

DEPARTMENT OF THE INTERIOR

Fish and Wildlife Service

50 CFR Part 17

RIN 1018-AF81

Endangered and Threatened Wildlife and Plants; Emergency Rule To List the Santa Barbara County Distinct Population of the California Tiger Salamander as Endangered

AGENCY: Fish and Wildlife Service, Interior.

ACTION: Emergency rule.

SUMMARY: We, the Fish and Wildlife Service (Service), exercise our authority to emergency list the Santa Barbara County Distinct Vertebrate Population Segment (DPS) of California tiger salamander (*Ambystoma californiense*), as endangered under the Endangered Species Act of 1973, as amended (Act). Of 14 documented breeding sites and associated uplands, half have been destroyed or have suffered severe degradation in the last 18 months. Plans to convert additional sites from grazing to intensive agriculture are being developed and implemented. Because these losses and planned conversions constitute an emergency posing a significant and imminent risk to the well-being of the Santa Barbara County DPS of the California tiger salamander, we find that emergency listing is necessary. This emergency rule provides Federal protection pursuant to the Act for a period of 240 days. A proposed rule to list the Santa Barbara County DPS of the California tiger salamander is published concurrently with this emergency rule, in this same issue of the **Federal Register** in the proposed rule section.

DATES: This emergency rule becomes effective January 19, 2000 and expires September 15, 2000.

ADDRESSES: The complete file for this rule is available for inspection, by appointment, during normal business hours at the U.S. Fish and Wildlife Service, Ventura Fish and Wildlife Office, 2493 Portola Road, Suite B, Ventura, California, 93003.

FOR FURTHER INFORMATION CONTACT: Grace McLaughlin or Carl Benz, Ventura Fish and Wildlife Office, at the address listed above (telephone: 805/644-1766; facsimile: 805/644-3958).

SUPPLEMENTARY INFORMATION:**Background**

The California tiger salamander was first described as a distinct species, *Ambystoma californiense*, by Gray in

1853 from specimens collected in Monterey (Grinnell and Camp 1917). Storer (1925) and Bishop (1943) likewise considered the California tiger salamander as a distinct species. However, Dunn (1940), Gehlbach (1967), and Frost (1985) considered the California tiger salamander a subspecies (*Ambystoma tigrinum californiense*) that belonged within the *A. tigrinum* complex. Based on recent morphological and genetic work, geographic isolation, and ecological differences among the members of the *A. tigrinum* complex, the California tiger salamander is considered to be a distinct species (Shaffer and Stanley 1991; Jones 1993; Shaffer and McKnight 1996; Irschick and Shaffer 1997). The California tiger salamander was recognized as a distinct species in the November 21, 1991, Animal Notice of Review (56 FR 58804).

The California tiger salamander is a large, stocky, terrestrial salamander with a broad, rounded snout. Adults may reach a total length of 207 millimeters (mm) (8.2 inches (in)), with males generally averaging about 200 mm (8 in) in total length and females averaging about 170 mm (6.8 in) in total length. For both sexes, the average snout-vent length is approximately 90 mm (3.6 in). The small eyes have black irises and protrude from the head. Coloration consists of white or pale yellow spots or bars on a black background on the back and sides. The belly varies from almost uniform white or pale yellow to a variegated pattern of white or pale yellow and black. Males can be distinguished from females, especially during the breeding season, by their swollen cloacae (a common chamber into which the intestinal, urinary, and reproductive canals discharge), more developed tail fins, and larger overall size (Stebbins 1962; Loredo and Van Vuren 1996).

California tiger salamanders are restricted to California, and their range does not overlap with any other species of tiger salamander (Stebbins 1985). Within California, the Santa Barbara County population is separated by the Coast Ranges, particularly the La Panza and Sierra Madre Ranges, and the Carrizo Plain from the closest other population, which extends into the Temblor Range in eastern San Luis Obispo and western Kern Counties (Shaffer, *et al.* 1993).

The California tiger salamander inhabited low elevation, below 300 meters (m) (1000 feet (ft)), vernal pools and seasonal ponds and the associated coastal scrub, grassland, and oak savannah plant communities of the Santa Maria, Los Alamos, and Santa Rita

Valleys in western Santa Barbara County (Shaffer, *et al.* 1993; Sam Sweet, University of California, Santa Barbara, *in litt.* 1993, 1998a). Although California tiger salamanders still exist across most of their historic range in Santa Barbara County, the habitat available to them has been reduced greatly. The ponds available to the salamanders for breeding have been degraded and reduced in number and the associated upland habitats inhabited by salamanders for most of their life cycle have been degraded and reduced in area through changes in agriculture practices, urbanization, building of roads and highways, chemical applications, and overgrazing (Gira *et al.* 1999; S. Sweet, *in litt.* 1993, 1998a,b).

Subadult and adult California tiger salamanders spend much of their lives in small mammal burrows found in the upland component of their habitat, particularly those of ground squirrels and pocket gophers (Loredo and Van Vuren 1996; Trenham 1998a). During estivation (a state of dormancy or inactivity in response to hot, dry weather), California tiger salamanders eat very little (Shaffer, *et al.* 1993). Once fall and winter rains begin, they emerge from these retreats on nights of high relative humidity and during rains to feed and to migrate to the breeding ponds (Stebbins 1985, 1989; Shaffer, *et al.* 1993). The salamanders breeding in and living around a pool or seasonal ponds, constitute a local subpopulation. The rate of natural movement of salamanders among subpopulations depends on the distance between the ponds or complexes and on the intervening habitat (e.g., salamanders may move more quickly through sparsely covered and more open grassland versus more densely vegetated scrublands).

Adults may migrate up to 2 kilometers (km) (1.2 miles (mi)) from summering to breeding sites. The distance from breeding sites may depend on local topography and vegetation, the distribution of ground squirrel or other rodent burrows, and climatic conditions (Stebbins 1989, Hunt 1998). In Santa Barbara County, juvenile California tiger salamanders have been trapped over 360 m (1,200 ft) while dispersing from their natal (birth) pond (Ted Mullen, Science Applications International Corporation (SAIC), personal communication, 1998), and adults have been found along roads over 2 km (1.2 mi) from breeding ponds (S. Sweet, *in litt.* 1998a). Migration is concentrated during a few rainy nights early in the winter, with males migrating before females (Twitty 1941; Shaffer, *et al.* 1993; Loredo and Van Vuren 1996; Trenham 1998b). Males

usually remain in the ponds for an average of about 6 to 8 weeks, while females stay for approximately 1 to 2 weeks. In dry years, both sexes may stay for shorter periods (Loredo and Van Vuren 1996, Trenham 1998b). Although most marked salamanders have been recaptured at the pond where they were initially captured, in one study approximately 20 percent were recaptured at different ponds (Trenham 1998b). As with migration distances, the number of ponds used by an individual over its lifetime will be dependent on landscape features.

Female California tiger salamanders mate and lay their eggs singly or in small groups (Twitty 1941; Shaffer, *et al.* 1993). The number of eggs laid by a single female ranges from approximately 400 to 1,300 per breeding season (Trenham 1998b). The eggs typically are attached to vegetation near the edge of the breeding pond (Storer 1925, Twitty 1941), but in ponds with no or limited vegetation, they may be attached to objects (rocks, boards, etc.) on the bottom (Jennings and Hayes 1994). After breeding, adults leave the pond and typically return to small mammal burrows (Loredo *et al.* 1996; Trenham 1998a), although they may continue to come out nightly for approximately the next 2 weeks to feed (Shaffer, *et al.* 1993).

Eggs hatch in 10 to 14 days with newly hatched larvae ranging from 11.5 to 14.2 mm (0.45 to 0.56 in) in total length. Larvae feed on algae, small crustaceans, and mosquito larvae for about 6 weeks after hatching, when they switch to larger prey (P.R. Anderson 1968). Larger larvae have been known to consume smaller tadpoles of Pacific treefrogs (*Hyla regilla*) and California red-legged frogs (*Rana aurora*) as well as many aquatic insects and other aquatic invertebrates (J.D. Anderson 1968; P.R. Anderson 1968). Captive salamanders appear to locate food by vision and olfaction (smell) (J.D. Anderson 1968).

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). Feaver (1971) found that California tiger salamander larvae metamorphosed and left the breeding ponds 60 to 94 days after the eggs had been laid, with larvae developing faster in smaller, more rapidly drying ponds. The longer the ponding duration, the larger the larvae and metamorphosed juveniles are able to grow. The larger juvenile amphibians grow, the more likely they are to survive and reproduce (Semlitsch *et al.* 1988; Morey 1998).

In the late spring or early summer, before the ponds dry completely, metamorphosed juveniles leave the ponds and enter small mammal burrows after spending up to a few days in mud cracks or tunnels in moist soil near the water (Zeiner *et al.* 1988; Shaffer, *et al.* 1993; Loredo *et al.* 1996). Like the adults, juveniles may emerge from these retreats to feed during nights of high relative humidity (Storer 1925; Shaffer, *et al.* 1993) before settling in their selected estivation sites for the dry summer months.

