

Platenkamp 1998, Zedler *et al.* 1979). The distribution of San Joaquin Valley 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 old stream terrace areas with Redding and related soil series; lower old stream terraces with San Joaquin and related soil series having an iron-silica hardpan but less strongly acidic sites with shallow, residual soils of the Pentz and related soil series underlain by a well-cemented tuffaceous alluvium. One occurrence in Fresno County is found in a rather shallow stony moderately to strongly acidic vernal pool complex on residual soils of the Hideaway series at a relatively high elevation. Not all areas of San Joaquin Valley Orcutt grass have been identified as to the specific soil series or soil mapping units on which they occur. The parent material of vernal pools greatly influences species composition and hydrologic functioning of the vernal pool (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 inaequalis* 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 inaequalis* germination, growth and reproduction, including but not limited to vernal pools on alluvial fans, high and low stream terraces, and tabletop lava flows. 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 *Orcuttia inaequalis* germination, growth and reproduction, and dispersal, but not necessarily every year.

*Unit 1, Merced Unit, Merced and Mariposa Counties (93,125 ac (37,699 ha))*

This unit is an important representative of the geographic diversity of *Orcuttia inaequalis* (criterion 1) because it supports over half of the known occurrences of the species, and represents the northernmost extent of the species' current range (CNDDDB 2001). It is also ecologically important (criterion 2) because it contains the only area where *O. inaequalis* is found on vernal pools formed on Corning and Greenfield soils, and one of only two sites where it is found on San Joaquin soils (Holland 1998; EIP 1999; USDA 2001). This unit supports some of the largest, most robust occurrences of the species (Holland 2000). The area within this unit encompasses the largest block of pristine, high density vernal pool grasslands remaining in California, increasing the likelihood that it will continue to support occurrences of the species into the future (criterion 4) (Vollmar 1999).

A majority of the vernal pool habitat in the Merced Unit is in Merced County, although the eastern edge of the unit overlaps into Mariposa County in the low elevation foothills of the Sierra Nevada. The entire unit is located east of State Highway 99. A majority of the land in the Merced Unit is privately owned. Approximately 8 ac (3 ha) of this unit is owned by the Federal government. TNC has 8,559 ac (3,424 ha) of easement lands within this unit.

*Unit 2, Le Grand Unit, Merced, Mariposa, and Madera Counties (32,152 ac (13,012 ha))*

This unit supports *Orcuttia inaequalis* occurrences within vernal pools formed on alluvial terraces on Raynor clay soils (CNDDDB 2001). The lack of such soils at other occurrence sites makes the unit ecologically important (criterion 2). The Le Grand Unit is also essential for the conservation of the species because it contains large intact and contiguous vernal pool grassland areas that provide connectivity between units to the north and south (criterion 3). This unit is important to maintain the range of habitats in which the species is known to occur.

The Le Grand Unit contains an area where *Orcuttia inaequalis* was introduced into six created pools. It germinated and flowered in five of them during the 2 years following its introduction (Durgarian 1995; Stebbins *et al.* 1995) and was still present in 2000 (Faubion, *in litt.* 2000), thus demonstrating the suitability of the

habitat to support this species. This site is now treated as an occurrence by the CNDDDB (2001). The Madera Irrigation District manages the property, which is owned by the BOR (Stebbins *et al.* 1995).

A majority of the vernal pool habitat in the Le Grand Unit is in eastern Merced County. The eastern edge of the unit overlaps into Mariposa County and in the south it extends to the Madera County line. Bear Creek serves as the northern boundary. The entire unit is located east of State Highway 99. TNC has 1,070 ac (428 ha) of easement lands within this unit. The remaining lands are privately owned.

*Unit 4, Fresno Unit, Fresno County (7,451 ac (3,016 ha))*

This unit contains *Orcuttia inaequalis* occurrences within vernal pools formed on Fallbrook, Ramona, San Joaquin, Vista, and Pollasky soil series (CNDDDB 2002). Possibly due to this variation of soil types, vernal pool habitat in this unit is less dense than habitat in units further north. The diversity of vernal pool types found within the Fresno Unit contributes to the range of ecological conditions in which *O. inaequalis* occurs (criterion 2). Vernal pool types within this unit include Northern Hardpan vernal pools. The unit is also likely to be important because it provides connectivity for pollen and seeds between units 3 and 5 (criterion 3).

Located in Fresno County, this unit contains vernal pool habitat south of Millerton Lake and east of the San Joaquin River. The eastern boundary parallels the low elevation foothill region of the Sierra Nevada. All the land within this unit is privately owned.

*Unit 5A, Table Mountain Unit, Fresno County (4,258 ac (1,723 ha))*

This area supports *Orcuttia inaequalis* occurrences within Northern Basalt Flow vernal pools (Holland 1998; Keeler-Wolf *et al.* 1998; CNDDDB 2002). This is the only area in which the species is known to occur within these pool types (criterion 2) (CNDDDB 2002). Northern Basalt Flow vernal pool complexes are an extremely rare vernal pool habitat occurring only on ancient terraces and hilltops above the surrounding low-lying terrain. They typically contain small, irregularly clustered pools with "flashy hydrology" (Keeler-Wolf *et al.* 1998). This unit is also geographically noteworthy (criterion 1) because it marks the easternmost extent of the range, and includes occurrences at the highest elevations for the species.