DEPARTMENT OF THE INTERIOR

Fish and Wildlife Service

50 CFR Part 17

RIN 1018–AI61

Endangered and Threatened Wildlife and Plants; Determination of Endangered Status for the Sonoma County Distinct Population Segment of the California Tiger Salamander

AGENCY: Fish and Wildlife Service, Interior.

ACTION: Final rule.

SUMMARY: We, the Fish and Wildlife Service (Service), determine endangered status for the Sonoma County distinct population segment (DPS) of the California tiger salamander (*Ambystoma californiense*), under the Endangered Species Act of 1973, as amended (Act). In Sonoma County, the California tiger salamander is imperiled by a variety of factors including habitat destruction, degradation, and fragmentation due to urban development, hybridization with non-native salamanders, inadequate regulatory mechanisms, disease, and pesticide drift. We listed this DPS on an emergency basis on July 22, 2002. The emergency designation expires on March 19, 2003. This rule is effective upon publication in the **Federal Register,** and implements the Federal protection and recovery provisions afforded by the Act for the Sonoma County DPS of the California tiger salamander. This final rule is being issued as a result of a settlement agreement and consent decree.

DATES: This rule is effective on March 19, 2003.

ADDRESSES: The complete file for this final rule is available for inspection, by appointment, during normal business hours at the Sacramento Fish and Wildlife Office, U.S. Fish and Wildlife Service, 2800 Cottage Way, Suite W–2605, Sacramento, CA 95825.

FOR FURTHER INFORMATION CONTACT: David E. Wooten, Susan Moore, or Chris Nagano, Sacramento Fish and Wildlife Office, at the address listed above (telephone 916/414–6600; facsimile 916/414–6713).

SUPPLEMENTARY INFORMATION:

Background

The California tiger salamander was first described as *Ambystoma californiense* by Gray in 1853, based on specimens that had been collected in Monterey, California (Grinnell and Camp 1917). Storer (1925) and Bishop (1943) also considered the California tiger salamander to be a distinct species. Dunn (1940), Gehlbach (1967), and Frost (1985) stated that the California tiger salamander was a subspecies of the more widespread tiger salamander (*Ambystoma tigrinum*). However, based on recent studies of the genetics, geographic distribution, and ecological differences among the members of the *A. tigrinum* complex, the California tiger salamander is now considered to be a distinct species (Shaffer and Stanley 1991; Shaffer *et al.* 1993; Jones 1993; Shaffer and McKnight 1996; Irschick and Shaffer 1997; Petranka 1998). The range of this animal does not naturally overlap with any other species of tiger salamander (Stebbins 1985; Petranka 1998).

The California tiger salamander is a large, stocky, terrestrial salamander with small eyes and a broad, rounded snout. Adults may reach a total length of 208 millimeters (mm) (8.2 inches (in)), with males generally averaging about 203 mm (8 in) in total length and females averaging about 173 mm (6.8 in) in total length. For both sexes, the average snout-vent length is approximately 91 mm (3.6 in). The small eyes have black irises and protrude from the head. Coloration consists of white or pale yellow spots or bars on a black background on the back and sides. The belly varies from almost uniform white or pale yellow to a variegated pattern of white or pale yellow and black. Males can be distinguished from females, especially during the breeding season, by their swollen cloacae (a common chamber into which the intestinal, urinary, and reproductive canals discharge), more developed tail fins, and larger overall size (Stebbins 1962; Loredo and Van Vuren 1996).

California tiger salamanders are restricted to vernal pools and seasonal ponds in grassland and oak savannah plant communities from sea level to about 460 meters (m) (1,500 feet (ft)) (Stebbins 1989; Shaffer *et al.* 1993; Jennings and Hayes 1994; Petranka 1998; California Natural Diversity Data Base (CNDDB) 2002). Genetic studies of the California tiger salamander suggest that levels of interchange among populations are very low, and that populations or groups of subpopulations (metapopulations) are genetically isolated from one another (Shaffer *et al.* 1993; Shaffer and Trenham 2002). Studies of mitochondrial DNA and allozymes (proteins) indicate that there are six populations of *Ambystoma californiense,* which are found in: (1) The Santa Rosa area of Sonoma County; (2) the Bay Area (central and southern Alameda, Santa Clara, western Stanislaus, western Merced, and the majority of San Benito counties); (3) the Central Valley (Yolo, Sacramento, Solano, eastern Contra Costa, northeast Alameda, San Joaquin, Stanislaus, Merced, and northwestern Madera counties); (4) southern San Joaquin Valley (portions of Madera, central Fresno, and northern Tulare and Kings counties); (5) the Central Coast Range (southern Santa Cruz, Monterey, northern San Luis Obispo, and portions of western San Benito, Fresno, and Kern counties); and (6) Santa Barbara County (Shaffer and Trenham 2002).

The California tiger salamander in Sonoma County inhabits low-elevation (below 60 m (200 ft)) vernal pools and seasonal ponds, associated grassland, and oak savannah plant communities. The historic range of the species also may have included the Petaluma River watershed, as there is one historic record of a specimen from the vicinity of Petaluma from the mid-1800s (Borland 1856, as cited in Storer 1925).

California tiger salamanders found in the Santa Rosa Plain in Sonoma County are geographically separated from other California tiger salamander populations. The closest California tiger salamander populations to Sonoma County are located in Contra Costa, Yolo, and Solano counties, which are separated from the Sonoma County population by the Coast Range, Napa River, and the Carquinez Straits, a distance of about 72 kilometers (km) (45 miles (mi)).

Subadult and adult California tiger salamanders spend the dry summer and fall months of the year estivating (a state of dormancy or inactivity in response to hot, dry weather) in the burrows of small mammals, such as California ground squirrels (*Spermophilus beecheyi*) and Botta's pocket gopher (*Thomomys bottae*) (Storer 1925; Loredo and Van Vuren 1996; Petranka 1998; Trenham 1998a). During estivation, California tiger salamanders eat very little (Shaffer *et al.* 1993). Once fall or winter rains begin, they emerge from these retreats on rainy nights to feed and to migrate to the breeding ponds (Stebbins 1985, 1989; Shaffer, *et al.* 1993). The salamanders breeding in, and living around, a seasonal pool or pools, and associated uplands where estivation can occur are said to occupy a breeding site. A breeding site is defined as a location where the animals are able to successfully breed in years of ''normal'' rainfall and complete their estivation (derived from Trenham 1998b and 2001). Normal rainfall in Santa Rosa is 76 centimeters (cm) (30 in) per year (National Weather Service 2002).

Occurrence of California tiger salamanders in Sonoma County is significantly associated with occurrence of gophers (D. Cook, The Wildlife Society, pers. comm., 2002). Active gopher burrows probably are needed to sustain California tiger salamanders because inactive burrow systems become progressively unsuitable over time. California tiger salamanders cannot persist without estivation habitat.

Adult California tiger salamanders may migrate up to 2 km (1 mi) from their estivation sites to the breeding ponds (S. Sweet, University of California, Santa Barbara, *in litt.,* 1998), which may be vernal pools, stockponds, or other seasonal water bodies. The distance between the estivation sites and breeding pools depends on local topography and vegetation, and the distribution of ground squirrel or other rodent burrows (Stebbins 1989; Lawrence Hunt, consultant, *in litt.,* 1998). Males migrate before females (Twitty 1941; Shaffer *et al.* 1993; Loredo and Van Vuren 1996; Trenham 1998b). Males usually remain in the ponds for an average of about 6 to 8 weeks, while females stay for approximately 1 to 2 weeks. In dry years, both sexes may stay for shorter periods (Loredo and Van Vuren 1996; Trenham 1998b). Most marked salamanders have been recaptured at the pond where they were initially captured; in one study approximately 80 percent were recaptured at the same pond (Trenham 1998b). The rate of natural movement of salamanders among breeding sites depends on the distance between the ponds or complexes of ponds and on the intervening habitat (*e.g.,* salamanders may move more quickly through sparsely covered and more open grassland than densely vegetated lands) (Trenham 1998a). As with migration distances, the number of ponds used by an individual over its lifetime will be dependent on landscape features and environmental factors.

The adults mate in the ponds and the females lay their eggs in the water (Twitty 1941; Shaffer *et al.* 1993; Petranka 1998). Females attach their eggs singly, or in rare circumstances, in groups of two to four, to twigs, grass stems, vegetation, or debris (Storer 1925; Twitty 1941). In ponds with no or limited vegetation, they may be attached to objects, such as rocks and boards on the bottom (Jennings and Hayes 1994). After breeding, adults leave the pool and return to the small mammal burrows (Loredo *et al.* 1996; Trenham 1998a), although they may continue to come out nightly for approximately the next 2 weeks to feed (Shaffer *et al.* 1993). In drought years, the seasonal pools may not form and the adults can not breed (Barry and Shaffer 1994).

Salamander eggs hatch in 10 to 14 days with newly hatched salamanders (larvae) ranging from 11.5 to 14.2 mm (0.45 to 0.55 in) in total length (Petranka 1998). The larvae are aquatic. They are yellowish gray in color and have broad fat heads, possess large, feathery external gills, and broad dorsal fins that extend well onto their back. The larvae feed on zooplankton, small crustaceans, and aquatic insects for about 6 weeks after hatching, after which they switch to larger prey (J. Anderson 1968). Larger larvae have been known to consume smaller tadpoles of Pacific treefrogs (*Pseudacris regilla*) and California red-legged frogs (*Rana aurora*) (J. Anderson 1968; P. Anderson 1968). The larvae are among the top aquatic predators in the seasonal pool ecosystems. They often rest on the bottom in shallow water, but also may be found at different layers in the water column in deeper water. The young salamanders are wary and when approached by potential predators will dart into vegetation on the bottom of the pool (Storer 1925).

The larval stage of the California tiger salamander usually lasts 3 to 6 months, as most seasonal ponds and pools dry up during the summer (Petranka 1998). Amphibian larvae must grow to a critical minimum body size before they can metamorphose (change into a different physical form) to the terrestrial stage (Wilbur and Collins 1973). Individuals collected near Stockton in the Central Valley during April varied from 47 to 58 mm (1.85 to 2.3 in) in length (Storer 1925). Feaver (1971) found that larvae metamorphosed and left the breeding pools 60 to 94 days after the eggs had been laid, with larvae developing faster in smaller, more rapidly drying pools. The longer the ponding duration, the larger the larvae and metamorphosed juveniles are able to grow, and the more likely they are to survive and reproduce (Pechmann *et al.* 1989; Semlitsch *et al.* 1988; Morey 1998; Trenham 1998b). The larvae will perish if a site dries before they complete metamorphosis (P. Anderson 1968; Feaver 1971). Pechmann *et al.* (1989) found a strong positive correlation between ponding duration and total number of metamorphosing juveniles in five salamander species. In Madera County, Feaver (1971) found that only 11 of 30 pools sampled supported larval California tiger salamanders, and five of these dried before metamorphosis could occur. Therefore, out of the original 30 pools, only six (20 percent) provided suitable conditions for successful reproduction that year. Size at metamorphosis is positively correlated with stored body fat and survival of juvenile amphibians, and negatively correlated with age at first reproduction (Semlitsch *et al.* 1988; Scott 1994; Morey 1998).

When the metamorphosed juveniles leave their ponds in the late spring or early summer, before the ponds dry completely, they settle in small mammal burrows at the end of their nightly movements (Zeiner *et al.* 1988; Shaffer *et al.* 1993; Loredo *et al.* 1996). Like the adults, juveniles may emerge from these retreats to feed during nights of high relative humidity (Storer 1925; Shaffer *et al.* 1993) before settling in their selected estivation sites for the dry, hot summer months. Juveniles have been observed to migrate up to 1.6 km (1 mi) from breeding ponds to estivation areas (Austin and Shaffer 1992).

An estimated 83 percent of the salamanders rely on rodent burrows for shelter (Petranka 1998). Mortality of juveniles during their first summer exceeds 50 percent (Trenham 1998b). Emergence from estivation in hot dry weather occasionally results in mass mortality of juveniles (Holland *et al.* 1990). Juveniles do not typically return to the breeding pools until they reach sexual maturity at several years of age (Trenham 1998b; L. Hunt, *in litt.,* 1998). Trenham (1998b) estimated survival from metamorphosis to maturity at his study site at less than 5 percent, well below the estimated replacement level of 18 percent that would maintain the population. Adult survivorship varies greatly between years, but is a crucial determinant of whether a population is a source or sink (*i.e.,* whether net productivity exceeds the level necessary to maintain the population).

Lifetime reproductive success for California and other tiger salamanders is low. Trenham *et al.* (2000) found the average female bred 1.4 times and produced 8.5 young that survived to metamorphosis per reproductive effort. This resulted in roughly 11 metamorphic offspring over the lifetime of a female. Preliminary data suggest that most individuals of the California tiger salamanders require 2 years to become sexually mature, but some individuals may be slower to mature (Shaffer *et al.* 1993). Some animals do not breed until they are 4 to 6 years old. While individuals may survive for more than 10 years, many breed only once, and in some populations, less than 5 percent of marked juveniles survive to become breeding adults (Trenham 1998b). With such low recruitment, isolated populations can decline greatly from unusual, randomly occurring natural events as well as from human caused factors that reduce breeding success and individual survival. Factors that repeatedly lower breeding success in isolated ponds that are too far from other ponds for migrating individuals to replenish the population can quickly extirpate a population.

The total number of individual California tiger salamanders in Sonoma County is not known. The difficulty of estimating total California tiger salamander population size has been discussed by a number of biologists (Shaffer *et al.* 1993; Jennings and Hayes 1994). However, estimates have been made for a few populations in Monterey (Barry and Shaffer 1994; Trenham *et al.* 1998b). Because data on numbers of individual California tiger salamanders are lacking since these amphibians spend much of their lives underground, and because only a portion of the total number of animals migrate to pools to breed each year, the availability of suitable habitat and documentation of its loss is thus an appropriate method for assessing the status of the species.

The life history and ecology of the California tiger salamander on the Santa Rosa Plain in Sonoma County make it likely that this population has a metapopulation structure (Hanski and Gilpin 1991). A metapopulation is a set of local populations or breeding sites within an area, where typically migration from one local population or breeding site to other areas containing suitable habitat is possible, but not routine. Movement between areas containing suitable habitat (*i.e.,* dispersal) is restricted due to inhospitable conditions around and between areas of suitable habitat. Because many of the areas of suitable habitat may be small, and support small numbers of salamanders, local extinction of these small units may be common. A metapopulation's persistence depends on the combined dynamics of these local extinctions and the subsequent recolonization of these areas by dispersal (Hanski and Gilpin 1991, 1997; McCullough 1996; Hanski 1999).

We believe habitat loss has reduced the sizes and connectivity between patches of suitable and occupied salamander habitat on the Santa Rosa Plain. The reduction in the extent and amount of suitable water bodies, grasslands, and other suitable upland habitats likely has eliminated connectivity among most of the known breeding sites, making recolonization of some sites more difficult following local extinction. In addition, the reduction of habitat below a certain size threshold has the effect of reducing the quality of the remaining habitat by reducing the size of habitat boundaries, and making effects of other factors such as amount of food, availability of rodent burrows, pesticide use, mortality from vehicles, and predators more pronounced given the smaller area now exposed to such impacts. We do not have enough data to determine what the size threshold for habitat might be, whereby any further reduction would lower the quality of the remaining habitat. The acreage is probably dependent on factors such as the type of building occurring along habitat boundaries (*i.e.,* residential, industrial, community park), number of roads bordering the habitat and the amount of traffic those roads experience, amount of pesticide use within the breeding pool watershed, or whether domestic animals or people have access to the site during periods when salamanders are vulnerable, such as migrating to or from estivation sites. We believe there is a size threshold for habitat below which the combination of various impacts will result in the loss of more salamanders than the Sonoma County California tiger salamander population can produce, and thus local extinction will occur.

