STILLWATER-CHURN CREEK COMMUNITY WILDFIRE PROTECTION PLAN (CWPP) 2010

This project was funded through a grant from the
Shasta County Title III Secure Rural Schools Program

WESTERN SHASTA RESOURCE CONSERVATION DISTRICT

COUNTY OF SHASTA CALIFORNIA

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1. Introduction—Purpose of a Community Wildfire Protection Plan

Increasingly, wildfire has captured the attention of California's populace. Seemingly, every summer has its rash of fires with associated impacts to the state's citizens. Air quality is affected, roads are closed, wildlife habitat and watersheds are degraded, and in too many cases, tragedies occur to families or businesses as the fires destroy structures or infrastructure.

To address the risk of wildfire in our state, the concept of community-based forest planning and prioritization has been advocated (Norwicki, 2002; Bahro et al., undated). Actual incentives for communities to engage in comprehensive planning to reduce the risk of wildfire occurred with the promulgation of the Healthy Forests Restoration Act (HFRA) in 2003. This act was written following the disastrous 2002 fire year when over 7.1 million acres burned in the U.S., more than twice the 10-year average (NOAA, 2002). The HFRA gave local communities and adjacent federal land management agencies (e.g., U.S.D.I. Bureau of Land Management and U.S.D.A. Forest Service) encouragement to collaborate in developing, prioritizing, and implementing forest management and hazardous fuel reduction projects. The law's process allows for integration of projects that reduce wildfire risk on both public and private lands.

According to the HFRA, for a community to be eligible for funding, a Community Wildfire Protection Plan (CWPP) must be written. At a minimum, all CWPPs must include the following elements or follow certain processes:

I. **Collaboration:** CWPPs must be developed in a collaborative manner, by local and state government representatives, in consultation with federal agencies and other interested parties. Input must be provided by a wide range of private landowners and citizens.

2. **Prioritized Fuel Reduction**: CWPPs must identify and prioritize areas where work can be done to reduce the risk of wildfires and recommend the methods to be used to protect one or more at-risk communities and/or essential infrastructure.

3. **Treatment of Structural Ignitability:** CWPPs must recommend measures that homeowners and communities can take to reduce the ignitability of structures throughout the plan's area.

A CWPP offers at least two important benefits to areas at risk from wildland fire. First, is the opportunity to establish a local definition and boundary for especially high risk areas where wildland vegetation and communities, rural homes, and critical infrastructure intermingle. Identification of these high-risk wildland-urban interface areas (WUIs) are important because at least 50 percent of all funds appropriated for projects under the HFRA must be used within the Wildland-Urban Interface (WUIs).

The second noteworthy community benefit of a completed CWPP is that grant funding priority by federal agencies is given to the projects and treatment areas identified in the plan. If a federal agency proposes a fuel treatment project in an area addressed by the CWPP but identifies a different treatment method, the agency must also evaluate the communities' recommendation as part of the project's environmental assessment process. This process allows for an effective Action Plan to be developed to address risks to communities and rural areas from wildfire.

2. Goals and Objectives

The Stillwater-Churn Creek CWPP has a variety of goals, including to:

- Define the boundary of the planning area in order to maximize coordination with other groups planning wildfire risk reduction projects in the area.
- Develop maps of watershed characteristics germane to fire ignition and behavior, as well as prevention and control.
- Identify assets at risk from wildfire.
- Describe effective home owner and community-based fire safe practices around structures and encourage its implementation.
- Identify, prioritize, and map potential fuel reduction projects that will provide for human safety, minimize private property loss, and minimize the potential of a wildfire burning into rural subdivisions or communities.
- Develop and Action Plan for implementing the prioritized risk-reduction projects.
- Enter the completed plan on the Western Shasta Resource Conservation District's website, in order for a wide range of stakeholders to view the document.

3. Definitions

Prior to beginning this CWPP a few definitions of terms used in the document will be given. In addition, short discussions of each term with respects to their implications to wildfire behavior and risks from wildfire are offered.

Wildlands—Portions of the Study Area that dominated by native grasses, shrubs, and trees.

Urban Areas—Portions of the Study Area that are dominated by houses, businesses, streets, and infrastructure development. The vegetation that occurs tends to be clumpy and of non-native species, and most is irrigated.

Fuels—Basically, fuels are anything that will burn. Typically, these include grasses and forbs, shrubs, trees, and the organic debris that lies under or adjacent to shrubs and trees. Unfortunately, in wildfire situations, fuels can also include combustible material within or adjacent to structures. This could include fences, siding, roofs, and stored items in sheds.

Most wildland fuels absorb moisture from precipitation and humidity during wet seasons and release it to the air during dry seasons. Small or fine fuels (such as grasses or small twigs) both absorb and release moisture relatively quickly, while larger fuels take longer to both absorb and release moisture. The rate of moisture release and amount of moisture in wildland fuels is very important because they affect the behavior (intensity) in which fires will burn. Specifically, during the early portion of the fire seasons (late spring or early summer), the light or moderate-sized fuels might be very dry, but larger fuel pieces are still moist from the winter. This condition greatly reduces the intensity of any wildfire. However, later in the summer large fuels (e.g., large logs lying on the ground) lose moisture and fires will burn much more intensely. This creates conditions in which fires are much more difficult to extinguish.

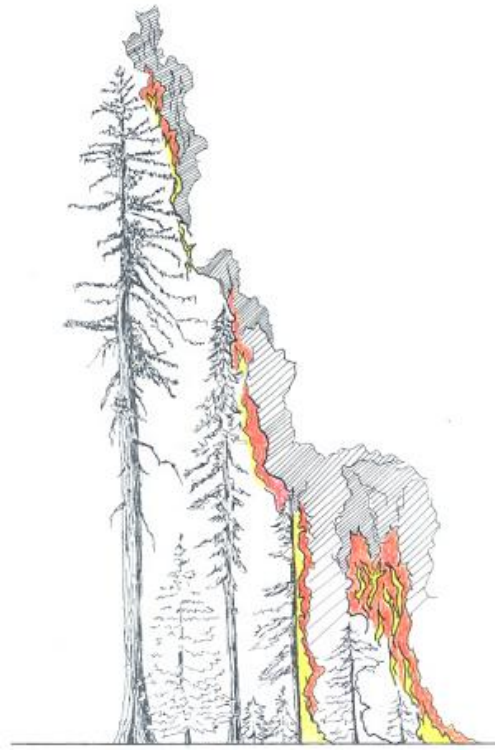
Wildland-Urban Interface (WUI)—Many people in Shasta County live in urban communities with structures in tight densities. When buildings are close together, vegetation generally consisted on non-native shrubs and trees that are watered throughout the summer. In addition, many houses or apartments have watered lawns. These conditions create neighborhoods where fire does not typically jump from structure to structure and firefighting entities are able to contain a fire to one structure.

Frequently, in rural areas within the county, the conditions are much different than urban locales. Houses may be scattered, isolated, or in small clusters. Another contrasting condition from urban areas is that houses can be adjacent to or surrounded by wildlands, having dense vegetation (see Image 1). This combination of factors results in extremely difficult conditions for firefighters. First, access route may be one-way and densely vegetated, hence safety risks. Second, vegetation may be so dense that during severe fire conditions the firefighters cannot risk staying near the home to protect it.

In other situations, homes are in clusters or form a fringe along the edges of dense wildland vegetation. Regardless, the conditions remain similar as in the case of isolated homes, with the mix of heavy wildland fuels and the presence of residences or business resulting in extremely difficult firefighting conditions and high risk of human loss of life.

Image 1. A Rural Home in the WUI

Fuel Ladder—Due to the heat from a fires and the upward motion of flames, fires will burn upward if at all possible. This pertains to slope of land or to vegetation layers. The concept of a fuel ladder is shown in the diagram to the left (courtesy of: http://www.fs.fed.us/psw/ programs/snrc/water/ kingsriver/images/fuel_loading/fuel_ladder.jpg).



Fires typically start at ground level and burn material that is readily available. If there is a combination of low-lying and moderate-stature vegetation, the fire will be carried to a higher level. Finally, if the low-lying grasses and debris and the adjacent shrubs are over-topped by trees, the fire may be carried further and further up into the crowns of the trees. The different heights of fuel represent a "ladder" for fire to climb to higher fuel.

From a firefighting perspective, fires that stay on or near the ground are the easiest to fight and cause the least damage. Fires that move further up into vegetation are harder and harder to fight. The dreaded forest "crown fires"have reached into the tree tops and are carried very quickly from one tree to another. These fires cause massive damage to forests, wildlife, and watersheds.

One of the keys to preventing large and destructive wildfires is to eliminate fuel ladders or to make openings within areas with large fuel loads. This will help keep the fire on or near the ground, or if it gets into the tree tops, to prevent it from advancing too far before it comes back to the ground.

Fuelbreak (Shaded Fuelbreak)—Fire requires fuels in order to burn. Wildfires will burn until either fuel is no longer available or weather makes burning impossible. Fuelbreaks are discrete areas where the vegetation is treated in some manner to reduce the amount of fuel or eliminate fuel ladder conditions. Fuelbreaks are generally created in strategic locations, in order to prevent wildfire from entering an area or to lower fuel conditions to slow down and reduce the intensity of fires. This enables firefighters to successfully contain a fire at the fuelbreak locations.

Fuelbreaks are often 200-300 feet in width and located along roads, edges of subdivisions, or placed between areas with heavy wildland fuels and important infrastructure features. During a wildfire, firefighters may use heavy equipment to cut a firebreak, removing all vegetation; however, that is rarely done in a strategically located shaded fuelbreak. Generally, all or nearly all shrubs are removed as well as some smaller trees, in order to break up fuel ladder conditions. Larger trees may be thinned to create wider spacing that is esthetically-pleasing, but will not carry a crown fire (so-called "shaded fuelbreaks"). In addition, the retained trees are often pruned of lower limbs, in order to reduce the fuel ladder conditions. The resulting conditions are often "park-like" in appearance.

4. The Stillwater-Churn Creek Study Area

A. Project Location and Climate

The Stillwater-Churn Creek Study Area (Study Area) is located in southwestern Shasta County (see Figure 1). The Study Area includes the Stillwater and Churn Creek drainages, and in order to help facilitate wildfire logistics planning, includes adjacent fringes of land outside of the drainages' northern boundary. The Study Area covers approximately 94,096 acres and includes the eastern and northern suburbs of Redding, most of Shasta Lake City, and many rural homes and subdivisions outside of the cities' boundaries (see Figure 2).

The headwaters of both the Stillwater and Churn Creek watersheds begin in the hills between Redding and Shasta Lake and flow in a north to south direction, entering the Sacramento River south of Redding (see Figure 2). The steep, hilly headwaters (see Figure 3) do not exceed 2,500 feet in elevation, but constitute a heavy precipitation zone that receives over 60 inches of rain annually. Annual precipitation tapers down from north to south, with the southern fringe of the Study Area receiving about 30 inches of annual rainfall.

