a minimum, it is possible for them to mitigate most of their exposure to wildfire losses.

4.4 Risk Potential from Outside Study Area

Wildfires do not obey jurisdictional boundaries. As evidenced by the 2018 Camp Fire, under extreme conditions, a large fire originating almost 20 miles away can threaten the city within a day. Future large wildfires in the foothills above Chico are a certainty. The Camp Fire, Doe Mill, Musty and Humboldt Fire all showed us that traditional firefighting systems break down during wind events, or when lightning storms cause hundreds or thousands of fires to start in a short amount of time.

While the existing wildfire response system succeeds in keeping most fires small, access to the foothills is extremely difficult anywhere beyond a couple miles up from the Valley floor. Historically, most major wildland fires in the foothills have only been stopped when they get to more-easily traversed areas, for example: Access roads along high voltage power line corridors, Highway 32, North Rim Trail, Upper Park Road, or Honeyrun/Centerville Roads.

Recommendations on Mitigating Outside Risks

Since poor access and difficult terrain make firefighting difficult in the canyons of the foothills, the city should prioritize hazard mitigation projects directly adjacent to, and within the urban area, and undertake road improvement or maintenance projects that improve access to key tactical access corridors. Specific recommendations are included in the next section.

5. SOLUTIONS AND PROPOSED PROJECTS

Our hazard assessment work found many of the areas in the city with the highest potential for wildfire damage are in neighborhoods that have not traditionally been perceived as having a high level of risk.

The City's capacity for outreach, inspection, and weed abatement code enforcement has recently been bolstered with the passage of amendments to Butte County's weed abatement regulations. Several of the key projects identified in this section relate to application of the CWPP's findings toward targeted wildfire education, increased inspections, and code enforcement in these newly-identified high-hazard areas. Most of the new recommendations in this CWPP apply to actions to be undertaken for private lands. For projects on city-owned properties, we incorporate the findings of the recently-adopted *City of Chico Vegetative Fuels Management Plan (VFMP, 2021)*

Summary: Wildfire Mitigation Strategies

These findings are discussed in greater detail in the text following these tables.

A	**Information, Education, and Planning**
City of Chico residents have benefited from activities of the city fire department, the Butte County Fire Safe Council, and County, Municipal, State, and Federal agencies. Numerous local, state, and federal funding sources have provided funding for wildfire hazard reduction. Some examples are:	
· Homeowner consultations · Emergency Preparedness and Wildfire Evacuation Planning · Educational information and displays · Helping interested communities in becoming recognized Firewise USA Communities. · Hazardous fuel reduction projects in Bidwell Park and on other public lands.	
Mitigation Measures related to Information, Education, and Planning	
A1	**Fund public education** Continue to seek funding to support development of education and outreach materials for wildfire safety, fire ecology, and ecologically-based vegetation management.
A2	**Continue to expand information & education to residents** Specific topics include ember awareness and what causes homes to ignite and burn in a wildland fire, fire ecology of Bidwell Park, grazing, prescribed fire, and rangeland health/noxious weed management. Programs should also address: the need for safe access and signage, the importance of available water, adequate fire protection, and the critical role vegetation, drought, and weather plays in wildland fire.
A3	**Expand awareness of wildfire issues related to landuse planning and building** Local and State agencies should provide educational information for civil engineers, developers, realtors, contractors, home builders, and building inspectors on methods to ensure structural and forest survival following a wildfire. Educational programs should focus on PRC 4290 and the State Fire Marshall WUI Standards, with focus on what causes homes to ignite and burn in a wildland fire. Programs should also address: the need for good home site location, wildfire-resilient subdivision layouts, safe access, and signage; and the importance of available water, adequate fire protection, and the critical role topography plays in wildland fire behavior.

A4	**Evacuation planning** There appears to be little public awareness or discussion of how to manage evacuations during a potential urban wildfire in areas like Lindo Channel, Lower Park, or Little Chico Creek. The Chico FD should coordinate with the Chico PD, Butte County Sheriff, and other potentially-involved entities to educate residents on potential evacuation scenarios. These efforts should focus on the parcels identified in Appendix A of this document.
A5	**Targeted outreach to high-priority areas** Enhancing realtor and new homeowner understanding of the wildfire zones in this document is important. The city should continue current education outreach efforts to assist current residents, realtors, and those persons moving into the City in understanding wildfire hazards and the need for active, ongoing hazard mitigation, especially in areas identified in Appendix A.
A7	**Provide education on use of prescribed fire** Engage landowners and public in order to educate, promote and plan prescribed fire on private and public lands in and around the City of Chico. Large prescribed grassland burns will help maintain the health of rangelands to the east of the city, while reducing the hazard of major wind-driven fires

B	**Structure Ignitability**	
The first priority for mitigation actions are immediately around structures, the home ignition zone, within 5 (minimum) feet from the building. Research shows fire prevention measures within the first 5 feet play the largest role in home survival. The level of attention given to a residence in terms of its vulnerability to ignitions is controlled by the owners, often days, weeks, months & years before a fire event.		
B1	**Existing structures & attachments -** Strengthen building standards for construction, replacement activities, and enforcement of compliance for existing residences and properties to make them less prone to loss from a wildfire due to combustible vegetation, embers, radiated heat, or surface fire spread.	
	Risk Condition:	Mitigation Measures:
B2	**Roof-edge/eave condition** Research shows exposed edge of eaves and roof corners are the most susceptible to ember-ignition during fires.	**1.** Continue educating residents on importance of regular maintenance to the roof edge of their homes. Special attention should be paid to keeping roof eave corners tight and freshly-painted. **2.** Seek financial assistance programs for roof- edge maintenance for old homes in high-priority (Appendix A) areas, especially in densely-built areas.

B3	**Decks –** Provide that adequate defensible space is maintained around and under decks. Provide maintenance of flammable vegetation debris and flammable furnishings on decks. The next greatest threat from decks is to firefighter safety. Some newer deck surfaces (synthetics) can ignite with direct flame more easily than wood but won't stay lit once the flame is removed. Synthetic decks have a more rapid collapse when subjected to high heat loads.	**1. Educate residents** on importance of safe deck construction and maintenance. Refer residents to IBHS fact sheets concerning decks and fire spread on ember ignited decks: https://www.nfpa.org/-/media/Files/Firewise/Fact-sheets/FirewiseFactSheetsEmberIgnitedDecks.pdf
B4	**Vent openings** - Provided adequate defensible space is maintained, screening of vent openings with steel screens will prevent embers (during the ember blizzard that comes with a wildfire) from entering into attics and crawl spaces. Currently standards exist in the county for new construction, but not older structures.	**1.** Create owner awareness of the critical **importance of steel vent screening** - of all vent openings and promote screen **standard of a maximum 1/8 inch steel screen mesh**. **2.** Create owner awareness of importance of remediating **flammable surfaces and objects inside and adjacent to vent** openings. **3.** Promote the protection of roof vents in eaves and cornices with baffles where possible. **4.** Refer residents to IBHS data sheets on Attic & Crawl Space Vents: https://www.nfpa.org/-/media/Files/Firewise/Fact-sheets/FirewiseFactSheetsAtticsCrawlSpaces.ashx

B5	**Outbuildings** - Structures (e.g. storage, wood & tool sheds) with less than 30- feet separation from outbuildings place homes at a high risk of loss.	**1.** Continue educating residents on need for separation of heat loads from their residence. **2.** Enforce weed abatement codes to assure clearance requirements are met around all structures.
B6	**Woodpiles** with less than 30 feet separation from outbuildings often place homes at a high risk of loss.	**1.** Continue educating residents to have 30 feet separation between firewood piles and their residence and not stored against homes, or on porches during fire season.
B7	**Propane tanks** with less than 10 feet of vegetative clearance to bare mineral soil and no vegetation (per 14 CCR 1299.03 (c 1) may place homes at a risk of loss.	**1.** Continue educating residents on need for separation of heat loads - t**o have vegetative & flammable material clearance** around propane tanks and placed **at least 10 feet from any building**.
B8	**Defensible Space- Lean, Clean, Green Zone - (5-30') & Reduced Fuel Zone - (30-100')** Eliminating flammable vegetation within the 0-30' zone can significantly increase the chances of home survival during a wildfire threat. Reducing flammable vegetation within the 30-100' zone to comply with recommended California Defensible Space Guidelines can significantly increase the chances of home survival.	**1. Continue to provide information and education on methods to create defensible space and fire safe landscaping (5-30')** - Starting with the flammable free first 5 feet from the structure the emphasis should be on vegetation and landscaping materials that do not readily accept embers and perpetuate fire spread; along with keeping roofs and gutters free of leaves and needles. **2. Continue to provide information and education on methods to create defensible space in the "Reduced Fuel Zone" (30-100')** – emphasis on reducing fuel ladders and increasing spacing between bushes and trees, so that flames and embers are reduced lessening the perpetuation of fire spread **3. Continue to implement & seek additional funding assistance programs for weed abatement** and building upgrades for qualifying senior & disabled citizens in priority Appendix A areas.
B9	**Defensible Space Enforcement** required by State weed abatement regulations	**1.** Secure funding for additional code enforcement officers to conduct weed abatement inspections for Appendix A areas. **2.** Enforce weed abatement regulations on all parcels in Appen

C Suppression Capabilities & Public Safety

The City of Chico currently has a Type 3 and a Type VI fire engine, both of which are considered suitable for wildland fire suppression. They also have a UTV with an 85 gallon fire pump and medical rescue capabilities. Off-road wildland fire engines such as Type 6 and 7 engines or UTVs allow firefighters the resources needed to address potential catastrophic wildfires in the WUI, and to support neighboring agencies in addressing complex fires in their jurisdictions. Given the severity and destructive nature of fires in the WUI around the West, in addition to ongoing drought and climate change, expanding the city's wildland fire-specific equipment should be a priority moving forward.

Priority access improvement projects and regional-scale mitigations include:
A bridge or low-water crossing on Big Chico Creek at the end of the Upper Park Road, connecting to the bottom of 10 Mile House Road.
Improvements to PG&E powerline access roads between Honey Run Road and Highway 32.

Risk Condition:		Mitigation Measures:
C1	**Fire protection access** – some lots in un-incorporated or recently-annexed parts of Chico have large lots with potentially-high levels of weedy vegetation. Access can be difficult into these properties during a fire.	**1. Continue current efforts on educating the public about wildfire hazards inside the city.** Encourage landowners to create gated access to larger lots, right-of-ways, and other areas with significant wildland vegetation.
C2	**Signage** is critical to agencies providing emergency services, not only for wildland fire purposes, but all emergency vehicle access. City of Chico should strive to have all residences and communities meet CA Fire Safe Standards (PRC 4290) for road and address signage.	**1.** Continue to explore homeowner incentives for fire safe house signing - to meet CA Fire Safe Standards (PRC 4290) for signing of their homes. **2.** Consider educating homeowners to measures which may include, but not be limited to, requiring proper signage upon sale.
C3	**Driveways and private roads** are critical to agencies providing emergency services, not only for wildland fire purposes, but all emergency vehicle access.	**1.** Educate existing property owners on the need to maintain adequate clearance to allow passage of large fire engines safely.
C3a	**Driveway length** – Some driveways are less than 150 feet of line sight distance from a road, however, the driving distance exceeds 150 feet with no way to turn apparatus around or allow for passing of vehicles.	**1.** Educate existing homeowners on the importance of providing turn- outs and improved turn arounds.

C3b	**Gates** - Emergency responders have come across either narrow gates, or gates that do not open during power outages.	**1.** Continue educating residents on importance of emergency access through gates. Encourage residents to share gate codes with Chico FD and PD dispatch centers.

C3c	**Vegetative clearances** – Some existing private roads and driveways are too overgrown for their apparatus. A good standard is PRC 4290, which requires **vegetation be cleared for 14 feet horizontally and 15 feet vertically along driveways**.	**1.** Encourage homeowners to maintain for fire safe driveway vegetation clearances is areas included in Appendix A.
C3d	**Bridges** - Emergency responders have no way to cross Big Chico Creek at the end of the Park Road to make access to Tenmile House Road.	**1.** Build a bridge or low-water crossing at this location.
C4	**Access for evacuations in and out of gated communities** – There are only access points into Canyon Oaks neighborhood.	**1. Educate Canyon Oaks residents on their options for sheltering in place within their community during a fire – either in their homes or on the golf course.** The Chico FD currently states their desire to avoid evacuations in Canyon Oaks during wildfire, as they feel existing clearances should provide adequate protection from a major conflagration within the community.
C4a	**There is very limited vehicle access** to the foothills between Humboldt Road and Honey Run Road, on the NE side of the city, and between Bidwell Park and Cohasset Road**.**	**1.** Make improvements to PG&E powerline access roads between Honey Run Road and Highway 32. Work with ranchers/landowners to initiate an annual program of large patchwork grassland prescribed burns between the powerline corridor and the city, all the way from Honey Run Road to the Chico Airport.
C5	**Water systems** - Water is a premium commodity in the suppression of both structural and wildland fires.	
C5a	**Proposed residential developments** - Communities may have been allowed to develop in the city which will have unacceptable water flow and/or storage for firefighting, under future housing densities.	**1.** City and County fire departments should be consulted and included in general plan updates or other planning processes which increase housing densities in wildfire-prone parts of the city.

C5b	**Development in the WUI** - Lack of accessible water sources for wildfire suppression in areas off of Highway 32 adjacent to Upper Bidwell Park.	**1.** Consider enhancing storage of water in WUI areas off of Highway 32. **2.** Communities and local agencies should work collaboratively at the local, state, and federal level to identify opportunities to improve water storage, access, signage and development for firefighting on public and private lands.

D	**Hazardous Fuel Reduction**	
	Risk Condition:	Mitigation Measures:
D1	**Vegetation on developed lots -** An excess of hazardous fuel around structures, largely in the form of annual weeds and tall grasses, places many homes at risk of ignition from wildfires – not necessarily originating from outside of the community.	**1. Continue to educate residents** on the need for creating structure survivable space by complying with PRC 4291, even though it is not enforced within non SRA lands. **2. Educate residents on legal requirements of state weed abatement regulations.** **3.** Seek funding for additional code enforcement staff. **4.** Increase surveys and enforcement of weed abatement regulations.
D2	**Hazardous vegetation on adjacent vacant lots.** Presently in City of Chico, many parcels adjacent to homes are undeveloped with extensive fuel loading, placing neighboring homes at risk.	**1.** Enforce state weed abatement laws.
D3	**Vegetation in and around city-owned lands.** High wildfire hazard conditions exist on many parcels of city-owned and other park lands, often directly adjacent to homes and residential lots.	**1.** Implement priority projects for city lands identified in Chapter 5 of this document, and described in greater detail in the city's Vegetative Fuels Management Plan (2021).

D4a	**Addressing wildfire hazards for planned subdivisions -** Proposed subdivisions on eastern margin of City of Chico currently have hazardous fuel conditions, and are located where it will be difficult to provide wildfire response during severe wildfire conditions.	**1.** Require developers to consult wildfire experts when developing their subdivision maps. Special attention should be paid to building spacing and alignment of multiple structures with prevailing fire weather. Require open space and trails which can be used for firefighting or as control lines for prescribed burns. Open space, trail, and road alignments should be developed in collaboration with wildfire behavior experts.
D4b	**Maintenance of treated hazardous fuels in planned subdivisions** – Hazardous fuel treatment must be part of an on-going strategy in order to maintain a fire-resistant condition into the future. Once planned subdivisions are treated to a fire resilient condition, there need to be a written strategy and long-term funding to maintain that condition and an assignment of responsibility should be required,	**1.** Consider modification of county codes to **require a plan and legally-binding funding mechanism for the maintenance of treated fuelbeds on proposed developments prior to recordation of final map.** Requiring a **hazardous fuel reduction maintenance plan** by either the Homeowners Association or Communities Service District will provide for future **fiscal and enforcement responsibilities** to maintain communities in a fire-resilient condition. Any vegetation management plans should be reviewed by qualified wildfire behavior experts.
D5	**Treating hazardous fuels on conservation lands adjacent communities at risk** - There are over 10,000 acres of contiguous conservation lands between Highway 32 and Cohasset Road, extending miles into the foothills. Landscape-scale burning in these areas could place burdens upon ranchers, who may have to forgo grazing in some areas if burning occurs at a meaningful scale.	**1.** Work with conservation landowners in the foothills to develop a grazing bank, where ranchers can share access to grazing to compensate for lost forage if grazing on city-owned properties is impacted by rangeland improvement or hazard reduction burns.
D6	**Mitigating risks of wildfires started by unauthorized camping in the Chico Urban Area.**	**1.** Illegal campfires have started many wildfires in Chico parks. Popular camping areas should be mapped, and city should seek funding to weed-eat around the most-impacted camping areas at the end of the spring growing season, especially in Lower Bidwell Park, Lindo Channel, adjacent to Sycamore Creek Diversion, and Little Chico Creek.

E	Building Prescribed Fire and Wildfire Management Capacity	
	There are a wide variety of opportunities to use fire to improve the function, safety, aesthetics, and resiliency of Chico's parklands while also helping educate the general public on fire's many ecological and public-safety benefits. The use of prescribed fire is explicitly supported in existing city planning documents including the Bidwell Park Master Plan (2008), Vegetative Fuels Management Plan Programmatic EIR (VFMP PEIR, 2021) and Prescribed Burning Plan for Lands Managed by the City of Chico (Lunder, 2021).	
	Risk Condition:	Mitigation Measures:
E1	**Firefighting activities have the potential to cause longer-lasting resource damage to Bidwell Park than an actual wildfire does.**	**1**. Pre-fire planning should be conducted for Upper and Middle Bidwell Park. This planning should game out specific wildfire scenarios to identify opportunities for vegetation management projects and infrastructure improvements that can minimize firefighting impacts on sensitive resources while identifying opportunities to use fire to achieve land management objectives.
E1a	The Chico Parks Department has identified places where prescribed burning or wildfire is desired to reduce the density of invasive plants such as yellow star thistle, but implementation can be difficult, due to a need to pay overtime to City firefighters, among other factors.	**1.** Seek funding for Chico firefighters to staff prescribed burns. **2.** Strategic prep work on key tactical corridors like the Upper Park Road or existing dozer lines from past fires could make it possible for firefighters to use indirect firefighting tactics to manage some wildfires, using the fire to burn priority prescribed fire areas. **3.** The fire department should develop a training plan for prescribed fire qualifications, and pursue training opportunities in the Firing Boss and Burn Boss roles both on local and out-of-county assignments. **4.** Seek funding for the development of burn plans.
E1b	Bulldozer firelines can have adverse impact on Park natural resources. There are few good strategic places to put new bulldozer lines in steeper areas of Upper Bidwell Park.	**1.** The city should work with CAL FIRE to distribute maps of existing dozer lines, and encourage use of previous dozerline alignments whenever possible. **2.** The Park and City Fire Department should coordinate on the development of a tactical wildfire management plan for Bidwell Park.
E1c	If properly prepared with annual weed-eating, many of the Park trails could be used as control lines for wildfires. However, these trails have not been identified or mapped, and they are currently not being maintained for use during wildfires.	**1.** The Park and City Fire Department should coordinate on the development of a tactical wildfire management plan for Bidwell Park.

