

A.24 Butte County Checkerbloom (*Sidalcea robusta*)

A.24.1 Legal and Other Status

The Butte County checkerbloom (*Sidalcea robusta*) currently has no status under the federal or the California Endangered Species Act (DFG 2011).

The California Native Plant Society (CNPS) includes the Butte County checkerbloom on California Rare Plant Rank 1B.2 (formerly List 1B.2): Plants Rare, Threatened, or Endangered in California and Elsewhere (2010). Under CNPS, it has a state ranking of S2, meaning there are between six and 20 occurrences or 1,000 to 3,000 individuals, or it is known to occupy from 2,000 to 10,000 acres (CNPS 2007).



photo courtesy BCAG

A.24.2 Species Distribution and Status

A.24.2.1 Range and Status

The Butte County checkerbloom is endemic to Butte County. It lives in the foothills of the Southern Cascades, inhabiting partial shade in foothill woodlands (often with a chaparral component intermixed) and blue oak savanna, on Tuscan Formation derived soils at 300 to 1,200 feet (100 to 400 meters) elevation (BLM 2007).



It is found in a narrow band along the eastern margin of the Sacramento Valley, east and south of the city of Chico. All populations are found within a strip approximately 2.2 miles (3.5 kilometers [km]) wide by 3.8 miles (6.1 km), running northwest to southeast from Upper Bidwell Park to Pentz Road near Butte College (Hantelman 2004).

The Butte County checkerbloom's original distribution is unknown (Hantelman 2004). It was first collected in 1846 during John C. Fremont's third expedition to explore the west (Roush 1931). Its first description in the botanical literature was in 1931, and it has always been considered a distinct taxonomic entity (Roush 1931).

A.24.2.2 Distribution and Status in the Plan Area

A total of 126 occurrences of Butte County checkerbloom have been reported from the Plan Area (see Figure A.24-1, *Butte County Checkerbloom Modeled Habitat and Recorded Occurrences*). The Butte County checkerbloom is known from 22 CNDDDB-reported occurrences within the Cherokee, Hamlin Canyon, Chico, Cohasset, Paradise West, and Richardson Springs quadrangles (CNDDDB 2007) (see Figure A.24-1). Most of these are found between the city of Chico and the town of Paradise, on a mix of public and private lands. Some occurrences are found east of the Plan Area, while most are within it. Many occurrences are within Upper Bidwell Park (nos. 14, 27, 28, 29, and 30), including the largest known population (no. 27) with approximately 1,500 plants at last census. Other occurrences are found east of Chico between Highway 32 and the Skyway, including a large population (no. 2), ranked excellent with 600 plants at last census (CNDDDB 2007). Many of the CNDDDB occurrences are comprised of fewer than 20 clumps (Hantelman 2004). Genetic individuals are impossible to determine in the field; molecular work is necessary to determine the numbers of remaining populations (Hantelman 2004).

Of the 22 occurrences, at least three (nos. 10, 11, and 17) have not been relocated since 1930 or before, suggesting that they were either recorded at the wrong locality or are now locally extinct. While most occur on private land, some are located on BLM or City of Chico land (CNDDDB 2007).

A.24.3 Habitat Requirements and Special Considerations

Limited information exists on the specific habitat requirements of the Butte County checkerbloom. Mapping of known and historical occurrences show that the species is restricted to the relatively young soils of the Tuscan Formation mudflows in the southern Cascade Range foothills (Oswald 2002). It is found in foothill woodland and savanna, often dominated by blue oaks, and occasionally at the ecotone with chaparral. It is commonly found in the shade of oaks or growing beneath shrubs; it can also be found within ephemeral drainages. The checkerbloom appears to exhibit microsite preferences that include under blue oak trees (at the dripline or the base of the trunk), against rocks or at the base of ledges or rock benches, in small drainages, and under the dripline of shrubs (Hantelman 2004). It is found more frequently on north-facing slopes and of slopes of 20 percent or more, although it has been mapped on all aspects (Hantelman 2004). It is less likely to occur on south-facing slopes, in grassland without canopy cover, or where grazing by livestock occurs (Hantelman 2004).