Many of the pools in which California tiger salamanders lay eggs do not retain water long enough to support successful metamorphosis. Generally, 10 weeks is required to allow sufficient time to metamorphose. The larvae will desiccate (dry out and perish) if a site dries before larvae complete metamorphosis (P.R. Anderson 1968, Feaver 1971). Pechmann *et al.* (1989) found a strong positive correlation with ponding duration and total number of metamorphosing juveniles in five salamander species. In one study, successful metamorphosis of California tiger salamanders occurred only in larger pools with longer ponding durations (Feaver 1971), which is typical range-wide (Jennings and Hayes 1994). Even though there is little difference in the number of pools used by salamanders between wet and dry years, pool duration is the most important factor to consider in relation to persistence and survival (Feaver 1971; Shaffer, *et al.* 1993; Seymour and Westphal 1994, 1995).

Lifetime reproductive success for California and other tiger salamanders is typically low, with fewer than 30 metamorphic juveniles per breeding female. While individuals may survive for more than 10 years, many may breed only once, and, in some populations, less than 5 percent of marked juveniles survive to become breeding adults (Trenham 1998b). With such low recruitment, isolated subpopulations can decline greatly from unusual, randomly occurring natural events as well as from human-caused factors that reduce breeding success and individual survival. Factors that repeatedly lower breeding success in isolated ponds that are too far from other ponds for migrating individuals to replenish the population can quickly drive a local population to extinction.

Distinct Vertebrate Population Segment

The evidence supports recognition of Santa Barbara County California tiger salamanders as a DPS for purposes of listing, as defined in our February 7, 1996, Policy Regarding the Recognition

of Distinct Vertebrate Population Segments (61 FR 4722). The definition of "species" in section 3(16) of the Act includes "any distinct population segment of any species of vertebrate fish or wildlife which interbreeds when mature." When listing a population under the Act as a DPS, three elements are considered: (1) The discreteness of the population segment in relation to the remainder of the species to which it belongs; (2) the significance of the population segment to the species to which it belongs; and (3) the population segment's conservation status in relation to the Act's standards for listing (*i.e.*, is the population segment, when treated as if it were a species, endangered or threatened?) (61 FR 4722).

The DPS of California tiger salamanders in Santa Barbara County is discrete in relation to the remainder of the species as a whole. The DPS is geographically isolated and separate from other California tiger salamanders; no mixing of the population with other California tiger salamander populations occurs. As detailed below, this finding is supported by an evaluation of the species' genetic variability.

Genetic analyses of the California tiger salamander suggest that levels of interchange among populations are very low, and that populations or subpopulations are genetically isolated from one another (Jones 1993; Shaffer, *et al.* 1993). Allozyme variation (distinct types of enzymes (proteins) in the cells, which are formed from an individual's inherited genes) and mitochondrial DNA sequence data indicate the existence of at least seven genetically distinct California tiger salamander populations (Shaffer, *et al.* 1993). Although the allozyme variation reported by Shaffer, *et al.* (1993) is quite low, it does indicate patterns of geographic isolation. Probably because of this isolation, the population in Santa Barbara County is one of the two most genetically distinct, and these salamanders are more similar to California tiger salamanders on the eastern side of the Central Valley than to those in the closest populations found in the Temblor Range (Shaffer, *et al.* 1993). The populations in the Temblor Range are about 67.5 km or 44 mi by air, from the Santa Barbara County population, while the eastern Central Valley populations are 200 km or 128 mi by air, across mountain ranges, an arid plain, and the Central Valley, all of which are inhospitable zones for California tiger salamanders. The Santa Barbara County population may be a relict population of a much more widespread group that extended across the area where the Tehachapi and

Transverse Ranges now extend. The uplift of those ranges changed the terrain and the local climatic conditions, isolating salamanders in what is now northwestern Santa Barbara County. The Temblor Range salamanders appear to be a more recent extension from the populations south of San Francisco Bay. The sequence divergence between the Santa Barbara County tiger salamanders and other samples from throughout the species' range is on the order of 1.7 percent (Shaffer, *in litt.* 1998) or 1.8 percent (Shaffer, *et al.* 1993). Shaffer's mitochondrial DNA sequence data (Shaffer and McKnight 1996, and unpublished data) suggest that the seven distinct populations differ markedly in their genetic characteristics, with Santa Barbara County tiger salamanders having gene sequences not found in any other California tiger salamander populations (Shaffer, *in litt.* 1998). California tiger salamanders in Santa Barbara County may have been separated from the other populations for about 1 to 1.5 million years (Shaffer, *et al.* 1993; Shaffer and McKnight 1996; H. Bradley Shaffer, University of California, Davis (UCD), *in litt.* 1998). Shaffer, *et al.* (1993) and Shaffer (*in litt.* 1998) suggest that differentiation at this level is sufficient to justify species-level recognition.

The Santa Barbara County California tiger salamander population is biologically and ecologically significant to the species. As discussed above, the Santa Barbara County population is genetically distinct from other populations of California tiger salamanders, and individuals exhibit genetic characteristics not found in other California tiger salamanders. The Santa Barbara County population is also significant in that it constitutes the only population of California tiger salamanders west of the outer Coast Ranges, and it is the southernmost population of the species. The DPS covered in this emergency rule is found only in Santa Barbara County. The extinction of the Santa Barbara County California tiger salamander population would result in the loss of a significant genetic entity, the curtailment of the range of the species as a whole, and the loss of a top predator in the aquatic systems that Santa Barbara County California tiger salamanders inhabit. Based on geographic isolation, the lack of evidence of gene flow with other populations, and marked genetic differentiation, we conclude that the Santa Barbara County population of California tiger salamanders meets the discreteness and significance criteria in

our Policy Regarding the Recognition of Distinct Vertebrate Population Segments and qualifies as a DPS. We discuss the Santa Barbara County population's conservation status below.

Status and Distribution

Currently, California tiger salamanders in Santa Barbara County are found in four discrete regions (S. Sweet, *in litt.* 1998a). Collectively, salamanders in these regions constitute a single genetic population or DPS, reproductively separate from the rest of the California tiger salamanders (Jones 1993; Shaffer, *et al.* 1993; Shaffer and McKnight 1996). Ponds and associated uplands in southwestern (West Orcutt) and southeastern (Bradley-Dominion) Santa Maria Valley, Los Alamos Valley, and Santa Rita Valley constitute the four discrete regions or metapopulations where California tiger salamanders now exist in Santa Barbara County (S. Sweet, *in litt.* 1998a). For the purposes of this rule, a metapopulation is defined as a group of subpopulations or "local populations" linked by genetic exchange. Of 14 known breeding sites or subpopulations within this DPS, 1 was destroyed in 1998, the upland habitat around 3 has been converted into more intensive agriculture practices (*i.e.* vineyards, gladiolus fields, and row crops, which may have eliminated the salamander subpopulations), 1 is surrounded by agriculture and urban development, 2 are affected by overgrazing, 4 are imminently threatened with conversion to vineyards or other intensive agriculture practices, and the remaining 3 are in areas rapidly undergoing conversion to vineyards and row crops (Sweet, *et al.* 1998; Sweet, *in litt.* 1998; Santa Barbara County Planning and Development 1998; Grace McLaughlin, Service, personal observations, 1998). Thus, only 6 or 7 of 13 existing ponds potentially provide breeding habitat for viable subpopulations of Santa Barbara County California tiger salamanders. Although other breeding ponds could exist within each of the four metapopulations noted above, searches around extant localities in the county, as well as in other areas with suitable habitat, have not identified additional subpopulations of the species (Paul Collins, Santa Barbara Museum of Natural History, *in litt.* 1998, pers. comm. 1999; S. Sweet, *in litt.* 1998a). Four possible breeding ponds or pond complexes (three in the Bradley-Dominion area, one in Santa Rita Valley) have been identified from aerial photography and by finding salamanders on roads in the vicinity (Sweet, *et al.* 1998) but have not been sampled. Most of the upland habitats

around the ponds have been converted to vineyards or row crops within the last 6 years (Santa Barbara County Planning and Development 1998). All of the known and potential localities of the California tiger salamander in Santa Barbara County are on private lands, none are protected by conservation easements or agreements, and access is limited.

Previous Federal Action

On September 18, 1985, we published the Vertebrate Notice of Review (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 notices of review (54 FR 554 and 56 FR 58804, respectively) also included the California tiger salamander as a category 2 candidate, soliciting information on the status of the species. On February 21, 1992, we received a petition from Dr. H. Bradley Shaffer of the University of California, Davis, 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 Notice of Review (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 to the Field Supervisor, 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 from the listing program funding. The moratorium was lifted and listing funding was restored through passage of the Omnibus Budget Reconciliation Act on April 26, 1996, following severe funding constraints

imposed by a number of continuing resolutions between November 1995 and April 1996. The listing of the California tiger salamander throughout its range was precluded by the need to address higher priority species, although the status of the entire species is currently under review. The decision to emergency list this DPS of the California tiger salamander is based on information contained in the original petition, information referenced in the petition, and new information otherwise available to the Service.

The processing of this emergency rule conforms with our Listing Priority Guidance published in the **Federal Register** on October 22, 1999 (64 FR 57114). The guidance clarifies the order in which we will process rulemakings. Highest priority is processing emergency listing rules for any species determined to face a significant and imminent risk to its well-being (Priority 1). Second priority (Priority 2) is processing final determinations on proposed additions to the lists of endangered and threatened wildlife and plants. Third priority is processing new proposals to add species to the lists. The processing of administrative petition findings (petitions filed under section 4 of the Act) is the fourth priority. The processing of critical habitat determinations (prudence and determinability decisions) and proposed or final designations of critical habitat will be funded separately from other section 4 listing actions and will no longer be subject to prioritization under the Listing Priority Guidance. This emergency rule is a Priority 1 action and is being completed in accordance with the current Listing Priority Guidance.

