

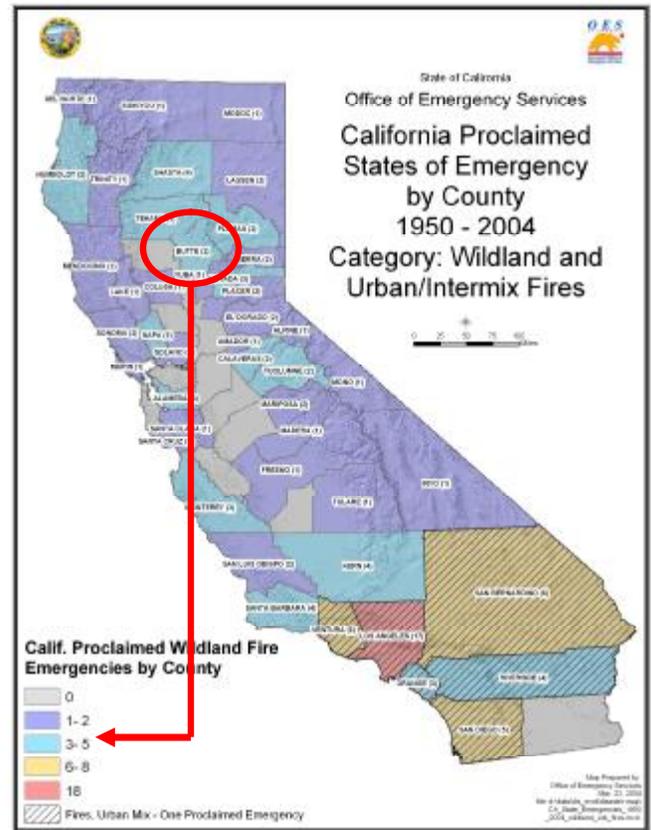
Wildland Fires

Wildland fires exacerbate the affects of flooding and have a drastic affect on the discharge rates, water levels, sedimentation, and runoff. Historical fire event locations are shown on Map C-1. According to the State OES, Butte County has had three states of emergency proclamations due to wildland urban/intermix fires since 1950. Wildland fire events are a continuing threat and have taken place as recently as August 2004.

According to the data presented on the Wildland Fire Threats Map provided by the California Department of Forestry (CDF) (Map C-2), most of Butte County is classified as a moderate fire threat, with many areas designated as high threat. A fire threat is determined by the CDF as a "...combination of two factors; (1) fire frequency, or the likelihood of a given area burning, and (2) potential fire behavior. These two factors are combined to create four threat classes ranging from moderate to extreme" (CDF, 2003).

Increased fire hazards near developed areas perpetuate the vulnerability to flooding and accumulated sedimentation through loss of vegetation and ground cover. According to CDF, the surface erosion potential following a wildfire in Butte County is considered moderate to high in the foothills and mountainous regions (CDF Fire and Resource Assessment Program, 2003).

A hydrologic and hydraulic computer model, Hydrologic Engineering Center, Model 1 (HEC-1), was used to conduct an analysis to evaluate the hydrologic impacts of a large wildfire event occurring in the Butte Creek watershed preceding a 100-year storm. Data from the CDF Wildland Fire Threat Map (Map C-2) was used to identify the extent of areas that would be damaged in a large wildfire event. Areas considered for the model were those designated by CDF to be within 2,400 meters of extreme threat. For the analysis, it was assumed that the fire damage from a large event would remove all of the



vegetation in the wildland fire extreme threat hazard areas. The analysis was conducted for several reaches in the Butte Creek watershed, and peak discharge after a wildfire event was compared with the peak discharge under existing conditions. The increase in discharge from runoff over areas where vegetation was lost due to fire was over 100 percent. The flow increased 200 and 300 percent at some locations.

