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50 CFR Part 17

Endangered and Threatened Wildlife and Plants; Determination of Threatened Status for the California Tiger Salamander; and Special Rule Exemption for Existing Routine Ranching Activities; Final Rule

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RIN 1018–AI68

Endangered and Threatened Wildlife and Plants; Determination of Threatened Status for the California Tiger Salamander; and Special Rule Exemption for Existing Routine Ranching Activities

AGENCY: Fish and Wildlife Service, Interior.

ACTION: Final rule.

SUMMARY: We, the Fish and Wildlife Service (Service), determine threatened status for the California tiger salamander (*Ambystoma californiense*), under the Endangered Species Act of 1973, as amended (Act). The California tiger salamander, Central population is threatened by habitat destruction, degradation, and fragmentation due to urban development and conversion to intensive agriculture. We also finalize the 4(d) rule for the species rangewide, which exempts existing routine ranching activities.

DATES: This rule is effective September 3, 2004.

ADDRESSES: The complete file for this rule is available at U.S. Fish and Wildlife Service, Sacramento Fish and Wildlife Office (SFWO), 2800 Cottage Way, Suite W–2605, Sacramento, CA 95825.

FOR FURTHER INFORMATION CONTACT: Wayne White, Field Supervisor (Attn: CTS) telephone: 916/414–6600; facsimile: 916/414–6713.

SUPPLEMENTARY INFORMATION:

Background

We, the Fish and Wildlife Service (Service), determine threatened status for the California tiger salamander (*Ambystoma californiense*), under the Endangered Species Act of 1973, as amended (Act). We also finalize the 4(d) rule for the species rangewide.

We will also soon publish a proposed rule designating critical habitat for the Central California tiger salamander in 20 counties in California.

This rule satisfies the final portion of the settlement agreement approved by the Court on June 6, 2002, in *Center for Biological Diversity* v. *U. S. Fish and Wildlife Service* (No. C–02–055-WHA (N.D. Cal.). The settlement agreement required us, among other things, to submit a proposal to list the California tiger salamander throughout its remaining range in California (except for the Santa Barbara County and Sonoma County Distinct Population Segments) for publication in the **Federal Register** on or before May 15, 2003, and to submit a final determination on that proposed rule for publication in the **Federal Register** on or before May 15, 2004. Throughout this rule we will refer to the final population addressed by the settlement agreement as the Central California tiger salamander. References to the rangewide CTS population include the Sonoma and Santa Barbara populations as well as the Central population addressed in the settlement agreement.

On May 14, 2004, the Assistant Secretary for Fish and Wildlife and Parks at the U.S. Department of the Interior requested from the Court a six-month extension of the May 15, 2004, deadline pursuant to 16 U.S.C. 1533(b)(6)(B)(i). The request was based upon the Assistant Secretary's assessment that there is substantial disagreement regarding the sufficiency or accuracy of the available data relevant to the determination, including the level of threat due to inadequacy of the existing regulatory structure, projected future habitat losses and their significance, and the sufficiency or accuracy of data concerning extent of population losses and extent of existing populations. The Court granted an extension to July 23, 2004, to allow us time to resolve the issues raised by the information included in the preliminary California Department of Conservation's (CDC) 2004 data on rangeland and agricultural land conversion. This final listing determination has considered the implications of the information in the CDC report for the California tiger salamander. In addition, we have considered all other scientific and commercial information available to us.

Scientific Disagreement Over Availability of Central California Tiger Salamander Habitat Due to Past Conversions

On June 10, 2004, the United States District Court for the Northern District of California granted an extension to the May 15, 2004, deadline for the specific purpose of resolving the issue of whether there was a 14 percent decrease in grazing land versus an increase in such land that would constitute an increase in Central California tiger salamander habitat. The Court also stated that the Service must make its final determination by July 23, 2004. The issue of habitat trend arose from an April 30, 2004, letter from the Central California Tiger Salamander Coalition (Coalition) to the Service stating that new information was available on the California Department of Conservation's (CDC) Farmland Mapping and Monitoring Program (FMMP) website. The Coalition stated that this new information indicated that grazing land increased by 1,678 ha (4,146 ac) from 2000 to 2002 for ten counties located within the range of the Central California tiger salamander. The Coalition proposed that these new grazing land areas would serve as habitat for the California tiger salamander, which would in turn offset the loss of salamander habitat that is being converted to intensive agriculture. In their letter, the Coalition concluded that the loss of Central California tiger salamander habitat to intensive agriculture was not a threat to the species.

In response to the July 23, 2004, extension, the Center for Biological Diversity (Center) sent a letter regarding the issue of grazing land and urbanization trends as determined by the FMMP data. In their letter, the Center provided information from the most recent reporting period (six counties, 2000 to 2002) and information on 13 counties that did not have 100 percent coverage from 1992 to 2002 (data from counties that had 100 percent coverage were presented in their comment letter dated September 22, 2003). From the most recent data (2000 to 2002), the Center determined that grazing land continued to be lost to development and other land use changes. This trend was also observed when the data were analyzed for all other counties that did not have 100 percent coverage. In their comment letter dated September 22, 2003, the Center also concluded that many other adverse indirect impacts to California tiger salamanders would result from the continued expansion of urbanization.

Thus, while the two groups used the same data from FMMP, they each applied different analyses and came up with different results and conclusions regarding the future threat to the Central California tiger salamander from the conversion of grazing land.

Following the June 10, 2004, hearing, representatives from the Service met with members of the Coalition and the Center on June 29, 2004, to receive clarification from the Coalition on the issue of trends in the acreage of grazing land. At this meeting, the Coalition provided the Service with a report entitled, ''Evaluation of Threats to CTS from Agricultural Conversion.'' This report provided additional information on changes in the acreage of grazing land to intensive agriculture using the FMMP data within their suggested range of the Central California tiger

salamander. The Coalition's report also discussed the results of meetings with Agricultural Commissioners from six counties to discuss future conversion of grazing land to intensive agriculture within their respective counties.

After reviewing the information provided by the Coalition, the Center, and our own analysis, we found that all approaches comparing total grazing land lost to total grazing land gained for the 10- to 12-year period indicate a net loss of grazing land for that period. Comparing a different set of figures, however, it appears that intensively farmed lands have been fallowed at a greater rate than they have been reconverted over the last 12 years. It is more difficult to determine what this means to the California tiger salamander. It is unlikely that all of the grazing land converted to intensive agriculture was suitable for salamanders, as some of that could simply be reconversion of previously cultivated land, so the magnitude of the loss likely is not as large as the numbers indicate. Similarly, it is unlikely that the grazing land gained from fallowed agricultural land was all suitable for salamanders.

It is unlikely that the grazing lands formerly under intensive agricultural uses would completely regain all value as California tiger salamander habitat because wetlands that provide breeding habitat would have been destroyed as a result of intensive farming, limiting these areas to potential upland habitat. Fallowed agricultural land might, depending on how it is managed, provide estivation habitat or open space for migration depending on its proximity to breeding habitat. Even though the overall rate of conversion of new lands to intensive agriculture may be decreasing in the future (see below), any expansion of lands under cultivation is most likely to expand into areas adjacent to already cultivated areas. Particularly in the San Joaquin Valley, the lands at greatest risk to this expansion are the fringes of the valley floor which are inhabited by the California tiger salamander. Therefore, we conclude that the majority of these newly created grazing areas may have some utility for migration or estivation to the extent they are adjacent to breeding habitat, but that they do not offset the loss of the portion of grazing lands that were suitable California tiger salamander habitat. In addition, neither the Coalition nor the County Agricultural Commissioners concluded that no California tiger salamander habitat would be converted to intensive agricultural uses in the foreseeable future, only that the future rates of conversion are likely to be lower than they have been in the past. We therefore conclude while it may no longer be the primary source that conversion of suitable habitat to intensive agriculture remains a source of cumulative habitat loss and fragmentation which are primary threats to the California tiger salamander.

The FMMP is a valuable tool for assessing changes in land use over time. However, it is also important to use other sources of information when determining past habitat trends because of continued improvements in mapping technologies and the purpose of each reporting service. We found that grazing land has been lost due to urbanization, conversions to intensive agriculture, and other land uses. We expect these land use trends to continue largely due to the projected increase in human population and development, as well as subsequent expansion of intensive agriculture, as described in this rule.

The areas where acreage of grazing land increased represented 80,267 ha (198,344 ac) over the 10-year period on a county-wide basis. Approximately 60,926 ha (150,552 ac, 76 percent) of this increase is attributable to cultivated agricultural lands that were fallowed. The grazing land increases reported by FMMP are those lands that have been fallowed for at least three reporting periods or 6 years. Other grazing lands had been previously mapped and reported as urbanized areas, mines, or low-density residential developments, which accounted for 17,608 ha (43,511 ac, 22 percent) of the increase in grazing land. Many of these data, including much of the recent data available from FMMP (2000 to 2002), indicate that the increase in grazing land areas are due to improvements in digital imagery that allowed for a more precise distinction between urban boundaries and grazing land (CDC 2002, 2004).

The FMMP data indicate that there was a substantial decline in grazing land in areas, some of which likely represented aquatic and upland habitats for the California tiger salamander and some of which, such as reconverted fallowed agricultural lands, did not. Because of the lower quality of the habitat that may be created from fallowed land, it is unlikely that the increase in grazing land during the 1990s and early 2000s offset the decline in habitat that occurred as a result of the continued trend in grazing land converted to intensive agriculture and development.

Future Conversions to Intensive Agriculture

Using the acreage of grazing land converted to intensive agriculture during this period, the Coalition estimated that 68,119 ha (168,325 ac) of grazing land would be converted to intensive agriculture over the next 25 years based on an estimated rate of loss of 2,725 ha (6,733 ac) per year. The Coalition estimated that this would result in a 4.1 percent loss (68,119 ha, 168,325 ac) of salamander habitat from their estimate of the total amount of available Central California tiger salamander habitat (1.7 million ha, 4.1 million ac). Responses by the Agricultural Commissioners to the interviews indicated that they believed that no more than 405 to 809 ha (1,000 to 2,000 ac) of grazing land would be converted in their counties and that the future loss of grazing land to intensive agriculture would be limited due to lack of water, poor soils, and low crop prices. The Agricultural Commissioners also expected that the majority of future expansions of intensive agriculture would occur around the periphery of other intensive agricultural areas.

Summary

After reviewing data from the 2000–2002 FMMP report, and the supporting information submitted by the Center and the Coalition, we conclude that the newest data set is consistent with trends identified in our habitat analysis for approximately 1990 through 2000, showing that rates of habitat loss for California tiger salamander from all land use changes have been greater than the rate of other land use types ''converting'' to grazing land. We found that between 20 and 25 percent of the observed increase in grazing lands between 2000 and 2002 is attributable to better mapping technology. We also found that rates of agricultural land being fallowed have been greater than rates of fallowed lands being reconverted to cultivation or natural habitat being converted to intensive agricultural uses. We conclude that the majority of these newly created grazing areas may have some utility for migration or estivation, to the extent they are adjacent to breeding habitat, or even potential breeding habitat if stockponds are eventually installed, but they do not offset the loss of the portion of grazing lands that were suitable habitat for the California tiger salamander habitat; however, rates of habitat conversion to intensive agriculture are likely to be lower in the future than they have been in the past.

Description and Life History of the California Tiger Salamander

Systematics and species description. 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) believed the California tiger salamander was a subspecies of the more widespread tiger salamander (*A. 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 has been determined to represent a distinct species (Shaffer and Stanley 1991; Jones 1993; Shaffer *et al.* 1993; Shaffer and McKnight 1996; Irschick and Shaffer 1997; Petranka 1998). The range of this amphibian does not naturally overlap with any other species of tiger salamander (Stebbins 1985; Petranka 1998).

The California tiger salamander is a large and 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-to-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), larger tails, and larger overall size (Stebbins 1962; Loredo and Van Vuren 1996).

Distribution and genetics. California tiger salamander breeding and estivation habitat includes vernal pools, and seasonal and perennial ponds and surrounding upland areas in grassland and oak savannah plant communities from sea level to about 1,067 meters (m) (3,600 feet (ft)) (Stebbins 1989; Shaffer *et al.* 1993; Jennings and Hayes 1994; Petranka 1998; California Natural Diversity Data Base (CNDDB) 2003; Bobzien in litt. 2003; Service 2004). Along the Coast Ranges, the species occurs in the Santa Rosa area of Sonoma County, southern San Mateo County south to San Luis Obispo County, and the vicinity of northwestern Santa Barbara County (CNDDB 2003). In the Central Valley and surrounding Sierra Nevada foothills and Coast Range, the species occurs from northern Yolo County (Dunnigan) southward to northwestern Kern County and northern Tulare and Kings Counties (CNDDB 2003). This final rule lists the California tiger salamander rangewide as threatened including the Central California tiger salamander population as required by the court and the former DPSs located in Sonoma and Santa Barbara counties, which were listed as endangered (see Previous Federal Action section below) as well as the remaining population of the California tiger salamander as required by the court.

Other records of tiger salamanders from Lake and Mono Counties outside the range of the Central California tiger salamander have been identified as non-native tiger salamanders (Shaffer *et al.* 1993). Salamanders at Grass Lake in Siskiyou County (Mullen and Stebbins 1978) have been identified as the northwestern tiger salamander (*A. t. melanostictum*) (H.B. Shaffer, University of California, Davis pers. comm. 1998).

We note several historical occurrences of the salamander outside its current range. In the northeastern Sacramento Valley, there is a single occurrence located at the Gray Lodge Waterfowl Management Area in southern Butte County and northern Sutter County, and there is also a single occurrence located in Glenn County; both of these records are from the mid 1960s (CNDDB 2003). There are two records from 1939 and another, from an unknown date, of salamanders observed on the edge of the range in south western San Luis Obispo County (CNDDB 2003; Shaffer and Trenham 2004). There is also a historic record of the California tiger salamander that occurs outside the species' range, which is from Riverside County recorded in the late 1800s. Subsequent surveys have not been able to verify the presence of tiger salamanders from any of those locations (Stebbins 1989; Shaffer *et al.* 1993; M. Root, USFWS, pers. comm. 2004).

Although the area between Butte County and the Cosumnes River contains suitable vernal pools and has been surveyed extensively, the species has only been recorded along the southern edge of Sacramento County, south of the Cosumnes River (CNDDB 2003). In a survey transect that extended along the west side of the Sacramento Valley from Shasta County to Solano County, containing 35 kilometers (km) (22 miles (mi)) of vernal pool habitat and over 200 pools, California tiger salamanders were recorded only at the Jepson Prairie in Solano County (Simovich *et al.* 1993). In the East Bay area, the California tiger salamander generally does not occur west of Interstate Highway 680, south of Interstate Highway 580, or north of State Highway 4 in Contra Costa or Alameda Counties (LSA Associates, Inc. 2001; CNDDB 2003). It is likely that the species is uncommon or absent in much of the southernmost San Joaquin Valley because of unsuitable habitat. This includes areas to the south of Los Banos in Merced County, and the foothills of the Sierra Nevada south of Visalia in Tulare County (Shaffer *et al.* 1993).

The factors that restrict the California tiger salamander in the northern and southern extent of its range are not fully understood (H.B. Shaffer, pers. comm. 2002), but may include low rainfall in the southern San Joaquin Valley and the greater abundance of non-native predatory fish in the northern Sacramento Valley (Hayes 1977). Studies suggest that the present patchy distribution pattern was caused by a combination of the extreme anthropogenic changes in and around the Central Valley, and the restrictive breeding requirements of the species (Dahl 1990; Fisher and Shaffer 1995; Frayer *et al.* 1989; Holland 1978, 1998; Jones and Stokes 1987; Shaffer *et al.* 1993; Trenham *et al.* 2000). Because there are only a few historic collections of the species made during the 1800s, and the majority of collections have occurred in the last 25 years (CNDDB 2003) subsequent to significant changes in historic habitat types (Shaffer *et al.* 1993), we do not have good documentation of the historic distribution of the California tiger salamander. We have based the analysis in this listing on estimated current distribution and habitat availability and assumed the available habitat is populated.

Reproduction and larval growth. Adult California tiger salamanders mate in vernal pools and similar water bodies, and the females lay their eggs in the water (Twitty 1941; Shaffer *et al.* 1993; Petranka 1998). In the East Bay area, California tiger salamanders may lay eggs twice, once in December and the second time in February (Bobzien in litt. 2003). 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 little or no vegetation, females may attach eggs to

objects, such as rocks and boards on the bottom (Jennings and Hayes 1994). After breeding, adults leave the pool and return to small mammal burrows in surrounding uplands (Loredo *et al.* 1996; Trenham 1998a), although they may continue to come out nightly for approximately the next two weeks to feed (Shaffer *et al.* 1993). In drought years, the seasonal pools may not form and the adults may not breed (Barry and Shaffer 1994).

The eggs hatch in 10 to 14 days with newly hatched salamanders (larvae) ranging in size from 11.5 to 14.2 mm (0.5 to 0.6 in) in total length (Petranka 1998). The larvae are aquatic. Each is yellowish gray in color and has a broad fat head, large, feathery external gills, and broad dorsal fins that extend well onto its back. The larvae feed on zooplankton, small crustaceans, and aquatic insects for about six 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). 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; when approached by potential predators, they will dart into vegetation on the bottom of the pool (Storer 1925).

The larval stage of the California tiger salamander usually lasts three to six months, because most seasonal ponds and pools dry up during the summer (Petranka 1998), although some larvae in Contra Costa and Alameda Counties may remain in their breeding sites over the summer (Alvarez in litt. 2003; Bobzien in litt. 2003; Shaffer and Trenham 2004). The absence of sexually mature paedomorphic larvae (mature adults that retain larval characteristics) suggests that the California tiger salamander is unable to express this life history trait, presumably because most of their evolutionary history has been spent in seasonal vernal pool habitats (Shaffer and Trenham 2004).

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). Larvae collected near Stockton in the Central Valley during April varied from 47 to 58 mm (1.9 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 inundation period, the larger the larvae and metamorphosed juveniles are able to grow, and the more likely they are to survive and reproduce (Semlitsch *et al.* 1988; Pechmann *et al.* 1989; Morey 1998; Trenham 1998b). The larvae perish if a site dries before they complete metamorphosis (P. Anderson 1968; Feaver 1971). Pechmann *et al.* (1989) found a strong positive correlation between inundation period and total number of metamorphosing juvenile amphibians, including tiger salamanders. 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).

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. Most California tiger salamanders in this study did not reach sexual maturity until four or five years old (Trenham *et al.* 2000). While individuals may survive for more than 10 years, many breed only once, and one study estimated that less than five percent of metamorphic juveniles survive to become breeding adults (Trenham 1998b). The mechanisms for recruitment are clearly dependent on a number of factors such as migration, terrestrial survival, and population turnover, whose interaction is not well understood (Trenham 1998b).

Breeding habitat. The salamanders breeding in, and living around, a seasonal or perennial pool or pond and associated uplands utilized during the dry months 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 survive during the dry months of the year. The primary historic breeding sites used by California tiger salamanders included vernal pools and other natural seasonal ponds (Storer 1925; Feaver 1971; Zeiner *et al.* 1988; Trenham *et al.* 2000). The species has been found in 10 of the 17 California vernal pool regions defined by Keeler-Wolf *et al.* (1998). Vernal pools are an important part of the California tiger salamander breeding habitat in the Central Valley and South San Joaquin regions (CNDDB 2003). Currently, the salamander primarily uses stock ponds in the Bay Area and Coast Range regions, largely due to the destruction of vernal pool habitat in these regions. A number of records in the Santa Rosa area document CTS being found in ditches. The extent of the contribution of these intermittent water bodies has not been specifically studied, however there is no evidence that these areas are used for breeding (Cook in. litt. 2003).

Vernal pools typically form in topographic depressions underlain by an impervious layer (such as claypan, hardpan, or volcanic strata) that prevents downward percolation of water. Vernal pool hydrology is characterized by inundation of water during the late fall, winter, and spring, followed by complete desiccation during the summer dry season (Holland and Jain 1998). Vernal pools support diverse flora and fauna that are adapted to the dramatic seasonal changes in moisture and benefit from the lack of predation by non-native fish. Twenty-nine other federally or State listed species within the California tiger salamander's range are vernal pool specialists, including 24 plants, four crustaceans, and one insect (Keeler-Wolf *et al.* 1998). California tiger salamanders, like the listed vernal pool crustaceans, inhabit these seasonally inundated habitats. However, listed vernal pool crustaceans require a relatively short period of inundation to complete their life cycle (59 FR 48136; September 19, 1994); therefore, pools that support some crustaceans may not hold water long enough to allow successful metamorphosis of California tiger salamander larvae. In a study of amphibians located in eastern Merced County, California tiger salamander larvae were only observed in the largest vernal pools (Laabs *et al.* 2001). Unlike vernal pool crustaceans, California tiger salamanders can breed and metamorphose in perennial ponds.

In addition to vernal pools and seasonal ponds, California tiger salamanders also use small artificial water bodies such as stockponds for breeding (Stebbins 1985; Zeiner *et al.* 1988; Shaffer *et al.* 1993; Alvarez in litt. 2003; Bobzien in litt. 2003; CNDDB 2003). Stock ponds for cattle, sheep, horses, and other livestock have been, and continue to be, built to supply local water needs, especially in rural grazing lands in coastal and Sierra foothill areas where inexpensive public water or ground water is not available (Bennett

1970). Stock ponds constructed as water sources for livestock are important habitats for the California tiger salamander throughout its range (H. Shaffer, pers. comm. 2003; P. Trenham, University of California, Davis, pers. comm. 2002). In some areas, stock ponds have largely replaced vernal pools as breeding pools (due to the loss of vernal pools) and provide important habitat for the species. For instance, of the 155 California tiger salamander locality records in the East Bay area (Alameda and Contra Costa Counties) where the wetland type was identified, 85 percent (131 sites) were located in stock ponds (CNDDB 2003).

Management of stock ponds determines their suitability as breeding habitat for California tiger salamanders (Shaffer in litt. 2003). As is true of natural vernal pools, the inundation period of stock ponds can be so short that larvae cannot metamorphose (*e.g.*, when early drawdown of irrigation ponds occurs). However, in contrast to natural vernal pools, stock ponds may contain water throughout the year, or for sufficiently long periods, that predatory fish and bullfrogs (*R. catesbeiana*) can colonize the pond and establish self-sustaining breeding populations (see Factor C below; Shaffer *et al.* 1993; Seymour and Westphal 1994) these populations likely affect California tiger salamanders. The presence of bull frogs and fish are negatively correlated with salamander populations and so it is possible that extirpation of the salamander population is likely if fish and other predators are introduced (Shaffer *et al.* 1993; Seymour and Westphal 1994). Inappropriate management of ponds can threaten California tiger salamander habitat. Natural soil erosion, sometimes increased by pond breaching, berm failure, stock animal impacts, and inadequate management practices can result in increased sedimentation of the pond (Hamilton and Jepson 1940, Prunuske 1987), thereby reducing their quality as salamander habitat. Alternatively, ponds with insufficient turbidity provide inadequate cover for larvae. Stock ponds may be geographically isolated from other seasonal wetlands occupied by California tiger salamanders, and newly created ponds may be located beyond the maximum dispersal distances of juvenile or adult salamanders. However, because the species can live for more than a decade (Trenham *et al.* 2000), and during this time individuals can migrate between aquatic and upland habitats, colonization of newly created and geographically isolated ponds may be possible, provided the intervening habitat can be successfully traversed by dispersing salamanders (Sweet in litt. 2003).