Distinct Vertebrate Population Segment

Under the Act, we must consider for listing any species, subspecies, or, for vertebrates, a DPS of these taxa, if there is sufficient information to indicate that such action may be warranted. To implement the measures prescribed by the Act and its Congressional guidance, we, along with the National Marine Fisheries Service, developed policy that addresses the recognition of DPSs for potential listing actions (61 FR 4722). The policy allows for a more refined application of the Act that better reflects the biological needs of the taxon being considered, and avoids the inclusion of entities that do not require its protective measures. Under our DPS policy, we use two elements to assess whether a population segment under consideration for listing may be recognized as a DPS. The elements are: (1) The population segment's discreteness from the remainder of the species to which it belongs; and (2) the significance of the population segment to the species to which it belongs. If we determine that a population segment being considered for listing represents a DPS, then the level of threat to that population segment is evaluated based on the five listing factors established by the Act to determine if listing it as either threatened or endangered is warranted.

Discreteness

A population segment of a vertebrate species may be considered discrete if it satisfies either one of the following two conditions: (1) It is markedly separated from other populations of the same taxon as a consequence of physical, physiological, ecological, or behavioral factors (Quantitative measures of genetic or morphological discontinuity may provide evidence of this separation.); or (2) it is delimited by international governmental boundaries within which significant differences in control of exploitation, management of habitat, conservation status, or regulatory mechanisms exist.

The Sonoma County California tiger salamander is discrete in relation to the remainder of the species. The population is geographically isolated and separate from other California tiger salamanders. The Sonoma County population is widely separated geographically from the closest populations, which are located in Contra Costa, Yolo, and Solano counties. These populations are separated from the Sonoma County population by the Coast Range, Napa River, and the Carquinez Straits, at a minimum distance of about 72 km (45 mi). There are no known records of the California tiger salamander in the intervening areas (D. Warenycia, CDFG, pers. comm., 2002). We have no evidence of natural interchange of individuals between the Sonoma County population and other California tiger salamander populations. As detailed below, this finding is supported by an evaluation of the genetic variability of the species.

Dr. H. Bradley Shaffer has analyzed the population genetics of the California tiger salamander (Shaffer *et al.* 1993; Shaffer and Trenham 2002). The most recently available and most comprehensive mitochondrial DNA (mtDNA) sequence data indicate that there are six populations of California tiger salamander; these six populations are distinguished from one another by their mtDNA characteristics (Shaffer and Trenham 2002). Shaffer *et al.* 1993 reported that the sequence divergence (a percentage indicating the difference among DNA sequences studied) between the Sonoma County population was found to diverge on the order of 2 percent from other populations of this species. This high level of genetic divergence indicates that there has been little, if any, gene flow for a significant period of time between the Sonoma County population and other California tiger salamander populations. These results are supported by additional sampling and mtDNA work of Shaffer and Trenham (2002). The ''first, deepest and most significant phylogenetic split within California tiger salamander samples is between Sonoma County and all others'' (H.B. Shaffer, University of

California, Davis, *in litt,* 2002). This is illustrated by the phylogenetic tree based on mtDNA in which Sonoma County California tiger salamander is the first branch after the outgroup (groups known from independent evidence to have branched off earlier than the groups under study; Avise 1994, Weir 1996) (Shaffer and Trenham 2002). This branch is strongly supported statistically (with bootstrap probability of 100 percent) on a phylogenetic tree constructed by the neighbor joining method (a method used to construct phylogenetic trees; NJ, Avise 1994, Weir 1996). Bootstrapping is a method of statistically testing the significance of particular patterns; it involves resampling (with replacement) from the existing data sets and then reassessing the frequency with which particular groups appear in trees generated from the resampled data (Avise 1994, Weir 1996). For the Sonoma County California tiger salamander branch a bootstrap probability of 100 percent means that 100 percent of the trees generated from the resampled data had the same configuration. A bootstrap probability of seventy percent is the normal criterion for statistical significance in the systematic literature (Hillis and Bull 1993 as cited in Shaffer and McKnight 1996). In addition to being strongly supported using the NJ method, the branch pattern indicating that the Sonoma County population is distinct is supported by maximum likelihood and parsimony (Shaffer and Trenham 2002), two other methods of constructing phylogenetic trees (Avise 1994, Weir 1996). In addition, Shaffer and Trenham (2002) report preliminary results of analyses of two nuclear genes. These preliminary results also show that Sonoma County California tiger salamanders are genetically distinct from other California tiger salamanders. Shaffer *et al.* (1993) suggest that the differences are so large that the Sonoma County population may warrant separate taxonomic recognition (Shaffer *et al.* 1993).

In the proposed rule we relied on the 2 percent divergence value as evidence that the Sonoma County California tiger salamander population is discrete. At the time, we were using the best available information (Shaffer *et al.* 1993). We note that systematists typically identify species boundaries by using phylogenetic analysis rather than absolute levels of sequence divergence (Avise 1994, Weir 1996, Hedrick 2000). As noted above, the phylogenetic tree (which indicates relationships among populations or groups) constructed from the more comprehensive mtDNA data of Shaffer and Trenham (2002) indicates that Sonoma County California tiger salamanders are very distinct relative to other California tiger salamanders, and separated from them on a branch that is strongly supported statistically. Therefore, the most comprehensive available genetic data (Shaffer and Trenham 2002) for California tiger salamanders strongly indicate that Sonoma County California tiger salamanders are distinct from other populations of the species.

Significance

Under our DPS policy, once we have determined that a population segment is discrete, we consider its biological and ecological significance to the larger taxon to which it belongs. This consideration may include, but is not limited to, evidence of the persistence of the discrete population segment in an ecological setting that is unique for the taxon; evidence that loss of the population segment would result in a significant gap in the range of the taxon; evidence that the population segment represents the only surviving natural occurrence of a taxon that may be more abundant elsewhere as an introduced population outside its historic range; and evidence that the discrete population segment differs markedly from other populations of the species in its genetic characteristics. We have found substantial evidence that two of these significance factors are met by the population of the California tiger salamander that occurs on the Santa Rosa Plain in Sonoma County.

The extinction of the Sonoma County population would result in the loss of a significant genetic entity and the curtailment of the range of the species. As discussed above, the Sonoma County population is genetically distinct from other populations of California tiger salamanders. Loss of the Sonoma County population would also eliminate the most northern coastal extent of the range of the species. The Sonoma County population is geographically isolated. Genetic analysis of the species supports the hypothesis that no natural interchange of the Sonoma County population occurs with other California tiger salamander populations.

Conclusion

We evaluated the Sonoma County population, addressing the two elements which our policy requires us to consider in deciding whether a vertebrate population may be recognized as a DPS and considered for listing under the Act. We conclude that the Sonoma County population is discrete, as per our policy, based on its geographic separation and genetic divergence from the rest of the California tiger salamander populations. We conclude that the Sonoma County population of the California tiger salamander is significant because the loss of the species from the Santa Rosa Plain in Sonoma County would result in a significant reduction in the species' range and would constitute loss of a genetically divergent portion of the species. Because the population segment meets both the discreteness and significance criteria of our DPS policy, the Sonoma County population of the California tiger salamander constitutes a DPS which qualifies for consideration for listing. An evaluation of the level of threat to the DPS based on the five listing factors established by the Act follows.

Previous Federal Action

On September 18, 1985, we published the Vertebrate Notice of Review (NOR) (50 FR 37958), which included the California tiger salamander as a category 2 candidate species for possible future listing as threatened or endangered. Category 2 candidates were those taxa for which information contained in our files indicated that listing may be appropriate but for which additional data were needed to support a listing proposal. The January 6, 1989, and November 21, 1991, NORs (54 FR 554 and 56 FR 58804, respectively) also included the California tiger salamander as a category 2 candidate, soliciting information on the status of the species.

On February 21, 1992, we received a petition from Dr. H. Bradley Shaffer of the University of California, Davis (UCD), to list the California tiger salamander as an endangered species. We published a 90-day petition finding on November 19, 1992 (57 FR 54545), concluding that the petition presented substantial information indicating that listing may be warranted. On April 18, 1994, we published a 12-month petition finding (59 FR 18353) that the listing of the California tiger salamander was warranted but precluded by higher priority listing actions. We elevated the species to category 1 status at that time, which was reflected in the November 15, 1994, NOR (59 FR 58982). Category 1 candidates were those taxa for which we had on file sufficient information on biological vulnerability and threats to support preparation of listing proposals.

We discontinued the use of different categories of candidates in the February 28, 1996, NOR (61 FR 7596), and defined ''candidate species'' as those meeting the definition of former category 1. We maintained the California tiger salamander as a candidate species in that NOR, as well as subsequent NORs published September 19, 1997 (62 FR 49398), October 25, 1999 (64 FR 57533), and October 30, 2001 (66 FR 54808).

On June 12, 2001, we received a petition dated June 11, 2001, from the Center for Biological Diversity (CBD) and Citizens for a Sustainable Cotati to emergency list the Sonoma County population of the California tiger salamander as an endangered species and to designate critical habitat. On February 27, 2002, CBD filed a complaint for our failure to emergency list the Sonoma County population of the California tiger salamander as endangered (*Center for Biological Diversity* v. *U.S. Fish and Wildlife Service* (N.D.Cal.) (Case No. C–02–0558 WHA)). On June 6, 2002, based on a settlement agreement with the CBD, the court signed an order requiring us to submit for publication in the **Federal Register**, a proposed and/or emergency rule to list the species by July 15, 2002.

On July 22, 2002, we published in the **Federal Register** an emergency rule listing the Sonoma County distinct population segment (DPS) of the California tiger salamander (Sonoma County California tiger salamander) on an emergency basis because we found that a number of threats constituted immediate and significant risk to the species (67 FR 47726). We concurrently published a proposed rule to list this taxon as endangered (67 FR 47758). The proposed rule opened a 60-day comment period which closed on September 20, 2002. On August 26, 2002, we published a notice in the **Federal Register** notifying the public of a hearing to be held on October 1, 2002, and extending the comment period until October 21, 2002 (67 FR 54761). On October 31, 2002, we re-opened the comment period for 45 days (67 FR 66377). The re-opened public comment period closed on December 16, 2002. This final rule to designate the Sonoma County California tiger salamander as an endangered species complies with the June 6, 2002, settlement agreement.

As required by section 4(b)(1) of the Act, our decision to list the Sonoma County population of the California tiger salamander is based upon the best available information at this time. We note that the petition and subsequent emergency listing of this population has led to increased interest in this population by a variety of parties, and thus to an acceleration of the rate at which new information is becoming available. We expect this trend to continue subsequent to this final listing determination. The settlement agreement discussed above requires that we submit to the **Federal Register** a proposed rule to list the California tiger salamander range wide by May 15, 2003, and make a final listing determination on that proposal by May 15, 2004. As a part of that rulemaking we intend to review all then-current information regarding both the Sonoma County and Santa Barbara County populations, including whether they constitute valid distinct population segments, and render a final determination on the California tiger salamander accordingly.

Summary of Comments and Recommendations

In the July 22, 2002, proposed rule (67 FR 47758), we requested all interested parties submit factual reports, information, and comments that might contribute to development of a final determination. We contacted appropriate Federal agencies, State agencies, county and city governments, scientific organizations, affected landowners and other interested parties requesting comments. We published legal notices in the Santa Rosa Press Democrat on July 29, 2002, and September 3, 2002, and the Sonoma Index-Tribune on July 30, 2002, and September 27, 2002, notifying the public of the comment period on the proposed and emergency rule and the public hearing, respectively. We requested 12 peer reviewers to comment on the proposed rule in compliance with our policy, published in the **Federal Register** on July 1, 1994 (59 FR 34270).

During both public comment periods, we received 111 comment letters from public agencies, individuals, businesses, and organizations, with several commenters submitting more than one set of comments during the subsequent extensions of the comment period. We received oral comments from 49 people at the public hearing. Ninety-nine commenters opposed the listing, 60 supported the listing, and one was neutral. The breakdown of the comments included none from Federal agencies, 2 from State agencies, 8 from Sonoma County and city agencies, 49 from organizations or corporations, and 99 from individuals. One hundred and twenty people attended the hearing, with 31 individuals and 18 representatives of organizations providing oral comments. In total, 39 commenters at the hearing were opposed to the listing, 9 supported the listing, and 1 was neutral. Several comments were received after the comment period closed.

We updated the final rule to reflect comments and information we received during the comment periods. We address substantive comments concerning the rule below. Comments of a similar nature are grouped together (referred to as ''Issues'' for the purpose of this summary).

Issue 1: Some commenters questioned the validity of our DPS determination for Sonoma County California tiger salamander, suggesting that the genetic data do not support a DPS. One commenter specifically suggested that the evidence that Sonoma County California tiger salamander is a separate species or subspecies and use of this as a criterion for a DPS is less clear than we indicated in our emergency rule. The commenter also suggests that there is little evidence that California tiger salamander populations in different parts of California represent separate species or subspecies. The commenter also noted that, while the unpublished Shaffer *et al.* (1993) suggest Sonoma County may warrant species status, Shaffer and McKnight (1996) make no such claim in their published paper.

Response: Genetic distinctness or the presence of genetically determined traits may be important in recognizing some DPS's, but this kind of evidence is not specifically required in order for a DPS to be recognized. Genetic information can play two different roles in the evaluation of whether a population should be recognized as a distinct vertebrate population segment for the purposes of listing under the Act. First, quantitative genetic information may, but is not required in order to provide evidence that the population is markedly separated from other populations and thus meets the DPS policy's criterion of being discrete. The DPS policy's standard for discreteness is meant to allow an entity given DPS status under the Act to be adequately defined and described. The standard adopted is believed to allow entities recognized under the Act to be identified without requiring an unreasonably rigid test for distinctness. At the same time, the standard does not require absolute separation of a DPS from other members of its species, because this can rarely be demonstrated in nature for any population of organisms. Second, genetic characteristics that differ markedly from other populations may be one consideration in evaluating the discrete population segments biological and ecological significance to the taxon to which it belongs.

Restricting listings to full taxonomic species would render the Act's definition of species, which explicitly includes subspecies and DPS's of vertebrates, superfluous.

We did note in our emergency rule that Dr. Shaffer and his colleagues believe the divergence of Sonoma County California tiger salamanders justifies separate species recognition (Shaffer *et al.* 1993). Our DPS policy (61 FR 4722), however, does not require that levels of differentiation warranting taxonomic revision be identified for the DPS criteria to be met. In fact, our DPS policy is used for identifying groups *within* species or subspecies that may warrant listing under the ESA. Therefore, our DPS determination for Sonoma County California tiger salamander is not based on whether the divergence observed warrants separate taxonomic recognition, but rather on the relatively high divergence of the Sonoma County population from other populations of California tiger salamanders.

