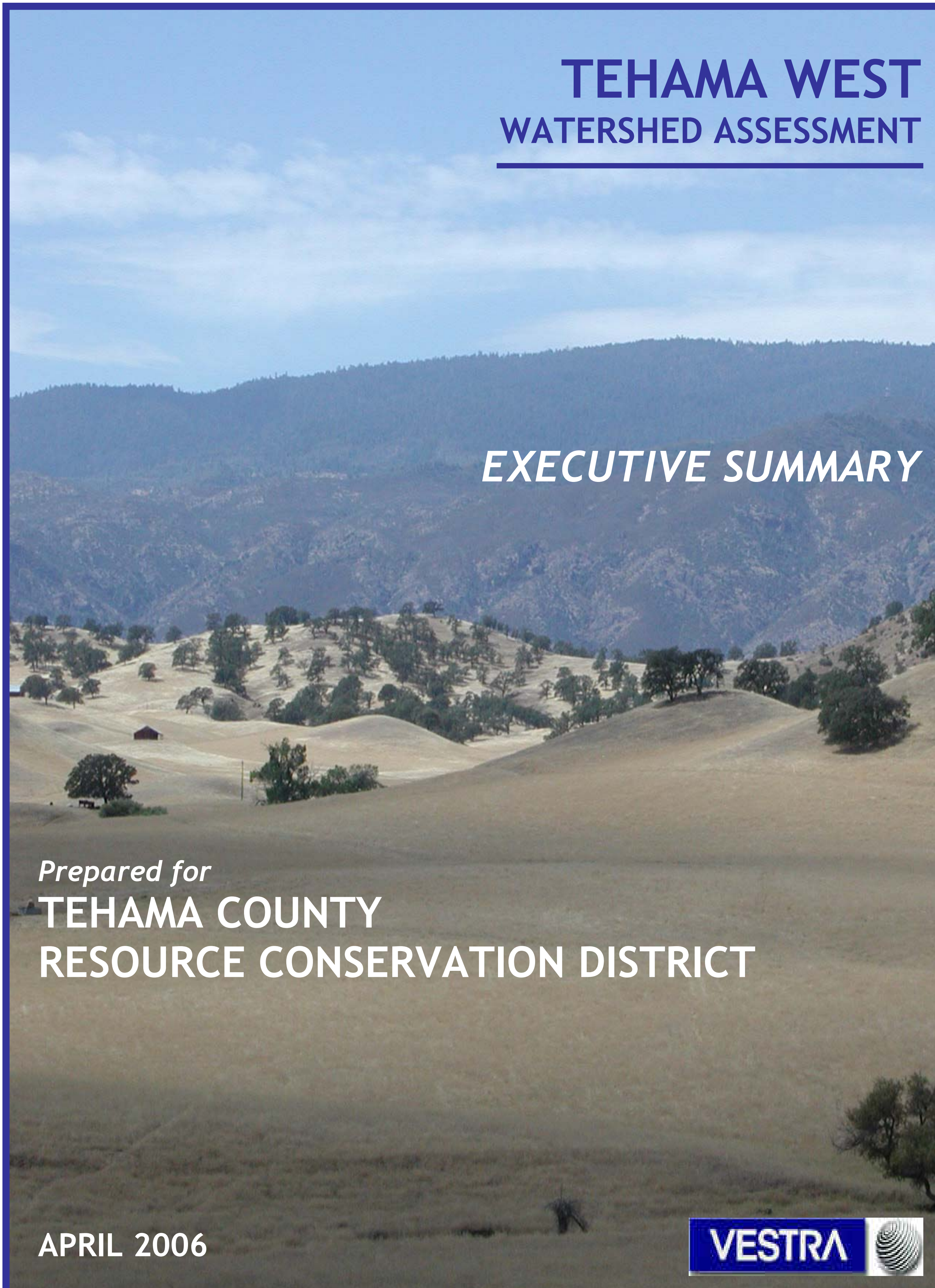

TEHAMA WEST
WATERSHED ASSESSMENT

EXECUTIVE SUMMARY

Prepared for

TEHAMA COUNTY
RESOURCE CONSERVATION DISTRICT

APRIL 2006

VESTRA

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Tehama County Resource Conservation District

Prepared by

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APRIL 2006

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EXECUTIVE SUMMARY OF THE TEHAMA WEST WATERSHED ASSESSMENT

LOCATION

The Tehama West Watershed is located in northern California along the western edge of the Sacramento Valley. It is bordered by the Cottonwood Creek Watershed to the north, Mendocino County to the west, Glenn County to the south, and the Sacramento River to the east. The Tehama West Watershed encompasses 668,168 acres and includes 11 sub-units. The watershed contains 11 major tributaries to the Sacramento River.

