Federal Register

Thursday,
September 21, 2000

Part II

Department of the Interior

Fish and Wildlife Service

50 CFR Part 17

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

DEPARTMENT OF THE INTERIOR

Fish and Wildlife Service

50 CFR Part 17

RIN 1018–AF81

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

AGENCY: Fish and Wildlife Service, Interior.

ACTION: Final rule.

SUMMARY: We, the Fish and Wildlife Service (Service), list the Santa Barbara County Distinct Vertebrate Population Segment (DPS) of the California tiger salamander (*Ambystoma californiense*) as endangered under the Endangered Species Act of 1973, as amended (Act). Of six habitat complexes, consisting of 27 documented breeding sites and associated uplands, five have suffered moderate to severe levels of habitat destruction or degradation between 1996 and 2000. Plans to convert additional sites from grazing to intensive agriculture are being developed and implemented. We emergency listed the population segment on January 19, 2000. The emergency listing was effective for 240 days. Immediately upon publication, this action continues the protection provided by the temporary emergency listing.

DATES: This final rule is effective 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 inhabits low elevation, typically below 427 meters (m) (1400 feet (ft)), vernal pools and seasonal ponds and the associated grassland, oak savannah, and coastal scrub 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, 2000a). Although California tiger salamanders are adapted to natural vernal pools, manmade or modified ephemeral and permanent pools are now frequently used (Fisher and Shaffer 1996). California tiger salamanders prefer open grassland to areas of continuous woody vegetation (Trenham in revision). 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 (S. Sweet *in litt.* 1993, 1998a,b; Gira *et al.* 1999; Santa Barbara County Planning and Development 2000).

The salamanders breeding in and living around a pool or seasonal pond, or a local complex of pools 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).

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) at depths ranging from 20 centimeters (cm) (7.9 in) to 1 m (3.3 ft) beneath the ground surface (Trenham in revision). California tiger salamanders use both occupied and unoccupied small mammal burrows but, since burrows collapse within 18 months if not maintained, an active population of burrowing mammals is necessary to sustain sufficient underground refugia for the species (Loredo *et al.* 1996). California tiger salamanders may remain active underground into summer, moving small distances within burrow systems (Trenham in revision). 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).

Adults may migrate long distances between summering and 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 more than 360 m (1,200 ft) away while dispersing from their natal (birth) pond (Ted Mullen, Science Applications International Corporation (SAIC), personal communication, 1998), and adults have been found along roads more than 2 km (1.2 mi) from breeding ponds (S. Sweet *in litt.* 1998a). Although most marked salamanders have been recaptured at the pond where they were initially captured, in one study approximately 20 percent of California tiger salamanders hatched in one pond traveled to ponds a minimum of 580 m (1900 ft) away to breed (Trenham 1998; Trenham *et al.* in review). Non-dispersing California tiger salamanders, however, tend to stay closer to breeding ponds; 95 percent of California tiger salamanders at a study site in Monterey County probably stay within 173 m (568 ft) of the pond in which they bred. Once established in underground burrows, California tiger salamanders may move short distances within burrows or overland to other burrows, generally during wet weather. Dispersal distance is closely tied to precipitation; California tiger salamanders travel further in years with more precipitation (Trenham in revision). As with migration distances, the number of ponds used by an individual over its lifetime will be dependent on landscape features.

Migration to breeding ponds 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 1998; Trenham *et al.* 2000). Males usually remain in the ponds for an average of 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 1998). In years where rainfall begins late in the season, females may forego breeding altogether (Loredo and Van Vuren 1996, Trenham *et al.* 2000).

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 1998). 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 in revision), 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 will consume smaller tadpoles of Pacific treefrogs (*Hyla regilla*), California red-legged frogs (*Rana aurora*), western toads (*Bufo boreas*), and spadefoot toads (*Scaphiopus hammondii*), as well as many aquatic insects and other aquatic invertebrates (J.D. Anderson 1968; P.R. Anderson 1968). The larvae also will eat each other under certain conditions (H.B. Shaffer and S. Sweet cited in Paul Collins, Santa Barbara Museum of Natural History, *in litt.* 2000a). Captive salamanders appear to locate food by vision and 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. In general, 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. Newly metamorphosed juveniles range in size from 41 to 78 mm (1.6 to 3.1 in) snout-vent length (Trenham *et al.* 2000).