The Sonoma County population of California tiger salamanders is the most divergent of any population of the species. This finding is supported by the original mitochondrial DNA (mtDNA) work of Shaffer *et al.* (1993) and by additional sampling and mtDNA work of Shaffer and Trenham (2002). The ''first, deepest and most significant phylogenetic split within California tiger salamander samples is between Sonoma County and all others'' (H.B. Shaffer, *in litt.*, 2002). This is illustrated by the phylogenetic tree based on mtDNA in which Sonoma County California tiger salamander is the first branch after the outgroup (Shaffer and Trenham 2002). This branch is strongly supported statistically (with bootstrap probability of 100 percent) on a phylogenetic tree constructed by the neighbor joining (NJ) method. Seventy percent is the normal criterion for statistical significance of bootstrap proportions in the systematic literature (Hillis and Bull 1993 as cited in Shaffer and McKnight 1996). In addition, the branch pattern indicating that the Sonoma County population is distinct is supported by maximum likelihood and parsimony (Shaffer and Trenham 2002), two other methods of constructing phylogenetic trees (Avise 1994, Weir 1996). In addition, Shaffer and Trenham (2002) report preliminary results of analyses of two nuclear genes. These preliminary results also show that Sonoma County California tiger salamanders are genetically distinct from other California tiger salamanders. Therefore, we believe that the levels of divergence observed in Sonoma County California tiger salamanders provide substantial evidence of the significance of the population.

Shaffer and McKnight (1996) do not mention whether the divergence of Sonoma County California tiger salamanders justifies separate species recognition. They make no statements about the taxonomic status of Sonoma County California tiger salamanders in their paper. In the Discreteness section of the emergency rule, we incorrectly attributed the statement that Sonoma County California tiger salamanders warrant separate taxonomic recognition to the 1996 publication. In fact, no Sonoma County California tiger salamanders were sampled in the study (Appendix 1 of Shaffer and McKnight 1996). The paper examined evolutionary relationships among tiger salamander species and subspecies and did not include a formal taxonomic treatment of the tiger salamander complex. Therefore, it is not surprising that the authors did not specifically note whether or not the divergence of Sonoma County California tiger salamanders justifies species status.

Issue 2: One commenter also implied that the discreteness criterion of our DPS policy was only met by genetic data.

Response: Two professional biologists who commented reported that the Sonoma County population is geographically isolated from other populations of the California tiger salamander. We note that the proposed rule discussed the geographic separation of the Sonoma County population from other populations of California tiger salamander. The Sonoma County population is separated from other California tiger salamander populations by the Coast Range, Napa River, and the Carquinez Straits, a distance of about 72 km (45 mi).

Issue 3: Some commenters felt that 2 percent divergence of the Sonoma population of the California tiger salamander from the remainder of the California tiger salamander population is not meaningful or worthy of recognition as a DPS.

Response: We note that species boundaries are typically identified by systematists using phylogenetic analysis rather than absolute levels of sequence divergence. The intraspecific sequence divergence value of 2 percent depends on the total number of nucleotides sequenced for each gene region. This can differ significantly from species to species or from study to study and is therefore a relative value (Avise 1994, Weir 1996, Hedrick 2000). Comparisons need to be made from the same baseline. From a DPS perspective, percent sequence divergence is less important than the phylogenetic relationships depicted with strong statistical support in the neighbor joining (NJ) tree that indicate the distinctive genetic character of Sonoma County California tiger salamanders. The phylogenetic tree (which indicates relationships among populations or groups) constructed from the mtDNA data of Shaffer and Trenham (2002) indicates that Sonoma County California tiger salamanders are very distinct relative to other California tiger salamanders, and separated from them on a branch that is strongly supported statistically. Therefore, the most comprehensive available genetic data (Shaffer and Trenham 2002) for California tiger salamanders strongly indicate that Sonoma County California tiger salamanders are distinct from other populations of the species.

Issue 4: One commenter analyzed Shaffer and McKnight's (1996) divergence values for various *Ambystoma tigrinum* subspecies and for California tiger salamander, finding that divergence between populations in different groups (*e.g.*, between California tiger salamander and *A. tigrinum* subspecies and other such combinations among species and subspecies versus within a species or subspecies) had a mean of 6.37 percent and a range of 5.08 percent to 7.41 percent. The commenter states that these statistics show the 2 percent divergence of the Sonoma County California tiger salamander population is unremarkable.

Response: As noted above, one way to meet the significance criterion of our DPS policy (61 FR 4722) is for a population to ''differ markedly *from other populations of the species* in its genetic characteristics'' (emphasis added). We note again that our DPS policy focuses on differentiation within species (*i.e.*, the population ''differs markedly from other populations of the species''). The commenter's analysis is of differences among taxonomic groups of tiger salamanders, not of within-species or subspecies differences, which are the focus of the DPS policy.

As explained above, we believe the available mtDNA data (Shaffer *et al.* 1993, Shaffer and Trenham 2002) show that the Sonoma County population of California tiger salamander is markedly genetically divergent from other populations of the California tiger salamander. That the sequence divergence value is 2 percent is less important than the configuration of the phylogenetic tree, which strongly supports the distinctness of Sonoma County California tiger salamanders.

Issue 5: One commenter stated that one would expect broadly similar conclusions from allozyme and mtDNA studies and that for Sonoma County California tiger salamanders this was not the case. The commenter noted that

Shaffer *et al.*'s (1993) allozyme work did not reveal much variation (only 9 of 26 loci were variable) and indicate that Sonoma County California tiger salamanders are not distinct from other western populations of California tiger salamander from Yolo County to San Luis Obispo County.

Response: A variety of genetic tools are available to assess genetic variation. These tools are often referred to as ''genetic markers.'' All are indicators of genetic variation, but none is considered determinative. Which genetic marker is most useful depends on the question being asked and the organism being studied (Haig 1998, Parker *et al.* 1998).

Allozymes are proteins which are used as genetic markers because DNA contains information that is used by cells to build protein. Allozymes have been used to assess genetic variation for many years. Allozyme studies have the advantage of being relatively inexpensive and straightforward, once the basic technique is developed for a group. However, drawbacks of using allozymes include the limited number of proteins that can be screened (Parker *et al.* 1998) and the fact that they often detect little variability (Haig 1998). On average across taxa, less than half of all loci are variable. It is not uncommon for population biologists to encounter species for which allozymes cannot be used as genetic markers because they lack variation (Parker *et al.* 1998).

Molecular techniques, such as mtDNA, allow biologists to examine variation in DNA directly, rather than looking at the product derived from DNA (*i.e.*, proteins) (Parker *et al.* 1998). Analysis of animal mtDNA is the most commonly used technique for examining phylogenetic relationships among populations of the same species and among closely related species (Taberlet 1996). One advantage of mtDNA in particular is its high rate of evolution (*i.e.*, rate of nucleotide substitution) compared to other DNA (Taberlet 1996, Parker *et al.* 1998). The D-loop (which Shaffer and colleagues examined for their tiger salamander studies) is especially variable, making it useful to study recently divergent populations or species. Different genetic techniques are expected to resolve different amounts of variation because the genetic markers used have different evolutionary characteristics (Parker *et al.* 1998). The observation that some characters (in this case, allozymes) are not variable does not diminish the utility of other data (in this case mtDNA) in describing relationships among groups.

Issue 6: Several commenters felt that our finding that California tiger salamanders in Sonoma County qualified as a DPS was based on an isolated, and dated, report (*i.e.*, Shaffer *et al.* (1993). One commenter noted several times that Shaffer *et al.* (1993), the source of mtDNA data for California tiger salamanders, is an unpublished report.

Response: We are required to use the best available scientific data. In this case, the data were in an unpublished report. During the comment period, we received a second report (Shaffer and Trenham 2002) that contained findings similar to Shaffer *et al.* 1993 but which was based on more extensive data collection. The publication of Shaffer and McKnight (1996) using mtDNA techniques for California and other tiger salamanders and the publication of mtDNA work by Shaffer *et al.* (2000) on Yosemite toad (*Bufo canorus*) gives us confidence that Shaffer's work is scientifically defensible.

Issue 7: Several commenters noted that recent aerial photos and a map that is based on the photos show 515 or more pools located within, or in the vicinity of, the Santa Rosa Plain. They believe these could potentially provide habitat for the Sonoma County California tiger salamander. They stated that many of the pools have not been surveyed and, therefore, the species could be more widespread in Sonoma County than is currently known.

Our Response: The map submitted displayed 515 water bodies and was based on interpretation of aerial photography with little on-the-ground verification. We compared the map of potential habitat for the California tiger salamander to information and data we obtained and have determined 360 water bodies can be eliminated as potential habitat for the California tiger salamander due to a variety of factors including: unsuitable soils, unsuitable vegetation, high elevation, presence of aquatic predators, agricultural development (row crops, vineyards, etc.), urbanization, and unsuitable hydrology. One hundred and fifty-five water bodies remained within the suitable habitat area.

Of the 155 remaining water bodies, 53 were characterized as ''man-made long'' and ''natural long'' ponds/wetlands, which hold water for too long and /or harbor aquatic predators, and were eliminated as potential habitat for the California tiger salamander. Another set of water bodies were ''man-made short'' and ''natural short'' ponds/wetland (12 in total) which do not hold water long enough to be a source of potential habitat for the California tiger salamander. Consequently only ''man-made moderate'' and ''natural moderate'' mapped water bodies were considered potential suitable habitat (90 in total).

Of the ''man-made moderate'' and ''natural moderate'' mapped water bodies, four were formerly known breeding sites that have been eliminated and eight are currently identified as existing breeding sites. Some of the mapped water bodies are anticipated to have aquatic predators given their location on the Laguna de Santa Rosa floodplain, which would limit California tiger salamander utilization. Others contain habitat with sightings near the ponds, but these ponds have been repeatedly surveyed by experts, with results indicating they do not support breeding populations of California tiger salamanders.

The determination that some of the mapped water bodies contain potential habitat is solely based on aerial photographs; however, the majority of these are on private property and inaccessible to surveying without landowner permission. Several recognized salamander biologists have conducted repeated road surveys in Sonoma County along areas where the California tiger salamander is known to exist or where suitable habitat appears to exist (D. Cook, The Wildlife Society, pers. comm., 2002; P. Northen, California State University, Sonoma, pers. comm., 2002; J. Seifers, Santa Rosa, California, per. comm., 2002; H. B. Shaffer, pers. comm., 2002; P. C. Trenham, UCD, pers. comm., 2002). Night driving is a standard technique for surveying for reptiles and amphibians (Shaffer and Juterbock 1994; Parris 1999). The locations where these biologists found breeding sites, migrating adult salamanders, subadults, larvae, and egg masses in roadside ditches were entered into the CNDDB. This data is considered essential (D. McGriff, CDFG, pers. comm., 2002) and the data was utilized in our analysis of the status of the California tiger salamander in Sonoma County. Several of the experts indicated that there are likely to be a few small breeding sites or potential habitat for California tiger salamanders on private lands containing grassland areas and suitable soils on the Santa Rosa Plain, including stock ponds (P. Northen, pers. comm., 2002; H. B. Shaffer, pers. comm., 2002; P. C. Trenham, pers. comm., 2002); however, these private lands were inaccessible during their survey efforts.

Issue 8: One commenter believed that two sites not specifically mentioned in the proposed rule should be included as breeding sites for California tiger salamanders.

Our Response: We evaluated the two sites mentioned by the commenter. They are the Hartunian (Scenic Avenue) Preserve and the Southwestern Santa Rosa Vernal Pool Preservation Bank (Engel Bank).

The Hartunian Preserve is approximately 14 hectares (ha) (34 acres (ac)) in size and has one shallow swale that could support successful breeding during a rainy season of above-average rainfall. This preserve was not listed in the emergency rule and has not been included in the final rule because breeding by the species is not likely to occur during years of low to average rainfall.

Upon review of all information available, we have concluded that the Engel Bank does meet the biological requirements for California tiger salamander breeding and we have included this site as an eighth breeding site. Engel Bank is a 16-ha (40-ac) preserve that contains approximately 7-ha (18-ac) of wetlands and has documented records of the species. However, California tiger salamanders require a fairly large upland component. Approximately 9 ha (22 ac) of protected uplands are available at this site. Therefore, due to the limited upland habitat protected within the Engel Bank, a sustainable population at this site is dependent on the activities occurring on the surrounding private property.

Issue 9: Many commenters stated that the California tiger salamander is adequately protected by current regulations. Examples of current regulations cited include the application of the Porter-Cologne Water Quality Control Act and the California Environmental Quality Act (CEQA) by CDFG. Both of these require one-to-one mitigation for projects impacting the species. Commenters also mentioned strict local land use controls enacted by Sonoma County and cities within the Santa Rosa Plain. In addition, commenters noted that the Sonoma County Agricultural and Open Space District has acquired potential California tiger salamander habitat that is set aside as open space through a county-wide sales tax. They felt these preserves are adequate for the animal. Several other commenters stated that current legal protections have been inadequate for the species, and losses of breeding sites have occurred.

Our Response: CDFG lists the California tiger salamander as a species of special concern and has no specific regulatory mechanism to require mitigation for impacts to this species. In some instances, the CDFG has obtained one-to-one mitigation for destruction of California tiger salamander breeding sites. However, five breeding sites have been eliminated in Sonoma County during the past 2 years without new breeding sites being created. The use of CEQA and the Porter-Cologne Water Quality Control Act have not halted the loss of habitat for this species in Sonoma County. The land use controls enacted by the County and cities have not required adequate compensation for the loss of breeding sites. The Sonoma County Agricultural and Open Space District has acquired acreage through a one-quarter of a cent county sales tax. However, the acreage purchased does not overlap with areas known to contain California tiger salamander breeding sites. A majority of their purchased lands lie outside of the Santa Rosa Plain. Of the lands they have purchased within the Santa Rosa Plain, the majority fall within the floodplain of the Laguna de Santa Rosa River. There are no known records of the California tiger salamander within this 100 year floodplain.

Issue 10: Many commenters stated that the comment period did not allow sufficient time for meaningful public input. A number of them said that more time was needed to complete surveys that currently are underway.

Our Response: The comment period for the proposed rule was initially open for 60 days, closing on September 20, 2002. On August 26, 2002, the comment period was extended until October 21, 2002. The comment period was re-opened on October 31, 2002, for an additional 45 days. In total, the comment period was open for 145 days.

At least 12 surveys are ongoing in Sonoma County in three areas not previously known to have California tiger salamander occurrences, and to date, there have been no detections of the animal. We agree that additional survey information is valuable. However, the Service has not had the flexibility to wait until surveys are finished because an order, issued by the district court in *Center for Biological Diversity* v. *U.S. Fish and Wildlife Service*, required us to complete this rule before the expiration of the protection afforded the DPS by the emergency rule.

Issue 11: One commenter stated that we should extend the comment period because we had not made available to the public documents on which the emergency listing and permanent listing was based.

Our Response: As stated in the emergency rule, the complete file for the rule is available for inspection, by appointment, during normal business hours at the Sacramento Fish and Wildlife Office. In addition, the proposed rule stated that all comments received during the comment period were available for public review. The complete file for this rule is available for inspection, by appointment, during normal business hours at the Sacramento Fish and Wildlife Office.

Issue 12: Several commenters felt we should complete peer review and incorporate that analysis into a proposed rule.

Our Response: In accordance with our July 1, 1994, Interagency Cooperative Policy for Peer Review in Endangered Species Act Activities (59 FR 34270), we solicited review from 12 experts in the fields of ecology, conservation, genetics, taxonomy and management. The purpose of such a review is to ensure that listing decisions are based on scientifically sound data, assumptions, and analyses, including input from appropriate experts. The five peer reviewers who sent comments supported listing of the Sonoma County California tiger salamander. They provided additional documentation on the distribution, genetics, and threats to the species. This information has been incorporated into this final rule.