Snowfall is rare in the southern half of the Study Area, but more common above 1,000' elevations along the northern portions. Even so, a snowpack does not form and, consequently, rainfall and to a much lesser extent spring discharge, is responsible for stream flows. Because of this, both streams were originally ephemeral, with no flows during the summers, but during the past century irrigation runoff from fields and urban areas results in portions of Stillwater and Churn Creeks flowing perennially.

The Stillwater-Churn Creek Study Area has a history of severe wildfires with damage to homes and infrastructure. Later sections of this CWPP will discuss how topography, vegetation, and climate all play a role in wildfire risk.

B. Existing Fire Plans, Organization, and Agencies

A variety of management plans exist that address wildfires in the vicinity and efforts to integrate firefighting activities in efforts to reduce the risk and respond to wildfires. The following summarizes the existing plans and firefighting infrastructure.

FEDERAL LAND AND FIRE PLANS

In 2001, the Chief of the USDA Forest Service published a *National Fire Plan* (U.S. Department of Interior and U.S. Department of Agriculture, 2001). It is a cohesive strategy for improving the resilience and sustainability of forests at risk; conserving priority watersheds, species, and biodiversity; reducing wildland fire costs, losses and damages; and insuring public and firefighter safety. To achieve these goals, the plan initiated steps to improve firefighting readiness and fire prevention through education; rehabilitation of watersheds; reduce hazardous fuel conditions; foster collaborative stewardship actions; and accomplish research and technology transfer.

The objective of the National Fire Plan is to describe actions that could restore healthy, diverse, and resilient ecological systems to minimize the potential for uncharacteristically intense fires. Methods include removal of excessive vegetation and dead fuels through thinning, prescribed fire and other treatment methods. The focus of the strategy is on restoring ecosystems that historically evolved with frequently occurring, low intensity fires. These fires typically occurred at intervals of between 1-35 years and served to reduce the growth of brush and other understory vegetation while generally leaving larger, older trees intact. The report is based on the premise that sustainable resources depend on healthy, properly functioning, resilient ecosystems.

SHASTA-TRINITY NATIONAL FOREST

The Forest Service administers about 2,000 acres (2.1 percent) along the northern boundary of the planning area. Responsibility for fire incidents is dependent upon where the fire is located, and can include CAL FIRE, and local community fire fighting infrastructures.

BUREAU OF LAND MANAGEMENT

The Bureau of Land Management (BLM) administers about 1,200 acres (1.3 percent) in the planning area, located in scattered parcels in the northern half of the planning area.

All BLM lands with burnable vegetation must have an approved Fire Management Plan (FMP), a strategic plan that defines a program to manage the wildland and prescribed fires based on the area's approved land management plan (U. S. Department of Interior, U.S. Department of Agriculture, 2002). The FMP provides for firefighter and public safety, includes fire management strategies, tactics and alternatives, addresses values to be protected and public health issues, and is consistent with resource management objectives, activities of the area and environmental laws and regulations. Until an FMP is approved, BLM units must take aggressive suppression action on all wildland fires consistent with firefighter safety and public safety and the resources to be protected. The BLM Fire Management Officer is responsible and accountable for providing leadership for the BLM fire and aviation management program at the local level.

Although structural fire suppression is the responsibility of tribal, state or local governments, BLM may assist with exterior structural protection activities under a formal agreement with CAL FIRE (as of 2003, CAL FIRE is under contract to provide fire protection to BLM lands).

STATE AND PRIVATE LANDS AND FIRE PLANS

The California Fire Plan considers the wildfire situation on state and privately owned lands and follows five strategic objectives:

1. Create wildfire protection zones that reduce risks to citizens and firefighters.
2. Assess all of California's wildlands to identify high risk, high-value areas and determine who is responsible, who responds, and who pays for wildland fire emergencies.
3. Identify and analyze key wildfire policy issues and develop recommendations for changes in public policy.
4. Develop a strong fiscal policy focus and monitor wildland fire protection in fiscal terms.
5. Translate the analyses into public policies.

CAL FIRE

CAL FIRE is the agency responsible for fire suppression and prevention on non-federal lands identified as State Responsibility Areas (SRAs) and on lands where a contract has been signed for CAL FIRE protection, known as Direct Protection Areas (DPAs). CAL FIRE may also provide and manage emergency services through cooperative agreements with counties and fire districts.

In 2000, the State Board of Forestry and CAL FIRE completed an update of the state fire plan for wildland fire protection in California. The overall goal of the plan is to reduce

total costs and losses from wildland fire by protecting assets at risk through focused pre-fire management prescriptions and increasing initial attack success. CAL FIRE's statewide Initial Attack Fire Policy is to aggressively attack all wildfires, with the goal of containing 95% of all fire starts to 10 acres or less.

SOUTH LAKE SHASTA FIRE SAFE COUNCIL

The South Lake Shasta Fire Safe Council (SLSFSC) was initiated as a continuation of an effort that began in 1993 to form area Fire Safe Councils to educate and encourage Californians to prepare for wildfires. The SLSFSC meets periodically to discuss wildfire risk reduction projects, share information, schedule speaking engagements, develop educational opportunities, and update maps showing fuels reduction projects and maintenance.

LOCAL FIREFIGHTING INFRASTRUCTURE

Currently, the Study Area has 10 fire stations located within its boundary or that has responsibility for some portion of the Study Area (see Table 1). Each station has an area of responsibility, but can assist on fires outside of their area of responsibility in certain situations. CAL FIRE has primary responsibilities for responding to fires on U.S.D.A. Forest Service and U.S.D.I. Bureau of Land Management administered lands within the northern fringe of the Study Area.

Table 1. Stillwater-Churn Creek Fire Stations Responsible For Portions of the Area

Station #	***Location***	***Responsibility Area***
Redding Station # 1	Downtown	Downtown, N Market, Hwy. 299 East/College View
Redding Sta. # 4	Bonnyview	Bonnyview/S Study Area
Redding Station # 5	Enterprise/Hartnell	Enterprise and E City Portions
Redding Station # 6	Oasis	N City Portions
Redding Station # 7	Airport	Airport, SE City Portions
Redding Station # 8	N. Churn Creek Rd.	NE Redding
Shasta Lake Station # 1	Ashby	Shasta Lake City
Shasta Co. Volunteer #72	Jones Valley	Jones Valley and NE Study Area
Shasta Co. Volunteer # 33	Bella Vista	Bella Vista and E Study Area
Shasta Co. Volunteer # 32	Palo Cedro	Palo Cedro and E Study Area

C. Stakeholder Involvement

During development of this CWPP, several steps were taken to solicit and ensure stakeholders input and involvement. A series of meetings were planned and advertised, in order to both inform the local agencies and populace of the CWPP planning process and to solicit ideas and recommendations. Each meeting provided a venue where specific recommendations from the attendees were discussed and documented. Information regarding each meeting is summarized in Table 2. One outcome of the meetings was that several newspaper articles were written regarding the CWPP, providing an additional means for information to be disseminated to the public and to facilitate the public's interaction with the CWPP developers.

The recommendations and input received during these meetings and communications with stakeholders were incorporated within this CWPP.

Table 2. Stillwater-Churn Creek CWPP Stakeholder Solicitation and Involvement

Date	Venue	Information Provided	Agencies/Citizens Solicited and Attending
Sept. 9, 2009	Stillwater-Churn Creek Watershed Alliance Meeting (Redding)	Introduction of the Shasta Co. Fire Safe Council Coordinator (Lee Delaney). Formation of Technical Advisory Committee (TAC) to develop a Community Wildfire Prevention Plan (CWPP).	A variety of citizens and state/federal agency representatives. WSRCD Representatives.
Oct. 14, 2009	TAC Meeting (Shasta Lake City)	Described the CWPP process and timelines; solicited technical input.	S. Morgan, C. Dafilen: Shasta Lake Fire Prot. Dist. (SLFPD) J. Granberry (Redding Fire) J. Zulliger (CALFIRE) T. Bradley (BLM) R. Wan Wyhe (SLFSC) G. Watkins (Shasta Lake City Council; current mayor, Shasta Lake City) WSRCD representatives
Nov. 19, 2009	CWPP Information Meeting (Pacheco School, Redding)	The CWPP process; solicited input.	3 Landowners, K. Hernandez , JT Zulliger (CALFIRE) WSRCD Representatives
Dec. 10, 2009	CWPP Information Meeting (Fire Sta. 6, Redding)	The CWPP process; solicited input.	2 Landowners J. Granberry, J. Houston, R. Valles (RFD)
Jan. 5, 2010	CWPP Information Meeting (Fire Sta. 5, Redding)	The CWPP process; solicited input.	23 Landowners (including CCBHO members) M. Ham, R. Nordo, J. Granberry, M. Holst (RFD) S. Morgan (SLFPD) K. Swanson (Fire Safe Council) WSRCD representatives
Jan. 14, 2010	CWPP Information Meeting/Input Solicitation (Fire Sta. 33, Bella Vista)	The CWPP process; solicited input.	13 landowners Andy Reiling, Kim Desena (CALFIRE), K. LaRussa (East Valley Times) WSRCD representatives

Table 2. Stillwater-Churn Creek CWPP Stakeholder Solicitation and Involvement			
Date	**Venue**	**Information Provided**	**Agencies/Citizens Solicited and Attending**
Feb. 9, 2010	CWPP Information Meeting/Input Solicitation (Shasta Lake City)	The CWPP process; solicited input.	10 landowners A. Rogers, S. Morgan (SLFPD) R. Van Wugh (SLSFSC) WSRCD representatives
April 13, 2010	TAC Project Prioritization Meeting	Displayed proposed projects and requested/received input regarding prioritization.	R. Van Whle (SLSFSC) J. Granberry (Redding Fire) WSRCD representatives
April 20, 2010	Briefing Meeting; City of Shasta Lake City Council	Briefly described the CWPP development process and distributed maps showing proposed projects.	Shasta Lake City Council and citizen participants.

Summary of Stakeholder Involvement

In summary, a series of meetings solicited stakeholder input, in addition:

News Media--Personal invitations and outreach through local radio and printed news media were used to advertise the effort to prepare a CWPP for the Stillwater-Churn Creek Study Area and specifics regarding the public meetings. A reporter from the East Valley Times attended one meeting and wrote several pieces regarding the CWPP process and requested public input.

Federal Agencies—The Western Shasta Resource Conservation District (WSRCD) contacted the existing Firewise Technical Advisory Committee (TAC) regarding initiation of the CWPP. The TAC, consisting of technical experts from local, state, and federal agencies were invited to the October 14, 2009 meeting. Both U.S.D.A. Forest Service and U.S.D.I. Bureau of Interior representatives stated that because only a small portion of the Study Area was federally managed and due to man-power constraints, they could only take a relatively minor role in providing input and participating in the CWPP process.

State Agencies—CAL FIRE representatives attended the initial TAC meeting on October 14th and various subsequent meetings. They provided input, including proposed projects.