Many of the pools in which California tiger salamanders lay eggs do not hold water long enough for 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 other tiger salamanders is typically low, with fewer than 30 metamorphic juveniles per breeding female. Trenham *et al.* (2000) found even lower numbers for California tiger salamanders, with roughly 12 lifetime metamorphic offspring per breeding female. In part, this is due to the extended length of time it takes for California tiger salamanders to reach sexual maturity; most do not breed until 4 or 5 years of age. While individuals may survive for more than 10 years, less than 50 percent breed more than once (Trenham *et al.* 2000). Combined with low survivorship of metamorphs (in some populations, less than 5 percent of marked juveniles survive to become breeding adults (Trenham 1998)), reproductive output in most years is not sufficient to maintain populations. This suggests that the species requires occasional ''boom'' breeding events to prevent extirpation (temporary or permanent loss of the species from a particular habitat) or extinction (Trenham *et al.* 2000). 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. Based upon what is probably the largest genetic data set for a non-human vertebrate (H. Bradley Shaffer, University of California, Davis (UCD), *in litt.* 2000a), 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 to 1.8 percent (Shaffer *et al.* 1993; H.B. Shaffer *in litt.* 1998, 2000a). 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 (H.B. 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.B. Shaffer *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; Shaffer will probably describe Santa Barbara County tiger salamanders as a distinct species when he and his colleagues submit their results for publication (H.B. Shaffer *in litt.* 2000b).

The genetic differences between Santa Barbara County California tiger salamanders and the remainder of the species as a whole are accompanied by a morphological difference that is diagnostic for the DPS. Individuals in Santa Barbara County have a distinct color pattern consisting of a yellow band, rather than distinct spots, along the lateral side of the animal, and a distinct yellow pattern on the lateral margins of the belly (H.B. Shaffer *in litt.* 2000b; Scott Stanley, American Museum of Natural History, New York, New York, *in litt.* 2000; S. Sweet *in litt.* 2000a).

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 final 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 are found in six metapopulations in Santa Barbara County. 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, west Solomon Hills/north Los Alamos Valley, east Los Alamos Valley, Purisima Hills and Santa Rita Valley constitute the six discrete regions or metapopulations where California tiger salamanders are documented in Santa Barbara County (S. Sweet *in litt.* 1998a, 2000b; Monk & Associates 2000a). Ponds and upland habitats occupied by the California tiger salamander on the crest of the Purisima Hills between the Los Alamos and Santa Rita Valleys may provide a genetic link between these two metapopulations (S. Sweet *in litt.* 2000b).

For the purposes of this rule, a metapopulation is defined as a group of subpopulations or ''local populations'' linked by genetic exchange. Of 14 breeding sites or subpopulations within this DPS documented at the time of the emergency listing, 1 was destroyed in 1998, the upland habitat around 3 had been converted into more intensive agriculture practices (*i.e.,* vineyards, gladiolus fields, and row crops) which may have eliminated the salamander subpopulations, 1 was surrounded by agriculture and urban development, 2 were affected by overgrazing, 4 were

believed to be threatened with conversion to vineyards or other intensive agriculture practices, and the remaining 3 were in areas rapidly undergoing conversion to vineyards and row crops (Sweet *et al.* 1998; Sweet *in litt.* 1998a, b; Santa Barbara County Planning and Development 1998; Grace McLaughlin, Service, personal observations 1998). Since the publication of the emergency rule, nine breeding ponds have been verified in two pool complexes previously designated as potential breeding areas (Purisima Hills and eastern Los Alamos), and four new ponds have been found in known complexes (S. Sweet *in litt.* 2000a, pers. comm. 2000a; Monk & Associates 2000a; Lawrence Hunt, Biological Consultant, *in litt.* 2000). The ponds are all within 2 kilometers (km) (1.2 miles (mi)) of previously mapped known or potential ponds. Of the new ponds and surrounding upland habitats, only the Purisima Hills complex, with six ponds, is relatively free from threats. Of the other seven ponds, three are threatened by vineyard development (although discussions aimed at providing protection for the California tiger salamander and its habitat are underway), one is adjacent to an intensively farmed area near Highway 101 and two are adjacent to roads; one of the latter is near a reservoir occupied by bullfrogs. The seventh pond may not be large enough to sustain a viable population of California tiger salamanders over the long term. A larger nearby pond, only 76 m (250 ft) away, appears to have suitable habitat but may not have had successful breeding for several years due to the introduction of catfish by the previous owner (S. Sweet pers. comm. 2000a).