Once fall or winter rains begin, adults emerge from the upland sites on rainy nights to feed and to migrate to the breeding ponds (Stebbins 1985, 1989; Shaffer *et al.* 1993). Males migrate to the breeding ponds 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 six to eight weeks, while females stay for approximately one to two 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 over the course of three breeding seasons (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 quality of intervening habitat (*e.g.*, salamanders may move more quickly through sparsely covered and open grassland than they can through densely vegetated lands) (Trenham 1998a).

Upland habitat and terrestrial ecology. California tiger salamanders spend the majority of their lives in upland habitats, and cannot persist without them (Trenham and Shaffer *in review*). The upland component of California tiger salamander habitat typically consists of grassland savannah (Shaffer *et al.* 1993; Alvarez in litt. 2003; Bobzien in litt. 2003; Service 2004). However, in Santa Barbara and eastern Contra Costa Counties, some California tiger salamander breeding ponds occur in grasslands with scattered oak trees, and scrub or chaparral habitats (Shaffer *et al.* 1993; Alvarez in litt. 2003; 65 FR 57242). Salamanders most commonly utilize burrows in open grassland or under isolated oaks, and less commonly in oak woodlands (Shaffer *et al.* 1993).

Juvenile and adult California tiger salamanders spend the dry summer and fall months of the year 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). Although the upland burrows inhabited by California tiger salamanders have often been referred to as ''aestivation'' sites, which implies a state of inactivity, evidence suggests that California tiger salamanders may remain active in their underground dwellings (Sweet in litt. 2003). Movement within and among burrow systems continues for at least several months after the salamander leaves the breeding site (Trenham 2001; Trenham and Shaffer 2004).

California tiger salamanders cannot dig their own burrows, and as a result their presence is associated with burrowing mammals such as ground squirrels (Seymour and Westphal 1994). The creation of burrow habitat by ground squirrels and utilized by California tiger salamanders suggests a commensal relationship between the two species (Loredo *et al.* 1996). Active ground-burrowing rodent populations probably are required to sustain California tiger salamanders because inactive burrow systems become progressively unsuitable over time. Loredo *et al.* (1996) found that California ground squirrel burrow systems collapsed within 18 months following abandonment by, or loss of, the mammals. California tiger salamanders use both occupied and unoccupied burrows.

Adult California tiger salamanders have been observed up to 2,092 m (1.3 mi) from breeding ponds (S. Sweet, University of California, Santa Barbara, in litt. 1998), which may be vernal pools, stock ponds, or other seasonal or perennial water bodies. A recent trapping effort in Contra Costa County captured California tiger salamanders 805 m (2,641 ft) to 1,207 m (3,960 ft) from the nearest breeding aquatic habitat (Orloff in litt. 2003). Trenham *et al.* (2001) observed California tiger salamanders moving up to 670 m (2,200 ft) between breeding ponds in Monterey County. Similarly, in an experimental study, Shaffer and Trenham (*in review*) found that 95 percent of California tiger salamanders resided within 640 m (2,100 ft) of their breeding pond at Jepson Prairie in Solano County. Based on the Monterey County study, and with the caution that there is limited understanding as regards essential terrestrial habitats and buffer requirements, Trenham *et al.* (2001) recommended that plans to maintain local populations of California tiger salamanders should include pond(s) surrounded by at least 173-m (567-ft) wide buffers of terrestrial habitat occupied by burrowing mammals. The distance between the upland and breeding sites depends on local topography and vegetation, and the distribution of California ground squirrel or other rodent burrows (Stebbins 1989).

Metamorphosed juveniles leave the breeding sites in the late spring or early summer. Before the breeding sites dry

completely, the animals settle in small mammal burrows, to which they return at the end of 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 upland sites for the dry, hot summer months. Juveniles have been observed to migrate up to 1.6 km (1 mi) from breeding pools to upland areas (Austin and Shaffer 1992).

While most California tiger salamanders rely on rodent burrows for shelter, some individuals may utilize soil crevices as temporary shelter during upland migrations (Lorendo *et al.* 1996). Mortality of juveniles during their first summer exceeds 50 percent (Trenham 1998b). Emergence from upland habitat 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 two years of age at a minimum (Trenham 1998b; Hunt 1998), and survival to adulthood may be low. Trenham (1998b) estimated survival from metamorphosis to maturity at a site in Monterey County to be less than 5 percent (well below an estimated replacement level of 18 percent). Adult survivorship varies greatly between years, but is a crucial determinant of whether a locality is a source or sink (*i.e.*, whether net productivity exceeds, or fails to reach, the level necessary to maintain the breeding site).

Metapopulation biology may help us predict the effects of future habitat loss and fragmentation for taxa that have a metapopulation structure (Marsh and Trenham 2001 and references cited therein). A metapopulation is a set of local subpopulations within an area, where subpopulations become extinct and are recolonized in the future by migrants from other subpopulations (Hanski and Gilpin 1991; Hanski 1994; McCullough 1996). Regional persistence in such systems depends on the migration of individuals between habitat patches (Trenham 1998b). California tiger salamanders appear to conform to a broadly defined metapopulation structure. In the California tiger salamander system, the spatial arrangement of ponds and the migratory behavior of the animals probably have a substantial influence on pond occupancy and local population persistence (Trenham 1998b). If metapopulation theory is predictive of California tiger salamander behavior, then the direct loss of breeding sites with high production of California tiger salamanders or their isolation from other sites due to habitat fragmentation could result in the loss of other breeding sites that rely on inter-pond dispersal or the metapopulation structure (Trenham 1998b; Marsh and Trenham 2001).

Number of individuals. The total number of individual California tiger salamanders rangewide is not known. Estimating the total number of California tiger salamanders is difficult due to limited data and understanding concerning the life history of the species. Data on numbers of individual California tiger salamanders are lacking for several reasons, first because the species is difficult to detect, second, because the animals spend much of their lives underground (Storer 1925, Feaver 1971, Shaffer *et al.* 1993, van Hattem 2004), and third, because only a portion of the total number of California tiger salamanders migrate to pools to breed each year (Trenham *et al.* 2000). The activity of California tiger salamanders during the majority of the year in these burrows is not well documented and has only recently been studied (van Hattem 2004). In the absence of estimates of the total number of California tiger salamanders, we primarily rely on measures of habitat availability as well as current and future habitat status as an indication of the status of the species.

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, candidate 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 at Davis, 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, Animal 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. In a memorandum dated November 3, 1994, from the acting Assistant Regional Director of the Pacific Region to the Field Supervisor of the Sacramento Field Office, the recycled 12-month finding on the petition and a proposed rule to list the species under the Act were given a due date of December 15, 1995. However, on April 10, 1995, Public Law 104–6 imposed a moratorium on listings and critical habitat designations and rescinded $1.5 million funding from our listing program. The moratorium was lifted and listing funding was restored through passage of the Omnibus Budget Reconciliation Act on April 26, 1996. In the NOR published February 28, 1996 (61 FR 7596), we discontinued the use of different categories of candidates, and defined ''candidate species'' as those meeting the definition of former category 1. We maintained California tiger salamander as a candidate species in that NOR, as well as in subsequent NORs published on September 19, 1997 (62 FR 49398), October 25, 1999 (64 FR 57534) and October 30, 2001 (66 FR 54808).

On January 19, 2000, the Santa Barbara County DPS of the California tiger salamander was listed as an endangered species under an emergency basis (65 FR 3096) and proposed for listing as endangered (65 FR 3110). On September 21, 2000, we listed the Santa Barbara County DPS of the California tiger salamander as endangered (65 FR 57242). On January 22, 2004, we proposed critical habitat for the Santa Barbara County DPS (69 FR 3064).

On February 27, 2002, the Center for Biological Diversity (CBD) filed a complaint in the Northern District of California for our failure to list the Sonoma County Distinct Population Segment of the California tiger salamander as endangered (*Center for Biological Diversity* v. *U.S. Fish and Wildlife Service* (No. C–02–055–WHA (N.D. Cal.)). On June 6, 2002, the Court approved a settlement agreement requiring us to (1) make 90-day and 12-month petition findings on the Sonoma County DPS of California tiger salamander, or to publish an emergency and proposed rules if the DPS faced an emergency under the meaning of the Act's section 4(b)(7), by July 15, 2002 and (2) submit a proposal to list the California tiger salamander throughout its remaining range in California (except

for the Santa Barbara County and Sonoma County Distinct Population Segments) for publication in the **Federal Register** on or before May 15, 2003, and to submit a final rule for publication in the **Federal Register** on or before May 15, 2004. On July 22, 2002, we listed the Sonoma County DPS of the California tiger salamander as an endangered species on an emergency basis and proposed to list the DPS as endangered permanently (67 FR 47726; 67 FR 47758). On March 19, 2003, we listed the Sonoma County DPS of the California tiger salamander as endangered (68 FR 13498) with notice that the Service would consider downlisting or listing the entire species rangewide. On May 23, 2003, we proposed (1) to list the Central California DPS of the California tiger salamander as threatened, (2) to downlist the Santa Barbara and Sonoma DPSs from endangered to threatened, and (3) a 4(d) rule for the California tiger salamander where listed as threatened (68 FR 28648). We also asked for public comment on a number of issues, including whether the three populations should be consolidated into a single rangewide listing. This final rule completes our obligations under the settlement agreement.

Summary of Comments and Recommendations

In the May 23, 2003, proposed rule, we proposed to list the Central California DPS of the California tiger salamander as threatened, and we proposed reclassification of the Santa Barbara County and Sonoma County populations from endangered to threatened (68 FR 28648). In the same notice we also proposed that the special rule under section 4(d) of the Act for the Central California DPS be extended to the Santa Barbara and Sonoma County DPS.

In the proposed rule and associated notifications, we announced six public hearings and requested that all interested parties submit factual reports or information that might contribute to the development of this final rule. The comment period for the proposed rule was initially open from May 23 through July 22, 2003. On July 3, 2003, we extended the comment period for an additional 60 days until September 22, 2003 (68 FR 39892) to accommodate additional public hearings. On September 30, 2003, we reopened the comment period for 30 days until October 31, 2003 (68 FR 56251).

We held a total of 10 public hearings on our May 23, 2003, proposed rule: two on June 17, 2003, in Livermore, California; two on June 18, 2003, in Monterey, California; two on June 19, 2003, in Merced, California; two on July 29, 2003, in Santa Rosa, California; and two on July 31, 2003, in Santa Maria, California. We also organized six informal workshops to inform the public and answer questions regarding the California tiger salamander and the proposed rule: two on June 10, 2003, in Livermore, California; two on June 11, 2003, in Merced, California; and two on June 12, 2003, in Monterey, California. On June 24, 2003, per the request of the Alameda County Agricultural Commission, we attended a county meeting, gave a presentation to the public on the proposed rule, and answered questions regarding the species and the proposal. In addition to the public hearings and public workshops we organized, we attended community forums in Merced, California, on September 12, 2003, and in Modesto, California, on October 24, 2003, to discuss the proposed rule and answer questions. At the forums, we provided information on where to obtain copies of the proposed rule and maps of the areas considered potential habitat for the species.

We produced news releases on the proposed listing and the public hearings and workshops and distributed them to the news media on May 16, 2003, July 3, 2003, and September 30, 2003. Stories based on the news releases and the meetings were produced by the Associated Press (May 16 and October 1); the Santa Rosa Press Democrat (May 18, July 30); the San Francisco Chronicle (May 17); the Santa Barbara News Press (May 17); the Modesto Bee (June 12); the Merced Sun-Star (June 12 and June 20), and the Stockton Record (June 18).

Written public comments were accepted at all the public hearings, workshops, and the Merced and Modesto meetings and entered into the supporting record for the rulemaking. Oral comments given at the public hearings were also accepted into the supporting record. In making our decision on the proposed rules, written comments were given the same weight as oral comments presented at hearings.

We contacted all appropriate State and Federal agencies, county governments, elected officials, and other interested parties and invited them to comment. This was accomplished through telephone calls, electronic mail correspondence, letters, and news releases faxed and/or mailed to appropriate elected officials, media outlets, local jurisdictions, interest groups, and other interested individuals. We also posted the proposed rule and associated material on both our Sacramento and Ventura Fish and Wildlife Office internet sites following their release on May 16, 2003, July 3, 2003, and September 30, 2003, respectively. We published legal notices on the public hearings and workshops in the Contra Costa Times and Tri-Valley Herald on June 1, 2003; the Merced Sun-Star, Monterey Herald, Santa Barbara News-Press, San Luis Obispo Telegram Tribune, and Salinas Californian on June 2, 2003; the Pinnacle Newspaper on June 5, 2003; and in the Santa Rosa Press Democrat on July 19, 2003.

We received a total of 1,955 comment letters and electronic mail correspondences (e-mails) during the three comment periods. Comments were received from Federal, State, and local agencies, Federal and State lawmakers, and private organizations and individuals. We reviewed all comments received for substantive issues and comments, and new information regarding the Central California tiger salamander, the proposed special rule to exempt routine ranching activities, the proposed downlisting of Santa Barbara County and Sonoma County DPSs, and on the appropriateness of a single rangewide designation or combinations of designations. Similar comments were grouped into several general issue categories relating specifically to the proposed rule and are identified below. Some of the comments expressed support for a listing of the Central California tiger salamander. Others opposed a listing. Substantive information supporting each position was incorporated into this final rule. All comments on the proposed reclassification of the Santa Barbara County and Sonoma County DPSs are addressed in this final determination.

Peer Review

We asked 28 scientists, researchers, and biologists who have knowledge of California tiger salamanders, or amphibians generally, to provide peer review of the proposed rule. Eleven of the 28 individuals who were asked to act as peer reviewers submitted comments on the proposed rulemaking. Based on our analysis, all 11 peer reviewers supported the listing of the Central California tiger salamander as threatened. Two of the peer reviewers stated that the proposed exemption for routine ranching activities as written in the proposed rule lacked sufficient biological rationale or did not provide a conservation benefit to the California tiger salamander and stated that it is inappropriate to consider applying it to the Sonoma and Santa Barbara DPSs, while six were generally in support of

the proposed 4(d) rule. Some peer reviewers suggested ways to improve the conservation aspects of this proposed exemption. Additionally, peer reviewers provided additional documentation of threats to the species and potential conservation measures. This information has been incorporated into the final rule.

Because we relied on unpublished genetics studies for this rule, we also requested peer review from nine universities on the mitochondrial DNA (mtDNA) study of California tiger salamander conducted by Dr. H.B. Shaffer and Dr. P.C. Trenham of the University of California at Davis (report cited as Shaffer and Trenham 2002). Three of the nine agreed to review the report. The peer reviewers had a few technical comments and suggestions; however, all three concluded that the methods and analyses used in this genetic research were appropriate and felt that the conclusions drawn by Dr. Shaffer and Dr. Trenham were appropriate and defensible. One of the peer reviewers also concluded that the data demonstrated that California tiger salamander hybridization with non-native tiger salamanders posed a considerable threat to the species. The study by Shaffer and Trenham has recently been accepted for publication (Shaffer *et al.* in press).

Summary of Comments and Responses for the Proposed Downlisting of the Santa Barbara and Sonoma County Distinct Population Segments

Eight of the 11 peer reviewers who submitted comments on the proposed rule specifically addressed the proposed reclassification of the Santa Barbara and Sonoma County DPSs. Several stated that the proposed reclassification was not consistent with available information on the status and threats to the Santa Barbara and Sonoma County DPSs. One peer reviewer stated that, although it appeared counter-intuitive to change the listing designation without data showing some improvement in status, the reclassification may be warranted if the change would allow routine ranching activities.

State Agencies

We received comments from the California Department of Food and Agriculture (CDFA). The issues raised by CDFA are addressed below.

CDFA Comment 1: The proposed rule to list the Central California tiger salamander should include a full discussion of the potential economic impacts associated with the proposed rule. The proposed listing will likely create a regulatory burden for landowners who convert rangeland to other forms of agriculture. Economic burdens to landowners need to be evaluated and mitigated.

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 regarding the likelihood that the species meets the definitions of threatened or endangered as defined in the Act.

CDFA Comment 2: The relative importance of stressors to the Central California tiger salamander should be described.

Our Response: As described in more detail below, the California tiger salamander is at risk due to: (1) Habitat loss, degradation, and modification from land conversion and alteration; and secondarily to: (2) predation from non-native species; (3) inadequacy of existing regulatory mechanisms; and (4) hybridization with non-native tiger salamanders. Thus, the California tiger salamander is appropriately considered to be threatened by conditions identified under four of the five factors and meets the definitions of threatened, regardless of having a relatively extensive distribution. The threat of hybridization with non-native tiger salamanders is a particularly severe threat in the Central Coast Range and Bay Area regions and, to a lesser extent, the Central Valley region. We consider the other threats to be secondary, but still material to the status of the DPS (see Factor E below).

CDFA Comment 3: References in the proposed rule used to describe adverse impacts to the salamander need to be documented. CDFA indicated that it has recently completed a risk assessment of the use of rodenticides on threatened and endangered species.

Our Response: As stated in the proposed 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.

The Service received a copy of the risk assessment entitled, ''Ecological Risk Assessment for Grain-Based Field-Use Anticoagulant Rodenticides Registered by the California Department of Food and Agriculture for Special Local Needs'' (Silberhorn *et al.* 2003). The study was an ecological risk assessment that focused on four specific anticoagulant rodenticides and their potential for effects to non-target birds and mammals through secondary poisoning (*e.g.*, poisoning through consumption of prey killed by the toxin). The primary target species for these rodenticides is the California ground squirrel, with mortality of exposed squirrels caused by internal hemorrhaging. Secondary poisoning of non-target species, such as canids or raptors, may result from preying on moribund animals or scavenging on carcasses. The ecological risk assessment did not examine potential effects to amphibians, and California tiger salamanders do not consume dead or dying rodents. The Service has determined that the results of this ecological risk assessment provide little information on the potential risk to California tiger salamanders as the result of direct or indirect effects of rodenticide use.

Summary of Public Comments and Responses

We address other substantive comments and accompanying information in the following summary. Many of the public comments on the proposed downlisting of the Santa Barbara and Sonoma DPSs were similar to, and are included in, the summary of public comments and responses for the Central DPS. In addition to those, commenters raised the issues described below regarding the proposed reclassification of the Santa Barbara and Sonoma County DPSs. All substantive information provided by commenters has been evaluated in the process of making this final determination and has been incorporated into the final rule as appropriate.

Issue 1—Distribution, Habitat, Threats, and Use of Science

Comment 1: Numerous commenters stated that the Central California tiger salamander should not be listed as threatened or endangered because the Central California tiger salamander inhabits a large geographical area or is found in many counties. A few commenters, including local governments, stated that the proposed rule did not present scientific evidence that the Central California tiger salamander was threatened, or likely to become endangered in the foreseeable future, as defined by the Act. One commenter questioned how the Central California tiger salamander could be listed if a large portion of its habitat could be deemed as having beneficial land use practices (ranching activities)

and these activities were proposed for exemption under the special 4(d) rule.

Our Response: A wide distribution or one that includes a number of counties does not, in and of itself, preclude the need to list a species, subspecies, or DPS under the Act. When making a listing determination, we carefully consider the best available scientific and commercial information regarding the historic and current ranges of the taxon under consideration, as well as the abundance of the species, and the pattern, imminence, and magnitude of threats relative to the species' distribution. After completing such an analysis for the Central California tiger salamander, we believe that the best available evidence supports a threatened listing. All 11 of the peer reviewers who responded agreed with our assessment.

We believe that one of the primary threats to the Central California tiger salamander is habitat destruction, degradation, and fragmentation. Much of this threat is related to losses of habitat to urban development and conversion to intensive agriculture. We believe routine ranching, as identified in the 4(d) rule, is neutral or beneficial for salamanders. Listing the DPS as threatened, while exempting these ranching practices, concurrently increases protection of rangelands from conversion to land uses which eliminate Central California tiger salamander habitat and allows ranchers to continue conducting business in a way that either does not harm or benefits the salamander. Because one of our primary concerns is elimination of Central California tiger salamander habitat, we believe it is appropriate to exempt routine ranching even though it is practiced throughout a large portion of the range of the salamander. As described in Factor C and E below, the Central California tiger salamander is threatened on rangeland by other factors unrelated to habitat loss.

Comment 2: Many commenters including local governments stated that we did not use adequate science in making our decision to propose the Central California tiger salamander as a threatened species. A few commenters stated that the California tiger salamander records from the CNDDB were insufficient because this database lacked observations of the species on private lands.

Our Response: We used the best scientific and commercial information available during the status review process and preparation of the proposed rule to make our listing determination. We used museum records; CNDDB information; GIS coverages documenting the land use changes; unpublished reports by biologists; and peer-reviewed articles from scientific journals in making that determination. Additionally, the proposed rule was peer-reviewed by 11 scientists, researchers, and biologists with amphibian expertise throughout the United States.

Regarding the lack of occurrence data from private lands, the Service is aware that systematic surveys have not been conducted throughout the range of the species. The CNDDB is the clearinghouse for location and status data collected by State and Federal agencies, consultants, scientists, and other knowledgeable biologists on private, State, and Federal lands. We believe that the data in CNDDB, supplemented by information available in other sources and provided by commenters, represents the best available scientific and commercial information on the distribution of the Central California tiger salamander.

Comment 3: Numerous commenters expressed concern that there was not scientific justification for stating that the California tiger salamander can migrate 1 to 2 miles from aquatic breeding habitat into upland habitat.

Our Response: Adult California tiger salamanders have been observed up to 2.1 km (1.3 mi) from breeding ponds (S. Sweet, University of California, Santa Barbara, in litt. 1998), which may be vernal pools, stock ponds, or other seasonal water bodies. During the comment period, the Service received information about a trapping study of California tiger salamanders in West Pittsburg, California, where, during the first three years of the study, 200 to 446 California tiger salamanders were trapped each year 0.8 km to 1.2 km (0.5 to 0.75 miles) away from potential breeding habitat (S. Orloff, in litt. 2003). Additionally, researchers have marked California tiger salamanders in study ponds and have also captured them using pit fall traps in upland migration studies and have determined that the species can migrate up to 670 m (2,200 ft) from breeding ponds to upland habitat (Trenham *et al.* 2002; Trenham and Shaffer in *review*).

Comment 4: Numerous commenters stated that the Central California tiger salamander should not be listed as threatened or endangered because the proposed rule does not have population information that would indicate that the species is declining. Commenters also believed that it was inappropriate for the Service to rely on habitat loss for determining the species' decline. One commenter, after conducting a population estimate of the Central California tiger salamander, concluded that there were 840,000 individuals.

Our Response: Based on a review of the scientific and commercial data, the total number of individual California tiger salamanders is not known. The difficulty of estimating the total number of California tiger salamanders has been documented by a number of biologists (Jennings and Hayes 1994; Shaffer *et al.* 1993). However, estimates have been made for specific locations in Monterey and Alameda counties (Trenham *et al.* 2000; Kolar in litt. 2003). The fact that this species spends much of its life underground, only a portion of the total number of animals migrate to pools to breed each year, animals do not always breed in their natal pool or pond, and the California tiger salamander's wide distribution make estimating the total number of California tiger salamanders difficult.

