

**A.40 BUTTE COUNTY GOLDEN CLOVER  
(TRIFOLIUM JOKERSTII)**



photo courtesy Robert E. Preston, PhD

**A.40.1 Legal and Other Status**

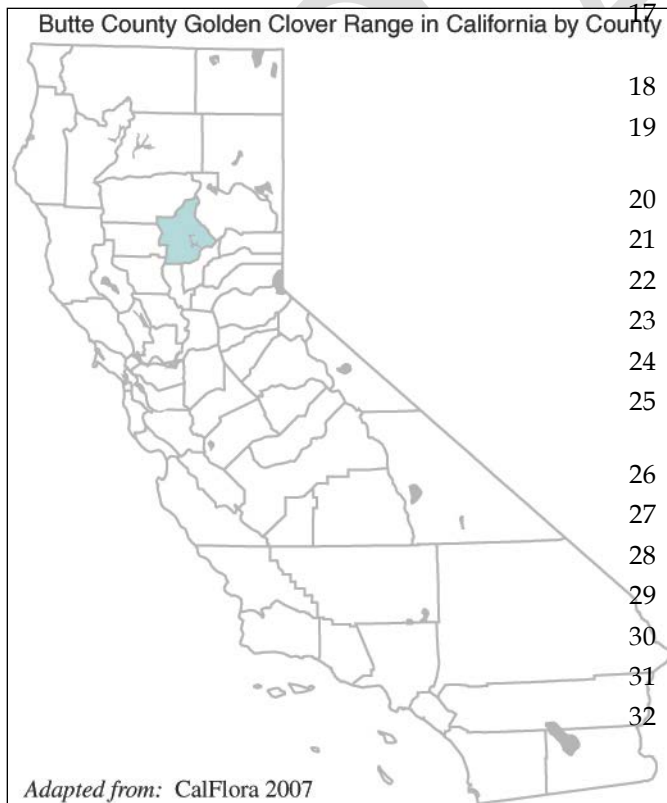
Butte County golden clover, also called Jim’s clover, currently has no status under the federal Endangered Species Act (ESA) or under the California ESA (DFG 2011).

The California Native Plant Society (CNPS) includes Butte County golden clover on list 1B.2, rare, threatened or endangered in California and elsewhere (CNPS 2006).

**A.40.2 Species Distribution and Status**

**A.40.2.1 Range and Status**

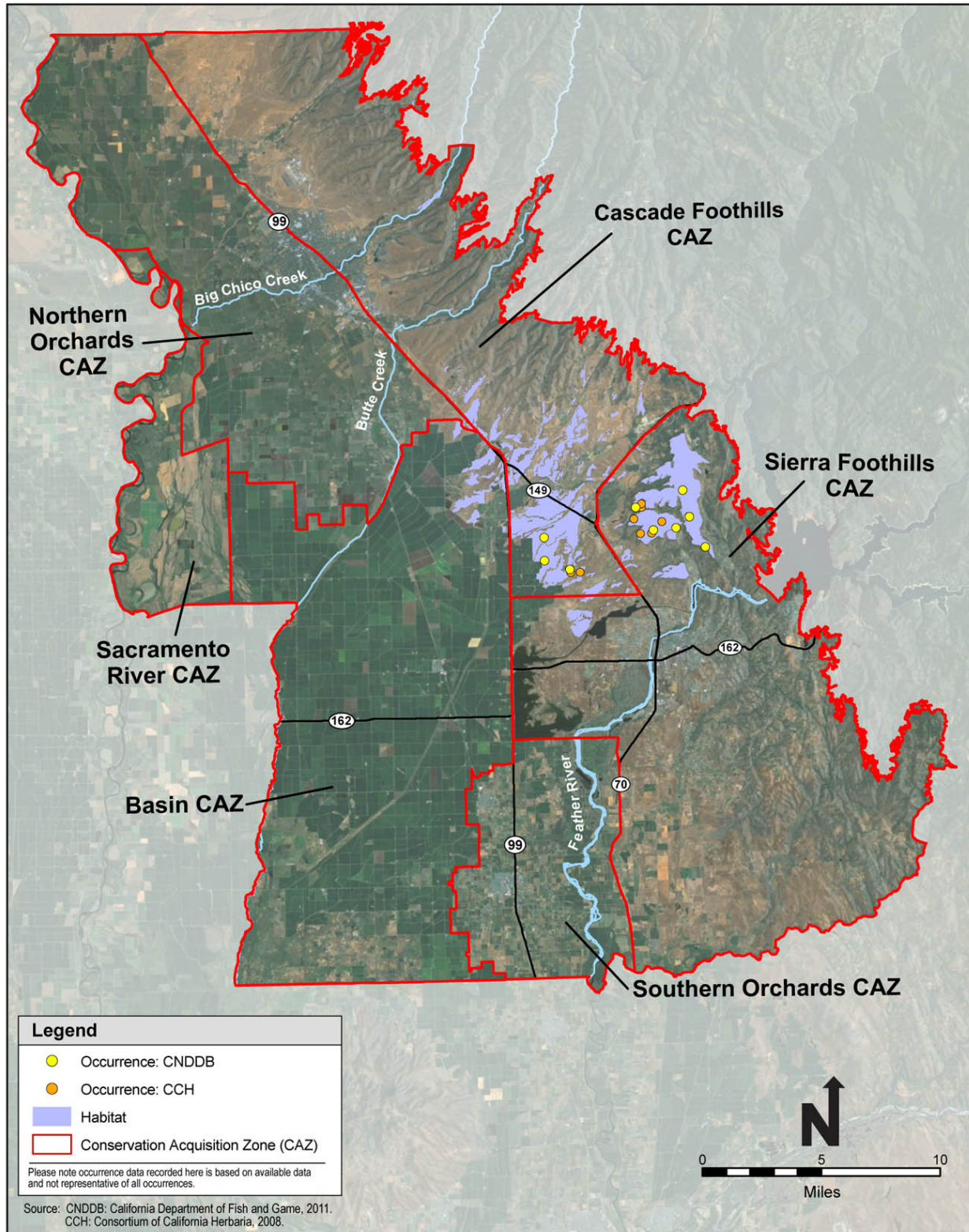
Butte County golden clover is known from nine occurrences, all in Butte County, within the Oroville and Shippee quadrangles near Table Mountain (CNDDDB 2007). Butte County golden clover was first described in the botanical literature in 1998 subsequent to a revision of the *Trifolium barbigerum* (bearded clover) species group (Vincent and Morgan 1998). It is not included in the current edition of the Jepson Manual (Hickman 1993) but is recognized by the Jepson Flora Project and the California Native Plant Society as a distinct species (Baldwin and Ertter 2007, CNDDDB 2007).