Summary of Factors Affecting the Species

After a thorough review and consideration of all information available, we have determined that the Santa Barbara County population of the California tiger salamander warrants classification as an endangered DPS. We followed procedures found at section 4 of the Act (16 U.S.C. 1533) and regulations (50 CFR part 424) promulgated to implement the listing provisions of the Act. We may determine a species to be endangered or threatened due to one or more of the five factors described in section 4(a)(1). These factors and their application to the Santa Barbara County DPS of the California tiger salamander (*Ambystoma californiense*) are as follows:

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

California tiger salamanders now occur in scattered subpopulations within four isolated areas or metapopulations across the historic range in Santa Barbara County. Based on the topography and habitat type of the lands that have been converted to agriculture and urban development, we conclude that the number of breeding ponds, the extent of upland habitats, and the quality of the remaining habitats have been reduced greatly since Europeans first settled the region. While those areas remained in grazing lands or oil production, which generally have relatively low effects on the subpopulations, the species was relatively secure. However, based on aerial photography from the 1930's through the 1990's (archived at the Santa Barbara County Department of Planning and Development), the conversion to intensive agriculture and urban developments has resulted in the loss of breeding habitat from the destruction or alteration of natural vernal pools and seasonal ponds, and the loss of upland habitat used for estivation and migration.

Pools and ponds are destroyed when they are filled during grading and leveling operations or deep-ripping. Deep-ripping or deep slip plowing is a technique that uses a 4- to 7-foot deep plow to break up the hardpan (layer of dense soil or material that prevents water percolation) or compacted soil to allow water to drain deeper into the soil and prevents water retention or ponding. Alternatively, seasonal ponds may be converted to irrigation ponds, which are often managed in ways that are not conducive to salamander survival (Lawrence Hunt, Biological Consultant, *in litt.* 1998). The repeated plowing and discing or deep-ripping of upland habitats can alter the hydrology of the pools, thus destroying them (Coe 1988), or can kill salamanders outright and destroy the small mammal burrow systems in which they live most of the year.

Intensive agricultural practices began in the Santa Maria River and San Antonio Creek Valleys over 130 years ago (Elihu Gevirtz, Santa Barbara County Planning and Development, pers. comm. 1999), probably eliminating many breeding ponds and associated upland habitats. The increasingly rapid conversion of these lands and those in the Los Alamos and Santa Rita Valleys to intensive agricultural practices is characterized by the increase in row crop acreage by more than 9,900

hectares (ha) (over 25,000 acres (ac)) since 1986 and the installation of approximately 4,000 ha (10,000 ac) of vineyards just since 1996 (Gira *et al.* 1999). These conversions have resulted in the destruction of two breeding ponds (one suspected and one documented) and the grading of 90 and 100 percent of their drainage basins, and the grading of 50 to 100 percent of the drainage basins of five documented and two suspected breeding ponds in the last 5 years (Santa Barbara County Planning and Development 1998). Six of 14 documented breeding sites and associated uplands have been destroyed or severely affected since 1996, and there are proposals to develop vineyards around 4 other documented breeding ponds, leaving only 4 of 13 remaining pond sites relatively free from imminent threat (Hunt 1998; G. McLaughlin, pers. obs. 1998; Santa Barbara County Planning and Development 1998; Sweet, *et al.* 1998; Sweet, *in litt.* 1998). The current and potential threats to the remaining ponds from agriculture and urbanization are discussed below by region (West Orcutt, Bradley-Dominion, Los Alamos, Santa Rita).

The known breeding sites in southwestern Santa Maria Valley (west of Highway 101 and Santa Maria), comprising the West Orcutt metapopulation, are on grazing and other agricultural lands. Vernal pools in the area have been lost or adversely affected by rapid development in the Santa Maria Valley (E. Gevirtz, pers. comm. 1999). Thirty years ago, a housing development directly affected one of three documented breeding sites in this metapopulation. The two remaining sites are separated by a railroad that may disrupt migration routes and reduce genetic interchange. These sites are also threatened by overgrazing (G. McLaughlin, pers. obs. 1998) (see discussion on grazing in Factors C and E, below) and potentially threatened by urban development (S. Sweet, *in litt.* 1998a; E. Gevirtz, pers. comm. 1999).

Before 1996, the four documented and three possible breeding sites (Sweet, *et al.* 1998) in southeastern Santa Maria Valley, which constitute the Bradley-Dominion metapopulation, were surrounded by oil production and grazing lands. Since 1996, agricultural land conversion for vineyards, vegetable row crops, and flowers has destroyed one documented and one suspected breeding site, possibly extirpated salamanders from two other documented sites and one possible breeding site, and threatens the remaining possible breeding site (S. Sweet, *in litt.* 1993; 1998a,b). Although

California tiger salamanders were found migrating across roads in the vicinity of the possible breeding sites throughout the 1980's, salamanders have not been observed since the early 1990's, when the grazing lands were converted to vineyards (S. Sweet, *in litt.* 1998a).

A storage facility for agricultural products and chemicals is within the watershed of the remaining documented breeding site (S. Sweet, *in litt.* 1998a; Theresa Stevens, Santa Barbara County Planning and Development, pers. comm. 1999). Although precautions have been taken to reduce the threats of runoff and spills into the natural pond (Analise Merlo, Santa Barbara County Planning and Development, pers. comm. 1999) that could eliminate or injure salamanders during the breeding or development seasons, the threats still exist. A road between this pond and a nearby pond, the watershed of which was converted to gladiolus fields in 1998, disrupts migration between the ponds and the uplands, has caused the deaths of many salamanders, and contributes to potentially lethal contamination of the ponds (S. Sweet, *in litt.* 1993, 1998a).

The Los Alamos Valley or Las Flores metapopulation, although fragmented by Highway 101, was considered to be an important breeding site for the species provided existing conditions could be maintained (Stebbins 1989). However, recent changes in land ownership and management have resulted in the conversion from grazing lands to vineyards, east of the highway. The direct effects of this conversion resulted in the loss of one vernal pool and the severe degradation of upland habitats surrounding that pool and another documented breeding site (Hunt 1998). On the west side of Highway 101, habitat around four vernal pools and seasonal ponds that are documented breeding sites and currently grazing lands, may be converted for intensive agricultural practices (Santa Barbara County Planning and Development 1998; L. Hunt, *in litt.* 1999; S. Sweet, *in litt.* 1998a; Abe Lieder, Santa Barbara County Planning and Development, *in litt.* 1999; Morgan Wehtje, California Department of Fish and Game (CDFG), pers. comm. 1999).

In the Santa Rita Valley metapopulation, one of the two sites used by the California tiger salamander west of Buellton has been severely affected by agricultural grading and conversion to row crops (S. Sweet, *in litt.* 1993, 1998a,b). The other site has two vernal pools that have been deepened to create a permanent water source for cattle and have had introductions of mosquitofish

(*Gambusia affinis*) and sunfish (*Lepomis* spp.). The pools are adjacent to Highway 246, resulting in considerable road mortality of salamanders during their breeding migrations (S. Sweet, *in litt.* 1993, 1998). Upland habitats around two possible breeding ponds northeast of the latter were deep-ripped in 1998 in preparation for conversion to vineyards (L. Hunt, *in litt.* 1998; Santa Barbara County Planning and Development 1998). The conversion to vineyard of these areas is in progress (G. McLaughlin, pers. obs. 1999), and one of the ponds has recently been enlarged and deepened (E. Gevartz, pers. comm. 1999; Jim Mace, U.S. Army Corps of Engineers, pers. comm. 1999). This change may make the pond less desirable for the California tiger salamander and more likely to be inhabited by exotic fish, crayfish, and bullfrogs.

Oil production began within the range of the salamander approximately 100 years ago, with the discovery of oil in the Solomon Hills (within the range of the Los Alamos tiger salamander metapopulation). By 1910, production had begun in the Santa Maria Valley (E. Gevartz, pers. comm. 1999). Although oil production is less disruptive to the upland habitats than agriculture, oil sump ponds, particularly those located where natural ponds and pools once existed, may act as toxic sinks. While attracting salamanders seeking breeding sites, these ponds may contain levels of contaminants that may kill adults, eggs, and larvae outright, or cause deformities in the developing larvae thus precluding their survival (see discussion on contaminants in Factor E of this section). Also, the "burping" (release) of hydrogen sulfide gas by the wells can acidify the ponds as the gas settles in low-lying areas, reducing the survival rates of larvae and adults (S. Sweet, *in litt.* 1993).

The primary cause of the reduced distribution of the California tiger salamander in Santa Barbara County is the conversion of native habitat to intensive agricultural practices and urban development. In addition, the largest remaining subpopulations are in areas most severely threatened by human encroachment (Shaffer, *et al.* 1993; S. Sweet, *in litt.* 1993; 1998a; E. Gevartz, *in litt.* 1998). Besides direct loss of habitat, the widespread conversion of land to agricultural and residential uses has led to the fragmentation of the range of the tiger salamander and isolation of remaining subpopulations in Santa Barbara County (Shaffer, *et al.* 1993; S. Sweet, *in litt.* 1993; 1998a). Even relatively minor habitat modifications, such as construction of roads, pipelines,

fences, and berms that traverse the area between breeding and refuge sites, can increase habitat fragmentation, impede or prevent breeding migrations, and result in direct and indirect mortality (Mader 1984; S. Sweet, *in litt.* 1993, 1998; Findlay and Houlahan 1996; Launer and Fee 1996; Gibbs 1998).