Local Fire Agencies—Local Fire agencies were involved in the initial TAC meeting on October 14th, various subsequent information/input solicitation meetings, and the final TAC prioritization meeting.

Political Representation—A Shasta Lake City Council member (Greg Watkins), now mayor of Shasta Lake City, attended a meeting and provided input.

Community Member Involvement—Approximately 51 members of the public and local landowners attended the six public meetings held in Redding, Bella Vista, Shasta Lake City, and Palo Cedro. An overview of the CWPP process was described at each meeting. Input was solicited regarding specific wildfire issues to be addressed in the plan and specific means to

address fuels and wildfire risk on a local basis. Community member's suggestions were recorded by WSRCD staff and were incorporated into the CWPP.

On April 13, 2010 representatives from the TAC meet with WSRCD representatives to discuss the final list of proposed projects. At that meeting the TAC prioritized the projects by consensus. On April 20, 2010, the City Council of Shasta Lake City was briefed on the CWPP's progress.

D. Ownership and Population

The Study Area contains 94,092 acres. Of the total land base, federal agencies (U.S.D.I, Bureau of Land Management and Bureau of Reclamation and the U.S.D.A. Forest Service manage approximately 3,200 acres of land, or about 3.4 percent of the area. Most of the public land is concentrated in the densely vegetated and steep hills along the northern fringe of the Study Area (see Figures 2 and 3). A large portion of the Study Area (about 96.6 percent) is private land.

The Study Area contains a population of approximately 75,000 people, a significant portion of the population of Shasta County (176,000) and contains many "bedroom communities" for the City of Redding (WSRCD, 2007). While portions of the cities of Redding and Shasta Lake are densely populated large areas of rural subdivisions and scattered rural home sites exist in the study area. Many portions of the Study Area contain scattered residences, rural subdivisions, or mixes of commercial and residential properties.

Understanding land ownership and population distribution patterns helps in understanding wildfire risks and how to plan to reduce those risks. In reality different landowners have different perspectives regarding wildfire and wildfire risks. In addition, different landowner groups may have different legal constraints that restrict what they can do to address the risks.

E. Road Systems

Approximately 675 miles of roads exist in the study area (North State Resources, 2007). Of the total, about 75 percent of the total mileage consists of "local" roads, which are two-lane, paved roads that service scattered residential areas. Nine percent of the road mileage is highways, including Interstate 5, Highways 299 and 44. Roads provide locations for firefighter access to wildfires. Second, roads provide physical breaks in vegetation that slow down fires or be used by firefighters to help stop wildfires. Third, roads are the main locations for most fire starts, such as people throwing burning material from vehicles or to commit arson. Fourth, in emergency situations, roads provide ingress and egress to reach or evacuate homes.

F. Vegetation Patterns

Dry vegetation provides most of the "fuel" that escalates a small fire into a wildfire. Various types of vegetation provide different amounts of fuel and associated wildfire risks. Therefore, in determining wildfire risk for a specific location, the type of vegetation present and its proximity to nearby vegetation types helps wildfire planners design mitigation strategies and priorities. The types of vegetation present within the Study Area are shown in Table 3 and depicted on Figure 4. Short descriptions of each vegetation type follow Table 3.

Table 3. Major Vegetation Communities Within the Stillwater-Churn Creek Study Area.[1]

Vegetation Type (Habitat)	Acres	Percent of Total Study Area
Montane Hardwood/Hardwood-Conifer	21,703	23.1
Blue Oak-Foothill Pine	8,114	8.6
Blue and Valley Oak Woodland	22,726	24.2
Chaparral (Shrublands)	6,283	6.7
Riparian	6	<0.01
Annual Grasslands	12,386	13.2
Agriculture	5,311	5.6
Urban	14,743	15.7
Barren	584	6.2
Water	978	1.0
Missing Data/Unclassified Habitats	1,258	1.3
Total	94,092	

[1]Habitats are roughly based on California Wildlife Habitat Relationships (CWHR; CDFG, 1988) descriptions and WHR statewide typing data.

i. Vegetation Descriptions:

Montane Hardwood/Hardwood-Conifer—This habitat exists in the heavy precipitation zone along the northern fringe of the Study Area, generally on steep slopes. Trees include evergreen oaks (Interior live oak, *Quercus wislizeni* or Canyon Live Oak, *Q. chrysolepis*) and pines, including Foothill (*Pinus sabineana*) and Ponderosa Pine (*P. ponderosa*). The habitat often has a moderate understory shrub layer that helps create ladder fuels and difficult firefighting conditions. This is the second most common habitat type found in the Study Area and an example is shown in Image 2.

Image 2. Montane Hardwood/Hardwood-Conifer Habitat

Blue Oak-Foothill Pine—This habitat is characterized by a mix of Blue Oak (*Quercus douglassii*) with Foothill Pine (see Image 3). It may occasionally have a dense understory layer of shrubs, including *Ceanothus* spp. and Manzanita (*Arctostaphylos spp*.) and other species. This habitat is generally found in the northern half of the Study Area and on hill sides. The combination of dense shrub understory and moderate to dense tree overstory can create significant "fuel ladders".

Image 3. Blue Oak-Foothill Pine Habitats

Blue Oak and Valley Oak Woodlands—These stands generally grow in open conditions with a herbaceous understory layer. Valley oak tends to grow on deeper soil in valley bottoms

and blue oaks tend to be found on hill slopes and in areas with poorer soils (see Image 4). Blue Oak stands are widely distributed through the Study Area, both on hilly and flat terrain, while Valley oak stands are much more restricted in acreage and are generally found near streams or along terraces. Valley Oak stands, near streams, can have dense shrub understories.

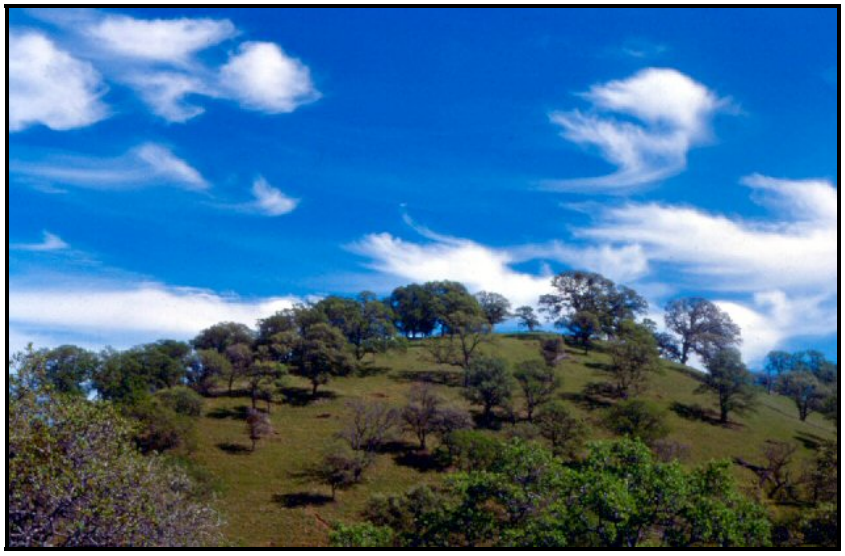


Image 4. Blue Oak Woodland Habitats

Chaparral—These habitats consist of dense shrublands, especially *Ceanothus spp*. and *Arctostaphylos spp*. They generally occur on steep hillsides in the northern and central portions of the Study Area (Image 5). This vegetation tends to burn intensely.

Image 5. Chaparral Habitats

Riparian—Riparian habitats grow adjacent to streams or other waterbodies and support native Willows (*Salix spp*.), Fremont Cottonwood (*Populus fremontii*), Valley Oak, and a variety of shrub understory species. Confined to near-water locations, riparian habitat occurs in narrow stringers of small size and are difficult to accurately identify with statewide typing efforts. Therefore, Table 3 likely underestimates the extent of riparian habitat.

Annual Grasslands—Generally, this habitat is found in the central and southern third of the Study Area. It consists of herbaceous vegetation (grasses and forbs) with few trees or shrubs. The light, homogeneous fuels create conditions where fires can move rapidly when wind driven (see Image 6); however, fires burning in these habitats are relatively easy to extinguish.

Image 6. Annual Grassland Habitats

Agricultural—This land is used for crops and is usually irrigated (Image 7). Ag land is generally found in the central and southern thirds of the Study Area. Due to the irrigation and lack of fuel ladders, these habitats rarely suffer from devastating wildfires.

Image 7. Agricultural Habitats

Urban—These areas are dominated by homes and outbuildings. Vegetation consists of evergreen or deciduous shrubs or trees with irrigated areas, including lawns. Urban habitats can be close to or intermixed with wildland habitats, creating challenging firefighting conditions (see Image 8). Urban habitats exist in the Study Area within and along the peripheries of Shasta Lake City, the north portions of Redding, and in other rural subdivisions.

Image 8. Urban Habitats

Barren and Water—Barren habitats, such as mines and manufacturing sites, have been disturbed by human activities and have sparse vegetation which does not provide fuel for wildfires. However, there may be infrastructure sited on these habitats that are vulnerable to nearby wildfires.

Water exists as small ponds scattered throughout the Study Area. (No images of these habitats are shown.)

Many of the Study Area's habitats intergrade or intermix with each other (refer to Figure 4). In addition, many urban- or rurally-developed areas adjoins or exists within a matrix of wildland habitats. This mixture of flammable vegetation types with heavy fuel concentrations in and around homes and businesses creates especially dangerous situations in the WUI areas.

G. Fuel Conditions

In a discussion of landscape level fuel conditions, which are critical when analyzing wildfire risks, the most important fuels are herbaceous, shrubs, and trees. Other factors are topography, dwelling density, and weather patterns. The State of California has produced maps

categorizing all areas into either Moderate, High, and Very High Fire Hazard Severity Zones. This risk factor gives a general indication of how wildfires may act, including advancing speed, flame length, etc. The entire Study Area falls into a Very High Fire Hazard Severity Zone.

i. Fuel Models

Fuels are made up of various components of vegetation, live and dead, that occur on a given site. Fuels have been classified into four groups – grass, shrub, timber litter, and slash. The differences in fire behavior among these groups are related to the fuel load and its distribution among the fuel diameter-size class. In 1972, 13 mathematical fire behavior models or Fuel Models were developed by Rothermel for use in fire behavior predictions and applications for every vegetation type.

Fuel models were designed to predict fire behavior for specific weather and fuel conditions. They are accurate throughout a broad range of climates, but tend to under predict the spread and intensity of fire during extreme conditions (high winds combined with very low relative humidity). Fuel models are tools to help the user realistically estimate fire behavior. The criteria for choosing a fuel model includes the assumption that fire burns in the fuel stratum best conditioned to support the fire. This means that situations will occur where one fuel model will represent the rate of spread most accurately, while another best depicts fire intensity. In other situations, two different fuel conditions may exist, so the spread of fire across the area must be weighed by the fraction of the area occupied by each fuel type.