**A.40.2.2 Distribution and Status in the Plan Area**

Butte County golden clover is endemic to the Plan Area (see Figure A-40). It is found on a mix of public and private lands near Table Mountain, a significant topographical feature in the area with a unique volcanic geology and associated flora.

Three occurrences (nos. 2, 3 and 6) are found on the North Table Mountain Ecological Reserve, managed by the Department of Fish and Game for botanical resources and hunting. These occurrences are considered in good (no. 3 and no.6) and excellent condition (no. 2).



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**Figure A-40. Butte County Golden Clover Modeled Habitat and Recorded Occurrences**

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1 Occurrences nos. 2 and 3 contained several thousand individual plants at last census, and no. 6  
2 contained less than 100. Similarly, occurrence no. 8 is on public land managed by the Bureau of  
3 Land Management, in excellent condition, and contained several thousand plants within four  
4 colonies at recent census. One occurrence was found at a private game reserve (no. 11), and one on a  
5 PG&E substation (no. 1). The remainder (nos. 7, 9, and 10) are on unspecified private lands near  
6 Table Mountain and were documented by a vernal pool monitoring team in 2001 (CNDDDB 2007).

### 7 **A.40.3 Habitat Requirements and Special Considerations**

8 Little has been reported on specific habitat requirements of Butte County golden clover. It is  
9 found within valley and annual grassland communities containing vernal pools, typically  
10 inhabiting the swales surrounding pools, margins of the pools, or banks of ephemeral streams.  
11 Elevation ranges from 180 to 1,300 feet. Site-specific soil conditions are not documented, but  
12 the parent material is volcanic basalt flow throughout the species' range.

13 Like most vernal pool plants, Butte County golden clover is a low-growing, annual species (i.e.,  
14 germinates, grows, produces seed, and dies within one year) that is well-adapted to the  
15 Sacramento Valley's Mediterranean-type weather patterns, with its cool, wet winters and hot, dry  
16 summers (Zedler 1990). Butte County golden clover is probably a fairly recent endemic, likely  
17 having evolved from more common species (probably bearded clover) during recent climatic and  
18 geologic changes to survive extreme fluctuation in water availability between winter-spring  
19 inundation and spring-summer drought.