E1d	**Park land management objectives are not communicated or represented** in the selection of wildfire management tactics during going fires.	**1.** Develop fire management objectives and preferred suppression tactics for Upper Park. **2.**Train park staff to be 'Resource Advisors' during wildfires; build READ program for Park. **3.** Develop Park 'Fire Ranger' funding and position to coordinate and manage Park's wildfire hazard mitigation and prescribed burning program.
Building Prescribed Fire Capacity		
Risk Condition:		Mitigation Measures:
E2	Noxious weeds and heavy fuel loading degrade user experience in Middle and Upper Park. Dense understory vegetation in Middle Park creates opportunities for unauthorized camping.	**1.** Burn star thistle, medusahead, and barbed goat grass areas in Middle and Upper Park. Initial entry completed in 2021 requires 2 more consecutive years of burning to achieve reductions in weed seeds, **2.** Initiate moderate-complexity burns in oak woodlands areas of Middle Park, north of 5 Mile (Signed burn plans completed in 2021)
E2a	Public is interested in learning more about prescribed fire, but opportunities are limited to provide direct access during burns or provide interpretive materials after the burn,	**1.** Develop Bidwell Park Fire Festival educational program, which includes live prescribed fire demos. **2.** Develop outreach and messaging programs to prepare public for increased use of fire on City-managed lands.
E2b	Need to reintroduce fire into recently-burned areas on South Rim of Upper Park to reduce fuel loading from fire-killed trees and shrubs. Need to get fire back into areas above Parking Lot R that have not had fire for decades.	**1.** Develop burn plans which can be implemented after a wildfire burns the east side of Highway 32. **2.** Develop plans for prescribed fire to be used after a wildfire is held upslope of Park Road in area above Parking Lot R.
E2c	Native tribes need to build capacity for cultural burning to maintain important cultural resources.	**1.** Continue cultural burns in Verbena Fields, expand burning into areas of Lower Park identified in 2021 VFMP. **2.** Implement demonstration cultural burns for traditional edible plants in old walnut orchard on Peterson Drive. **3.** Collaborate with CSU, Chico Ecological Reserves to host TREX prescribed fire training events on City of Chico-owned lands.
E2d	Need to increase scale of grassland burns on east side of City.	**1.** Continue to conduct larger burns on Bidwell Ranch and Chico Airport. Media outreach during large burns. **2.** Work with California Cattleman's Association to develop demonstration burns on City-owned lands.

5.1 Wildfire Mitigation Projects on City-owned lands

Every acre of city-owned vegetation has a fire return interval and requires some fire for optimal health and to remain safe from catastrophic fire. If fire cannot be safely applied to these lands, then a fire surrogate will need to be applied in order to do some of the work fire would have done. Fire surrogates include almost any technique that reduces or kills vegetation, including hand cutting, mechanical mastication, grazing, mowing, or herbicide use. A trait shared by fire and all fire surrogates is that a single entry (treatment) is not enough. Follow-up treatments (i.e, maintenance) are crucial to keeping land healthy. This work is never done. Some vegetation communities require more frequent re-entry intervals to stay healthy (or at socially acceptable vegetation densities) compared to others.

The city adopted a comprehensive plan for managing vegetation on publicly-owned lands in 2021. This section will summarize key findings and recommendations from that effort.

City of Chico Vegetative Fuels Management Plan (VFMP, 2021)

The VFMP establishes fuel load guidelines (see VFMP Section 4.2) and describes high- priority areas for programmatic prescribed burning (see VFMP Sections 4.2, 5.1, 5.2, and 5.3). It provides a fire risk assessment for parks and other city-owned lands to guide the prioritization of projects (VFMP Section 6.1) and it provides a framework for prioritizing invasive plants for removal during fuel reduction activities (VFMP Section 6.3).

To restore and maintain ecological health and appropriate fire intervals in Chico's parklands, the VFMP program objectives are as follows:

1. Establish and implement strategic management actions on City-owned lands to reduce the likelihood of unwanted ignitions in the wildland-urban interface
2. Reduce the negative effects of parkland fires on structures, lives and natural resources.
3. Create conditions under which fire, when it does occur, can have beneficial ecological effects.
4. Fulfill the need for a comprehensive fuels management program for Bidwell Park as expressed in the 2008 BPMMP Natural Resources Management Plan.
5. Make it easier for the City to efficiently complete future vegetation management projects (and increase pace and scale of vegetation management) by establishing standard project requirements for all projects.
6. Reduce fire hazard to homes, businesses, and natural resources while continuing to manage natural parks (e.g. Bidwell, Verbena Fields, and the others listed in VFMP sections 2.1-2.5) for natural values, while managing other parklands for their respective primary management objectives as described in VFMP sections 3.1-3.5 (e.g. floodwater conveyance for Lindo Channel, airport safety for airport parcels).
7. Post- fire, in the three woodland vegetation zones (Upland Mix, Blue Oak-Gray Pine) create an open stand of well-spaced single-or few-stemmed trees that has reduced horizontal and vertical fuel continuity.

8. In grasslands, sustain health and biodiversity (including by fostering good fire) while reducing any threats to homes, businesses or natural resources from unwanted grass fires.
9. In riparian areas, maintain riparian values, including cold water temperatures needed by salmon and riparian buffers' ability to filter sediment, while reducing overgrowth by removing invasive plants first before removing any natives.

5.2 The Use of Prescribed Fire and Adaptive Wildfire Tactics

There are a wide variety of opportunities to use managed fires to improve the function, safety, aesthetics, and resiliency of Chico's parklands while also helping educate the general public on fire's many ecological and public-safety benefits. Bidwell Park is a perfect teaching laboratory for fire ecology, with a history of successful prescribed fire use, ample opportunities for safe public viewing of active burns, and many ongoing community-driven land stewardship efforts, including the Park's popular volunteer programs, the Mechoopda Tribe's ongoing Traditional Ecological Knowledge (TEK) work, and the applied fire ecology and wildland management research being carried out by the CSU, Chico Wildland Management students both on City lands and the CSU, Chico Ecological Reserves.

While Bidwell Park is a high priority for prescribed fire, many other city-managed lands could benefit from more prescribed burning. The use of prescribed fire is explicitly supported in existing city planning documents including the Bidwell Park Master Plan (2008), Vegetative Fuels Management Plan Programmatic EIR (VFMP PEIR, 2021) and Prescribed Burning Plan for Lands Managed by the City of Chico (Lunder, 2021). The 2021 citywide burn plan is included as Appendix C of this document. The map below identifies general strategies for the use of prescribed fire.

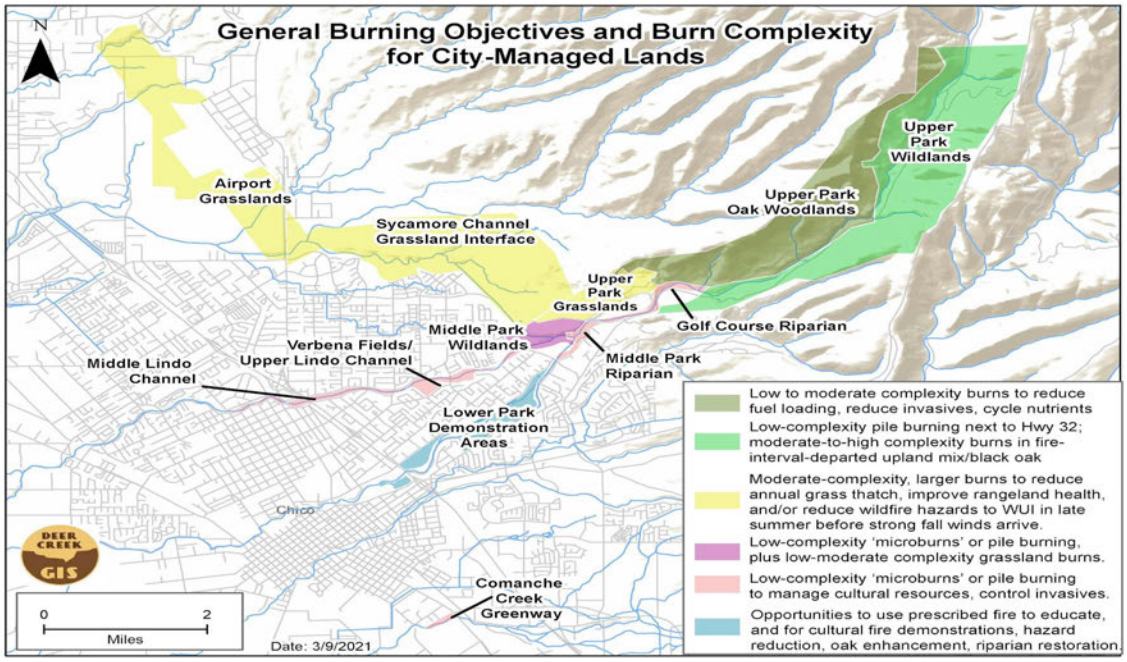

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Figure 22. Burn Objectives for City-Managed Lands

Potential burning projects range from wintertime cultural burning on small patches of deer grass that are just a couple feet across, to large grassland restoration burns adjacent to the North Rim Trail Parking lot, or more intense chaparral burns on the Northeast corner (Upper South Rim) of Upper Bidwell Park that have not had natural fires in the past 50 years.

Adaptive Wildfire Tactics

Long-term fire exclusion and firefighting tactics like utilizing bulldozer firelines on previously un-disturbed areas have the potential to cause longer-lasting resource damage to Bidwell Park than an actual wildfire does. Also, the Park has identified places where prescribed burning or wildfire is desired to reduce the density of invasive plants such as yellow star thistle. Strategic prep work on key tactical corridors like the Upper Park Road or existing dozer lines from past fires could make it possible for firefighters to use indirect firefighting tactics to manage some wildfires, using the fire to burn priority prescribed fire areas; decreasing resource damage, accomplishing Park resource management objectives, increasing the ease of mop-up, while decreasing resource commitment times and reducing overall costs for the incident. The latter two points are possibly the most important for the overall efficiency and responsiveness of the fire department's operations.

The dense network of trails in the Park create many opportunities for fire control. Often, a trail which has been mowed 6 feet on either side will hold a grass fire as well as a dozer line. The Park and City Fire Department should coordinate on the development of a tactical wildfire management plan for Bidwell Park. The recommendations below are adapted from the 2021 Citywide Prescribed Fire Plan (Lunder, 2021).

Building Prescribed Fire and Wildfire Management Capacity - A Timeline:

Ready: Can Proceed Almost Immediately.

- Burn star thistle, medusahead, and barbed goat grass areas in Middle and Upper Park.
- Small cultural burns in Verbena Fields and Lower Park.
- Moderate-complexity burns in oak woodlands areas of Middle Park, north of 5 Mile.
- Conduct larger burns on Bidwell Ranch and Chico Airport.
- Prioritize Firing Boss and Burn Boss training assignments for Chico FD firefighters.
- If needed, build cooperative agreements to utilize private contractors to train Chico FD staff on prescribed burning operations.
- Demonstration cultural burns for traditional edible plants in old walnut orchard on Peterson Drive.

Near-Term: May require 1-2 years of planning/surveys/funding development

- Chaparral and live oak burns on South Rim of Bidwell Park in recently burned areas.
- Develop fire management objectives and preferred suppression tactics for Upper Park
- Train park staff to be 'Resource Advisors' during wildfires; build READ program for Park.
- Develop Park 'Fire Ranger' funding and position to coordinate and manage Park's wildfire hazard mitigation and prescribed burning program.
- Develop Bidwell Park Fire Festival educational program, which includes live prescribed fire demos.
- Develop outreach and messaging programs to prepare public for increased use of fire on City-managed lands.
- Larger understory burns in Lower Park Valley Oak woodlands.

Medium-Term: Realistically requires 2-5 years of preparation including securing funding and other resources and at least some advance on-the-ground prep work (e.g. brush reduction in some areas)

- Higher-complexity chaparral burns in areas on North side of Big Chico Creek upstream of Parking Lot Q that haven't burned in last 50 years.
- Develop landscape-scale burning projects in conjunction with Big Chico Creek Forest Health Restoration Project, BCCER, and private landowners adjoining Upper Bidwell Park.

5.3 Fuels Reduction on Other City-owned Lands

Table 5: City-owned land units and relevant associated vegetation management plans.

'ark/open space	Acreage	Management plan
[illegible]	[illegible]	[illegible] (EDAW 2008a) and Draft Natural Resources Management Plan (unpublished; City of Chico 2010).

;idwell Ave. Greenway	4.68	No management plan
;idwell Ranch Preserve	750	Draft management plan guides interim grazing and firebreak maintenance until final management plan can be developed; has Bidwell Ranch Site Inventory (RiverPartners, 2008).
;hico Municipal Airport and ssociated open space	1,322	Airport Land Use Compatibility Plan; Chico General Plan 2030 (City of Chico 2017);
;omancne Creek Greenwa	30	Comancne Creek Management Plan (City of Chico 2012); Comanche Creek Vegetation Management Plan (DCE 2008)
indo Channel Greenway	129.15	No City management plan; but has Sandy Gulch Resource Inventory (GEM 2001) and various
eichert Ponds	38.26	Teichert Ponds Restoration Habitat Development Plan (Restoration Resources 2008).
;outh Chico Conserved arcel	14.8	Established to protect endangered Butte County Meadowfoam. Detailed management plan (CNLM 1996).

South Deadhorse Slough	51.43	No management plan
Wildwood Vernal Pools Preserve	3.1	Wildwood Estates Preserve, Operations and Management Plan (Foothill Associates 2014)
Miscellaneous Small Parcel	16.89	No management plan
Total	**6,397**	**City of Chico Vegetative Fuels Management Plan, 2021**

The need for fuels reduction varies greatly across City-owned properties. Some parcels already have fire-safe fuel loads or are not in a location where wildfires burning on them will threaten any assets of concern. This is especially true in the Grassland and Blue Oak-Gray Pine zones, as well as most Riparian areas that are not close to homes and businesses. Other parts of the program area would benefit from light treatment, and still others are scheduled for substantial thinning.

Lower Park

The citywide fire risk assessment conducted for the 2021 VFMP project identified areas of dense ladder fuels in Lower Park. Under the right (rare) weather conditions, a high-intensity fire could move from Lower Park to adjacent neighborhoods. A wind-driven fire along this corridor, while a low-probability event, could result in structure losses. Therefore, a thinning project to address the densest areas in this corridor was prioritized in the City of Chico VFMP. The VFMP has detailed prescriptions for fuels reduction work in Lower Park.

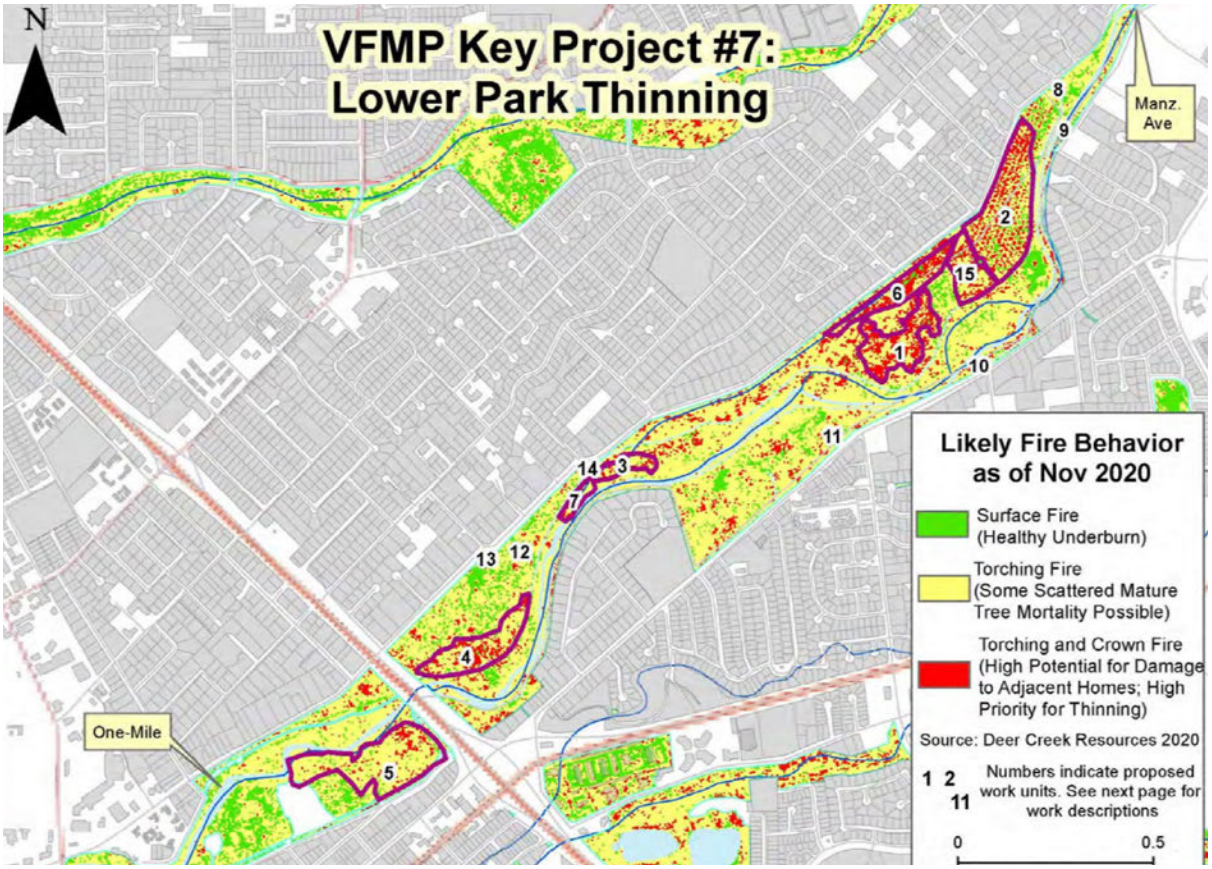

Figure 23. Lower Park Thinning Projects

The general focus of thinning work in Lower Park should be to reduce ladder fuels, especially invasive plum, blackberry, and walnut, using ecologically trained hand crews. Also opportunities exist to use late-fall and winter prescribed burns to reduce fuel loading and manage important culturally important plants and food sources (map from VFMP, 2021).

