

also conducted on April 14, and 19 of 2004; however, BCM was not found. The discrepancy in sightings between 2004 and 2005 is probably due to the abnormally productive conditions during the spring of 2005. Due to the proposed actions 0.0001 acre of BCM will be directly impacted and 0.183 acre will be indirectly impacted (**Figure 6**). BCM suitable habitat and survey locations were taken from the Gallaway 2005 surveys.

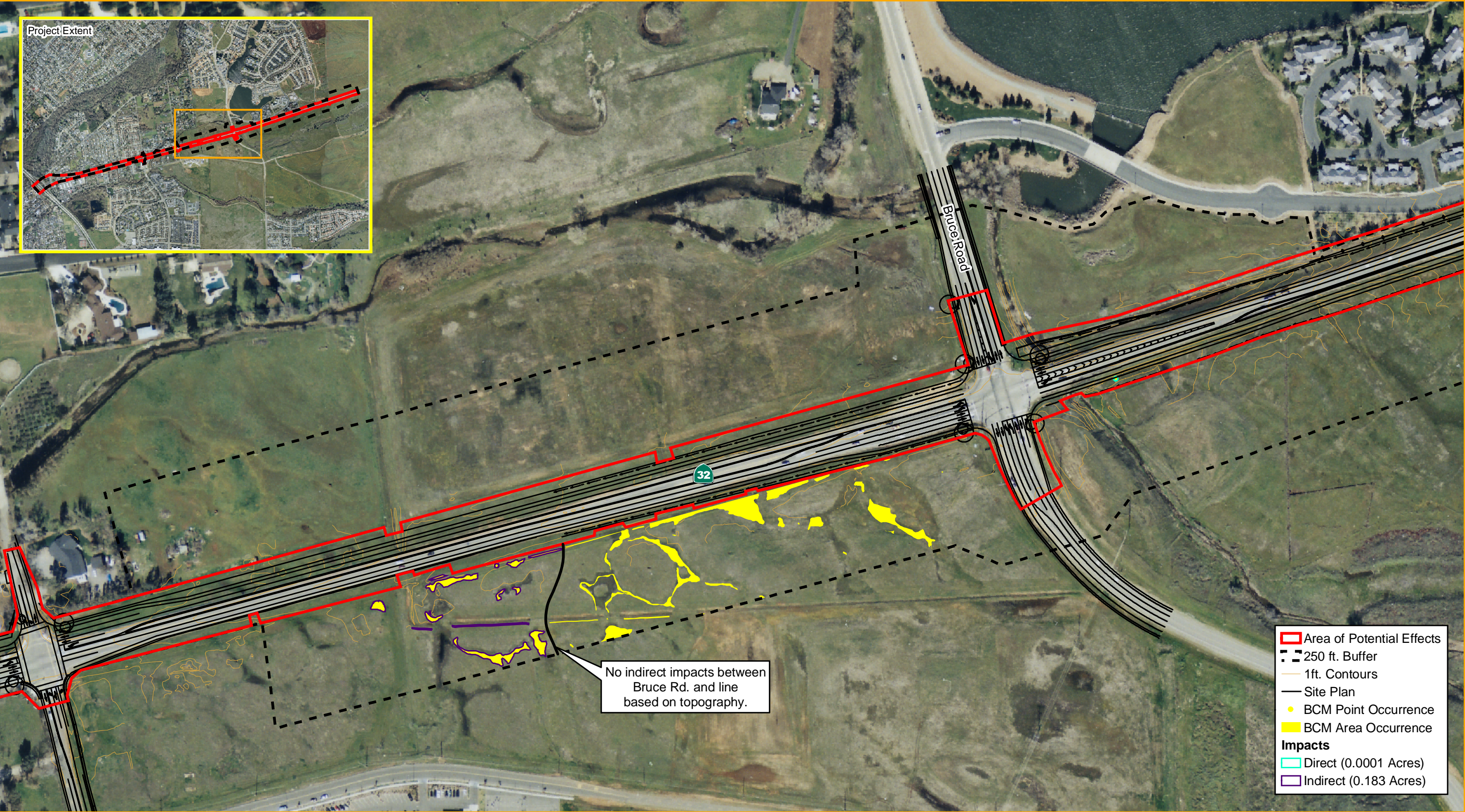
Butte County meadowfoam is a state and federal endangered species and a CNPS List 1B plant. According to V.H. Oswald *Selected Plants of Northern California and Adjacent Nevada*, 2002 (or *Manual of the Vascular Plants of Butte County, CA*), BCM inhabits vernal moist drainages and pools from the Chico Municipal Airport southward to Shippee Road and the Thermalito Forebay (2002). For this report, BCM “occupied habitat” is defined as habitat where BCM is known to occur and swales and margins of vernal pools that are hydrologically connected to BCM occurrences. Actual BCM occurrences that were located during surveys will be referred to as BCM occurrences.