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

Although tiger salamanders have been used for bait and imported larvae ("waterdogs") are still sold in California, we have no information about the use of California tiger salamanders for this purpose (see discussion under Factor E of this section).

C. Disease or Predation

Disease

The direct effect of disease on the Santa Barbara County population of California tiger salamanders is not known and the risks to the DPS have not been determined. Because California tiger salamanders are found in so few sites in Santa Barbara County, and because the sites are found across a relatively small area, disease must be considered a potential threat to the persistence of the DPS. Sam Sweet (pers. comm. 1998) reported that one landowner in the Los Alamos Valley has seen large numbers of dead and dying salamanders in a pond, but the cause was not determined. Several pathogenic (disease-causing) agents, including at least one bacterium (Worthylake and Hovingh 1989), a water mold (fungus) (Kiesecker and Blaustein 1997; Lefcort *et al.* 1997), and a virus (McLean 1998), have been associated with die-offs of closely related tiger salamanders, as well as other amphibian species. Each of these pathogens could devastate one or all of the remaining subpopulations or metapopulations if introduced into Santa Barbara County.

Worthylake and Hovingh (1989) reported on repeated die-offs of tiger salamanders (*Ambystoma tigrinum*) in Desolation Lake in the Wasatch Mountains of Utah. Affected salamanders had red, swollen hind legs and vents, and widespread hemorrhage of the skin and internal organs. The researchers determined that the die-offs were due to infection with the bacterium *Acinetobacter*. The number of bacteria in the lake increased with increasing nitrogen levels as the lake dried. The nitrogen was believed to come from both atmospheric deposition and waste from sheep grazing in the watershed (Worthylake and Hovingh

1989). *Acinetobacter* spp. are common in soil and animal feces. Overstocking of livestock in pond watersheds could lead to high levels of nitrogen in ponds and contribute to increased bacterial levels.

Lefcort *et al.* (1997), in Georgia, found that tiger salamanders raised in natural and artificial ponds contaminated with silt were susceptible to infection by the water mold *Saprolegnia parasitica*. The fungus first appeared on the feet, then spread to the entire leg. All infected animals died. Die-offs of western toads (*Bufo boreas*), Cascades frogs (*Rana cascadae*), and Pacific treefrogs (*Hyla regilla*) also have been associated with *Saprolegnia* infections (Kiesecker and Blaustein 1997). *Saprolegnia* spp. are widespread in natural waters and commonly grow on dead organic material (Wise 1995).

High nitrogen and silt levels from overgrazing or other agricultural or urban runoff may increase susceptibility to disease and may interact with other risk factors (e.g., habitat loss, introduced species) to jeopardize the persistence of a local population. Two of the three ponds in the West Orcutt metapopulation area are in severely overgrazed grasslands and are at risk of receiving runoff that has both high nitrogen and high silt levels. Four ponds in the Los Alamos metapopulation and the two ponds in the Santa Rita metapopulation are on grazing lands; although the levels of grazing are not excessive, silt and nitrogen levels must be considered when assessing the health of these populations. One of the ponds in the Los Alamos Valley was the site of a die-off of California tiger salamanders, but the cause was unknown (S. Sweet, pers. comm. 1998).

In addition to the *Acinetobacter* discussed above, an iridovirus (viruses with DNA as the genetic material that occur in insects, fish, and amphibians and may cause death, skin lesions, or no symptoms) has been identified by the U.S. Geological Service (USGS), National Wildlife Health Center in Madison, Wisconsin, as the cause of deaths of large numbers of tiger salamanders at Desolation Lake, Utah. Infected salamanders moved slowly in circles and had trouble remaining upright. They had red spots and swollen areas on the skin. Viruses associated with die-offs of tiger and spotted salamanders in two other States, Maine and North Dakota, have been isolated (McLean 1998). In 1995, researchers reported similar die-offs attributed to an iridovirus in southern Arizona and near Regina, Saskatchewan, Canada (McLean 1998). Iridoviruses are found in both fish and frogs and may have been introduced to some sites through fish

stocking programs. Little is known about the historical distribution of iridoviruses in salamander populations. A virus could enter California via bait shops where eastern tiger salamanders are legally sold in certain counties (California Code of Regulations (CCR) Title 14, Division 1, Subdivision 1, Chapter 2, Article 3, Sec. 4, 1999), or where they are illegally sold in other areas. The virus may be carried by birds, such as herons and egrets, that feed on the salamanders. Such a virus could be devastating to the Santa Barbara County population of California tiger salamanders.

Predation

Predation and competition by introduced or nonnative species potentially affect 38 percent of the remaining 13 Santa Barbara County California tiger salamander breeding sites. Shaffer, *et al.* (1993) consider bullfrogs (*Rana catesbeiana*), mosquitofish, and other introduced fish to be biological indicators of ponds that have been disturbed to a degree that California tiger salamanders are excluded. Competition is discussed under Factor E of this section.

Bullfrogs prey on California tiger salamander larvae (P.R. Anderson 1968). Morey and Guinn (1992) documented a shift in amphibian community composition at a vernal pool complex, with California tiger salamanders becoming proportionally less abundant as bullfrogs increased. Although bullfrogs are unable to establish permanent breeding populations in unaltered vernal pools and seasonal ponds, dispersing immature frogs take up residence in vernal pools during winter and spring (Morey and Guinn 1992) and may prey on native amphibians, including larval California tiger salamanders. Lawler *et al.* (1999) found that less than 5 percent of California red-legged frog tadpoles survived to metamorphosis when raised with bullfrog tadpoles (initially, ponds held 720 red-legged frog tadpoles and 50 bullfrog tadpoles; approximately 50 percent of the bullfrogs successfully metamorphosed). Due to the documented effects of bullfrogs on other amphibian species, we believe that they are likely to have similar effects on California tiger salamanders and that the presence of bullfrogs in salamander habitat threatens the persistence of the salamander populations. Bullfrogs are found within 1.6 km (1 mi) of one vernal pool complex in Santa Barbara County (S. Sweet, pers. comm. 1999), posing a threat to that metapopulation.

Mosquitofish, instead of pesticides, often are placed into ponds by vector

control agencies to eliminate mosquitoes. Mosquitofish are used by every vector control district in the State and in some districts represent the majority of their control efforts (Ken Boyce, California Mosquito and Vector Control Association, *in litt.* 1994). These fish were first introduced to California in 1922 and have since become well-established throughout the State's water systems (K. Boyce *in litt.* 1994). In general, mosquitofish are stocked in very small numbers because they quickly reproduce to the maximum population levels that a particular habitat may sustain. Mosquitofish are extremely tolerant of polluted water with low levels of dissolved oxygen and have an extremely wide range of temperature tolerance (Boyce 1994). Mosquitofish prey on the California newt (*Taricha torosa*) (Gamradt and Kats 1996) and Pacific treefrog (Goodsell and Kats 1999) larvae in both field and laboratory experiments, even given the optional prey of mosquito larvae (Goodsell and Kats 1999; Lee Kats, Pepperdine University, pers. comm. 1999). Both newt and Pacific treefrog larvae were found in stomachs of wild-caught mosquitofish (Goodsell and Kats 1999; L. Kats, pers. comm. 1999). Robert Stebbins observed mosquitofish ingesting and then spitting out California newt larvae, causing severe damage to the newts in the process (Graf 1993). Schmieder and Nauman (1993) found that mosquitofish significantly affected the survival of both prefeeding and large larvae of California red-legged frogs. Lawler *et al.* (1999) did not find a reduction in survival rates of California red-legged frog tadpoles raised in the presence of mosquitofish versus controls with no mosquitofish, but those tadpoles that did survive weighed less than control tadpoles and metamorphosed later, and most were injured by the fish. Smaller size at metamorphosis may reduce survival to breeding age and reproductive potential (Morey 1998, Semlitsch *et al.* 1988). Salamanders may be especially vulnerable to mosquitofish predation due to their fluttering external gills, which may attract these visual predators (Graf 1993). Loredó-Prendeville *et al.* (1994) found no California tiger salamanders in ponds with mosquitofish. Due to the documented effects of mosquitofish on other amphibian species, we believe that they are likely to have similar effects on California tiger salamanders and that the use of mosquitofish in salamander habitat threatens the persistence of the salamander populations.

Louisiana red swamp crayfish (*Procambarus clarki*) also apparently prey on California tiger salamanders (Shaffer, *et al.* 1993) and may have eliminated some populations (Jennings and Hayes 1994). The crayfish prey on California newt eggs and larvae, in spite of toxins that the species has developed, and may be a significant factor in the loss of newts from several streams in southern California (Gamradt and Kats 1996). These crayfish are found in two salamander breeding sites in Santa Barbara County, but their effect on egg and larval survival is unknown (S. Sweet, pers. comm. 1999).

California tiger salamander larvae also are preyed upon by many native species. In healthy salamander populations such predation is probably not a significant threat, but when combined with other impacts, such as predation by nonnative species, contaminants, or habitat alteration, it may cause a significant decrease in population viability. Native predators include great blue herons (*Ardea herodias*) and egrets (*Casmerodius albus*), western pond turtles (*Clemmys marmorata*), various garter snakes (*Thamnophis* spp.), larger California tiger salamander larvae, larger spadefoot toad (*Scaphiopus hammondi*) larvae, and California red-legged frogs (Mike Peters, Service, *in litt.* 1993; Hansen and Tremper 1993).