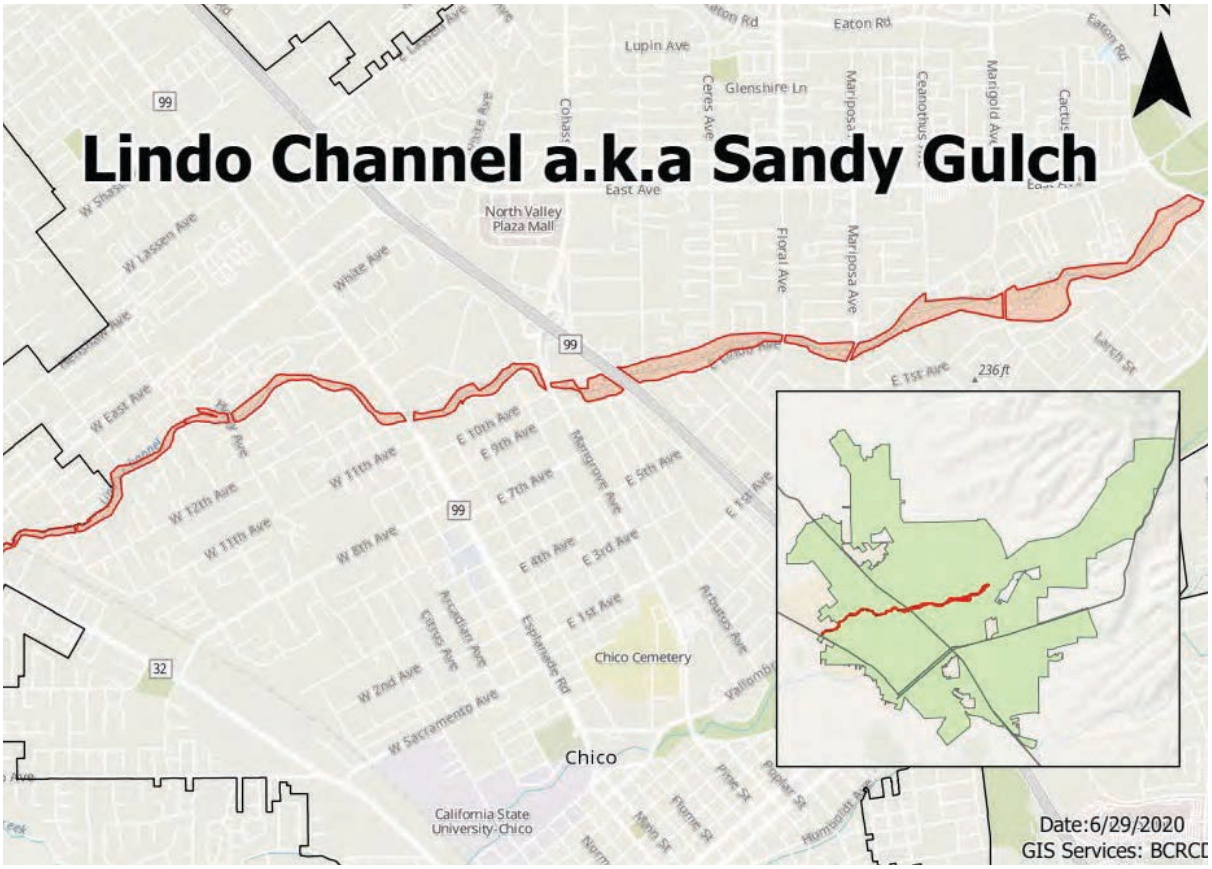

Figure 24. Lindo Channel

The entire length of Lindo Channel is a priority vegetation management project for the City. Vegetation management in this Riparian zone (see Section 4.2.3) focuses on raising sightlines to improve public safety, reducing the likelihood that an untended campfire could start a wildfire, and reducing flotsam buildup that can hinder floodwater conveyance (City of Chico VFMP, 2021). Recent vegetation management work along Lindo Channel between Esplanade and Highway 32 has worked to reduce overgrown vegetation that had attracted illegal campers due to all the hiding places it provides. Upstream of Mangrove Avenue, fuel loads are generally dominated by annual grasses and weeds. Areas of tall grass on City property adjacent to homes should be a high-priority for spring mowing, and code enforcement should be prioritized for private parcels adjacent to Lindo Channel. Vegetation management for Lindo Channel is covered in greater detail in the City of Chico VFMP (2021).

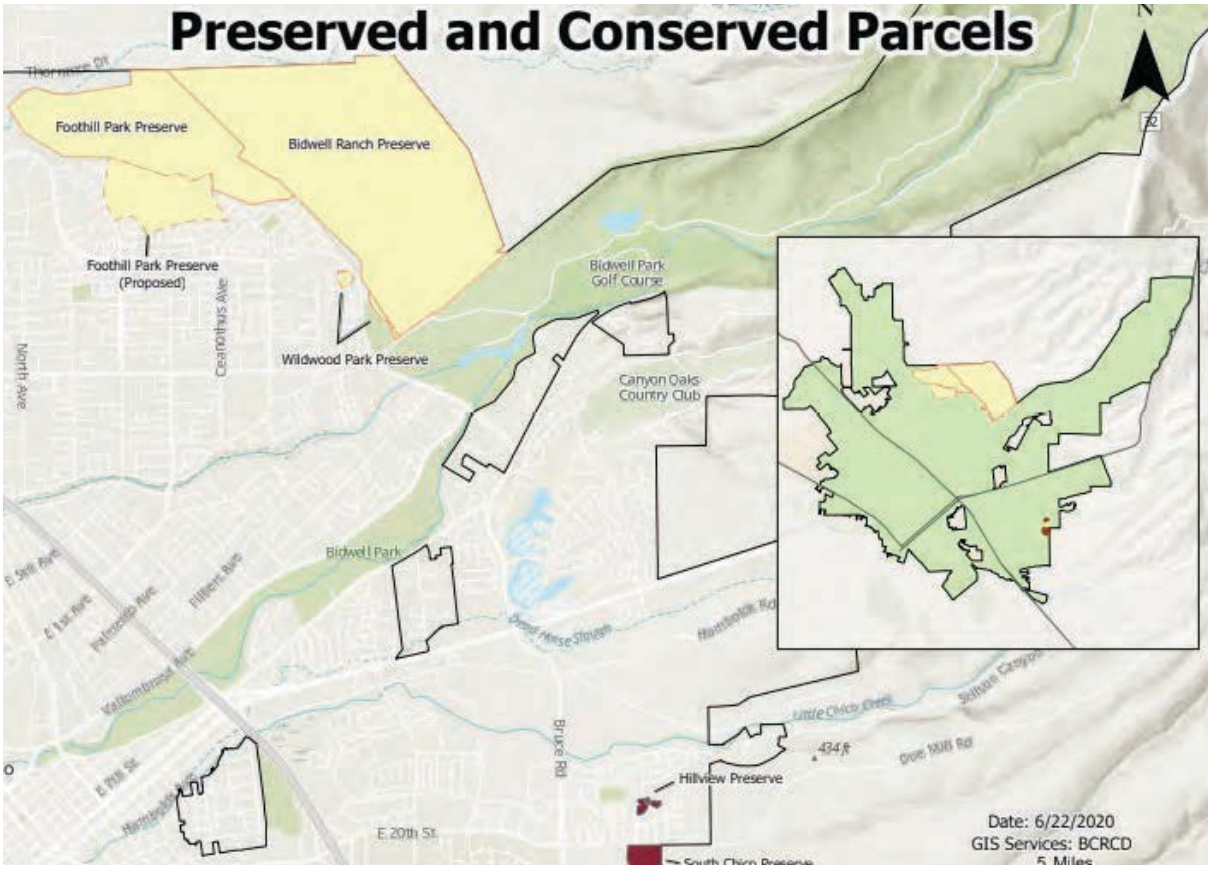

Figure 25. Preserved and Conserved Parcels

The contiguous areas of Bidwell Ranch, Foothill Park Preserve, and Wildwood Vernal Pool Preserve were set aside to preserve vernal pool rare and sensitive species habitat. (City of Chico VFMP, 2021).

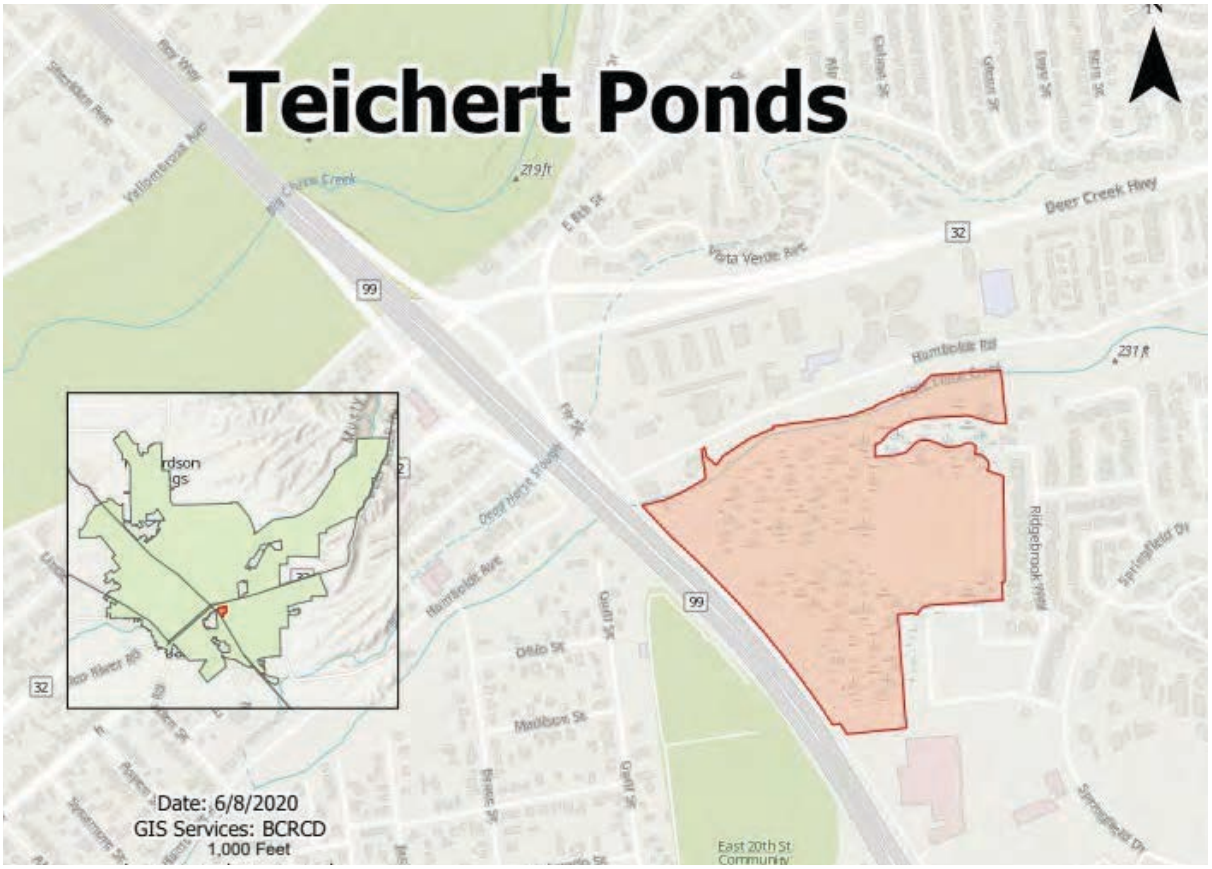

Figure 26. Teichert Ponds

Teichert Ponds' location in the middle of a busy, urban residential/commercial neighborhood makes it an attractive place to camp and possibly build an (unauthorized) camp fire. This results in a risk level for human-caused ignition that does not exist in most wetlands.

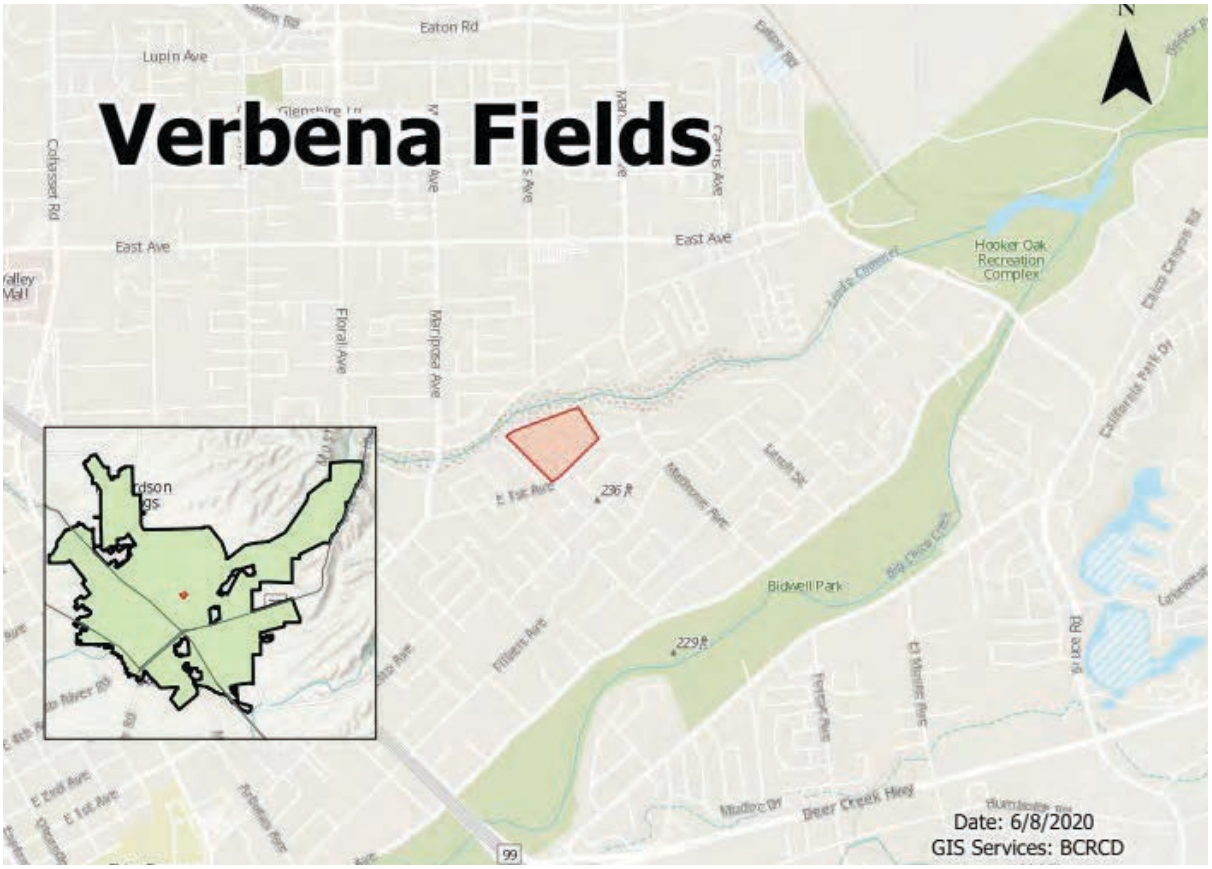

Figure 27. Verbena Fields

Mechoopda tribal members and volunteers are working to develop plans for the use of small-scale prescribed burns to manage culturally-important plants at Verbena Fields. Several objectives have been identified for work in the park. These include the reduction of fire hazard, the removal of invasive species, and the promotion of Mechoopda cultural heritage using burning to encourage native plant species.

A key objective for Verbena Fields and other city-owned lands should be to remove institutional obstacles to letting native people use fire for the management of vegetation and plants.

Between the Bidwell Park Master Management Plan (BPMMP Appendix D), a 2008 MOU, and the VFMP Programmatic EIR (PEIR,2021), a basic framework has been set up for the City of Chico and the Mechoopda Indian Tribe of Chico Rancheria to consult and work together to best protect cultural resources in the City of Chico and all of its open spaces. Engaging Mechoopda people in the tending of cultural fires will, in the words of the MOU, provide an opportunity for both parties to "work cooperatively to protect, preserve, enhance, mitigate, and manage archeological sites, traditional cultural properties, and traditional cultural resources, identified within the jurisdiction and sphere of influence of the City" (City-Mechoopda Tribe 2008).