Rural lifestyles and a population density of approximately five persons per square mile generally characterize the watershed. The largest community in the watershed is Red Bluff, an incorporated city in Tehama County, with a current population of 13,147. Other incorporated towns in the watershed include Corning and Tehama. Unincorporated towns include Flournoy, Gerber, Paskenta, and Proberta. Ranching, farming, and timber are the primary resource activities throughout the watershed. Cattle, pasture and range, orchards, and grain hay dominate the agricultural activities.

TOPOGRAPHY

The topography of the Tehama West Watershed varies significantly from the flat valley areas of the Sacramento Valley to the mountainous upper reaches to the west. The slope gradient and aspect of the watershed vary significantly, (as discussed in detail later in this report) but the valley floor is comparatively flat with a 0 to 5% slope. The average elevation of the watershed is approximately 1,000 feet above mean sea level (msl), with the lowest elevation of 150 feet msl at the Sacramento River, climbing steeply above 8,000 feet msl in the western mountains. South Yolla Bolly Mountain reaches the highest elevation in the watershed at 8,094 feet msl. The town with the highest elevation, Paskenta, sits at 743 feet msl.

CLIMATE

The Mediterranean climate of the watershed is characterized by warm to hot dry summers and cool to wet winters. Temperatures ranges differ from the lower elevations to the high elevations in the mountains. Average monthly precipitation in Red Bluff varies between 0.6 inches in July to 4.44 inches in January. Annual precipitation along the western perimeter of the watershed approaches 50 inches.

GENERAL HISTORY

The land within the watershed boundary has been home to humans for thousands of years. During the 1830s when the first Europeans were traveling through the area, the primary inhabitants were the Nomlaki peoples. There were two distinct Nomlaki divisions, the River Nomlaki and the Hill Nomlaki. The River Nomlaki occupied the area adjacent to the Sacramento River and the Hill Nomlaki occupied the areas to the west in the foothills. The Nomlaki were hunter-gatherers that lived off the abundant resources. Trade within the Nomlaki was widespread and integral to their survival. The River Nomlaki traded fish to the Hill Nomlaki in exchange for seeds and animals. At first contact with early settlers, the Nomlaki most likely had a population of approximately 2,000 individuals. As more Europeans moved through the area, disease and displacement resulted in the decline of native populations. In September 1854, the Nome Lackee Indian Military Post was established near Paskenta. The reservation encompassed 23,000 acres. The Nome Lackee Military Post existed for seven years.

1820s

The first European to enter the area was probably Hudson Bay trapper Louis Pickett in 1820. In 1821 a Spanish expedition entered Tehama County. The explorers used the Sacramento River as a guide and followed the path of the meandering river past Red Bluff. The first known American to enter Tehama County was explorer Jedediah Smith in 1828.

1830s

Disease outbreaks brought on by contact with white trappers rapidly reduce the native population by estimates upwards of 75 percent.

1840s

The 1840s saw a marked increase in traffic of settlers through the area. In 1844 General John Bidwell, William Chard, A.G. Toomes, R.H. Thomes, J.F. Dye, and Pierson B. Reading traveled to the area. The first Mexican land grants were also established as the first attempts at permanent settlement in Tehama County. Rancho de Los Saucos, Rancho de las Flores, and Rancho Barranca Colorada were established in 1844. The late 1840s saw the start of the California Gold Rush which brought many new settlers into the area. In 1849 the first-known steamboat, the "Washington," owned by Peter Lassen, brought supplies up the Sacramento River.

1850s
The town of Red Bluff was established as the primary location for steamboat navigation on the Sacramento River. In 1852 Red Bluff was receiving many smaller steamers, better equipped to traverse the Sacramento River and by 1953 had become a bustling community. Supplies were unloaded in Red Bluff and transported by ground to the various mining camps in the area.

1860s
Congressional authority in the 1860s allowed legal land acquisition by Euro-American settlers. Passage of the Homestead Act in 1864 allowed settlers to gain legal title to lands squatted in the 1850s. The general pattern of Euro-American settlement within and around the forest was clearly established by the 1870s.

1870s
In December 1872 the Central Pacific Railroad was completed to Red Bluff and the town soon became a reliable distribution center for agricultural commodities and helped shape the area as an agricultural crossroads. The census in 1870 indicated that Red Bluff's population had swelled to approximately 2,000 residents. In 1876 the Sierra Flume and Lumber Company established one of the most complex lumber operations in the world, building a new factory on the east bank of the Sacramento River across from Red Bluff. Also during the 1870s, a water service, gas lights, and a fire company were all established in Red Bluff. The Centennial Free Bridge was completed in 1876, allowing lumber to be transported by rail across the Sacramento River to the Central Pacific Railroad tracks.

1880s
In 1881, a post office was established in Riceville. In 1881 and 1882 the Central Pacific Railroad was expanding through the area.