Additional breeding ponds could exist within each of the metapopulations noted above, but searches in other areas with apparently suitable habitat have not identified additional probable habitat areas or subpopulations (Christopher 1996; John Storrer, Biological Consultant, *in litt.* 1997, 1998a, b, c; P. Collins *in litt.* 1998, 2000b, pers. comm. 1999; S. Sweet *in litt.* 1998a, 2000b; L. Hunt *in litt.* 2000; Monk & Associates 2000a). All of the known and potential localities of the California tiger salamander in Santa Barbara County are largely on private lands, none are protected by signed and implemented habitat conservation plans, and access is limited. Although one habitat management plan, which was written before the listing at the request of the Army Corps of Engineers (Corps) as mitigation for a Clean Water Act violation, has been implemented recently, we do not know if it will ensure the continued existence of the California tiger salamanders population on that property. Discussions with several other landowners show promise of developing agreements that will provide sufficient high quality habitat for the long-term persistence of California tiger salamanders on their lands.

Although historical evidence of California tiger salamanders from San Luis Obispo County exists in the Santa Barbara Museum of Natural History's vertebrate collection (Collins *in litt.* 2000a), no California tiger salamanders have been found during more recent survey efforts in appropriate habitat in southern San Luis Obispo County (Scott and Harker 1998, California Army National Guard 2000, S. Sweet *in litt.* 2000a). Any California tiger salamanders found in southern San Luis Obispo County would probably be part of the Santa Barbara County DPS, although genetic testing would need to be conducted to verify this, in the event that any are discovered.

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, Notice of Candidate 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.

On January 19, 2000, we published an emergency rule to list the Santa Barbara County distinct population segment of the California tiger salamander as endangered (65 FR 3096), concurrently with a proposed rule (65 FR 3110) to list the species as endangered. Our decision to emergency list this DPS of the California tiger salamander was based on information contained in the original petition, information referenced in the petition, and new information available to us. We re-opened the comment period associated with the proposed rule twice (65 FR 15887 and 65 FR 31869). We held a public hearing on March 24, 2000.

The processing of this final 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 (prudency and determinability decisions) and proposed or final designations of critical habitat are no longer subject to prioritization under the Listing Priority Guidance. This final rule is a Priority 2 action and

is being completed in accordance with the current Listing Priority Guidance. We have updated this rule to reflect new information concerning changes in distribution, status, and threats since publication of the emergency and proposed rules.

Summary of Comments and Responses

In the January 19, 2000, proposed rule (65 FR 3110), we requested all interested parties to submit factual reports or information that might contribute to development of a final rule. A 60-day comment period closed on March 20, 2000. We contacted appropriate Federal agencies, State agencies, county and city governments, scientific organizations, and other interested parties and requested comments, and notified affected landowners of the emergency listing. We submitted public notices of the proposed rule, which invited general public comment, to the *Santa Maria Times* and the *Santa Barbara News-Press,* both in Santa Barbara County, on January 19, 2000. We requested peer review in compliance with our policy, published in the **Federal Register** on July 1, 1994 (59 FR 34270).

We received several requests for a public hearing and on March 24, 2000, we re-opened the public comment period (65 FR 15887) until May 4, 2000, to accommodate that hearing, which was held on April 20, 2000. On May 19, 2000, we published an additional re-opening of the public comment period (65 FR 31869), extending the comment period until June 5, 2000.