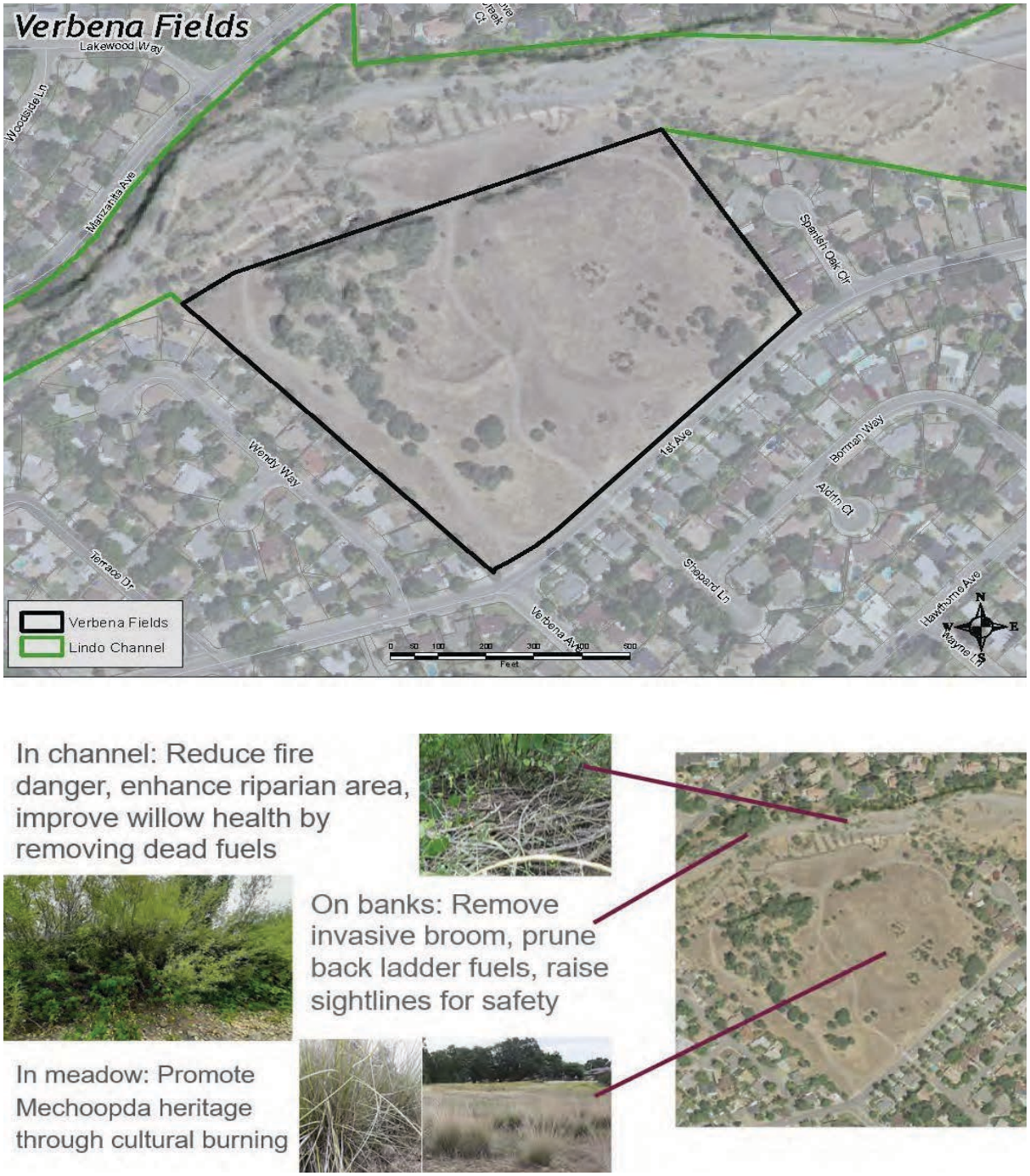

Figure 28. Management Objectives at Verbena Fields

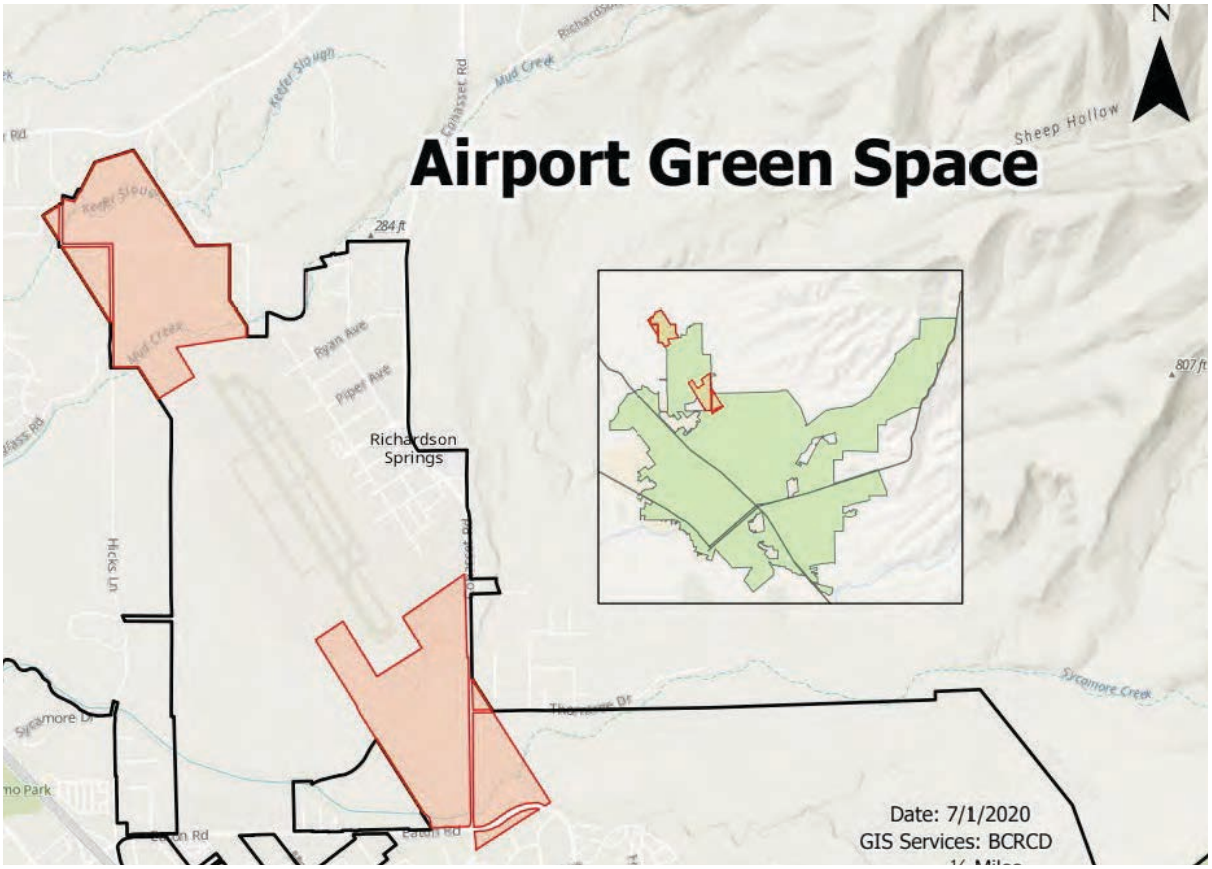

Figure 29. Airport Green Space

There is potential to use prescribed burns in grasslands on Airport property to achieve both resource management and community safety objectives. The City of Chico VFMP document discusses this in greater detail. Some of this land is grazed by cattle. Objectives of burning here would be to reduce thatch and other dead vegetation, and to maintain the health of endangered wetland plant species.

Figure 30. Little Chico Creek

On Little Chico Creek, giant reed (Arundo donax) or Arundo forms large stands in places. Reducing this infestation has long been a City goal, because Arundo displaces native vegetation, displaces native vegetation habitat for a wide variety of animals, and creates very attractive spaces to light illegal campfires which could easily get out of control. Arundo will burn even when green and reducing its prevalence along Chico creekways is explicitly recommended in the Butte County Community Wildfire Protection Plan, which doubles as the CAL FIRE Butte Unit plan (CAL FIRE 2015).

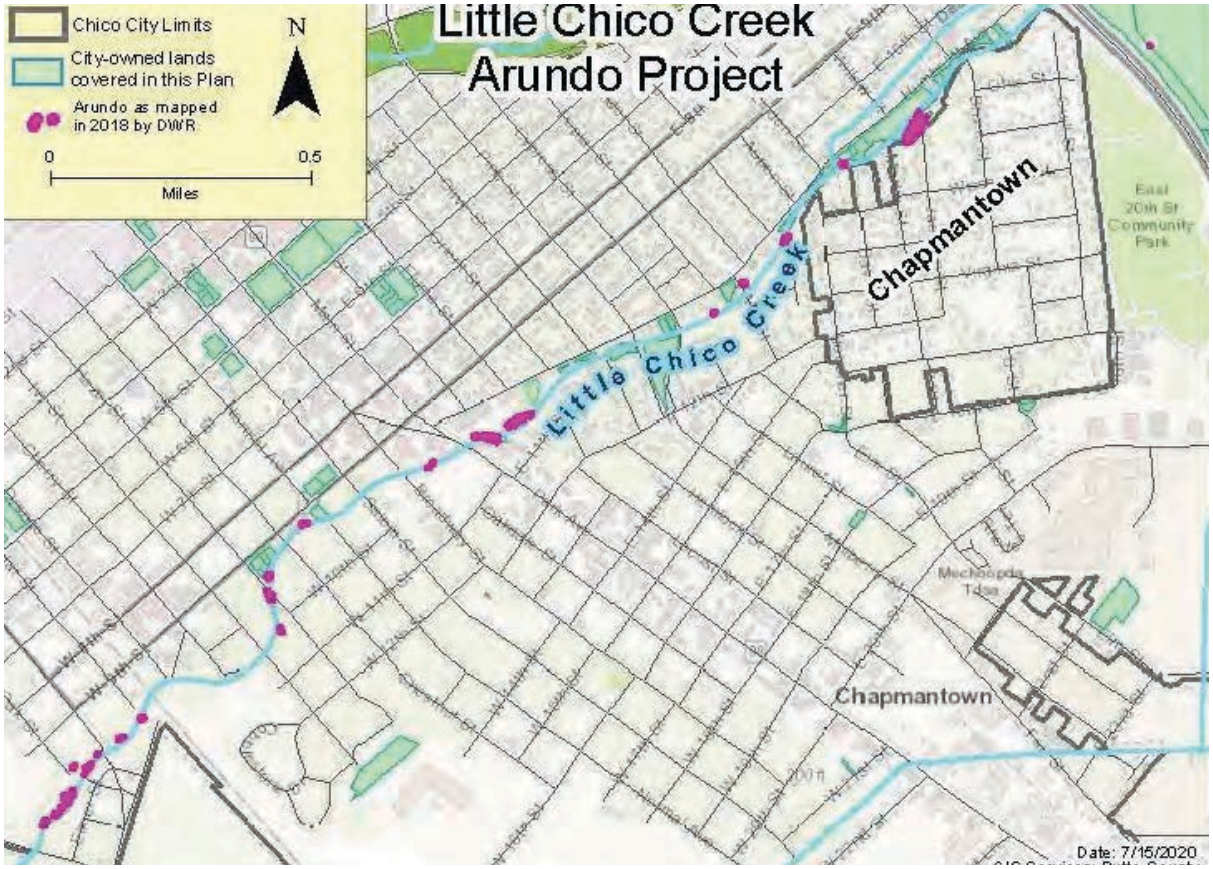

Figure 31. Little Chico Creek Arundo Project

In some areas where parks or greenways adjoin private property, fire hazards cannot be eliminated without cooperation between city managers and adjacent or upstream private landowners. Primarily, this pertains to *Arundo donax* eradication efforts in Little Chico Creek. Because *Arundo donax* rapidly grows to 10-15' high in very dense and continuous stands and readily burns even when green, it creates the the potential for increased fire behavior, and pose a challenge for fire protection because of its heavy, flammable fuel type, attractive secluded location for fire ignitions whether by campers or arsonists, and poor firefighter access because it is usually behind houses or in creek canyons. The Parks Division hopes to cooperate with landowners on a fuel hazard reduction initiative as part of VFMP Key Project 6 (VFMP section 5.6). Other places where the Parks Division plans to cooperate with landowners in the future is in Lindo Channel between Manzanita and Longfellow Bridge (City of Chico VFMP, 2021).

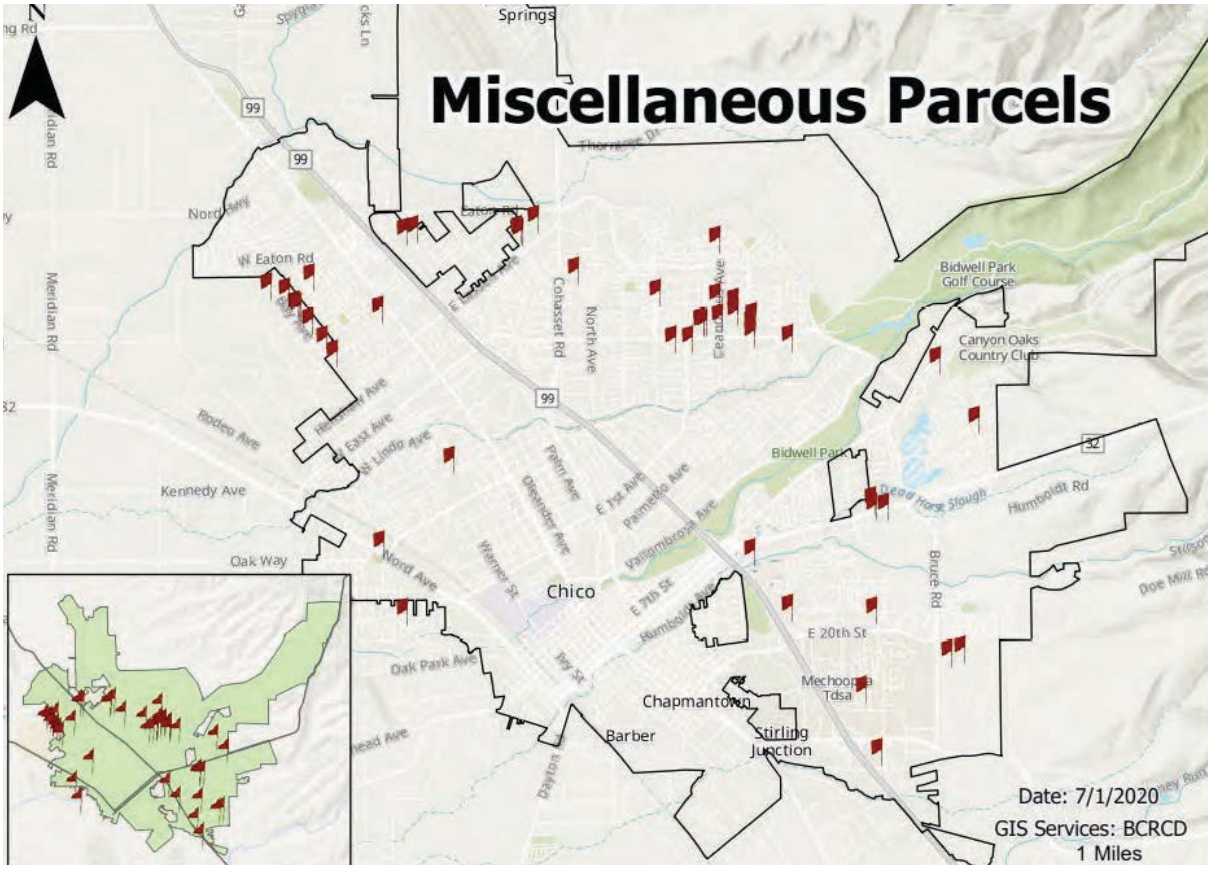

Figure 32. Miscellaneous city-owned parcels.

Vegetation management on these parcels (most of which are stormwater detention basins) is responsibility of the City Department of Public Works. Work should focus on reducing fire danger to neighboring properties, reducing invasive species infestations that can act as seedbanks to start downstream infestations, and removing excess live or dead vegetation that could obstruct stormwater flow.

5.4 Regional-scale Mitigation Projects

Priority access improvement projects and regional-scale mitigations include:

- A bridge or low-water crossing on Big Chico Creek at the end of the Upper Park Road, connecting to the bottom of 10 MIle House Road.
- Improvements to PG&E powerline access roads between Honey Run Road and Highway 32.

5.5 Public education

The City of Chico lacks resources regarding public outreach and education on wildfire preparedness. While the City of Chico's VFMP has their own guidelines as to how to manage vegetation and the

environmental impacts of their projects, the people of Chico can also learn to manage the vegetation on their own properties with the right education. With funding, programs the city would benefit from include CalFire's VIP (Volunteers in Prevention) program to educate parents and children about fire prevention by participating in fairs, displays, and parades each year, and the fire prevention education program called Fire PALS (Fire Prevention and Life Safety). Fire PALS is an elementary school program produced in cooperation with the agencies from the Butte County Fire Chief's Association and the Butte County Sheriff's Office. Lessons include fire safety as well as life safety, including home exit plans, bicycle helmet use, and firearm safety. Fire PALS presentations could be a high priority tool within the education program.

Carson City Nevada, is a great example of a city that prioritizes their fire prevention division, public education and training in the school district, along with awareness programs for the community. Successful programs for Carson City's Fire Prevention Division include:

Fire Extinguisher Training
Participants watch videos on how to properly use a fire extinguisher, then perform in a "hands on" simulation and actually operate an extinguisher on a live fire.

Fire Prevention Week
Citizens are encouraged and invited to visit any of the city's fire stations where there are tours, demonstrations, refreshments, handouts and personnel standing by to assist anyone. This is typically an all day event. Presentations are also held at local schools and other organizations, emphasizing fire safety practices, identifying escape routes and what to do in the case of a fire, and stop, drop & roll.

Juvenile Fire Setter Program
This program is designed to discover what motivates a child caught playing with matches/fire. The notion is that if we discover the motivation, the appropriate intervention can be planned and implemented. The intervention is usually parental conducted education or professional counseling. There has been tremendous success with this program in the past.

Learn Not to Burn
This program was originally conducted by the fire dept in the local school district. In recent years the program has been taught by the teachers in the Kindergarten through third grade classes within the school district. The fire safety information and curriculum is incorporated into the basic educational curriculum for the particular grade level.

Senior Fire Safety Classes
Seniors over 65 have the highest rate of dying in a fire so this program caters to educating seniors in fire safety as it relates to them. It includes things such as using smoke detectors, electrical cord safety, and first aid for burns.

6 Home hardening

While recently-built neighborhoods currently have less-overgrown landscaping and contain homes

built to modern WUI building codes, the houses are packed tightly onto small lots, increasing the risk of home to home fire spread should a wildfire ignite homes on the edge of the City. Over time, landscaping in newer neighborhoods will increase in hazard as shrubs grow and dead material collects within them. There are deer in many neighborhoods on the edge of the City, and people have traditionally planted 'browse-resistant' shrubs like juniper and rosemary. These are full of highly flammable compounds and burn like gasoline.

7 Equipment upgrades

The City of Chico currently has one Type 6 fire engine, which is considered suitable for wildland fire suppression. Wildland fire suppression capabilities such as type 6 and 7 engines allow firefighters the resources needed to address potential catastrophic wildfires in the WUI, and to support neighboring agencies in addressing complex fires in their jurisdictions. Given the severity and destructive nature of fires in the WUI around the West, in addition to ongoing drought and climate change, expanding wildland fire-rated equipment should be a priority moving forward.

6. CONCLUSIONS AND FUTURE DIRECTIONS

A CWPP is the beginning, not the end, of continued efforts toward understanding and planning for wildland fire risk. This document serves as a jumping off point for future community conversations, vegetation management projects, policy development and enforcement. With increases in catastrophic and destructive wildfires, and recent memories of devastating fire events both in Chico and around the West, it is important to consider wildland fire risk as one of the primary priorities for emergency response and land use planning. This document should encourage the community to familiarize themselves with wildfire history, risk and vegetation conditions on and around their properties. And it should encourage fire officials and policy makers to consider wildland fire risk and the private and public lands that play a role in WUI fire in the greater Chico area. With the completion of this document, the City of Chico is recommended to:

- Reaffirm commitment to vegetation management projects outlined in the 2021 Vegetation and Fuels Management Plan
- Continue targeted public outreach with at-risk and priority parcels as outlined in Section 5 and Appendix A via public meetings and planning sessions.
- Secure funding to plan and execute additional fuels reduction on city-owned parcels identified in section 5 and Appendix A.

CWPPs are living documents, and should be updated regularly. In accordance with FEMA recommendations, this document should be revisited in 5 years, as projects are completed, or sooner if vegetation or climate conditions change drastically.