Issue 13: Numerous commenters felt the proposal to list the Sonoma County California tiger salamander was based on one study conducted by a group with a very specific agenda against property rights and development. They said listing decisions should be based on specific studies by non-partisan professionals. Two commenters felt that the proposed rule was based on inaccurate or incomplete data. Numerous commenters felt the data we utilized on the California tiger salamander was at least 10 years old and was thus not current or accurate. One recognized herpetologist provided additional peer-reviewed articles on the California tiger salamander from scientific journals. Another professional biologist noted the proposed rule was based on research conducted as recently as 2001 by knowledgeable herpetologists.

Our Response: We used the best scientific and commercial information available during the status review process and preparation of the emergency and final rules to make our listing determination. We utilized museum records; CNDDB information; aerial photographs documenting the land use changes over the last 60 years; reports produced by the Sonoma County Agricultural Commissioners and the Sonoma County Planning and Development Department; unpublished reports by biologists; and peer-reviewed articles from scientific journals in making that determination.

Out of 126 citations appearing in the emergency rule, 52 have been published within the past 5 years (41 percent) and 83 citations have been published within the past 10 years (66 percent). The initial report on the population genetics of the California tiger salamander by Shaffer *et al.* (1993) has been substantiated by additional research (Barry and Shaffer 1994; Fisher and Shaffer 1996; Shaffer and McKnight 1996; Cook and Northen 2001; Shaffer and Trenham 2002).

Issue 14: Some commenters felt we had not quantified the magnitude of loss of the California tiger salamander in Sonoma County. One herpetologist said we had presented accurate information on the status of the species in Sonoma County.

Our Response: Based on the best available scientific and commercial information, five breeding sites for the California tiger salamander in Sonoma County have been destroyed in the past 2 years, and there are only eight known breeding sites remaining. Five of these sites are on private lands with no effective regulatory protection. Only one of the three protected sites is over 32 ha (80 ac) in size. All known breeding sites in the Cotati area have now been destroyed. The remaining sites in the Cotati area where the animals can mate and develop are roadside ditches and other suboptimal habitat during years of above average rainfall.

Issue 15: According to some commenters, there has been no study to determine population trends or ways to improve breeding at the known preserves containing the California tiger salamander.

Our Response: All of the three protected sites known to contain salamanders have been surveyed for the past 4 years. All surveys at these sites have resulted in the detection of very low numbers of salamander larvae during years that they were found at all. The largest preserve is approximately 81 ha (200 ac) in size, yet continues to exhibit very low numbers of larvae as indicated by yearly surveys. It is probable that salamander populations are limited by the lack of uplands for estivation during the dry season.

Issue 16: A number of commenters asked us to delay a final listing decision until a full review of the scientific evidence supporting or disputing the status of the Sonoma County California tiger salamander had been presented in a public forum.

Our Response: The purpose of publishing a proposed rule and soliciting public input during the comment period is to fully involve the public in the listing process. We also held a workshop and public hearing in Santa Rosa, California, to encourage agency and public input into the review of the proposed rule. We solicited 12 recognized experts and specialists to review the proposed rule. We utilized this information in making the final determination.

Issue 17: Numerous commenters said the listing of the California tiger salamander would have a severe economic impact on Sonoma County. They said we should complete an analysis of the economic effects of listing and include it in the final rule.

Our Response: Under section 4(b)(1)(A) of the Endangered Species Act of 1973, as amended (Act) (16 U.S.C. 1531 *et seq.*), we must base a listing decision solely on the best scientific and commercial data available. The legislative history of this provision clearly states the intent of Congress to ensure that listing decisions are ''* * * based solely on biological criteria and to prevent non-biological criteria from affecting such decisions* * * '' (House of Representatives Report Number 97–835, 97th Congress, Second Session 19 (1982)). As further stated in the legislative history, ''* * * economic considerations have no relevance to determinations regarding the status of species * * *''(Id. at 20). Therefore, we did not consider the economic impacts of listing the Sonoma County California tiger salamander.

Issue 18: Two commenters stated that critical habitat has not been proposed and, therefore, the listing is in violation of the Act.

Our Response: Pursuant to section 4(a)(3) of the Act, we have determined that designation of critical habitat is prudent for the Sonoma County California tiger salamander (see the ''Critical Habitat'' section). However, our budget for listing activities is currently insufficient to allow us to immediately complete all the listing actions required by the Act. Listing the DPS without designating critical habitat at this time allows us to provide protections needed for the conservation of the species without further delay. This is consistent with section 4(b)(6)(C)(i) of the Act, which states that final listing decisions may be issued without critical habitat designations when it is essential that such determinations be promptly published. We will prepare a critical habitat designation in the future when our available resources allow.

Issue 19: One commenter said the 1995 Santa Rosa Plain Vernal Pool Ecosystem Preservation Plan indicated the Sonoma County California tiger salamander is potentially less vulnerable than stated in our proposed rule.

Our Response: The Santa Rosa Plain has experienced rapid urban growth since the vernal pool ecosystem preservation plan was issued in 1995. From 1995 until 2001, the population of Sonoma County increased by approximately 10% with an average annual growth rate of approximately 1.6 percent. (U.S. Census Bureau; California Department of Finance; California Association of Realtors website 2002). Increases in housing, traffic, industry, and office buildings have occurred concurrent with the increase in population growth. In the past 2 years, five breeding sites for the Sonoma County California tiger salamander have been destroyed. Loss of real and potential salamander breeding sites and estivation habitat continues to occur in the Santa Rosa Plain. Given the amount of habitat loss, inadequate regulatory mechanisms, and other threats, we believe the remaining California tiger salamanders in Sonoma County are endangered.

Issue 20: Several commenters stated that we should compensate private landowners for the loss of revenue that occurs when California tiger salamanders are found on their land. Another commenter said the ''Cattle Growers'' ruling prohibits us from imposing land use restrictions predicated upon listing except through a designation of critical habitat, and not doing so constitutes unlawful taking of property without compensation.

Our Response: The presence of an endangered or threatened species does not prevent all uses of public or private lands. The listing of a species does not impose land use restrictions and, therefore, does not result in unlawful taking of property. In addition, we will assist landowners in the identification of proposed activities that could result in take (harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct), develop measures to minimize the potential for take, and work with them to obtain authorizations for incidental take through sections 7 and 10 of the Act. Recovery planning for this species may include recommendations for land acquisition or easements involving private landowners. Any such efforts will be undertaken with the full cooperation of the landowners.

A recent case pertinent to this issue, *Arizona Cattle Growers* v. *Fish and Wildlife and Bureau of Land Management* (9th Circuit Court of Appeals 99–16102), provides that, in biological opinions issued pursuant to section 7 of the Act, the terms and conditions in a biological opinion must have an articulated, rational connection to the take of a listed species. The court stated that the Act provides for the designation of critical habitat outside the geographic range currently occupied by a listed species when ''such areas are essential for the conservation of the species.'' Absent this procedure, the court stated that there is no evidence that Congress intended to allow the Service to regulate any parcel of land that is merely capable of supporting a listed species. Therefore, the mere listing of species, such as the Sonoma County California tiger salamander, will not result in land use restrictions.

Issue 21: One commenter was concerned that existing vineyards and wineries would be burdened by excessive costs when water permits are required or changed, or when planting or replanting permits are requested.

Our Response: Once a species becomes listed, section 9 of the Act sets forth a series of general prohibitions that apply to that species. The Sonoma County California tiger salamander is protected from ''take'' by any person subject to the jurisdiction of the United States. The definition of take under the Act includes harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, collect, or attempt to engage in any such conduct. Harm is further defined to include significant habitat modification or degradation that results in death or injury to the listed wildlife by significantly impairing behavioral patterns such as breeding, feeding, or sheltering. Harass is further defined to include actions that create the likelihood of injury to listed wildlife by annoying it to such an extent as to significantly disrupt normal behavior patterns which include, but are not limited to, breeding, feeding, or sheltering. Therefore, if the action by a party, such as water use by a vineyard or winery, planting or replanting of vineyards, could result in ''take'' of a listed species, then authorization for incidental take should be obtained pursuant to either sections 7 or 10 of the Act.

Issue 22: One commenter felt that the CDFG considered the emergency listing inappropriate due to a lack of proper information and sufficient scientific support.

Our Response: Only species or subspecies, and not distinct population segments, of vertebrates can be listed as endangered or threatened under the California Endangered Species Act (California Department of Fish and Game internet web site 2003). However, the California Department of Fish and Game has expressed concern for adverse impacts to the salamander and its habitat (R. Floerke, CDFG, *in litt.,* 2002).

Issue 23: One commenter stated that the breeding sites identified in the emergency rule for the Sonoma County California tiger salamander are not threatened, and the sites around the old airfield would not be destroyed because construction will avoid them and be limited to the runway. The commenter also felt the degree of threat, isolation of habitats, and barriers to movement were overstated and not based in reality. This same commenter believed that the Roseland Creek channel and asphalt run-way already constitute a significant barrier to migrating salamanders at the old airfield. Several other commenters noted the vernal pools at the Southwest Air Center (Air Center) have been damaged, destroyed, or are currently on the verge of being lost.

Our Response: Other than approximately 28 ha (70 ac) designated as open space, the remainder of the Air Center has been designated for development in the Southwest Santa Rosa Area Development Plan. One of the breeding sites could be destroyed by development and two others could be isolated and imperiled by a loss of estivation habitat. Upon development of this area, not enough upland will likely remain to support a viable salamander population even if two of the three breeding sites are not destroyed. Proposed development could also isolate the Federal Emergency Management Agency (FEMA)/ Broadmore North Preserves.

Burrowing mammals also could be increasingly subject to control actions given the proximity of developed areas to any remaining estivation habitats. One proposed development project at the Air Center could fill two wetlands that make up one of the eight known breeding sites. Surveys of this site over the past 2 years have found breeding California tiger salamanders. Construction on the runway itself and extension of Fresno Avenue could result in total isolation of the FEMA/ Broadmore North Preserves, a known Sonoma County California tiger salamander breeding site. We have determined that Roseland Creek Channel is not likely to be a barrier to salamander migration. Flows in the channel are minimal, except during the heaviest of rain events.

Issue 24: One commenter felt that the emergency rule overstated the effects of development at the Air Center because the runways are too hot for salamanders to cross.

Our Response: Hot runways are not a concern for this species because California tiger salamanders are in estivation during the dry, hot, summer months. The nocturnal adult animals concentrate their movements during rain events in the cooler fall, winter, and spring months. Researchers conducting night-time road surveys for California tiger salamanders during the fall, winter, and spring have documented this species crossing roads on many occasions.

Issue 25: One commenter stated that California tiger salamanders exist in the Central Valley and coastal areas of California and, therefore, they could not be endangered.

Our Response: Research has indicated there are six populations of California tiger salamanders occurring in California. These include the Santa Rosa area of Sonoma County; the Bay Area (central and southern Alameda, Santa Clara western Stanislaus, western Merced, and the majority of San Benito counties); Central Valley (Yolo, Sacramento, Solano, eastern Contra Costa, northeast Alameda, San Joaquin, Stanislaus, Merced, and northwestern Madera counties); southern San Joaquin Valley (portions of Madera, central Fresno, and northern Tulare and Kings counties); Central Coast Range (southern Santa Cruz, Monterey, northern San Luis Obispo, and portions of western San Benito, Fresno, and Kern counties); and Santa Barbara County (Shaffer and Trenham 2002). The Sonoma County population meets the requirements of our Distinct Population Segment policy and therefore can be separated from the remainder of the population in making this determination.

Issue 26: One commenter stated that much of the area defined as potential range of the Sonoma County California tiger salamander was based on soil types.

Our Response: The distribution of the Sonoma County California tiger salamander corresponds to the distribution of specific soil types. The known breeding sites of the animal in Sonoma County are restricted to Huichica-Wright-Zamora and Clear Lake-Reyes soils series/associations as defined by the USDA (1972, 1990). The poorly drained soils in the Huichica-Wright-Zamora association are considered prime soils for containing wetlands, and more specifically, prime soils for habitat containing California tiger salamander (P. Northen, pers. comm., 2002). The Huichica-Wright-Zamora association is restricted to the Santa Rosa Plain and the vicinity of the town of Sonoma (USDA 1972, 1990). The poorly drained soils in the Clear

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 (Waaland *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 Houlahan 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 sites are found in and around the former Air Center that is located in southwest Santa Rosa. This area contains one of the largest undeveloped blocks of land within the city limits of Santa Rosa. Urban development is proposed on or near locations containing four of the eight known breeding sites in the Santa Rosa area (EIP Associates 1994, 2000). The airport was closed and the property sold to the City of Santa Rosa in the mid-1980s. The City of Santa Rosa is proposing the majority of the area be developed as part of their Southwest Area Plan (EIP Associates 1994, 2000).

Urban development of the Santa Rosa area is proceeding rapidly. Demographic data obtained from the City of Santa Rosa Housing and Community Development Commission indicate that, since 1980, Santa Rosa has experienced a greater than 53 percent increase in its population. From 1980 until 1997, the number of housing units grew by 66 percent from 35,403 units in 1980 to 53,558 units by January 1, 1997 (M. Enright, pers. comm., 2001).

Five known breeding sites were lost within the past 2 years, two of which were lost due to commercial development with another lost to urban development/housing. In June 2002, a fourth breeding site near Cotati was destroyed when the pond was filled for unknown reasons (D. Cook, *in litt.,* 2002; L. Davis, pers. comm., 2002). The Cotati location was considered highly productive for salamanders (D. Cook, *in litt.,* 2002). A fifth, and previously unknown, breeding site near Cotati was destroyed shortly after the emergency listing went into effect (67 FR 47726) (D. Wooten, Service, pers. comm., 2002). We were not aware of this occurrence at the time the emergency rule was published. Salamander larvae were found in a roadside ditch that backed up onto a large pool on private property (CNDDB 2002). It is likely this pool served as the breeding site for salamanders in this area. This site was located in an area where road sightings of tiger salamanders commonly occurred in absence of a known breeding site. The pool was drained without appropriate authorizations under County of Sonoma ordinances (P. Shannin, U.S. Army Corps of Engineers (Corps), pers. comm., 2002; P. Stamp, Sonoma County Planning Department, pers. comm., 2002).

Roads and Highways

California tiger salamanders require a large amount of barrier-free landscape for successful migration (Shaffer *et al.* 1993; Loredo *et al.* 1996). Roads and highways are permanent physical obstacles that can block the animals from moving to new breeding habitat, or prevent them from returning to their breeding ponds or estivation sites. Road construction can reduce or completely eliminate the viability of a breeding site, and in some cases, larger portions of a metapopulation.

All the pools at the known extant Sonoma County California tiger salamander breeding sites are within 450 m (1,476 ft) of roads of various sizes. Findlay and Houlahan (1996) found that roads within 2,000 m (1.2 mi) of wetlands adversely affected the number of amphibian species. At this time, it is still possible for salamanders at breeding sites associated with the Air Center to migrate to the FEMA/Broadmore North Preserves. A proposed through-street and high-density housing will eliminate this migration corridor, leading to fragmentation and further isolation of remaining breeding sites. If this planned through-street and accompanying high-density housing are completed, only three breeding sites will remain where salamanders can access more than one breeding pool without crossing roads.