During the public comment period, we received written comments and new information from 657 individuals, businesses and organizations, with several commenters submitting comments during more than one comment period. We received oral comments from 37 people at the public hearing; 22 provided written comments also. In all, 231 commenters opposed the listing, and 426 supported continued protection for the DPS. Issues raised by the commenters, and our response to each, are summarized below.

Issue 1: One commenter stated that additional research on the life history and habitat needs of the Santa Barbara County population of California tiger salamanders is needed before making a decision to list. Specifically, the commenter felt that we disregarded the possibility of tiger salamanders using seasonal drainages as breeding habitat.

Our Response: We respectfully disagree. None of the surveys and research conducted on the Santa Barbara County population of California tiger salamanders over the past 25 years have indicated that this population has markedly different habitat requirements or life history traits than other California tiger salamanders. While we did not discuss the use of ponded areas within seasonal drainages as breeding habitat, we do recognize that such use occurs in a limited number of cases (about 2 to 10 percent across the entire range of the species (Dwight Harvey, Service, Sacramento, California, *in litt.*)). Based on aerial photographs going back to the 1930s, we recognized that the ponds identified as Railroad and Pipeline are modifications of natural features. The fact remains that the California tiger salamander is a pond breeding, not stream breeding, species, and water must be impounded, naturally or artificially, for a long enough period for development from egg to metamorphosis to occur. In most of the small seasonal streams in northern Santa Barbara County, flow rates are too rapid and surface water duration is too short to allow tiger salamanders to breed.

Issue 2: One commenter requested that we identify the range of dates that a breeding pool must remain hydrated in order to qualify as suitable California tiger salamander breeding habitat in Santa Barbara County.

Our Response: The range of dates within which California tiger salamanders breed varies from year to year depending on the timing and amount of rainfall (see ''Background'' section). Therefore, we are unable to provide specific dates within which a breeding pond must remain hydrated. Also, researchers have found that female California tiger salamanders will often forgo breeding in years with unusually late rainfall. We do know that California tiger salamanders require a minimum of 10 weeks to complete the transition from egg to metamorphosed juvenile; larvae that have a longer time period before metamorphosis are more likely to survive to adulthood and reproduce.

Issue 3: One commenter suggested that the salamanders may have migrated to other areas as a result of habitat loss and degradation.

Our Response: We do not agree. We believe that most California tiger salamanders in areas subject to habitat conversion are killed in the process. Deep-ripping and repeated plowing of grazing or oil production lands during conversion to vineyards and intensive cropping destroys the burrows in which the salamanders spend most of their lives. The mechanical actions kill burrow residents directly, or unearth them, leaving them exposed to risks of being run over by equipment, and death from dehydration or predation.

Issue 4: One commenter stated that the genetic data relied on were insufficient, as all samples were taken from one pond, and none from surrounding counties.

Our Response: While the data presented by Shaffer and McKnight (1996) did incorporate samples from only one Santa Barbara County pond, samples from three other counties were also included (Madera, Alameda, and Solano). Clear differences were demonstrated among those four sites. That paper also included data from 20 additional taxa (species, subspecies, and populations) within the tiger salamander (*Ambystoma tigrinum*) complex. Additional data cited in the emergency listing (Shaffer and Stanley 1991; Irschick and Shaffer 1997; Shaffer *et al.* 1993; Shaffer *in litt.* 1998; H.B. Shaffer's unpublished mitochondrial DNA sequence data) incorporated data from 56 localities representing 12 populations, including 3 sites from the Santa Barbara population, 15 sites in Monterey County, 6 sites in San Benito County, and 5 sites representing 1 population along the San Luis Obispo-Kern County line, the latter two being the only counties with California tiger salamanders that share borders with Santa Barbara County. Samples from populations in 8 other counties (Yolo, Sonoma, Solano, Alameda, Stanislaus, Fresno, Tulare, and Madera) were also examined. It is clear from Dr. Shaffer's and his colleague's data that the Santa Barbara County animals are genetically distinct from other California tiger salamander populations, including those in ''surrounding'' counties.