To determine the Central California tiger salamander's listing status, we estimated the current distribution and habitat of the species based on known occurrences, and the projected status of the species in the foreseeable future after review of the threats to the DPS from habitat-related and other factors (see Summary of Factors Affecting the Species section below). For habitat-related factors, because of our understanding of the habitat that California tiger salamanders use, and the species' distribution based on known occurrences, we used threats to habitat associated with known occurrences of the Central California tiger salamander as an indication of the status of Central California tiger salamander, in the absence of estimates of the total number of individuals (see Factor A below; Service 2004). The relationship between habitat loss and population decline is further discussed in the Background section above. We also evaluated other threats such as predation from exotic species and the potential threat from disease (see Factor C below), inadequacy of existing regulatory mechanisms (see Factor D below), and hybridization with non-native tiger salamanders (see Factor E below; Service 2004).

The population estimate of 840,000 individuals provided by the commenter is based on an estimate of 1,140 salamanders per pond, which is then extrapolated for the number of breeding sites presented by the commenter. This estimate is largely based on a study conducted by the Loredo and Van Vuren study (1996), which investigated breeding migrations and reproductive traits of California tiger salamanders at a breeding pond in Contra Costa, California. In this study, researchers

marked juveniles during three seasons and recaptured mature adults during two of the seasons. The commenter used the mark recapture information presented in the Loredo and Van Vuren study (1996), in addition to survival data for California tiger salamander (Trenham *et al.* 2000), to conduct the population estimate.

We have determined that the estimate provided by the commenter is speculative and not properly derived because the breeding pond being investigated by Loredo and Van Vuren (1996) may not have been a closed system. At least four other breeding sites were observed in the area (Loredo and Van Vuren 1996). We believe this may have allowed salamanders to migrate into and out of the population being investigated, at unknown rates. Some salamanders also may have lost their marks due to regeneration of clipped toes (Loredo and Van Vuren 1996), and California tiger salamanders that were marked in the first season may not have had an equal opportunity to be recaptured during the following two seasons because salamanders may not mature until four or five years of age (Trenham *et al.* 2000); thus, individuals would not have migrated to the breeding pond during the study period to allow for possible recapture. We have also concluded that the rangewide estimate for the Central California tiger salamander provided by the commenter is speculative because it extrapolates a population estimate derived from a single site to all sites throughout the range of a species that displays different environmental conditions and population sizes associated with such conditions.

Comment 5: Some commenters stated that the proposed rule did not have information on the range or distribution of the California tiger salamander. Another commenter stated that the current range of the Central California tiger salamander was similar to the species' historic range.

Our Response: We used specific locations of the California tiger salamander identified in the California Department of Fish and Game's CNDDB and additional information provided by outside parties in our analysis of the current distribution of the salamander. Maps illustrating the current known distribution of the animal were available to the public during the comment period upon request from the Sacramento Fish and Wildlife Office. They were also available to the public at six workshops and ten public hearings during the comment period.

We agree that the California tiger salamander still occurs throughout much of its historic range (Trenham *et al.* 2000), although we estimate approximately 75 percent of the species' historic natural habitat has been lost within this range (Shaffer *et al.* 1993; see Factor A below). However, we do not believe that the size of the range of the California tiger salamander is the only statistic relevant to an evaluation of listing status. Although the current range of the California tiger salamander approximates its historic range in size, we believe the quality, connectivity, and distribution of the habitat within the range has been substantially altered and degraded.

Comment 6: Several commenters stated that the Service did not conduct population surveys to document in what counties the Central California tiger salamander is located. One commenter stated that the Service did not use best available information on range, abundance, and number of extant populations. Another commenter provided information on additional occurrences of Central California tiger salamander breeding populations and stated that there were more occurrences presently than in the past and that there are 32 percent more occurrences than the Service used in the proposed rule.

Our Response: The Service has determined that the Central California tiger salamander is located within 22 counties, which is based upon CNDDB and other information from biologists, and reports on the species that were available to the Service (see previous response to comment). The CNDDB data base contains information on observations of California tiger salamanders that have been submitted by biologists, researchers, and scientists who have documented the animal's presence at breeding sites and upland habitats. All location information submitted by commenters was used by the Service to make its determination for this final rule. When commenters asserted that additional occurrences exist without providing site-specific information, we attempted to obtain the information independently and/or requested the information from the commenter. If we could not obtain the information or it was not provided to us, we did not evaluate it in our analysis. Therefore, we believe that we used the best available scientific and commercial information in developing this final rule.

Comment 7: One commenter stated that the Central California tiger salamander was not threatened because the species occupies 1.7 million ha (4.1 million ac) of habitat with 737 known breeding populations within its 3.4-million-ha (8.3-million-ac) range.

Our Response: The commenter conducted an independent analysis of the range and habitat of the Central California tiger salamander. Because their methodology differed from ours, their results (*i.e.*, amount of salamander habitat and percentage of habitat likely to be lost) and interpretation also differed substantially from ours. The commenter assumed that all area within a habitat type used by the California tiger salamander was suitable salamander habitat regardless of the location and distribution of suitable aquatic breeding sites within those habitat types (*i.e.*, the sum of grassland, woodland, and other habitat types within the range of the animal). We believe that their approach results in a substantial overestimate of the habitat actually used by extant salamanders.

In contrast, we assessed the amount of salamander habitat based on known salamander location records. These records included all records in the CNDDB, as well as other records provided to us during the comment period. In contrast to the commenters' estimate, we acknowledge that our result is likely to be conservative. Nevertheless, because it is based upon known salamander locations, we believe that our approach yields a more appropriate estimate of the amount of habitat likely to be used by salamanders.

Regarding the 737 California tiger salamander breeding populations presented by the commenter, we used all available information to us for our analysis for this final rule, which represents a total of 711 California tiger salamander records and occurrences. Although the number of breeding populations is important for determining the California tiger salamander's distribution and habitat (as performed in our analysis), the number of breeding sites should not be solely used for assessing the status of the species because the number of breeding sites does not assess the range of the salamander or its distribution relative to historic loss and future threats. Additionally, records within the CNDDB database do not always constitute an observation of a salamander at a breeding site and can be an observation of the species in an upland area.

Details of our approach can be obtained from the Sacramento Fish and Wildlife Office in the document cited here as Service (2004). In addition, the process is described briefly below in the Summary of Factors Affecting the Species section. Based on our analysis, we estimate that there are approximately 378,882 ha (936,204 ac) of Central California tiger salamander

habitat, considerably less than the 1,659,214 ha (4.1 million ac) suggested by the commenter.

Some portion of this area will be lost in the future to development (including low- and very-low-density residential) and conversion of rangeland to intensive agriculture. We estimate that 26 percent of the habitat associated with known salamander locations is threatened by conversion, fragmentation, and degradation from urbanization and low- and very-low-density residential development in the future. This estimated loss of habitat does not include the continued loss of habitat that has occurred as a result of conversion of habitat to intensive agriculture. In addition, California tiger salamanders are at risk from hybridization with non-native tiger salamanders, predation and other factors discussed in the Summary of Factors below.

The primary threats include habitat destruction, degradation, and fragmentation due to urban development, and conversion to intensive agriculture. Other threats include hybridization with non-native salamanders and predation.

Comment 8: Many commenters stated that the Central California tiger salamander did not require listing under the Act because it was already protected by existing regulatory mechanisms. Examples of current regulations cited include the application of the Porter-Cologne Water Quality Control Act, California Environmental Quality Act (CEQA) by CDFG, Clean Water Act, and species listed under the Endangered Species Act, such as vernal pools species, vernal pool critical habitat, California red-legged frog, and the San Joaquin kit fox. One commenter stated that habitat conservation plans provide protection for the California tiger salamander. Many commenters, including local governments in Merced County, stated that the Central California tiger salamander was presently protected in Merced County by a 20,000-acre conservation easement program that acts as an existing regulatory mechanism. A few other commenters indicated that Merced County had existing regulatory mechanisms sufficient to protect the Central California tiger salamander through the Clean Water Act as well as to protect its habitat on waterfowl easements and on the San Luis National Wildlife Refuge. Commenters also mentioned existing protections that occur from local land use laws such as county plans and local ordinances. A few commenters also stated that the Williamson Act provides regulatory protection to the Central California tiger salamander.

Our Response: Existing regulatory mechanisms may afford some regulatory protection to the Central California tiger salamander. However, the protection afforded by these regulations does not sufficiently protect the species to such an extent that listing is not warranted (see Factor D). In addition, the species is threatened by hybridization with non-native tiger salamander, predation, and other threats (see Factors C, D, and E below), that existing regulatory mechanisms do not alleviate. Regarding protected areas in Merced County, San Luis National Wildlife Refuge and other areas, we incorporated these areas into our analysis for estimating the amount of protected Central California tiger salamander habitat (see Factor A). While many of these areas may be protected from habitat destruction, California tiger salamanders on some of these otherwise protected lands are still threatened by hybridization, predation, and other non-habitat based threats (Factors C, D, and E).

Comment 9: Several commenters stated that there are no diseases adversely affecting the Central California tiger salamander and that the discussion on disease as a threat in the proposed rule was speculative. Several commenters stated that the Service was on record that disease did not pose a threat to the California tiger salamander.

Our Response: As stated in the proposed rule, the Service acknowledges that relatively little is known about the diseases of wild amphibians in general (Alford and Richards 1999) and California tiger salamander in particular (see Factor C below). Pathogen outbreaks have not been documented in the Central California tiger salamander, and while two of the peer reviewers expressed concerns that disease could pose a future threat to the California tiger salamander, we currently do not have specific information to consider it a threat.

Comment 10: A few commenters expressed concern about the estimate of 4,451,549 ha (11.1 million ac) of habitat available for the Central California tiger salamander referenced in the proposed rule. These commenters stated that this estimate of potential habitat did not coincide with our estimates of habitat estimated for the four populations that are part of the Central California tiger salamander in the proposed rule. One commenter stated that the Service estimated the amount of habitat for the Central California tiger salamander without correlating potential habitat with distributional data for the species. One commenter stated that the Service did not ground truth California tiger salamander records that were determined to be extirpated as part of the proposed rule's GIS analysis (Service 2003).

Our Response: The 4,451,549 ha (11.1 million ac) referred to in the proposed rule was a typographical error; the correct estimate was 445,155 ha (1.1 million ac), which represents the sum of polygons representing presumed extant records surrounded by an area 2.4 km (1.5 mi) wide to represent additional habitat that could be associated with Central California tiger salamander observations. Records were determined to be extant as recorded by the individual that made the observation, and refined through additional GIS analysis by the Service of records of California tiger salamander observation sites likely destroyed by existing urbanization and intensive agriculture, or where the California tiger salamander is threatened by hybridization with non-native tiger salamanders. Within the 445,155 ha (1.1 million ac), we estimated that there was approximately 283,280 ha (700,000 ac) of Central California tiger salamander habitat.

Our estimate of distribution of existing Central California tiger salamander habitat was based upon the evaluation of California tiger salamander records and observations, together with other information on current land uses and habitat types associated with those locations. Using commenter's suggestions on our methodology and other new information received, we conducted a new analysis for this final rule. Our analysis methodology is described in greater detail below in the Summary of Factors.

With respect to ground-truthing CNDDB records, the commenter is correct. While we visited as many sites as time allowed, our resources limited us to visiting only a fraction of the sites. Additional information from an increased number of site visits would have been useful, but in its absence, we have made this determination based on the best information available to us.

Comment 11: Several commenters expressed concern that the proposed rule made contradictory statements regarding agricultural crops as habitat for the Central California tiger salamander while also discussing agriculture as a threat to the species. Another commenter stated that agriculture is not a threat because the total quantity of agricultural lands in the state is declining with the increasing human population.

Our Response: While intensive agriculture is partially responsible for

removal of historic California tiger salamander habitat, we recognize the contribution that some agricultural practices like rangeland ranching make to California tiger salamander survival. Accordingly, we are promulgating a rule to allow ordinary and usual ranching practices to be exempt from the Act.

Comment 12: Another commenter stated that development was not a threat to the Central California tiger salamander based on an analysis of impacts on Central California tiger salamander potential habitat projected by general plans. The commenter's independent analysis showed that 75 records and 127,192 ha (314,297 ac) of suitable habitat fall within areas designated by general plans for urban development. By this analysis, 88 percent of the localities (567 records) and approximately 92 percent of the suitable habitat (1,537,808 ha (3,800,000 ac)) are not threatened by development. Additionally, the commenter's analysis included review of open space designations and other forms of conservation. This review identified 96 records (15 percent) and 233,103 ha (576,008 ac) of habitat (14 percent) as protected from development. This commenter identified 25 sites that met the requirements of California tiger salamander preserves (Shaffer *et al.* 1993).

Our Response: We discussed above (see Response to Comment 6) a fundamental difference between our analysis and the commenter's analysis. We believe that the commenter's methodology resulted in a substantial overestimate of the amount of California tiger salamander habitat. Their subsequent estimates, such as the amount and percentage of habitat falling within general plan areas or within protected areas, rely on their estimation of salamander habitat. Because we believe the underlying habitat estimate to be inappropriate, we believe the subsequent estimates are questionable as well.

Despite the difference between the commenter's estimate of salamander habitat and our estimate of habitat, these analyses are similar in that both utilized general plans and planned development for estimating habitat loss. Our analysis also included habitat loss, fragmentation, and degradation as a result of low-density and very-low-density development, and we considered habitat conversion to intensive agriculture to also be a threat. The commenter did not use or consider these factors in their analysis (see Factor A below). Regarding the commenter's estimate of protected habitat, their percentage estimate (14 percent) is slightly less than ours (20 percent), despite that fact that we used different information to determine protected habitats.

Our analysis indicated that approximately 28,526 ha (70,489 ac, or 8 percent) of Central California tiger salamander habitat is threatened by development identified in general plans or by other planned development (Factor A). Our 8 percent estimate of Central California tiger salamander habitat threatened by development identified in general plans or by other planned development is similar to the commenter's estimate. Additionally, we determined 24,240 ha (59,897 ac, or 6 percent) of Central California tiger salamander habitat is threatened by low-density housing and 45,880 ha (113,371 ac, 12 percent) by very-low-density housing (Factor A). The general plans that we used for this analysis represent the planning area for local governments. Planning for many areas does not extend beyond 2020, while California's growth rates are projected to continue to grow for at least the next 40 years (see Factor A below). Therefore, our estimate of habitat likely to be converted to land uses incompatible with Central California tiger salamander persistence is likely to be conservative. Our estimate is also conservative because it does not consider the loss of habitat due to conversion to intensive agriculture. Projecting the future loss of Central California tiger salamander habitat from conversion of rangeland to intensive agriculture is difficult because conversion to this land use is largely unregulated by cities and counties and is dependent upon the individual landowner and numerous factors that are difficult to predict, such as economic considerations, markets, and water availability.

We also determined that 76,501 ha (189,032 ac, or 20 percent) are afforded some protection (see Factor A below). The percentage of habitat within protected areas varies across the Central California tiger salamander range from 2 to 27 percent (see Factor A below).

We also evaluated the additional information received after the closing of the comment period regarding the issue of agricultural land conversion back from intensive use to areas no longer in production and determined that our analysis of existing California tiger salamander habitat was correct and that these land conversions are not resulting in an increase in habitat available to the California tiger salamander.

Comment 13: We received information from several commenters on specific projects and their impacts to California tiger salamander.

Our Response: These comments were not accompanied by information we could use to substantiate the status of each project (*e.g.*, photographs, environmental documents). To the extent that we could independently verify the information submitted, we included it in our analysis.

Comment 14: Another commenter stated that planned development areas should not be considered areas of potential impact due to avoidance, minimization, and mitigation. Additionally, this commenter stated that development will not go beyond general plans.

Our Response: Planned development may often provide avoidance, minimization, and mitigation measures which are specifically for, or which may incidentally benefit, California tiger salamander. These measures result from conformance with local land use plans for providing open space, through working with the California Department of Fish and Game under the authority CEQA, or through working with the Service when other federally listed species are present. The avoidance, minimization, and mitigation measures of individual projects, nevertheless, tend to result in fragmented landscapes and a trend of cumulative regional habitat loss and fragmentation. Mitigation does not create new land, it simply balances land converted with land protected for natural values, so even with mitigation, a net loss of habitat results. We tried to reflect the overall effect of this balancing in our Factor A analysis when we looked at the amount of protected lands and lands being converted to urban uses. We did not project development beyond general plans except where we had specific information that indicated otherwise (see Factor A).

Comment 15: A number of commenters stated that the Service should provide a map to landowners, counties, and other local governments with records of California tiger salamanders and their habitat. A few commenters stated that the Service should provide a map with records of California tiger salamanders and their habitat together with designated critical habitat for listed vernal pool species. A few commenters stated that the proposed rule did not present maps with the historic habitat for the Central California tiger salamander.

Our Response: At each of our public workshops and hearings, we provided maps that identified California tiger salamander locations that were available for the public. We also brought larger maps that explained much of our five-factor analysis with respect to the

Central California tiger salamander. At each of these hearings and workshops, biologists were available to discuss the species with interested persons. These maps were also available from the SFWO upon request. Regarding the request for maps to provide the location of historic habitat for the Central California tiger salamander, we provided information on the species' historic range in the proposed rule and in this final rule.

Comment 16: A few commenters stated that the Service was assuming that all vernal pools represented aquatic breeding habitat for the species.

Our Response: The Service is not assuming that all vernal pools represent breeding habitat for the California tiger salamander. We consider vernal pools within the vicinity of known California tiger salamander records likely breeding habitat if they pond for a sufficient amount of time for larvae to metamorphose in some years. A given vernal pool may not hold water for a sufficient amount of time every year due to variability in the duration of pool inundation from one year to another.

Comment 17: One commenter stated that there was no evidence that non-native fish and crayfish or wild pigs pose any threat to the Central California tiger salamander. This commenter also stated that bullfrogs are being eliminated by the control programs that are outlined in the California red-legged frog recovery plan, and, consequently, bullfrog populations will decrease in the future. Another commenter stated that the proposed rule did not quantify the threat of exotic species on the Central California tiger salamander.

Our Response: While predation in and of itself may not threaten California tiger salamander, studies indicate, although not quantitatively, a strong negative correlation between the presence of the California tiger salamander and the presence of various species, including the bullfrog (Shaffer *et al.* 1993; Seymore and Westphal 1994; Laabs *et al.* 2001); mosquitofish (Loredo-Prendeville *et al.* 1994; Leyse and Lawler 2000; Leyse in litt. 2003); non-native fish species (Fisher and Shaffer 1996; Laabs *et al.* 2001); crayfish (Jennings and Hayes 1994); and wild pigs (Waithman *et al.* 1999). These studies suggest that predation can negatively affect the persistence of California tiger salamander populations.

The California tiger salamander may incidentally benefit in some ways from the Act's regulatory protection of the California red-legged frog. However, we believe that these protections will only partially protect the California tiger salamander because the two species only co-occur in certain areas and have differing habitat requirements in some phases of their life cycles.

Comment 18: Several commenters stated that the Service was on record stating that pesticides were not a threat to the California tiger salamander (Service citing Davidson *et al.* 2002). Other commenters stated that pesticides are not a threat and their use in California is declining.

Our Response: We acknowledge that most toxicological studies to date have not been conducted on California tiger salamander, but rather on other amphibian species, in particular Anuran species (frogs and toads). California tiger salamanders may be sensitive to pesticides and other chemicals, which may be found in both the aquatic and terrestrial habitats they use in different stages of their life cycle (Blaustein and Wake 1990) (see factor C below).

We agree information indicates that pesticide use (measured by pounds of active ingredient) in California has declined between 1992 and 2002 (California Department of Pesticide Regulation website). However, in 2002 eight of the top ten pesticide-using counties were in the range of the Central California tiger salamander. We believe that California tiger salamanders may be at risk from the use of pesticides because salamanders occur in the vicinity of agricultural lands where pesticides are often used (*e.g.*, along the east side of the San Joaquin Valley). See also Factor E below.

Comment 19: A few commenters stated that ground squirrel control was not a threat to the California tiger salamander because the control of ground squirrels in the state is declining. Another commenter stated that rodenticides do not pose a threat to the California tiger salamander any more than they do to burrowing owls.

Our Response: California ground squirrel control may be done by trapping, shooting, fumigation of burrows, use of toxic (including anticoagulant) baits, and habitat modification, including deep-ripping of burrow areas (UC IPM internet website 2004). These control programs are still widely conducted by numerous local and state agencies. We received no data to suggest that active rodent control is declining. Two of the most commonly used rodenticides, chlorophacinone and diphacinone, are anticoagulants that cause animals to bleed to death (see Factor E below). These chemicals can be absorbed through the skin and are considered toxic to fish and wildlife (EPA 1985; EXOTONET 1996). These two chemicals, along with strychnine, are used to control rodents (R. Thompson, in litt. 1998). There are no specific studies to determine the direct effects of these poisons on California tiger salamander. However, based on studies of similar amphibian species, any uses in close proximity to occupied Central 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).

Comment 20: A few commenters stated that mosquito control did not represent a significant threat to the Central California tiger salamander because other forms of control were being utilized to reduce the use of this fish as a control strategy.

Our Response: We believe that mosquito control activities can be readily adapted to prevent or minimize potential threats to salamanders by appropriate water level management of stock ponds or proper application of bacterial larvicides. As a result, we have exempted some forms of mosquito control undertaken as routine ranching activities from the take prohibitions of the Act (see Special Rule below).

Comment 21: One commenter stated that there is not evidence that roads place California tiger salamander populations at risk, and that minimization measures, such as culverts, are established for safe passage.

Our Response: Significant numbers of various species are killed by vehicular traffic while crossing roads (Hansen and Tremper 1993; S. Sweet in litt. 1993; Joe Medeiros, Sierra College, pers. comm. 1993), including California tiger salamanders (D. Cook, pers. comm. 2002; see Factor E below). Loss of California tiger salamanders to vehicular-caused mortality in the vicinity of breeding sites can range from 25 to 72 percent of the observed salamanders crossing roads (Twitty 1941; S. Sweet, in litt. 1993; Launer and Fee 1996). As vehicular usage on California roads and road density continue to increase with increases in human population and associated urban expansion (California Department of Transportation internet website 2003), the threat to California tiger salamanders from road-kill mortality will increase. Unless there is a means of directing the species to a culvert, we have no data suggesting that a salamander would seek or use a culvert in preference to just crossing a road at

the place they encountered one, or that the presence of culverts reduces crossing risk to salamanders.

Comment 22: Some commenters stated that we did not discuss the usefulness of stock ponds for the species.

Our Response: Stock ponds can be useful aquatic habitats for breeding of the Central California tiger salamander. However, stock ponds require management to ensure their long-term habitat suitability for the species (Shaffer in litt. 2003; see 4(d) rule below). We recognize the usefulness of stock ponds as potential breeding habitat for the California tiger salamander and encourage their continued use through the 4(d) rule that exempts routine ranching activities.

Issue 2. Listing Process

Comment 23: Many commenters stated that the California Fish and Game Commission had reviewed a petition to list the California tiger salamander under the California Endangered Species Act and had determined that the listing was not warranted. Many of these commenters stated that since California Fish and Game Commission made this determination there has been no new scientific information to indicate that the species warrants protection under the Act.

Our Response: California Fish and Game Commission determined that the listing of the California tiger salamander was not warranted under the California Endangered Species Act. The Service has proposed listing the Central California tiger salamander as a threatened species based on our evaluation of the status of the species and five factor analysis, and the best available commercial and scientific information as required by the Federal Endangered Species Act.