The BCM populations are known to be extremely variable from year to year. According to the *Draft Recovery Plan for Vernal Pool Ecosystems of California and Southern Oregon* (USFWS, Oct. 2004), reproduction is influenced by length of daylight and germination temperature. In addition, it has been observed in other varieties of meadowfoam that seeds that do not germinate the first year following their production are still viable. This is probably the reason why under ideal conditions in 2005 (large amounts of rain interspersed with sunny days), BCM had such a high fecundity and was observed in areas it had not been seen in 10 years.

The following BCM habitat description is taken from the *Draft Recovery Plan for Vernal Pool Ecosystems of California and Southern Oregon*, (USFWS, 2004):

“*Limnanthes floccosa* ssp. *californica* found primarily in vernal swales and to a lesser extent on the margins of vernal pools. Both the swales and vernal pools where it grows are on alluvial terraces in annual grasslands with a mima mound topography. Swales vary in width from narrow channels to broad, pool-like areas. They may connect in branching, tree-like patterns or in net-like patterns around low mounds. Occupied swales are inundated periodically by water from the surrounding uplands, causing the soil to become saturated. However, *L. floccosa* ssp. *californica* does not persist in pools or swales that are inundated for prolonged periods or remain wet during the summer months, nor does it occur in drainages where water flows swiftly. One *L. floccosa* ssp. *californica* site near the Chico Municipal Airport is unusual in that it does not contain vernal pools or recognizable swales, which were most likely obliterated by earlier grading.

The swales that support *L. floccosa* ssp. *californica* are generally less than 10 centimeters (3.9 inches) deep and pools are typically less than 30 meters (100 feet) long. In vernal pools, *L. floccosa* ssp. *californica* more often grows on the margins than in the bottom, but the pattern is reversed in swales, with the plants more often growing in the center. This plant typically occurs in long, narrow bands in connected swales or on pool margins but can be found in irregular clusters in isolated drainages. *L. floccosa* ssp. *californica*



↑
APE derived from MTCO CAD, Butte County
parcel right of way & proposed avoidance.
Date of Aerial: Feb. 26, 2002
Map Date: Dec. 1, 2005.

0 100 200 Feet



Figure 6.

has also been found occasionally in disturbed areas, such as drainage ditches, firebreaks, and graded sites.

Limnanthes floccosa ssp. *californica* occurs on soils of the Tuscan-Anita and the Redding Igo complexes, specifically on the Anita and Igo soils, which are confined to the pools and swales. Tuscan and Redding soils are restricted to the mounds. Anita soils can be up to 50 centimeters (19.7 inches) deep, whereas Igo soils are no more than 18 centimeters (7.1 inches) deep; the two soils are underlain by iron-silica cemented and indurated hardpan, respectively, presumably because the former can hold roughly twice as much moisture. Confirmed occurrences have been found at 50 to 90 meters (165 to 300 feet) in elevation.”

Factors Affecting Vernal Pool Species in Butte County

The ephemeral wetlands that support this network of populations are remnants of what was formerly a pristine vernal pool ecosystem. This highly disturbed remnant habitat is imperiled. Fragmentation by a variety of human-caused activities, primarily urban development, water supply/flood control projects and conversion of land to agricultural use has resulted in small isolated populations. Ecological theory predicts that such populations will be highly susceptible to extinction due to chance events, inbreeding depression, or additional environmental disturbance. Other factors have contributed to declines in vernal pool species as well. Vernal pool hydrology can be altered by a variety of activities, including the construction of roads, trails, ditches, or canals which can block the flow of water into, or drain water away from the vernal pools and vernal pool complexes. Vernal pool crustaceans are highly sensitive to the water chemistry of their habitats and contamination of vernal pools may injure or kill them. In addition, vernal pool habitats have declined as a result of a variety of other incompatible land uses including off-road vehicle use, dumping, and invasion of non-native species, vandalism, erosion and sedimentation. Holland (1978) estimated that between 60 and 85 percent of the habitat that once supported vernal pools, had been destroyed by 1973. Since 1973, a substantial amount of remaining habitat has been converted for human uses. The rate of loss of vernal pool habitat in the state has been estimated at two to three percent per year (Holland and Jain 1988). Rapid urbanization of the Central Valley of California currently poses the most severe threat to the continued existence of the listed vernal pool crustaceans.

Analysis of Alternatives

Mark Thomas and Company prepared a Combined Project Study Report/Project Report for Caltrans, which conducted a Conditions Analysis for the scenarios No Project, and With Project for year 2010 and 2030. The Conditions Analysis for 2030 is presented below.

The 2030 analysis incorporated the recommended SR 99/Fir Street/SR 32 improvements west of the proposed widening effort for the No Project and With Project scenarios as the improvements would have likely been incorporated as part of the SR 99 Auxiliary Lane project.