D. The Inadequacy of Existing Regulatory Mechanisms

The primary cause of the decline of the Santa Barbara County population of California tiger salamanders is the loss, degradation, and fragmentation of habitat from human activities. Federal, State, and local laws have not been sufficient to prevent past and ongoing losses of California tiger salamander habitat.

Federal

Section 404 of the Clean Water Act (CWA) authorizes the U.S. Army Corps of Engineers (Corps) to issue individual or general permits for the discharge of dredged or fill material into waters of the United States, which include navigable waters, wetlands (*e.g.*, vernal pools), and other seasonal ponds typically used by breeding salamanders. Projects that involve only the excavation of pools or that alter the watershed and hydrological regime of the pool but do not involve "discharge" into the pool do not require a section 404 permit (Coe 1988). General permits include both nationwide and regional permits and may allow projects to proceed without the scrutiny afforded through the individual permitting process.

Of particular concern relative to the persistence of California tiger salamanders are activities conducted under Nationwide Permit (NWP) Number 26 (33 CFR part 330 Appendix A), which authorizes an applicant to fill up to 1.2 ha (3 ac) of waters and wetlands, including vernal pools and seasonal ponds. Filling of less than 0.13 ha (0.33 ac) of isolated waters can be undertaken without notifying the Corps of the proposed activity. If the activity will affect between 0.13 and 0.4 ha (0.33 and 1 ac) of wetlands, an applicant is required to notify the Corps, but the Corps is not required to notify resource agencies unless the project may affect a listed species or designated critical habitat. Because vernal pools are often small and scattered across the landscape, projects, even very large development projects that fill hundreds of vernal pools, can be authorized under NWP 26. Numerous small projects in a given area also could be authorized, cumulatively resulting in the loss of significant amounts of wetland and associated upland habitats, with significant negative effects on local and regional biodiversity (Semlitsch and Brodie 1998).

Projects affecting between 0.4 ha and 1.2 ha (1 ac and 3 ac) of isolated waters also can be authorized under NWP 26 after the Corps circulates a pre-discharge notification to the Service and other resource agencies for review and comments. For such projects, the Corps can place special conditions requiring minimization of impacts and/or compensatory mitigation on authorizations granted under NWP 26. The Corps can require an individual permit for these projects if it determines the project will have significant individual or cumulative effects. However, the Corps generally is reluctant to withhold authorization under NWP 26 unless a listed threatened or endangered species is known to be present. Also, the Corps often confines its evaluation of impacts to those areas under its jurisdiction (*i.e.*, wetlands and other waters of the United States). Impacts to uplands and mitigation for upland habitat losses usually are not addressed by the Corps. Preservation of existing pools without protection of large blocks of suitable uplands is unlikely to result in the persistence of viable salamander populations because the salamanders require both aquatic and upland habitats during their life cycle. Thus, section 404 provides insufficient protection of small isolated wetlands.

An individual permit is required for projects filling or affecting 1.2 ha (3 ac) or more of isolated waters. Individual

permits are subject to review by the Service, other resource agencies, and the public. When we review the permit, we may recommend measures to avoid, minimize, or mitigate losses. In some cases, compensatory mitigation (*e.g.*, the creation of artificial wetlands) is incorporated in the Corps permit as a Special Condition. However, problems associated with such compensatory measures often decrease or eliminate the habitat value for salamanders at the sites (DeWeese 1994).

The creation of artificial wetlands and ponds as breeding habitat for tiger salamanders has been used as a compensatory mechanism for the loss of natural wetlands and pools. The long-term viability and suitability of artificially created wetlands are unknown. In 1994 the Service completed a report evaluating 30 wetland creation projects authorized through the Corps of Engineers section 404 program (DeWeese 1994). Twenty-two projects ranged in age from 3 to 5 years old, and eight projects were greater than 5 years old at the time of the study. The Service found that, although it appeared the Service's goal of "no net loss of acreage" was being met or exceeded, the value of the habitat created, which included the local wildlife species that would be expected to use the habitat, was low. This situation was especially the case for vernal pools and seasonal wetlands that had a value of only 20 and 40 percent (respectively) of what existed previously. Particular problems were noted for these habitat types, which often were inundated (flooded) for longer than natural systems or more frequently. The study concluded that, of the 600 ac of proposed mitigation, half were meeting less than 75 percent of the mitigation conditions. Mitigation and compensation for impacts to larger wetlands under section 404 have failed to reduce threats to California tiger salamanders.

The conversion of grazing land to intensive agricultural uses that may adversely affect the California tiger salamander generally is unregulated at any level of government. For example, the Corps has promulgated regulations that exempt some farming, forestry, and maintenance activities from the regulatory requirements of section 404 (33 CFR 323.4). Therefore, not all activities that destroy or degrade vernal pools require Corps authorization. Certain normal farming activities, including discing and plowing to depths less than 16 in, can degrade or destroy vernal pools without requiring a permit because these activities are exempt under the Clean Water Act. However,

deep-ripping, which disrupts the water-retaining hardpan that underlies vernal pools and other seasonal wetlands, of lands formerly used for ranching (*i.e.*, grazing) or dry-land farming (*e.g.*, non-irrigated hay production) represents a "change in use" of the lands and is not considered a normal and ongoing farming activity. As such, the practice triggers section 404(f)(2) of the CWA, and requires review by and a permit from the Corps (R. H. Wayland III, U.S. Environmental Protection Agency, and D. R. Burns, Corps, *in litt.* 1996). However, as discussed previously, the Corps typically asserts jurisdiction only over the actual wetlands, not over the surrounding uplands.

State

The State of California recognizes the California tiger salamander as a species of special concern under the California Endangered Species Act (ESA), and has placed this species on the list of protected amphibians, which means that it may not be taken without a special (*i.e.*, scientific collecting) permit (CRC, Title 14, Section 41). However, this protection applies only to actual possession or intentional killing of individual animals, and affords no protection to habitat. Activities that destroy habitat and kill salamanders in the process are not regulated.

The California Environmental Quality Act (CEQA) offers some opportunities to protect rare threatened and endangered plants and animals and declares that it is the policy of the State to "(p)revent the elimination of fish or wildlife species due to man's activities, ensure that fish and wildlife populations do not drop below self-perpetuating levels, and preserve for future generations representations of all plant and animal communities." (California Public Resources Code, section 21001(c) 1999). Species do not have to be listed under the Federal or California ESAs to meet the determination of rare (California Code of Regulations (CRC), Title 14, Chapter 3, Section 15380(b)(2)). Species that have been classified as "species of special concern" are considered rare for the purposes of CEQA. When the CEQA process is triggered, it requires full disclosure of the potential environmental impacts of proposed projects. However, the CEQA review process is not triggered unless issuance of a permit associated with a project is considered "discretionary" rather than "ministerial." The public agency with primary authority or jurisdiction over the project is designated as the lead agency and is responsible for conducting a review of the project and consulting with the other agencies

concerned with the resources affected by the project. Section 15065 of the CEQA Guidelines requires a finding of significance if a project has the potential to "reduce the number or restrict the range of a rare or endangered plant or animal." Once significant effects are identified, the lead agency has the option to require mitigation for effects through changes in the projects or to decide that overriding social or economic considerations make mitigation infeasible. In the latter case, projects may be approved that cause significant environmental damage, such as destruction of rare species. Protection of listed or rare species through CEQA is, therefore, dependent upon the discretion of the agency involved. Therefore, the effectiveness of this statute in protecting California tiger salamanders and their vernal pool and upland habitats has not been consistent.

Local

In Santa Barbara County, no specific regulatory protection exists for vernal pools, surrounding uplands, and their associated species, including California tiger salamanders. Some provisions are discretionary and could provide some measure of protection. For example, the Santa Barbara County Grading Ordinance (Ordinance 3937, Chapter 14 of the County Code) states that the issuance of a grading permit is discretionary (Section 14—6.(a)), and that "no person shall cause or allow a significant environmental impact to occur as a result of new grading as defined herein, including grading that is otherwise exempt from these regulations." In one case in 1998, the Planning Department required, after the fact, a permit, the preparation of an environmental impact report, and mitigation for the discing of a vernal pool and the deep-ripping of uplands associated with that and an adjacent, larger pool in preparation for vineyard installation (Albert J. McCurdy, Deputy Director, Santa Barbara County Planning and Development, *in litt.* 1998a). Those requirements were overturned by the County Board of Supervisors (A. McCurdy, *in litt.* 1998b). The Corps did require a small set-aside approximately 5.7 ha (14 ac) to provide a narrow buffer around both ponds, as mitigation for the discing of the smaller pool (David Castanon, Army Corps of Engineers, *in litt.* 1999). In another case, grazing lands surrounding another pool were converted to row crops to the edge of the pool. Although discing and other activities clearly degraded the wetland, no agency has required any review, permits, or mitigation for the activities.

Typically, California tiger salamander habitat has been eliminated without offsetting mitigation measures. Most mitigation plans that have been required were designed specifically for vernal pool plants and did not consider the upland habitats, including mammal burrows, needed by salamanders, or their dispersal needs. As indicated above, the artificial creation of vernal pools and seasonal wetlands as compensatory mitigation has not been proven scientifically to be successful over the long term (Zedler and Black 1988, Ferren and Gevirtz 1990, Zedler and Calloway 1999). Race and Fonseca (1996) reviewed numerous published and unpublished documents, which collectively analyzed over 2,000 permitted wetland mitigation projects, and concluded that significant wetland losses will continue unless compliance with existing regulations and permits is improved, more habitat is generated, and more fully functioning wetlands are created.