Comment 24: A few commenters stated that the information used in the original petition (Shaffer *et al.* 1993) was for the purpose of conducting genetic analysis of the species or that the petition did not provide an adequate argument for the species to be listed.

Our Response: In our evaluation of a listing petition and subsequent status survey and eventual listing determination, we are required to evaluate all information available regarding the status of a species when making a listing determination. Our positive findings for the 90-day, 12-month, proposed listing rule, and this final listing rule use the best scientific and commercial data available, as we are required to use in reaching our conclusions.

Comment 25: Many commenters stated that the information used by the Service in the proposed rule was not shared or available to the public.

Our Response: As stated in the proposed 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.

Comment 26: Many commenters stated that the proposed listing was a ''rushed process'' and these commenters requested further review and scientific analysis before the Service makes a final determination.

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 held six workshops and 10 public hearings in California to encourage agency and public input into the review of the proposed rule. We solicited 28 recognized experts and specialists to review the proposed rule and received responses from 11 of these experts. We utilized this information in making the final determination. In order to receive adequate information from the public, we extended the public comment period twice. In total, the comment period was open for 150 days.

Comment 27: Several commenters stated that the proposed listing should undergo a scientific peer review before the Service makes a final determination. Another commenter stated that the Service did not conduct a meaningful peer review because the Service requested the same information from peer reviewers as it did from the general public.

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 28 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 11 peer reviewers who provided comments on the proposed listing supported the listing of the Central California tiger salamander as threatened. Peer reviewers provided additional documentation of threats to the species and potential conservation measures. That information has been incorporated into this final rule. We also requested peer review from nine university scientists on the mitochondrial DNA (mtDNA) study of the California tiger salamander conducted by Dr. H.B. Shaffer and Dr. P.C. Trenham of the University California at Davis (Shaffer and Trenham 2003). Three researchers reviewed the report. Their comments are summarized above in the Peer Review section.

Issue 3. Cost and Regulatory Burden

Comment 28: Many commenters, including local governments, stated that the listing of the Central California tiger salamander would increase regulatory burdens and costs of completing projects and would have a negative impact on the local economy. Several commenters stated that the Service needs to address the economic impact in the proposed listing of the Central California tiger salamander. Several commenters stated that the listing would reduce local government's authority over land use decisions. Commenters also stated that the listing would have a negative impact on the California and national economies. Several commenters stated that if the Central California tiger salamander were listed, it would be expensive to hire consulting biologists and provide mitigation. One commenter requested that if the Central California tiger salamander were listed, then mitigation ratios for projects impacting California tiger salamanders and survey protocols be published simultaneously with the final rule. A few commenters expressed concern about the regulatory burden the proposed Central California tiger salamander listing would place on pesticide application, mosquito control, rodent control, and the relation of these regulated activities to human health. One commenter expressed concern about whether existing agricultural practices would constitute a section 9 violation if the Central California tiger salamander were listed. One commenter requested that all activities that do not constitute a section 9 violation be listed 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 Central California tiger salamander.

In our Notice of Interagency Cooperative Policy of Endangered Species Act Section 9 Prohibitions (59 FR 34272, July 1, 1994), we stated our policy to identify, to the extent known at the time a species is listed, specific activities that will not be considered likely to result in violation of Section 9. In accordance with that policy, we have published in this final rule a list of activities we believe will not result in violation of Section 9 of the Act (see Available Conservation Measures below).

Comment 29: One commenter stated that California tiger salamanders that hybridized with non-native tiger salamanders should not be afforded regulatory protections under the Act if the Central California tiger salamander were listed and that we were inconsistent with the recent westslope cutthroat trout determination (68 FR 46989).

Our Response: We do not believe our determination here is inconsistent with the 12-month finding for the listing of the westslope cutthroat trout (*Oncorhynchus clarki lewisi*) (68 FR 46989). We noted in that finding that ''our increasing understanding of the wide range of possible outcomes resulting from exchanges of genetic material between taxonomically distinct species, and between entities within taxonomic species that also can be listed under the Act (*i.e.*, subspecies, DPSs), requires the Service to address these situations on a case-by-case basis'' (68 FR 46992). We also stated our intention to evaluate long-term conservation implications for each taxon separately on a case-by-case basis where introgressive hybridization may have occurred.

Distinguishing between native California tiger salamanders and hybrid animals appears to require some scientific and technical expertise. We understand that it is difficult for non-experts to make the distinction based on morphology alone and that a number of misidentifications have been made as a result (Shaffer and Trenham 2002). The best way to identify hybrid or introgressed individuals at this point appears to be using sophisticated molecular genetic techniques. Because of the difficulty distinguishing hybrid and introgressed individuals from native California tiger salamanders, we believe it is both inappropriate and impractical to distinguish between them under the Act.

Comment 30: A few commenters expressed concern about the potential regulatory protection to ground squirrels that would result from listing the Central California tiger salamander and the ground squirrel's relation to incidences of the plague. Several other commenters also stated that the potential regulatory protection to ground squirrels would result in their inability to conduct rodent control in the interest of public health.

Our Response: In situations where human health and safety are at risk, human health and safety concerns would be a priority in making decisions about appropriate rodent control. We believe that ground squirrel control can occur in a manner that minimally affects California tiger salamander.

Issue 4. Notification and Public Comment

Comment 31: A number of commenters stated that landowners were either not notified, or not notified in a timely manner, and not given an adequate opportunity to comment on the proposed rule. The commenters also stated that the number of public hearings was inadequate to obtain full public input on the proposal and that additional public hearings should be held. A number of commenters also stated that the comment period on the proposed rule should be extended from September 22, 2003, to allow for additional outreach to interested parties as well as to hold more public hearings.

Our Response: We are obligated to hold at least one public hearing on a listing proposal, if requested to do so prior to 15 days before the end of a comment period (16 U.S.C. 1533(b)(5)(E)). We held a total of 10 public hearings on our proposal to list the Central California tiger salamander as a threatened species, the proposed reclassification of the Santa Barbara and Sonoma DPSs from endangered to threatened, and the proposed exemption for routine ranching activities. We also held six public workshops to notify the public of the proposed rule and to answer questions regarding the California tiger salamander and the proposed rule. In addition to the public hearings and public workshops, we attended a public meeting organized by Congressmen Dennis Cardoza and George Radanovich in Merced, California, on June 12, 2003, and in Modesto, California, on October 24, 2003, to discuss the proposed rule and answer questions regarding the California tiger salamander and the proposed rule.

Written public comments were accepted at all the public hearings, workshops, and the Merced and Modesto meetings, and entered into the supporting record for the rulemaking. Oral comments given at the public hearings were also accepted into the supporting record. In making our decision on the proposed rules, written comments were given the same weight as oral comments presented at hearings. We conducted much of our outreach about the proposed listing of the Central California tiger salamander through legal notices in numerous regional newspapers, telephone calls, letters, and news releases faxed and/or mailed to appropriate elected officials, local jurisdictions, and interest groups. We also posted the proposed rule, schedule of workshops and hearings, and other associated material on our Sacramento and Ventura Fish and Wildlife Office internet sites. We believe that our notification and outreach process was sufficient to make the public aware of this proposal. Further, our efforts in this process satisfied the requirements of the Act and the Administrative Procedure Act (5 U.S.C. 551 *et seq.*) (APA) for promulgating Federal regulations regarding listing actions.

The comment period for the proposed rule was initially open for 60 days, closing on July 22, 2003. On July 3, 2003, we extended the comment period until September 22, 2003. The comment period was re-opened on September 30, 2003, for an additional 30 days and closed on October 31, 2003. In total, the comment period was open for 150 days.

Comment 32: A few commenters stated that the Service should provide more information regarding the proposed rule on our website.

Our Response: Information on the California tiger salamander was available on our website (*http://sacramento.fws.gov*) related to the proposed rule, workshops, hearings, the status of the comment period, biological information, and contacts to gather additional information on the species. An e-mail address posted on our website offers the public the opportunity to offer suggestions or request the webmaster to include additional information.

Comment 33: One commenter stated that minority and disadvantaged people were not given the opportunity to comment on the proposed rule.

Our Response: We conducted extensive public outreach (see also comments 26 and 31 above) on the proposed rule to inform all affected

stakeholder groups and populations, with the reasonable expectation that the information would reach minority and disadvantaged populations. For instance, we scheduled 10 workshops and public hearings throughout California and released information to the news media in communities with substantial minority and disadvantaged populations. We also produced news releases that were widely distributed to newspapers and radio and television stations throughout the state; posted information on Fish and Wildlife Service internet sites, and placed notices in newspapers in communities with a large percentage of minority residents. In addition, as stated in the **Federal Register** notice, persons needing reasonable accommodations in order to attend and participate in the public hearings could contact the Sacramento Fish and Wildlife Service Office at least one week prior to the hearing.

Issue 5. Property Rights

Comment 34: Several commenters stated that the listing would result in the loss of property rights and decreased land values.

Our Response: The listing of a species and the functioning of the Act does result in the imposition of land use constraints. However, we have attempted to address only those activities that threaten the continual existence of the California tiger salamander. We have exempted many routine ranching activities from the take prohibitions of Section 9 of the Act through the special rule. 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.

Issue 6. Critical Habitat and Recovery Planning

Comment 35: Several commenters expressed concern that the proposed rule included or was a designation of critical habitat for the Central California tiger salamander. Several of these commenters stated that their property did not have the species or its habitat present on their property and that they requested that their property be exempted from the proposed critical habitat designation. A few commenters stated that the Service should designate critical habitat for the California tiger salamander. A few commenters stated that the discussion on critical habitat designation in the proposed rule was inappropriate.

Our Response: We are proposing critical habitat for the Central California tiger salamander population in an upcoming rule. In addition we will finalize critical habitat for the Santa Barbara California tiger salamander population by the court-ordered deadline of November 15, 2004. We intend to publish a proposed rule to designate critical habitat for the Sonoma geographic area in the future. When that rule is finalized, the critical habitat designation for the rangewide California tiger salamander will be complete.

Comment 36: Several commenters stated that the Service should also complete a recovery plan for the species. Several commenters, including local governments, requested that, if the species were listed, then they should be able to review a draft version of the recovery plan.

Our Response: A recovery plan will be developed, in coordination with stakeholders. This plan will identify recovery objectives and describe specific management actions necessary to achieve the conservation and long-term survival of the species. We anticipate that these management actions will include habitat protection and restoration, and efforts to conduct further surveys and research on this species. The draft recovery plan will be made available for public review and comment once it has been prepared.

Issue 7. Designation and Listing Status of the Central California Tiger Salamander

Comment 37: Numerous commenters stated that the Central California tiger salamander should be listed as an endangered species rather than threatened.

Our Response: As discussed in this final rule, we have concluded that the appropriate listing status is threatened. While there are a number of factors that put the population at risk, they are not so imminent that we believe the population is in danger of extinction at this time (*i.e.*, it does not meet the definition of endangered). Rather, we believe the Central California tiger salamander is likely to become endangered throughout all or a significant portion of its range in the foreseeable future (*i.e.*, it meets the definition of threatened).

Comment 38: A few commenters stated that the Central California tiger salamander does not qualify as a Distinct Population Segment or that it is inappropriate to consider it a DPS given the listing of Santa Barbara and Sonoma counties as DPSs (*i.e.*, we should have considered the species range wide instead of piece by piece). Another commenter stated the Central California tiger salamander DPS should be designated as four DPSs corresponding to the four sub-populations of the Central California tiger salamander. In contrast, a different commenter stated that there was no basis to subdivide the Central California tiger salamander into four DPSs.

In addition to these general comments about the appropriateness of considering Central California tiger salamander a DPS, we received several comments about whether the DPS meets the significance criterion of our DPS policy. In part these comments focused on our recent 12–month finding on western gray squirrel and on *National Ass'n of Homebuilders, et al.* v. *Norton, et al.*, No. 00–0903–PHX–SRB (D.Az.), recent litigation about our DPS determination for the cactus ferruginous pygmy owl.

Our Response: We have determined that listing the California tiger salamander rangewide is appropriate in light of the fact that all three populations share the same threatened status and the Congressional direction to use the DPS provision sparingly.

Issue 8. Proposed 4(d) Rule To Exempt Existing Routine Ranching Activities

Comment 39: Several commenters indicated that the proposed 4(d) rule to exempt existing routine ranching activities did not adequately define the activities proposed from exemption in the proposed rule. Many commenters made specific recommendations for additional activities they thought should be exempted in the special rule. Additional activities suggested for exemption included activities such as dairy operations, irrigated agriculture, and ground squirrel control, projects that have received approval from Federal, State, and local governments, and livestock grazing in vernal pools. One commenter stated that the Service should exempt take through conservation plans.

Our Response: The final version of the special rule includes an expanded definition of routine ranching practices and incorporates additional activities we believe are consistent with conservation of the California tiger salamander, which may provide conservation benefits to the California

tiger salamander through private landowner partnerships, and which are associated with largely natural rangeland environments with low, infrequent levels of human activity, in which California tiger salamander persist.

Comment 40: Some commenters stated that they were opposed to the proposed special rule for a variety of reasons, such as (1) it would allow a ''loop hole'' that would result in environmental degradation and allow activities that would harm or kill California tiger salamander, (2) it did not include enforcement and education provisions, and (3) conservation benefits were inadequately described.

Our Response: The primary threat to California tiger salamander is habitat loss and degradation. To the extent ranching activity is compatible with the California tiger salamander, we wish to encourage such activities to continue. We believe that relaxing the general take prohibitions on specific types of non-Federal lands through the special rule is likely to encourage continued responsible ranching, a land use that provide an overall benefit to the California tiger salamander. We also believe that such a special rule will promote the conservation efforts and partnerships critical for the recovery of the species. We have further described these benefits in our final version of the special rule. We have committed to monitor the status of California tiger salamander in areas where exempted activities occur (see section on special rule). We hope to enlist the partnership of the ranching community in education and outreach efforts, subsequent to the listing of the Central California tiger salamander, and throughout the recovery planning process.

Comment 41: Los Padres National Forest stated that California tiger salamanders were not present on the National Forest and that the proposed 4(d) rule should apply to the Los Padres National Forest. The USFS issues grazing permits on the Los Padres NF.

Our Response: Under the 4(d) rule, take of the threatened Central California tiger salamander caused by existing routine ranching activities on private or Tribal lands for activities that do not have a Federal nexus would be exempt from section 9 of the Act. Federal agencies have the responsibility to consult with the Service if a Federal action may affect a federally-listed species because of their section 7 responsibilities under the Act.

Comment 42: One commenter stated that they were unable to perform some of the same activities as included in the proposed 4(d) rule for exemption because they were not conducting those activities as part of routine ranching activities.

Our Response: The special 4(d) rule to exempt routine ranching practices is intended to promote a land use practice that is compatible with the conservation of the California tiger salamander. If an individual or organization seeks to perform the activities that are exempt under this special rule, but are not part of routine ranching activities, then incidental take authorization should be obtained through section 7 or 10 of the Act. If the activities have a net benefit to the California tiger salamander, then take may be authorized through a safe harbor agreement.

Comment 43: Several commenters stated that the proposed rule would place a burden on the ranching industry because ranching is no longer profitable and the ranching industry requires the need to diversify into more intensive agricultural uses that may require destruction of rangeland or Central California tiger salamander habitat.

Our Response: The purpose of the proposed 4(d) rule is to recognize the larger conservation value of maintaining existing rangeland that support California tiger salamander, even though some specific activities may adversely affect them. Activities likely to occur in those landscapes should ongoing ranching be removed, such as irrigated agriculture or urban development, remove and fragment upland and aquatic habitats used for migration, aestivation, and breeding that are essential for the species to complete its life history requirements. We believe that exemption of the ranching activities described in the special rule results in a net benefit to the conservation of the California tiger salamander (see Special Rule section below for specifics).

Comment 44: One commenter stated that they did not support the proposed exemption for activities that may qualify as conservation plans for the California tiger salamander.

Our Response: We have not included other activities, such as conservation plans, as part of a 4(d) rule. We only exempt routine ranching practices from the take prohibitions for the Central California tiger salamander. Conservation plans have many forms and the Act provides for authorization of activities that may take California tiger salamanders but which are consistent with conservation plans meeting our requirements under safe harbor agreements or habitat conservation plans.

Issue 9. Basis for Proposing Threatened Status for Santa Barbara and Sonoma County Populations

Comment 45: Some commenters questioned the soundness of both the scientific and procedural basis for the proposal to reclassify the Santa Barbara and Sonoma County populations of California tiger salamander. Others stated that the Service had failed to demonstrate that one or the other, or both, should be listed at all. Some pointed out that more breeding sites and habitat have been documented within the range of the Santa Barbara DPS since it was listed.

Our Response: Threats faced by the Santa Barbara and Sonoma County California tiger salamander and supporting documentation were reported in the final rules to list them as endangered (65 FR 57242 and 68 FR 13498, respectively). Our analysis of the status of the species rangewide, discussed below, has shed additional light on the status of the Santa Barbara and Sonoma County populations. In addition, once the Santa Barbara population was listed, the number of existing populations in Santa Barbara increased as efforts to locate the species increased. We now conclude that neither of these populations is currently in danger of extinction throughout all or a significant portion of its range. However, like the species as a whole, these populations are subject to a significant threat of additional habitat loss and fragmentation, as well as other secondary threats. Given their smaller ranges and populations, the Santa Barbara and Sonoma populations remain at higher risk that the species as a whole, which, as discussed below, we have determined is threatened. Similarly, we have determined that the Santa Barbara and Sonoma populations are likely to become endangered in the foreseeable future, and are also threatened.

Issue 10. Discreteness and Significance of Santa Barbara and Sonoma Populations

Comment 46: Numerous commenters stated that the Service failed to demonstrate that the Santa Barbara or Sonoma populations of California tiger salamander satisfy the discreteness or significance criteria of the Policy Regarding the Recognition of Distinct Vertebrate Population Segments (61 FR 4722). Other commenters contended that available scientific information on the genetics of the California tiger salamander indicated a significant degree of genetic distinction of the Santa Barbara or Sonoma County

populations. Some commenters maintained that the Service failed to apply the policy ''sparingly'' as instructed by Congress.

Our Response: In this rule, we list the California tiger salamander as threatened throughout its range, and eliminate the separate listings for the Santa Barbara and Sonoma populations.

Summary of Factors Affecting the California Tiger Salamander

Section 4 of the Act, and the regulations (50 CFR part 424) promulgated to implement the listing provisions of the Act, describe the procedures for adding species to the Federal List of Endangered and Threatened Wildlife and Plants. We may determine a species to be endangered or threatened on the basis of one or more of the five factors described in section 4(a)(1) of the Act. These factors, and their application to the California tiger salamander, are described below.

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

Central Population

We conducted a GIS analysis of California tiger salamander habitat in the range of the Central California tiger salamander for the proposed rule. We have modified the analysis for the final rule based on comments we received and specific suggestions for refinement of the analysis. The analysis we conducted for this final rule is described briefly below.

Identification of salamander locations. Intensive biological sampling has occurred in habitats such as vernal pools and stock ponds that represent potential breeding habitat for the California tiger salamander. In addition, the California tiger salamander has been designated as a candidate species since 1994 and has received a great deal of attention by biologists, scientists, and applicants for projects undergoing environmental review. State and Federal environmental laws (see Factor D below) require identification and analysis of impacts of the projects on sensitive species. Public agencies and project proponents have conducted many biological surveys for California tiger salamanders in the course of complying with environmental laws since the species' designation as a Federal candidate species in 1994. As a result, a great deal of information has been gathered on the distribution of the California tiger salamander. It is customary for scientists, consultants, and agency biologists to report the results of biological surveys for special status species to the CNDDB. Unfortunately an unknown amount of potential habitat has not been surveyed and much of the available data is contained in a patchwork of studies performed for various purposes. However,we believe that the location information on California tiger salamanders from CNDDB and information that we have obtained from other biologists and scientists is the best available information on the species' distribution.

We have analyzed threats to the Central California tiger salamander throughout the remaining portions of its range (Bay Area, Central Valley, Central Coast, and South San Joaquin regions) using information from 632 California tiger salamander records identified in the CNDDB, of which 589 records are considered extant by California Department of Fish and Game (CDFG) (CNDDB 2003; Service 2004). The CNDDB database includes the occurrences listed by Shaffer *et al.* (1993), Seymour and Westphal (1994), LSA Associates, Inc. (1994), and numerous other scientists and biologists. The wetlands present at localities in the CNDDB for which one or more wetland types were identified included vernal pools, artificial bermed ponds or stock ponds, or ponds and ditches (CNDDB 2003). Observations reported to CNDDB also include reports of the species in upland areas (CNDDB 2003). In addition, we used information on 79 California tiger salamander breeding sites from Carnegie Off-Road Vehicular Park and the Los Vaqueros watershed (Buckingham in litt. 2003; Alveras in litt. 2003). It is possible that some of these records located at Carnegie Off-Road Vehicular Park and the Los Vaqueros watershed may have already been submitted to the CNDDB database. If records were used twice in this analysis, they would not affect our estimate of California tiger salamander habitat because these overlapping records would fall within existing polygons. At each of these localities, at least one California tiger salamander (adult, juvenile, or larva) has been identified by a biologist. In many cases observations of the species are from breeding sites, although in some instances these records include observations of the California tiger salamander in upland areas (CNDDB 2003). In total, we were aware of 632 CNDDB occurrences in this analysis and 79 additional locations. In response to a comment that we were arbitrarily excluding occurrences or locations, and therefore, underestimating California tiger salamander habitat, we have used all of these 711 occurrences in the analysis described below.

While we have used the best available information to identify California tiger salamander locations, we recognize that the information available to us likely does not encompass all salamander breeding ponds and potential upland habitat because an unknown amount of habitat on private lands have not been surveyed. We believe that additional surveys on private lands would identify additional California tiger salamander.

Estimation of habitat using locality information. Our estimate of Central California tiger salamander habitat is the result of a several step process. We began by identifying known salamander records as described above. We then drew a 2,092-m (1.3-mile) boundary outside the perimeter of each record. We note that some records were points while others were circles or irregular polygons. We used this distance because it is the maximum distance a California tiger salamander has been observed from the nearest breeding pond (see Species Background above). One disadvantage of using this distance is that not all recorded localities represent breeding ponds and the distance is fundamentally based on how far we understand salamanders move away from breeding ponds. Therefore, this approach may result in an overestimate of habitat. We are comfortable that such an overestimate is not a significant error because, as noted above, we believe that additional California tiger salamander breeding locations, that have not been surveyed, are likely to exist within the 2,092-m (1.3-mi) boundary.

The polygons generated from the 2,092-m (1.3-mi) boundary around each record contained 756,470 ha (1,869,276 ac). We refined this estimate of habitat by examining the area within each polygon to determine the area of land that was urbanized, had already been converted to intensive agriculture, or consisted of habitat types unlikely to be inhabited by California tiger salamanders. After these adjustments, our estimate of habitat was 378,882 ha (936,204 ac). This area is our best estimate of the amount of habitat associated with known California tiger salamander records.

We then projected the loss of Central California tiger salamander habitat into the future. We used general plan information and information on future low-density residential development to determine how much of the remaining 378,882 ha (936,204 ac) of habitat is likely to be lost in the future (Service 2004).