The study area contains four of the 13 fuel models. These include Fuel Model 1 (grass), Fuel Model 4 (Chaparral/Shrub), and Models 9, and 10 (Timber Litter). Each fuel model is briefly described below and its distribution within the Study Area is shown on Figure 5:

- Fuel Model 1 (Short Grass) is governed by the fine, very porous, and continuous herbaceous fuels that have cured (dried) or are nearly cured. Fires are surface fires that move rapidly through the cured grass and associated material. Relatively little shrub or timber is present, and when it does exist it consists of scattered blue or valley oaks and small patches of chaparral. This model includes annual and perennial grasses and oak woodlands, and can be found in the central, eastern, and southern portions of the Study Area. It is the most common wildland fuel model within the area.
- Fuel Model 4 (Chaparral/Shrub, with considerable amounts of dead fuel) has very high to extreme rates of spread, which makes control efforts difficult. Fire involves the foliage and live and dead fine woody materials in the crowns of a nearly continuous secondary overstory. Besides flammable foliage, there is dead woody material in the stand that significantly contributes to the fire intensity. Dominant stands of chamise and/or manzanita are representative of Fuel Model 4. This fuel model is generally found in scattered patches and on steep slopes in the northern half of the Study Area.

- Fuel Model 9 consists of six acres of riparian habitat. Due to its very limited distribution, it is not shown on Figure 5.
- Fuel Model 10 (Timber Litter greater than 3 inches) fires burn in the surface and ground fuels with greater fire intensity than other timber litter models. Dead-down fuels include greater quantities of three inch or larger limb wood resulting from over maturity or natural events that create a large load of dead material on the forest floor, and ladder fuels are common. Crowning out, spotting, and torching of individual trees are more frequent in this Fuel Model, leading to potential fire control difficulties. Any forest type may be considered for this Fuel Model if heavy, downed material is present. Examples include insect or disease-ridden stands, wind-thrown stands, over mature situations with deadfall, and aged light thinning or partial cut slash. This Fuel Model is the second most common within the Study Area and is most prevalent on steep slopes in the northern half.

The Fuel Models most problematic to firefighters and damage residential areas or infrastructure are numbers 10 and 4. These Fuel Models foster wildfires that are difficult to control and wind can spread embers far in advance of the actual fire. These Fuel Models are concentrated in the northern half of the Study Area (see Figure 5).

H. Wildfire History

Previous sections describe the Study Area as a landscape in which the northern portions are dominated by steep hillsides with dense tree and shrub growth. Then, as one progresses down-slope and to the south, the hills moderate and tree and shrub growth patterns become less dense. While tree and dense brush growth dominates the northern third of the Study Area and the western fringe, agricultural land and grasslands dominate in the southern third. The transition between the two areas closely reflects the precipitation gradient from the moist, northern reaches of the Study Area to the relatively drier southern boundary.

Wildland fires can occur within the Study Area virtually any month of the year. Fires during late autumn, winter, and early spring tend to be small in size and relatively easy for firefighters to quickly contain. However, most fires occur in summer and early autumn, when debris, brush, and tree foliage are very dry and easily ignite.

Occasionally, conditions are right for a wildfire to explode and overwhelm existing suppression capabilities. This “worst case scenario” is when fires start on hot days in dry fuel with strong winds and low humidity. The wind spreads the fire much quicker and carries sparks, brands, and flames down-wind creating numerous spot fires a considerable distance away. At this point, natural or human-created openings (e.g., highways) may not slow down the fire at all. History shows these fires often result in significant losses of infrastructure and property, and occasionally human life.

The Stillwater-Churn Creek Study Area fire history includes several large events (see Figure 6). Between the late 1950s and 2009, wildfires burned approximately 48,664 acres. The largest was the 1999 Jones Fire, which started in the extreme northeast corner of the Study Area and burned southward. This fast moving fire was finally stopped near the Redding Municipal Airport. This fire burned over 26,000 acres

within the Study Area. The second largest fire was the 1954 Airport Fire that covered 2,700 acres in the southern portion of the Study Area (see Figure 6).

An interesting characteristic of fast moving fires is their linear shape (see Figure 6), a result of strong winds in the area that pushes the fire forward (with the shape of the fire's perimeter indicating the direction of wind-flow). The linear-shaped wildfires suggest either a strong North or South wind. The "worst case scenario" wildfire situation for the Study Area would be a fire start in the northern third of the area where tree and shrub fuels are dense (Fuel Models 4 and 10) driven by a strong northern wind that would carry the fire in a southerly direction. This condition has the potential of pushing a wildfire directly into heavily developed business parks, residential areas, and community suburbs.

I. The Wildland Urban Interface (WUI) and Locations at Potential Risk From Wildfire

1. Evaluating Critical Infrastructure, Areas of Community Importance, and Critical Species and Habitats

Critical Infrastructure and Areas of Community Importance

The Study Area has a wide variety of features that would be considered Critical Infrastructure or Areas of Community Importance. These features include:

Transportation Facilities—Redding Municipal Airport; Interstate 5; Highway 299; and Highway 44

Community Welfare Facilities—Police and Fire Stations; Powerlines; Waterlines; and Sewage Treatment Sites

Miscellaneous—Public and Private School; City and Community Parks

These particular features in the Study Area are without adjacent dense wildland fuels or are surrounded by zones with a significantly reduced level of fuels. During community meetings none of these sites were specifically identified as needing additional wildland fire protection measures. However, stakeholder input strongly indicated that the values most prone to risk from wildfire were the scattered homes, subdivisions, and zones of residence/small commercial property mixes located throughout the Study Area. These locations are frequently intermixed with adjacent or nearby dense wildland fuels.

Critical Species and Habitats

The Study Area provides habitat for several critical wildlife and plant species, "Special Status Species", that have some form of existing or proposed legal protective status set by either the federal or state government. Table 4 and Figure 7 show the Special Status Species identified within the Stillwater-Churn Creek Study Area as reported in the California Natural Diversity Database (CNDDB). The CNDDB is a state-managed database that records sightings of rare or unusual species. Because biologist are not required to submit sightings to this database, there are undoubtedly many more Special Status Species present within the Study Area than is depicted in the CNDDB and many additional locations where these species exist other than those shown on Figure 7. Regardless, the CNDDB is the best source of information on the presence of wildlife and plant species in the Study Area.

Table 4. Special Status Species and Critical Habitats Known to Exist Within the Stillwater-Churn Creek Study Area			
Common Name	**Scientific Name**	**Legal Status**	**Required Habitat**
Herptiles			
Northwestern pond turtle	*Actinemys marmorata*	CA Species of Concern	Ponds and Slow Moving Streams
Shasta salamander	*Hydromantes shastae*	CA Threatened	Limestone outcrops, N portion of Study Area
Invertebrates			
Vernal pool fairy shrimp	*Branchinecta lynchi*	Federally Threatened	Vernal pools and seasonal wetlands
Vernal pool tadpole shrimp	*Lepidurus packardi*	Federally Endangered	Vernal pools and seasonal wetlands
Valley elderberry longhorn bettle	*Desmocerus californicus dimorphus*	Federally Threatened	Blue elderberry plants, generally in riparian areas
Birds			
Bank swallow	*Riparia riparia*	CA Threatened	Nests in streambanks
Osprey	*Pandion haliaetus*	Formerly, CA Species of Concern	Nests in large trees or other structures; feeds on fish
Bald eagle	*Haliaeetus leucocephalus*	Formerly, Federally Threatened	Nests in large trees/other structures; eats fish/birds
Peregrine falcon	*Falco peregrinus anatum*	Formerly, Federally Threatened	Nests on cliffs; feeds on birds
Fish			
Chinook salmon (winter-run)	*Oncorhynchus tshawytscha*	Federally Endangered; California Endangered	Sacramento River tributaries (Churn and Stillwater Crs.)
Plants			
Fox sedge	*Carex vulpinoidea*	CA Native Plant Soc. List 2	Marshes/wetlands
Northern clarkia	*Clarkia borealis borealis*	CA Native Plant Soc. List 1B	Lower coniferous forests
Red Bluff dwarf rush	*Juncus leiospermus var. leiospermus*	CA Native Plant Soc. List 1B	Vernal pools/wetlands
Legenere	*Legenere limosa*	CA Native Plant Soc. List 1B	Vernal pools/wetlands
Shasta snow-wreath	*Neviusia cliftonii*	CA Native Plant Soc. List 1B	Chaparral habitats, N portion of Study Area
Slender Orcutt grass	*Orcuttia tenuis*	CA Native Plant Soc. List 1B; Federally Threatened; CA Endangered	Vernal pools/wetlands
Mammals			
Pacific fisher	*Martes pennanti*	CA Species of Concern; Federally Candidate	Conifer forests
Critical Habitat			
Vernal Pools Swales	*NA*	NA	Provide critical habitat for many rare plants and animals

While there are a significant number of Special Status Species within the Study Area, analyses suggests that no specific area known to harbor these species is at unusual risk from wildfire. In addition, there were no specific concerns regarding these species at any public meeting.

A vernal pool swale complex exists within the southern half of the Study Area (see Figure 7). Almost three-quarters of all vernal pool habitats in California are estimated to have been destroyed (Holland, 1998; referred to in North State Resources, 2007). These habitats have unique plant and animals populations and are considered to be federally-sanctioned "Critical Habitat" for several species, meaning that they have been deemed to be critical areas for the rare species' conservation. An 834-acre site within the Study Area has been established as the Stillwater Plains Mitigation Bank to protect and enhance the vernal pools.

Analyses of the location of vernal pool swale complexes in relationship to adjacent fuel conditions suggest that they are not abnormally at risk from wildfire. In addition, public input did not identify these habitats as in need of fire protection. In fact, from a biological and ecological perspective, periodic wildfires are probably necessary for the species that inhabit vernal pools and swales.

2. Determining the Wildland Urban Interface/Intermix (WUI)

Analyses of the locations of the Study Area's critical infrastructure, areas of community importance, and critical species and habitats and consideration of their location to heavy fuel concentrations indicated that no areas specifically demanded additional protection. Instead, the analyses did show, overwhelmingly, that the features at greatest risk are rural homes and subdivisions on the outskirts of Shasta Lake City and Redding, as well as the interspersed businesses and light industry within the same areas. Therefore, the remainder of this CWPP will focus on these specific locations and methods that can be used to reduce their risks from wildfire.

The conditions that result in high risk to rural homes and subdivisions and dispersed small businesses is the relationship to areas with heavy fuels, called Wildland Urban Interface (WUI). To be most effective, the CWPP identifies the WUI for the Study Area and addresses potential projects within the WUI to reduce wildfire risks. To determine the WUI for the Study Area, input was provided at public meetings (see Stakeholder Involvement), then existing natural vegetation maps were compared with subdivision maps, rural concentrations of residential structures, and dispersed small businesses. The WUI map, Figure 8, shows approximately 80 percent of the Study Area falls within the WUI.