E. Other Natural or Manmade Factors Affecting Its Continued Existence

Several other factors, including habitat fragmentation, contaminants, hybridization with and competition from introduced species, and effects from oil production and over-grazing may have negative effects on California tiger salamanders and their aquatic and upland habitats.

Fragmentation

Amphibian populations may be prone to local extinction due to human-caused fragmentation (Findlay and Houlahan 1996, Gibbs 1998). The primary factors that cause habitat fragmentation are road construction, urbanization, and intensive agriculture (Mader 1984; Saunders *et al.* 1991). All documented localities of California tiger salamanders in Santa Barbara County are affected by railroads, highways, or other roads that have caused extensive fragmentation of the landscape. The dispersal and migration distances of California tiger salamanders require a large amount of barrier-free landscape (Loredo, *et al.* 1996; Shaffer, *et al.* 1993). Large roads and highways represent permanent physical obstacles and can block California tiger salamanders from moving to new breeding habitat or prevent them from returning to their breeding ponds or estivation sites. Road construction can reduce or completely eliminate the breeding population of an entire pond and, in some cases, large portions of a metapopulation.

Two Santa Barbara County tiger salamander breeding ponds are within 0.4 km (0.2 mi) of a railroad that runs

between them, possibly reducing migration and genetic interchange between the ponds. In addition to the barriers created by fill deposited in small canyons and watercourses, the railroad tracks themselves can act as barriers to migrating salamanders (Thomas R. Jones, Museum of Zoology, University of Michigan, *in litt.* 1993). The animals have difficulty getting under the tracks unless adequate holes are present.

All 13 remaining breeding sites in Santa Barbara County are near roads of various sizes. Four are within 0.5 km (0.3 mi) of a major U.S. highway that bisects the pond complex, two are bounded by a State highway, one is immediately adjacent to a secondary road (as was the one destroyed in 1998), five are within 0.5 km (0.3 mi) of secondary roads, and one is in an oil field with dirt roads in the vicinity (Sweet, *et al.* 1998a). Findlay and Houlahan (1996) found that roads within 2 km (1.2 mi) of wetlands adversely affected the number of amphibian species in the wetlands.

Large numbers of California tiger salamanders, up to 15 or 20 per mile of road (Joe Medeiros, Sierra College, pers. comm. 1993), are killed as they cross the roads on breeding migrations (Hansen and Tremper 1993; S. Sweet, *in litt.* 1993). Estimates of losses to automobile traffic range from 25 to 72 percent of the breeding population (Twitty 1941; S. Sweet, *in litt.* 1993; Launer and Fee 1996). Curbs and berms as low as 9 to 12 cm (3.5 to 5 in), which allow salamanders to climb onto the road but can restrict or prevent their movements off the roads, are of particular concern, as they effectively turn the roads into death traps (Launer and Fee 1996; S. Sweet, *in litt.* 1998a). Such berms exist on the State highway and the secondary road adjacent to three ponds in Santa Barbara County.

Although few currently used breeding ponds are within 0.5 km (0.3 mi) of urban developments, the rapid expansion of Santa Maria and nearby communities will continue to fragment the remaining habitat. The urbanization of the Santa Maria River and Orcutt Creek Valleys divided what was probably a large, relatively contiguous tiger salamander population extending from the Casmalia Hills in the west to Fulger Point in the east into isolated subpopulations (West Orcutt, Bradley-Dominion) that are no longer capable of genetic interchange. One pond in the West Orcutt area is adjacent to an urban development, the owner of the other two ponds in that area has expressed a desire to develop his property (E. Gevirtz, pers. comm. 1999), and home

sites are being marketed in the Bradley-Dominion area.

Contaminants

Hydrocarbon and other contamination from oil production and road runoff; the application of numerous chemicals for agricultural production, roadside maintenance, urban/suburban landscape maintenance; and rodent and vector control programs may all have negative effects on tiger salamander populations, as detailed below.

Road mortality is not the only risk factor associated with roads, as oil and other contaminants in runoff have been detected in adjacent ponds and linked to die-offs of and deformities in California tiger salamanders and spadefoot toads and die-offs of invertebrates that form most of both species' prey base (S. Sweet, *in litt.* 1993). Lefcort *et al.* (1997) found that oil had limited direct effects on 5-week-old marbled (*A. opacum*) and eastern tiger salamanders (*A. t. tigrinum*), but that salamanders from oil-contaminated natural ponds metamorphosed earlier at smaller sizes and those from oil-contaminated artificial ponds had slower growth rates than larvae raised in non-contaminated ponds. Their studies did not address effects on eggs and early larval stages, where the effects may be more pronounced. Hatch and Burton (1998) and Monson *et al.* (1999) investigated the effects of one component of petroleum products and urban runoff (fluoranthene, a polycyclic aromatic hydrocarbon) on spotted salamanders (*A. maculatum*), northern leopard frogs (*Rana pipiens*), and African clawed frogs (*Xenopus laevis*). In laboratory and outdoor experiments, using levels of the contaminant comparable to those found in service station and other urban runoff, the researchers found reduced survival and growth abnormalities in all species and that the effects were worse when the larvae were exposed to the contaminant under natural levels of sunlight, rather than in the laboratory under artificial light.

Agricultural Contaminants

Even though most of the crop lands in California have been in agricultural production since 1900, the application and associated effects of large amounts of pesticides, herbicides, fungicides, and nitrogen fertilizers on the landscape have been addressed only recently (Burow *et al.* 1998a,b). The concentrations of these chemicals and their immediate effects on various species have been difficult to assess mainly due to lack of water sample data and lack of samples close to the sources

of application where the effects on wildlife are most severe. In 1986–87 and from 1993 to 1997, USGS and California Department of Pesticide Regulation (CDPR) personnel sampled well and ground water at 156 locations throughout the range of the California tiger salamander (CDPR 1998; Burow *et al.* 1998a,b). From these samples, 29 different chemicals potentially toxic to amphibians in general and California tiger salamanders specifically were detected.

In Santa Barbara County, over 1 million kilograms (kg) (2.2 million pounds (lb)) of agricultural chemicals were used in 1994 on strawberries, grapes, lettuce, broccoli, and carrots, which were the five major crop types grown on or near tiger salamander sites at that time (California Department of Food and Agriculture (CDFA) Internet Website). These chemicals included metam-sodium, methyl bromide, maneb, fosetyl-aluminum, acephate, cryolite, chlorpyrifos, and malathion, some of which are extremely toxic to aquatic organisms, including amphibians and the organisms on which they prey.

Metam-sodium, a carbamate, was one of the main chemicals applied on broccoli and lettuce grown in 1994, when over 114,000 kg (over 250,000 lb) were used in Santa Barbara County (CDFA). Metam-sodium is toxic to fish (Meister 1997). However, no test data are available for amphibians.

Chlorpyrifos is a highly toxic organophosphate insecticide applied as granules, wettable powder, dustable powder, or emulsifiable concentrate (EXTOXNET 1996). Chlorpyrifos was detected at a concentration of 0.006 micrograms/liter ($\mu\text{g/l}$) in domestic well water close to vineyards at one location (Burow *et al.* 1998a); however, animals migrating across recently treated fields may be exposed to much higher concentrations. The compound is absorbed through the skin of mammals (EXTOXNET 1999); amphibians, with their more permeable skins, absorb the chemical even more readily. General agricultural use of chlorpyrifos is considered to pose a serious threat to wildlife (EXTOXNET 1999). Over 6,000 kg (13,000 lb) were used in Santa Barbara County in 1994 (CDFA).

Malathion has caused effects such as mortality, delays in metamorphosis, and decreased size at metamorphosis in several species of frogs and toads at concentrations as low as 0.2 milligrams (mg/l) (Devillers and Exbrayat 1992). Malathion was detected at concentrations up to 0.1 $\mu\text{g/l}$ in test wells near fields on which it has been used (Burow 1998a). Over 3,500 kg

(7,800 lb) of malathion were used in Santa Barbara County in 1994 (CDFA).

Although test data for amphibian species could not be found, methyl bromide is extremely toxic and is used to kill weeds, insects, nematodes, and rodents (Salmon and Schmidt 1984). Methyl bromide is used primarily on strawberries in Santa Barbara County, which are grown extensively in the eastern Santa Maria Valley (Bradley-Dominion metapopulation). Over 225,000 kg (500,000 lb) were used in Santa Barbara County in 1994 (CDFA).

About 50 percent (6) of the remaining 13 documented California tiger salamander breeding sites in Santa Barbara County may be directly or indirectly affected by toxic agricultural chemical contaminants because there is intensive agriculture within their drainage basins. Even if toxic or detectable amounts of pesticides are not found in the breeding ponds or groundwater, salamanders may still be affected, particularly when chemicals are applied during the migration and dispersal seasons.