Results of Service Analysis of Habitat

The results of our GIS analysis of Central California tiger salamander habitat are discussed below. We discuss the estimated amount of Central California tiger salamander habitat present; habitat projected to be lost in the future to urban development and low-density development; other future development; and our estimate of the amount of habitat that is afforded some protection.

Central California tiger salamander habitat. Our GIS analysis of CNNDB and other records indicates that there are currently approximately 378,882 ha (936,204 ac, 50 percent of the total polygon area, described in the Service Analysis of Central California Tiger Salamander Habitat section above) of Central California tiger salamander upland and aquatic habitat (Service 2004). The remaining land use types (non-habitat) in the Central California tiger salamander polygons included 124,079 ha (306,595 acres, 16 percent of polygon area) of agricultural row crops, and 146,922 ha (363,040 acres, 19 percent of polygon area) of urban areas, and 50,783 ha (125,484 acres, 7 percent of polygon area) of orchards and vineyards (California GAP 1996; Service 2004). The remaining 8 percent of the Central California tiger salamander polygons consisted of other land uses and habitat types that California tiger salamanders are not known to inhabit.

Urban development. Of the 378,882 ha (936,204 ac) of Central California tiger salamander habitat, 28,526 ha (70,489 ac, 8 percent) fall within areas delineated by general plans or other planned development (high-density residential, medium-density residential, industrial, and commercial development) (Service 2004). Because they are within areas that are to be developed, we consider these areas to be threatened by development. These development projects may destroy and fragment upland and/or aquatic breeding habitat, killing California tiger salamanders and reducing the likelihood of long-term persistence and viability at the affected localities.

Low-density development. We determined that an additional 24,240 ha (59,897 ac, 6 percent) of the estimated 378,882 ha (936,204 ac) of Central California tiger salamander habitat is threatened by low-density residential development (2 to 20 acre parcels), and 45,880 ha (113,371 ac, 12 percent) by very-low-density residential development (20 to 160 acre parcels) (R. Johnston, UC Davis, in litt. 2003; Service 2004). The land use data we used to evaluate the threat of low-density and very-low-density development is based on a minimum delineation of these areas in 2000 and represents the current land use rather than the projected land use in the foreseeable future (R. Johnston, UC Davis, in litt. 2003). These areas will likely be further developed resulting in a greater number of houses per area in the future, and in some cases, low-density areas are regions that will become incorporated into high-density urban areas (R. Johnston, UC Davis, in litt. 2003).

Low-density residential development is a greater threat to the Central California tiger salamander than very-low-density residential development because low density has a greater number of houses per acre, which will result in greater habitat destruction and fragmentation. These low-density housing areas and rural residential areas may result in the extirpation of California tiger salamander at some locations due to construction of houses that destroy breeding sites and/or indirectly affect breeding sites by reducing their long-term ability to serve as breeding habitat (by alteration of hydrology and increased sedimentation). Structures, roads, and highways fragment habitat and prevent salamanders from reaching their breeding sites because the upland habitat is eliminated or their migratory corridors are disrupted (Marsh and Trenham 2001). Reduced availability of upland habitat decreases the long-term population viability of California tiger salamander breeding sites (Trenham and Shaffer *in review*). In the eastern United States, 25 percent of the upland habitat within 300 m (984 ft) of a spotted salamander (*Ambystoma maculatum*) vernal pool breeding site was destroyed, resulting in a 53 percent decline in the abundance of the animals (Calhoun and Klemens 2002; Jung in litt. 2003). These studies demonstrate the importance of upland habitat to maintain the long-term viability of California tiger salamanders.

Low-density housing would also further fragment Central California tiger salamander habitats. The Sierra Nevada and Coast Range foothill counties are among the fastest growing counties in California (CGOPR 2003). California tiger salamander is threatened by low-density population expansion farther into the east and west margins of the Central Valley, located in these fast growing counties, and which are the last stronghold of remaining California tiger salamander habitat. California tiger salamanders are known to have high inter-pond dispersal between breeding sites where one pond may produce a large number of individuals that colonize other less productive ponds (Trenham *et al.* 2001). Therefore, the loss of breeding localities, or their isolation due to habitat fragmentation, may result in the extirpation of other breeding locations (Marsh and Trenham 2001). Decreased landscape connectivity and increased habitat fragmentation has had negative effects on other amphibian assemblages, which included the tiger salamander *Ambystoma tigrinum* (Lehtinen *et al.* 1999).

Increased numbers of residents living in low-density residential developments and rural houses may also result in increased introduction of non-native predators (see Factor C below), increased applications of pesticides or agricultural contaminants, and rodent control that may reduce the long-term viability of the California tiger salamander inhabiting these areas (see Factor E below). The California tiger salamander may also be threatened by the construction of new roads or increased mortality due to increased vehicle traffic (see Factor E below).

Other future development. Our estimate of the location and amount of habitat threatened by conversion and fragmentation from urban uses described above does not consider all of the projected human population growth, urbanization, and subsequent habitat loss that will occur in the counties inhabited by the Central California tiger salamander because most city and county general plans have variable planning horizons that do not extend beyond 20 years (R. Johnston, UC Davis, pers. comm. 2004). California developers and builders constructed 2.8 million new housing units between 1980 and 1997, and an additional 220,000 units will be required each year for the next 20 years with the human population of the State almost doubling in less than 40 years (CGOPR 2003). New housing is currently being constructed in low-density developments on the edge of urban areas or beyond such areas (CGOPR 2003). Most of the future growth of California will be outside of the current metropolitan areas (San Francisco, Los Angeles, and San Diego), occurring in the Sacramento, San Joaquin, and Imperial valleys (CGOPR 2003). Two of these valleys are inhabited by salamanders in the Central Valley and South San Joaquin Valley regions.

Conversion to intensive agriculture. Additionally, the projection described above does not consider the loss of the Central California tiger salamander habitat caused by conversion of habitats to intensive agriculture. Projecting the future loss of Central California tiger

salamander habitat from conversion of rangeland to intensive agriculture is difficult because conversion to this land use is largely unregulated by cities and counties. Conversion to intensive agriculture largely depends upon the individual landowner and is based on numerous factors that are difficult to predict, such as economic considerations, markets, and water availability. The loss of rangelands and vernal pool grasslands, portions of which California tiger salamanders occupy, has been well documented in counties within the range of the Central California tiger salamander and annual rates of loss have been estimated (discussed in detail in the Urban and Agricultural Land Use sections above) (CDC 1996, 1998, 2000, 2002; Holland 1978, 1998a, 1998b, 2003; Jones and Stokes Associates 1987; 59 FR 48136; Keeler-Wolf *et al.* 1998; CDFG 2003; CDWR 1998). The cumulative loss of vernal pool grassland has been estimated at 78 percent by the late 1990s, and annual rates of loss have been between 1 and 3 percent during the 1980s and 1990s. Some of the loss of Central California tiger salamander habitat has resulted from conversion to intensive agriculture, and some is attributable to urbanization and other non-agricultural activities that have destroyed the species' habitat.

Even though future conversion of rangeland to intensive agriculture is difficult to estimate and has not been included in our GIS analysis, we believe that the continued loss of Central California tiger salamander habitat due to intensive agriculture represents an important threat to the species. Throughout the range of the Central California tiger salamander there has been a cumulative net loss of irrigated agriculture acreage through conversion to other land uses, such as development; however, there have been additional conversions of rangeland to irrigated agriculture, expanding this land use activity in areas such as the San Joaquin Valley and Central Coast (CDWR 1998; CDC 2002).

This conversion of land use activity has continually occurred throughout the salamander's range and we anticipate this conversion of land use activity will continue to adversely affect additional Central California tiger salamander habitat because of the significant projected increase in human population growth (75 percent increase from 2000 to 2040) in the range of the Central California tiger salamander (CDF 1998). This population growth will continue the trend of conversion of irrigated agriculture conversion to urban use, with a subsequent displacement of intensive agriculture on to rangeland in the foothill areas of the Central Coast or east side of the San Joaquin Valley (CDWR 1998; CDC 2002). However, the rate of displacement and subsequent conversion to intensive agriculture is expected to continue at lower rates than in the past as areas with suitable soils and water availability necessary for intensive agriculture become increasingly scarce. Additionally, there can be a financial incentive for landowners to convert existing rangeland and grasslands areas to irrigated crops. Generally, rangeland is valued much less (value per acre) than all irrigated agricultural crops in the area where Central California tiger salamander occurs (American Society of Farm Managers and Rural Appraisers 2003). Conversion of Central California tiger salamander habitat to intensive agriculture, in addition to the loss of habitat to rural residential housing (see Low-Density Development section above), further fragments the species' habitat. Fragmentation of habitat may not directly impact breeding sites but creates a barrier to inter-pond migration of salamanders and to movement of salamanders between breeding sites and upland habitat landscapes (Marsh and Trenham 2001; Trenham and Shaffer *in review*; Calhoun and Klemens 2002; Jung in litt. 2003).

Protected habitat. The Service has determined that approximately 76,501 ha (189,032 ac, 20 percent) of the total estimated Central California tiger salamander habitat associated with known records is protected to some degree (Service 2004). Protection of the species itself varies in these areas because we included a variety of land use designations that may provide only some protection for the species. Some sites may be managed to benefit the species, such as conservation banks, National Wildlife Refuges, and East Bay Regional Park District (EBRPD). Even if these areas are not specifically managed for the benefit of the species, the areas are protected from development and conversion to intensive agriculture. Many of these same areas are likely not providing protection from possible death, due to non-native predators (see Factor C below), agricultural and landscaping contaminants, rodent control, roads, and hybridization (see Factor E below). We estimated that approximately 24 percent of the 76,501 ha (189,032 ac) of protected habitat have hybridized tiger salamanders inhabiting the habitat or the California tiger salamanders in these habitats are threatened by hybridization (Service 2004; see Factor E below). Therefore our estimate is a liberal estimate of habitat in which the Central California tiger salamander is protected.

Sonoma and Santa Barbara Populations

Habitat loss in the range of the Sonoma and Santa Barbara populations was discussed in the listing rules for the Santa Barbara County DPS of the California tiger salamander (65 FR 57242), and the Sonoma County DPS of the California tiger salamander (67 FR 47726). New information suggests that additional locations of occupied salamander habitat exist in these areas. At the time of the final rule for Santa Barbara County, 27 breeding ponds in six subpopulations had been identified. Since that time, the number of known breeding ponds has increased to 46 within the same six subpopulations in Santa Barbara County as a result of biological surveys conducted for potential projects. These ponds include 23 artificial ponds, 4 human-altered ponds, and 19 natural ponds. The final rule listing the Sonoma County DPS as endangered identified eight known remaining breeding sites. Six additional breeding sites (Gobbi, Duer Road, Haroutunian, Alton Lane, Southwest Community Park, Yuba Drive) are now recognized. All but two (Haroutunian and Alton Lane) of these known breeding sites are distributed in the City of Santa Rosa and immediate associated unincorporated areas, an area approximately 6 km (4 mi) long by 6 km (4 mi) wide.

Urban and Agricultural Land Uses

Destruction, modification, and curtailment of California tiger salamander habitat is caused by conversion of rangeland to a variety of urban and agricultural land uses. We define urban impacts to include a variety of nonagricultural development activities such as building and maintenance of housing, commercial, and industrial developments; construction and widening of roads and highways; golf course construction and maintenance; landfill operation and expansion; operation of gravel mines and quarries; dam building and inundation of habitat by reservoirs; and other infrastructure activities that support urban areas. Agricultural impacts include the conversion of native habitat by discing and deep-ripping; and cultivation, planting, irrigation, and maintenance of row crops, orchards, and vineyards. These impacts threaten both breeding and upland habitat.

Upland habitat. We have concluded that California tiger salamanders have declined due to habitat conversion to

intensive agriculture and urbanization (Davidson *et al.* 2002, Fisher and Shaffer 1996). Researchers believe that even salamanders inhabiting breeding ponds that are protected from development may not persist as viable populations if upland habitat is unavailable or reduced in area, or if breeding ponds become fragmented and isolated from other ponds (Marsh and Trenham 2001; Jung in litt. 2003; Trenham and Shaffer *in review*). Earthmoving operations and cultivation in upland habitat can directly or indirectly kill or injure California tiger salamanders in burrows or on the surface by crushing or trapping them. Such activities render all affected areas unsuitable for salamander breeding, feeding, and sheltering. Earth disturbing practices can also expose salamanders to adverse environmental conditions (increased predation, high temperatures, low humidity, destroy food sources) and alter surface hydrology (potentially affecting breeding ponds). Discing, deep-ripping, or grading of upland habitat also destroys California ground squirrel burrows and crevices utilized by the salamander, making suitable upland sites unavailable and likely reducing long-term adult survival of Central California tiger salamanders (Loredo *et al.* 1996).

Wetland habitat. Filling, discing, or excavating wetland habitat can directly kill or injure larvae, eggs, or breeding adults, and prevent future use of the wetland for reproduction. Additionally, surviving adults may be unable to locate alternative breeding sites in subsequent years if habitat is present but has become highly fragmented by roads, housing, agriculture, and other non-habitat elements. Some changes in vernal pool or pond inundation duration and depth caused by urban and agricultural land use (*e.g.*, digging of drainage/irrigation ditches, construction of permanent ponds or reservoirs, deepening or berming of seasonal wetlands, redirection of runoff from developments) can reduce reproductive success for California tiger salamander by: (1) Prematurely drying wetlands and desiccating larvae; (2) extending the inundation period and facilitating invasion of non-native predators (see Factor C below); (3) creating conditions that are more conducive for hybridization with non-native tiger salamanders (see Factor E below); and (4) increasing vulnerability to disease by increasing isolation and fragmentation (see Factor C below). The actual effect of these activities is dependant on the specifics of the situation.

Loss of habitat. Although the California tiger salamander still occurs throughout the majority of its historic range, estimates of the past and present extent of suitable habitat for the California tiger salamander within its historic range indicate that the area of the species' natural habitat has been substantially reduced and that the species has become increasingly rare in regions of its range (Shaffer *et al.* 1993; Barry and Shaffer 1994; Fisher and Shaffer 1996). Some researchers estimate that as much as 75 percent of the area of California tiger salamander historic natural habitat has been lost (Shaffer *et al.* 1993). Historically, approximately 3.7 million ha (9.1 million ac) of valley and coastal grasslands existed within the range of the Central California tiger salamander (Kuchler 1988). Researchers are of the opinion that valley and coastal grasslands were very likely used by the species. An additional 2.6 million ha (6.5 million ac) supporting an overstory of blue oak/foothill pine, valley oak, or mixed hardwoods (Kuchler 1988) historically existed; some portion of these habitats may have been used by the species. However, urbanization and intensive agriculture have eliminated virtually all valley grassland and oak savanna habitat from the Central Valley floor. Loss of grasslands has exceeded the loss of all other habitats in California (Ewing *et al.* 1988). It has been estimated that less than 10 percent of California's Central Valley grasslands remain (CDFG 2003). Valley grasslands and, consequently, Central California tiger salamanders, are now distributed primarily in a ring around the Central Valley (Heady 1977; Holland 1978).

The relative loss of habitat has also been significant with respect to vernal pool grasslands, the historic breeding habitat of the California tiger salamander (Trenham *et al.* 2000). Approximately 1.68 million ha (4.15 million ac) of grasslands in 20 Central Valley counties are estimated to have supported vernal pools at the time of European settlement (Holland 1978, 1998a, 1998b; Holland and Jain 1988; CDFG 2003) although there is no historical data to substantiate this estimate. Most of this area, except northern Sacramento Valley, was within the California tiger salamander's assumed historic range (Shaffer *et al.* 1993). The remaining vernal pool complexes in California are now fragmented and reduced in area (59 FR 48136). Where vernal pools exist, the habitat is often disturbed and degraded and the natural regime has been affected by drainage modification, off-road vehicle use, gravel mining, non-native plant invasion, road construction, and urban development (Jones and Stokes Associates 1987; 59 FR 48136; Keeler-Wolf *et al.* 1998). Vernal pools in California are now recognized as threatened resources, and many of the species that inhabit them are listed as threatened or endangered species (Jones and Stokes Associates 1987; Wright 1991; 59 FR 48136). Estimates of vernal pool habitat loss through the 1980s were at 2 to 3 percent annually; this rate of loss is compounded continually (Holland 1988). During the 1980s and 1990s, vernal pool grasslands continued to be lost at an estimated rate of 1.5 percent per year (Holland 1998a, 1998b). As of 1997, 377,165 ha (931,991 ac) of vernal pool grasslands remained in the Central Valley, representing a loss of approximately 78 percent (Holland 1998a, 1998b; CDFG 2003). Along the southeastern edge of the Central Valley, from San Joaquin to Fresno counties, at least 25 percent of the 259–ha (640–ac) sections that had contained vernal pools in 1970 (Holland 1978) were wholly converted to agriculture or urban uses by 1994 (Seymour and Westphal 1994). This conversion estimate is probably conservative because it does not include partially converted sections where vernal pool habitat may also have been lost (Seymour and Westphal 1994). Holland (1998a) estimated that at a continued 1.5 percent annual loss of vernal pools in California, 50 percent of the vernal pool habitat present in 1997 would be lost by 2043 (46 years), representing a cumulative loss of 88 percent of vernal pool grasslands.

As part of an evaluation of California tiger salamander status throughout their range, Shaffer *et al.* (1993) detected California tiger salamanders in only 36 of 86 localities (42 percent) that had been previously recorded, and ponds currently occupied by California tiger salamanders were significantly higher in elevation than those that were unoccupied or had been previously occupied; although it should be noted that these decreases may also be the result of low sampling frequency. Some researchers (Shaffer *et al.* 1993; Seymour and Westphal 1994; Fisher and Shaffer 1996; Davidson *et al.* 2002) believe these and other data suggest that many of the low-elevation breeding sites on the valley floor have been eliminated in recent years, reducing habitat used by this species to higher elevations on the margin of its ecological requirements. These higher elevation breeding sites are likely human-created stock ponds or bermed ponds that have benefited the species by offsetting the loss of the California tiger salamander's natural historic vernal pool breeding habitat.

However, these artificial breeding ponds have a shorter life-span than natural vernal pools if not maintained. Additionally, some of these artificial breeding ponds can place California tiger salamanders at risk of predation by holding water for a greater period than vernal pools (see Factor C below), and placing the species at a greater risk of hybridization with non-native tiger salamanders (see Factor E below).

In both our final rules listing the Santa Barbara County DPS of the California tiger salamander (65 FR 57242), and the Sonoma County DPS of the California tiger salamander (67 FR 47726), we described land conversions to more intensive agriculture, especially conversions to grape vineyards, as being a factor in the species' decline. Data from the California Agricultural Statistics Service (CASS) (2002) shows conversion of rangeland to irrigated agriculture as a factor contributing to the species' decline. The data show that the phenomenon of rangeland conversion extends over much of the Central California tiger salamander's current and historic range. As land in irrigated agriculture is lost in the Central Valley due to urbanization, its cumulative loss has been partially offset through expansion of land in irrigated agriculture on the east side of the Central Valley and Coast Range, which in turn results in the loss of rangeland or grasslands which can be inhabited by the California tiger salamander (California Governor's Office of Planning and Research (CGOPR) 2003; California Department of Conservation (CDC) 2002; CNDDB 2003).

Urban and population growth. Urban development poses a similar significant threat to the Central California tiger salamander in particular. As the human population of the State of California continues to increase, there is a concomitant increase in urban and suburban development. According to the 2000 census, the number of people in California has increased by 13.8 percent since 1990 (California Department of Finance (CDF) 2002). The average growth in human population within the counties in the range of the Central California tiger salamander during this period has been 19.5 percent (CDF 1998). Counties in the East Bay region and the Highway 99 corridor in the San Joaquin Valley are also undergoing increases in urbanization related to population growth (CDF 1998; CDC 2002). From 1995 to 2020, the human population in the range of the Central California tiger salamander (Central Valley, Bay Area, and Central Coast counties) is projected to grow by 49 percent (from 12.8 million to 19.1 million people) (California Department of Water Resources (CDWR) 1998). According to the CDF, the human population in the counties inhabited by the Central California tiger salamander is expected to grow by 35 percent from 2000 to 2020 (from 11.2 million to 15.1 million people) and by 75 percent from 2000 to 2040 (from 11.2 million to 19.6 million people) (CDF 1998). Therefore, impacts to the Central California tiger salamander due to conversion of its habitat resulting from urban development are expected to continue (Service 2004).

Loss of rangeland. Rangeland areas which may contain vernal pool grassland habitats, are being lost as a result of rural residential development (CGOPR 2003). Privately owned rangeland in California decreased by 252,524 ha (624,000 ac) from 1982 to 1997, an average loss of 16,997 ha (42,000 ac) per year (U.S. Department of Agriculture 2003), and from 1998 to 2000 the State lost an additional 21,555 ha (53,263 ac) of rangeland (CGOPR 2003). The decline in farm rancher income, the aging of ranchers, tax implications of intergenerational transfers of ranches, and the difficulty of beginning a ranching operation (*e.g.*, in terms of cost and knowledge of ranching) are all reasons California is experiencing the loss of rangeland (CGOPR 2003). The recent protections afforded numerous vernal pool species (*e.g.* vernal pool crustaceans, vernal pool plants) under the Act will assist in slowing future development.

Conclusion for Factor A

In summary, a primary cause of the decline of the California tiger salamander is the loss of habitat due to conversion for residential, commercial, and agricultural activities (D. Wake, University of California, Berkeley, in litt. 1992; T. Jones, University of Michigan, in litt. 1993; Shaffer *et al.* 1993; Jennings and Hayes 1994; Davidson *et al.* 2002; CNDDB 2003; Service 2004). In addition to direct loss of habitat, the widespread conversion of land to residential and agricultural uses has led to the fragmentation of habitat throughout the range of the Central California tiger salamander, and isolation of the remaining populations (Shaffer *et al.* 1993). This fragmentation of the remaining habitat is expected to continue in the foreseeable future as an effect of the rapidly growing human population in these counties within range of the California tiger salamander.

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

There is no evidence that overutilization for commercial, recreational, scientific, or educational purposes is causing a decline of the California tiger salamander.

C. Disease or Predation

Disease

The specific effects of disease on the California tiger salamander are not known. We have to date no information indicating disease is prevalent in existing populations in California. Pathogens (fungi, bacteria, and viruses) have been known to adversely affect other tiger salamander species or other amphibians and chytrid fungus infections (chytridiomycosis) have been detected specifically in Central California tiger salamanders (Padgett-Flohr 2004). Two of our peer reviewers identified chytridiomycosis and ranaviruses as a threat to the California tiger salamander because these diseases have been found to adversely affect other amphibians, including tiger salamanders (Longcore, in litt. 2003; Lips, in litt. 2003). Both of these peer reviewers identified non-native species, such as bullfrogs and non-native tiger salamanders, as potential carriers of these diseases. Both bullfrogs and non-native tiger salamanders occur within the range of the California tiger salamander (see Predation and Factor E below). However, we have no information to date indicating this is an imminent threat.