We submitted the emergency rule and Dr. Shaffer's published and unpublished material to four additional reviewers in addition to those who provided comment on the distribution, status, threats, and ecology of the California tiger salamander. We received comments from a fish and reptile geneticists and from a bacterial geneticist. Both stated that they believe we interpreted Dr. Shaffer's data correctly, and applied it appropriately and in accordance with our policy on distinct population segments.

Issue 5: One commenter stated that it is questionable whether the reduction in habitat in one county poses a threat to the species as a whole.

Our Response: We did not emergency list nor propose to list the California tiger salamander across its range. We emergency listed and proposed for continued protection only the Santa Barbara County distinct population segment of the California tiger

salamander. The reasons for recognition of this DPS are in accordance with our policy and guidelines and are explained in the emergency rule and in this document. The best available scientific evidence supports our conclusion that the Santa Barbara County population of California tiger salamanders is discrete, is significant to the species as a whole, and is in danger of extinction throughout most of its historic range. We are currently reviewing the status of the entire species across its remaining range.

Issue 6: Several commenters suggested that we used insufficient scientific evidence or did not use the best scientific and commercial data available in making our decision. Several commenters implied that, in making our decision to emergency list the Santa Barbara County California tiger salamander, we relied on ''anecdotal information, speculation, and scientific studies of dubious validity'' or stated that the information was ''based on questionable science.''

Our Response: We respectfully disagree. We used the scientific and commercial information available to us during our status review process and at the time of the listing to make our decision. We based our decision on museum specimens and the accompanying collection data, aerial photographs documenting the land use changes over the last 60 years, reports produced by the County Agricultural Commissioner's and Planning and Development Department, articles published in peer-reviewed, professional scientific journals, and additional work conducted by the authors of some of those articles.

We have received and sought out additional information during the public comment periods and public hearings, requested appropriate professional peer review as required under our policies, reviewed all the information available to us, and presented that information in this document. As documented in the emergency listing and this rule, we have considerable evidence concerning the rates of land use changes and the inadequacy of regulatory mechanisms to protect the salamander, and extensive scientific evidence documenting the uniqueness of the Santa Barbara population, risks to amphibian species from habitat loss and fragmentation, disease, and predation by and competition from non-native species.

Issue 7: Several commenters stated that insufficient data has been collected to estimate the size of the Santa Barbara County population of California tiger salamanders or that we must know how many California tiger salamanders existed ''before, how many now, and what has affected their sustainability''; and believed we should have surveyed all possible ponds and contacted all landowners before emergency listing the population. One commenter implied that the loss of habitat may not have led to a decrease in population size.

Our Response: We agree that we do not have an estimate of the size of the Santa Barbara County population of California tiger salamanders. Our decision to list this population is based on significant threats associated with recent habitat loss and expectations of continued loss and fragmentation of the remaining habitat, as detailed in the Background, Status and Distribution, and Summary of Factors Affecting the Species sections (see factor E discussion, in particular), and not on absolute numbers of animals. It is not necessary to know how many individuals existed before habitat loss and degradation, etc., began to take their toll, nor is it necessary to know precise numbers of existing individuals. Amphibian populations naturally undergo large fluctuations in population size as a result of random natural events such as drought and fires. The loss of crucial upland habitats and the loss of individuals through agricultural and development activities can leave small populations that are unable to withstand decreases in size as a result of such events. Additional information on the effects of habitat loss and fragmentation that became available after the publication of the emergency rule has been incorporated into this final rule.

In our 12-month petition finding, published April 18, 1994, we concluded that we had sufficient information to warrant proposing the listing of the species as a whole, but that the preparation of a proposal was precluded by the need to complete higher priority actions. That conclusion was based on information provided in the petition and in our files. We published Candidate Notices of Review in 1996 (61 FR 7596), 1997 (62 FR 4938), and 1999 (64 FR 57534) that included the California tiger salamander and requested the submission of additional information on the status and distribution of the species. We have carefully considered information relevant to the status of and threats to the Santa Barbara County distinct population segment that became available since our 1994 12-month petition finding. The decision to move forward with an emergency listing for this population was based on the rapid changes in the quantity and quality of the habitat available.