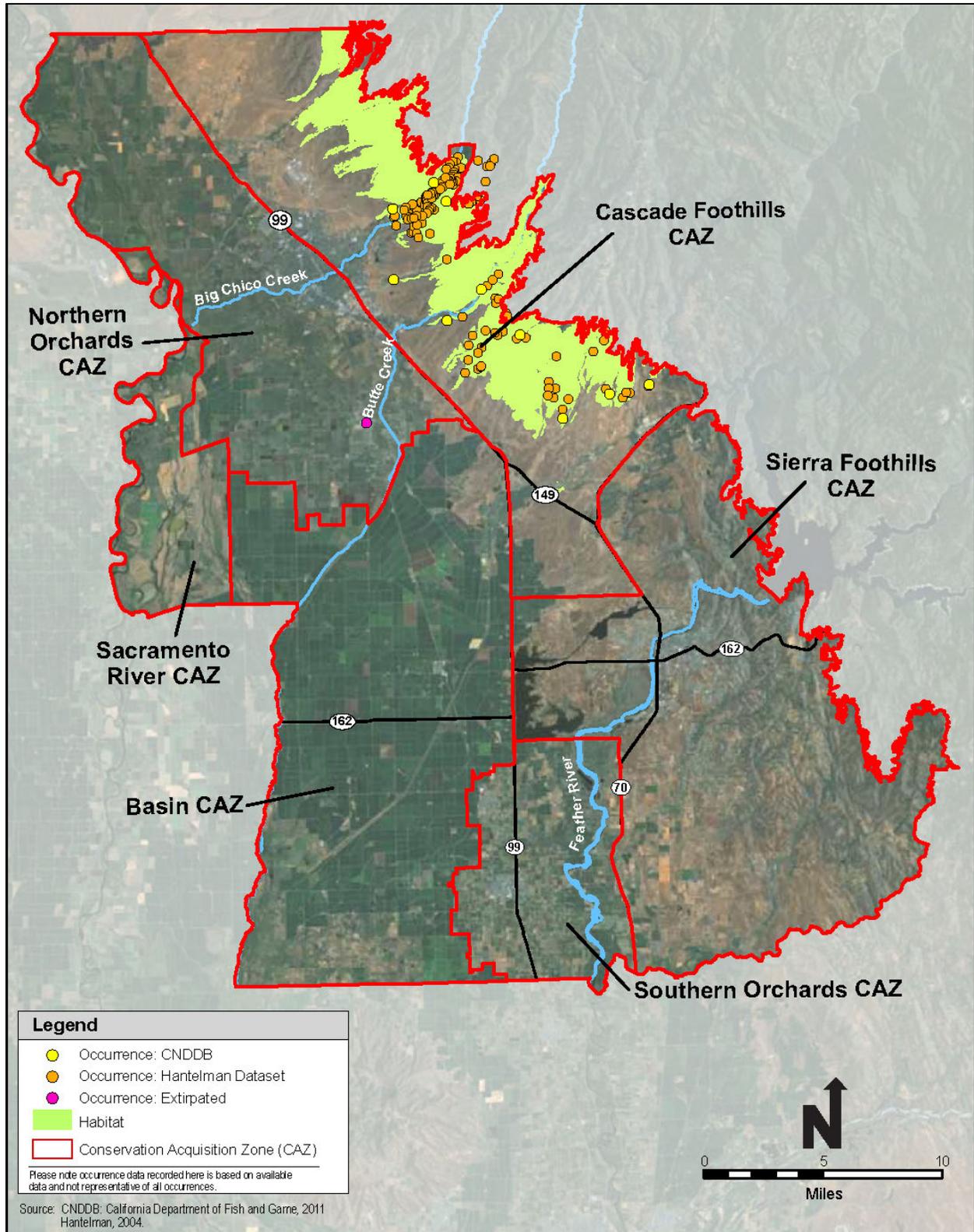


Figure A.24-1. Butte County Checkerbloom Modeled Habitat and Recorded Occurrences

Butte County checkerbloom is a component of the herbaceous understory, and is never a dominant species. Tree associates include blue oak (*Quercus douglasii*), interior live oak (*Quercus wislizenii*), foothill pine (*Pinus sabiniana*), and occasionally California buckeye (*Aesculus californica*). Shrub associates include Sierra buckbrush (*Ceanothus cuneatus*), poison oak (*Toxicodendron diversilobum*), redberry (*Rhamnus ilicifolia*), as well as toyon (*Heteromeles arbutifolia*) and common manzanita (*Arctostaphylos manzanita* spp. *manzanita*).

Forb associates include purple sanicle (*Sanicula bipinnatifida*), California clusterlily (*Brodiaea californica*), twining snakelily (*Dichelostemma volubile*), rose clover (*Trifolium hirtum*), and forest clarkia (*Clarkia rhomboidea*). Nonnative annual grasses such as wild rye (*Lolium multiflorum*), oat grass (*Avena barbata*), dogtail grass (*Cynosorus echinatus*), ripgut brome (*Bromus diandrus*) and soft chess (*Bromus hordeaceus*) commonly co-occur as well (CNDDDB 2007). These are the most frequently occurring vascular plant associates in one study (Hantelman 2004).

