

CDFG (212 ac (86 ha)) or occurs on private land.

*Limnanthes floccosa* ssp. *californica*

Butte County meadowfoam is found in four general areas of concentration in a narrow band from south to north of Chico, California. The vernal pool types and soils associated with the four general areas of concentration of Butte County meadowfoam include those vernal pools on Tuscan formation or terraced-alluvials with mostly Anita, Riverbank, Redbluff, Modesto, and Redding soils. The habitat associated with Butte County Meadowfoam includes saturated soils and pools with a "flashy" (short lived) inundation period. A vernal pool's parent material greatly influences that pool's species composition and hydrologic functioning (Hanes and Stromberg 1998; Holland and Jain 1981, 1988). Soils beneath vernal pools are extremely variable and are not the same as soils mapped by soil surveys, but are usually undescribed hydric inclusions that vary upon location (Holland and Dain 1990).

Butte County Meadowfoam is found more often within the swale system between vernal pools than in the pools themselves (Jokerst 1989). The swale habitat forms a branch or net-like pattern between the vernal pools and around mound topography and connects the vernal pools hydrologically. These swale systems are inundated by surface flow and post-storm runoff from adjacent areas and have a greater variability in environmental conditions than do the vernal pools. The swale systems also have different species compositions, depending on parent soil and moisture regime (Holland and Jain 1981, 1988; Jokerst 1989). Butte County meadowfoam at the southern extent of its range occurs on volcanic mudflows with Corning variant soils. Occurrences near Chico are on formations of eroded mudflow formations. Butte County meadowfoam in the northern extent of the species range occur on very shallow Tuscan formation soils (Dole 1988). All four areas designated as critical habitat have a different species composition, depending on soil and hydrologic conditions. We believe that providing for a mosaic of habitat types both between and among vernal pool species is essential because it would include the full extent of the physical and environmental conditions for the species (Dole 1988; Fugate 1992; Fugate 1998; Gonzales *et al.* 1996; Ikeda and Schlising 1990; Noss *et al.* 2002a; Platenkamp 1998; Zedler *et al.* 1979). The primary constituent elements of critical habitat for *Limnanthes floccosa*

ssp. *californica* are the habitat components that provide:

(i) Vernal pools, swales, and other ephemeral wetlands and depressions of appropriate sizes and depths and the adjacent upland margins of these depressions that sustain *Limnanthes floccosa* ssp. *californica* germination, growth and reproduction, including but not limited to vernal pool swales and the margins of vernal pools on the Tuscan, Redbluff, Riverbank, and Modesto geologic formations underlain by Tuscan-Anita and Igo-Redding complex soils, among others. These habitats typically become inundated during winter rains, but are dry during the summer and do not necessarily fill with water every year; and

(ii) The associated watershed(s) and hydrologic features, including the pool basin, swales, and surrounding uplands (which may vary in extent depending on pool size and depth, soil type and depth, hardpan or claypan type and extent, topography, and climate) that contribute to the filling and drying of the vernal pool or ephemeral wetland, and that maintain suitable periods of pool inundation, water quality, and soil moisture for *Limnanthes floccosa* ssp. *californica* germination, growth and reproduction, and dispersal, but not necessarily every year.

*Unit 1, Rock Creek Unit, Butte, and Tehama Counties (15,086 ac (6,105 ha))*

This unit contains the species identified by CNDDDB (2002) within vernal pools on the Tuscan formation, which are ecologically noteworthy (criterion 2) because they typically contain water for shorter periods of time than other types of vernal pools. The unit is also geographically important (criterion 1) because it represents the northern extent of *Limnanthes floccosa* ssp. *californica*'s range, and because it represents one of only four areas where *L. f.* ssp. *californica* occurs throughout its entire range. Each unit is likely important to allow the species to tolerate natural and environmental changes, as well as stochastic events. The unit includes occurrences from the northern race of *L. f.* ssp. *californica*. This race is genetically different from the southern race (Jokerst 1989; Dole and Sun 1992) and is important to maintain genetic diversity within the species. An introduced occurrence, thought to be of the southern race, also occurs within this unit.

This unit for *Limnanthes floccosa* ssp. *californica* occupies an area north of the City of Chico and includes vernal pool habitats east of Highway 99 along the Sierra foothills from near Pine Creek

southeast to Rock Creek. All the lands within this unit are privately owned.

*Lasthenia conjugens*

Contra Costa goldfields occurrences are found in five centers of concentration in the northern and central Coast Range and western part of the Central Valley in Solano and Contra Costa County. By far the greatest concentration of this species is in the area east of Fairfield in Solano County. Contra Costa goldfields normally are found in vernal pools, swales, moist flats, and depressions within open grassy areas of woodland and valley grassland habitats. However, several historical collections were from populations growing in the saline-alkaline transition zone between vernal pools and tidal marshes on the eastern margin of the San Francisco Bay (CNDDDB 2002).

Although some of the habitat characteristics of the species are known, specific pool characteristics that determine suitability for Contra Costa goldfields germination, growth, reproduction, and dispersal are not well understood. Contra Costa goldfields normally is observed in only a few of the pools within the vernal pool complexes in which it is found, and the pool characteristics that determine suitability for Contra Costa goldfields germination and growth are unknown. By overlapping known occurrences of Contra Costa goldfields with appropriate soil types, elevations, slopes, vegetation community associations, and vernal pool types, where we know Contra Costa goldfields to occur, we have designated what we believe is the likely distribution of the seed bank around Contra Costa goldfield occurrences. Due to the species' highly restricted nature and disjunct distribution, the long-term survival of Contra Costa goldfields depends upon the protection and management of all extant populations and their associated seed banks, and the maintenance of ecological functions within and between these populations. The primary constituent elements of critical habitat for *Lasthenia conjugens* are the habitat components that provide:

(i) Vernal pools, swales, moist flats, and other ephemeral wetlands and depressions of appropriate sizes and depths and the adjacent upland margins of these depressions that sustain *Lasthenia conjugens* germination, growth, and reproduction, including, but not limited to, vernal pools on clay soils from a variety of soils series, rock outcrop pools on basalt flows, and vernal pools in saline alkaline transition zones with tidal marsh habitats. All of these habitats typically become