Rodent Control

California tiger salamanders spend much of their lives in underground retreats, typically in the burrows of ground squirrels and gophers (Loredo *et al.* 1996; Trenham 1998a). Widespread ground squirrel control programs were begun in California as early as 1910 and are carried out on more than 4 million ha (9.9 million ac) in California (Marsh 1987). It is unclear how effective such control programs were in reducing ground squirrel populations. According to Marsh (1987), when a ground squirrel population is at or near carrying capacity, it must be reduced by at least 90 percent annually for several years to significantly reduce the population. However, it may not be practical to attain such high reduction rates over large areas typical of rangelands, but it may be possible to reduce populations to low numbers (Salmon and Schmidt 1984). In some primarily agricultural counties, the ground squirrel population has been reduced and maintained at perhaps 10 to 20 percent of the carrying capacity. Rodent control programs are conducted by individual land owners and managers on grazing, vineyard, and crop production lands (R. Thompson, *in litt.* 1998).

Until about 1990, ground squirrel control programs using compound 1080 (sodium fluoroacetate) were carried out on lands in Santa Barbara County (Rosemary Thompson, Senior Biologist, SAIC, *in litt.* 1998). Compound 1080 is extremely toxic to nontarget fish, birds, and mammals (U.S. Environmental

Protection Agency 1990) and may have contributed to reductions in salamander populations in the areas where it was used.

Poisoned grains are the most common method used to control ground squirrels on rangelands, and there is little risk of ingestion by California tiger salamanders. However, the use of these grains may impact the California tiger salamanders indirectly if washed into burrows or ponds used by the species. Two of the most commonly used rodenticides, chlorophacinone and diphacinone, are anticoagulants that cause animals to bleed to death. They can be absorbed through the skin and are considered toxic to fish and wildlife (EPA 1985, EXTTOXNET 1999). Both, along with strychnine, are used in Santa Barbara County to control rodents (R. Thompson, *in litt.* 1998). Zinc phosphide, an acute rodenticide and a restricted material, turns into a toxic gas once ingested. Although the effects of these poisons on California tiger salamanders have not been assessed, use along roadways or railways may result in contamination of salamander breeding ponds, with undetermined effects. Gases, including aluminum phosphide, carbon monoxide, and methyl bromide, can be introduced into burrows either by using cartridges or by pumping. When such fumigants are used, all animals inhabiting the burrow are killed (Salmon and Schmidt 1984).

In addition to possible direct effects of rodent control chemicals, control programs probably have an adverse indirect effect on California tiger salamander populations. Control of ground squirrels could significantly reduce the number of burrows available for use by the species (Loredo-Prendeville *et al.* 1994). Because the burrow density required to support California tiger salamanders in an area is not known, the loss of burrows as a result of control programs cannot be quantified at this time. However, Shaffer, *et al.* (1993) believe that rodent control programs may be responsible for the lack of California tiger salamanders in some areas. Active ground squirrel colonies probably are needed to sustain tiger salamanders because inactive burrow systems become progressively unsuitable over time. Loredo *et al.* (1996) found that burrow systems collapsed within 18 months following abandonment by or loss of the ground squirrels; although the researchers found that California tiger salamanders used both occupied and unoccupied burrows, they did not indicate that the salamanders used collapsed burrows. Rodent control programs must be analyzed and implemented carefully in

California tiger salamander habitat so the persistence of the salamanders is not threatened. Current risks to the salamander in Santa Barbara County from rodent control programs are unknown.

Mosquito Control

A commonly used method to control mosquitoes, including in Santa Barbara County (Kenneth Leanard, Santa Barbara County Vector Control, pers. comm. 1999) is the application of methoprene, which increases the level of juvenile hormone in insect larvae and disrupts the molting process. Lawrenz (1984–85) found that methoprene (Altosid® 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 1984–85). The use of methoprene thus could have an indirect adverse effect on the California tiger salamander by reducing the availability of prey. In more recent studies, although methoprene did not cause increased mortality of gray treefrog (*Hyla versicolor*) tadpoles (Sparling and Lowe 1998), it caused reduced survival rates and increased malformations in northern leopard frogs (*Rana pipiens*) (Ankley *et al.* 1998) and increased malformations in southern leopard frogs (*R. utricularia*) (Sparling 1998). Blumberg *et al.* (1998) also correlated exposure to methoprene with delayed metamorphosis and high mortality rates in northern leopard and mink (*R. septentrionalis*) frogs. Methoprene appears to have both direct and indirect effects on the growth and survival of larval amphibians.

Other insecticides (*e.g.*, temephos) have caused reductions in the growth rates of gray treefrog tadpoles, increased mortality rates in green frog (*R. clamitans*) tadpoles (Sparling and Lowe 1998), and increased mortality rates in southern leopard frogs (Sparling 1998). Few data are available on the effects of most insecticides on salamanders. A bacterium, *Bacillus thuringiensis israeli* (Bti), is also used in Santa Barbara County for mosquito control (K. Leanard, pers. comm. 1999). Its effects on the salamander prey base have not been quantified. Because of a lack of information regarding which mosquito control chemicals are used and where, and about the chemicals' effects on salamanders, the degree to which the

practices directly affect the California tiger salamander in Santa Barbara County cannot be determined at this time.

Introduced Species

Introduced species can have negative effects on California tiger salamander populations through competition and hybridization (Shaffer, *et al.* 1993; H. B. Shaffer, *in litt.* 1999). Competition from fish that prey on mosquito larvae and other invertebrates can reduce the survival of salamanders. Both California tiger salamanders (Stebbins 1962; J. D. Anderson 1968; Holomuzki 1986) and mosquitofish feed on micro and macro-invertebrates; large numbers of mosquitofish may out-compete the salamander larvae for food (Graf 1993). As urban areas continue to expand, the introduction of mosquitofish into previously untreated ponds may result in the elimination of California tiger salamanders from additional breeding sites. The introduction of other fish either inadvertently (fathead minnow, *Pimephales promelas*) (P. Collins, pers. comm. 1999) or for recreational fishing (*e.g.*, bass (*Micropterus salmoides*, *M. dolomieu*), sunfish (S. Sweet, pers. comm. 1999) or other purposes may also affect the prey base, reducing growth and survival rates of salamanders. Fish such as bass, green sunfish (*L. cyanellus*), carp (*Cyprinus carpio*), and bullhead (*Ictalurus* spp.) may also prey on tiger salamander larvae, reducing or eliminating populations (Shaffer, *et al.* 1993).

Various nonnative subspecies of the tiger salamander, *Ambystoma tigrinum*, have been imported into much of California for use as fish bait. The practice is still legal in California but is now restricted to fewer counties and is regulated by the California Department of Fish and Game (CCR Title 14, Division 1, Subdivision 1, Chapter 2, Article 3, Section 4 1999). Although importation into Santa Barbara County is illegal, introduced tiger salamanders have been documented at one locality west of the Santa Rita Valley (S. Sweet, pers. comm. 1998). Although they have not been documented in California tiger salamander habitat nonnative salamanders could potentially be introduced into breeding sites or into nearby ponds. The introduced salamanders may out-compete the California tiger salamander, or interbreed with the natives to create hybrids that may be less adapted to the California climate or are not reproductively viable past the first or second generations (Bury and Lukenbach 1976; Shaffer, *et al.* 1993). More recent evidence suggests that the

hybrids are viable, and that they breed with California tiger salamanders (H. B. Shaffer, *in litt.* 1999). With so few remaining subpopulations of California tiger salamanders in Santa Barbara County, the loss of any to hybridization with or competition from introduced species is of serious concern.

Grazing

Grazing in many cases has positive, or at least neutral, effects on the California tiger salamander (H. B. Shaffer and Peter Trenham, UCD, pers. comm. 1998; S. Sweet, pers. comm. 1998; 1999). By keeping vegetation shorter, grazing can make areas more suitable for ground squirrels, whose burrows are used by California tiger salamanders. In Santa Barbara County, the only remaining sites with large amounts of suitable salamander habitat (eight ponds at five sites) currently are being grazed. Although cattle drink large quantities of water, sometimes causing temporary pools to dry faster than they otherwise would (Sheri Melanson, Service, *in litt.* 1993) and possibly causing breeding pools to dry too quickly for salamanders to be able to metamorphose (Feaver 1971), these rangelands are the only undeveloped habitat in the area and thus provide the only chance for salamanders to breed successfully. Although Melanson (1993) noted that vernal pool species continued to reproduce under a November-to-April grazing regime, California tiger salamanders were either absent or found in low numbers in portions of pools that were heavily trampled by cattle. Continued trampling of a ponds' edge by cattle can increase the surface area of a pond and may increase water temperature and speed up the rate of evaporation and thus reduce the amount of time the pond contains enough water (S. Sweet, pers. comm. 1998). Cattle hoofprints could trap salamanders as water levels in pools recede, and reduction in water quality caused by cattle excrement may negatively affect the animals mainly by increasing potentially detrimental nitrogen levels. High nitrogen levels have been associated with blooms of deadly bacteria (Worthylake and Hovingh 1989), and silt has been associated with fatal fungal infections (Lefcort *et al.* 1997) (see Factor C of this section). However, grazing generally is compatible with the continued use of rangelands by the California tiger salamander as long as intensive burrowing rodent control programs are not implemented on such areas and grazing is not excessive (T. Jones, *in litt.* 1993; Shaffer, *et al.* 1993; S. Sweet, pers. comm. 1998, 1999).

Reason for Emergency Determination

Under section 4(b)(7) of the Act and regulations at 50 CFR 424.20, we may emergency list a species if the threats to the species constitute an emergency posing a significant risk to its well-being. Such an emergency listing expires 240 days following publication in the **Federal Register** unless, during this 240-day period, we list the species following the normal listing procedures. Below, we discuss the reasons why emergency listing the Santa Barbara County population of California tiger salamanders as endangered is necessary. In accordance with the Act, if at any time after we publish this emergency rule, we determine that substantial evidence does not exist to warrant such a rule, we will withdraw it.

