

Lake-Reyes association are considered suitable to marginal soils for containing wetlands or habitat for California tiger salamander (P. Northen, pers. comm., 2002). The Clear Lake-Reyes association is found from the Cotati region south and east of Petaluma to the tidelands of northern San Francisco Bay where the salt marsh habitat is unsuitable for the California tiger salamander. There are also scattered areas of the Clear Lake-Reyes association found south and southwest of the town of Sonoma (USDA 1972, 1990). There are no known records of the California tiger salamander from the area around the town of Sonoma (D. McGriff, pers. comm., 2002), and there is now extensive urban and agricultural development in this portion of the county.

#### Peer Review

In accordance with our July 1, 1994, Interagency Cooperative Policy for Peer Review in Endangered Species Act Activities (59 FR 34270), we solicited the expert opinions of 12 independent specialists regarding pertinent scientific or commercial data and assumptions relating to the taxonomy, population status, and supporting biological and ecological information for the California tiger salamander in Sonoma County. The purpose of such review is to ensure that listing decisions are based on scientifically sound data, assumptions, and analyses, including input of appropriate experts and specialists. Information and suggestions provided by the reviewers were incorporated or addressed as applicable.

We received peer reviews from five of the experts. All of them agreed the Sonoma County California tiger salamander is imperiled throughout all or a portion of its range. One reviewer provided references on threats from disease the reviewer believed relevant to our final rule decision. This peer reviewer also stated that threats from disease are much more severe for small populations. Another peer reviewer recommended a number of editorial clarifications in the emergency and proposed rules. The third peer reviewer stated that the California tiger salamander should be listed throughout its range. A fourth peer reviewer provided additional information on the California tiger salamander, and the fifth peer reviewer, based on years of field work, agreed that the Sonoma County California tiger salamander is endangered.

#### Summary of Factors Affecting the Species

Section 4 of the Act and regulations (50 CFR part 424) promulgated to implement the listing provisions of the Act describe the procedures for adding species to the Federal list. We may determine a species to be endangered or threatened due to one or more of the five factors described in section 4(a)(1). These factors, and their application to the Sonoma County California tiger salamander, are as follows:

##### *A. The Present or Threatened Destruction, Modification, or Curtailment of Its Habitat or Range*

The Sonoma County California tiger salamander population, as well as the population in Santa Barbara County, which we listed as endangered (65 FR 57242, September 21, 2000), are considered to be the most vulnerable of the six populations of the California tiger salamander (LSA Associates, Inc. 2001; Shaffer and Trenham 2002). Urban development is the primary threat to the Sonoma County California tiger salamander. The DPS now occurs in scattered, and increasingly isolated, breeding sites within a small portion of its historic range on the Santa Rosa Plain in Sonoma County. Five known breeding sites of this DPS have been destroyed in the last 2 years. All of the eight known remaining breeding sites are distributed in the City of Santa Rosa and immediate associated unincorporated areas, an area approximately 8 km (5 mi) long by 6 km (4 mi) wide. Within this area and south to the Cotati area, there are scattered records of adult salamanders crossing roads during the fall and winter rains, and also sporadic instances of breeding in roadside ditches and low-quality pools. However, these roadside ditches and low-quality pools likely do not represent viable breeding sites because they either do not have sufficient ponding duration and/or associated uplands for estivation.

The eight known breeding sites are imperiled by the construction of high-density housing, office buildings, roads, and other development. The survival and viability of the Sonoma County California tiger salamander is directly related to availability of breeding pools with hydrological and other factors conducive to the salamander's reproduction. There also must be adequate upland acreage, with associated small mammal burrows, in the vicinity of the Sonoma County California tiger salamander breeding pools to accommodate estivation. The Santa Rosa Plain once contained

extensive valley oak woods, native grasslands, riparian, and vernal pools (1942 aerial photographs on file with Dr. Phil Northen at California State University at Sonoma). Vernal pools and seasonal wetlands likely were extensive, due to the flat terrain, clay soils, and relatively high rainfall (CH2M Hill 1995). Based on the topography and habitat type of the lands that have been converted to urban development and agriculture on the Santa Rosa Plain, the number of breeding ponds, the extent of upland habitats, and the quality of the remaining habitats has been greatly reduced since Europeans first settled the region.

The extent of the historic range of the California tiger salamander within the Santa Rosa Plain in Sonoma County is uncertain due to limited information collected on this population prior to the 1990s (Shaffer *et al.* 1993; Jennings and Hayes 1994). However, based on the habitat requirements of the species for low elevation, seasonally filled breeding ponds and small rodent burrows, the ecology of the taxon, the general trend of urban development into suitable and occupied habitat, and other adverse factors affecting the species, we believe that it once occupied a more extensive, but still limited area within the Santa Rosa Plain.

A 1990 study of the Santa Rosa Plain found that 25 percent of an 11,300-ha (28,000-ac) study area had been converted to subdivisions, "ranchettes," golf courses, and commercial buildings (Waland *et al.* 1990). An additional 17 percent of the study area had been converted to agricultural uses. Since 1990, many more acres have been urbanized and converted to intensive agriculture, particularly vineyards. Even relatively minor habitat modifications, such as construction of roads, storm drains, and road curbs that traverse the area between breeding and estivation sites, increase habitat fragmentation, impede or prevent migration, and result in direct and indirect mortality of California tiger salamanders (Mader 1984; S. Sweet, *in litt.* 1993, 1998; Findlay and Houlihan 1996; Launer and Fee 1996; Gibbs 1998). All of the remaining known Sonoma County California tiger salamander breeding pools are within 450 m (1,476 ft) of roads and residential development, and five of the eight remaining viable breeding locations are within 100 m (328 ft) of major development activities.

#### Urban Development

Urban development poses a significant threat to all of the known breeding sites of the Sonoma County California tiger salamander. Six of these