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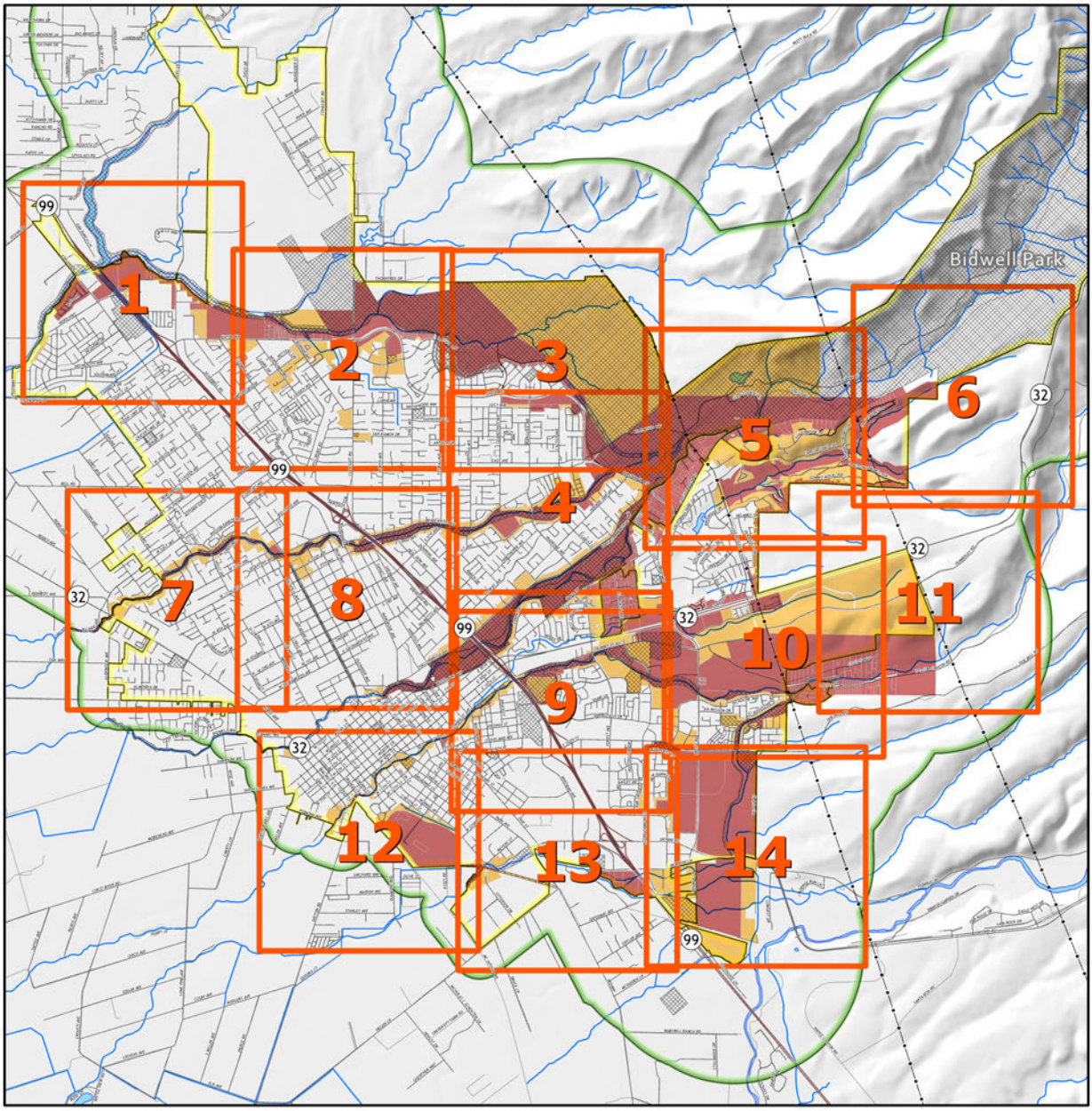
Appendix A - Priority parcels map series



Area of Analyses

Chico City Boundary

City of Chico land

Power Line

Priority level

High

Highest

Map book page

Priority Parcels for Wildfire Outreach and Hazard Mitigation

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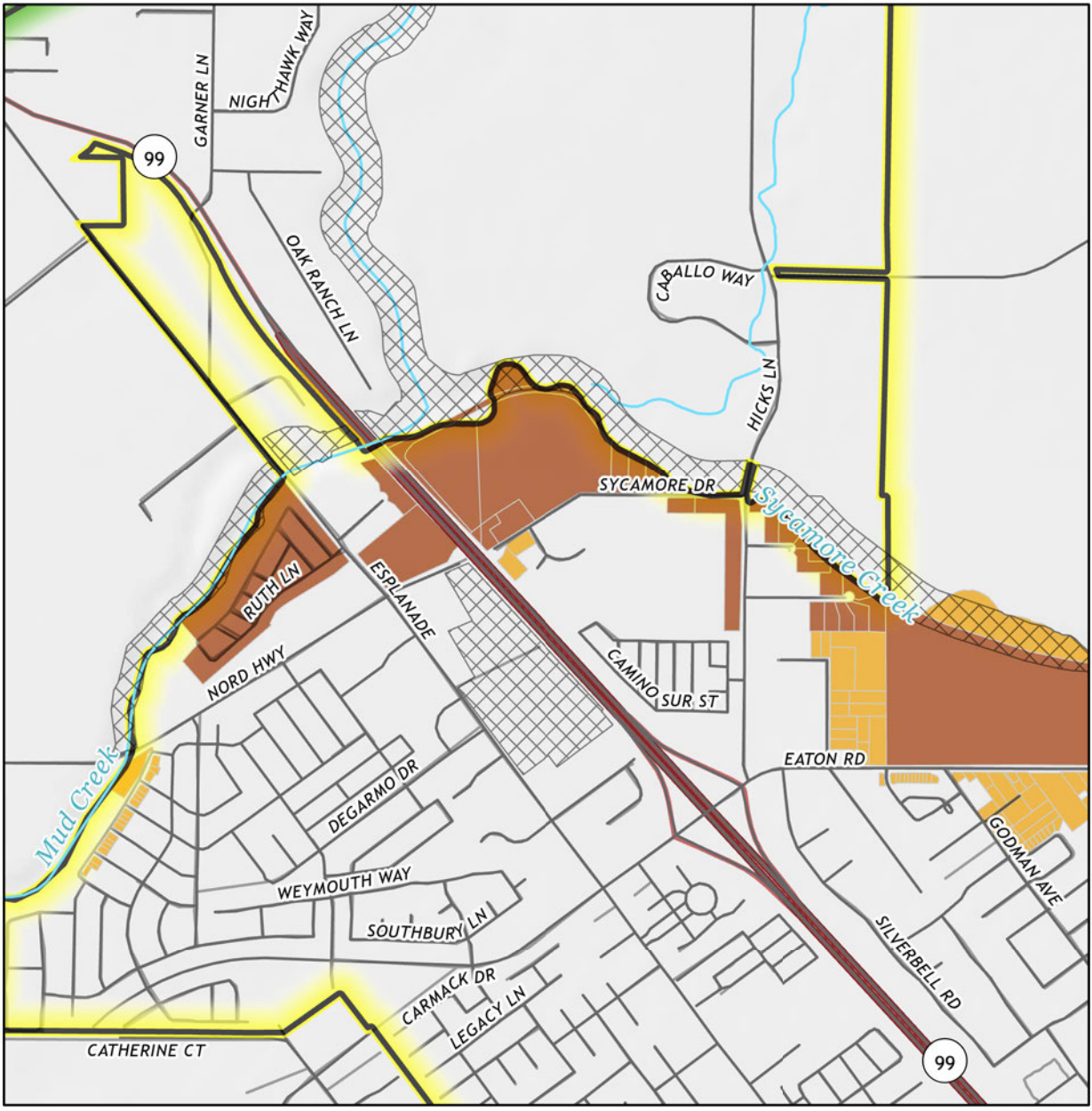

Area of Analyses

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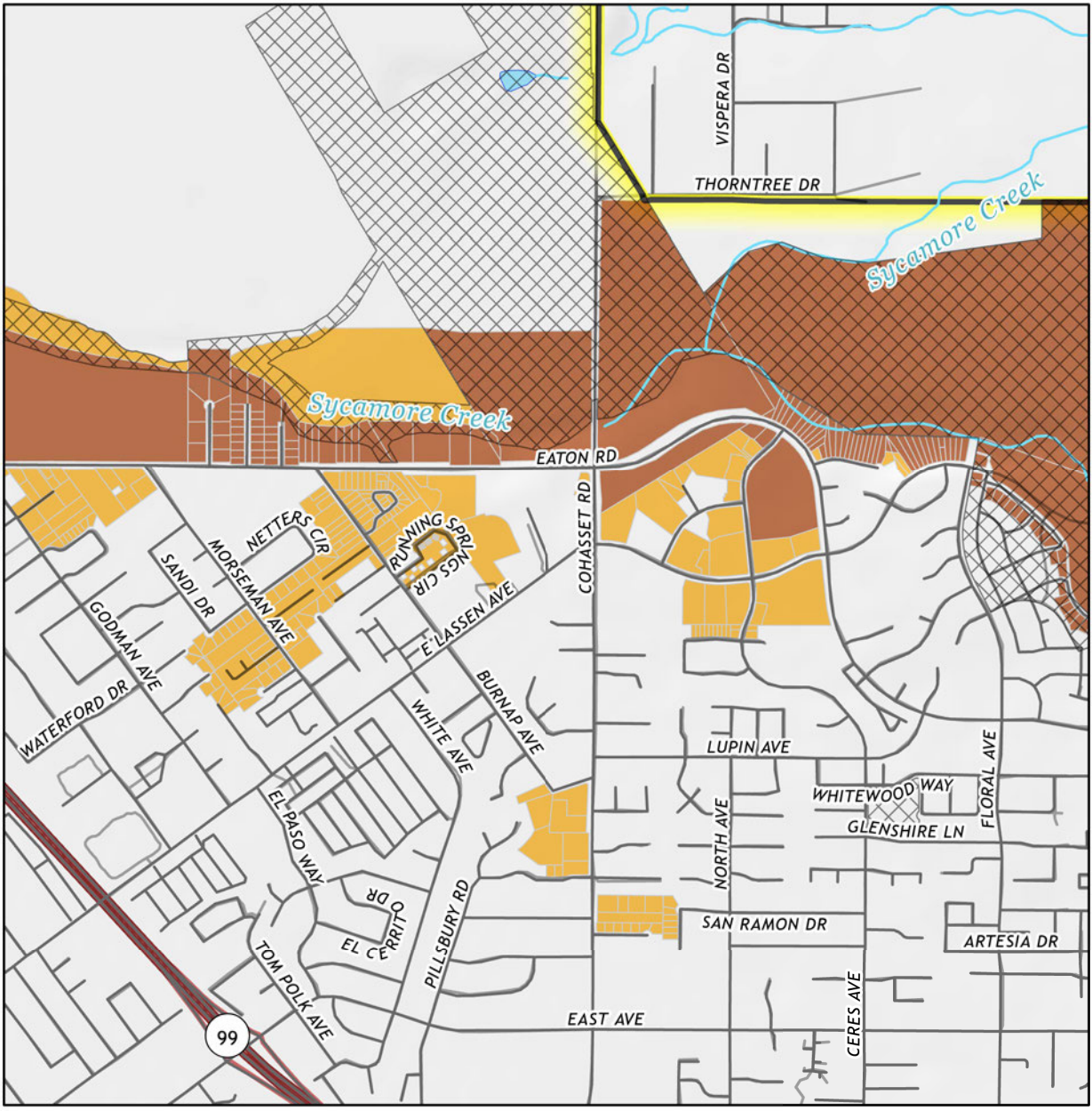

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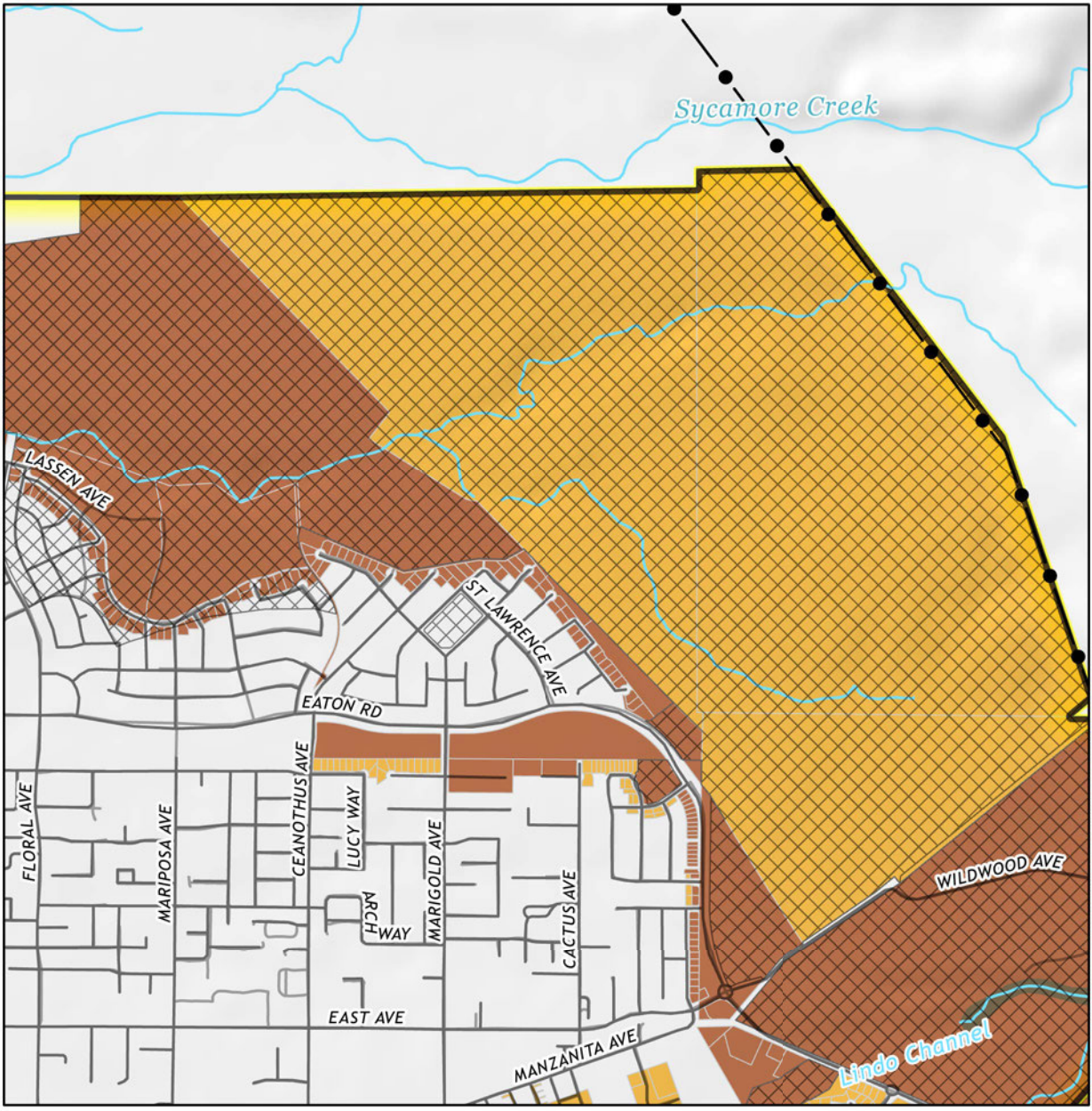

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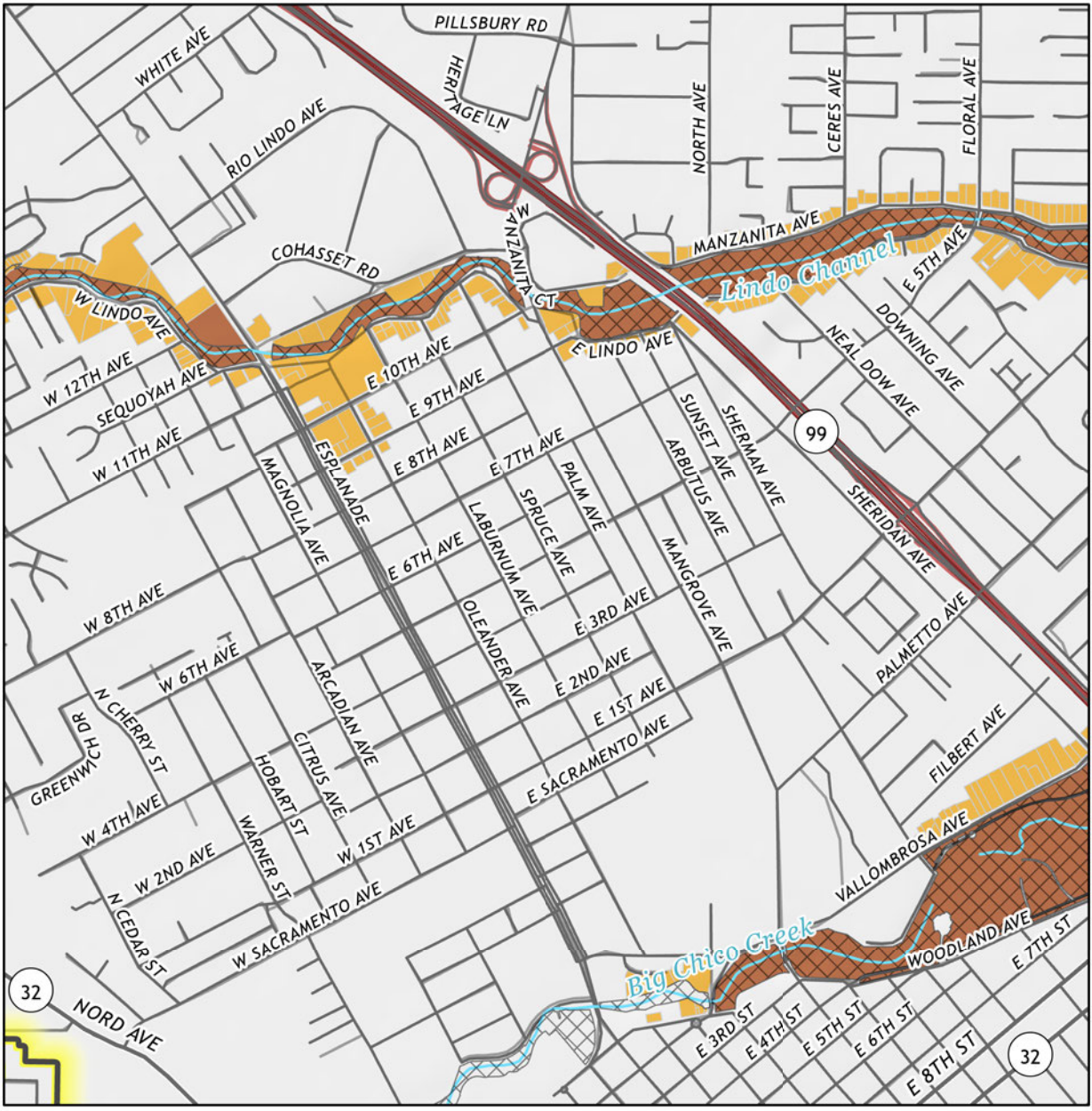