A.24.4 Life History

The life history of the Butte County checkerbloom has not been studied in detail. Most information on phenology and reproductive biology of the plant come from one thesis based on 2 years of data at two sites (Hantelman 2004). The checkerbloom is a long-lived rhizomatous perennial that flowers from April to June (BLM 2007). It is assumed, because it possesses rhizomes, to be capable of reproducing vegetatively.

Pollen vectors, most likely bees and beetles, are needed for seed production to occur. Plants appear to be pollinator-limited, as shown in hand out-crossing experiments that resulted in a higher seedset than open pollination. Seeds can be produced geitonogamously, but seed production is significantly higher when out-crossing occurs. Seeds have a seed coat-imposed physical dormancy and must be scarified or otherwise broken (often by summer heat) for germination to occur. In Hantelman's study, most ungerminated seeds (80 percent) remained viable, implying the checkerbloom forms a seed bank. Early hot, dry conditions in 2004 resulted in almost zero seed set for the two study populations, suggesting reproductive output is greatly impacted by rainfall.

In general, the plant has a limited seed output and appears to have almost no recruitment of new individuals by seed (Hantelman 2004). Seed dispersal in the plant has not been studied, though it appears to have no special morphological adaptations for dispersal. Episodic recruitment may occur when high seed production and favorable environmental conditions for germination and establishment coincide.

A.24.5 Threats

Threats to the Butte County checkerbloom have not been studied extensively but include habitat fragmentation, lack of recruitment, competitive exclusion by nonnative annual grasses, and possibly grazing. Additional threats are posed by residential development and fire suppression (CNPS 2007).

The very limited geographic distribution of the checkerbloom makes the plant particularly vulnerable. Impacts associated with urban expansion are increasing rapidly in blue oak savanna, blue oak woodland, foothill woodland, and chaparral (Shevock 1996), the same ecosystems to which the checkerbloom is endemic.

Survival of the long-lived adults is particularly important as existing evidence suggests the Butte County checkerbloom has a limited seed output and, therefore, limited dispersal ability. Potential reasons for this include pollinator limitation and high seed predation. Additionally, adult plants are subject to predation by deer and rabbits, which have been observed directly “nipping” the flower stems before anthesis, resulting in zero reproductive output for those plants (Hantelman 2004). When seeds are produced, anecdotal evidence suggests that nonnative grasses and thatch (potentially increased in amount and extent by fire suppression) prevent the establishment of seedlings and also compete with adults (Hantelman 2004).

In perennial plants like the Butte County checkerbloom, sexual reproduction need not occur every year as individuals may persist without producing seeds. However, some recruitment of new individuals from seed is necessary to maintain genetic variability within the population and to replace older plants as they die.

A.24.6 Relevant Conservation Efforts

A 27-acre conservation easement in the foothills east of Chico (Canyon Oaks) protects a large population of Butte County checkerbloom.

A.24.7 Species Habitat Suitability Model

A.24.7.1 Habitat

Butte County checkerbloom habitat includes areas with suitable soil type in the following land cover types:

- Blue oak savanna;
- Blue oak woodland;
- Interior live oak woodland;
- Mixed oak woodland;
- Valley oak riparian forest;
- Ranchette-wooded; and
- Grassland and grassland with vernal swale complex, and chaparral within 400 feet of the above listed land cover types.

Soil survey map units that are considered to be suitable soil types for Butte County checkerbloom are found within the middle and upper elevation Tuscan Formation. These are located within the following General soil map units:

- Lucksev, Butteside, Carhart (16);
- Xerorthents, Shallow-Typic Haploxeralfs-Doemill (18); and
- Rockstripe-Ultic Haploxeralfs, Mesic-Ultic Haploxeralfs (25).