1890s


In the early 1890s, 3,107 acres east of Corning were purchased for $77,675.00 ($25/acre) to be developed as the Maywood Colony. This land was subdivided into 10-acre plots. The lots were sold with the intent that a family could make a living off the land and afford the mortgage. In 1893 the Maywood Addition was established 160 acres east of the railroad. This was laid out with the intent to build a cooperative cannery and packing house, and to provide space for a central park, now designated as Woodson Park. In 1895 Maywood Colonies Nursery was established and many trees were planted around the town of Corning, including many of the palm trees that line the streets today. In 1899 the Maywood Colonies Fruit Association was established to assist in the processing of fruit.

1900s

In 1907, Theodore Roosevelt created the Stony Creek Forest Reserve, renamed the California National Forest (now the Mendocino National Forest).

1910s

By 1910 over 1,000 farms were in existence in Tehama County. Between 1910 and 1920, forest officers surveyed and defined specific grazing allotments within the national forest.

1920s

In 1924, a survey found that over 100,000 acres across the watershed's forest lands may have been impacted enough by grazing to injure forage and affect forage reproduction. In the 1920s and 1930s, massive poisoning programs conducted by the U.S. Biological Survey to reduce livestock predators and rodents on federal lands decimated the targeted species, but also had major impacts on other furbearers, birds, and domestic animals. The Pacific Southwest Region of the Forest Service began to log the timber resources of the Mendocino National Forest.

1930s

Sheep production in Tehama County peaked in 1930, with nearly 350,000 head. The Stony Creek Forest Reserve was renamed the Mendocino National Forest in 1932. In the 1930s, massive poisoning programs conducted by the U.S. Biological Survey to reduce livestock predators and rodents on federal lands decimated the targeted species, but also had major impacts on other furbearers, birds, and domestic animals. The Civilian Conservation Corp built many roads and trails between 1933 and 1941. In 1935 the authorization of the Central Valley Project helped paved the way for the construction of Shasta Dam.

1940s

Shasta Dam was constructed in 1945.

1950s–Present

Major congressional appropriations for road construction to support timber harvest occurred in the late 1950s and 1960s. The Sacramento Canals Unit was authorized on September 29, 1950 and included the construction of the Red Bluff Diversion Dam, Corning Pumping Plant, Tehama-Colusa Canal, and the Corning Canal. By the late 1960s total orchard production in Tehama County jumped to over 20,000 acres. Starting in the 1960s, as timber harvest became increasingly important on national forest lands, a series of public land management compliance measures came into effect, all of which have affected management of the Mendocino National Forest. The Multiple-Use/Sustained Yield Act of 1960 and the National Forest Management Act (NFMA) of 1976 established a process for managing National Forests including the development of forest plans. In 1969 the National Environmental Policy Act (NEPA) was passed, and in 1994 the Record of Decision for the

Final Supplemental Environmental Impact Statement on Management of Habitat for Late-Successional and Old Growth Forest Related Species within the Range of the Northern Spotted Owl was signed. In 1978 Bell-Carter Foods Inc. purchased the Maywood Olive Company, the only major olive processing facility in the county.

CURRENT LAND OWNERSHIP AND USES

Land use in the Tehama West Watershed is heavily influenced by ownership. While most of the low- and mid-elevation lands are held by private individuals who use these areas primarily for agriculture (ranching and farming) and residential uses, the upper elevations are held by commercial timber companies and the U.S. Forest Service (USFS) or the Bureau of Land Management (BLM).

LAND OWNERSHIP IN THE TEHAMA WEST WATERSHED

Owner	Total Acres	Percent of Watershed
Bureau of Land Management	14,745	2.21
California Department of Fish and Game	760	0.11
California Department of Parks and Recreation	260	0.04
Department of Defense	27	< 0.01
State Lands Commission	410	0.01
The Nature Conservancy	250	0.04
US Fish and Wildlife Service	2,767	0.41
US Forest Service	83,826	12.55
Subtotal Government Acres	103,045	15.37
Crane Mills	55,530	8.32
Sierra Pacific Industries	1,001	0.15
Unclassified Private Ownership	508,592	76.17
Subtotal Other Acres	565,122	84.63
Total	668,168	100.00
Source: California Resources Agency		

The Tehama West Watershed is largely rural in nature, with isolated pockets of population primarily concentrated along the watershed's major transportation corridor along Interstate 5. As the watershed extends westward from these populated areas and into the watershed's margins, large ranches, forest products industry, and government land holdings dominate the terrain.

The existing land use pattern within the watershed primarily consists of a combination of upland agricultural, exclusive agricultural, and public lands. A majority of the major incorporated (city) and unincorporated developed (town) areas within the watershed are located adjacent to Interstate 5.

Commercial land uses also primarily occur along the Interstate 5 transportation corridor, mainly in Red Bluff and Corning. Residential land uses within the developed portions of the county often tend to be located behind or beyond the commercial and service uses directly adjacent to the major street network.