Areas not included in the WUI were those with: 1) heavy fuels, but no nearby residential areas, or 2) relatively light fuels (e.g., urban areas; agricultural lands). The areas outside the WUI classification include the northernmost fringe (primarily federally-administered lands with no nearby dwellings) and areas with relatively light fuel along the southern fringe of the Study area.

J. Controlling Wildfire Risk to the Study Area's WUI

Due to the variability of wildfires and the risks present, a multi-scale strategy to controlling wildfire risk is best. First, a residential-scale approach is presented, in which a home or business owner can help protect their property and investments. Second, a community or vicinity approach is presented, in order for a group of landowners to work together to lower the risk of a large damaging fire. Third, a landscape

approach is presented, in which a variety of landowners and/or agencies can cooperate to reduce wildfire risks from the worst-case situations.

1. Fire Damage Prevention—On a Single-Property Scale

Any property owner within a WUI can assess their situation regarding the risk of a wildfire and take steps to reduce that risk. Individual actions, taken on the small-scale of an individual structure or parcel, are probably the most effective way to address wildfire risk. Many agencies have considered the topic of preventing damage to homes and a range of strategies have been proposed; however, most have very similar themes. The following figure was produced by Yuba County Watershed Protection and FireSafe Council and gives property owners many helpful ideas and guidelines.

Graphics developed by California Dept. of Forestry and Fire Protection

The schematic figure presents several important concepts. First, there should be two zones considered, centered on an isolated house or in the middle of a cluster of buildings. The first zone extends out in all directions at least 30 feet in distance. The second zone continues an additional 70 feet, for a total of 100 feet away from all buildings. There are a variety of actions that each homeowner, or business owner, should accomplish in each of these zones, including:

Zone 1—Area Within 30 Feet Distance From All Buildings

1. Very few shrubs should be retained. No shrub should have foliage that extends closer than 10 feet from a building.
2. If possible, use fire resistant species of shrubs[1].

3. Remove all plants greater than 10 feet in height.
4. Remove all flammable material from within five feet of any building.
5. Tree limbs should be pruned back to be further than 10 feet in distance from any flue or chimney.
6. Keep leaves and other debris cleaned off the roofs and from gutters.
7. Do not use wood or bark mulches within five feet of any building.
8. Use non-combustible (e.g., rock or brick) material for fences, ornamental garden structures, etc.

Zone 2—Area From 30 Feet to 100 Feet Distance From All Buildings

(Note: If the buildings are on or adjacent to steep slopes, Zone 2 should extend out 150 feet from any building.)

(Note: Insurance companies may require larger Zone 2 areas—refer to your agent.)

1. Trees should be thinned out so that their limbs are at least 10 feet apart. (On sloping land, this distance between tips of limbs should be at least 20 feet.)
2. Shrubs should be widely spaced so that the distance between adjacent shrub's foliage is two times the shrub plant's height on flat ground and six times the height of the shrubs on steep ground.
3. Shrubs should not be used to screen propane tanks, firewood piles, or other flammable items.
4. Promptly remove all trimmings and other forms of yard waste.
5. Create firewood stacks at least 30 feet from any building.
6. Clean all flammable materials from underneath an outdoor deck.
7. All tree limbs from ground level up to 15 feet in height should be cut.
8. Annually assess the property and complete maintenance in order to retain the conditions described for both Zone 1 and Zone 2.

2. Fire Damage Prevention—On the Local or Mid-Scale

Destructive wildfires can extend over large areas and affect many landowners' properties. Therefore, a group of adjacent landowners can develop an even more effective wildfire deterrent by coordinating the small-scale recommendations. In situations where houses are spaced on lots approximately one acre in size, virtually all of the land would be effectively treated if all landowners in a localized area followed the local scale strategy. Individual landowner should encourage their neighbors to join together and maintain their own fuels management actions.

Roads or lanes that provide access to individual houses or groups of houses likely fall outside the 100 foot zone described previously; however, the roads are very important for firefighting equipment access and as escape routes during evacuations. Clearing vegetation along the roads is another element of protection for property and lives. All landowners should consider treating 100 ft strips on either side of the access roads with the same strategy described for the Zone 2 residential areas, in the previous discussion. By thinning trees and shrubs to the specifications described, and by removing flammable material, the routes will likely serve both firefighters and landowners. As in the case of individual home protection measures, if adjacent landowners follow the mid-scale strategy regarding roads, an added protective value is accrued to the local area.

3. Fire Damage Prevention—On a Landscape Scale

Large fires are difficult to control, which makes plans difficult to construct. Planning for these fires takes a landscape perspective, meaning that the entire Study Area or large parts of the Study Area must be

considered as a unit in order to determine what landscape-scale activities would help to control large fires. Landscape planning assumes that each individual home and business owner has done what can be done individually, as described for both the parcel and mid-scale discussions. Landscape planning can include:

1. Construction of strategically located fuelbreaks
2. Improving Roads or Reducing Roadside Fuels to Increase Firefighting Access and Citizen Emergency Egress
3. Improving Knowledge of Citizens and Business Owners Regarding Fires, Emergency Escape Procedures, and Fuels Management

5.Proposed Projects—Fuels Reduction and Safety Corridors

On April 13, 2010 the Stillwater-Churn Creek Technical Advisory Committee (TAC) met with WSRCD representatives and discussed the proposed projects developed during preparation of the CWPP. The wildfire risks in the project area were considered and the projects were prioritized using a consensus process. The prioritized list of projects is summarized in Table 5 and the project locations are shown on Figure 9. These proposed projects form the basis for an Action Plan, which following the approval of the Stillwater-Churn Creek CWPP, will enable entities to write grant applications for funding.

Several of the projects involve the construction of fuelbreaks between wildlands having heavy fuels and subdivisions or small businesses, while other projects involve other approaches to reducing wildfire risk. Reducing fuel along major through-roads will serve to help prevent the advancement of wildfires and also improve safety to firefighters and rural residents by improving ingress and egress during wildfire events.

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Table 5. Prioritized Proposed Projects to Reduce Wildfire Risk, Stillwater-Churn Creek Study Area, Shasta County							
Project Name (By Priority)	**Purpose**	**Proposed By**	**Total Size[1] (Length x Width) =Approx. Ac**	**Estimated Project Cost/Ac[2]**	**Residences/Commercial Values at Risk[3]**	**WUI?[4]**	**Priority[5]**
1. North Shasta Lake City Fuelbreak	Prevent wildland fires from moving S into Shasta Lake City	SLCFPD	17,000' x 200' = 80 ac	($600-3,000)	173 ($200K) = $34.6 million/ 29 ($500K) = $14.5 million	Yes	1
2. Northeast Shasta Lake City Fuelbreak	Prevent wildland fires from moving SW into Shasta Lake City/ Protect Grand Oak School	CAL FIRE	5,500' x 200' = 26 ac	($600-3,000)	761 ($200K) = $152.2 million/ 51 ($500K) = $25.5 million	Yes	2
3. Union School Road Fuelbreak	Emergency egress/ ingress for rural areas E of I5/Fuelbreak	WSRCD	15,000' x 200' = 71 ac	($600-3,000)	173 ($200K) = $34.6 million/ 14 ($500K) = $7 million	Yes	3
4. Bear Mountain Rd. Fuelbreak	Emergency egress/ ingress for rural areas near Jones Valley/Fuelbreak	WSRCD	27,500' x 200' = 129 ac	($600-3,000)	576 ($200K) = $115.2 million/ 35 ($500K) = $17.5 million	Yes	4
5. Lake Blvd. (North) Fuelbreak	Emergency egress/ingress for rural areas NW of Shasta Lake City/Fuelbreak	WSRCD	6,000' x 200' = 28 ac	($600-3,000)	39 ($200K) = $7.8 million/ 0 ($500K) = $0	Yes	5
6. Lake Blvd. (South) Fuelbreak	Emergency egress/ingress along Lake Blvd. N of Williamson Rd.	WSRCD	13,000 x 200' = 62 ac	($600-3,000)	160 ($200K) = $32 million/ 8 ($500K) = $4 million	Yes	6
7. Pine Grove Fuelbreak	Emergency egress/ingress along Pine Grove (Lake Blvd. to I5)	WSRCD/ TAC	11,000' x 200' = 52 ac	($600-3,000)	2,420 ($200K) = $484 million/ 94 ($500K) = $47 million	Yes	7
8. Oasis Rd. Fuelbreak	Emergency egress/ingress along Oasis Rd. (Lake Blvd. to Bear Mtn. Rd.)	WSRCD/ TAC	29,000' x 200' = 136 ac	($600-3,000)	For logistical reasons, values were combined with project # 3.	Yes	8
9. Quartz Hill/Benton Fuelbreak	Emergency egress/ingress for rural areas S of Lake Blvd./Fuelbreak	WSRCD	18,500' x 200' = 87 ac	($600-3,000)	2,745 ($200K) = $549 million/ 203 ($500K) = $101.5 million	Yes	9
10. Dry Creek Rd. Fuelbreak	Emergency egress/ ingress for rural areas near Jones Valley/Fuelbreak	WSRCD	47,000' x 200' = 223 ac	($600-3,000)	532 ($200K) = $106.4 million/ 4 ($500K) = $2 million	Yes	10
11. Akrich Subd. Fuelbreak	Prevent fires wildland fires from moving W into subdivision	CAL FIRE	6,000' x 200' = 28 ac	($600-3,000)	137 ($200K) = $27.4 million/ 6 ($500K) = $3 million	Yes	11
12. Fawndale Community Fuelbreak	Prevent fires wildland fires from moving into Fawndale	WSRCD	11,500' x 200' = 54 ac	($600-3,000)	92 ($200K) = $46 million/ 23 ($500K) = $11.5 million	Yes	12
13. N Railroad/Shasta Lake City Fuelbreak	Prevent wildland fires from moving into NE Shasta Lake City	SLCFPD	8,000' x 200' = 38 ac	($600-3,000)	87 ($200K) = $17.6 million/ 9 ($500K) = $4.5 million	Yes	13