A.24.7.2 Assumptions

Butte County checkerbloom is found as a component of the herbaceous understory in partial shade within blue oak woodland and foothill woodland communities (Hantelman 2004). It is also found in foothill savanna and occasionally at the ecotone with chaparral (CNDDDB 2007). It appears to exhibit

microsite preferences that include under blue oak trees (at the dripline or the base of the trunk), against rocks or at the base of ledges or rock benches, in small drainages, or under the dripline of shrubs (Hantelman 2004). Given these habitat preferences, suitable habitat for Butte County checkerbloom is defined as the blue oak woodland, blue oak savanna, interior live oak woodland, mixed oak woodland, and ranchette-wooded land cover types. Additionally, to capture the ecotonal habitat between woodland and grassland or chaparral, grassland, grassland with vernal swale complex, and chaparral within 400 feet of the woodland types listed above were selected. The distance of 400 feet is the greatest distance Butte County checkerbloom has been found from an oak woodland edge. Suitable habitat for Butte County checkerbloom was selected by intersecting these land cover types with selected Tuscan Formation soil map units.

The Natural Resources Conservation Service (NRCS) Soil Survey for Butte County was used to select suitable soils within the Plan Area (NRCS 2006). Mapping of known and historical occurrences of the species show that it is restricted to the Tuscan Formation mudflow soils in the southern Cascade Range foothills (Oswald 2002). To determine suitable soils within the Plan Area, a detailed dataset (Hantelman 2007) was used to initially identify the relationship between Butte County checkerbloom occurrences and soil units. Selected soils were those that support either historical or current occurrences within or outside the Plan Area. Physical characteristics (e.g., soil depth, parent material) were used to both verify these selected soils and to identify additional suitable soils within the Plan Area (NRCS 2006). All soils were cross-referenced with existing research on the plant. NRCS staff was consulted to confirm that appropriate soils were chosen within the Plan Area (Conlin pers. comm.).

A.24.8 Recovery Plan Goals

A recovery plan and recovery goals have not been prepared for this species.

A.24.9 References

A.24.9.1 Literature Cited

- BLM (Bureau of Land Management). 2007. Special status plants (online edition). Washington, DC: Bureau of Land Management. Available: http://www.blm.gov/ca/st/en/prog/ssp/plants/sidalcea_robusta.html. Accessed: February 25, 2007.
- Calflora. 2007. Berkeley, California: The Calflora Database. Available: <http://www.calflora.org/>. Accessed: February 1, 2007.
- CNDDDB (California Natural Diversity Database). 2007. RareFind. February. California Department of Fish and Game, State of California Natural Heritage Division.
- CNDDDB (California Natural Diversity Database). 2011. California Department of Fish and Game, Natural Heritage Division.
- CNPS (California Native Plant Society). 2007. Inventory of Rare and Endangered Plants (online, ed. v7-07a). Sacramento: California Native Plant Society. Available: <http://www.cnps.org/inventory>. Accessed February 21, 2007.

- CNPS (California Native Plant Society). 2010. Inventory of Rare and Endangered Plants (online, 8th ed.). Sacramento: California Native Plant Society. Available: <http://www.cnps.org/inventory>. Accessed: April 12, 2012.
- DFG (California Department of Fish and Game). 2011. Special Vascular Plants, Bryophytes, and Lichens List, Natural Diversity Database. Available: <http://www.dfg.ca.gov/biogeodata/cnddb/pdfs/SPPlants.pdf>. Accessed: May 19, 2011.
- Hantelman, Christine. 2004. Ecological Life History of a Checkerbloom, *Sidalcea robusta* (Malvaceae), a Rare Endemic Plant of Butte County, California. Master's thesis. California State University, Chico.
- NRCS (Natural Resources Conservation Service). 2006. *Soil Survey of Butte Area, California, Parts of Butte and Plumas County*.
- Oswald, V. H. 2002. Selected Plants of Northern California and Adjacent Nevada. *Studies From the Herbarium* No. 11. California State University, Chico.
- Roush, E. M. F. 1931. A monograph of the genus *Sidalcea*. *Annals of the Missouri Botanical Garden* 18:117–224.
- Shevok, J. R. 1996. Status of Rare and Endemic Plants. Sierra Nevada Ecosystem Project: Final report to Congress. Vol. 2, *Assessments and Scientific Basis for Management Options*. University of California Centers for Water and Wildland Resources, Davis.

A.24.9.2 Supplemental Dataset

Hantelman, C. 2007 – C. Hantelman provided BCAG/SAIC with a GIS dataset with detailed occurrence data for Butte County Checkerbloom (*Sidalcea robusta*). This was derived from herbarium sheets, CNDDDB occurrences, personal observations from 2002–2004, and maps shared with Hantelman by other consulting botanists.

A.24.9.3 Personal Communications

Andrew Conlin, Soil Scientist. USDA - Natural Resources Conservation Service (NRCS). December 4, 2008 – phone conference with Drs. Paul Cylinder and Letty Brown.

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