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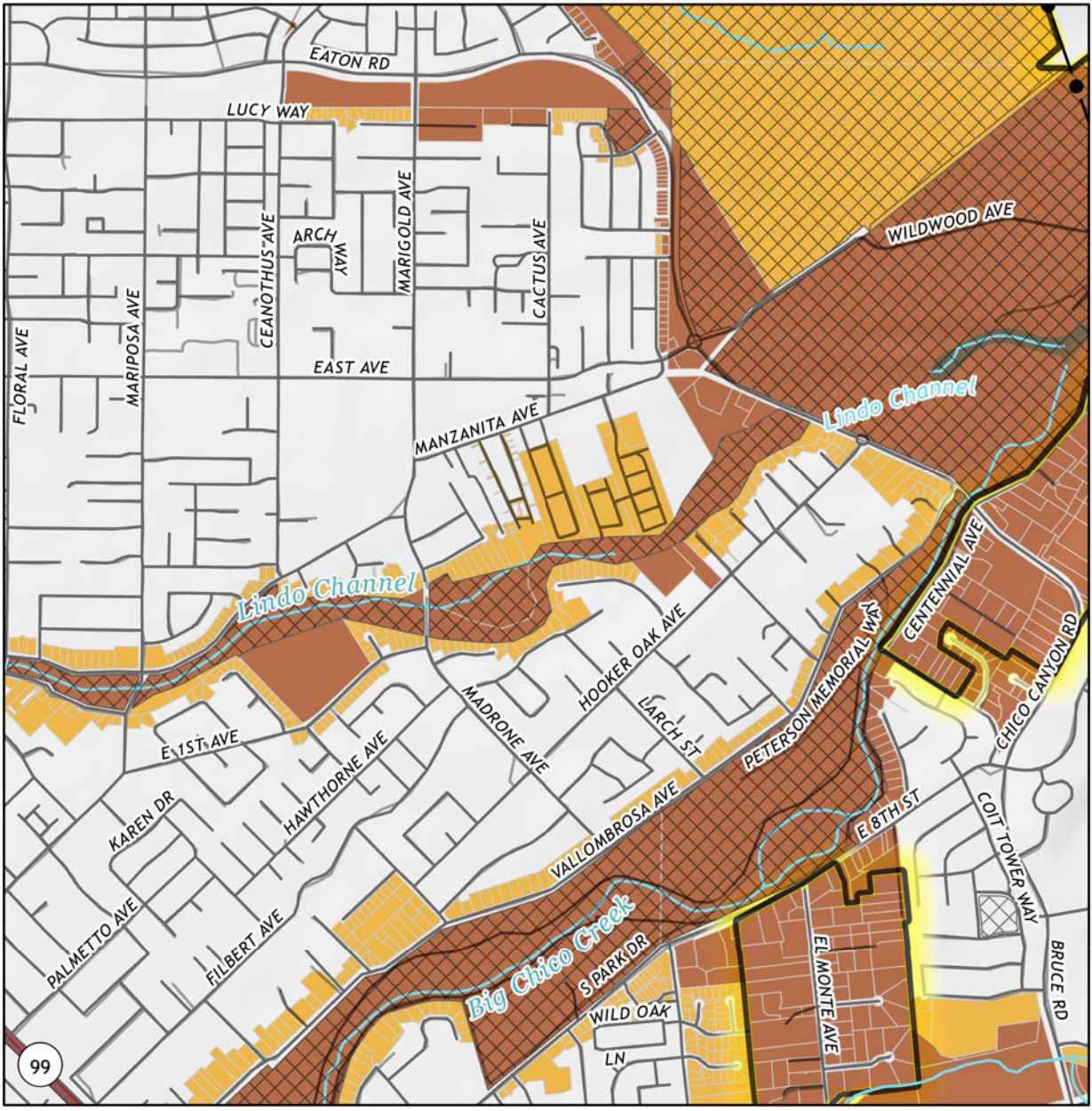

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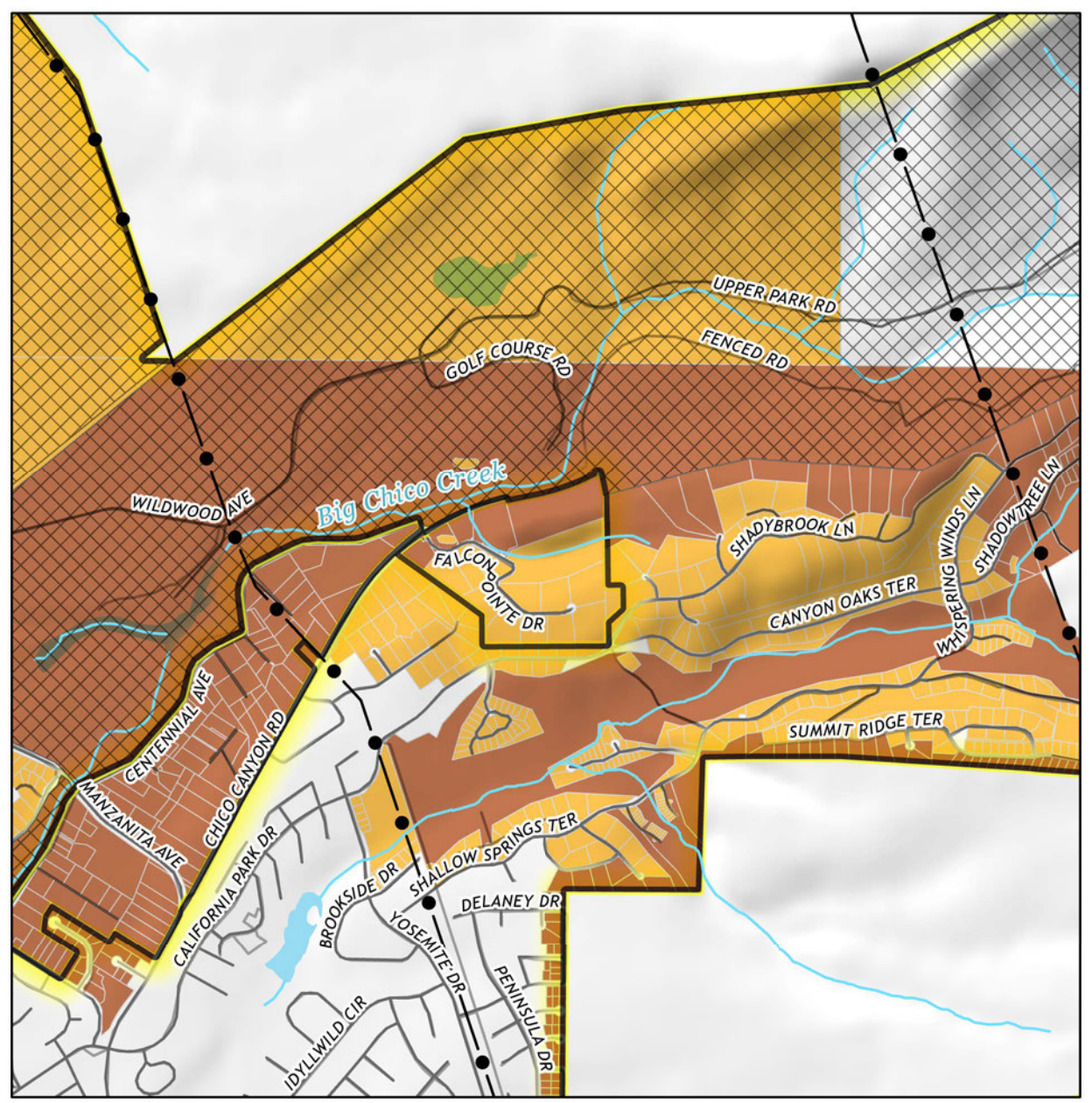

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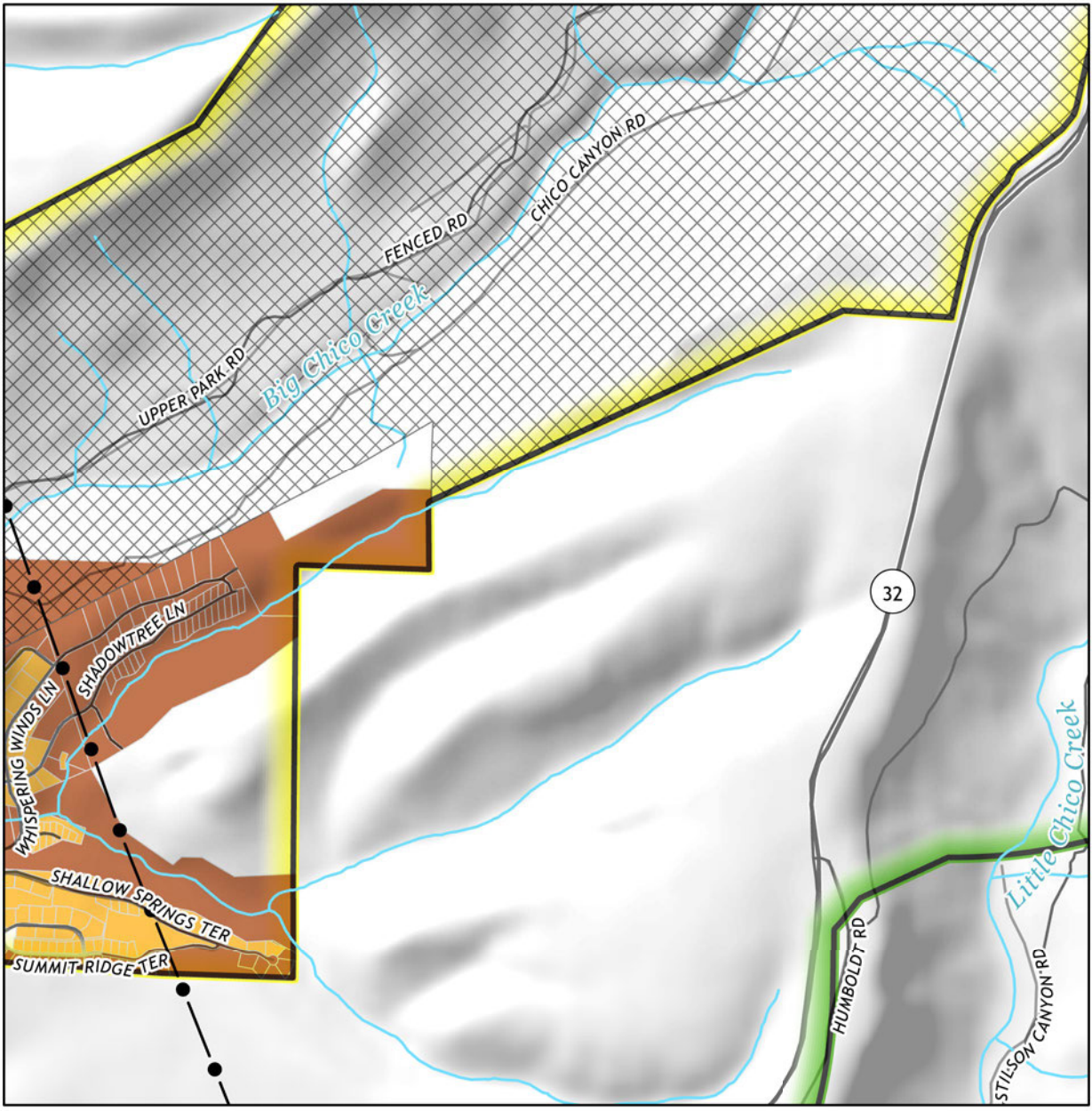

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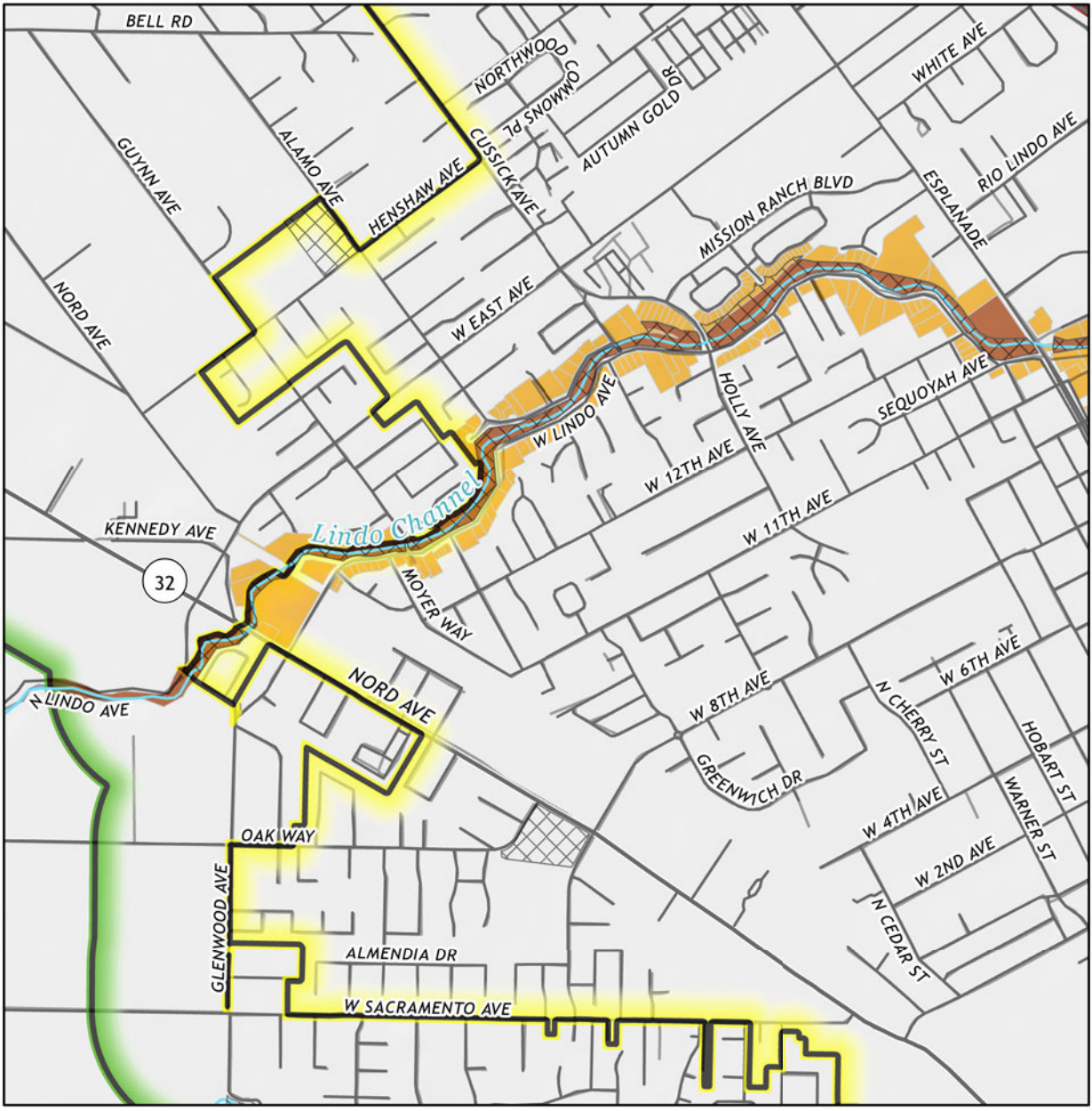

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Priority Parcels for Wildfire Outreach and Hazard Mitigation

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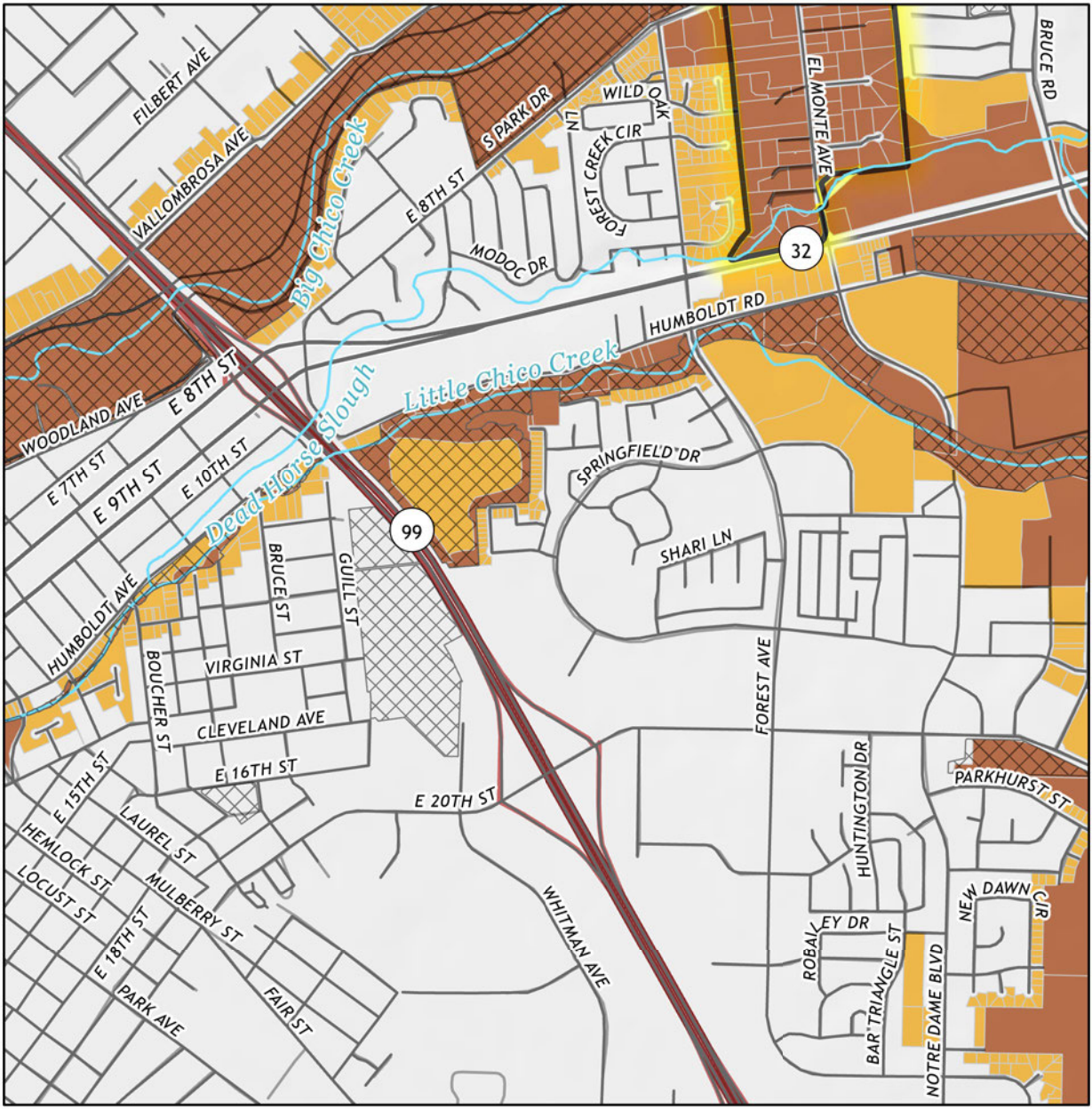

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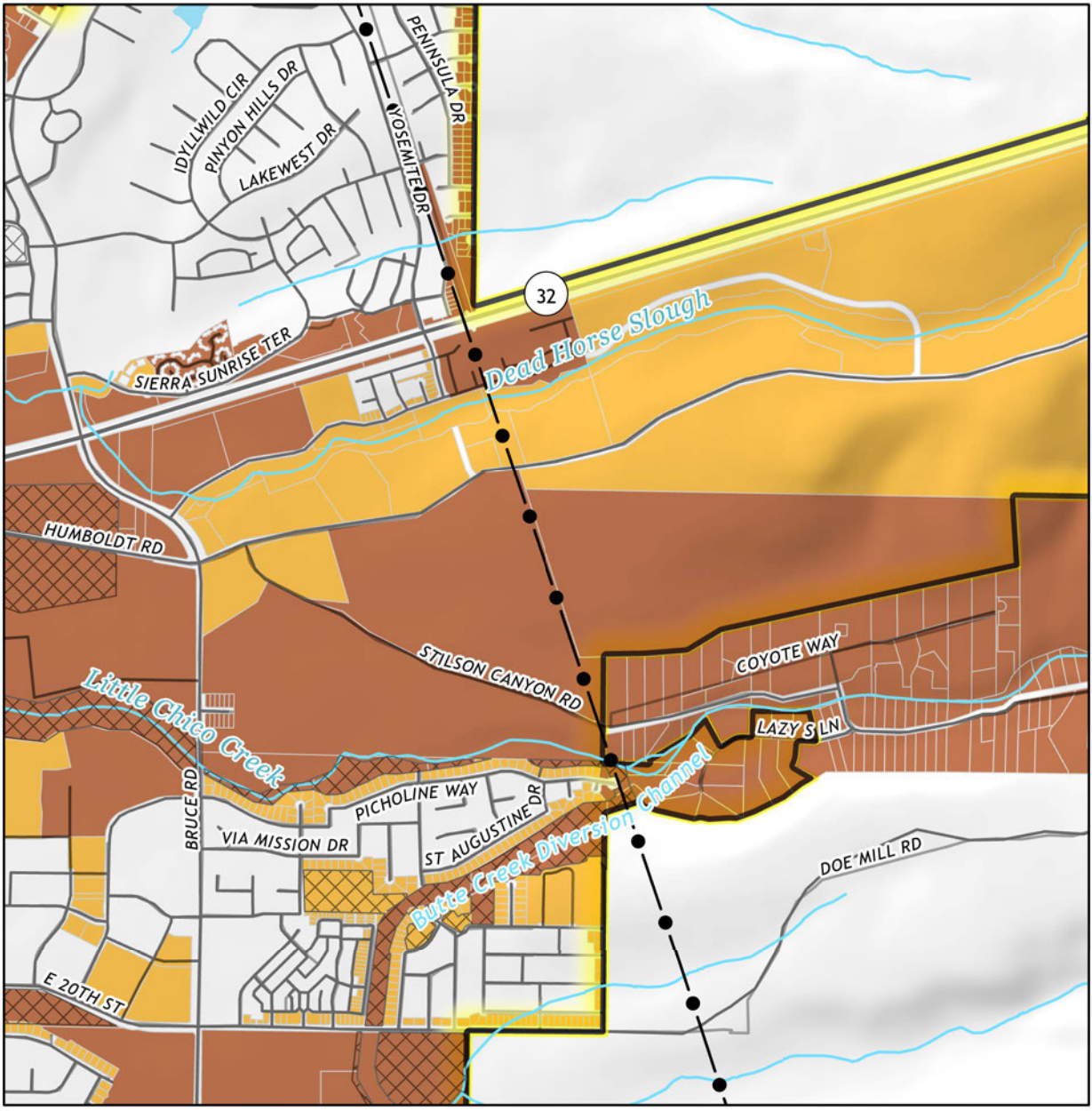