Table 5. Prioritized Proposed Projects to Reduce Wildfire Risk, Stillwater-Churn Creek Study Area, Shasta County							
14. Old Oregon Trail Fuelbreak	Emergency egress/ ingress for rural areas E of I5/Fuelbreak	WSRCD/ TAC	40,000' x 200' = 188 ac	($600-3,000)	168 ($200K) = $33.6 million/ 30 ($500K) = $15 million	Yes	14
15. Hwy 299 Fuelbreak	Emergency egress/ingress along Hwy 299/Fuelbreak	TAC	38,500' x 200' = 181 ac	($600-3,000)	888 ($200K) = $177.6 million/ 7 ($500K) = $3.5 million	Yes	15
16. Hwy 44 Fuelbreak	Emergency egress/ingress along Hwy 44	TAC	10,500' x 200' = 49 ac	($600-3,000)	11,460 ($200K) = $2,292,000 million/ 864 ($500K) = $432 million	Yes	16
17. Intermountain Rd. Fuelbreak	Emergency egress/ingress for rural areas N of Hwy. 299/Fuelbreak	WSRCD	25,000' x 200' = 117 ac	($600-3,000)	54 ($200K) = $10.8 million 0 ($500K) = $0	Yes	17
18. Breakaway Gate for Intermountain Rd.—Purch./ Maint.	Allow Emergency egress/ingress along Intermountain Road	WSRCD	NA	$3,000 (Lump Sum)	For logistical reasons, values were combined with project # 17.	Yes	18
19. Keswick Dam Rd. Fuelbreak	Emergency egress/ingress for rural areas W of Lake Blvd./Fuelbreak	WSRCD	6,400' x 200' = 30 ac	($600-3,000)	For logistical reasons, values were combined with project # 9.	Yes	19
20. Buenaventura Blvd. Fuelbreak	Emergency egress/ingress for subdivisions N of Sacramento R,/ Fuelbreak	WSRCD	3,000 x 200' = 14 ac	($600-3,000)	For logistical reasons, values were combined with project #9.	Yes	20
21.Whiteway/Pickard Subd. Fuelbreak	Prevent wildland fires from moving S and W into subdivision	CAL FIRE	5,000' x 200' = 23 ac	($600-3,000)	33 ($200K) = $6.6 million/ 0 ($500K) = $0	Yes	21
22. Twin Tower (Collyer) Subd. Fuelbreak	Prevent wildland fire from moving SW into subdivision	CAL FIRE	2,000 x 200' = 10.5 ac.	($600-3,000)	4,686 ($200K) = $937.2 million/ 246 ($500K) = $123 million	Yes	22

[1] Acreage assumes that the entire fuelbreak area will be treated.

[2] Estimated Project Cost/Ac is highly variable, therefore the estimate is based on the range of recent WSRCD-completed projects. Variables influencing cost include: 1) total project acreage; 2) entity that completes the work (Inmate Conservation Crews vs. WSRCD employees); 3) ground steepness; 4) treatment technique (machine vs. hand-treatment) and 5) vegetation density. When more site-specific information is available, more accurate costs can be determined.

[3]Both residences and commercial businesses vary widely in value. For this analyis it was estimated that mean value of residences was $200,000 and mean value of commercial properties was $500,000.

[4]See Figure 8 for the WUI location.

[5] Prioritization was accomplished at the Stillwater-Churn Creek Technical Advisory Team meeting on April 20, 2010 (see Table 2) and was based on values at risk and subjective determination of wildfire potential and historical patterns.

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7. Figures

Figures

FIGURE 1

Vicinity Map

Stillwater-Churn Creek Community
Wildfire Protection Plan (CWPP)

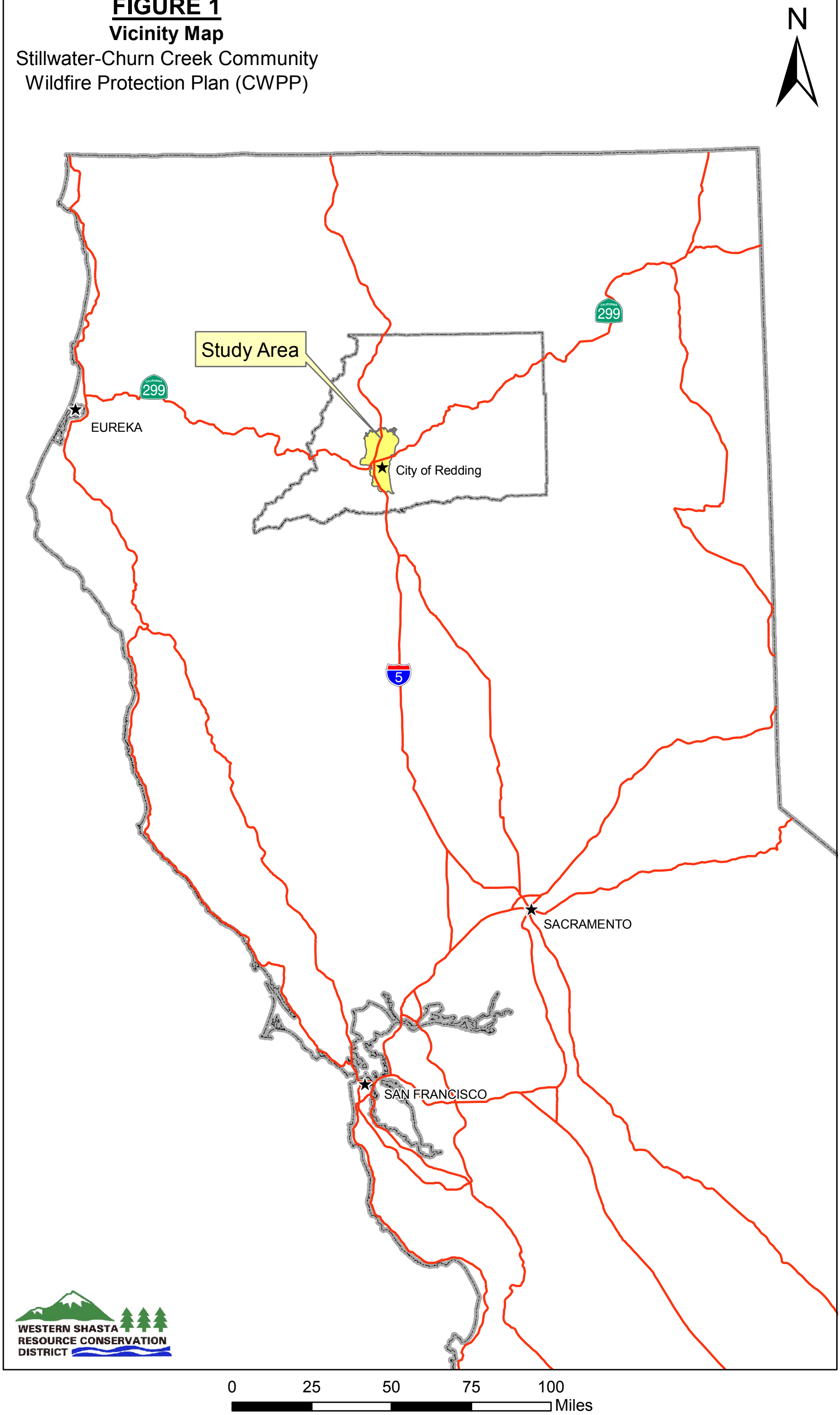


FIGURE 2

Project Area

Stillwater-Churn Creek Community
Wildfire Protection Plan (CWPP)

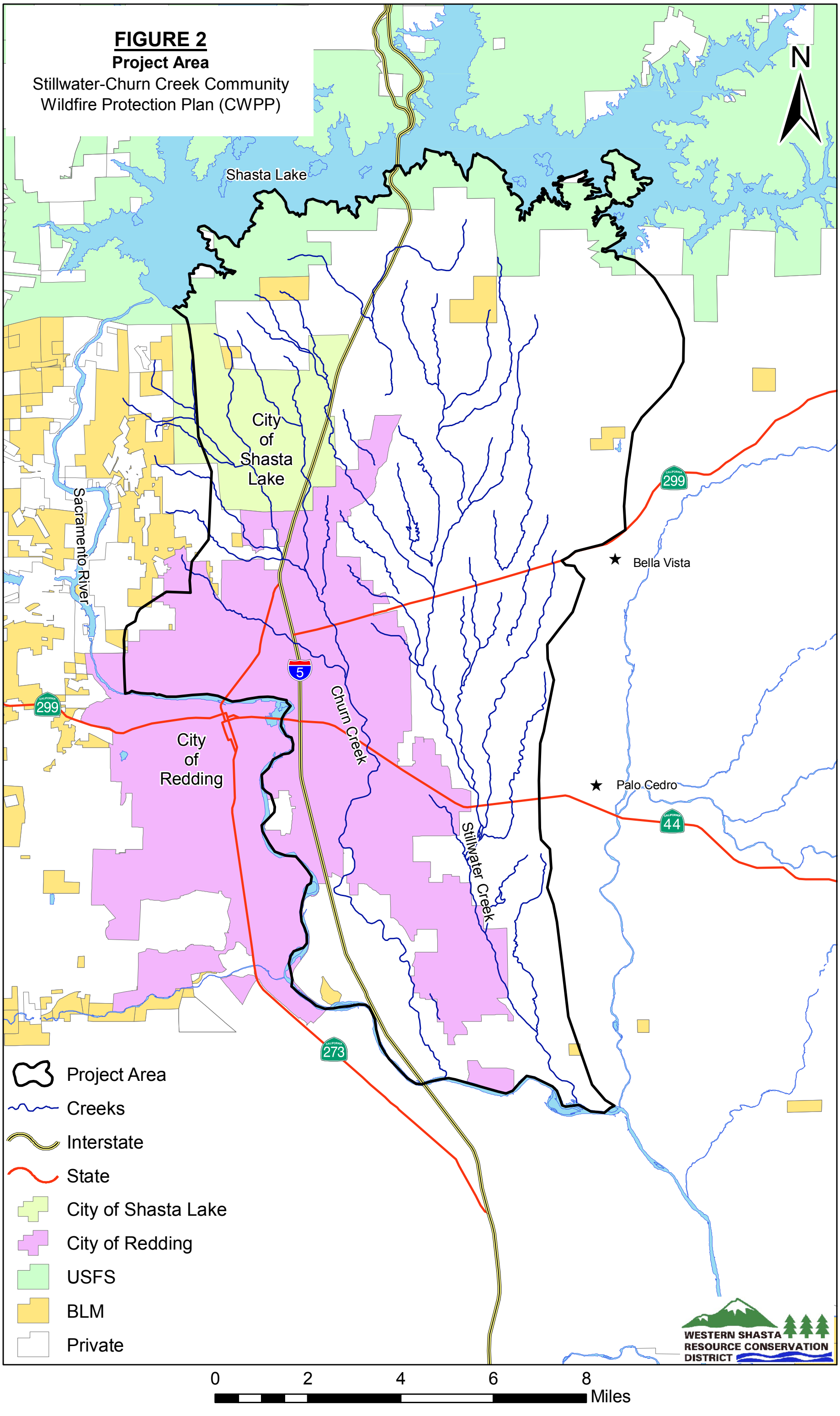


FIGURE 3

Topography

Stillwater-Churn Creek Community
Wildfire Protection Plan (CWPP)