We have documented the factors that led to the rapid loss of habitat and increases in threats to the Santa Barbara County population. As our efforts and those of other agencies in working with landowners had failed to stem the rapid rate of habitat loss, and the existing regulatory mechanisms were inadequate to ensure protection for the population and its habitats, we believe that immediate protection under the Act was necessary to protect the remaining California tiger salamanders in Santa Barbara County.

Issue 8: Several commenters stated that the California tiger salamander is more widespread in Santa Barbara County than we presented in the emergency rule, and stated that they had seen them in a variety of places.

Our Response: Service and other biologists investigated many of these sightings. None of the sightings were verified as California tiger salamanders. We concluded that most of the sightings were of arboreal (tree dwelling) salamanders, *Aneides lugubris,* a smaller, purple-brown colored salamander with very tiny scattered yellow spots. We will investigate two other cases, one in an area where non-native tiger salamander larvae have been found, and one in area that appears to have suitable California tiger salamander habitat, when environmental conditions are appropriate.

Issue 9: Two commenters stated that there are more than 20 sites available and in good condition for the California tiger salamander, not 14 as stated in the rule. One commenter stated that the emergency rule did not give adequate attention to additional potential sites that could supply breeding habitat for California tiger salamanders.

Our Response: At the time of the publication of the emergency rule, the California tiger salamander was known from 14 current and historical sites in Santa Barbara County. We acknowledged in the emergency rule that other potential breeding ponds or pond complexes may exist, but could not be surveyed by local biologists due to access restrictions from private landowners. The rule also stated that possible California tiger salamander breeding ponds were probably facing types and levels of threats similar to those documented for the known ponds. Since the publication of the emergency rule, surveys have found new ponds. These findings are discussed in this final rule. Our assumption at the time of the emergency rule that most of the potential ponds face threats (*e.g.,* conversion to intensive agriculture, impacts from roads and exotic species)

similar to those affecting the known ponds has been substantiated. Only one metapopulation appears to be relatively free of significant threats and may be protected through conservation easements.

Issue 10: One commenter questioned the viability of the Tanglewood Complex as a breeding site, as this was based on a record from one larval California tiger salamander.

Our Response: The discovery of a larval California tiger salamander in the vicinity of the Tanglewood Complex suggested the presence of a nearby breeding locality, as juvenile California tiger salamanders do not move great distances when migrating from breeding ponds in the fall. We agree that in the absence of actual breeding pond surveys on the Tanglewood complex, it is conceivable that the larvae had not come from that location, but rather some unknown nearby location. Since publication of the emergency rule, a survey of the vernal ponds on the Tanglewood property has confirmed a breeding population of California tiger salamanders, as represented by multiple larvae captured onsite. Additional ponds within 2 km (1.2 mi) of the Tanglewood ponds also have breeding California tiger salamanders (see ''Background'' section).

Issue 11: One commenter suggested that, as there was no recent petition specific to the Santa Barbara population of California tiger salamanders, we have no legal basis for listing the population.

Our Response: Receipt of a petition to list a species is not required in order for us to undertake a status review and develop a proposal to list or an emergency rule. We have the independent authority to undertake assessments and status reviews of species considered as candidates for listing, and to list those species where their protection under the Act is warranted. Dr. Shaffer's 1992 petition was not rejected, as the commenter claimed, but was found in the 12-month petition finding to be ''warranted but precluded,'' meaning that there was enough information to support a listing, but that there were higher priority listings to complete.

Issue 12: One commenter suggested that we list the Santa Barbara County California tiger salamander as threatened, rather than endangered, to give the Service the option of proceeding with a special 4(d) rule that would exempt from the prohibitions of section 9 of the Act certain activities that would otherwise constitute take of California tiger salamanders.