Predation

Bullfrogs prey on California tiger salamanders (Anderson 1968; Lawler *et al.* 1999), which has created an overall pattern of the decline of this species in areas where bullfrogs and other exotic species are present (Fisher and Shaffer 1996). The bullfrog, native to North America east of the Great Plains, was introduced into California in the late-1800s and early-1900s, and it rapidly spread throughout the State (Storer 1925 as cited in Moyle 1973; Hayes and Jennings 1986). Morey and Guinn (1992) documented a shift in amphibian community composition at a vernal pool complex, with salamanders becoming proportionally less abundant as bullfrogs increased in number. Bullfrogs are unable to establish permanent breeding populations in unaltered vernal pools and seasonal ponds because they require more than one year to complete their aquatic larval stage. However, dispersing immature bullfrogs take up residence in such water bodies

during the winter and spring where they prey on native amphibians, including larval salamanders (Laabs *et al.* 2001; Morey and Guinn 1992; Seymour and Westphal 1994).

Bullfrogs are known to travel at least 2.6 km (1.6 mi) from one pond to another (Bury and Whelan 1984), and they have the potential to naturally colonize new areas where they do not currently exist, including areas where Central California tiger salamanders occur. In one study of the eastern San Joaquin Valley, 22 of 23 ponds (96 percent) 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 as food, and may be taken without limit under a fishing license (CDFG, 2004 Sport Fishing Regulations), the threat of transport for intentional establishment in new habitat suitable for the Central California tiger salamanders is significant.

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; they were introduced 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 (K. Boyce, Sacramento County/Yolo County Mosquito and Vector Control District, in litt. 1994; Moyle 2002) by about 50 local mosquito abatement districts. Western mosquitofish are ubiquitous because of their tolerance of poor water quality and wide temperature ranges (K. Boyce, in litt. 1994).

Larval 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. Leyse and Lawler (2000) found that the survival of California tiger salamander in experimental ponds stocked with western mosquitofish, at densities similar to those found in many stock ponds, was significantly reduced.

Larvae that survived in ponds with western mosquitofish were smaller, took longer to reach metamorphosis, and had injuries such as shortened tails. Additionally, a recent experiment that replicated conditions in vernal pool environments and permanent ponds determined that, at low densities, mosquitofish did not have a significant effect on larval California tiger salamander growth and survival, but that growth and size at metamorphosis was significantly reduced at high fish densities (Leyse, in litt. 2003).

Other non-native fish have either been directly implicated in predation of California tiger salamanders or appear to have the potential to prey upon them (Fisher and Shaffer 1996; Shaffer *et al.* 1993). For example, introductions of sunfish species (*e.g.*, largemouth bass (*Micropterus salmoides*), 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 (65 FR 3096). In eastern Merced County, California tiger salamanders were absent in stock ponds where non-native fish were present, whereas stock ponds absent of non-native fish had California tiger salamanders present (Laabs *et al.* 2001). 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 of eastern North American origin (Hayes and Jennings 1986). The alien species have been introduced for a variety of reasons including ornamental, sport, bait, insect control and food uses. Thus, we consider introductions of such non-native fish species into Central California tiger salamander breeding habitat a threat to the persistence of the species in these locations.

Detrimental effects of wild pigs on the Central California tiger salamander include both predation and habitat modifications.

D. The Inadequacy of Existing Regulatory Mechanisms

One primary cause of Central California tiger salamander decline 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 Central California tiger salamander, and are unlikely to prevent further declines of the species.

Federal

Clean Water Act. Pursuant to section 404 of the Clean Water Act (CWA) (33 U.S.C. 1344), the U.S. Army Corps of Engineers (Corps) regulates the discharge of dredged or fill material into all Waters of the United States, including wetlands. In general, the term ''wetland'' refers to areas meeting the Corps criteria of having hydric soils, hydrology (either a defined minimum duration of continuous inundation or saturation of soil during the growing season), and a plant community that is predominantly hydrophytic vegetation (plants specifically adapted for growing in a wetland environment).

Any discharge of dredged or fill material into waters of the United States, including wetlands, requires a permit from the Corps. These include individual permits which would be issued following a review of an individual application, and general permits that authorize a category or categories of activities in a specific geographical location or nationwide (33 CFR parts 320–330). Individual permits are issued by the Corps for actions which are likely to result in greater than minimal individual or cumulative impacts to the human or aquatic environment. General permits are issued by the Corps for actions which are likely to result in minimal individual or cumulative impacts to the human or aquatic environment. It is important to note that in order for an applicant to utilize any general permit, including nationwide permits, the applicant must comply with the general and special conditions of the permit. General and special permit conditions may vary among individual Corps Districts and the various general permits. However, the use of any individual or general permit requires compliance with the Endangered Species Act. Some activities such as normal farming practices and the construction of forestry roads and temporary roads used for moving mining equipment are exempt under CWA and do not require a permit (33 U.S.C 1344)(f)(1).

While the Clean Water Act provides a means for the Corps to regulate the discharge of dredged or fill material into waters and wetlands of the United States, it does not provide complete protection. Nationwide the Corps denies less than one percent of all applications to discharge dredged or fill material into waters or wetlands on an annual basis. While many applicants are required to provide compensation for wetlands losses (*i.e.*, no net loss), many smaller impact projects remain largely unmitigated unless specifically required by other environmental laws such as the Endangered Species Act.

Recent court cases limit the Corps' ability to utilize the CWA to regulate the discharge of fill or dredged material into the aquatic environment within the current range of the 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 California tiger salamander has recently become clear by the Corps' decision not to assert its jurisdiction over the discharge of fill material into several wetlands within the range of the California tiger salamander. In a letter from the Corps, dated March 8, 2002, concerning the discharge of fill into 0.18 ha (0.45 ac) of seasonal wetlands southwest of the intersection of Piner and Marlow Roads in Santa Rosa, California (Corps 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 not: (1) Navigable waters; (2) interstate waters; (3) part of a tributary system to 1 or 2; (4) wetlands adjacent to any of the foregoing; and (5) 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, the waters are not subject to regulation by the Corps under Section 404 of the CWA. There may be instances where seasonal wetlands used by California tiger salamander lack sufficient connection to waters of the United States for the Corps to assert jurisdiction under the authority of the Clean Water Act. For example, the Corps also cited the SWANCC decision as their reason for not taking jurisdiction over some seasonal wetlands located in Sonoma County, California, that are California tiger salamander habitat.

We conclude that regulation of wetlands filling by the Corps under Section 404 of the CWA is inadequate to completely protect the Central California tiger salamander from further decline. Section 404 does not reach to isolated wetlands, and it does not regulate the continuing losses of the terrestrial habitat of the amphibian.

Endangered Species Act. Within the range of the Central California tiger salamander there are currently 16 species (1 beetle, 4 species of vernal pool crustaceans, and 11 species of plants) listed under the Act that occur in association with seasonally-flooded vernal pools (45 FR 62807; 59 FR 48136). The California red-legged frog (*Rana aurora draytonii*) is listed as threatened under the Act and is associated with stock ponds, stream drainages, and upland habitats located primarily in the Coastal Range, as well as portions of the foothills in the eastern Central Valley (61 FR 25813). The San Joaquin kit fox (*Vulpes macrotis mutica*) is listed as endangered under the Act and is associated with upland habitat in the San Joaquin Valley and parts of the Coastal Range (32 FR 4001). Critical habitat has been designated for the threatened delta green ground beetle (*Elaphrus viridus*) at Jepson Prairie in Solano County, but this unit covers only a portion of the area (less than 1 percent) that is inhabited by the California tiger salamander (45 FR 52807; Service 2004). We have also designated 740,000 million acres of critical habitat which includes upland areas in 30 California counties and one county in Oregon for four vernal pool shrimp and 11 vernal pool plant species (68 FR 12336). However, due to life history of the California tiger salamander requiring additional upland areas outside those supporting the hydrology of the vernal pool or other pond the regulatory protections for vernal pool species are not adequate to protect the species.

In the Central Valley region (Contra Costa, Mariposa, San Joaquin, Stanislaus, and Tuolumne Counties), South San Joaquin region (Fresno and Tulare Counties), Bay Area region (San Benito County), and Central Coast region (Monterey and San Luis Obispo Counties), some vernal pools supporting the 16 listed vernal pool species (*i.e.*, the 15 listed above and delta green ground beetle), and the critical habitat designated for them, overlap with local occurrences of the Central California tiger salamander; however, such overlap is limited. Approximately 31,625 ha (78,144 ac, 8 percent) of Central California tiger salamander habitat occurred in areas designated as critical habitat for vernal pool species (Service 2004). Most of the requirements of the listed vernal pool plants and crustaceans can be met through maintenance of existing hydrology within the confines of individual vernal pool complexes (68 FR 12336). Vernal pool critical habitat does provide some protection to a limited area of uplands surrounding vernal pools for pollinator species and to protect other vernal pool functions. However, California tiger salamanders spend approximately 20 percent of their lives in vernal pools or ponds, and approximately 80 percent in the confines of small mammal burrows in upland areas, in addition to using upland areas as migratory corridors. Therefore, the protection provided to the listed vernal pool species and their critical habitats provides only partial protection to California tiger salamander upland habitat and movement corridor requirements because listed vernal pool species require substantially less upland habitat than salamanders and the resulting overlap with designated vernal pool species' critical habitat is limited.

The threatened California red-legged frog requires dense, shrubby or emergent riparian vegetation closely associated with deep still or slow moving water, including stock ponds, for breeding habitat (Hayes and Jennings 1998; 61 FR 25813). They also utilize upland areas to migrate between aquatic habitats which they may use as refugia during summer months if aquatic habitats are no longer available in a specific area (Jennings and Hayes 1994; Service 2002).

There are approximately 133,960 ha (331,010 ac, or 35 percent) of Central California tiger salamander habitat that occurs within 3.2 km (2 mi) of all California red-legged frog records in CNDDB (Service 2004). We used 3.2 km (2 mi) as a distance from California red-legged frog records because this is the maximum known dispersal distance of the species (Service 2002). Using this distance surrounding records provided us with an estimate of California red-legged frog habitat that overlapped with salamander habitat. Although some regulatory protections may be afforded to the Central California tiger salamander from the California red-legged frog, these protections do not fully protect the salamander because geographic overlap between the two species is limited.

Approximately 45 percent of the habitat for the Central California tiger salamander is located in the San Joaquin Valley and southern Sacramento Valley where California red-legged frogs no longer persist (Service 2004). California red-legged frogs likely were extirpated from the San Joaquin Valley floor before 1960; the last breeding population on the San Joaquin Valley floor was observed in 1947, and sighting of the species in that area last occurred in 1957 (Jennings *et al.*, in litt. 1992; Service 1996). In the Coastal Range where both species are still present, California tiger salamanders and California red-legged frogs may coexist in the same breeding ponds. Thirty-nine percent of the 61 California tiger salamander breeding ponds in the EBRPD located in Contra Costa and Alameda Counties had California red-legged frogs present. Of these ponds where coexistence between the two species occurred, only 29 percent of the ponds had breeding populations of California tiger salamanders and California red-legged frogs. The remaining ponds had larval salamanders and adult California red-legged frogs (S. Bobzien, in litt. 2003). The EBRPD information shows that, while California tiger salamanders and California red-

legged frogs may occur in the same geographic area, their use of habitat within those areas may differ.

In the northern portion of the range of the endangered San Joaquin kit fox, there is the potential for overlap with the upland habitat of the California tiger salamander because both species inhabit grassland. San Joaquin kit fox habitat overlaps with approximately 133,635 ha (330,209 ac, 35 percent) of the Central California tiger salamander habitat (Service 2004). Where the two species inhabit the same area, the regulatory protections afforded under the Act for the San Joaquin kit fox provide limited protection to Central California tiger salamander breeding habitats. Protected lands for San Joaquin kit fox may incidentally protect California tiger salamanders because San Joaquin kit fox depend on grassland with small mammal burrows for dens (Service 1998). Additionally, the fox preys on the mammals that create these burrows, which may be utilized by California tiger salamanders as upland habitat.

There are three approved habitat conservation plans (HCP) that cover the California tiger salamander. The Natomas Basin HCP provides coverage for the Central California tiger salamander, although these animals have not been documented in the HCP planning area (Service files; CNDDB 2003). California tiger salamander preserves will be created by the Natomas HCP if the species is detected during surveys and impacted by covered activities. The Kern Water Bank HCP provides coverage for the California tiger salamander, although no documented occurrences have been observed in the project area; consequently the conservation strategy for this HCP targets other species known to occur in the project area (Service files). The California tiger salamander is a covered species in the San Joaquin County Multi-Species Habitat Conservation and Open Space Plan (SJMSCP). To qualify as a covered species, the plan must address the unlisted species as though it were listed. The SJMSCP will provide habitat preserves totaling 2,592 ha (6,406 ac) for the Central California tiger salamander as a result of the 708 ha (1,749 ac) of converted habitat from SJMSCP covered activities, primarily those associated with urban development. Agricultural activities (conversion of natural or agricultural lands to intensive agriculture) however, are not covered activities in the SJMSCP.and may result in the loss of California tiger salamander habitat. California tiger salamander habitat loss from agricultural activities is discussed in Factor A.

State

Since 1994, the California Department of Fish and Game (CDFG) has designated the California tiger salamander as a ''species of special concern.'' 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. In addition, such a designation provides for special protections and considerations under the California Environmental Quality Act (CEQA) (California Public Resources Code section 21000–21177). Also, as stated earlier in Factor C, the California Code of Regulations (2002) specifies California tiger salamanders can no longer be taken, possessed, or used for fishing bait.

On July 6, 2001, the CDFG received a petition from the CBD to list the California tiger salamander under the California Endangered Species Act. The status of the animal and potential threats were evaluated by the CDFG. On October 3, 2001, the Director of the CDFG recommended to the California Fish and Game Commission (Commission) that they accept the petition and designate the animal as a candidate (R. Hight, CDFG, in litt. 2001). On December 7, 2001, the Commission found that the petition was not warranted because the Commissioners felt there was not enough information on the population abundance and trend information of the California tiger salamander (R. Treanor, Commission, in litt. 2001).

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.

CEQA requires disclosure of potential environmental impacts ofall discretionary activities proposed to be carried out or approved by all state or local government agencies in California, unless an exemption applies. Under CEQA, a significant effect on the environment means ''a substantial, or potentially substantial, adverse effect on the environment'' (California Public Resources Code section 21068). Any project that affects a protected species results in a mandatory finding of significant effect and all the mitigation requirements appurtenant. The lead agency must then mitigate for unavoidable significant effects or, in rare circumstances and under specified conditions, the lead agency can make a determination that overriding considerations make such mitigation infeasible (California Public Resources Code section 21002) and may then provide for other mitigation. CEQA can provide protections for a species that, although not listed as threatened or endangered, meets one of several criteria for rarity (14 California Code of Regulations section 15380).

Because of State environmental laws such as CEQA, planned development often provides avoidance, minimization, and mitigation measures which are specifically for, or which may incidentally benefit, California tiger salamander, as a result of conformance with local land use plans for providing open space, through working with the California Department of Fish and Game under the authority CEQA. The avoidance, minimization, and mitigation measures of individual projects nevertheless tend to result in fragmented landscapes and a trend of cumulative regional habitat loss and fragmentation. Mitigation does not create new land, it simply balances land converted with land protected for natural values, so even with mitigation, a net loss of habitat results. So while mitigation provided by developments under CEQA may be offered with the intent to benefit California tiger salamander, the resulting fragmentation of regional landscapes over time creates high risk of disrupting or precluding migration patters, isolating small local populations, and subjecting animals to higher risks from road crossing mortality during migration and other risks associated with urban preserves. The threats to California tiger salamander associated with habitat fragmentation are discussed more fully in Factor A.

Neither CEQA nor other statutory mechanisms under CDFG's jurisdiction serves as an effective regulatory mechanism for reducing or eliminating several of the other manmade factors (see Factor C above) which may also adversely affect California tiger salamanders and their habitat. These factors include stocking ponds with non-native fish for recreational fishing and mosquito control. Agencies and individuals may purchase (from CDFG-licensed fish breeders) and stock into such waters sunfish, catfish, and other non-native fish for recreational fishing. Similarly, there is no State regulation of western mosquitofish stocking into stock ponds and waters inhabited by California tiger salamanders by the approximately 50 mosquito abatement districts that routinely stock this

mosquito predator as a means for mosquito control. As a result, California tiger salamanders suffer predation pressure in such environments and may be eliminated from ponds stocked with predatory fish (see Factor C above and E below). In addition, conversion of rangeland to intensive agriculture is not regulated by City or County government and is not subject to CEQA.

Section 1600 *et seq.* of the California Fish and Game Code authorizes the CDFG to regulate streambed alteration. CDFG must be notified of and approve any work that substantially diverts, alters, or obstructs the natural flow or substantially changes the bed, channel, or banks of any river, stream, or lake. If an existing fish or wildlife resource may be substantially adversely affected by a noticed project, CDFG must identify and submit measures to protect the fish and wildlife resources within 60 days to the project proponent (Section 1602 of CDFG Code). However, if CDFG does not respond within 60 days of notification, the applicant may proceed with the work. Section 1600 does not provide protection to upland habitat beyond the bank of the affected waterway (see discussion under CWA and its limitations above), and does not regulate stock ponds that are not constructed on natural streams or vernal pools, which are the breeding habitats for the species. Mitigation under a streambed alteration agreement is entirely voluntary by a project applicant and is typically agreed upon only when compatible with mitigation required by another permit (J. Gan, CDFG, pers. comm. 2004).

The 2002 California Code of Regulations 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 sport fishing license.

The California Porter-Cologne Act of 1969 (California Water Code section 13000 *et seq.*) is the primary law regulating water quality in California. The Porter-Cologne Act designated the State Water Resources Control Board and the nine Regional Water Quality Control Boards to serve as California's water quality planning agencies with authority over surface and groundwater quality. The State Water Resources Board develops a State Water Quality Control Plan, while the nine Regional Water Quality Control Boards develop Regional Water Quality Control Plans and issue waste discharge requirements (permits).

As part of surface and groundwater quality planning, the Porter-Cologne Water Quality Control Act (Porter-Cologne) regulates the discharge of fill into wetlands and other water bodies and to areas where it could impact those waters (California Water Code section 13260 *et seq.*). If the Corps has jurisdictional authority over waters under the CWA section 404, and a project applicant requires a Corps permit for work in those waters, then that project applicant must also obtain Water Quality Certification from its local Regional Water Quality Control Board (Water Board), pursuant to section 401 of the CWA, that its project will not violate State water quality standards (33 U.S.C. 1341). If the Corps does not have jurisdictional authority, then a project applicant may require a permit under Porter-Cologne. State jurisdiction over waters under Porter-Cologne can be much greater than federal jurisdiction under the CWA. However, the Water Boards generally regulate the fill of State waters where fill occurs within waters that would normally fall under Corps regulation, but have been excluded due to various reasons (*e.g.*, the Supreme Court's SWANCC and Tulloch Rule decisions). We believe that Porter-Cologne has the same shortcomings as the Clean Water Act as a regulatory mechanism that effectively protect California tiger salamander, that is, it provides State authority to regulate, and therefore protect, when deemed appropriate, wetlands, but does not provide authority to substantially regulate surrounding uplands that also may be essential to wetland dependent organisms such as the California tiger salamander.

Local

We are not aware of any specific county or city ordinances or regulations that provide direct protection for the California tiger salamander. The California tiger salamander may be indirectly benefiting from the increased attention being given to conversions of grasslands, oak woodlands, row-crops, and other agricultural uses to vineyards and orchards. Although some counties have begun regulating such conversions, counties within the Central California tiger salamander's range do not regulate conversions to vineyards and orchards. Such conversion has significant potential to adversely affect the Central California tiger salamander. The California tiger salamander may also directly and indirectly benefit through some city and county open space designations that coincide with salamanders and their habitats or mitigation plans for special status species that have been developed as part of their general plans.

E. Other Natural or Manmade Factors Affecting Its Continued Existence

Several other factors may threaten California tiger salamanders. These factors include exposure to various contaminants, rodent population control efforts, mosquito control, direct mortality while they are crossing roads, the species' hybridization with non-native tiger salamanders and future hybridization that is likely to occur, and certain practices associated with livestock grazing.

Contaminants

Little research has been done on the effects of contaminants to the California tiger salamander, especially with respect to agricultural pesticides. This section uses currently available salamander data and surrogate species data as the best available science. Most toxicological studies to date have been conducted on other amphibian species, in particular Anuran species (frogs and toads). These studies however provide insight to the potential risks of contaminants to the California tiger salamander.

Like most amphibians, California tiger salamanders inhabit both aquatic and terrestrial habitats during different stages of their life cycle and may be exposed to a variety of pesticides and other chemicals throughout their range. Due to their permeable skin, amphibians may be particularly vulnerable to environmental stressors such as pesticides (Blaustein and Wake 1990). Toxicants do not have to be present at lethal levels to be harmful. Toxicants at sublethal levels may still cause adverse effects such as developmental abnormalities in larvae and behavioral anomalies in adults, which can be deleterious to the exposed individuals (Hall and Henry 1992; Blaustein and Johnson 2003). Sources of chemical pollution which may adversely affect California tiger salamanders include pesticides used in agricultural, landscaping, roadside maintenance, and rodent and vector control activities, as well as hydrocarbons and other pollutants in stormwater runoff residential and urban lawn and garden care as well as industrial facilities.

Rodent Control

California tiger salamanders spend much of their lives in underground retreats, often in burrowing mammal (ground squirrel, pocket gopher, and other burrowing mammal) burrows (Loredo *et al.* 1996; Trenham 1998a, D. Cook, pers comm. 2001). Therefore,

widespread burrowing mammal control may pose threats to the salamander. California burrowing mammal control, which began in the early 1900s (Marsh 1987), may be done by trapping, shooting, fumigation of burrows, use of toxic (including anticoagulant) baits, and habitat modification, including deep-ripping of burrow areas (UC IPM internet Web site 2004).

Burrowing mammal control programs are widely conducted (frequently via bait stations placed at specific problem sites) on and around various commercial agricultural operations, including grazing/range lands and various cropland including vineyards (R. Thompson, Science Applications International Corporation *in litt.* 1998). Also, agencies, particularly flood control agencies and levee districts, conduct extensive California ground squirrel control programs around levees, canals, and other facilities they manage (Knell in litt. 2003). Pocket gopher control typically is most common around golf courses and other large, landscaped areas, and around residential homes and gardens.

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 (EPA 1985; EXOTONET 1996). These two chemicals, along with strychnine, are used to control rodents (R. Thompson, in litt. 1998). Although the effects of these poisons on California tiger salamander have not been assessed, any uses in close proximity to occupied Central California tiger salamander habitat may 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, most or all animals inhabiting the fumigated burrow are killed (Salmon and Schmidt 1984).

In addition to possible direct adverse effects of rodent control chemicals and gasses, California ground squirrel and pocket gopher control operations may have the indirect effect of reducing the number of upland burrows available to specific California tiger salamanders (Loredo-Prendeville *et al.* 1994). Because the burrow density required by California tiger salamanders is unknown, the impacts of less than total burrow loss are also unknown.

Active California ground squirrel colonies probably are needed to sustain California tiger salamanders, because inactive burrow systems become progressively unsuitable over time. Loredo *et al.* (1996) found that burrow systems usually collapsed within 18 months following cessation of California ground squirrel use, and did not report California tiger salamanders utilizing any collapsed burrows.

Mosquito Control

In addition to the use of western mosquitofish (see Factor C above), a common chemical method of mosquito control in California involves the use of methoprene. Methoprene is an insect hormone mimic which 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.