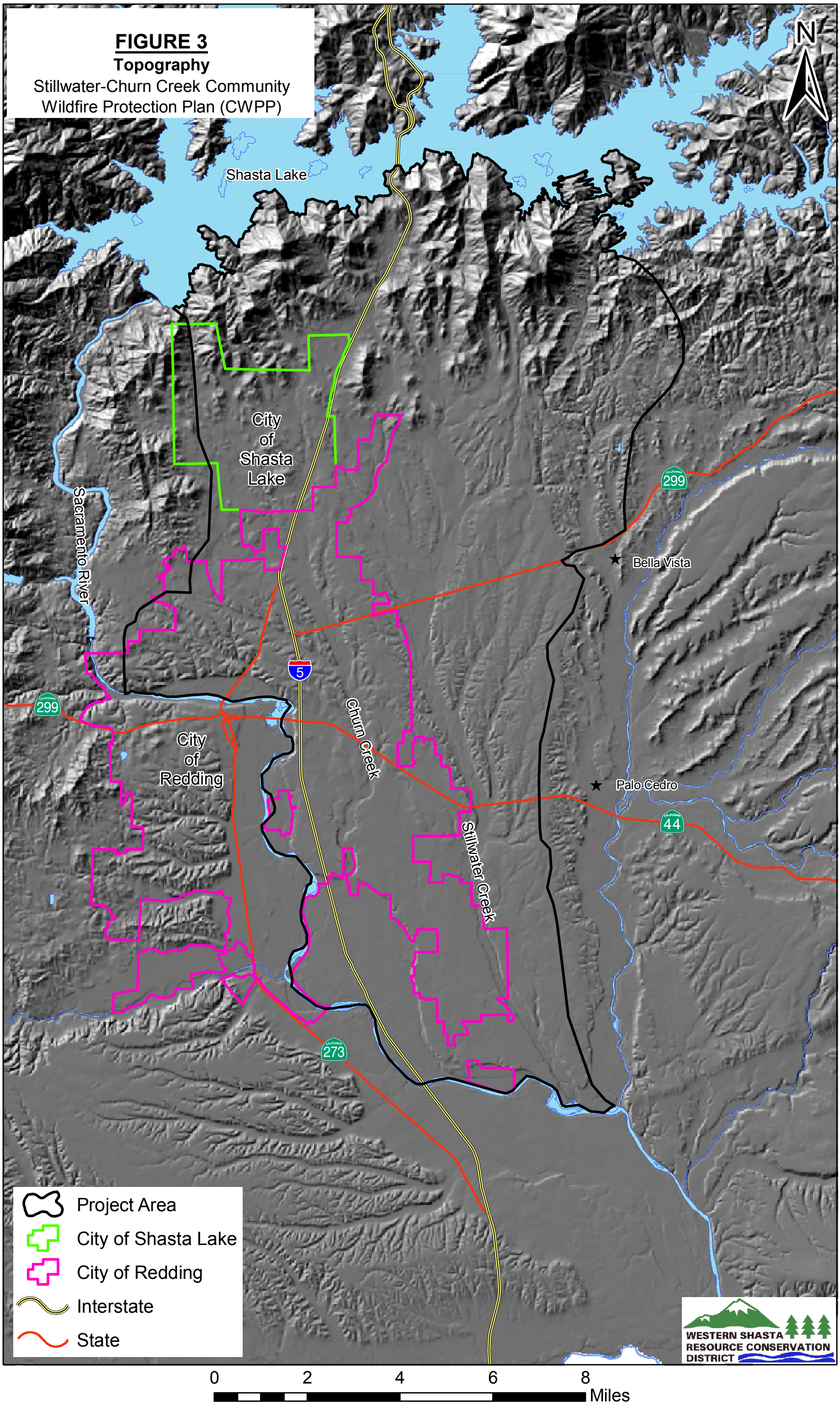


FIGURE 4

Vegetation Characteristics

Stillwater-Churn Creek Community
Wildfire Protection Plan (CWPP)

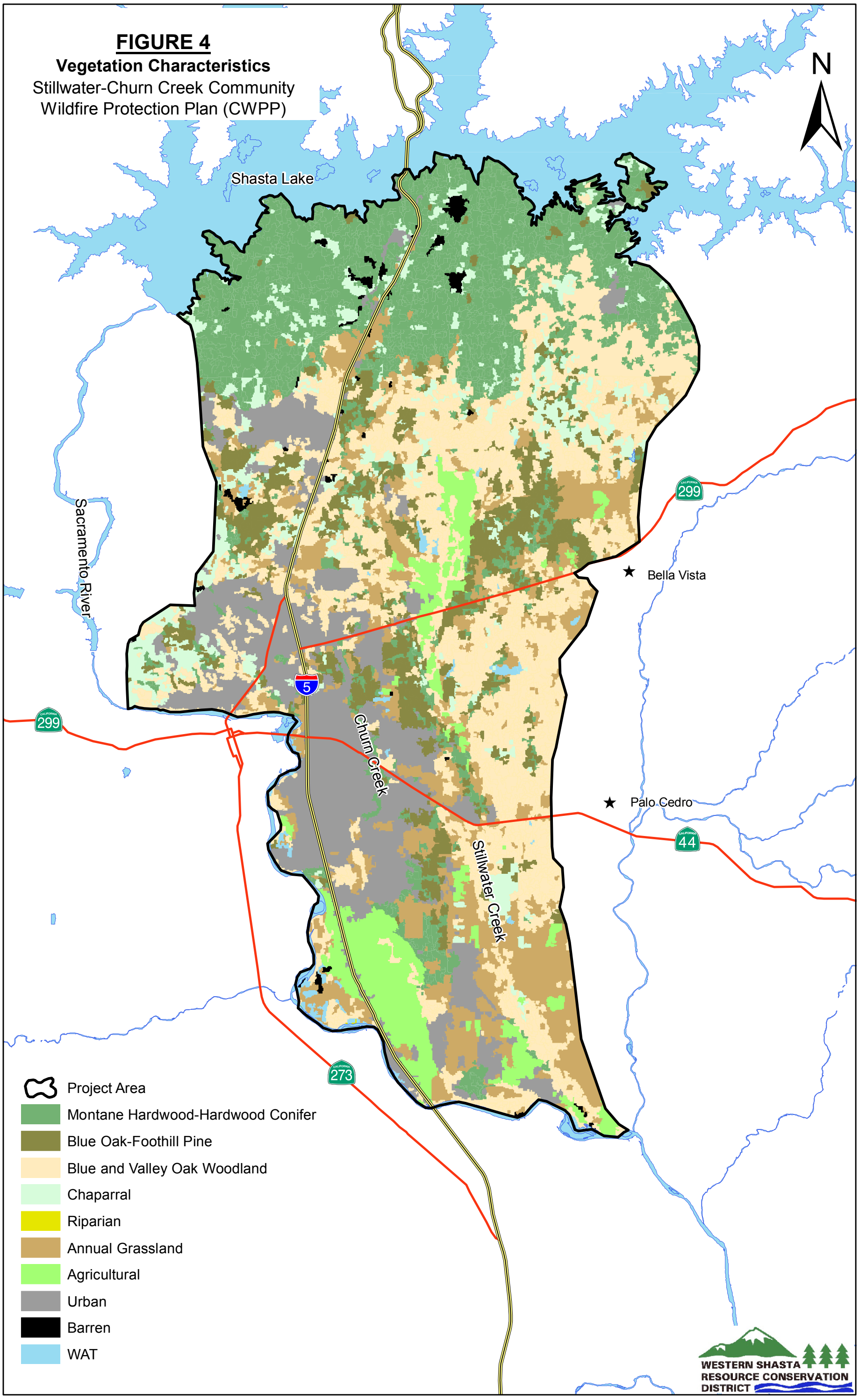


FIGURE 5

Fuel Model

Stillwater-Churn Creek Community
Wildfire Protection Plan (CWPP)

N

Shasta Lake

Sacramento River

Churn Creek

Stillwater Creek

Bella Vista

Palo Cedro

299

44

5

273

Fuel Model Rating

- Project Area
- #10 Timber and Understory
- #4 Chaparral (Shrub)
- #1 Short Grass

WESTERN SHASTA RESOURCE CONSERVATION DISTRICT

0 2 4 6 8 Miles

FIGURE 6

Fire History

Stillwater-Churn Creek Community
Wildfire Protection Plan (CWPP)

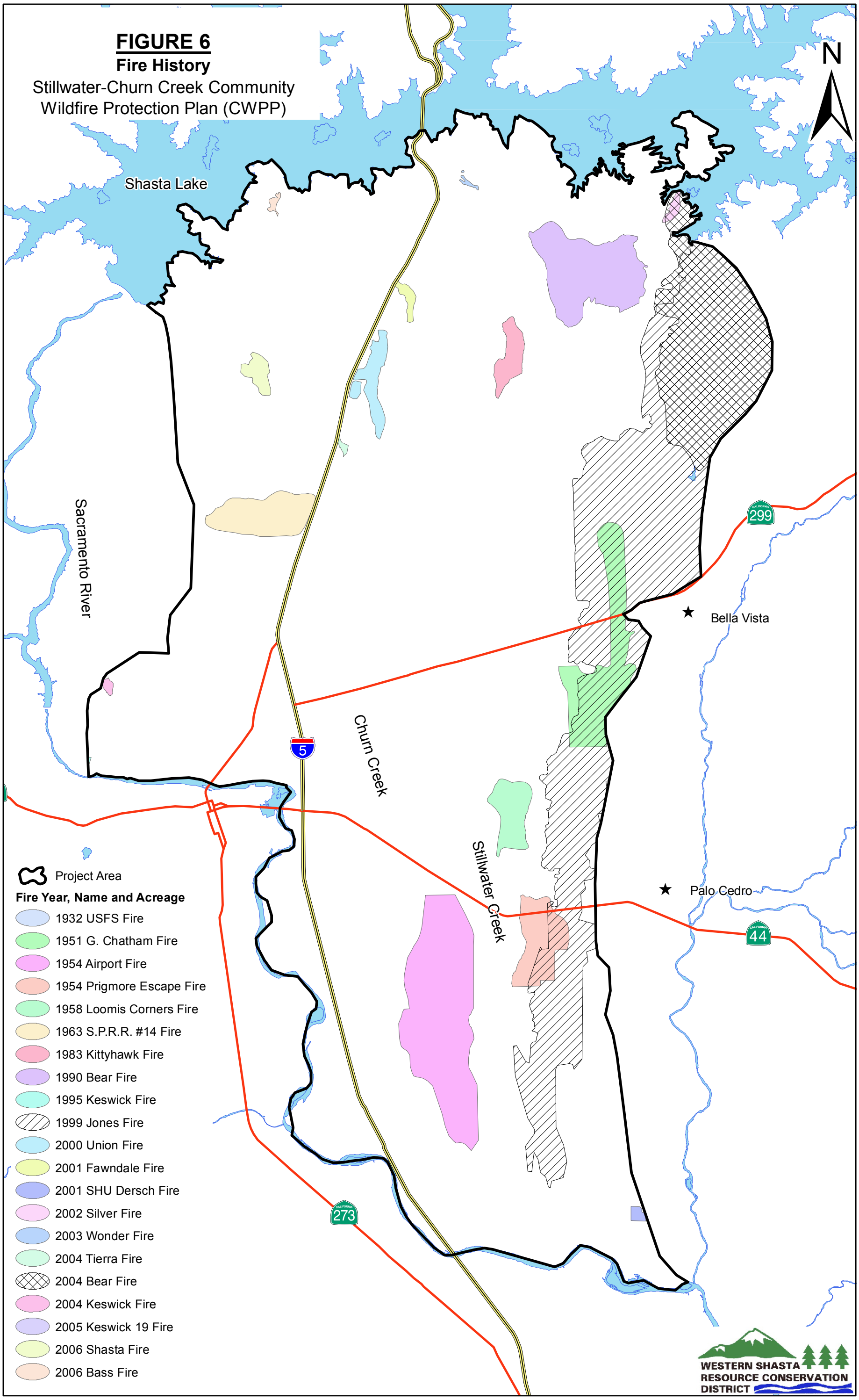


FIGURE 7

Special Status Species and Unique Habitats

Stillwater-Churn Creek Community Wildfire Protection Plan (CWPP)