POPULATION

Between 1960 and 1990, Tehama County's population increased from 25,305 to 49,625 people, an average annual growth rate of 1.68 percent. Between 1990 and 2000 the county's population increased from 49,625 to 55,700 people, or an average 1.18 percent annual growth rate for the decade. The growth rate was around 3 percent early in the decade (1990 to 1992) and declined to less than 1 percent in the latter part of the decade. Tehama County's population ranks 41st among the 58 counties in California. The majority of the population is located along the central valley area of the county, primarily adjacent to the north-south running Interstate 5 and Highway 99, a roughly parallel facility. The State Department of Finance Demographic Research Unit estimated Tehama County's population at 58,700 people in 2005, representing a 1.1 percent annual growth rate over the last 10 years. It further projected the county population to reach 61,200 people in 2010, representing a 0.8 percent annual growth rate through the year 2010.

GEOLOGY AND SOILS

Although geology and soils have not changed appreciably in recent times, land use practices have exerted tremendous influence over hillslope and fluvial processes in watersheds since the arrival of Europeans nearly 150 years ago. Impacts from various mining, logging, farming and ranching, and industrial activities created significant sediment loading to the Sacramento River and its tributary streams.

The Tehama West Watershed encompasses an area of diverse landscape of geologic features critical to Tehama County's agricultural and mining industries. Mountain ranges along the western border of assessment area reach elevations of approximately 7,500 feet (Solomon Peak) and are comprised of steep slopes and rock types susceptible to erosion. Two primary drainages, Elder Creek and Thomes Creek, continuously transport and deposit the eroded sediments along flood plains of the Sacramento River.

It is has been noted that, in general, streams originating from the Coast Ranges produce the highest sediment yields of all the Sacramento River tributaries. An analysis by the USGS showed that the annual suspended sediment yield of Thomes Creek is nearly three times higher than other streams of comparable size. Many other drainages also exist throughout the watershed and play a vital role in the development of the Sacramento Valley.

Many landforms are visible throughout the assessment area, the majority of which include mountains, foothills, and flood plains. Depositional features such as alluvial fans and terrace deposits are also common. Fluvial erosion, hillslope erosion, and mass wasting are attributed to the development of each of these landforms.

The Tehama West Watershed includes portions of the eastern Coast Range and western Great Valley Geologic Provinces. The Coast Range Province is characterized by north northwest-trending mountain ranges composed of thick Mesozoic and Cenozoic (240 million years old) strata generally rising 2,000 to 4,000 feet and is commonly characterized by zones of extensive shearing and the presence of ophiolite/serpentinite mélanges. The Great Valley Province is a sedimentary basin approximately 400 miles long by 50 miles wide, located throughout the central portion of California. In the watershed, the province is characterized by a thick deposit of moderately deformed Jurassic and Cretaceous marine sedimentary layers that consist of detrital materials derived from uplifted basement rocks of the Klamath Mountain and Coast Range Provinces. Great Valley rocks consist primarily of mudstone, shale, and sandstone and occur mostly along the west side of the central valley. These units yield an abundance of suspended sediment but relatively little gravel to drainages.

Three primary soil associations (Columbia-Vina, Maywood-Tehama, and Corning-Redding) are found on floodplains and terraces along the Sacramento River and its tributaries. Soils of the foothills are derived mostly from unconsolidated sediments, sandstone, and shale parent material and include the Newville-Dibble, Millsholm-Lodo, and Toomes-Guenoc associations. Along the western margin of the watershed, above 3,000 feet, soil associations include the Maymen-Los Gatos and Henneke-Stonyford soil associations.

HYDROLOGY

The eastern portion of the watershed is underlain by rocks of the Great Valley Geomorphic Province. In general, this portion of the watershed is characterized by low elevations, low precipitation, relatively gentle topography, low erosion potential, and a significant groundwater reservoir. The western portion of the watershed is underlain by rocks of the Coast Range Geomorphic Province. This portion of the watershed is characterized by high elevations, high rainfall, steep slopes, high erosion potential, and a relatively poor fractured groundwater reservoir. As a result, streams originating in the eastern or Great Valley portion of the watershed have very different characteristics from streams originating in the western or Coast Range portion of the watershed. The transition between the two geomorphic provinces generally trends north-south, passing through Paskenta. This transition serves as the western boundary of the Sacramento Groundwater Basin. Significant groundwater recharge occurs in the alluvial deposits associated with this transition zone.

Headwaters of the streams in the watershed have relatively little, if any, drainage area with significant snowpack. Therefore, in contrast to streams flowing from the high Sierra Nevada with relatively predictable and significant snow packs, snow melt and run-off play a minor role in the flow characteristics of the streams in the watershed. Watershed streams show rapid responses to storms, and flow levels fluctuate greatly between storm-periods and intervening dry spells.