Large numbers of California tiger salamanders at some locations in the Central Valley, up to 15 or 20 per mile of road (J. Medeiros, Sierra College, pers. comm., 1993), have been killed as they crossed roads on breeding migrations (Hansen and Tremper 1993; S. Sweet, *in litt.,* 1993). Estimates of losses to automobile traffic range from 25 to 72 percent of the breeding population for several different populations of the species (Twitty 1941; S. Sweet, *in litt.,* 1993; Launer and Fee 1996). Curbs and berms as low as 9 to 13 cm (3 to 5 in), which allow salamanders to climb onto the road but can restrict or prevent their movements off the roads, can turn the roads into sources of high mortality (Launer and Fee 1996; S. Sweet, *in litt.,* 1998). Automobile traffic along Stony Point Road in western Santa Rosa has probably quadrupled in the past 5 years (D. Cook, pers. comm., 2002). This was once a moderately used rural road which is now a major route for commuter traffic. Between November 21, 2001, and December 5, 2001, 26 California tiger salamanders were found killed by cars on this road between Santa Rosa and Cotati. Fourteen of these dead California tiger salamanders were found along Stoney Point Road near Meachum Road (D. Cook, pers. comm., 2002). The Engel Preserve is adjacent and north of Todd Road. A proposed road widening project along Todd Road would likely increase traffic and result in an increased threat of roadkill for salamanders migrating between the Engel Preserve and salamander estivation habitat south of Todd Road.

Description of the Breeding Sites

(1) *Hall Road Preserve:* This 74-ha (183-ac) site is owned by CDFG. It is the largest preserved area where the Sonoma County California tiger salamander is currently known to occur. It contains two pools with ponding levels adequate for successful breeding during drought years. This preserve contains seven additional breeding pools that are relatively shallow and do not pond water long enough for successful breeding in years of moderate to low rainfall. Surveys conducted over the past 2 years indicate this preserve does not function as a highly productive breeding site (Cook and Northern 2001). The land surrounding the preserve is privately owned, and the City of Santa Rosa has issued permits for urban development. Urban development has occurred on adjacent lands to the east and west, and agriculture to the north of the preserve. Exotic predators of the salamander, such as Louisiana crayfish (*Procrambus clarkii*), stickleback fish (*Gasterosteus aculeatus*), and possibly bullfrogs (*Rana catesbeiana*) are present at the Hall Road Preserve.

(2) *FEMA/Broadmore North Preserves:* This breeding site consists of two properties, the FEMA Preserve and the Broadmore North Preserve. The 24-ha (59-ac) FEMA Preserve is owned by CDFG and contains one of the most productive Sonoma County California tiger salamander breeding sites. The 6.5-ha (16-ac) Broadmore North Preserve is a conservation area that was set aside as mitigation by the Bellvue School District. It is also managed by CDFG. The two breeding sites are contiguous and encompass 30 ha (75 ac) containing three breeding pools. The FEMA Preserve has two large, deep pools that remain ponded late in the season. Salamanders probably breed there during most years. The one breeding pool on Broadmore North is shallow and does not contribute salamanders to the population in dry years (*i.e.*, there is no recruitment) (D. Cook, pers. comm., 2001). While there is no hydrological connection between this site and the deeper pools contained on the FEMA Preserve, the FEMA Preserve probably allows the salamanders at the Broadmore North Preserve the opportunity to breed during dry years. Urban development has occurred to the north and east sides of the preserves. Although these breeding sites are protected, urbanization imperils upland habitats on private land to the east and west of them. A new road and housing development on lands adjacent to the

preserves' western boundaries have been permitted by the City of Santa Rosa and are now partially constructed. This new road and construction has partially blocked the western migration route between breeding pools at the Air Center and the pools at the FEMA and Broadmore North preserves. Planned future phases of this project, also permitted by the City of Santa Rosa, will totally block migration between the FEMA/Broadmore North Preserves and the Air Center.

(3) *Engel Preserve:* This is a 16-ha (40-ac) privately owned preserve that contains approximately 7 ha (18 ac) of wetlands. Three pools appear to have ponding levels adequate for salamander breeding in normal to dry rainfall years. Sonoma County California tiger salamanders were not documented at this site prior to the 2001/2002 rainy season. Based on the small number of larvae found at this site, however, it is likely that there are low numbers of salamanders inhabiting this site. Todd Road runs along the southern boundary of this site and automobile traffic poses a threat to salamanders migrating between the Engel Preserve and estivation sites to the south.

(4) *Northwest Air Center:* This breeding site contains one breeding pond and is located on private land. Much of the associated upland has recently been developed. This site is bordered on the west and north by roads subject to heavy traffic from housing developments that have been constructed under the City of Santa Rosa's Southwest Area Development Plan. Housing has eliminated migration routes to the east and south, thus leaving this site as an isolated breeding site with less than 22 ha (55 ac) of remaining undeveloped upland area and pool with private lands surrounding it to the south and east (M. Enright, pers. comm., 2001).

(5) *Southwest Air Center:* This breeding site is located on private land and contains one breeding pool. The City of Santa Rosa has issued permits for a residential development that likely will result in the elimination of salamanders at this location. Preparation of this site for construction was initiated, but further development has been delayed as a result of the emergency listing of this species. The salamanders at this location also may utilize the breeding ponds at the FEMA/Broadmore North preserves by an existing migration corridor to the east. The destruction of this breeding site likely will further isolate the animals inhabiting this location. Loss of this breeding site will contribute to the overall isolation of the remaining breeding sites.

(6) *North Air Center:* There is one breeding pool on this privately owned site. Recent residential and commercial developments that border the breeding site on three sides severely restrict the potential for migration. The City of Santa Rosa has approved residential and road projects for this location that will adversely affect the salamanders. This site is bordered by houses to the west, a road with high levels of automobile traffic to the north, and a corporate park to the east. There is a small tract of undeveloped private land to the south. No protection exists for the uplands or breeding pool which is located directly south of Sebastopol Road. The upland area is about 15 ha (37 ac). Portions of Sebastopol Road have been widened to four traffic lanes, including the construction of storm drains and curbs. The curbs likely funnel migrating salamanders into storm drains where they perish after being washed into the sewer system. Residential and commercial projects currently are under construction in this area. The City of Santa Rosa has issued permits for the development of this site, and the Corps has requested formal consultation from us for the fill of this breeding site. Development plans will also result in the loss of estivation habitat. Preparation of this site for construction was initiated, but further development has been delayed as a result of the emergency listing of this species.

(7) *Wright Avenue:* This breeding site is located on private land. Approved development described in the City of Santa Rosa's Southwest Area Development Plan will isolate this breeding site through increased automobile traffic and residential development along Wright and Ludwig Avenues. No construction is specifically proposed for this property, but no protection exists to prevent the breeding site and associated uplands from being developed. This site is on agricultural lands, and access has not been allowed for several years. Thus, the condition, or even the continued existence of this pool, cannot be confirmed.

(8) *South Ludwig Avenue:* This breeding site is located on private land, and current threats to the salamanders include increased traffic along Ludwig Avenue due to increasing residential development. The breeding site and associated uplands are currently not protected from potential development. This site is on agricultural lands, and access has not been allowed for several years. Thus, the condition, or even the continued existence of this pool cannot be confirmed.

Conclusion for Factor A

Except for the Hall Road Preserve, all of the known breeding sites of the Sonoma County California tiger salamander are found on small locations in areas being rapidly converted from low-intensity farming, cattle grazing, and low-density housing, to high-density housing and office buildings. Only three breeding sites (the Hall Road Preserve, FEMA/Broadmore North Preserve, and Engel Preserve) have hydrologic regimes adequate to provide recruitment for Sonoma County California tiger salamanders in normal to dry years. Five of the breeding sites are on private property. Two of the breeding sites on private lands are on agricultural lands where access for salamander surveys has not been allowed in recent years. Thus, it is unknown if these two breeding sites still have Sonoma County California tiger salamanders, or if they retain hydrological features required for successful salamander breeding. Four of the breeding locations associated with the old airfield in southwest Santa Rosa are slated for development, which will disrupt the hydrology of the surrounding uplands by altering natural runoff. If plans for the development of the area in the vicinity of these four breeding sites are completed, there will be no migratory corridors remaining between any of the currently extant breeding locales.

Maintenance of tracts of habitat between breeding sites will likely play a pivotal role in maintenance of the Sonoma County California tiger salamander metapopulation dynamics. If breeding sites are eliminated and the metapopulation becomes so fragmented that individuals are unable to disperse between suitable patches of habitat, the probability of natural recolonization will not offset the probability of extinction. Some of the salamander breeding sites, such as the FEMA Preserve/ Broadmore North Preserve and the pools associated with the Air Center, are linked to each other by suitable habitat. If movements through these linkages are disrupted or precluded (*e.g.*, by urban development), then the stability of the metapopulation (*i.e.*, the exchange of individuals between breeding sites) will be affected. Isolation, whether by geographic distance or ecological factors, will prevent the influx of new genetic material, and likely to result in inbreeding and eventual extinction (Levin 2002). We believe that the Sonoma County California tiger salamander is at risk from increasing fragmentation and isolation caused by urban development.

B. Overutilization for Commercial, Recreational, Scientific, or Educational Purposes

In the past, the larvae of non-native tiger salamanders could legally be used as bait by fishermen in California. The extent of the use of the Sonoma County California tiger salamander is unknown. The California Code of Regulations (2002) now specifies that no salamander may be used as bait and excludes the California tiger salamander from a list of salamanders, newts, toads, and frogs that may legally be taken and possessed under authority of a sportfishing license. The success of these present regulations in avoiding or reducing recreational harvest of the California tiger salamander is unknown.

Tiger salamanders are generally thought to make good pets by amateur herpetologists (Porras 2002). The Sonoma County California tiger salamander does not appear to be particularly popular among amphibian and reptile collectors. However, Federal listing could raise the value of the species within wildlife trade markets, and increase the threat of unauthorized collections above current levels (K. McCloud, Special Agent, Service, pers. comm., 2002). Even limited interest in the species could pose a serious threat to the DPS.

C. Disease or Predation

Disease

Relatively little is known about the diseases of wild amphibians (Alford and Richards 1999). The specific effects of disease on the Sonoma County California tiger salamander are not known and the risks to the animal have not been determined. However, it is known that mass mortalities of amphibians from disease are not uncommon, and may be either a natural phenomenon of the biology of species or induced by anthropogenic agents (Corn 1994). In California, large numbers of dead and dying California tiger salamanders were observed in a pond in the Los Alamos Valley in Santa Barbara County, but the cause was not determined (S. Sweet, pers. comm., 1998).

Worthylake and Hovingh (1989) described repeated die-offs of tiger salamanders (*A. tigrinum*) at Desolation Lake in the Wasatch Mountains of Utah. Affected salamanders had red, swollen hind legs and vents, and widespread hemorrhage of the skin and internal organs. The researchers determined that the die-offs were due to infection from the bacterium *Acinetobacter,* or redleg disease. The number of *Acinetobacter* in the lake increased with increasing nitrogen levels as the lake dried. The nitrogen was believed to come from both atmospheric deposition and waste from sheep grazing in the watershed (Worthylake and Hovingh 1989). *Acinetobacter,* which appears to affect amphibians whose immune systems have been weakened by stress (Corn 1994) or another bacterial infection, was also the suspected cause of larval tiger salamanders deaths in Arizona (Collins *et al.* 1988, as cited in Corn 1994). *Acinetobacter* is common in soil and animal feces.

Lefcort *et al.* (1997) found that tiger salamanders raised in natural and artificial ponds contaminated with silt were susceptible to infection by the water mold *Saprolegnia parasitica* at a location in Georgia. This fungus first appeared on the feet, spread to the entire leg, and then infected animals died. Die-offs of western toads (*Bufo boreas*), Cascades frogs (*Rana cascadae*), and Pacific treefrogs also have been associated with *Saprolegnia* infections (Kiesecker and Blaustein 1997). *Saprolegnia* is widespread in natural waters and commonly grows on dead organic material (Wise *et al.* 1995). *Saprolegnia ferax* outbreaks have been identified as a cause of high amphibian embryo mortalities in the Pacific Northwest (Kiesecker *et al.* 2001).

Viruses associated with die-offs of tiger and spotted salamanders in Maine and North Dakota have been isolated (B. McLean, National Wildlife Health Center, *in litt.,* 1998). Also, Jancovich *et al.* (1997) isolated a virus, believed to be an iridovirus, as the primary pathogen responsible for a decimating epizootic event affecting the federally endangered Sonoran tiger salamander (*Ambystoma tigrinum stebbinsi*) in Arizona. Iridoviruses have recently been implicated as the cause of amphibian mass deaths worldwide, with novel iridoviruses identified from a number of regions.

Ranaviruses are often highly virulent and cause systemic infections in amphibians. Epizootiology (science that deals with the character, ecology, and causes of outbreaks of animal diseases) of ranaviral disease in amphibians is poorly understood, but dissemination may be partly due to the virus's ability to remain infectious under adverse conditions and for prolonged periods. Likely modes of spread of amphibian ranaviruses may include use of fishing gear, including boats, and through artificial stocking of ponds for recreational fishing. Also, water birds have the potential to mechanically transfer the virus on their feathers, feet, or bills, or by regurgitation of ingested infected material. Some outbreaks of ranaviral disease in tiger salamanders have been associated with altered habitats and artificial ponds. Due to their highly virulent nature, ranaviruses should be considered a potential threat to amphibian populations, especially those isolated from previous disease outbreaks (and thus lacking specific immunity) and species with low fecundity (Daszak *et al.* 1999).

Kiesecker *et al.* (2001) reported that pathogen outbreaks in amphibian populations in the western U.S. may be linked to climate-induced changes in UV–B light exposure. Their findings indicate that climate-induced reductions in water depth at oviposition (laying of eggs) sites have caused high mortality of embryos by increasing their exposure to UV–B radiation and, consequently, their vulnerability to infection. Furthermore, they speculate that climate changes since the mid-1970s related to El Niño/Southern Oscillation cycles and elevated sea-surface temperatures could be the precursor for pathogen-mediated amphibian declines in many regions.

Pathogen outbreaks have not been documented in Sonoma County California tiger salamanders. Nevertheless, disease must be considered a potential future population threat because of the relatively small, fragmented remaining Sonoma County California tiger salamander breeding sites, the many stresses on these sites due to habitat losses and alterations, and the many other potential disease-enhancing anthropogenic changes which have occurred both inside and outside of the range of this DPS. An amphibian pathogen could eliminate one or more breeding sites of this animal.

Predation

Predation and competition by introduced or non-native species potentially affect all of the known Sonoma County California tiger salamander breeding sites. Bullfrogs prey on California tiger salamanders (P. Anderson 1968; Lawler *et al.* 1999). Morey and Guinn (1992) documented a shift in amphibian community composition at a vernal pool complex, with California tiger salamanders becoming proportionally less abundant as bullfrogs increased in number. Lawler *et al.* (1999) found that less than 5 percent of California red-legged frog (*Rana aurora draytonii*) tadpoles survived to metamorphosis when raised with bullfrog tadpoles. Moyle (1973) attributed disappearance of both

California red-legged frogs and foothill yellow-legged frogs (*Rana mucosa*) within the San Joaquin Valley of California to habitat alteration coupled with predation and competition from bullfrogs. Although bullfrogs are unable to establish permanent breeding populations in unaltered vernal pools and seasonal ponds, dispersing immature bullfrogs take up residence in such water bodies during winter and spring where they prey on native amphibians, including larval salamanders (Morey and Guinn 1992; Seymour and Westphal 1994).