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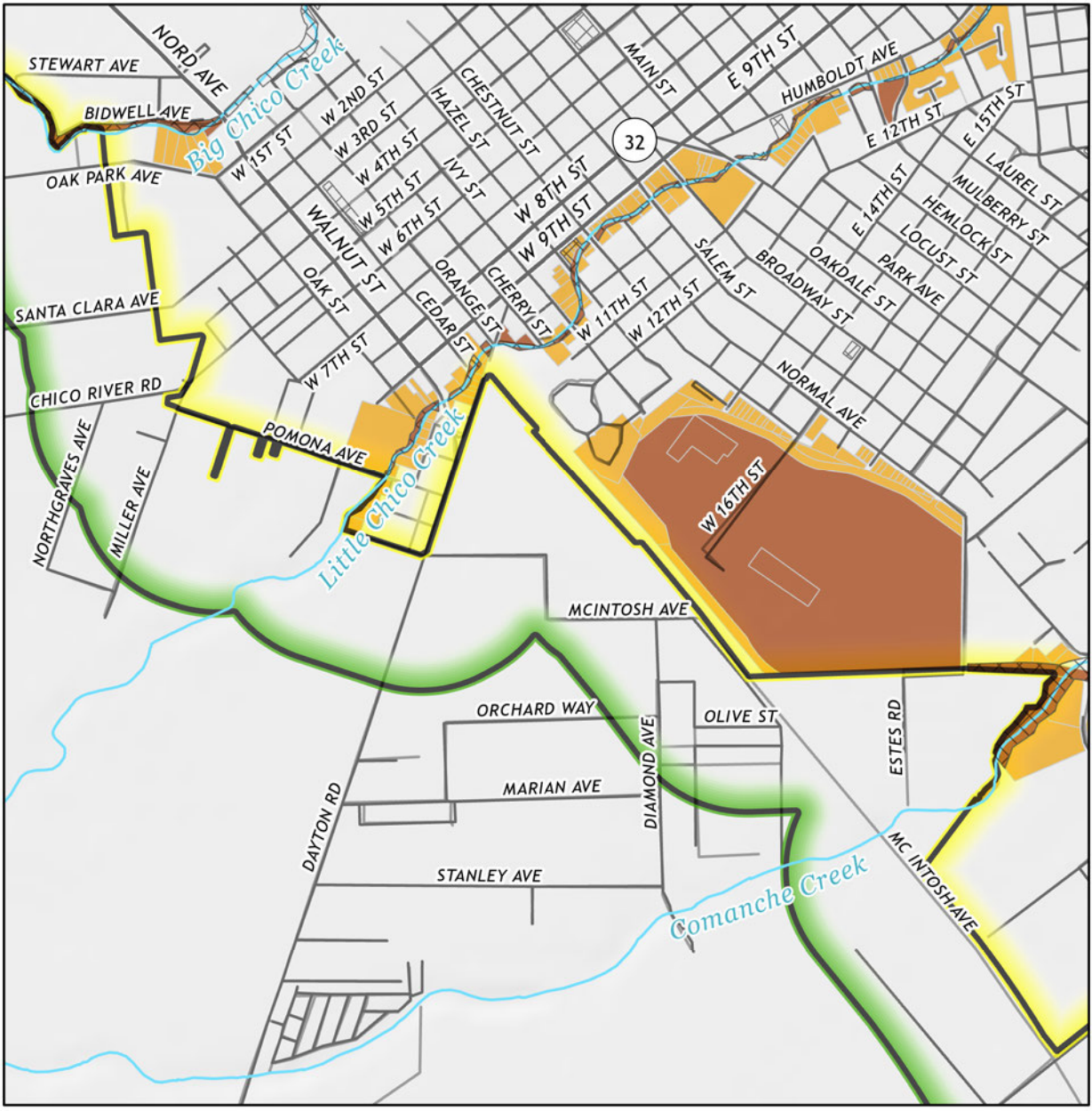

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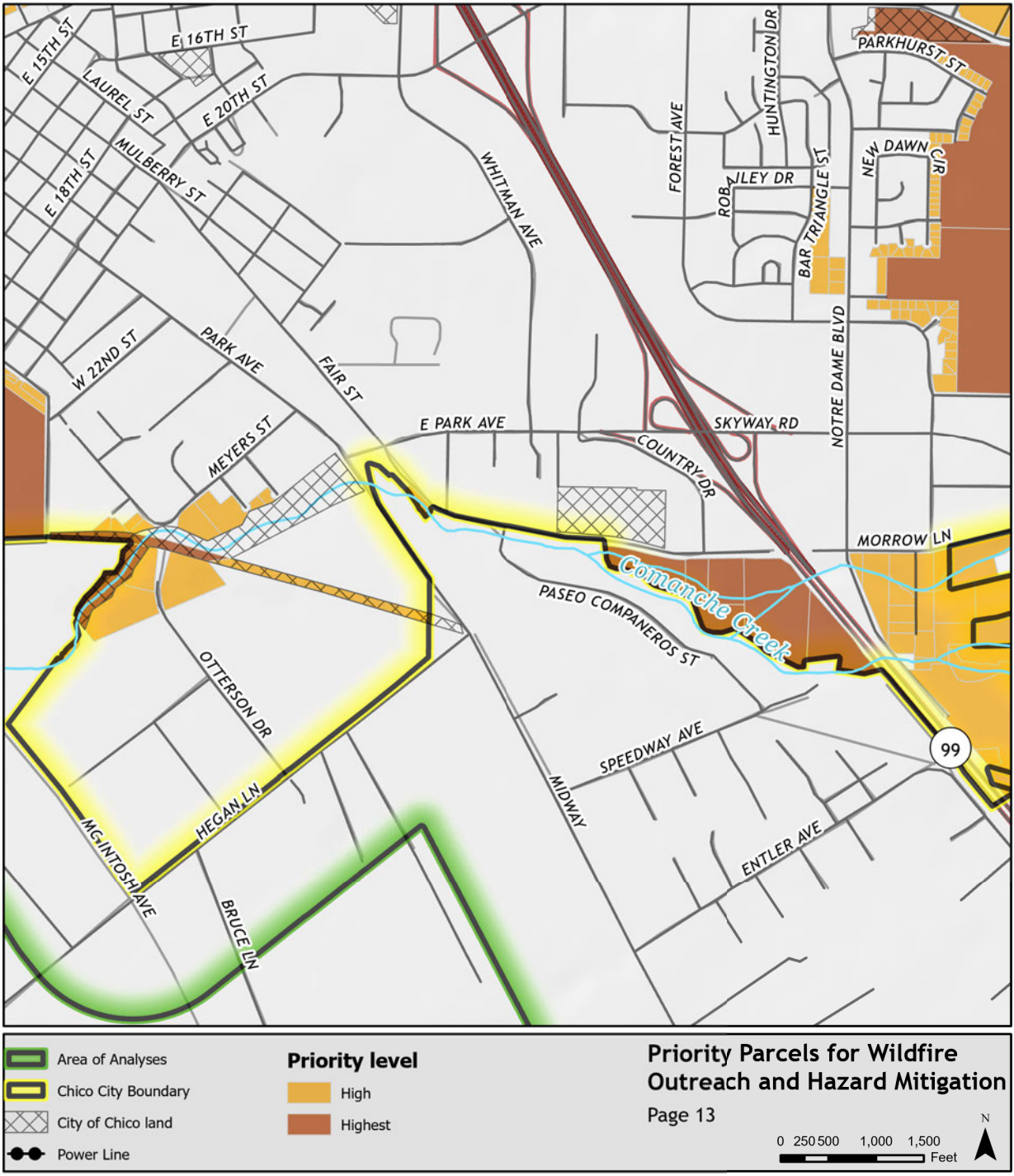
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FAIR ST
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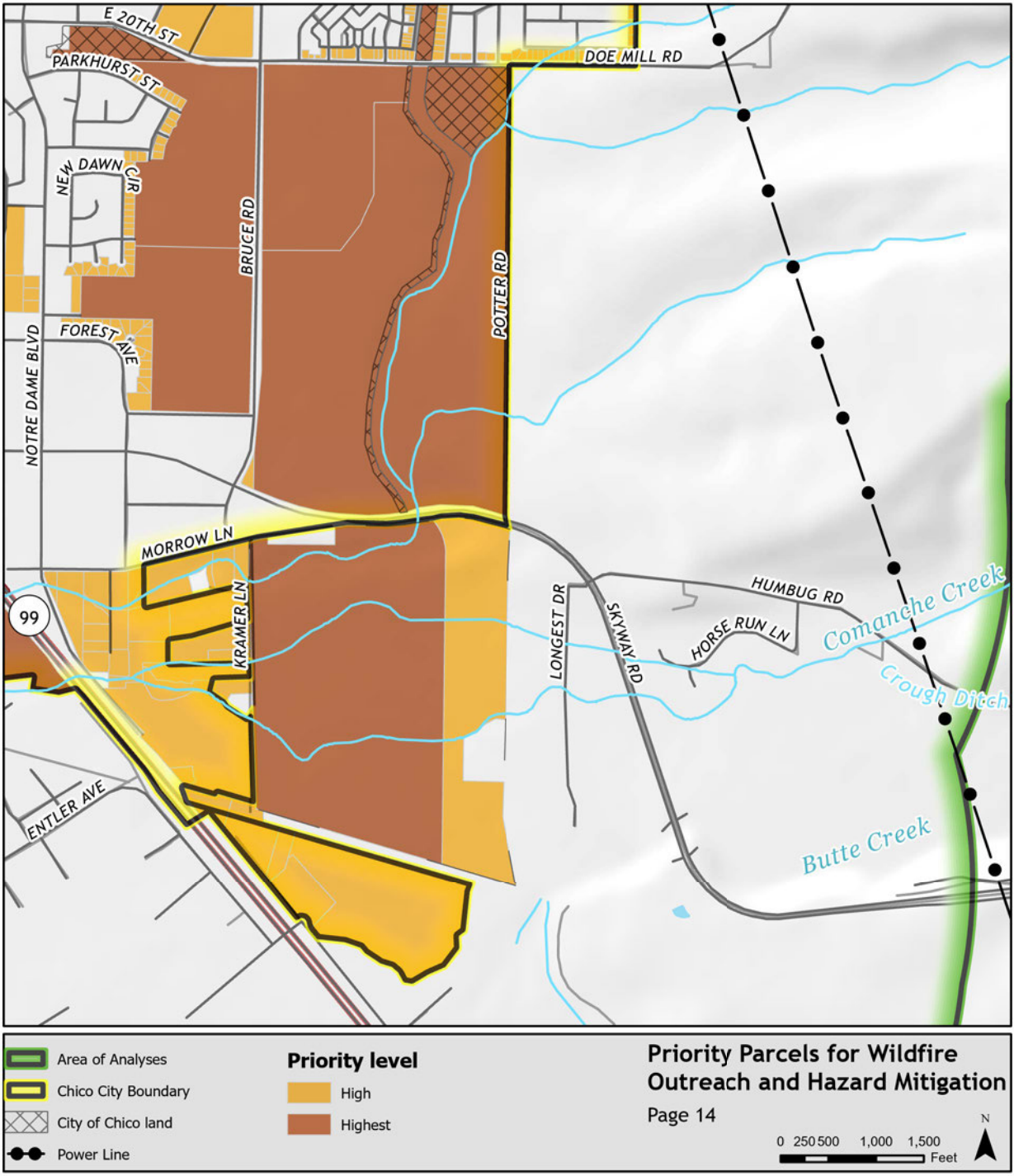
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HUMBUG RD
HORSE RUN LN
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Appendix B - Community survey questions

Still in progress – please respond to our CWPP survey via the links in our mailer, or click this link to submit your comments on this draft document.

The CWPP Survey can also be found at this address: http://tiny.cc/959ruz

Appendix C - City of Chico Prescribed Fire Plan

Prescribed Burning Plan for Lands Managed by the City of Chico
Prepared by Zeke Lunder
Deer Creek Resources, Chico, California
Spring 2021

Overview

California's native vegetation evolved with frequent fires that burned across a wide variety of vegetation types, under many different combinations of weather and fuel conditions. A century of fire suppression has caused great harm to the health and resilience of California's vegetated landscapes, and also, to our collective psyche. A growing disconnection from fire leaves all Californians increasingly traumatized when it appears, often, it seems, at the wrong time, and angry. In the aftermath of the Camp Fire, there is growing local interest in improving our understanding of fire's rightful place in our wildlands, and in remembering how to use it as one of our primary land management tools.

There are a wide variety of opportunities to use managed fires to improve the function, safety, aesthetics, and resiliency of Chico's parklands while also helping educate the general public on fire's many ecological and public-safety benefits. Bidwell Park is a perfect teaching laboratory for fire ecology, with a history of successful prescribed fire use, ample opportunities for safe public viewing of active burns, and many ongoing community-driven land stewardship efforts, including the Park's popular volunteer programs, the Mechoopda Tribe's ongoing Traditional Ecological Knowledge (TEK) work, and the applied fire ecology and wildland management research being carried out by the CSU, Chico Wildland Management students both on City lands and the CSU, Chico Ecological Reserves.

Potential projects range from wintertime cultural burning on small patches of deer grass that are just a couple feet across, to large grassland restoration burns adjacent to the North Rim Trail Parking lot, or more intense chaparral burns on the South Rim that have not had natural fires in the past 50 years.

Existing Park planning documents including the Bidwell Park Master Plan (2008) and Vegetative Fuels Management Plan Programmatic EIR (VFMP PEIR, 2021) recognize the importance of expanding the use of prescribed fire. This document provides a roadmap for meeting these goals. While it provides brief references to prescribed fire science, its primary purpose is to help park managers make decisions on where and when to do it, and how.

General Burning Objectives and Burn Complexity for City-Managed Lands
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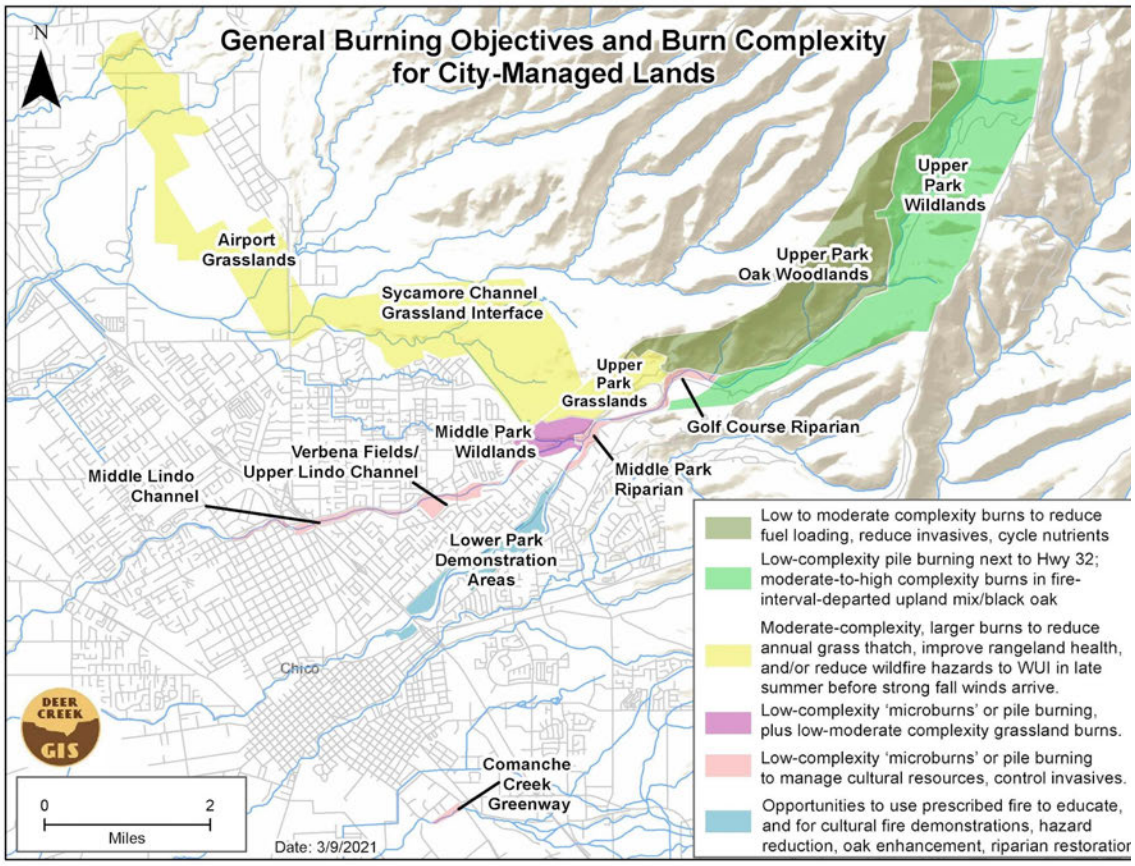

Upper Park Oak Woodlands - 1,115 acres (total area, not acreage of proposed burns).

Some opportunity for Moderate-complexity rangeland burns to control start thistle, medusahead, and barbed goat grass. Moderate-complexity burns in thicket areas along Park Road, for example between Bear Hole and Salmon Hole Parking Lots. Objectives are to reduce ladder fuels and heavy accumulations of dead and down material to reduce fire severities in these areas during future wildfires. Lower complexity burns could target sunny areas with heavy pine needle fuel loads under large gray pine for winter burns.