Prior to the completion of Shasta Dam in 1945, the Sacramento Valley's low gradient, wide expanse, maze of sloughs, ox-bows, and low-lying swales allowed the river to quickly extend beyond its banks and cover immense areas. Early day flooding had serious impacts on transportation and the development of infrastructure within the Sacramento River Valley. Since flows over the dam have been regulated, the Sacramento River does not flood in the same pattern or with the same magnitude that it had previously. Currently, floods tend to be relatively infrequent and highly localized with damage occurring in well-known and expected locations. As the number and extent of the flooding has been reduced, development has extended into the areas where it was previously infeasible or impossible. One result from these changing land use patterns is that flood flow features, such as the natural levees and ox-bow lakes, are now often difficult to identify or have been modified.

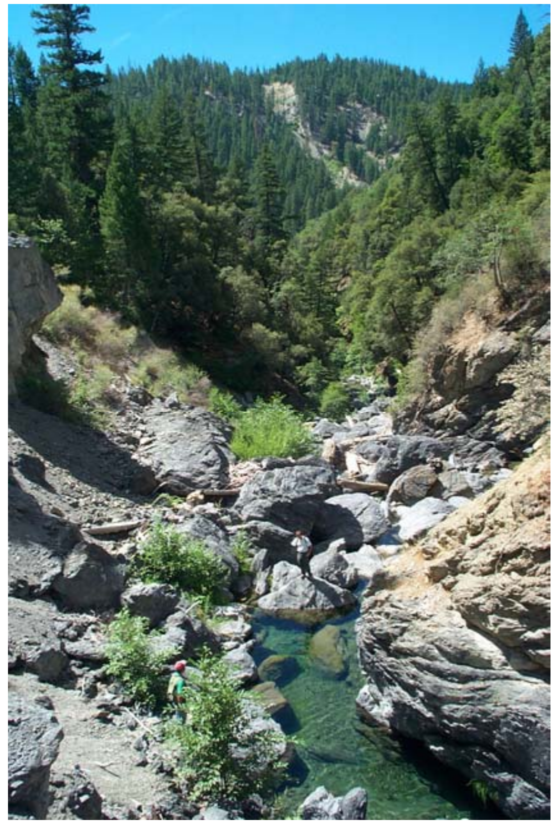
Water use history in the watershed has a direct correspondence to population and economic growth, development of regional water storage and supply projects, and water supply pricing and reliability. Agriculture is an economic driving force in the watershed and much of the water use history is directly tied to the development and use of water sources to satisfy agricultural needs.

Currently, groundwater is the primary water supply in the Tehama West Watershed, and because surface water supplies are unpredictable and limited, future growth in the region and water demand during drought conditions will depend on the continued availability of groundwater. Recognizing the importance of groundwater in the county, the Tehama County Flood Control and Water Conservation District has been authorized as a groundwater management agency to develop a comprehensive groundwater management plan. The overall purpose of the plan is to: 1) prevent long-term overdraft of groundwater, 2) provide a reliable long-term water supply, and 3) protect groundwater quality. Unfortunately, the majority of the groundwater used in the county is extracted by independent users, not organized districts, for agricultural purposes.

GEOMORPHOLOGY

The western portion of the watershed is characterized by high elevations, high rainfall, steep slopes, and high erosion potential with Thomes Creek being one of the fastest eroding watersheds draining into the Sacramento Valley. Two primary sources of sediment include mass wasting, especially the steeply sloped area between the Gorge and Slab, and remobilization of sediment previously stored in the stream channel. Slope failures as debris slides, block slides, rotational/translational slides, debris avalanches and rock slides are common and widespread. It has been estimated that the annual sediment yield of the Thomes Creek watershed is greater than 450,000 cubic yards. As a result, there are 11 sand and gravel operations in the Thomes Creek channel between Paskenta and the Sacramento River confluence.

Landslides are common in the watershed. Common types of landslides are debris slides, debris flows, rock slides, translational-rotational slides, and mantle creep zones. Other mass movement features mapped in the Thomes Creek watershed include block slides, "gutted" streams, and undifferentiated slides. Debris slides and flows probably were the greatest sources of sediment during the December 1964 flood. Landsliding and erosion are natural watershed processes related to such long-term events such as climatic changes and regional geologic uplift. In the last few decades, however, a dramatic increase in active landslides appears to be related to land-use activities.



Roads can also create significant watershed perturbations by channel impingement and increased sediment supply, leading to bank instability and sedimentation (i.e., sediment deposition and reduction of dominant substrate sizes within the channel). Failure of road crossings, particularly culverts, can cause disturbances including, bed and bank erosion and change in channel course. Ungated roads may also promote erosion by allowing vehicles into areas that should be closed seasonally because of sensitive conditions.

Natural wildfires are among the agents that can cause disturbance within a watershed. Fire may also, however, be an intentional, human-caused disturbance or perturbation. In addition, fire has a greater potential to cause disturbance or perturbation since the advent of fire suppression as a forest management practice early in the twentieth century. Fire suppression has resulted in widespread over-accumulation of fuels throughout the forests in the west. From a channel morphology perspective, high-intensity burns are much more likely to result in disturbance or perturbation than presuppression wildfires that burned in more open forest stands with much lighter fuel loads.