Because bullfrogs are known to travel at least 2.6 km (1.6 mi) from one pond to another (Bury and Whelan 1984), they have the potential to naturally colonize new areas where they do not currently exist, including ponds where Sonoma County California tiger salamanders occur. In one study of the eastern San Joaquin Valley, 22 of 23 (96 percent) ponds with California tiger salamanders were within the bullfrogs' potential dispersal range (Seymour and Westphal 1994). In addition, because bullfrogs are still sought within California for sport and food, and may be taken without limit under a fishing license, the threat of transport for intentional establishment in new locations where California tiger salamanders exist or could exist is significant.

One of the pools at the Hall Road breeding site, and two of the pools contained at the FEMA/Broadmore North preserves, are located within 46 m (150 ft) of ditches or creek channels known to contain bullfrogs or crayfish. Bullfrogs likely occur in Roseland Creek, which is near the FEMA/Broadmore North preserve and breeding sites associated with the Air Center (D. Cook, pers. comm., 2002). Bullfrogs are likely present in ditches that cross the Hall Road Preserve (D. Cook, pers. comm., 2002). The direct and indirect evidence thus indicates that non-native bullfrogs represent a continuing significant threat to the persistence of the Sonoma County California tiger salamander.

Western mosquitofish (*Gambusia affinis*) are native to central North America (watersheds tributary to the Gulf of Mexico) and have been introduced throughout the world for mosquito control, including in California beginning in 1922. Western mosquitofish now occur throughout California wherever the water does not get too cold for extended periods, and they are still widely planted throughout the State (Boyce, UCD, *in litt.,* 1994) by about 50 local mosquito abatement districts.

Salamanders may be especially vulnerable to western mosquitofish predation due to their fluttering external gills, which may attract these visual predators (Graf and Allen-Diaz 1993). Loredo-Prendeville *et al.* (1994) found no California tiger salamanders inhabiting ponds containing western mosquitofish. Western mosquitofish prey on other amphibian species, such as the California newt (*Taricha torosa*) (Gamradt and Kats 1996) and Pacific treefrog (Goodsell and Kats 1999) tadpoles in both field and laboratory experiments, even given the optional prey of mosquito larvae (Goodsell and Kats 1999; L. Kats, Pepperdine University, pers. comm., 1999). Mosquitofish have also been observed ingesting and then spitting out California newt larvae, causing severe damage to the newts in the process (Graf and Allen-Diaz 1993). Given the effects of western mosquito fish on other amphibian species, they are likely to have similar effects on California tiger salamanders. If they have the same effects, the use of mosquito fish in California tiger salamander habitat threatens the persistence of the species, especially in the isolated Sonoma County California tiger salamander population.

Other non-native fish have either been directly implicated in predation of California tiger salamanders or appear to have the potential for such. For example, introductions of sunfish species (*e.g.*, largemouth bass (*Micropterus salmoides*) and bluegill (*Lepomis macrochirus*)), catfish (*Ictalurus* spp.), and fathead minnows (*Pimephales promelas*) are believed to have eliminated California tiger salamanders from several breeding sites in Santa Barbara County (Service 2000). Non-native sunfish species, catfish, and bullheads (*Ameiurus* spp.) have been, and still are, widely planted in ponds in California to provide for sportfishing. By 1984, the California fish fauna included about 50 such transplanted and exotic species, mostly from eastern North America origin (Hayes and Jennings 1986). More recently, Moyle (2002) estimated that, on average, California is losing about one native species or subspecies of fish every 5 to 6 years, and gaining an average of one alien species about every 2 years.

Non-native fish introductions may be responsible for the declines of frog species in western North America (Hayes and Jennings 1986). Such introduced fish may be a problem for California raids because of their specialization for preying on aquatic life (including eggs and larvae), and because the affected amphibians may have evolved under conditions of limited fish predation, which now increases the impacts of such introductions (Hayes and Jennings 1986). We believe the same threat applies to the California tiger salamander. Thus, potential introduction of such non-native fish species in Sonoma County California tiger salamander breeding habitat should be considered a threat to the persistence of this DPS.

The degree to which predation from native fish have affected the Sonoma County California tiger salamanders is unknown. For example, sticklebacks (*Gasterosteus* spp.), which have been present in California for at least 16 million years, were believed to be the factor preventing the Sonoma County California tiger salamander from establishing at a site in Sonoma County (Cook and Northen 2001). One pool at the Hall Road Preserve appears to have all of the biological components for successful California tiger salamander breeding, but has a small connector to a drainage ditch containing stickleback. Sonoma County California tiger salamanders have never been found at this site, and it is suspected that predation of their eggs and larvae by this fish is the limiting factor (D. Cook, pers. comm., 2002).

Non-native and native crayfish (*Pacifastacus, Orconectes,* and *Procambarus* spp.) apparently prey on California tiger salamanders (Shaffer *et al.* 1993) and may have eliminated some populations (Jennings and Hayes 1994). Crayfish prey on California newt eggs and larvae, despite toxins produced by these amphibians, and they may be a significant factor in the loss of newts from several streams in southern California (Gamradt and Kats 1996). These crayfish have been found at both the FEMA/Broadmore North and Hall Road Preserves. At the FEMA property, crayfish were found in the pool (D. Cook, pers. comm., 2002). The crayfish likely came from the adjacent Roseland Creek Channel. Louisiana crayfish have been found in the ditches that cross the Hall Road Preserve, but not at any of the pools known to support Sonoma County California tiger salamander populations (D. Cook, pers. comm., 2002). The presence of both stickleback and crayfish, along with the suspected presence of bullfrogs, could negatively affect Sonoma County California tiger salamanders within the Hall Road Preserve.

California tiger salamanders are also likely preyed on by many native species of fish and wildlife. In healthy salamander populations, such predation is probably not a significant threat. But when combined with other impacts, such as predation by non-native species, contaminants, migration barriers, or habitat alteration, it may cause a significant decrease in population viability. Native predators include herons and egrets, western pond turtles (*Clemmys marmorata*), various garter snakes (*Thamnophis* spp.), larger California tiger salamanders, larger spadefoot toads (*Scaphiopus hammondii*), and California red-legged frogs (M. Peters, Service, *in litt.,* 1993; Hansen and Tremper 1993). In Arizona, larval tiger salamanders are preyed upon by adult predaceous diving beetles (*Dytiscus dauricus*) (Holomuzki 1986), and turkey vultures (*Carthartes aura*) have been observed feeding on larval or adult tiger salamanders (Duncan 1999).

D. The Inadequacy of Existing Regulatory Mechanisms

The primary cause of the decline of the Sonoma County California tiger salamander is the loss, degradation, and fragmentation of habitat due to human activities. Federal, State, and local laws have been insufficient to prevent past and ongoing losses of the limited habitat of the Sonoma County California tiger salamander.

Federal

Clean Water Act. Under section 404 of the Clean Water Act (CWA) (33 U.S.C. 1344 *et seq.*), the U.S. Army Corps of Engineers (Corps) regulates the discharge of fill material into waters of the United States, including wetlands. Section 404 regulations require applicants to obtain a permit for projects that involve the discharge of fill material into waters of the United States, including wetlands. However, normal farming activities are exempt under the CWA and do not require a permit (53 FR 20764; Robert Wayland III, Environmental Protection Agency (EPA), *in litt.,* 1996). Projects that are subject to regulation may qualify for authorization to place fill material into headwaters and isolated waters, including wetlands, under several nationwide permits. The use of nationwide permits by an applicant or project proponent is normally authorized with minimal environmental review by the Corps. No activity that is likely to jeopardize the continued existence of a threatened or endangered species, or that is likely to destroy or adversely modify designated critical habitat of such species, is authorized under any nationwide permit. An individual permit may be required by the Corps if a project otherwise qualifying under a nationwide permit would have greater than minimal adverse environmental impacts.

Recent court cases may further limit the Corps' ability to utilize the CWA to regulate the fill or discharge of fill or dredged material into the aquatic environment within the current range of the Sonoma County California tiger salamander (*Solid Waste Agency of Northern Cook County* v. *U.S. Army Corps of Engineers,* 531 U.S. 159 (2001) (SWANCC)). The effect of SWANCC on Federal regulation of activities in wetlands in the area of the Sonoma County California tiger salamander has recently become clear by the Corps' failure to assert its jurisdiction over fill of several wetlands within the range of the Sonoma County California tiger salamander. In a letter from the Corps dated March 8, 2002, concerning the fill of 0.18 ha (0.45 ac) of seasonal wetlands southwest of the intersection of Piner and Marlow Roads (Corp File Number 19736N), the Corps referenced the SWANCC decision and reiterated that the subject wetlands were not ''waters of the United States'' because they were: (1) Not navigable waters; (2) not interstate waters; (3) not part of a tributary system to 1 or 2; (4) not wetlands adjacent to any of the foregoing; and (5) not an impoundment of any of the above. The letter further stated that the interstate commerce nexus to these particular waters is insufficient to establish CWA jurisdiction and, therefore, not subject to regulation by the Corps under section 404 of the CWA. The Corps also cited the SWANCC decision as their reasoning for not taking jurisdiction over fill of Sonoma County California tiger salamander breeding pools at the recently constructed South Sonoma Business Park.

When on- or off-site mitigation is required by the Corps as a condition of a section 404 permit to fill certain wetlands, there is often low probability that affected Sonoma County California tiger salamander habitat values, if any, would actually be compensated and replaced by the ensuing mitigation action(s). A 1994 Service study of selected wetlands re-creation projects in California authorized through the section 404 program found deficiencies in both compliance and performance of the re-created wetlands (Santa Rosa Plain Vernal Pool Ecosystem Preservation Plan 1995). There was evidence that, of all the proposed mitigation, half of the sites were meeting less than 75 percent of the mitigation conditions and our goal for ''in-kind'' replacement was not being met (DeWeese 1994). Other recent studies have produced similar results. In addition, most wetland re-creation efforts in California to date have been directed at the wetlands themselves and have not adequately addressed the upland and other related needs of California tiger salamanders.

Semlitsch (1998) examined published literature for six species of pond-breeding ambystomatid salamanders from five States and concluded that a buffer zone encompassing 95 percent of a given population would need to extend 263 m (534 ft) from a wetland's edge into surrounding terrestrial habitat in order to give adequate protection. More recently, Trenham (2001), although cautioning that essential terrestrial habitats and buffer requirements are still relatively poorly understood, concluded that plans to maintain local populations of California tiger salamanders should include pond(s) surrounded by buffers at least 173 m (567 ft) wide of terrestrial habitat occupied by burrowing mammals. Management plans that focus only on preserving ponds or wetlands—without consideration for associated terrestrial habitat—are likely to fail to maintain viable amphibian populations (Marsh and Trenham 2001). However, even with inclusion of terrestrial habitat buffers, recent studies have demonstrated that restored wetlands are often still only partially successful in recolonization by the full amphibian assemblages being targeted for restoration (Lehtinen and Galatowitsch 2001; Pechmann *et al.* 2001). Successful compensatory mitigation for losses of California tiger salamander pool and pond habitat due to filling would also require the connectivity of the restoration site to other pools and ponds (Gibbs 1998; Lehtinen *et al.* 1999; Trenham *et al.* 2001; Marsh and Trenham 2001). Pond isolation may be an important consideration in disturbed environments where inter-pond dispersal is impeded by barriers such as roads and urban development (Marsh and Trenham 2001). The California tiger salamander may also require large preserves to maintain viable breeding populations and to allow recolonizations from natural and anthropogenic local extirpations (P. Northen, *in litt.,* 2001).

Three federally endangered plants, Sonoma sunshine (*Blennosperma bakeri*), Sebastopol meadowfoam (*Limnanthes vinculans*), and Burke's goldfields (*Lasthenia burkei*) occur on the Santa Rosa Plain of Sonoma County in the vicinity of the Sonoma County California tiger salamander. However, little overlap occurs between the viable breeding sites of this species and these federally listed vernal pool species. Any Corps consultation requirement for fill of pools on the Santa Rosa Plain would be triggered by the listed plants. Since the salamander and the federally listed plants do not substantially overlap, salamander breeding pools are unlikely to be protected by presence of the plants or their habitat. Furthermore, even if breeding pools of this animal are avoided due to the presence of a federally listed plant species, this protection may only extend to the pool itself with a small upland buffer. Since Sonoma County California tiger salamanders spend up to 80 percent of their life in small mammal burrows in upland habitats surrounding breeding pools, the protection of the pool itself, with concurrent loss of uplands surrounding the pool, would still result in the loss of local Sonoma County California tiger salamander breeding sites.

We conclude that regulation of wetlands filling by the Corps under section 404 of the CWA is inadequate to protect the Sonoma County California tiger salamander from further decline. Section 404 implementation fails to prevent losses of numerous small wetlands in California that may support California tiger salamander breeding. Section 404 does not regulate the continuing losses of California tiger salamander terrestrial habitat (except to the extent certain agricultural activities may be regulated). When authorized fills under section 404 do result in compensatory mitigation for wetlands losses, it is unlikely that California tiger salamander habitat losses at specific fill sites can, and will be, fully and successfully mitigated.

State

Since 1994, the CDFG recognizes the California tiger salamander as a ''species of special concern'' by the CDFG. More recently, the California tiger salamander has been placed on the State's list of protected amphibians, which means that it cannot be taken without a special permit issued for scientific collecting or research. Also, as stated earlier, the California Code of Regulations (2002) specifies California tiger salamanders can no longer be taken, possessed, or used for fishing bait. However, any more stringent protection of California tiger salamanders or their habitat, as would be provided under a CESA listing or designation as a Fully Protected species by CDFG, is lacking.

CDFG recognizes the importance of California tiger salamander conservation at the local population level, and routinely considers and recommends actions to mitigate potential adverse effects to the species during its review of development proposals. However, CDFG's primary regulatory venue is under CEQA (Public Resources Code Sec. 21000–21177). CEQA has been a variable, and apparently inadequate, regulatory mechanism for providing protection to the California tiger salamander and its habitat.

The California Environmental Quality Act (CEQA) (Public Resources Code Sec. 21000–21177) requires a full disclosure of the potential environmental impacts of proposed projects. The public agency with primary authority or jurisdiction over a project for which it has discretion is designated as the lead agency and is responsible for conducting a review of the project and consulting with the other agencies concerned with the resources affected by the project. Section 15065 of the CEQA Guidelines, as amended, requires a finding of significance if a project has the potential to ''reduce the number or restrict the range of a rare or endangered plant or animal.'' Once significant effects are identified, the lead agency has the option of requiring mitigation for effects through changes in the project or to decide that overriding considerations make mitigation infeasible (CEQA Sec. 21002). In the latter case, projects may be approved that cause significant environmental damage, such as destruction of listed endangered species and/or their habitat. Protection of listed species through CEQA is, therefore, dependent upon the discretion of the lead agency involved, although ''overriding considerations'' are infrequently found.

However, neither CEQA nor CDFG provide completely effective regulatory mechanisms for reducing or eliminating the introduction of non-native fish into Sonoma County California tiger salamander habitat. For example, there is no State regulation of non-native fish stocking into ponds and waters occupied by Sonoma County California tiger salamanders. Agencies and individuals may purchase fish from CDFG-licensed breeders and stock into such waters an array of non-native sunfish, catfish, and other fish for recreational fishing. Similarly, there is no State regulation of western mosquitofish stocking into Sonoma County California tiger salamander breeding ponds and waters. In addition, lethal control of small mammals in places where small mammal burrows occur may affect the survival of the California tiger salamander because the practice is not State-regulated, and is still widely and commonly practiced throughout the California tiger salamander's range. The burrows of these small mammals are used by California tiger salamanders to estivate during the summer and fall months of the year.