Road-Crossing Mortality

Although no systematic studies of road mortality of the California tiger salamander have been conducted, we know that salamanders are killed by vehicular traffic while crossing roads (Hansen and Tremper 1993; S. Sweet, in litt. 1993; Joe Medeiros, Sierra College, pers. comm. 1993). For example, 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). Loss of salamanders to vehicular-caused mortality in the vicinity of breeding sites can range from 25 to 72 percent of the observed salamanders crossing roads (Twitty 1941; S. Sweet, in litt. 1993; Launer and Fee l996). Mortality may be increased by associated roadway curbs and berms as low as 9 to 12 centimeters (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).

Vehicular usage on California roads is increasing rapidly and directly with human population growth and urban expansion. During November 2002, California's estimated total vehicular travel on State highway system roads alone was 23 billion km (14.27 billion mi) (this figure and subsequent vehicular-use data from California Department of Transportation's internet website 2003). From 1972 to 2001, the State highway system total vehicular usage rose steadily from 108.6 km to 270 billion km (67.1 to 167.8 billion mi) annually. For the California Counties in which the Central California tiger salamander may occur, State highway system total annual vehicular usage in 1999, 2000, and 2001 was 86.0, 90.0, and 92.1 billion km (53.3, 55.9, and 57.2 billion mi), respectively. Moreover, in those areas of the State in which the Central California tiger salamander occurs, road densities due to past urbanization are already high. Overall, these areas have 5,860.2 km (3,641.5 mi) of roads (and rail tracks) of all types. The range of current road (and rail) density is from 1.01 km per 100 ha (0.25 mi per 100 ac) in the Southern San Joaquin Valley, to 1.64 km per 100 ha (0.41 mi per 100 ac) in San Francisco Bay Area counties. We believe such relatively high road-use and road-density values make road-kill mortality a threat to the species, a threat that is likely continuing to grow in concert with the State's rapid growth of human population and urbanization.

Hybridization With Non-native Salamanders

Hybridization has been defined by Rhymer and Simberloff (1996) as ''interbreeding of individuals from what are believed to be genetically distinct populations, regardless of taxonomic status.'' Hybridization between species may lead to introgression, which occurs when hybrid individuals repeatedly backcross to one or both parental types so that genetic material is transferred between the two species. Natural hybridization can be an important component of evolutionary processes. However, hybridization and introgression can be cause for concern, particularly if they are the result of human activities such as the introduction of non-native taxa. In the extreme, hybridization between native and non-native taxa can lead to loss of the native taxon through ''genetic assimilation'' (Rhymer and Simberloff 1996, Allendorf *et al.* 2001). Hybridization has been implicated in the extinction of populations and species of many animal and plant taxa (Rhymer and Simberloff 1996, Allendorf *et al.* 2001), including Tecopa pupfish (*Cyprinodon nevadensis calidae*), Amistad gambusia (*Gambusia amistadensis*), and longjaw cisco (*Coregonus alpenae*) (Rhymer and Simberloff 1996).

We are concerned about the threat of genetic contamination and assimilation

of California tiger salamanders by non-native tiger salamanders. Non-native tiger salamanders (*Ambystoma tigrinum mavortium*) were introduced into central California as bass bait in the mid-1900s (Riley *et al.* 2003, Fitzpatrick and Shaffer *in review*). Two studies (Riley *et al.* 2003, Fitzpatrick and Shaffer *in review*) have dealt with hybridization between these two species relative to habitat types commonly used by the species. The authors identified diagnostic genetic markers from mtDNA and nuclear DNA (*i.e.*, markers that distinguish between *A. tigrinum* and California tiger salamander). These markers were used to study the course of hybridization between these species in various situations.

Riley *et al.* (2003) examined hybridization between California tiger salamanders and non-native tiger salamanders at a study site in Monterey County. They found clear evidence that the two species are interbreeding in the wild and that they are producing viable and fertile hybrid offspring. The authors suggest, however, that the extent of genetic mixing depends on the breeding habitat, with pure California tiger salamanders more likely to occur in natural habitats than in artificial or disturbed ones. Vernal pools contained significantly fewer larvae with hybrid genotypes (genetic composition) and significantly more pure parental genotypes than expected. In contrast, there was little evidence of barriers to gene exchange in artificial breeding ponds. Since many available breeding ponds are artificial or highly modified, the authors believe that barriers preventing genetic exchange in natural breeding ponds are unlikely by themselves to prevent merging of the two taxa. This result indicates that concern about contamination, and possibly assimilation, of California tiger salamanders by non-native salamanders is not unfounded because barriers which might prevent genetic exchange do not appear absolute, particularly in artificial or highly modified habitats.

Fitzpatrick and Shaffer (*in review*) further analyzed the frequencies of hybrid genotypes in breeding habitats, focusing on natural vernal pools, ephemeral man-made cattle pools and perennial man-made ponds. They found that perennial ponds contained a preponderance of non-native alleles (alternative forms of a gene). They suggested that this may be because *A. tigrinum* (1) has a more flexible breeding phenology than California tiger salamander (and therefore, can take advantage of perennial ponds by breeding earlier in the fall) and (2) exhibits facultative paedomorphosis (retention of larval characteristics as an adult). These two characteristics of *A. tigrinum* may increase the relative ability of non-native alleles to persist in perennial ponds.

Riley *et al.* (2003) and Fitzpatrick and Shaffer (*in review*) show that the extent of hybridization between *A. tigrinum* and California tiger salamander may depend on the breeding habitat used (*i.e.*, artificial and highly modified habitats may facilitate hybridization) and that, in at least some circumstances (*e.g.*, where there are perennial ponds), non-native genes may be more likely to persist than native genes.

Using mtDNA and nuclear DNA markers as described above, researchers have examined the geographic extent of hybridization between *A. tigrinum* and California tiger salamander (Shaffer and Trenham 2002, H.B. Shaffer in litt. 2003). Hybridization has been found to varying degrees in the Central Coast, Bay Area, and the Central Valley portions of the California tiger salamander's range (Shaffer and Trenham 2002, H.B. Shaffer in litt. 2003, Service 2004). Of particular concern is the widespread hybridization within the Central Coast. Introduced genes have been found from southern Santa Clara County throughout most of Monterey County down to Fort Hunter Liggett on the San Luis Obispo County line, and east across all of San Benito County where California tiger salamanders occur (H.B. Shaffer in litt. 2003). We believe hybridization is a serious threat in the Central Coast region of California tiger salamander. Within this region, virtually all Monterey County populations of the California tiger salamander have been compromised by non-native genes, and every population of the California tiger salamander at Fort Hunter Liggett is either introduced or a hybrid mixture (H.B. Shaffer in litt. 2003).

Also of concern is the advancement of hybrid genes observed over the last decade. Salamander tissues collected ten or more years ago at the former Fort Ord and in the upper Carmel Valley were all pure California tiger salamander. However, material collected in May, 2003, at the former Fort Ord, and two years ago in the Carmel Valley contained introduced genes, suggesting that introduced genes are moving into new areas. In addition, introduced genes were recently detected from material collected in eastern Merced County, suggesting that human-mediated movement of introduced salamanders may still be occurring (Shaffer in litt. 2003). These changes in the distribution of hybridization indicate that the threat from hybridization is likely to increase in the future.

Using GIS, we estimated the number of Central California tiger salamander records (presumably California tiger salamanders without non-native genes present) that were threatened by hybridization (Service 2004). We considered a California tiger salamander record threatened by hybridization if the record was within 2.1 km (1.3 mi) of a hybridized or nonnative tiger salamander observation. Locations of hybridized or non-native tiger salamander locations were provided by Dr. H. Bradley Shaffer of University of California at Davis. Other records also were considered threatened if they were part of a larger polygon that consisted of multiple records (see Service Analysis of Central California Tiger Salamander Habitat above), located within 2.1 km (1.3 mi) of a hybridized or nonnative tiger salamander observation. Our assumptions were that if a nonnative or hybridized tiger salamander was within 2.1 km (1.3 mi) (based on the maximum observed migration distance of a tiger salamander, Sweet in litt. 1998) of a California tiger salamander record, then the nonnative or hybridized tiger salamander would be able to migrate to the pure salamander breeding site and breed with the California tiger salamanders at that location. Additionally, if the non-native or hybrid was located within 2.1 km (1.3 mi) of a polygon consisting of multiple records, then there would be sufficient intervening breeding habitat located within the polygon to allow for the nonnative or hybrid tiger salamanders to migrate to and breed with the California tiger salamander records within the polygon.

Using this analysis, we determined that 48 records (22 percent) in the Bay Area region, 56 records (78 percent) in the Central Coast region, and 27 records (8 percent) in the Central Valley region were threatened by hybridization because of their close proximity to nonnative and hybridized tiger salamanders (Service 2004).

Nonnative salamanders are not known to occur within the range of the California tiger salamander in Sonoma County. In Santa Barbara County, nonnative tiger salamanders are known from the Lompoc Federal Penitentiary. The closest known California tiger salamander breeding pond is approximately 8 mi (12.9 km) from the Penitentiary.

In summary, we believe that the available information indicates that the California tiger salamander is at risk from genetic contamination, and possibly genetic assimilation. The

course of hybridization and introgression appears particularly aggressive in artificial and highly modified habitats and perennial ponds (Riley *et al.* 2003, Fitzpatrick and Shaffer *in review*). Evidence of hybridization has been found in three geographic areas (*i.e.*, Central Coast, Bay Area and Central Valley) within the Central California tiger salamander's range (Shaffer and Trenham 2002, Shaffer in litt. 2003, Service 2004). In areas where hybrid individuals are already prevalent, such as the Central Coast, we believe it is not unreasonable to consider that the California tiger salamander portion of the genome may be reduced and could even be lost entirely.

Livestock Grazing

Suitably managed livestock (cattle, sheep, and horses) ranch land is generally thought to be compatible in many cases with the successful use of rangelands by the California tiger salamander (T. Jones, in litt. 1993; Shaffer *et al.* 1993; Loredo *et al.* 1996; S. Sweet, pers. comm. 1998; H. B. Shaffer and P. Trenham, pers. comm. 2003; Alveraz in litt. 2003; Barry in litt. 2003; Bobzien in litt. 2003; Kolar in litt. 2003). By maintaining shorter vegetation, grazing may make areas more suitable for California ground squirrels whose burrows are essential to California tiger salamanders.

The long-term effect of ranching on the species is either neutral or beneficial, as long as burrowing rodents are not completely eradicated, because the California tiger salamander would have likely been extirpated from many areas if stock ponds had not been built and maintained for livestock production (see also Special Rule below.)

Conclusion

As discussed in the Summary of Factors Affecting the Species above, we have identified a number of threats to the California tiger salamander. In earlier actions we listed the Santa Barbara and Sonoma County DPSs of the species and identified the threats to those populations. Here we identify threats to the Central population of the species as well as re-evaluate the threats to the Santa Barbara and Sonoma populations and conclude that the California tiger salamander is threatened throughout its range. The primary threats throughout the range are habitat destruction, degradation, and fragmentation due to urbanization and conversion of habitat to intensive agriculture. Other circumstances that contribute to threatening the species include hybridization with non-native tiger salamanders and predation from non-native species.

While the California tiger salamander still occurs throughout much of its historic range (Trenham *et al.* 2000), researchers estimate that approximately 75 percent of the species' historic natural habitat has been lost within this range (Shaffer *et al.* 1993; see Factor A below). For example, loss of vernal pool habitat, the natural breeding habitat of California tiger salamanders, had reached 78 percent by 1997 (Holland 1998a, 1998b; CDFG 2003) and, at a continued 1.5 percent annual loss (the rate of loss during the 1980s and 1990s), is projected to reach 88 percent by 2043 (Holland 1998a). The Central California tiger salamander has been able to persist despite these losses, probably because of the presence of artificial water bodies, such as stockponds. Although the current range of the California tiger salamander approximates its historic range in size, the quality, connectivity and distribution of the habitat within the range has been substantially altered and degraded.

The past habitat loss, alteration, and degradation, along with projected future losses and further degradation, is the primary factor in our determination that the California tiger salamander meets the definition of threatened under the Act. Urban and agricultural land uses have destroyed, degraded, and altered both aquatic breeding habitat and upland estivation and dispersal habitat of the salamander, and we have reason to believe these impacts will continue in the future. Between 1990 and 2000 human population growth in the counties inhabited by California tiger salamander increased by almost 20 percent, is projected to increase by 35 percent between 2000 and 2020, and by 75 percent between 2000 and 2040 (CDF 1998, 2002). Although current data from general plans and other planned development incorporate planning over a limited time horizon (many general plans only project out to 2020), our analysis suggests that eight percent of the remaining California tiger salamander habitat will be lost in the future to such activities. Because of the limited time horizon associated with these data, and because planning for development, and development itself, is a dynamic process, we believe that eight percent is an underestimate of the likely loss of habitat to high-intensity development. Our data also suggest that an additional 18 percent of remaining Central California tiger salamander habitat is threatened by low- and very-low-density development. In addition, habitat proximate to developed areas is subject to degradation and fragmentation from human uses, including increased size and number of roads. Of the four geographic areas in the Central California population identified by Shaffer and Trenham (2002), the South San Joaquin area is the most threatened, with 14 percent of the remaining habitat projected to be lost to planned development and 35 percent threatened by low- and very-low-density development. In addition, we believe conversion of rangeland to intensive agriculture, though difficult to quantify, will result in a substantial loss of Central California tiger salamander habitat in the future.

In sum, we conclude that 75 percent of California tiger salamander habitat has already been lost and that at least 26 percent of the remaining habitat of the Central California tiger salamander is under threat from urban development and low- and very-low-density residential development. Additional habitat will also be lost as rangeland is converted to intensive agriculture.

Additionally, the Central California tiger salamander is at great risk from genetic contamination, and possibly genetic assimilation. Hybridization and introgression appear more likely in artificial and highly modified habitats and perennial ponds (Riley *et al.* 2003, Fitzpatrick and Shaffer *in review*). Hybridization has been found to varying degrees in the Central Coast, Bay Area, and the Central Valley regions of California tiger salamander (Shaffer and Trenham 2002, H.B. Shaffer in litt. 2003, Service 2004). Of particular concern is the widespread hybridization within the Central Coast. In areas where hybrid individuals are already prevalent, such as the Central Coast region, we believe it is not unreasonable to expect that the California tiger salamander portion of the genome may continue to be reduced.

A number of non-native California species, especially bullfrogs, western mosquitofish, and other non-native fish, may be adversely affecting the California tiger salamander through predation (Fisher and Shaffer 1996, Factor C). The data suggest that when these non-natives are present, California tiger salamanders and/or other native amphibians are either less abundant or completely absent (Shaffer *et al.* 1993; Loredo-Prendeville *et al.* 1994; Seymour and Westphal 1994; Laabs *et al.* 2001). Other non-native fish have either been directly implicated in predation of California tiger salamanders or appear to have the potential to prey upon them (Fisher and Shaffer 1996).

Our analysis indicates that, while existing Federal, State, or local regulatory mechanisms currently offset some of the various threats to California

tiger salamander, the protections are insufficient.

The Act defines an endangered species as one that is in danger of extinction throughout all or a significant portion of its range. The Act defines a threatened species as any species likely to become endangered within the foreseeable future throughout all or a significant portion of its range. In making this determination, we have carefully assessed the best scientific and commercial data available regarding the past, present, and future threats faced by the California tiger salamander. Based on this evaluation, we are listing the California tiger salamander as a threatened species, as it is likely to become endangered within the foreseeable future throughout all or a significant portion of its range.

Having determined that the California tiger salamander is threatened rangewide, we turn to the issue of the status of the Santa Barbara, Sonoma, and Central California populations. Our analysis of the status of the species rangewide has shed additional light on the status of the Santa Barbara and Sonoma County populations. In addition, once the Santa Barbara population was listed, the number of existing populations in Santa Barbara increased as efforts to locate the species increased. We now conclude that neither of these populations is currently in danger of extinction throughout all or a significant portion of its range. However, like the species as a whole, these populations are subject to a significant threat of additional habitat loss and fragmentation, as well as other secondary threats. Given their smaller ranges and populations, the Santa Barbara and Sonoma County populations remain at higher risk than the species as a whole, which as discussed above, we have determined is threatened. Similarly, we have determined that the Santa Barbara and Sonoma County populations are likely to become endangered in the foreseeable future, and are also threatened. Having determined that the Santa Barbara and Sonoma populations have the same listing status as the taxon as a whole, we are removing these populations as separately listed DPSs.

Special Rule

Section 4(d) of the Act imparts the authority to issue regulations necessary and advisable to provide for the conservation of threatened species. Under section 4(d), the Secretary may publish a special rule that modifies the standard protections for threatened species found under section 9 of the Act and Service regulations at 50 CFR 17.31 with special measures tailored to the conservation of the species. We believe that, in certain instances, easing the general take prohibitions on non-Federal lands may encourage continued responsible land uses that provide an overall benefit to the species. We also believe that such a special rule will promote the conservation efforts and private lands partnerships critical for species recovery (Bean, 2002; Conner and Matthews, 2002; Crouse *et al.*, 2002; James, 2002; Knight, 1999; Koch, 2002; Main *et al.*, 1999; Norton, 2000; Wilcove *et al.*, 1996). However, in easing the take prohibitions under section 9, the measures developed in the special rule must also contain prohibitions necessary and appropriate to conserve the species.

As discussed elsewhere in this final rule, the California tiger salamander faces many threats. Foremost among these is the continuing loss of California's vernal pool habitats. Historically, California's vernal pools served as the predominant breeding habitat for the California tiger salamander and were essential components for the species' stability throughout its range (Storer 1925; Feaver 1971; Zeiner *et al.* 1988; Shaffer *et al.* 1993; Jennings and Hayes 1994; Thelander 1994). With the loss of these natural habitats during the last century, alternative breeding sites have become more critical for the continued survival of the California tiger salamander.

Stock ponds created for livestock ranching are important alternative breeding sites for the California tiger salamander, as evidenced by the substantial number of salamander locality records from these artificial habitats (CNDDB 2002). While various activities associated with livestock operations may result in inadvertent take of salamander adults, juveniles, or eggs, livestock ranching stock ponds with suitable adjacent upland habitat provide valuable refugia for the remaining California tiger salamander. Maintaining California tiger salamander use of stock ponds on livestock ranches for breeding appears to be a critical link in the conservation and recovery of this species. For this reason, we are today finalizing a special rule under section 4(d) of the Act which would exempt routine livestock ranching activities on private or Tribal lands, where there is no Federal nexus, from the take prohibitions under section 9 of the Act. The special rule applies to those situations, whether currently existing or that may develop in the future, where livestock ranching is the primary land use or livelihood and where the routine activities are essential for the continued operation of the livestock ranch.

Special rules developed under section 4(d) of the Act are published in the **Federal Register** concurrent or subsequent to the listing of a species. With the finalization of this special rule, the general regulations at 50 CFR 17.31 will not apply to the California tiger salamander. Our rationale behind the development of the special rule is discussed below.

Livestock ranching is a dynamic process, which requires the ability to adapt to changing environmental and economic conditions. However, many of the activities essential to successful ranching are considered routine, and are undertaken at various times and places throughout the year as need dictates. Although this special rule is not intended to provide a comprehensive list of those ranching activities considered routine, some examples include: maintenance of stock ponds; fence construction for grazing management; planting, harvest, and rotation of unirrigated forage crops; maintenance and construction of corrals, ranch buildings, and roads; discing of field sections for fire prevention management; control of noxious weeds by prescribed fire or by herbicides; placement of mineral supplements; and rodent control.

Routine activities associated with livestock ranching have the potential to affect California tiger salamander. Some routine activities have the potential to positively affect salamanders (*e.g.*, creation of suitable stock pond breeding habitats), while other activities may be neutral with respect to salamander effects (*e.g.*, construction of ranch buildings in areas unsuitable for salamander occupation). However, other routine ranching activities have the potential to negatively affect salamanders, depending on when and where the activities are conducted (*e.g.*, direct take from discing and/or grading of salamander-occupied upland aestivation habitat).

While section 9 of the Act provides general prohibitions on activities that would result in take of a threatened species, the Service recognizes that routine ranching activities, even those with the potential to inadvertently take salamanders, may be necessary components of livestock operations. The Service also recognizes that it is, in the long-term, a benefit to the California tiger salamander to maintain, as much as possible, those aspects of the ranching landscape that can aid in the recovery of the species. We believe this special rule will further conservation of the species by discouraging further

conversions of the ranching landscape into habitats unsuitable for the California tiger salamander and encouraging landowners and ranchers to continue managing the remaining landscape in ways that meet the needs of their operation and provide suitable habitat for the California tiger salamander.

Routine Livestock Ranching Activities Exempted by the Special Rule

The activities mentioned above and discussed below are merely examples of routine ranching activities that would be exempted by the special rule, with the exception of use of burrow fumigants. Routine activities may vary from one ranching operation to another, and vary with changing environmental and economic conditions. Routine ranching activities include the activities described below, and any others that a rancher may undertake to maintain a sustainable ranching operation. Our premise for not attempting to regulate routine activities is that, ultimately, we believe that a rancher acting in the best interest of maintaining a sustainable ranching operation also is providing incidental but significant conservation benefits for the California tiger salamander.

In this special rule, we describe and recommend best management practices for carrying out routine ranching activities in ways that would minimize take of salamanders, but we do not require these practices. Overall, we believe that minimizing the regulatory restrictions on routine ranching activities will increase the likelihood that more landowners will voluntarily allow salamanders to persist or increase on their private lands, and that the impacts to salamanders from such activities are far outweighed by the benefits of maintaining a rangeland landscape in which salamanders can co-exist with a ranching operation, as opposed to alternative land uses in which salamanders would be eliminated entirely. For reasons discussed below, we did not exempt rodent control by burrow fumigants. We have exempted other methods of rodent control and believe there are enough alternative methods that would be exempt under this special rule that lack of an exemption for burrow fumigants should not constrain a ranching operation or work in a manner contrary to our intent to encourage conservation of California tiger salamanders on private rangelands through this special rule.

Sustainable Livestock Grazing. The act of grazing livestock on rangelands in a sustainable manner (*i.e.*, not overgrazed to the point where rangeland is denuded and compacted) has the potential for take of the California tiger salamander. Grazing livestock in California tiger salamander-occupied areas may trample individual salamanders as they move to and from their upland habitats, or as adults and newly metamorphosed juveniles leave breeding ponds. Salamander eggs and larvae located along a pond edge may also be trampled by livestock. Salamanders of all life stages may also be taken as a result of livestock altering the water quality and physical characteristics of breeding ponds. Physical perturbation of pond edges by milling livestock may increase siltation of the pond, potentially smothering salamander eggs or larvae, and may increase the difficulty for passage of juveniles out of the ponds into upland shelters. Water chemistry parameters of breeding ponds, such as pH or nitrogen levels, may be altered by the introduction of livestock wastes. Such water quality changes may be detrimental to all salamander life stages present in a breeding pond (Worthylake and Hovingh 1989; Ouellet 2000; Rowe and Freda 2000).

