

maintain suitable periods of pool inundation, water quality, and soil moisture for vernal pool crustacean hatching, growth and reproduction, and dispersal, but not necessarily every year.

Unit 1, Vina Plains Unit, Butte and Tehama Counties (41,733 ac (16,890 ha))

This unit contains vernal pools found on Anita clay and Tuscan loam soils (EPA 1994; Holland 1998; Tehama County 1999; USDA 2001), and represents the northern extent of Conservancy fairy shrimp range. Conservancy fairy shrimp in this area occupy vernal pools that are classified as Northern Hardpan by Sawyer and Keeler-Wolf (1995) and occur on the Tuscan, Red Bluff, and Riverbank geologic formations. Within this unit vernal pools occur in complexes with a range of pool sizes, from over several acres (hectares) to less than a 0.1 ac (500 m²), in areas of hummocky ground on old terraces above recent river flood plains below the foothills (Alexander and Schlising 1997; Keeler-Wolf *et al.* 1998). The unit is essential to ensure the conservation of the species in general, as well as in the northern extent of its range (criterion 1). It is also essential to the conservation of the ecological distribution of the species, because of the wide range of occupied pool sizes and because the combination of soils, geologic formations, and pool type is not otherwise well represented for the species (criterion 2). The unit is also important because it includes relatively undisturbed, hydrologically intact vernal pool habitats that will likely continue to support natural vernal pool ecosystem processes and meet the appropriate habitat conditions for Conservancy fairy shrimp (criterion 4), and because it provides seasonal habitat for waterfowl and other migratory bird species that aid in the dispersal of Conservancy fairy shrimp among vernal pools within the unit, as well as between other habitats across the species range (criterion 3).

The majority of the lands included within this unit are privately owned. This unit contains The Nature Conservancy's (TNC) Vina Plains preserve as well as other TNC lands 5,660 ac (2,264 ha) and conservation easements 10,870 ac (4,348 ha). The Natural Resource Conservation Services (NRCS) also holds Wetlands Reserve Program (WRP) conservation easements or agreements on 142 ac (57 ha).

The Vina Plains Unit extends from south of Deer Creek to north of Rock Creek and the Chico Airport near the City of Chico. State Highway 99 bisects this unit. The western boundary

generally parallels the Southern Pacific Railway line. The eastern boundary of this unit extends to the boundary of the East Red Bluff watershed.

Unit 6, Merced Unit, Merced and Mariposa Counties (132,902 ac (53,785 ha))

This unit contains Conservancy fairy shrimp occurrences within large playa vernal pools found on Raynor Cobbly clay soils on the Mehrten Formation (EIP Associates 1999; CNDDDB 2001). This soil and geologic formation combination is not represented by any of the other units (criterion 2). The Merced Unit encompasses the largest block of pristine, high-density vernal pool grasslands remaining in California (Vollmar 2002). The relatively undisturbed, hydrologically intact condition of the unit increases the likelihood that it will continue to support natural vernal pool ecosystem processes and maintain suitable habitat conditions for Conservancy fairy shrimp (criterion 4). The Conservancy fairy shrimp occurrence at the Flying M Ranch is already being managed through a conservation easement with TNC that conserves over 5,000 ac (2,023 ha) of vernal pool and upland habitat (criterion 4). Land ownership within the unit includes approximately 8 ac (3 ha) of Federal lands and TNC has a total of 11,283 ac (4,513 ha) of conservation easements within this unit.

A majority of the vernal pool habitat in the Merced Unit is in eastern Merced County. The eastern edge of the unit overlaps into western Mariposa County, and in the south, it extends to Deadman Creek. The northern boundary parallels the Merced River. The unit is located east of Highway 99 and the City of Merced, Planada, and Le Grand. The eastern boundary extends into the low elevation foothills of the Sierra Nevada.

Unit 8, Ventura County Unit, Ventura County (46,531 ac (18,831 ha))

The Ventura County Unit is located in the north-central portion of Ventura County. With the exception of 1,951 ac (790 ha) that are privately owned, all other land within this unit occurs within the Los Padres National Forest. Vernal pool fairy shrimp and Conservancy fairy shrimp co-occur at relatively high-elevation (5,500 ft (1,700 m)) forested sites within this unit. This combination of attributes is ecologically unique because these species normally occur at much lower elevations in grassland habitat. The critical habitat perimeter encompasses an area that is known to contain vernal pool and Conservancy fairy shrimp and isolated pools that provide habitat for both

species. Few fairy shrimp surveys exist for this unit. However, listed fairy shrimp probably occur at several additional locations with suitable ephemeral aquatic habitat. A further potential benefit of designating this unit is that it may help to promote efforts to identify and proactively manage such locations, which are not typically associated with these invertebrates. The Ventura County Unit is essential for the conservation of Conservancy fairy shrimp because it contains high elevation ephemeral aquatic environments that are rarely associated with fairy shrimp (criterion 2). This unit also represents the extreme southern end of the species range, and is 124 mi (200 km) from other species occurrences in the Great Central Valley (criterion 1).

Longhorn Fairy Shrimp Criteria

Longhorn fairy shrimp occurrences are highly disjunct and scarce within the geographic range in which they occur. There are fewer areas in which this species is known to occur than any other listed vernal pool crustacean. The specific pool characteristics that determine suitability for longhorn fairy shrimp reproduction and growth are not well understood. We identified critical habitat areas essential to the conservation of longhorn fairy shrimp in three areas in which it is known to occur. In determining areas that are essential to conserve longhorn fairy shrimp, we used the best scientific and commercial data available. Longhorn fairy shrimp occurrences are known from Contra Costa County to San Luis Obispo County with an elevational variation of near 15 m (50 ft) to near 600 m (2,000 ft). A broad distribution of longhorn fairy shrimp 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 the species range. The vernal pool types and soils associated with the three general areas of concentration of longhorn fairy shrimp differ greatly across the geographic range of the species and leads to different species compositions and environmental conditions between longhorn fairy shrimp occurrences. 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 (Fugate 1992; Fugate 1998; Gonzales *et al.* 1996; Ikeda and Schlising 1990; Noss *et al.* 2002a, Platenkamp 1998; Zedler *et al.* 1979). The Altamont Pass subunits (unit 1abc)