Local

We are not aware of any specific county or city ordinances or regulations that provide protection for the Sonoma County California tiger salamander. Sonoma County recently has begun applying regulatory oversight to conversions to vineyards, which may indirectly benefit the species. This oversight is resulting in requirements for full-scale environmental analyses, restrictions on the steepness of slopes onto which vineyards may be established, and requirements for erosion control plans and measures. However, it is unclear if the restriction on planting vineyards on steep slopes will result in more pressures to cultivate flat areas that contain habitat for the Sonoma tiger salamander.

E. Other Natural or Manmade Factors Affecting Its Continued Existence

Several other factors, including contaminants, ground squirrel and gopher control, mosquito control, hybridization with non-native salamanders, competition with introduced species, and decreased population viability may have negative effects on California tiger salamanders and their aquatic and upland habitats.

Contaminants

Like most amphibians, California tiger salamanders inhabit both aquatic and terrestrial habitats at different stages in their life cycle, and are likely exposed to a variety of pesticides and other chemicals throughout their range. They are extremely sensitive to these pollutants due to their highly permeable skin, which can rapidly absorb pollutant substances (Blaustein and Wake 1990). Toxins at lower than lethal levels may still have adverse effects, such as causing abnormalities in larva and behavioral anomalies in adults, both of which could eventually lead to lethal effects (Hall and Henry 1992; Blaustein and Johnson 2003).

California tiger salamanders also could die from starvation by the loss of their prey-base. Hydrocarbon and other contaminants from oil production and road runoff; the application of numerous chemicals for agricultural production; roadside maintenance activities; urban/suburban landscaping applications; and rodent and vector control programs may all have negative effects on tiger salamander populations, as detailed below.

Road mortality is not the only risk factor associated with roads, as oil and other contaminants in runoff have been detected in adjacent ponds and linked to die-offs and deformities in California tiger salamanders and spadefoot toads, and die-offs of invertebrates that form most of both species' prey base (S. Sweet, *in litt,.* 1993). Lefcort *et al.* (1997) found that oil had limited direct effects on 5-week-old marbled (*Ambystoma opacum*) and tiger salamanders (*A. t. tigrinum*). However, salamanders from oil-contaminated natural ponds metamorphosed earlier at smaller sizes, and those from oil-contaminated artificial ponds had slower growth rates, than larvae raised in non-contaminated ponds. Their studies did not address effects on eggs and early larval stages, where the effects may be more pronounced.

Hatch and Burton (1998) and Monson *et al.* (1999) investigated the effects of one component of petroleum products and urban runoff (fluoranthene, a polycyclic aromatic hydrocarbon) on spotted salamanders (*A. maculatum*), northern leopard frogs (*Rana pipiens*), and African clawed frogs (*Xenopus laevis*). In laboratory and outdoor experiments, using levels of the contaminant comparable to those found in service stations and other urban runoff, the researchers found reduced survival and growth abnormalities in all species. The effects were worse when the larvae were exposed to the contaminant under natural levels of sunlight, rather than in the laboratory under artificial light.

In Sonoma County, there are a number of records of California tiger salamanders using roadside ditches. Many are in areas where there are no known breeding ponds, and these animals are utilizing the only marginal habitat remaining. Also, many pools in these areas have likely been destroyed, leaving these marginal sites as the only option for breeding. In light of this increased urbanization occurring in Sonoma County, along with concurrent increases in traffic, the risk factor associated with contaminants in runoff likely will increase in both roadside ditches and across the general landscape.

Agricultural and Landscaping Contaminants

In Sonoma County, over 1.4 million kilograms (3.1 million pounds) of agricultural chemicals were used in 2000 on grapes, apples, rights of way, structural pest control, and landscape maintenance (California Department of Pesticide Regulation 2000, Internet Website). Chemical use occurring on or near tiger salamander breeding sites in Sonoma County is primarily associated with rights of way, structural pest control, and landscape maintenance. These chemicals included metam-sodium, methyl bromide, mancozeb, petroleum oil, phosmet, chlorpyrifos, pendimethalin, parathion, paraquat dichloride, fosetyl-aluminum, acephate, cryolite, and malathion, some of which are extremely toxic to aquatic organisms, such as amphibians and the organisms on which they prey.

Even if toxic or detectable amounts of pesticides are not found in breeding ponds or groundwater, salamanders may still be affected, particularly when chemicals are applied during the migration and dispersal seasons. All but one of the remaining eight documented salamander breeding sites in Sonoma County may be directly or indirectly affected by toxic landscaping chemicals due to the presence of housing developments within their drainage basins. Sparling *et al.* (2001) examined pesticide usage and amphibian (*Rana* and *Bufo* spp.) population declines in California and found that pesticides have been instrumental in declines of these species. Davidson *et al.* (2001, 2002) also found a strong relationship between the declines in four California native ranid species and upwind agriculture, specifically the use of agrochemicals upwind of ranid populations that are not directly impacted by habitat destruction. However, Davidson *et al.* (2002) were unable to find a significant overall relationship between upwind agriculture and the California tiger salamander's decline.

Rodent Control

California tiger salamanders spend much of their lives estivating in underground retreats, typically in the burrows of ground squirrels and gophers (Loredo *et al.* 1996; Trenham 1998a). Dave Cook (pers. comm., 2001) found that pocket gopher burrows are most often used by California tiger salamanders in Sonoma County. Both of these species are classified as non-game mammals by CDFG, which means that if pocket gophers or ground squirrels are found to be injuring growing crops or other property, including garden and landscape plants, they may be controlled at any time and in any legal manner by the owner or the tenant of the premises (University of California Integrated Pest Management (UCIPM) internet website 2002).

Legal methods of pocket gopher control include trapping, strychnine-treated grain bait, and anticoagulant baits. Poisoned grains (anticoagulant baits) are the most common method used to control ground squirrels around homes and other areas where children, pets, and poultry are present (UCIPM internet website 2002; Jon Shelgrin, California Department of Pesticide Regulation, pers. comm., 2002). Zinc phosphide is highly toxic to freshwater fish and to non-target mammals (Extension Toxicology Network (EXOTONET) 1996). Zinc phosphide, a rodenticide and restricted material, turns into phosgene gas, which is toxic to the rodents once ingested. There is little risk of California tiger salamanders ingesting any of these baits; however, the use of these grains may impact the California tiger salamanders indirectly if washed into burrows or ponds used by the species.

Two of the most commonly used rodenticides, chlorophacinone and diphacinone, are anticoagulants that cause animals to bleed to death. These chemicals can be absorbed through the skin and are considered toxic to fish and wildlife (U. S. Environmental Protection Agency 1985; EXOTONET 1996). These two chemicals, along with strychnine, are used in Sonoma County to control rodents (R. Thompson, Science Applications International Corporation, *in litt.*, 1998). Although the effects of these poisons on California tiger salamander have not been assessed, any uses in close proximity to occupied California tiger salamander habitat could have various direct and indirect toxic effects. Gases, including aluminum phosphide, carbon monoxide, and methyl bromide, are used in rodent fumigation operations and are introduced into burrows by either using cartridges or by pumping. When such fumigants are used, animals inhabiting the fumigated burrow are killed (Salmon and Schmidt 1984).

In addition to possible direct effects of rodent control chemicals, control programs probably have an adverse indirect effect on California tiger salamander populations. Control of ground-burrowing rodents could significantly reduce the number of burrows available for use by the Sonoma County California tiger salamander (Loredo-Prendeville *et al.* 1994). All but one of the remaining Sonoma County California tiger salamander breeding locations exist in areas that are likely to experience a heightened degree of rodent control due to landscaping concerns surrounding residential developments. Because the burrow density required to support Sonoma County California tiger salamanders in an area is not known, the loss of burrows as a result of control programs cannot be quantified at this time. However, Shaffer *et al.* (1993) stated that rodent control programs may be responsible for the lack of California tiger salamanders in some areas. Active ground squirrel colonies probably are needed to sustain tiger salamanders because inactive burrow systems become progressively unsuitable over time. Loredo *et al.* (1996) found that burrow systems collapsed within 18 months following abandonment by or loss of the ground squirrels. Although the researchers found that California tiger salamanders used both occupied and unoccupied burrows, they did not indicate that the salamanders used collapsed burrows. Rodent control programs must be analyzed and implemented carefully in California tiger salamander habitat so the persistence of the animals is not threatened. One of the remaining Sonoma County California tiger salamander sites is currently occupied by cattle. Most owners of livestock seek to eliminate ground squirrel burrows because of the threat of cows (*Bos bos*) breaking their legs if they accidentally step into a burrow.

Mosquito Control

In addition to the use of western mosquitofish, a common chemical method of mosquito control in California involves the use of methoprene. Methoprene is an insect hormone mimic that increases the level of juvenile hormone in insect larvae and disrupts the molting process. Lawrenz (1984, 1985) found that methoprene (Altosoid SR–10) retarded the development of selected crustacea that had the same molting hormones (*i.e.*, juvenile hormone) as insects, and anticipated that the same hormone may control metamorphosis in other arthropods. Because the success of many aquatic vertebrates relies on an abundance of invertebrates in temporary wetlands, any delay in insect growth could reduce the numbers and density of prey available (Lawrenz 1984, 1985). The use of methoprene could have an indirect adverse effect on California tiger salamanders by reducing the availability of prey.

In more recent studies, methoprene did not cause increased mortality of gray treefrog (*Hyla versicolor*) tadpoles (Sparling and Lowe 1998). However, it caused reduced survival rates and increased malformations in northern leopard frogs (*Rana pipiens*) (Ankley *et al.* 1998) and increased malformations in southern leopard frogs (*R. utricularia*) (Sparling 1998). Blumberg *et al.* (1998) correlated exposure to methoprene with delayed metamorphosis and high mortality rates in northern leopard and mink (*R. septentrionalis*) frogs. Methoprene appears to have both direct and indirect effects on the growth and survival of larval amphibians.

Road-Crossing Mortality

Although no systematic studies road-crossing mortality of the Sonoma County California tiger salamander have been conducted, it is known that significant numbers of California tiger salamanders in other portions of the species' range are killed by vehicular traffic while crossing roads (Hansen and Tremper 1993; S. Sweet, *in litt.*, 1993; J. Medeiros, pers. comm., 1993). For example, during a 1-hour period on a road bordering Lake Lagunita on the Stanford University campus, 45 California tiger salamanders were collected, 28 of which had been killed by cars (Twitty 1941). More recently, during one 15-day period in 2001 at a Sonoma County location, 26 road-killed California tiger salamanders were found (D. Cook, pers. comm., 2002). Overall breeding population losses of California tiger salamanders due to road kills have been estimated to be between 25 and 72 percent (Twitty 1941; S. Sweet, *in litt.*, 1993; Launer and Fee 1996). Mortality may be increased by associated roadway curbs and berms as low as 9 to 12 cm (3 to 5 in), which allow California tiger salamanders access to roadways but prevent their exit from them (Launer and Fee 1996; S. Sweet, *in litt.*, 1998). In a recent study along a 1.1 km (0.7 mi) high-vehicular-use (21,450 vehicles per day) section of the Trans-Canadian Highway in Alberta, Canada, Clevenger *et al.* (2001) recorded 183 road-killed tiger salamanders (*Ambystoma* species) in 30 days and concluded it was likely that very few of the local population had survived.

Hybridization With Non-native Salamanders

Hybrids between the California tiger salamander and the non-native tiger salamander (*Ambystoma tigrinum*) have been documented elsewhere in the range of *Ambystoma californiese* (Shaffer and Trenham 2002). Introduced salamanders may out-compete the California tiger salamander, or interbreed with the natives to produce hybrids that may be less fit and adapted to the California climate, or are not reproductively viable past the first or second generations (Bury and Lukenbach 1976; Shaffer *et al.* 1993). More recent evidence suggests that the hybrids are viable, and that they breed with California tiger salamanders (Shaffer and Trenham 2002). Over time, a population of a species could become genetically indistinguishable from a larger population of an introgressing species such that the true genotype (the genetic constitution of an individual or group) of the lesser species no longer exists (Levin 2002). The loss of any breeding sites of the Sonoma County California tiger salamander due to hybridization with, or competition from, introduced species is of serious concern.

Livestock Grazing

Light-to-moderate livestock grazing is generally thought to be compatible with California tiger salamanders, provided the grazed areas do not also have intensive burrowing rodent control efforts (T. Jones, University of Michigan, *in litt.*, 1993, S. Sweet, pers. comm. 1998). By keeping vegetation shorter, grazing may make areas more suitable for ground burrowing rodents whose burrows are essential to Sonoma County California tiger salamanders. However, heavy grazing, or heavy use of certain pools and ponds for livestock watering, can clearly have adverse effects on the species. Melanson (*in litt.*, 1993) noted that, although vernal pool species continued to reproduce under a November-to-April grazing regime, California tiger salamanders were either absent or found in low numbers in portions of pools heavily trampled by cattle. Repeated trampling of pond edges by cattle can increase the surface area of a pond, and may increase water temperature and evaporation rate, thus reducing the amount of time the pond contains water (S. Sweet, pers. comm., 1998).

Reduction in water quality caused by livestock excrement may negatively affect the California tiger salamander by increasing nitrogen and silt levels. High nitrogen levels associated with bacterial blooms, lowered dissolved oxygen (Worthylake and Hovingh 1989), and silt have been associated with fatal fungal infections (Lefcort *et al.* 1997), as discussed earlier under Factor C.

However, grazing generally is compatible with the continued use of rangelands by the California tiger salamander as long as intensive control programs for burrowing rodents are not implemented on such areas, and grazing is not excessive (T. Jones, *in litt.*, 1993).

Population Size

The low numbers of Sonoma County California tiger salamander make it vulnerable to risks associated with small, restricted populations. The elements of risk that are amplified in very small populations include: (1) The impact of high death rates or low birth rates; (2) the effects of genetic drift (random fluctuations in gene frequencies) and inbreeding (mating among close relatives); and (3) deterioration in environmental quality

(Gilpin and Soulé 1986). Genetic drift and inbreeding may lead to reductions in the ability of individuals to survive and reproduce (*i.e.*, reductions in fitness) in small populations. In addition, reduced genetic variation in small populations may make any species less able to successfully adapt to future environmental changes (Shaffer 1981, 1987; Noss and Cooperrider 1994; Primack 1998).

Conclusion for the Five Factors

In making this determination, we have carefully assessed the best scientific and commercial information available regarding the past, present, and future threats faced by the Sonoma County California tiger salamander. As discussed in the Summary of Factors Affecting the Species above, this DPS faces a number of threats. The most overwhelming threat is from continuing habitat destruction, degradation, and fragmentation. Secondary threats exist from predation and competition from introduced exotic species; possible commercial overutilization; disease; hybridization with non-native salamanders; various chemical contaminants; road-crossing mortality; rodent control operations, and the species' small remaining population. The various primary and secondary threats are not currently being offset by existing Federal, State, or local regulatory mechanisms. The Sonoma County California tiger salamander also is vulnerable to chance environmental or demographic events, to which small populations are particularly vulnerable. The combination of its biology and specific habitat requirements makes the animal highly susceptible to random events, such as drought, disease, and other occurrences. Such events are not usually a concern until the number of breeding/estivation sites or geographic distribution become severely limited, as is the case with the Sonoma County California tiger salamander.