Our Response: The criteria for designating species as threatened or endangered are outlined in section 4(a)(1) of the Act and regulations that we issued in (50 CFR part 424). Based upon information that we have received regarding the status and distribution of the species, we believe that the California tiger salamander is in danger of extinction throughout all or a significant portion of its range in Santa Barbara County, and therefore, fits the definition of endangered as defined in the Act. This is discussed in detail in the ''Summary of Factors Affecting the Species'' section.

Issue 13: One commenter suggested that in the absence of information regarding specific threats to the distinct population segment (*e.g.,* overutilization, disease, predation), we should not have based our decision ''solely on the conversion of native habitat. * * *''

Our Response: Under section 4 of the Act and the regulations (50 CFR part 424) issued 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). The rates of habitat degradation and loss in Santa Barbara County are sufficient to warrant the listing of the Santa Barbara DPS. However, we did not base our decision solely on the rate of conversion of habitat, but also on the inadequacy of existing Federal, State, and local regulatory mechanisms to protect the salamanders and their habitat, and the risks faced by salamanders due to intensified agricultural activities, urbanization, and habitat fragmentation. As the threat of habitat loss is still present, and neither the regulatory mechanisms nor their enforcement has changed since the emergency listing, both factors still threaten the continued existence of the Santa Barbara DPS.

Issue 14: Several commenters stated or implied that the threats to salamander habitat do not exist, the Service has portrayed the threats inaccurately, the County has received no applications for projects to eliminate breeding pools, and threats to the breeding pools would be subject to the Clean Water Act, the Act, and the Santa Barbara County Grading Ordinance.

Our Response: We respectfully disagree that we have portrayed the threats inaccurately. We have documented the threats based on aerial photography and site visits. We agree that projects or actions that would eliminate breeding pools would be subject to review under the Clean Water Act and the Santa Barbara County Grading Ordinance, but specific consideration of impacts to California tiger salamander habitat would not necessarily be required under these laws if the Santa Barbara DPS is not a listed entity. In addition, a primary factor cited in the emergency listing was the conversion of the upland habitats surrounding the breeding ponds to environments that will not support tiger salamanders, and the fact that the salamanders would be killed during the deep-ripping processes in preparation for vineyard installation and other land clearing activities. Activities in upland habitats are not normally under Corps Clean Water Act jurisdiction. Implementation of the County Grading Ordinance has not resulted in adequate protection of the salamander's upland habitats.

Issue 15: One commenter stated that information provided by the County was incorrect and biased and was intended to mislead the Service.

Our Response: As the commenter did not cite specific references, we believe he was referring to the location and status information in Santa Barbara County Planning and Development (1998) and Sweet, Collins and Hunt (1998). The information was compiled by recognized scientists with knowledge of the species, its habitat, and the threats to its continued existence. Determinations of known, potential, and other possible ponds were made based on specimens housed in museums in Santa Barbara County and elsewhere, U.S. Geological Survey topographic maps, Fish and Wildlife Service National Wetland Inventory maps, and aerial photographs archived at the County of Santa Barbara Planning Division. All of these sources are available to the general public, either through public agencies or private commercial resources. We also used a report prepared by Santa Barbara County Planning and Development Department, the Agricultural Commissioner and the UC Cooperative Extension (Gira *et al.* 1999), that provides information on agricultural land use and trends in the county.

Issue 16: We received several comments that a potential range map, that we released at the April 20, 2000, public hearing, constituted new information as it increased the number of landowners affected by the listing.

Our Response: Under the emergency rule and the proposed rule, all California tiger salamanders within Santa Barbara County are protected, whether they are found in the previously documented range or outside of those areas. The emergency rule states that the known habitat for the California tiger salamander in Santa Barbara County is 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. The map released by us indicated the distribution of possible suitable habitat for the California tiger salamander in Santa Barbara County and was based on the best information currently available to us. The map was designed to assist landowners in identifying where these areas are, and to provide guidelines as to the areas most likely affected by the listing. The map does not alter the obligations or responsibilities of Santa Barbara County landowners and land managers with respect to the Santa Barbara County population of California tiger salamanders under the Act, under the emergency, proposed, or final rules.

Issue 17: Several commenters believe that the Grading and Zoning Ordinances are sufficient to protect the species; one provided additional information in support of this belief.