In making this determination, we have carefully assessed the best scientific and commercial information available regarding the past, present, and future threats faced by the Santa Barbara County population of California tiger salamanders. This DPS is one of the two most genetically differentiated populations of the species and is restricted to very few breeding ponds, all of which are threatened by agricultural conversion, fragmentation, and development. As discussed under Factor A of this section, ponds and upland habitats are being lost at a rapid rate in all four regions of the county in which the species occurs, and no preserves have been established to protect the species. As discussed in Factor E of this section, this salamander is a DPS and still occurs in a significant part of its historic range, but the remaining subpopulations are becoming increasingly fragmented and thus vulnerable to threats associated with isolation and small population size. From the discussion under Factor D of this section, it is clear that Federal, State, and local regulations and ordinances, individually and collectively, do not provide adequate protection for California tiger salamanders or assure that California tiger salamanders will continue to survive in Santa Barbara County.

The 14 known breeding sites (1 was destroyed in 1998 (G. McLaughlin, *in litt.* 1999) and several others may no longer support breeding) are all located on privately owned land, and no conservation agreements or easements are in place. Given the extremely rapid rate of recent and projected habitat loss and degradation, this DPS is in imminent danger of extinction throughout its historic range. The survival of the Santa Barbara County population of the California tiger

salamander now depends on protecting as many breeding sites and the associated upland habitats from further degradation and destruction as possible, and on the rapid rehabilitation of sites that have been seriously degraded in the last few years. The remaining subpopulations in Santa Barbara County are vulnerable to extinction from random natural or human-caused events unless sufficient habitat can be protected and the subpopulations increased in size.

Critical Habitat

In the last few years, a series of court decisions have overturned Service determinations regarding a variety of species that designation of critical habitat would not be prudent (e.g., *Natural Resources Defense Council v. U.S. Department of the Interior* 113 F. 3d 1121 (9th Cir. 1997); *Conservation Council for Hawaii v. Babbitt*, 2 F. Supp. 2d 1280 (D. Hawaii 1998)). Based on the standards applied in those judicial opinions, we have examined the question of whether critical habitat for the Santa Barbara County California tiger salamander would be prudent.

Due to the small number of populations the Santa Barbara County California tiger salamander is vulnerable to unrestricted collection, vandalism, or other disturbance. We remain concerned that these threats might be exacerbated by the publication of critical habitat maps and further dissemination of locational information. However, we have examined the evidence available for Santa Barbara County California tiger salamander and have not found specific evidence of taking, vandalism, collection, or trade of this species. Consequently, consistent with applicable regulations (50 CFR 424.12(a)(1)(i)) and recent case law, we do not expect that the identification of critical habitat will increase the degree of threat to this species of taking or other human activity.

In the absence of a finding that critical habitat would increase threats to a species, if there are any benefits to critical habitat designation, then a prudent finding is warranted. In the case of this species, there may be some benefits to designation of critical habitat. The primary regulatory effect of critical habitat is the section 7 requirement that Federal 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. There may also be some educational or informational benefits to designating critical habitat. Therefore, we find that critical habitat is prudent for the Santa Barbara County California tiger salamander.

The Final Listing Priority Guidance for FY 2000 (64 FR 57114) states, "The processing of critical habitat determinations (prudence and determinability decisions) and proposed or final designations of critical habitat will be funded separately from other section 4 listing actions and will no longer be subject to prioritization under the Listing Priority Guidance. Critical habitat determinations, which were previously included in final listing rules published in the **Federal Register**, may now be processed separately, in which case stand-alone critical habitat determinations will be published as notices in the **Federal Register**. We will undertake critical habitat determinations and designations during FY 2000 as allowed by our funding allocation for that year." As explained in detail in the Listing Priority Guidance, our listing budget is currently insufficient to allow us to immediately complete all of the listing actions required by the Act. Deferral of the critical habitat designation for the Santa Barbara County California tiger salamander will allow us to concentrate our limited resources on higher priority critical habitat and other listing actions, while allowing us to put in place protections needed for the conservation of the Santa Barbara County California tiger salamander without further delay.

We plan to employ a priority system for deciding which outstanding critical habitat designations should be addressed first. We will focus our efforts on those designations that will provide the most conservation benefit, taking into consideration the efficacy of critical habitat designation in addressing the threats to the species, and the magnitude and immediacy of those threats. We will develop a proposal to designate critical habitat for the Santa Barbara County California tiger salamander as soon as feasible, considering our workload priorities.

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 results in public awareness and conservation actions by Federal, State, and local agencies, private organizations, and individuals. The Act provides for possible land acquisition and cooperation with the State and requires that recovery actions be carried out for all listed species. The protection required of Federal agencies and the prohibitions against certain activities involving listed species are discussed, 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 or 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. Section 7(a)(4) of the Act requires Federal agencies to confer with us 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 Santa Barbara County population of California tiger salamanders and may require conference and/or consultation with us include, but are not limited to, those within the jurisdiction of the Corps, Bureau of Reclamation, Natural Resources Conservation Service, Federal Farm Bureau, and Federal Highway Administration.

The Act and its implementing regulations found at 50 CFR 17.21 set forth a series of general prohibitions and exceptions that apply to all endangered wildlife. These prohibitions, in part, make it illegal for any person subject to the jurisdiction of the United States to take (including harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect; or attempt any such conduct), import or export, ship 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 those of State conservation agencies.

Permits may be issued to carry out otherwise prohibited activities involving endangered wildlife under certain circumstances. Regulations governing permits are codified at 50 CFR 17.22 and 17.23. For endangered 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.

As published in the **Federal Register** on July 1, 1994 (59 FR 34272), it is our policy 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 of a Santa Barbara County California tiger salamander legally acquired prior to the effective date of this rule and consistent with 50 CFR 17.4;

(2) Actions that may affect the Santa Barbara County California tiger salamander that are authorized, funded, or carried out by a Federal agency, when the action is conducted in accordance with an incidental take statement issued by us under section 7 of the Act;

(3) Actions that may affect the Santa Barbara County California tiger salamander that are not authorized, funded, or carried out by a Federal agency, when the action is conducted in accordance with an incidental take statement issued by us under section 10(a)(1)(B) of the Act. Applicants design a plan or a Habitat Conservation Plans and apply for an incidental take permit. These are developed for species listed under section 4 of the Act and are designed to minimize and mitigate impacts to the species to the greatest extent practicable; and

(4) Actions that may affect the Santa Barbara County California tiger salamander that are conducted in accordance with the conditions of a section 10(a)(1)(A) permit for scientific research or to enhance the propagation or survival of the species.

We believe that the following actions could result in a violation of section 9;

however, possible violations are not limited to these actions alone:

(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 Santa Barbara County California tiger salamanders without a permit (research activities where salamanders are trapped or captured will require a permit under section 10(a)(1)(A) of the Endangered Species Act);

(2) Destruction or alteration of the Santa Barbara County California tiger salamander occupied habitat through the discharge of fill material 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 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.);

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

(4) Release of exotic species (including, but not limited to, bullfrogs, eastern tiger salamanders, mosquitofish, bass, sunfish, bullhead, catfish, crayfish) into Santa Barbara County tiger salamander breeding habitat; and

(5) Destruction or alteration of uplands associated with vernal pool or seasonal pond habitats used by Santa Barbara County California tiger salamanders during estivation and dispersal, or modification of migration routes such that migration and dispersal are reduced or precluded.

Questions regarding whether specific activities will constitute a violation of section 9 should be directed to the Field Supervisor of the Ventura Fish and Wildlife Office (see **ADDRESSES** 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, Oregon 97232-4181 (503/231-2063, facsimile 503/231-6243).

National Environmental Policy Act

We have determined that an Environmental Assessment, 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 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 collections of information that require Office of Management and Budget (OMB) approval under the Paperwork Reduction Act, 44 U.S.C. 3501 *et seq.* An information collection related to the rule pertaining to permits for endangered and threatened species has OMB approval and is assigned clearance number 1018-0094. This rule does not alter that information collection requirement. For additional information concerning permits and associated requirements for endangered wildlife, see 50 CFR 17.21 and 17.22.

References Cited

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

Authors

The primary authors of this rule are Grace McLaughlin, U.S. Fish and Wildlife Service, Ventura Fish and Wildlife Office, and Dwight Harvey, U.S. Fish and Wildlife Service, Sacramento Fish and Wildlife Office (see **ADDRESSES** section).

List of Subjects in 50 CFR Part 17

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

Regulation Promulgation

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

PART 17—[AMENDED]

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

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

2. Amend §17.11(h) by adding the following, in alphabetical order under AMPHIBIANS, to the List of Endangered and Threatened Wildlife:

§ 17.11 Endangered and threatened wildlife.

(h) * * *

Species		Historic range	Vertebrate population where endangered or threatened	Status	When listed	Critical habitat	Special rules
Common name	Scientific name						
AMPHIBIANS							
*	*	*	*	*	*		*
Salamander, California tiger.	<i>Ambystoma californiense</i> .	U.S.A. (CA)	U.S.A., (CA—Santa Barbara County).	E	667	NA	NA
*	*	*	*	*	*		*

Dated: December 20, 1999.

Jamie Rappaport Clark,

Director, Fish and Wildlife Service.

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