Because the Sonoma County DPS of the California tiger salamander has been reduced to only eight known breeding sites, and all of them are subject to various immediate, ongoing, and future threats as outlined above, we find that the species is in imminent danger of extinction throughout all or a significant portion of its range and warrants immediate protection under the Act. The survival of this DPS now depends on protecting as many breeding sites and their associated upland habitats from further degradation and destruction as possible. The remaining breeding sites are vulnerable to loss from random natural or human-caused events unless sufficient habitat can be protected and the metapopulations increased in size.

Critical Habitat

Critical habitat is defined in section 3 of the Act as the—(i) specific areas within the geographical area occupied by a species, at the time it is listed in accordance with the Act, on which are found those physical or biological features (I) essential to the conservation of the species, and (II) that may require special management considerations or protection, and (ii) specific areas outside the geographical area occupied by the species at the time it is listed in accordance with the provisions of section 4 of the Act, upon a determination by the Secretary that such areas are essential for the conservation of the species. ''Conservation'' means the use of all methods and procedures needed to bring the species to the point at which listing under the Act is no longer necessary.

Section 4(a)(3) of the Act and implementing regulations (50 CFR 424.12) require that, to the maximum extent prudent and determinable, the Secretary of the Interior (Secretary) designate critical habitat at the time the species is determined to be endangered or threatened. Our implementing regulations (50 CFR 424.12(a)) state that critical habitat is not determinable if information sufficient to perform the required analysis of impacts of the designation is lacking, or if the biological needs of the species are not sufficiently well known to allow identification of an area as critical habitat. Section 4(b)(2) of the Act requires us to consider economic and other relevant impacts of designating a particular area as critical habitat on the basis of the best scientific data available. The Secretary may exclude any area from critical habitat if she determines that the benefits of such exclusion outweigh the conservation benefits, unless to do so would result in the extinction of the species. In the absence of a finding that critical habitat would increase threats to a species, if any benefits would derive from critical habitat designation, then a prudent finding is warranted. In the case of this species, designation of critical habitat may provide some benefits.

The primary regulatory effect of critical habitat is the section 7 requirement that agencies refrain from taking any action that destroys or adversely modifies critical habitat. While a critical habitat designation for habitat currently occupied by this species would not be likely to change the section 7 consultation outcome because an action that destroys or adversely modifies such critical habitat would also be likely to result in jeopardy to the species, there may be instances where section 7 consultation would be triggered only if critical habitat is designated. Examples could include unoccupied habitat or occupied habitat that may become unoccupied in the future. Designating critical habitat may also produce some educational or informational benefits. Therefore, designation of critical habitat for the Sonoma County California tiger salamander is prudent.

However, our budget for listing activities is currently insufficient to allow us to immediately complete all the listing actions required by the Act. Not designating critical habitat at this time allows us to provide the necessary protections needed for the conservation of the species without further delay. This is consistent with section 4(b)(6)(C)(i) of the Act, which states that final listing decisions may be issued without critical habitat designations when it is essential that such determinations be promptly published. The legislative history of the 1982 Act amendments also emphasized this point: ''The Committee feels strongly, however, that, where biology relating to the status of the species is clear, it should not be denied the protection of the Act because of the inability of the Secretary to complete the work necessary to designate critical habitat * * * . The committee expects the agencies to make the strongest attempt possible to determine critical habitat within the time period designated for listing, but stresses that the listing of species is not to be delayed in any instance past the time period allocated for such listing if the biological data is clear but the habitat designation process is not complete'' (H.R. Rep. No. 97–567 at 20 (1982)). We will prepare a critical habitat designation in the future when our available resources allow.

We will protect the Sonoma County California tiger salamander and its habitat through section 7 consultations to determine whether Federal actions are likely to jeopardize the continued existence of the species, through the recovery process, through enforcement of take prohibitions under section 9 of the Act, and through the section 10 process for activities on non-Federal lands with no Federal nexus.

Available Conservation Measures

Conservation measures provided to species listed as endangered or threatened under the Act include recognition, recovery actions, requirements for Federal protection, and prohibitions against certain practices.

Recognition through listing encourages conservation actions by Federal, State, and local agencies. The Act provides for possible land acquisition and cooperation with the State and requires that recovery actions be carried out for listed species. We discuss the protection of Federal agencies, considerations for protection and conservation actions, and the prohibitions against taking and harm for the Sonoma County California tiger salamander, in part, below.

Section 7(a) of the Act, as amended, requires Federal agencies to evaluate their actions with respect to any species that is proposed to be listed or is listed as endangered or threatened, and with respect to its critical habitat, if any is being designated. Regulations implementing this interagency cooperation provision of the Act are codified at 50 CFR part 402. Federal agencies are required to confer with us informally on any action that is likely to jeopardize the continued existence of a proposed species, or result in destruction or adverse modification of proposed critical habitat. If a species is listed subsequently, section 7(a)(2) requires Federal agencies to ensure that activities they authorize, fund, or carry out are not likely to jeopardize the continued existence of such a species or to destroy or adversely modify its critical habitat. If a Federal agency action may affect a listed species or its critical habitat, the responsible Federal agency must enter into formal consultation with us. Federal agency actions that may affect the Sonoma County California tiger salamanders and may require consultation with us include, but are not limited to, those within the jurisdiction of the Corps, and Federal Highway Administration (FHA).

We believe that protection and recovery of the Sonoma County California tiger salamander will require reduction of the threats from destruction and degradation of wetland and associated upland habitats due to urban development, exotic predators, unnecessary ground squirrel and gopher control, and road construction. Threats from collection and pesticide drift also must be reduced. These threats should be considered when management actions are taken in habitats currently and potentially occupied by the Sonoma County California tiger salamander, and areas deemed important for dispersal and connectivity or corridors between known locations of this species. Monitoring also should be undertaken for any management actions or scientific investigations designed to address these threats or their impacts.

Listing the Sonoma County California tiger salamander provides for the development and implementation of a recovery plan for the DPS. This plan will bring together Federal, State, and regional agency efforts for the conservation of the DPS. A recovery plan will establish a framework for agencies to coordinate their recovery efforts. The plan will set recovery priorities and estimate the costs of the tasks necessary to accomplish the priorities. It also will describe the site-specific actions necessary to achieve conservation and survival of the DPS.

Listing also will require us to review any actions that may affect the Sonoma County California tiger salamander for lands and activities under Federal jurisdiction, State plans developed pursuant to section 6 of the Act, scientific investigations of efforts to enhance the propagation or survival of the animal, pursuant to section 10(a)(1)(A) of the Act, and habitat conservation plans prepared for non-Federal lands and activities pursuant to section 10(a)(1)(B) of the Act.

Federal agencies with management responsibility for the Sonoma County California tiger salamander include the Service, in relation to the issuance of section 10(a)(1)(A and B) permits for habitat conservation plans and other programs. Occurrences of this species could potentially be affected by projects requiring a permit from the Corps under section 404 of the CWA. The Corps is required to consult with us on applications they receive for projects that may affect listed species. Highway construction and maintenance projects that receive funding from the FHA would be subject to review under section 7 of the Act. In addition, activities that are authorized, funded, or administered by Federal agencies on non-Federal lands will be subject to section 7 review.

The Act and implementing regulations found at 50 CFR 17.21 set forth a series of general prohibitions and exceptions that apply to all endangered wildlife. These prohibitions, codified at 50 CFR 17.21, in part make it illegal for any person subject to the jurisdiction of the United States to take (includes harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect; or attempt any such conduct), import, export, transport in interstate or foreign commerce in the course of commercial activity, or sell or offer for sale in interstate or foreign commerce any listed species. It also is illegal to possess, sell, deliver, carry, transport, or ship any such wildlife that has been taken illegally. Certain exceptions apply to our agents and State conservation agencies.

Permits may be issued to carry out otherwise prohibited activities involving endangered wildlife under certain circumstances. Regulations governing permits are codified at 50 CFR 17.22 and 17.23. Such permits are available for scientific purposes, to enhance the propagation or survival of the species, and for incidental take in connection with otherwise lawful activities.

It is our policy, as published in the **Federal Register** on July 1, 1994 (59 FR 34272), to identify to the maximum extent practicable at the time a species is listed those activities that would or would not constitute a violation of section 9 of the Act. The intent of this policy is to increase public awareness of the effect of the listing on proposed and ongoing activities within a species' range. We believe that, based on the best available information, the following actions are not likely to result in a violation of section 9, provided these actions are carried out in accordance with any existing regulations and permit requirements:

(1) Possession, delivery, including interstate transport and import or export from the United States, involving no commercial activity, of Sonoma County California tiger salamanders that were collected prior to the date of publication of the emergency listing rule in the **Federal Register**;

(2) Any actions that may affect the Sonoma County California tiger salamander that are authorized, funded, or carried out by a Federal agency, when the action is conducted in accordance with the consultation requirements for listed species pursuant to section 7 of the Act;

(3) Any action taken for scientific research carried out under a recovery permit issued by us pursuant to section 10(a)(1)(A) of the Act;

(4) Land actions or management carried out under a habitat conservation plan approved by us pursuant to section 10(a)(1)(B) of the Act, or an approved conservation agreement; and

(5) Grazing management practices that do not result in the degradation or elimination of suitable California tiger salamander habitat.

Activities that we believe could potentially result in a violation of section 9 of the Act include, but are not limited to:

(1) Unauthorized possession, collecting, trapping, capturing, killing, harassing, sale, delivery, or movement, including intrastate, interstate, and foreign commerce, or harming, or attempting any of these actions, of Sonoma County California tiger salamanders. Research activities where

salamanders are trapped or captured will require a permit under section 10(a)(1)(A) of the Act;

(2) Activities authorized, funded, or carried out by Federal agencies that may affect the Sonoma County California tiger salamander, or its habitat, when such activities are not conducted in accordance with the consultation for listed species under section 7 of the Act;

(3) Discharges or dumping of toxic chemicals, silt, or other pollutants into, or other alteration of the quality of waters supporting Sonoma County California tiger salamanders that results in death or injury of the species or that results in degradation of their occupied habitat;

(4) Release of exotic species (including, but not limited to, bullfrogs, tiger salamanders, mosquito fish, bass, sunfish, bullhead, catfish, crayfish) into Sonoma County California tiger salamander breeding habitat;

(5) Destruction or alteration of uplands associated with seasonal pools used by Sonoma County California tiger salamanders during estivation and dispersal, or modification of migration routes such that migration and dispersal are reduced or precluded; and

(6) Activities (*e.g.*, habitat conversion, excessive livestock grazing, road and trail construction, recreation, development, and unauthorized application of herbicides and pesticides in violation of label restrictions) that directly or indirectly result in the death or injury of larvae, sub-adult, or adult Sonoma County California tiger salamanders, or modify Sonoma County California tiger salamander habitat in such a way that it adversely affects their essential behavioral patterns including breeding, foraging, sheltering, or other life functions. Otherwise lawful activities that incidentally take Sonoma County California tiger salamanders, but have no Federal nexus, will require a permit under section 10(a)(1)(B) of the Act.

Questions regarding whether specific activities will constitute a violation of section 9 should be directed to the Field Supervisor of the Sacramento Fish and Wildlife Office (see **FOR FURTHER INFORMATION CONTACT** section). Requests for copies of the regulations regarding listed species and inquiries regarding prohibitions and permits may be addressed to the U.S. Fish and Wildlife Service, Endangered Species Permits, 911 NE 11th Avenue, Portland, OR 97232–4181 (503/231–2063; facsimile 503/231–6243).

Effective Date

We published the emergency rule listing the Sonoma County DPS of the California tiger salamander as endangered on July 22, 2002 (67 FR 47726). The emergency rule set forth a 240-day period temporarily adding this species to the List of Threatened and Endangered Wildlife, and that period expires on March 19, 2003. This final rule must be published on or before this date to prevent Federal protection for the Sonoma County California tiger salamander from expiring. In addition, as part of the June 6, 2002, settlement with the CBD, we are required to make a final determination on this listing action on or before March 19, 2003. Because of these reasons, we find that good cause exists for this rule to take effect immediately upon publication in accordance with 5 U.S.C. 553(d)(3).

National Environmental Policy Act

We have determined that an Environmental Assessment and Environmental Impact Statement, as defined under the authority of the National Environmental Policy Act of 1969, need not be prepared in connection with regulations adopted pursuant to section 4(a) of the Endangered Species Act as amended. We published a notice outlining our reasons for this determination in the **Federal Register** on October 25, 1983 (48 FR 49244).

Paperwork Reduction Act

This rule does not contain any new collections of information other than those already approved by the Office of Management and Budget under the Paperwork Reduction Act, 44 U.S.C. 3501 *et seq.*, and assigned control number 1018–0094, which is valid through July 31, 2004. This rule will not impose record keeping or reporting requirements on State or local governments, individuals, businesses, or organizations. An agency may not conduct or sponsor, and a person is not required to respond to, a collection of information, unless it displays a currently valid control number.

Executive Order 13211

On May 18, 2001, the President issued an Executive Order 13211 on regulations that significantly affect energy supply, distribution, and use. Executive Order 13211 requires agencies to prepare Statements of Energy Effects when undertaking certain actions. This rule is not expected to significantly affect energy supplies, distribution, or use. Therefore, this action is not a significant energy action and no Statement of Energy Effects is required.

References Cited

A complete list of all references cited in this rulemaking is available upon request from the Sacramento Fish and Wildlife Office (see **ADDRESSES** section).

Author

The primary author of this rule is David E. Wooten, U.S. Fish and Wildlife Service, Sacramento Fish and Wildlife Office (see **ADDRESSES** section).

List of Subjects in 50 CFR Part 17

Endangered and threatened species, Exports, Imports, Reporting and recordkeeping requirements, Transportation.

Regulation Promulgation

For the reasons given in the preamble, we amend part 17, subchapter B of chapter I, title 50 of the Code of Federal Regulations, as set forth below:

PART 17—[AMENDED]

1. The authority citation for part 17 continues to read as follows:

Authority: 16 U.S.C. 1361–1407; 16 U.S.C. 1531–1544; 16 U.S.C. 4201–4245; Pub. L. 99–625, 100 Stat. 3500, unless otherwise noted.

2. Amend § 17.11(h) by revising the entry for ''California tiger salamander'' under AMPHIBIANS, in the List of Endangered and Threatened Wildlife, to read as follows:

§ 17.11 Endangered and threatened wildlife.

* * * * *

(h) * * *

Species		Historic range	Vertebrate population where endangered or threatened	Status	When listed	Critical habitat	Special rules
Common name	Scientific name						
*	*	*	*	*	*		*
AMPHIBIANS							
Salamander, California tiger.	*Ambystoma californiense*.	U.S.A. (CA)	U.S.A. (CA—Santa Barbara County).	E	677E, 702	NA	NA.

Species		Historic range	Vertebrate population where endangered or threatened	Status	When listed	Critical habitat	Special rules
Common name	Scientific name						
Do	......do	......do	U.S.A. (CA—Sonoma County).	......do	729E, 734	......do	do.
*	*	*	*	*	*	*	

Dated: March 12, 2003.

Marshall P. Jones, Jr.,

Director, Fish and Wildlife Service.

[FR Doc. 03–6454 Filed 3–18–03; 8:45 am]

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