WATER QUALITY

Demographics and land use can have a pronounced effect on water quality; not only through the addition of contaminants to surface and groundwater, but through the use and management of soil and potential increases in sediment and nutrient loading over background levels. The eastern portions of these watersheds are underlain by rocks of the Great Valley Geomorphic Province. In general, this portion of the watershed is characterized by low elevations, low precipitation, relatively gentle topography, low erosion potential, and a significant groundwater reservoir. The western portion of the watershed is characterized by high elevations, high rainfall, and steep slopes with high erosion potential. Over time the transport of material from these rugged upland areas to the valley floor has resulted in the deposition of large alluvial fans and gravel reserves.

Surface Water Quality

DWR and USGS monitoring have recorded analytes that have exceeded their limits on Elder, Red Bank, Reeds, and Thomes Creeks for dissolved aluminum, dissolved iron, pH, total dissolved solids, water temperature, turbidity, specific conductance, and chloride. However, overall water quality in the watershed is good.

Sediment loading in Thomes Creek continues to be a problem. Studies conducted by CSUC and DWR attribute sediment loading to landslides and remobilization of sediment. Concerns caused by sediment include changes in channel cross-section, changes in stream stability, impaired salmonid migration and spawning sites, and increased volume of suspended solids.

Groundwater Quality

DWR and USGS monitoring stations have recorded constituents that have exceeded their limits at several monitoring sites in the watershed. Overall, groundwater quality in the watershed is good. However, it is recommended that further studies be conducted to monitor groundwater quality.

Other Water Quality Issues

Although best management practices and general land use practices have improved significantly, sediment continues to be generated for the upland areas and from bank instability in the transition zones. Also, the purported source of contaminated stormwater runoff under the Ag Waiver program is dormant spray from orchard croplands.

Municipal runoff from roads, parking facilities, sidewalks, buildings, rooftops, and other impervious surfaces can transport trash, debris, metals, hydrocarbons, and fecal matter that pollute receiving streams. Lawns and other landscaped areas may also contaminate runoff with nutrients, fertilizers, and suspended solids. Agricultural runoff may carry nutrients, animal wastes, sediment, salts, pesticides, fertilizers, and other ingredients that may be harmful in high concentrations. Receiving surface and groundwaters are susceptible to contamination from all these sources. Contamination of groundwater tends to occur gradually because contaminants percolate downward through the soil at slow rates. Highway runoff that soaks into soil with or without the presence of any type of vegetation, channel, or basin is usually harmless to the environment. Surface waters (streams, rivers, ponds, and lakes) are particularly vulnerable because they are directly exposed to contaminants released into the air and to direct discharges from point or non-point sources. Excessive concentrations of these microorganisms can prevent receiving waters from being used for certain water supply and/or recreational activities.

FIRE AND FUELS

Fire has long played an important role in the watershed. There is evidence of native populations using fire as a tool to shape their surroundings to their needs. Fires set in the spring by natives reduced understory vegetation allowing for easier hunting and encouraged the growth of edible shoots and basket making materials. Some species of native trees, shrubs, and grasses depend upon fire for re-seeding purposes. With the influx of European settlers during the mid to late nineteenth century, wildfires were no longer viewed as a natural and needed part of the ecosystem, but as a dangerous and destructive force. With the implementation of the USFS policy of fire exclusion, there has been an accumulation of fuels for nearly 100 years.

Historically, decomposition rates are low in the Mediterranean climate of California. This is due to low temperatures in the winter and little to no moisture during the summer months. During the last century, however, the climate in California is slowly getting wetter. This, coupled with denser forest stands producing more biomass on the forest floor due to suppression of wildfires, is creating an environment that is favorable to decomposition. However, the possible increase in decomposition rates cannot handle the amount of material that has accumulated. Combine this fuel load with dry summer months, increased urbanization, and summer thunderstorms and the conditions lend themselves to increased fire risk.

Uncontrolled stand replacing wildfire is detrimental to both watershed function and quality, and can negatively impact all aspects of the watershed. In a catastrophic wildfire, typically all vegetation is removed or damaged, including seeds, soil microorganisms, minerals, and nutrients. Prescribed or planned fires generally remove some vegetation but soil micrograms and many elements of the ecosystem remain unaffected. All fires produce a range of conditions across the landscape, from benign to stand-replacing. A "catastrophic" fire is large in acreage and a higher proportion of it is stand-replacing. The high intensity and high acreage causes a multiplier effect on water quality sedimentation, wildlife, and damage to human infrastructure.

ACREAGE BURNED SUMMARY

Date	Fire Events	Total Acres Burned	% Watershed Burned
1920-1929	4	17,446	3%
1930-1939	6	17,178	2%
1940-1949	14	5,878	Less than 1%
1950-1959	8	3,356	Less than 1%
1960-1969	13	4,453	Less than 1%
1970-1979	7	25,437	3%
1980-1989	5	5,175	Less than 1%
1990-1999	11	8,130	1%
2000-2003	12	10,093	1%

Source: CDF
Note: These figures have been modified from the source file and acreages have been recalculated to show only acres burned in the watershed.

