

west of the unit, and the Oakdale Airport is located outside of the northwest corner. The eastern boundary extends into the low-elevation foothills of the Sierra Nevada. Vernal pool complexes in the Waterford Unit are located mainly in eastern Stanislaus County, but overlap into southwestern Tuolumne County. Approximately (2 ac (0.8 ha)) of this unit is administered by the CDFG. The remaining lands within this unit are privately owned.

*Unit 7, Merced Unit, Merced, Madera, and Mariposa Counties (133,460 ac (54,011 ha))*

This unit contains numerous occurrences of the species within large, hydrologically intact vernal pool complexes areas (criterion 4) (Holland 1998; Vollmar 1999), including Northern Hardpan vernal pools on Redding, Raynor, and Bear Creek soils series (EIP 1999; USDA 2001). These soil and vernal pool type combinations are not otherwise well represented (criterion 2). Over 30 percent of the extant occurrences of *Tuctoria greenei* are in the Merced Unit (criterion 1) (CNDDDB 2002).

A majority of the vernal pool habitat in the Merced Unit is in Merced County. The eastern edge of the unit overlaps into Mariposa County and in the south it extends to the Chowchilla River in Madera County. The northern boundary parallels the Merced River. The entire unit is located east of Highway 99. Approximately 8 ac (3 ha) is owned by the Federal government and the rest is privately owned. TNC has 11,283 ac (4,513 ha) of easement lands within this unit. The remaining lands within this unit are privately owned.

*Orcuttia pilosa*

Hairy Orcutt grass occurrences are known from southern Tehama County in the Sacramento Valley to southern Madera County in the San Joaquin Valley with a predominate elevational variation of from near 55 m (180 ft) to near 123 m (405 ft). Conserving a broad distribution of hairy Orcutt grass across its geographical and elevational distribution protects the natural environmental processes for the species and provides the best chance for retaining the species across the full extent of its range. The vernal pool types and soils associated with the six areas of concentration of hairy Orcutt grass differ greatly across the geographic range of the species; these differences lead to different species compositions and environmental conditions between hairy Orcutt grass occurrences. Providing for a mosaic of habitat types both between and among vernal pool

species occurrences is essential to the species' conservation because it would include the full extent of the physical and environmental conditions for the species (Fugate 1992; Fugate 1998; Gonzales *et al.* 1996; Ikeda and Schlising 1990; Noss *et al.* 2002a; Platenkamp 1998; Zedler *et al.* 1979). The distribution of hairy Orcutt grass reflects a diversity of vernal pool habitat types that provide habitat for the species on the alluvial fans and old stream terraces of the Sierra Nevada foothills. Vernal pool complexes that provide suitable habitat for this species include mostly three different physiographic and edaphic settings—old high and lower old stream terrace areas with soils having an iron-silica hardpan and sites with shallow soils underlain by cemented tuffaceous alluvium. The Tehama County occurrences of hairy Orcutt grass are associated with slightly to medium acid soils of the Tuscan and Anita soil series that are underlain by an iron-silica cemented hardpan. Not all areas of hairy Orcutt grass have been identified as to the specific soil series or soil mapping units on which they occur. Many of the occupied vernal pools vary in size from 3,400 sq m (36,600 sq ft) to 250 ha (618 ac). A vernal pool's parent material greatly influences the 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). The primary constituent elements of critical habitat for *Orcuttia pilosa* 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 *Orcuttia pilosa* germination, growth and reproduction, including but not limited to features occurring on both acidic and saline-alkaline soils, with an iron-silica cemented hardpan or claypan, and that 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 *Orcuttia pilosa* germination, growth and reproduction, and dispersal, but not necessarily every year.

*Unit 1, Vina Plains Unit, Tehama and Butte Counties (19,306 ac (7,813 ha))*

This area supports over 25 percent of all known occurrences of the species, and represents the northern extent of the species range (criterion 1) (CNDDDB 2002). It is over 25 mi (40 km) from the nearest occurrence to the south. Species occurrences in the unit grow in large vernal pools on Tuscan and Anita soils (USDA 2001). This area represents one of only two occupied locations that have some form of special habitat protection (criterion 4).

The unit for *Orcuttia pilosa* occupies the area south of Deer Creek and north of Pine Creek to near Cana Highway. California State Route 99 bisects the unit and the western boundary generally parallels the Southern Pacific Railway line. The majority of the lands included within this unit are privately owned. Land ownership includes 5,660 ac (2,264 ha) owned by TNC, which also has additional 9,564 ac (3,826 ha) of conservation easements within this unit, and 142 ac (57 ha) of private land protected by conservation easement or agreement under the WRP.

*Unit 4, Turlock Unit, Stanislaus and Merced Counties (48,649 ac (19,688 ha))*

Vernal pool complexes in the Turlock Unit are located in eastern Stanislaus and Merced Counties. The unit contains occurrences of *Orcuttia pilosa* within vernal pool complexes on Whitney and Meikle soil mapping units, which are not otherwise well represented (criterion 2) (Holland 1998; USDA 2001; CNDDDB 2002). This unit also contains the Hickman pools in Stanislaus County, and a high concentration of *O. pilosa* occurrences (CNDDDB 2002). The Hickman pool complex contains one of the largest vernal lakes in California at more than 300 ac (121 ha) and represents a unique habitat for *O. pilosa* (criterion 2). The unit encompasses large, intact vernal pool complexes that are more likely to allow the species to persist over time (criterion 4).

The Turlock Unit is bordered by the Tuolumne River to the north and the Merced River to the south. It lies between the towns of La Grange and Snelling. Stanislaus County Road J9 runs west of the unit and the eastern edge is located in the low elevation foothills of the Sierra Nevada. Land ownership within this unit includes BLM (17 ac (7 ha)) and California State Parks (41 ac (17 ha)). The remaining land within this unit is privately owned.