

The critical habitat units were delineated by using ArcView (Environmental Systems Research Institute, Inc.), a computer GIS program to evaluate GIS data derived from a variety of Federal, State, and local agencies, and from private organizations and individuals. Data layers included current and historic species occurrence locations (CNDDDB 2002), mapped vernal pool grassland habitats (Holland 1998, 2003), and/or other vernal pool location information. We presumed occurrences identified in CNDDDB to be extant unless there was affirmative documentation that an occurrence had been extirpated. We also relied on unpublished species occurrence data contained within our files including section 10(a)(1)(A) reports and biological assessments. These data layers were then mapped onto SPOT imagery (satellite aerial photography) (CNES/SPOT Image Corporation 1993–2000) for each vernal pool region identified by Keeler-Wolf *et al.* 1998 to help us identify which specific areas contained the vernal pool species and their habitat.

We then evaluated the areas defined by the overlap of the combined coverages (data layers) to initially focus on which areas may provide those physical and biological features essential to the conservation of the 15 vernal pool species. The areas were further refined by using satellite imagery, watershed boundaries, geologic landform coverages, elevational modeling data, soil type coverages, vegetation/land cover data, and agricultural/urban land use data to eliminate areas that did not contain the appropriate vegetation or associated native plant species, as well as features such as cultivated agriculture fields, housing developments, and other areas that are unlikely to contribute to the conservation of the 15 vernal pool species. Each of the factors identified above had a bearing on the total size and spatial configuration of the conglomeration of units for each species, as well as the size and location of each of the individual units. Whenever possible, geographic features (e.g., ridge lines, valleys, streams, plateaus, geologic formations, shorelines, etc.) or manmade features (e.g., roads or obvious land use) that created an obvious boundary for a unit were used as unit area boundaries.

The resulting delimited areas or lands for each species were then considered to define all habitat for that species, including occupied and unoccupied habitat. These lands were further evaluated to determine which of specific areas are essential to the conservation of each of the 15 listed

vernal pool species. Several tools were used to assist us in delineating the specific areas that we believed to contain the primary constituent elements for each species and therefore essential to the species' conservation. These included: (1) Generally accepted conservation biology principles as described below; (2) information in recovery plans covering the subject species; (3) peer reviewed, published literature; (4) expert opinion for each of the species. The resulting areas were subsequently proposed as critical habitat for the 15 vernal pool species.

Following publication of the proposed critical habitat rule for the 15 vernal pool species (67 FR 59884), we re-evaluated the lands proposed based on information received during the public comment period, from local habitat and species experts, or otherwise made available to us. We also used updated detailed aerial photography provided by county planning departments, and DOQQs from the USGS. In Merced County, local experts including National Wildlife Refuge and CDFG biologists were consulted to identify and verify habitat areas. We also visited selected locations to determine if they contained the PCEs.

Because the minimum mapping unit of the Holland (1998) vernal pool habitat data was 40 ac (16 ha), and the resolution of the SPOT imagery did not allow us to identify all vernal pool habitat, we refined unit boundaries based on additional GIS data layers when necessary and available, including soils information from the Soil Survey Geographic data bases (U.S. Department of Agriculture (USDA) 1998–2001), and the California State Soil Geographic data bases (USDA 1994). We used geologic information developed by the California Department of Mines and Geology (2000) and Liss (2001). To identify the extent of flat or gently sloping topography where vernal pools are found, we evaluated Digital Elevation Models from the USGS (2000).

We also used a number of local GIS data sets for specific areas, including information developed through the Riverside Multiple Species HCP and the Vernal Pools of Southern California Final Recovery Plan (Service 1998), habitat mapping for Butte County (U.S. Environmental Protection Agency (EPA) 1994), Tehama County (2001), Shasta County (2001), Placer County (Glazner 2001), Solano County (2000), Yolo County (1995), Sacramento County (1999), and San Joaquin County (2000) in California, and by the Rogue Valley Council of Governments in Oregon (Evans 2000). Other smaller scale mapping efforts were reviewed from

Solano County Farmlands and Open Space (2000) and East Bay Regional Parks District (2001). Aerial photographs for eastern Merced County were used to determine habitat conditions. The specific layers used and the methodology employed for each unit is described within the Unit Descriptions section. To determine land ownership within each unit, we used data from the State of California (Davis *et al.* 1998) and the U.S. Bureau of Indian Affairs in Sacramento, California (2001).

We excluded areas that do not contain one or more of the PCEs or were not essential for the conservation of the vernal pool species because: (1) The area is highly degraded and may not be restorable; (2) the area is small, highly fragmented, or isolated, and may provide little or no long-term conservation value; or (3) the area is excluded under section 4(b)(2) of the Act for military, economic or other reasons (See Exclusions Under section 4(b)(2)). The critical habitat units were further refined to remove lands determined not to be essential to the conservation of the vernal pool species through analysis conducted through the section 7 or section 10 process. The specific modifications are described in the Summary of Changes from the Revised Proposed Rule section of this rule.

### Primary Constituent Elements

In accordance with section 3(5)(A)(i) of the Act and regulations at 50 CFR 424.12(b), in determining which areas to propose as critical habitat, we consider those physical and biological features essential to the conservation of the species and that may require special management considerations or protection. These include, but are not limited to, the following: (1) Space for individual and population growth, and for normal behavior; (2) food, water, air, light, minerals, or other nutritional or physiological requirements; (3) cover or shelter; (4) sites for breeding, reproduction, rearing of offspring, germination, or seed dispersal; and, generally; and (5) habitats that are protected from disturbance or are representative of the historic geographical and ecological distributions of a species. Our regulations at 50 CFR 424.12(b) further direct that when considering the designation of critical habitat, we are to focus on the principal biological or physical constituent elements within the defined area that are essential to the conservation of the species, and we are to list known PCEs with the critical habitat description. Our regulations