FIRES AND CAUSES, 1993-2003				
Cause	**Zone 1**	**Zone 6**	**Zone 9**	**Total**
Undetermined	13	9	90	102
Lightening	15	2	20	37
Campfire Escapes	2	2	6	10
Smoking	3	7	29	39
Burn Barrel/Pile Escapes	5	15	43	63
Arson	3	19	28	40
Equipment Use	21	46	185	252
Playing With Fire	4	3	9	16
Other	8	19	48	75
Vehicle	20	12	93	125
Power lines	0	2	8	10
Source: CDF				

The issue of fire protection in western Tehama County is an ongoing juggling act. Most of the watershed is located within the CDF's area of responsibility. Due to budget constraints, state fire protection resources have been strained. In an effort to counteract this, the Tehama-Glenn unit analyzed the area based on asset value and fire risk. This analysis allowed the unit to identify those areas that would potentially have a higher need for emergency fire response and the effort has been made to shift emphasis to these high-risk areas. In addition to the steps taken by CDF, there are some Tehama West communities that are listed on the National Registry of 'Communities at Risk.' They are Corning, Hamilton City, Paskenta, R-Ranch, and Red Bluff. All of these communities have high fire threat rankings.

WILDLIFE RESOURCES

The Tehama West Watershed is home to a diverse range of wildlife species. Human impact within the watershed, i.e. agriculture, logging, urban development, and fire suppression, have had negative impacts. Wildlife in the Tehama West Watershed provides opportunities for observation, hunting, and other recreational activities.

Restoration of degraded wildlife habitats is important, as well as protection of existing high quality and/or unique habitats. Considering the information available at this time, a statement regarding which habitats have been degraded and their degree of degradation cannot be made, other than water-related habitat have been severely affected by development. Inventories have shown that habitats known to harbor a large diversity of wildlife species, including wetlands and riparian habitats, are very uncommon within the drainage and those that still exist likely harbor many rare or at-risk species.

Exotic Wildlife Populations

- Bullfrog
- Ring-necked pheasant
- Wild turkey
- Feral pig
- European starling
- House sparrow
- Black rat
- Norway rat
- House mouse
- Virginia opossum
- Muskrat
- Rock dove
- New Zealand mud snail

Special Status Wildlife Populations

- Vernal pool fairy shrimp
- Vernal pool tadpole shrimp
- Valley elderberry longhorn beetle
- California red-legged frog
- Foothill yellow-legged frog
- Western spadefoot toad
- Northwestern pond turtle
- Bald eagle
- Golden eagle
- Northern goshawk
- Northern spotted owl
- Osprey
- Cooper's hawk
- Sharp-shinned hawk
- Northern harrier
- Swainson's hawk
- Western burrowing owl
- White-tailed kite
- Prairie falcon
- Peregrine falcon
- Merlin
- Tri-colored blackbird
- Bank swallow
- Loggerhead shrike
- California horned lark
- Western yellow-billed cuckoo
- Lark sparrow
- Lawrence's goldfinch
- Yellow warbler
- Yellow-breasted chat
- American badger
- Ringtail
- Yuma myotis
- Palid bat
- Pale big-eared bat

FISHERIES RESOURCES

The fishery resources of the Tehama West drainages are defined by the presence of the Sacramento River and its fisheries and the physical characteristics of streams that flow off the eastern slope of the Coast Range. The Sacramento River has a varied fish fauna, some taxa that stay in the stream year-round and others that travel to the ocean for a portion of their life. Over time, the natural diversity has been modified by the accidental and intentional introduction of many fish species. Many native species, particularly the anadromous fishes, have been seriously affected by physical changes to the Sacramento River and its tributaries, as well as changes to ocean conditions. For instance, several runs of Chinook salmon, steelhead, and possibly several lamprey and sturgeon species have all been negatively affected by these human-caused changes.

The physical characteristics of the Tehama West drainages also play an integral role in the fisheries. Their streamflow tend to rise quickly following wet-season storms, drop equally promptly following storms, and carry very large quantities of sediment. This leads to conditions where individual streams may appear like a river during major storms and be dry or nearly dry during mid-summer. Snowpack in the drainages' headwaters is less than for Sierra Nevada streams, resulting in relatively light warm-season run-off. It also results in an interesting situation where the upper Coast Range stream reaches may be perennial with resident fish populations; mid-reach sections of the streams may be dry in mid-summer; and lowest reaches (close to the Sacramento River) may have small amounts of water from irrigation run-off, and support a number of fish species that seasonally enter the tributaries from the Sacramento River.