Verbena Fields/Upper Lindo Channel - 66 acres

Low-complexity 'microburns' or pile burning to manage cultural resources and control invasive plants.

Middle Lindo Channel - 30 acres

Low-complexity 'microburns' or pile burning to manage cultural resources and control invasive plants.

Middle Park Wildlands - 112 acres

Low-moderate complexity grassland restoration burns. Low-complexity ‘microburns’ or pile burning to manage cultural resources, control invasive plants, or remove ‘jackpots’ or dead and down oak branches. Secondary objectives are to reduce ladder fuels/improve sightlines into live oak, ceanothus, and poison oak thickets. Consider using burning as a followup to mowing, masticating, or grazing in densest areas.

Middle Park Riparian - 34 acres

Low-complexity ‘microburns’ to manage cultural resources and control invasive plants.

Comanche Creek Greenway - 14 acres

Low-complexity ‘microburns’ to manage cultural resources and control invasive plants.

Sycamore Channel Grassland Interface - 1,200 acres, mainly in ‘Bidwell Ranch’, between lower powerlines and Sycamore Channel

Moderate-complexity, larger burns to reduce annual grass thatch and improve rangeland health. Also, potential to use fire on semi-annual basis in late-summer to reduce wildfire hazards posed to WUI near Sycamore Channel before strong fall winds arrive.

Airport Grasslands - 864 acres

Moderate-complexity, larger (100 acres+) burns to reduce thatch and improve rangeland health. Also, potential to use fire on semi-annual basis in late-summer to reduce hazards posed to WUI near Eaton Road before strong fall winds arrive.

Upper Park Grasslands - 207 acres

Moderate-complexity burns of 5-50 acres to improve grassland conditions, especially in areas of heavy star thistle, medusahead, or barbed goat grass.

Upper Park Wildlands - 1,640 acres

Low-complexity pile burning adjacent to Highway 32 and Tenmile House Road as part of roadside fuel reduction and black oak wildfire resiliency restoration projects.

Moderate to high-complexity broadcast burns of 20-50 acres in areas of dense live oak, gray pine, and chaparral, generally in late fall or midwinter in units defined by south and west-facing aspects between Big Chico Creek and Highway 32, generally burned when north aspects are too wet to burn. Objectives are to reduce fuels after wildfires in areas adjacent to long-term, repeatedly-used bulldozer and hand firelines. Other objectives are to introduce fire into older shrub stands and black oak forests that have not had fire in past 30 years to reduce potential wildfire intensity and create new growth for wildlife browse.

Golf Course Riparian - 50 acres

Low-complexity ‘microburns’ to manage cultural resources and control invasive plants

Lower Park Demonstration Burns - 168 acres

Low-complexity ‘microburns’ and grassland broadcast burns to manage cultural resources, improve valley oak health, educate the public, and control invasive plants.

How to Pull Off a Successful Burning Project

1. **Define Project Objectives**
2. **Determine Burn Complexity**
3. **Develop a Burn Prescription**
4. **Establish Burn Units**
5. **Write a Formal Burn Plan (if needed)**
6. **Burn it**

1. Define Project Objectives

Refer to "General Burning Objectives and Burn Complexity" section, above. Chapter 4 of the City's Vegetative Fuels Management Plan (VFMP) describes the ranges of acceptable fuel loading and thinning standards for each vegetation zone. Also, the Plan addresses unique considerations regarding using fire in each different vegetation type. Refer to Section 4.3.5 'Prescribed Fire and Cultural Burning' in the VFMP. Any burning objectives should be supported by the VFMP and its adopted PEIR document.

Specific burn objectives/desired outcomes should be spelled out in a letter to the Parks Director along with a description of the project area, and summary of proposed approach. For example: "We propose using matches to burn the dead material out of clumps of deergrass which are surrounded by green grass. Our desired outcome is a reduction of thatch around approximately 10 clumps of deer grass, each approximately 12 inches in diameter". Other objectives might be: "Raise crown base height of live oak to 8 feet and remove 50% of surface litter in areas under large gray pine".

2. Determine Burn Complexity

It is important that conversations around burning address the varying levels of complexity and risk inherent in each different type of burning project. We recommend the City adopt the National Wildfire Coordinating Group's (NWCG) Prescribed Fire Complexity Analysis process for any projects which use prescribed fire. This tool is a simple Excel spreadsheet with drop-down menus. The burn planner fills out each box, and the worksheet scores the project as Low, Moderate, or High Complexity. Winter 'microburns' are by their nature low-complexity, and should be exempt from the Complexity Analysis process. An experienced burn planner or firefighter should determine the resources needed to complete a burning project at each complexity level.

Read the NWCG Prescribed Fire Complexity Analysis Guide here:
https://drive.google.com/file/d/13IlgoFT544MmcXSed2xRqaXNTe3ES7au/view?usp=sharing

Prescribed Fire Complexity Analysis Worksheet
https://drive.google.com/file/d/1oitmKnnDPzj9YZ9MRF4I8Ck2VXHo8r8k/view?usp=sharing

3. Develop a Burn Prescription

A burn prescription is the 'recipe' for the weather and fuel conditions a burn should be conducted under to achieve the desired fire effects. For example, if the goal of a burning project is to prune up low-hanging dead branches on the trees or brush, or to kill a certain number of the small trees in an area,

the prescribed fire needs to have large enough flames to actually reach up to the desired ‘scorch height’.

Many of the proposed burning projects in this plan call for very low-intensity fires with flame lengths of less than 2-3 feet. These types of fire behavior can be achieved under very mild, late-fall or mid-winter conditions, and can be safely undertaken with minimal need for specialized equipment. For example, if the objective is to simply remove dead thatch in the grass understory under large oak trees, or to tend to individual plots of bunch grasses, the weather conditions just need to be dry enough that dead grass will burn. These projects can be as simple as a couple people going out with a bucket of water and 2 rakes in the late-evening in the fall or winter and burning a few dozen square feet of dead grass or weeds between two trails.

There are some opportunities to use fire on a larger scale and at higher intensities. For example, to reduce populations of yellow star thistle in grasslands of Upper Park. These types of projects are necessarily more complex, as the fire behavior required to achieve this goal may be much more intense, and the fire might be carried out in the middle of July - requiring several fire engines, a qualified burn boss, and a dozen firefighters.

A burn prescription should, at a minimum, describe the desired weather conditions for burning. For low-complexity microburns or thatch burns taking place in the winter where the target area is surrounded with green grass or trails, the prescription does not need to be overly technical. For example: “We will burn only areas which are surrounded by green grass or trails, not to exceed 800 square feet. We will not burn if the temperature is over 60 degrees or winds are over 2 miles per hour”. Any areas which will be burned in declared fire season should have a prescription developed by an experienced burner that includes a range of acceptable 1 and 10 hour fuel moisture levels, relative humidities, temperatures, and probabilities of ignition. As a general rule, probability of ignition should not exceed 70% without written justification (and mitigations) by an experienced person.

4. Establish Burn Units (if applicable)

Burn units should be scouted by experienced burners, in consultation with resource specialists. Control lines should use natural barriers like roads, trails, water bodies, barren areas, or large areas of green grass. Any new soil disturbance should be kept to a minimum. Generally, midslope control lines should be avoided. Important fire control considerations include expected wind direction, the ability to get water to the site and expected fire behavior. Water availability or the lack thereof may not be an issue depending on fuel continuity and expected fire behavior. In some places, especially after winter ‘greenup’ of annual grasses, control lines may be unnecessary if the objective is to burn areas with heavy loading of thatch and other dead fine fuels.

Given the difficulty in planning and implementing a burn, planning units should be as large as is practicable/desirable. It can be much easier and safer to burn a well-planned 50 acre project than to do ten 5-acre ones. Having a completed and signed burn plan for a large area gives you flexibility in implementation. Remember, just because the unit is 50 acres doesn’t mean you have to burn all of it at a given time.

5. Write a Formal Burn Plan (if needed)

At the discretion of the Parks Director, low-complexity burning projects (e.g. winter microburns or small thatch-removal burns) may be implemented with just a simple, one-page burn plan, but must follow the steps in the following *Prescribed Fire GO/NO-GO Checklist.* Any other projects which will use fire should have a formal burn plan which is signed by the Park Director. Refer to the 'Planning Good Fire' paragraphs under Section 4.3.5 of the VFMP. At a minimum, burn plans for moderate or high-complexity burns should include:

1. Signature Page
2. Prescribed Fire GO/NO-GO Checklist
3. Complexity Analysis Summary
4. Description of Prescribed Fire Area and Map
5. Ecological Objectives
6. Prescription: Prescription Narrative and Prescription Parameters
7. Pre-Burn Considerations and Weather
8. Briefing Checklist
9. Organization and Equipment
10. Communications Plan
11. Public and Personnel Safety, Medical Plan
12. Ignition Plan
13. Holding Plan
14. Contingency Plan
15. Wildfire Declaration Plan
16. Smoke Management and Air Quality
17. Fire Effects Monitoring Plan
18. Post-Burn Activities

This NWCG Burn Plan Template is included as an example of a thorough burn plan.
https://drive.google.com/file/d/1WokmqVhHzovxS_fYW8-2OVTFfC13oOiK/view?usp=sharing

Prescribed Fire Go/No Go Checklist for Low Complexity Burning Projects

- ❑ Have ALL permissions been obtained, including Air Quality permission? YES NO
- ❑ Have ALL required notifications been made? YES NO
- ❑ Has project area been thoroughly scouted for members of the public? YES NO
- ❑ Have signs been posted? YES NO
- ❑ Has ALL necessary preparation work been completed? YES NO
- ❑ Have ALL required current and projected fire weather forecasts been obtained and are they favorable? YES NO
- ❑ Are ALL prescription parameters met? YES NO
- ❑ Are ALL smoke management specifications met? YES NO
- ❑ Are ALL necessary personnel and equipment on-site, available and operational? YES NO
- ❑ Are ALL contingency resources available? YES NO

- ❑ Have ALL personnel been briefed on the project objectives, their assignment, safety hazards, escape routes, and safety zones? YES NO
- ❑ If all the questions were answered “YES” proceed with a test fire. Document the current conditions, location and results. If any questions were answered “NO”, DO NOT proceed with the test fire: Implementation is not allowed.
- ❑ After evaluating the test fire, in your judgment can the prescribed fire be carried out according to the prescribed fire plan and will it meet the planned objective? YES or NO

Briefing Checklist

- ❑ Burn organization and assignments
- ❑ Prescribed Fire objectives and prescription
- ❑ Description of prescribed fire project area
- ❑ Expected weather and fire behavior
- ❑ Communications
- ❑ Ignition plan
- ❑ Holding plan
- ❑ Contingency plan and assignments
- ❑ Wildfire declaration plan
- ❑ Safety and medical plan

A Vision For the Future of Wildland Fire Management on City-managed Lands

It took many decades of fire suppression for Chico's parklands to reach their present state. It will take more than a few years to restore them to their natural state. Some of the fire restoration projects listed above are safe and easy enough to implement almost immediately, i.e. after light but adequate environmental review. Others require more substantial preparation. In some cases, desired conditions may not be reached for generations. The timeline below is intended to provide a long-range perspective on the relative timing of fire projects in Chico parklands.

Ready: Can Proceed Almost Immediately.

- Burn star thistle, medusahead, and barbed goat grass areas in Middle and Upper Park.
- Small cultural burns in Verbena Fields and Lower Park.
- Moderate-complexity burns in oak woodlands areas of Middle Park, north of 5 Mile.

Near-Term: May require 1-2 years of planning/surveys/funding development

- Chaparral and live oak burns on South Rim of Bidwell Park in recently burned areas.
- Demonstration cultural burns for traditional edible plants in old walnut orchard on Peterson Drive.
- Develop fire management objectives and preferred suppression tactics for Upper Park
- Train park staff to be 'Resource Advisors' during wildfires; build READ program for Park.
- Develop Park 'Fire Ranger' funding and position to coordinate and manage Park's wildfire hazard mitigation and prescribed burning program.
- Develop Bidwell Park Fire Festival educational program, which includes live prescribed fire demos.
- Develop outreach and messaging programs to prepare public for increased use of fire on City-managed lands.
- Conduct larger burns on Bidwell Ranch and Chico Airport.

Medium-Term: Realistically requires 2-5 years of preparation including securing funding and other resources and at least some advance on-the-ground prep work (e.g. brush reduction in some areas)

- Larger understory burns in Lower Park Valley Oak woodlands.
- Higher-complexity chaparral burns in areas on North side of Big Chico Creek upstream of Parking Lot Q that haven't burned in last 50 years.
- Develop landscape-scale burning projects in conjunction with Big Chico Creek Forest Health Restoration Project, BCCER, and private landowners adjoining Upper Bidwell Park.
- Harden Upper and Middle Park infrastructure (e.g. don't use plastic culverts or wooden sign posts), phase-out any synthetic erosion control fabrics or other materials which release toxic smoke when burned.
- Realign trails or build new trails in locations with high tactical value for wildfire and prescribed fire control. For example, along 10 Mile House Road, Trashline Trail, Red Bud Trail, Cave Trail, Live Oak Trail.
- Phase out use of bulldozers during wildfires in Upper Park, using improved trails, instead.

- Establish Native burning program that can implement cultural burns in Chico Parks with minimal bureaucratic oversight.
- Develop pro-fire curriculum for CUSD, with opportunities for high-school students to participate in hands-on burning workshops.

Long-Term: These projects should be on the to-do list for the next generation of Park managers and may require nimble or sophisticated cross-boundary work as well as significant fuel model changes first.

- Develop regional fire resiliency (harden structures in Canyon Oaks and other neighboring settlements) and maintain fuels in areas with high hazard using prescribed fire and other methods so wildland fires can be left to burn within large areas of Upper Bidwell Park.

Appendix: Consistency with Applicable Local Plans
The following burning objectives are informed by The Bidwell Park Master Management Plan (2008), which contains the following relevant implementing strategy and objective:

● *I. PF-1. The need for and location of prescribed burning and related vegetation management shall be determined to reduce catastrophic fire risk and to enhance habitat quality.*
● *O. Upper-1. Manage Upper Park as open space set aside to remain in its natural state.*
● *O. NRMP-8. Utilize prescribed fire used as a management tool to protect and enhance habitats and reduce the risk of catastrophic fires within Bidwell Park.*

The Chico 2030 General Plan (City of Chico 2017) contains the following goals:
● *Goal OS-1 Protect and conserve native species and habitats.*
and
● *Goal OS-2 Connect the community with a network of protected and maintained open space and creekside greenways.*

The proposed program is consistent with these goals because burning projects will be targeted to protect and conserve native species, ensure sustained or improved habitat function, and maintain the health and condition of the naturally fire-dependent open space and creekside greenways.

● *Goal OS-6 Provide a healthy and robust urban forest.*

The proposed burning projects are consistent with this goal because reducing unhealthily dense understory in native parklands will increase the resilience of these areas to wildfire, pathogens, and drought.

Tribal Cultural Resources and Traditional Ecological Knowledge
The Mechoopda people are recognized as the first people to inhabit the Chico area and its parks. This original relationship to the land is described through the MOU between the City of Chico and Mechoopda Indian Tribe of Chico Rancheria. The MOU states that Mechoopda are to be consulted prior to the development of new open space or land use plans. The MOU also sets up the framework for cooperative work between the City and the Tribe to streamline processes for consultation. It also sets up a Tribal Technical Advisor for Native American Consultation in the Department of Planning Services for the City.

Because the 2008 MOU was written primarily to support land use planning (e.g., General Plan revisions), it would be beneficial to draft a follow-up MOU that can better address ongoing management activities, such as fire, on City-owned land. Cultural resources law in California has evolved considerably since 2008, so a follow-up MOU could define opportunities for sharing resources and knowledge, designate an individual within the Public Works Department to be a tribal liaison for management projects, and set clear expectations for what constitutes acceptable and effective consultation.

Between the BPMMP Appendix D, the 2008 MOU, and the VFMP PEIR, a basic framework has been set up for the City of Chico and the Mechoopda Indian Tribe of Chico Rancheria to consult and work together to best protect cultural resources in the City of Chico and all of its open spaces. Engaging Mechoopda people in the tending of cultural fires will, in the words of the MOU, provide an opportunity for both parties to "work cooperatively to protect, preserve, enhance, mitigate, and manage archaeological sites, traditional cultural properties, and traditional cultural resources, identified within the jurisdiction and sphere of influence of the City" (City-Mechoopda Tribe 2008).

The Bidwell Park Master Management Plan states the following objective under section 3.5.3, PARK RESOURCES:

● *O. P-9. Consult with the sovereign Nation of the Mechoopda Indian Tribe of Chico Rancheria regarding the propagation and gathering of native plant resources that are necessary to the continuation of cultural traditions.*

Cultural burning is an essential element in the propagation of culturally-important plants.

Appendix: The Concept of Prescribed Fire Complexity

"The term 'complexity' is generally used to characterize something with many parts where those parts interact with each other in multiple ways. In the context of the prescribed fire, complexity refers to the interconnectedness and dependence of the individual elements as they relate to the planning and implementation of the prescribed fire". (Prescribed Fire Complexity Rating System Guide, National Wildfire Coordinating Group, 2017).

The following Risk Management elements are analyzed in the NWCG worksheet:

• Safety: Hazards to personnel and public from planned prescribed fire activities through all phases of the prescribed fire. Safety is always considered for all elements.
• Fire Behavior: The difficulty of achieving the desired range of fire intensity, rate of spread and flame lengths to meet the prescribed fire objectives.
• Resistance to Containment: The conditions that influence the potential for a prescribed fire to leave the ignition unit or project area and resist containment effort.
• Ignition Procedures/Methods: Number and type of ignition devices, patterns, sequencing and/or timing required to safely ignite the prescribed fire and meet the objectives.
• Prescribed Fire Duration: The length of time (hours, days or weeks) that active ignition, fire spread, and primary holding operations (critical holding points are secure, transitioning to mop-up and patrol, etc.) are expected to occur in order to fully implement the prescribed fire.
• Smoke Management: The actions implemented by prescribed fire personnel directed at reducing the amount of smoke entering populated areas or impacting sensitive sites. Smoke management includes avoiding significant deterioration of air quality and violations of National Ambient Air Quality Standards, and minimizing or eliminating visibility impacts in Class I areas.
• Number and Dependence of Activities: Number and sequence of activities required to safely implement the prescribed fire and meet objectives through all phases of the project, including logistics, pre and post burn considerations, communication, test fire, ignition and holding operations, contingency actions (if implemented), mop-up and patrol, monitoring, and ensuring firefighter and public safety.
• Management Organization: The organizational capabilities needed to safely achieve objectives specified in the prescribed fire plan. This includes all phases of the prescribed fire until declared out.

• Treatment/Resource Objectives: The degree of difficulty to meet specific, measurable, achievable, realistic, time-sensitive treatment and resource objectives for the prescribed fire.
• Constraints: Conditions or requirements that place sideboards on the prescribed fire plan implementation. Example: Seasonal timing, logistical restrictions, smoke management restrictions, and national preparedness levels four, and five.
• Project Logistics: Facilities, services and supplies