20 Plants associated with Butte County golden clover include numerous annual graminoids and  
21 forbs that typically prefer wet or mesic habitat or are vernal pool specialists. Rushes include  
22 toad rush (*Juncus bufonius*, native) and the rare Red Bluff dwarf rush (*J. leiospermus* var.  
23 *leiospermus*, native). Other documented occurring species include native herbs Hartweg's  
24 checkerbloom (*Sidalcea hartwegii*), annual checkerbloom (*Sidalcea calycosa*), common vernal  
25 pool allocarya (*Plagiobothrys stipitata* var. *micranthus*), bracked popcornflower (*Plagiobothrys*  
26 *bratensis*), Austin's popcornflower (*Plagiobothrys austinae*), common meadowfoam  
27 (*Limnanthes douglasii*), peppergrass (*Lepidium nitidum*), white-headed navarretia (*Navarretia*  
28 *leucocephala*), goldfields (*Lasthenia* spp.), cowbag clover (*Trifolium depauperatum*), white-  
29 tipped clover (*Trifolium variegatum*), seep monkeyflower (*Mimulus guttatus*), butter and eggs  
30 (*Triphysaria eriantha*) rough-fruited allocarya (*Plagiobothrys trachycarpus*), common  
31 blennosperma (*Blennosperma nanum*), which are all annuals. Documented invasive annual  
32 Mediterranean grasses include barley (*Hordeum marinum*) and Italian ryegrass (*Lolium*  
33 *multiflorum*) (Hickman 1993, Calflora 2007, CNDDDB 2007).

### 34 **A.40.4 Life History**

35 The life history of Butte County golden clover has not been studied in detail. Flowering occurs  
36 in mid-spring (late March–May). Conditions necessary for germination and dispersal are  
37 unknown; congeners are typically pollinated by bees, and wind pollination is not effective. At

1 least some species of *Trifolium* are self-incompatible. Many vernal pool species have limited  
2 dispersal abilities; although this taxon is not strictly a vernal pool species, it may share this  
3 characteristic (Zedler 1990).

4 Demographics and population dynamics of this species are unknown. Genetic variability in  
5 some vernal pool annuals is high even at small scales (less than 10 meters) (Elam 1998); this  
6 may also be true for Butte County golden clover.

#### 7 **A.40.5 Threats**

8 Threats to vernal pool and surrounding habitat in the Plan Area have been described in *Recovery*  
9 *Plan for Vernal Pool Ecosystems of California and Southern Oregon* (USFWS 2005). Although  
10 Butte County golden clover does not require long-duration inundation, habitat threats are similar to  
11 species covered under the recovery plan. These threats include the following:

- 12 • Habitat loss and fragmentation consequent to urbanization, agricultural conversion, and  
13 mining; and habitat alteration and degradation due to changes to natural hydrology,  
14 invasive species, incompatible grazing regimes (including insufficient grazing for  
15 prolonged periods), infrastructure projects (such as roads and utility projects),  
16 recreational activities (such as off-highway vehicles and hiking), erosion, climatic and  
17 environmental change, and contamination.
- 18 • Conversion of land uses from intact natural communities (primarily grasslands) or  
19 livestock pastures to more intensive agricultural uses, such as croplands.
- 20 • Competition from invasive species. Butte County golden clover may be threatened by  
21 increasing dominance by competitors such as Italian rye-grass, Mediterranean barley, and  
22 waxy mannagrass (*Glyceria declinata*), which may in turn contribute to changes in  
23 hydrology and livestock grazing practices.
- 24 • Changes in hydrology that result in a change in the timing, frequency, and duration of  
25 water availability. The hydrology in many vernal pools and adjacent habitats has been  
26 altered by construction of flood control structures, such as levees and other water  
27 barriers, and changes in runoff, such as irrigation or construction of roads and culverts  
28 (USFWS 2005).
- 29 • The decline of pollinator species due to habitat fragmentation and the loss of upland  
30 habitats that support pollinators is a potential threat. Specific insects that pollinate Butte  
31 County golden clover have not yet been identified; therefore, it is not possible at this time  
32 to assess their status and determine if protection of pollinators or their habitat is  
33 necessary. If essential pollinators are declining through habitat loss, however, Butte  
34 County golden clover may be declining in response (USFWS 2005).
- 35 • Butte County golden clover populations are geographically restricted and isolated, and  
36 some have small numbers of individuals in some populations and years (CNDDDB 2007).  
37 Genetic drift, inbreeding, and reduced gene flow may result from small numbers of

1 populations or small number of individuals per occurrence (Elam 1998). Additionally,  
2 small populations are threatened with extirpation from random events, such as extreme  
3 weather and lack of genetic diversity. Small and/or less genetically diverse populations  
4 are less likely to adapt and survive environmental changes, even relatively minor events  
5 (USFWS 2005).