Much of Butte County is part of the Sacramento Valley Groundwater Basin and contains many subbasins (Map C-3). An intense and wide-spreading fire in the County would have a significant impact on the recharge rate and water quality in the groundwater subbasins. Depending upon how shallow the groundwater table is, and how dependent the groundwater basin is on water infiltration, a worst-case scenario fire could adversely affect the groundwater basin. Fires vaporize organic compounds on the soil surface, creating a water repellent layer within the upper soil, decreasing the infiltration capacity of the soil. In the event of a heavy storm, and especially one that induces flooding, the water repellent layer on the soil eventually deteriorates; however increased erosion continues to occur. Although water repellent soil conditions are generally temporary, depending upon soil type and fire heat intensity, a lingering layer of hydrophobic soil can persist for years. Without any surface vegetation or root systems to filter contaminants, storm or floodwater that has infiltrated the soil could significantly deteriorate groundwater resources.

Seismic Activity

The only known active fault in Butte County is the 10-mile-long Cleveland Hill fault, located approximately six miles southeast of Oroville. Potentially active faults that could result in significant ground motion in Butte County include Foothill Shear Zone, Sutter’s Butte fault, Willows fault, Dunnigan fault, Coast Range thrust zone, Big Bend fault zone, Camel’s Peak fault, Melones-Dogwood Peak faults, and Hawkins Valley fault. These faults should be considered potentially active due to geologic, historic, or seismic data (fault lines and earthquake epicenter locations in Butte County are illustrated on Map C-4) (Butte County General Plan, 2000).



Butte County has had one state of emergency due to an earthquake since 1950. Seismic activity on August 1, 1975, resulted in an earthquake in the Oroville area of 5.7 on the Richter scale and 2.2 miles of surface cracking along the western flank of the Cleveland Hill fault. Historically, other earthquakes have occurred in Butte County; however, none of these resulted in recorded structural damage or ground motion. The 1975 earthquake resulted in structural damage generally confined to older, unreinforced masonry buildings and chimneys, with minor affects on utilities (Earthquake Engineering Research Institute (EERI), 1975). According to State OES, the southwest, Lower Butte section of the watershed is most prone to ground movement due to seismic activity (Map C-5).

Seiche

A seiche is a periodic oscillation of a body of water such as a river, lake, harbor, or bay resulting from seismic or other causes. Seiche effects have not been recorded in any of the reservoirs in Butte County that are within the jurisdiction of DWR's Division of Safety of Dams (DSOD) (Butte County Master Environmental Assessment, 1996).

Landslides

An earthquake in Butte County with a magnitude of 6.0 on the Richter scale or larger could cause landslides in the area. Landslides could be expected if the earthquake were to happen during the wet season and in areas of high groundwater levels or saturated soil, such as the area surrounding the foothills west of Lake Oroville (Map C-6). No landslides were noted in reports regarding the 1975 Oroville earthquake, which occurred during a dry season in an area of moderate landslide potential (Butte County Master Environmental Assessment, 1996).

Liquefaction

Liquefaction is the transformation of a granular material from a solid state into a liquefied state as a result of increased pore-water pressure. The potential liquefaction zones outlined in Map C-7 indicate only general areas in which the liquefaction may occur in clean, saturated, granular layers (Butte County General Plan, 2000). The areas within the watershed that are considered to have a generally high liquefaction potential are located in the lower valley and the west side of the watershed, in the FEMA-

designated floodplain. Areas that were previously mapped as outside the 100-year floodplain may become a part of the floodplain if liquefaction occurs. The extent and depth of potential flooding depends upon the elevations of these areas before and after liquefaction and the existing susceptibility to flooding.

Subsidence

Subsidence is the vertical displacement of ground surface, usually as a result of groundwater withdrawal. According to investigations by the USGS, the areas of heaviest subsidence extend about two miles north and two miles south of Chico and in a one-mile radius around Gridley. Just as in the potential liquefaction hazard, hazard areas that were previously mapped as outside the 100-year floodplain could become a part of the floodplain if subsidence occurs. The extent and depth of flooding depends upon the elevations of these areas before and after subsidence and the existing susceptibility to flooding. Subsidence is a potential hazard for the portions of Butte County located within the Sacramento Valley; however, according to the 2003 Groundwater Status Report published by the Butte Basin Water Users Association, no subsidence has been recorded in Butte County.