In contrast, sustainable grazing may benefit the California tiger salamander in several ways. Sustainable grazing may make areas surrounding potential salamander breeding ponds more suitable for colonization by California ground squirrels, which are commonly found inhabiting well-grazed pasturelands (Jameson and Peeters 1988). Ground squirrel colonization produces burrows that are vitally important in the life cycle of the California tiger salamander, serving as shelters and aestivation sites for the terrestrial adult and juvenile salamanders (Seymour and Westphal 1994). The presence of ground squirrel burrows may be an important factor determining whether ponds can become successful salamander breeding sites. Sustainable grazing around natural pools may also benefit the California tiger salamander by extending the inundation period (Barry, UC Davis, 2003, *in litt.*). Amphibian larvae must grow to a critical minimum body size before they can metamorphose to the terrestrial stage; therefore, the longer a breeding site remains inundated, the greater the likelihood for juvenile production and survival (Semlitsch *et al.* 1988; Pechmann *et al.* 1989; Morey 1998; Trenham 1998b). By cropping fast-growing vegetation around breeding pools, which would otherwise accelerate transpiration, desiccation of the breeding site may be delayed (Barry, UC Davis, 2003, *in litt.*). The potential benefits of sustainable livestock grazing, according to normally acceptable and established levels of intensity to prevent overgrazing, provide justification for including this routine activity in today's special rule.

Stock Pond Management and Maintenance. Stock ponds are necessary components of livestock ranching in many parts of the California tiger salamander range, due to California's dry summer climate and the limited availability of naturally occurring water. As discussed previously, created stock ponds may serve as alternative breeding sites for the California tiger salamander in the absence of natural vernal pool or seasonal pond habitats. Once a stock pond is occupied as a California tiger salamander breeding site, however, salamanders may be vulnerable to take from the routine activities necessary to manage and maintain the stock pond for continued livestock use.

Hydroperiod management (*i.e.*, the amount of time the stock pond contains water) of California tiger salamander-occupied stock ponds may be so short that salamander larvae cannot complete metamorphosis, or so long that species known to prey on salamanders may become naturally established (Shaffer *et al.* 1993; Seymour and Westphal 1994). Stock ponds with suitable hydroperiods for salamander breeding cycles may require ongoing maintenance to protect water supplies and the integrity of the storage system. Routine maintenance activities can include periodic dredging, dam or berm repair, and mechanical or chemical control of aquatic vegetation. If any of these activities are conducted during the California tiger salamander breeding season, take of salamanders may occur. In addition, stock ponds may become infested by mosquitoes, requiring controls in order to protect human or livestock health. Mosquito infestations may be controlled by pesticide applications or by the introduction of non-native fish species that prey on mosquitoes. Take of salamanders may occur if pesticide applications are made during the California tiger salamander breeding season. However, regardless of what time of year non-native fish are introduced for mosquito control, they may become established in the stock pond and prey on salamanders during the breeding season. For the purposes of this special rule, we considered these various activities with regard to whether they could be readily adapted to avoid take of the California tiger salamander.

Hydroperiod management is likely dependent on many factors, including the annual water needs of the livestock operation and the local hydrological

conditions (*e.g.*, annual water availability). In any given year, these variables may cause a ranching operation to adjust a stock pond's hydroperiod in ways that could potentially disrupt the California tiger salamander breeding cycle, resulting in take of salamander adults, juveniles, or eggs. Although stock pond hydroperiods can theoretically be readily adapted to avoid take by maintaining an optimal breeding period for the California tiger salamander, we recognize that the continued viability of a livestock ranching operation may depend on the flexibility to make these hydroperiod adjustments on short notice. We also acknowledge the Service would not be able to provide timely technical assistance to most land managers. For these reasons, routine hydroperiod management of ranching operation stock ponds is included in the special rule.

Periodic dredging to counter the long-term effects of siltation and the maintenance or repair of containment structures (*e.g.*, dams, berms, levees) are activities necessary to maintain stock pond utility and integrity (N. Cremers, 2003, *in litt.*). Although these actions may result in take of salamanders if they coincide with the California tiger salamander breeding season, the need to conduct these maintenance activities is episodic and should not be necessary on a regular basis. In addition, we believe it is unlikely that these activities would be necessary during the California tiger salamander breeding season, except in the case of emergency repairs on a catastrophic breach, as a stock pond's integrity for the spring and summer grazing season should be ensured prior to the previous year's rainy winter season. We believe the infrequent nature of these routine activities, coupled with the likelihood that they will be conducted outside of the California tiger salamander breeding season, will have minimal impacts on salamanders in occupied stock ponds. For these reasons, the routine activities of periodic dredging and containment structure maintenance for ranching operation stock ponds are included in this special rule.

Aquatic vegetation, whether rooted or free-floating, may impede stock pond functionality. Control of this vegetation may be mechanical, (*e.g.*, harvesters, rakes, skimmers), chemical (*e.g.*, aquatic herbicides), or biological (*e.g.*, introduced herbivorous fish). Biological controls, such as the sterile grass carp (*Ctenopharyngodon idella*), would pose no predation threat to salamanders; however, this type of control is only for established year-round ponds which are typically not suitable habitat for California tiger salamander reproduction (Shaffer *et al.* 1993; Seymour and Westphal 1994). Vegetation control may also be necessary in temporary stock ponds which do provide suitable habitat, and both mechanical and chemical control methods may result in inadvertent take of salamanders if conducted during the California tiger salamander breeding and juvenile metamorphosis season. It is unlikely that vegetation control would be needed during the breeding period, as the primary time for explosive vegetative growth is during the warm summer months. However, vegetation control may be necessary prior to juvenile salamander dispersal into summer aestivation sites.

Mechanical controls may perturb the breeding habitat or cause death or injury to resident salamanders; however, these impacts would be restricted in time to singular control events. In contrast, chemical control using aquatic herbicides may have little immediate physical impact on salamanders or breeding habitat, but may negatively impact salamander health or reproductive fitness for an indefinite time beyond the control event. While no definitive link has been made between aquatic herbicide exposure and effects to the California tiger salamander, toxicity data in the scientific literature suggest that amphibians may be susceptible to adverse impacts from both the active and inert ingredients in various herbicide products (see Summary of Factors Affecting the Species). In addition, because aquatic herbicides disperse throughout a water body, all salamanders within the water body may potentially be exposed.

We recognize that routine aquatic vegetation control may be essential for the continued operation of stock ponds, and that this activity may not be readily adapted (*e.g.*, postpone control until after salamander use of stock ponds is discontinued) to avoid take of the California tiger salamander. Although both mechanical and chemical controls have the potential to negatively impact salamanders, we believe mechanical controls pose less long-term risk to breeding populations of California tiger salamander. For the reasons outlined above, the routine activity of aquatic vegetation control in ranching operation stock ponds is included in this special rule. While chemical control of aquatic vegetation in stock ponds is included under the special rule exemption, the Service recommends that this activity only be conducted outside of the general breeding season (November through June) and larval stage of the California tiger salamander.

Mosquito abatement in aquatic systems is similar to vegetation management, in that several control methods exist. The aquatic mosquito larvae can be controlled by chemical larvicides (*e.g.*, temephos and methoprene), bacterial larvicides, or biological organisms (*e.g.*, predaceous mosquitofish). In addition, mosquito larvae can be controlled through breeding source reduction and proper water management. Bacterial larvicides are especially target-specific, and likely pose little risk to salamanders using a stock pond; however, these products must be applied in specific timeframes during larval mosquito development to be efficacious. A broader range of non-target effects may be seen from chemical larvicides, with the potential for direct impacts on higher order taxonomic groups such as salamanders (Ankley *et al.* 1998; Blumberg *et al.* 1998; Sparling 1998). Biological organisms such as mosquitofish may become established in the affected water body and prey on juvenile salamanders (Graf and Allen-Diaz 1993; Leyse and Lawlor 2000).

While mosquito control in stock ponds may be a routine activity on ranching operations, we believe it unlikely that control would be necessary during much of the California tiger salamander breeding season, as this period coincides with the rainy winter and spring months. However, when control cannot be avoided during the latter part of the California tiger salamander breeding season, we believe mosquito control activities can be readily adapted to prevent or minimize potential take of salamanders by appropriate water level management and/or the proper application of bacterial larvicides. For this reason, these routine activities are included in this special rule. Also included in the special rule is the routine activity of properly applying (*i.e.*, following label directions and product precautions) either chemical or bacterial larvicides into ranching operation stock ponds outside of the California tiger salamander general breeding season. This exemption for routine mosquito control activities from the take prohibitions under section 9 does not include the purposeful introduction at any time of non-native biological organisms (*e.g.*, western mosquitofish (*Gambusia affinis*)) that may prey on California tiger salamander adults, larvae, or eggs.

Rodent Control. As discussed previously, the burrow complexes of various ground dwelling mammals are vitally important in the life cycle of the California tiger salamander. These burrows serve as shelters and estivation

sites for the terrestrial adult and juvenile salamanders (Seymour and Westphal 1994). In addition, the presence of these burrows near suitable water bodies may be critical for any water body to become a successful, long-term breeding site for the California tiger salamander. It has been estimated that 95 percent of the adult and subadult salamanders from a large breeding pool would require an area of adjacent upland habitat extending out approximately 650 m (0.4 mi) (H. B. Shaffer, in litt. 2003).

Burrowing rodents, particularly the California ground squirrel, may pose problems for livestock ranching operations to such an extent that control measures are necessary. Ground squirrels in sufficient numbers may deplete livestock forage, while their burrows may be a physical hazard for humans, livestock, and ranching machinery (N. Cremers, in litt. 2003). Common control measures for these rodents include shooting, poisoning with approved pesticides, and mechanical modification of burrow complexes (UCIPM Internet website 2003). While shooting of ground squirrels poses little risk to salamanders, the application of pesticides or the disruption of salamander aestivation sites may result in take of the California tiger salamander. Because the location of burrow complexes cannot be predicted or controlled, rodent control measures must be site-specific and cannot be redirected. Thus, the activity of controlling ground squirrels may not be readily adapted to avoid implementation in salamander habitats. However, because various control options are available that may minimize or prevent the potential for take of California tiger salamander, routine rodent control activities are included in this special rule.

Burrowing Rodent Control by Pesticide Application. Controlling burrowing rodents with pesticides is generally accomplished through the application of toxicant-treated grains, which are ingested by the target animals, or by the introduction of fumigants (*e.g.*, toxic or suffocating gasses) into burrow complexes. Fumigants are not target-specific, and all organisms inhabiting a treated burrow complex will likely be subject to the effects of the pesticide (*i.e.*, toxicant exposure or oxygen depletion). Although specific data are not available on the effects of fumigants on the California tiger salamander, the permeable skin of amphibians is likely to increase a salamander's susceptibility to adverse effects from exposure to toxicants (Henry 2000). We believe it is necessary to reduce the impact of fumigants on sheltering or aestivating salamanders (a March 1993 national consultation on the effects of vertebrate control agents reached jeopardy conclusions for several California species that use rodent burrows), and this control measure should be prohibited in areas used by the California tiger salamander. Based on the habitat requirement estimates presented above, this prohibition should extend 1.1 km (0.7 mi) in any direction from a water body, natural or human-made, suitable for California tiger salamander breeding. The application of fumigants outside of this area restriction is not prohibited.

Toxicant-treated grains, primarily using anticoagulant compounds, may be applied by several methods to control burrowing rodents (Silberhorn *et al.* 2003). Grains may be broadcast over the ground surface at defined rates, placed in confined bait stations, or placed into burrow openings. Ground squirrels and other rodents ingest these baits, and mortality of the exposed animal results from internal hemorrhaging. No data were found on the toxicity of these anticoagulant compounds to salamanders, although it is possible that exposure to these baits may cause similar adverse effects in salamanders. It is highly unlikely that salamanders would directly ingest any grains encountered; however, indirect exposure to the pesticides through dermal contact may occur if the treated grains are placed into salamander-occupied burrows. In addition, there may be potential for secondary exposure from this application method if estivating salamanders consume burrow-dwelling invertebrates that have ingested the treated grains. While no definitive risk assessment can be made for these possible exposures, we believe this application method would result in an increased risk for take of the California tiger salamander and should therefore be avoided whenever possible.

Salamanders may also face these potential indirect and secondary exposures from the broadcast and bait station application methods. However, by widely dispersing the treated grains over the ground surface, the broadcast application method likely reduces the probability of migrating salamanders being exposed through dermal contact or through ingestion of exposed invertebrates. Similarly, it is unlikely that salamanders would enter a confined bait station, further reducing the probability of exposure. While we are not endorsing the use of rodenticides for ground squirrel or other rodent control, we believe these two application methods (*i.e.*, broadcast surface treatments or confined bait stations) present a lower risk to the California tiger salamander than the burrow-placement method. For the reasons outlined above, broadcast and confined bait station application as part of routine livestock ranch operations are included in the special rule.

Burrowing Rodent Control by Habitat Modification. Colonies of ground squirrels and other burrowing rodents are sometimes controlled by using cultivation equipment to destroy or modify burrow complexes. The technique of deep-ripping is likely to result in complete destruction of the burrow complex and eradication of the rodent colony. Any salamanders using these burrows as sheltering or aestivation sites would also likely be killed by this activity. Discing of these burrow systems, followed by surface grading, removes the physical hazard of open holes and may successfully suppress the rodent colony. This process may not destroy the entire burrow complex, with the possibility of some burrows remaining intact. However, sheltering or aestivating salamanders may also suffer substantial mortality from this control method.

While modification of a burrow complex may aid in controlling a rodent colony, the primary benefit of such modification for ranching operations is the elimination of the physical hazards associated with burrows and burrow openings (N. Cremers, in litt. 2003). This may be particularly important for areas where livestock congregate in large numbers, such as corrals and stock pond watering sites. Because stock ponds have become important alternative breeding sites for the California tiger salamander, the extent of potential take may be directly related to the intensity of burrow complex modification around such sites. Large-scale modification of these habitats around a stock pond known to support salamanders would have the potential to eliminate or drastically reduce that localized breeding population of the California tiger salamander. As discussed previously, the majority of a localized breeding salamander population may be found in an area of adjacent upland habitat extending out up to 1.1 km (0.7 mi) in any direction from the breeding pond (H. B. Shaffer, in litt. 2003).

The Service recognizes that physical modification of rodent burrow complexes may be an essential activity to ranching operations. However, while habitat modification may not be a widespread practice for livestock

ranches, we believe that an unmoderated approach to this activity could have the potential for large-scale take of the California tiger salamander in certain locales. Adverse effects upon California tiger salamander that could result from large-scale modifications could include both direct injury or mortality and significant loss of suitable sheltering and aestivation habitats. We believe that a focused approach to burrow habitat modification would serve to achieve the dual goals of minimizing take of the California tiger salamander and reducing livestock ranching losses. To this end, rodent control through burrow modification is included in this special rule; however, the Service recommends that discing and/or grading of burrows should be limited to those areas where livestock congregate or move in large numbers. The Service also recommends that modification by deep-ripping be avoided within 1.1 km (0.7 mi) of known or potential salamander breeding ponds. We recognize that discing and/or grading around stock ponds or other suitable breeding pools may increase the risk to salamanders, and we encourage ranch operators to minimize the modification footprint around these sites as much as possible. We will continue to work with the livestock ranching community in developing and refining ways to attain these dual objectives.

Fire Prevention Management. In order to prevent or minimize the spread of wildfires in rangelands, livestock ranches may need to construct fire breaks in various places throughout the property. These fire breaks may be constructed by using cultivation equipment to create swaths of unvegetated land along property boundaries or between fields. If these fire breaks are constructed over rodent burrow complexes that are suitable sheltering or aestivation habitat for salamanders, there is the potential for take of the California tiger salamander. However, the Service recognizes the critical importance of fire prevention management in rangelands, and is thereby including this routine ranching activity in the special rule.

Monitor Impacts on the California Tiger Salamander. While it appears that the California tiger salamander may be benefiting from the creation of stock ponds and the prevention of rangeland conversion to unsuitable habitat throughout its range, much remains to be learned about the effects of livestock ranching activities on the salamander. We have concluded that developing a conservation partnership with the livestock ranching community will allow us to answer important questions about the impact of various ranching activities, and will provide valuable information to assist in the recovery of the species. We further believe that, where consistent with the discretion provided by the Act, implementing policies that promote such partnerships is an essential component for the recovery of listed species, particularly where the species occur on private lands. Conservation partnerships can provide positive incentives to private landowners to voluntarily conserve natural resources, and can remove or reduce disincentives to conservation (Bean, 2002; Conner and Matthews, 2002; Crouse *et al.*, 2002; James, 2002; Knight, 1999; Koch, 2002; Main *et al.*, 1999; Norton, 2000; Wilcove *et al.*, 1996). The Service will work closely with the ranching community and others in developing ways to monitor impacts on the California tiger salamander from the routine activities described above. We conclude this commitment is necessary and appropriate, and will provide further insights into land stewardship practices that foster the continued use of California's rangelands in ways beneficial to both the California tiger salamander and the livestock ranching community.

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 Central California tiger salamander population is prudent and the proposed designation will be published in an upcoming **Federal Register**. We proposed critical habitat for the Santa Barbara population on January 22, 2003 (69 FR 19364). We will finalize critical habitat for the Santa Barbara California tiger salamander population by the court-ordered deadline of November 15, 2004. We intend to publish a proposed rule to designate critical habitat for the Sonoma population in the future.

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 from the actions of Federal agencies, considerations for protection and conservation actions, and the prohibitions against taking and harm for the 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 California tiger salamander throughout its range 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 California tiger salamander will require reduction of the threats from destruction, fragmentation, and degradation of wetland and associated upland habitats due to urban development, conversion of habitat to intensive agriculture, predation by non-native species, disease, contaminants, agricultural and landscaping contaminants, rodent and mosquito control, road-crossing mortality, hybridization with non-native tiger salamanders, and some livestock grazing practices. Threats from pesticide drift also must be reduced. These threats should be considered when management actions are taken in habitats currently and potentially occupied by the 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 California tiger salamander as a whole provides for the development and implementation of a rangewide recovery plan. This plan will bring together Federal, State, and regional agency efforts for the conservation of the California tiger salamander. 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 species.

Listing also will require us to review any actions that may affect the California tiger salamander as a whole 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 California tiger salamander include the Service, in relation to the issuance of section 10(a)(1)(A) and (B) permits for scientific research, 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 17.31 set forth a series of general prohibitions and exceptions that apply to all threatened wildlife. These prohibitions, 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. In this case, we propose a special rule tailored to this particular species to take the place of the regulations in 50 CFR 17.31. The special rule, though, incorporates most requirements of the general regulations, along with additional exceptions.

Permits may be issued under section 10(a)(1) of the Act to carry out otherwise prohibited activities involving threatened wildlife under certain circumstances. Regulations governing permits are codified at 50 CFR 17.32 for threatened species. 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.

Habitat conservation plans (HCPs) provide one mechanism for reconciling potential conflicts between project actions and incidental take of listed species. The Service is actively working with the Fort Ord Reuse Authority on developing a Habitat Conservation Plan (HCP) in compliance with section 10 of the Act. The California tiger salamander is proposed to be covered under this developing HCP. HCPs reconcile the authorization of incidental take for species, such as the California tiger salamander, with species conservation. Consistent with the Act and its section 10 implementing regulations, a final Fort Ord HCP with an incidental take permit would provide for the conservation of California tiger salamander at Fort Ord, while allowing projects that impact California tiger salamander to move forward.

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 California tiger salamanders that were collected prior to the date of publication of a final regulation in the **Federal Register** adding the California tiger salamander to the list of endangered and threatened species;

(2) Any actions that may affect the 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, or for which such action will not result in take;

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

(4) Land actions or management carried out under an HCP approved by the Service 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 degradation or elimination of suitable California tiger salamander habitat and activities described in the 4(d) rule included in this notice.

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

(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 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 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) Unauthorized discharges or dumping of toxic chemicals, silt, or other pollutants into, or other illegal alteration of the quality of waters supporting California tiger salamanders that results in death or injury of the species or that results in degradation of their occupied habitat to an extent that individuals are killed or injured or essential behaviors such as breeding, feeding, and sheltering are impaired;

(4) Intentional release of exotic species (including, but not limited to, bullfrogs, tiger salamanders, mosquitofish, bass, sunfish, bullhead, catfish, crayfish) into currently occupied California tiger salamander breeding habitat;

(5) Destruction or alteration of the California tiger salamander occupied habitat through discharge of fill materials into breeding sites; draining, ditching, tilling, stream channelization, drilling, pumping, or other activities that interrupt surface or ground water flow into or out of the vernal pool, and seasonal or perennial pond habitats of this species (*i.e.*, due to the construction, installation, or operation and maintenance of roads, impoundments, discharge or drain pipes, storm water detention basins, wells, water diversion structures, etc.);

(6) Destruction or alteration of uplands associated with seasonal pools used by California tiger salamanders during estivation and dispersal, or modification of migration routes such that migration and dispersal are reduced or precluded and actual death or injury to the species results; and

(7) Activities (*e.g.*, habitat conversion, road and trail construction, recreation, development, and application of herbicides and pesticides in violation of label restrictions) that directly or indirectly result in the death or injury of larvae, juvenile, or adult California tiger salamanders, or modify 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 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).

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 (E.O.) 13211 on regulations that significantly affect energy supply, distribution, and use. E.O. 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).

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 ''Salamander, California tiger,'' under AMPHIBIANS, in the List of Endangered and Threatened Wildlife, as set forth below:

§ 17.11 Endangered and threatened wildlife.

* * * * *

(h) * * *

Species							
Common Name	Scientific name	Historic range	Vertebrate population where endangered or threatened	Status	When listed	Critical habitat	Special rules
*	*	*	*	*	*		*
AMPHIBIANS							
*	*	*	*	*	*		*
Salamander, California tiger.	*Ambystoma californiense*.	U.S.A. (CA)	U.S.A. (CA—California).	T	744	NA	§ 17.43(c)
*	*	*	*	*	*		*

■ 3. Amend § 17.43 by adding a new paragraph (c) to read as follows:

§ 17.43 Special rule—amphibians.

* * * * *

(c) California tiger salamander (*Ambystoma californiense*).

(1) *Which populations of the California tiger salamander are covered by this special rule?* This rule covers the California tiger salamander (*Ambystoma californiense*) rangewide.

(2) *What activities are prohibited?* Except as noted in paragraph (c)(3) of this section, all prohibitions of § 17.31 will apply to the California tiger salamander.

(3) *What activities are allowed on private or Tribal land?* Incidental take of the California tiger salamander will not be a violation of section 9 of the Act, if the incidental take results from routine ranching activities located on private or Tribal lands. Routine ranching activities include, but are not limited to, the following:

(i) Livestock grazing according to normally acceptable and established levels of intensity in terms of the number of head of livestock per acre of rangeland;

(ii) Control of ground-burrowing rodents using poisonous grain according to the labeled directions and local, State, and Federal regulations and guidelines (The use of toxic or suffocating gases is not exempt from the prohibitions due to their nontarget-specific mode of action.);

(iii) Control and management of burrow complexes using discing and grading to destroy burrows and fill openings;

(iv) Routine management and maintenance of stock ponds and berms to maintain livestock water supplies (This exemption does not include the intentional introduction of species into a stock pond that may prey on California tiger salamander adults, larvae, or eggs.);

(v) Routine maintenance or construction of fences for grazing management;

(vi) Planting, harvest, or rotation of unirrigated forage crops as part of a rangeland livestock operation;

(vii) Maintenance and construction of livestock management facilities such as corrals, sheds, and other ranch outbuildings;

(viii) Repair and maintenance of unimproved ranch roads (This exemption does not include improvement, upgrade, or construction of new roads.);

(ix) Discing of fencelines or perimeter areas for fire prevention control;

(x) Placement of mineral supplements; and

(xi) Control and management of noxious weeds.

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Thomas O. Melius,

Acting Director, Fish and Wildlife Service.

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