- 6 • Several other threats to vernal pool habitat and associated species were identified in the  
7 Recovery Plan. Water contamination can occur from use of herbicides, fertilizers, and other  
8 chemicals commonly used in urban and agricultural settings. Fertilizers may contribute to  
9 the growth of invasive plants (USFWS 2005). Habitat alteration may also occur due to large-  
10 scale climate and environmental changes, such as global warming, that lead to changes in the  
11 precipitation pattern and atmospheric conditions (USFWS 2005).

12 Inappropriate timing, intensity, kind/class of animal, or duration of livestock grazing may also  
13 negatively impact vernal pool species, including Butte County golden clover (Barry 1998, Marty  
14 2005). This species is found in less mesic habitat than many vernal pool endemics; therefore, it  
15 is more susceptible to competition from invasive annual upland species, particularly annual  
16 grasses, and thatch build-up. As a result, despite likely high palatability for forage, moderate  
17 grazing may be appropriate.

18 Fire and associated management activities could threaten Butte County golden clover. Plowed fire  
19 breaks would harm individuals and habitat. The impacts of fire on this species are unknown. It  
20 probably did not evolve with frequent burning so repeated prescribed burns could be detrimental.

## 21 **A.40.6 Relevant Conservation Efforts**

22 Active conservation measures for Butte County golden clover have been limited or not well  
23 documented. Several occurrences of the species are found on actively-managed, protected lands,  
24 however.

## 25 **A.40.7 Species Habitat Suitability Model**

### 26 **A.40.7.1 Habitat**

27 Butte County golden clover habitat includes areas with suitable soil types in the following BRCP  
28 mapped land cover types:

- 29 • Grassland;
- 30 • Grassland with vernal swale complex;
- 31 • Blue oak savanna;
- 32 • Vernal pools; and
- 33 • Altered vernal pools.

1 Vernal pools that may support Butte County golden clover habitat may also occur as inclusions  
2 in mapped ranchettes—open and disturbed ground land cover types. These inclusions were not  
3 mapped because they did not meet the mapping criteria for vernal pool, altered vernal pool, and  
4 grassland with vernal swale complex land cover types.

5 The following soil survey map units support Lovejoy Basalt and Tuscan Formation-derived soil  
6 series that are considered to be suitable soil types for Butte County golden clover present within  
7 the Plan Area: Redtough-Redswale-Anita, gravelly duripan (305), Durixeralfs-Typic Petraquepts  
8 complex (321), Rock outcrop, Lovejoy basalt (340), Elsey-Beatsonhollow-Campbellhills-Rock  
9 outcrop complex (341), Cherotable-Elsey complex (346), and Flagcanyon taxadjunct-  
10 Durixeralfs-Duraquerts complex (677).

#### 11 **A.40.7.2 Assumptions**

12 Butte County golden clover is found within valley and annual grassland communities containing  
13 vernal pool, typically inhabiting the swales surrounding pools, margins of the pools, or banks of  
14 ephemeral streams (CNDDDB 2007). Elevation ranges from 165 to 1265 feet (50 to 385 meters)  
15 (CNDDDB 2007). Site-specific soil conditions are not documented, but the parent material is  
16 basalt or volcanic mudflow throughout the species range (CNDDDB 2007). Given these habitat  
17 preferences, suitable habitat is defined as the grassland, grassland with vernal swale complex,  
18 blue oak savanna, vernal pool, and altered vernal pool land cover types, when present on suitable  
19 shallow soils with underlying basalt or volcanic mudflow bedrock. Suitable habitat for the plant  
20 was selected by intersecting these selected land cover types with selected soil map units.

21 The Natural Resources Conservation Service (NRCS) Soil Survey for Butte County was used to  
22 select suitable soils within the Plan Area (NRCS 2006). Soils that support Butte County golden  
23 clover are defined as shallow soils with underlying basalt or volcanic mudflow bedrock. To  
24 determine suitable soil map units, the California Natural Diversity Database was used to initially  
25 identify the relationship between golden clover occurrences and soil units based on known  
26 historical and extant occurrences of the species (CNDDDB 2007). Physical and chemical  
27 characteristics (e.g., soil depth, parent material) were used to both verify these selected soils, and  
28 to identify additional suitable soils within the Plan Area (NRCS 2006). Generally, shallow soils  
29 with underlying bedrock composed of the Lovejoy Basalt and specific soils on the Tuscan  
30 Formation were considered suitable. All soils were cross-referenced with existing research on  
31 the plant. NRCS staff was consulted to confirm that appropriate soils were chosen in the Plan  
32 Area (Conlin pers. comm.).

#### 33 **A.40.8 Recovery Goals**

34 A recovery plan has not been prepared for Butte County golden clover because it is not federally  
35 listed as threatened or endangered.

## A.40.9 References

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