Human activities, including channelization, water diversions, and gravel mining have altered the streams in many ways and have led to a reduction in riparian habitats, reduced summertime flow, and created warmer summertime temperatures. There is no evidence to suggest that the Tehama West drainages were ever significant anadromous fish streams; however, the changes created by human activity have likely reduced salmonid usage and possibly that of other native fishes, and changed the makeup of the fishery fauna. It is possible that improvement of watershed conditions and stream habitats could increase late spring and early summer flows in the lower reaches of the area's streams—thereby improving anadromous fisheries attributes, such as non-natal salmonid rearing.

Given the characteristics of the Tehama West drainages and their limited historical fishery values, it is likely that any efforts toward salmonid habitat restoration will be considerably lower in priority than for many other streams in the Sacramento River drainage. Regardless, NOAA Fisheries has stated that the lower reaches of the Tehama West drainages are critical habitat for Chinook salmon and steelhead and efforts should be placed in improving the stream's habitat potential.

Native Fish Species in Upper Segments of Thomes, Elder, and Red Bank Creeks

- California roach
- Hardhead
- Pacific lamprey
- Rainbow trout
- Sacramento pikeminnow
- Sacramento sucker
- Speckled dace

Federal or State Listed Species

- Steelhead
- Winter-run Chinook salmon
- Spring-run Chinook salmon
- Fall and Late-Fall Chinook salmon
- River lamprey
- Pacific lamprey
- Sacramento splittail
- Sacramento perch

VEGETATION RESOURCES

The 668,000 acres of the Tehama West Watershed are characterized by highly varied vegetation ranging from orchard, vineyard, or irrigated row and field crops; irrigated land; annual grassland and cropland; oak woodlands; and timberland. At large scales, vegetation patterns are shaped by the ecological forces at work in a region. Climate, topography, soil, the frequency of natural disturbance such as fire, and human management are all driving factors that affect how vegetation is distributed on the landscape at a given point in time.

The vegetation of the Tehama West Watershed has changed significantly since the arrival of the first European settlers. These changes include alterations in plant species composition, diversity, and density. Three primary forces have been the driving factors behind these changes: introduction of non-native plant species, intensive grazing by imported livestock (prior to regulations), and radical alteration of the pre-existing fire regime. To a lesser degree timber management, water management, and agricultural and urban development have also resulted in change.

Endangered, Threatened, and Rare Plant Species

- Hendersons' bent grass
- Scabrid alpine tarplant
- Sonoma manzanita
- Konocti manzanita
- Jepson's milk-vetch
- Big-scale balsamroot
- Indian Valley brodiaea
- Stony Creek spurge
- Dwarf soaproot
- Silky cryptantha
- Dwarf downingia
- Four-angled spikerush
- Oregon fireweed
- Brandagee's eriastrum
- Tracy's eriastrum
- Adobe-lily
- Boggs Lake hedge-hyssop
- Nile's harmonia
- Stebbin's harmonia
- Tehama County western flax
- Red Bluff dwarf rush
- Colusa layia
- Mt. Tedoc leptosiphon
- Anthony Peak lupine
- Leafy-stemmed miterwort
- Baker's navarretia
- Pincushion navarretia
- Ahart's paronychia

Noxious Weeds

- Diffuse knapweed
- Spotted knapweed
- Skeletonweed
- Dalmation toadflax
- European frogbit
- Wild garlic
- Heart-podded hoarycress
- Canada thistle

- Quackgrass
- Dyer's woad
- Perennial peppercress
- Oblong spurge
- Italian thistle
- Yellow starthistle
- Field bindweed
- Dodder
- Bermudagrass
- Scotch broom
- French broom
- Klamath weed
- Common Russian thistle
- Johnston grass
- Medusahead
- Southern sandbar grass
- Yellow nutsedge
- Common water hyacinth
- Tangy ragwort
- White horsenettle

Significant Invasive Plants

- Giant Reed, arundo
- Tree of Heaven
- Pampas grass
- Himalayan blackberry
- Edible fig
- Salt Cedar
- Periwinkle
- Cheat grass
- Yellow starthistle
- Bull thistle
- Canada thistle
- Klamath Weed
- Harding grass
- Medusahead
- Spotted knapweed
- Hydrilla
- Purple loosestrife
- Downy brome
- Yellow starthistle
- Scotch broom
- French broom
- Perennial pepperweed
- Tamarisk, salt cedar
- White-top, hoary cress
- Russian olive
- Pennyroyal
- Italian thistle
- Tocalote, Malta starthistle
- Poison hemlock
- St. John's wort
- Parrot's feather
- Black locust
- Spanish broom
- Flixweed, tansy mustard
- Dyers' woad
- Water primrose
- Monterey pine
- Pyracantha
- Russian thistle, tumbleweed
- Mediterranean sage
- Barbed goatgrass
- Wild oat
- Ripgut brome
- Wild teasel, Fuller's teasel
- California bur clover
- Yellow sweet clover
- Oleander
- Milk thistle
- Spiny cocklebur