N

Shasta Lake

Sacramento River

Churn Creek

Stillwater Creek

Bella Vista

Palo Cedro

5

299

44

273

- Project Area
- American peregrine falcon
- Pacific fisher
- Red Bluff dwarf rush
- Sacramento River winter-run chinook salmon
- Shasta salamander
- Shasta snow-wreath
- bald eagle
- bank swallow
- brown fox sedge
- legenere
- northern clarkia
- osprey
- slender Orcutt grass
- valley elderberry longhorn beetle
- vernal pool fairy shrimp
- vernal pool tadpole shrimp
- western pond turtle
- Vernal Pool Habitat

WESTERN SHASTA RESOURCE CONSERVATION DISTRICT

0 2 4 6 8 Miles

FIGURE 8

Wildland Urban Interface

Stillwater-Churn Creek Community
Wildfire Protection Plan (CWPP)

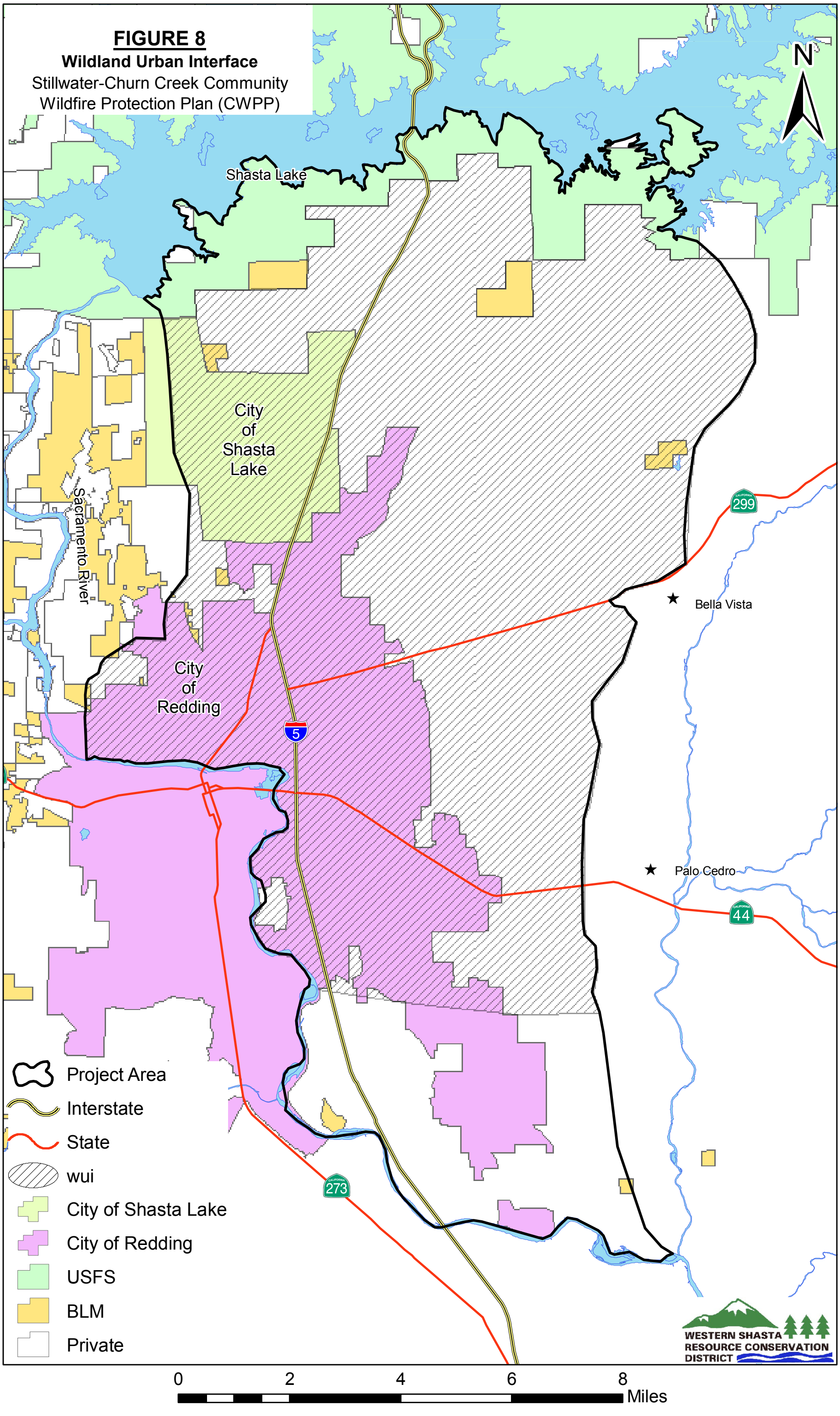
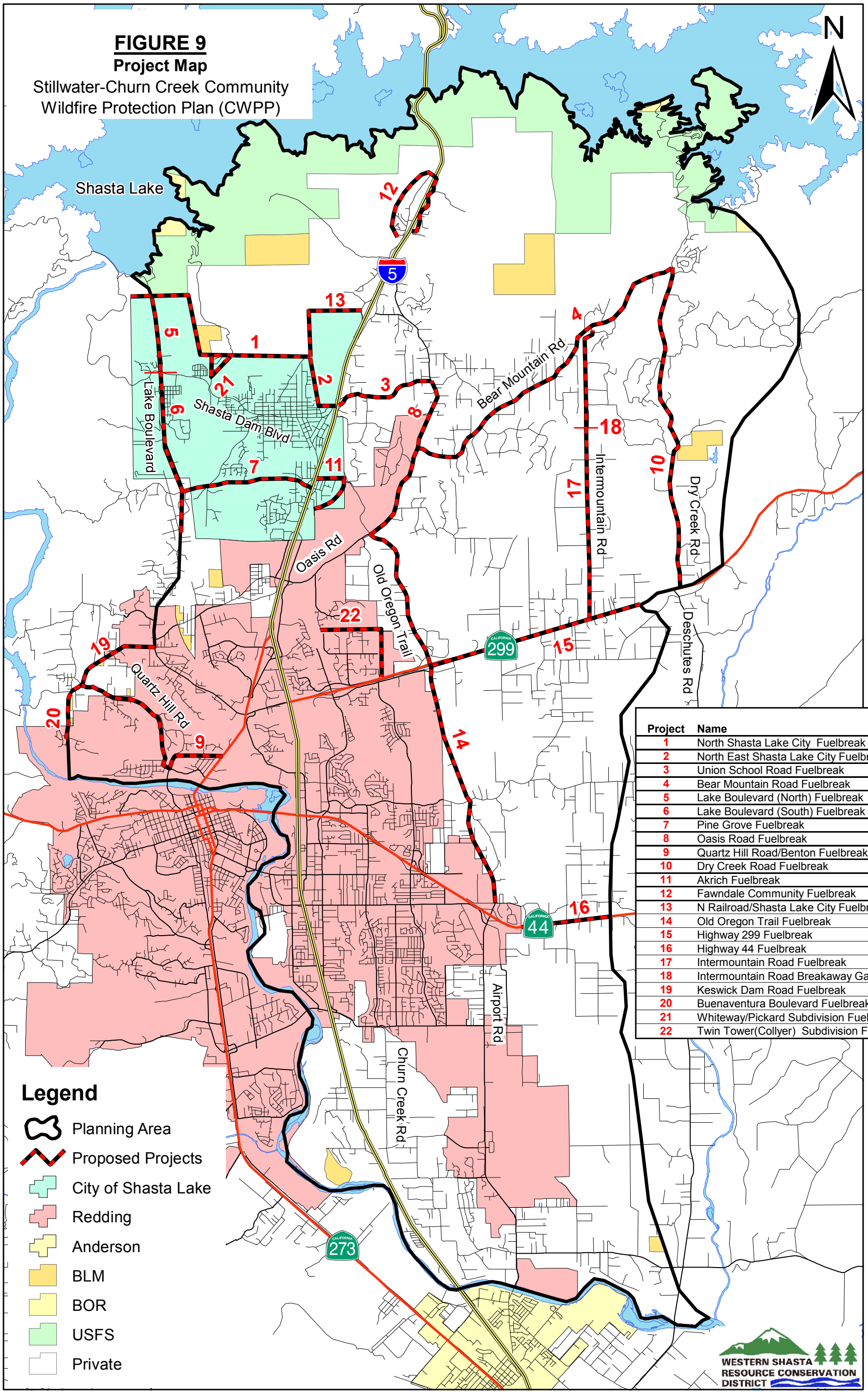


FIGURE 9
Project Map
Stillwater-Churn Creek Community
Wildfire Protection Plan (CWPP)



Project	Name
1	North Shasta Lake City Fuelbreak
2	North East Shasta Lake City Fuelbreak
3	Union School Road Fuelbreak
4	Bear Mountain Road Fuelbreak
5	Lake Boulevard (North) Fuelbreak
6	Lake Boulevard (South) Fuelbreak
7	Pine Grove Fuelbreak
8	Oasis Road Fuelbreak
9	Quartz Hill Road/Benton Fuelbreak
10	Dry Creek Road Fuelbreak
11	Akrich Fuelbreak
12	Fawndale Community Fuelbreak
13	N Railroad/Shasta Lake City Fuelbreak
14	Old Oregon Trail Fuelbreak
15	Highway 299 Fuelbreak
16	Highway 44 Fuelbreak
17	Intermountain Road Fuelbreak
18	Intermountain Road Breakaway Gate
19	Keswick Dam Road Fuelbreak
20	Buenaventura Boulevard Fuelbreak
21	Whiteway/Pickard Subdivision Fuelbreak
22	Twin Tower(Collyer) Subdivision Fuelbreak

Legend

- Planning Area
- Proposed Projects
- City of Shasta Lake
- Redding
- Anderson
- BLM
- BOR
- USFS
- Private

WESTERN SHASTA RESOURCE CONSERVATION DISTRICT

0 0.5 1 2 3 4 Miles