Our Response: As detailed in the rule, we believe that the County ordinances, the past implementation and enforcement of those ordinances by County agencies, and the adherence to those ordinances by some landowners were not sufficient to protect the salamander and its habitat. This is further supported by the Santa Barbara County 1998–99 Grand Jury Report, released May 6, 1999, which found

''The agricultural community * * * frequently proceeds with grading or other agricultural conversions without permits. * * * Members of the agricultural community choose to pay the fines and suffer other consequences * * *'' (Pg. 9)

One commenter provided information on nine violations of County and Federal laws, a letter from the U.S. Environmental Protection Agency (EPA) expressing concern over potential violations of the Clean Water Act and asking for County assistance in reviewing those cases, two letters to landowners requesting consultation with the County regarding sensitive resources, and a memo to the Board of Supervisors regarding enforcement of the Grading Ordinance. We believe the information provided and additional information relevant to the cases under review supports our conclusion that the existing regulatory mechanisms, including their application and enforcement have been inadequate to protect California tiger salamanders and their habitat in Santa Barbara County. Adequate mechanisms, processes and enforcement, prevent illegal actions from occurring in the first place. Once salamanders are killed and their habitat is destroyed or severely degraded, the damage is done, the loss of individuals and populations has occurred. It is very difficult, as documented in the emergency and final rules, to rehabilitate degraded habitat, particularly vernal pools and other seasonal wetlands, when the hydrology has been altered by deep soil disturbances.

Issue 18: Several commenters expressed the view that much of the California tiger salamander's habitat is agricultural land that has been in production since 1900 and suggested that if the salamander has survived it shows how well farmers have taken care of the land.

Our Response: Although much of the acreage in Santa Barbara County has been cultivated in the past, the scale and the nature of agriculture has changed over time. Historically, land was dry farmed in a patchwork, with fields laying fallow. This allowed California tiger salamanders to persist over time, as they always had some upland areas as refugia. However, as stated in our emergency rule and in this document, intensive agriculture has increased greatly in Santa Barbara County, and resulted in the permanent conversion of upland refugia to land uses that are incompatible with the long-term persistence of California tiger salamanders, including vineyards, intensive agriculture, and urban development. The changes have included the increased use of various chemicals that can have negative effects on salamanders, as well as changes in crops and farming methods that are not conducive to salamander survival.

Issue 19: Several commenters addressed the issue of roadkill, assuming that the greatest impact is roadkill and that we have done nothing to address that issue; another offered suggestions to reduce roadkill. Commenters also stated that any impact from the conversion of alleged habitat to crops is minimal at best compared to roadkill, that no peer-reviewed study proves that farming and ranching is incompatible with the protection of the species, and that we must eliminate losses from roadkill before addressing losses from farming practices.

Our Response: We respectfully disagree with the comments, but realize that we could have made our concerns more clear. The greatest impact to California tiger salamanders in Santa Barbara County is not roadkill, but the killing of all age classes of California tiger salamanders in burrows when deep-ripping and other land-clearing activities (such as conversion of grazing and oil production lands to intensive cropping or housing developments) occur. The Twitty (1941) and Launer and Fee (1996) citations in the emergency rule refer to roadkills near ponds in northern California on Stanford University property, and were provided as additional documentation of threats to amphibians in general and California tiger salamanders specifically. The only estimate of roadkill in Santa Barbara County is Sweet (*in litt.* 1993), which states that an average of 40 percent of salamanders seen on or along roads are dead. However, this does not mean that 40 percent of the mortality of California tiger salamander is due to collisions with vehicles; the study did not investigate other sources of mortality. Sweet's report concludes that ''the sizes of breeding adults do *not* point toward a major influence by road-kill.'' (Emphasis in original.) We have been working with CalTrans (beginning in May 1999) at one of the two sites of highest concern to undertake measures to encourage California tiger salamanders to use alternate routes under roads, to install more drains in berms so adults that do get on roads have more options, and to prevent juveniles from getting up on roads in the first place. Information on the rates of habitat loss and proximity of breeding sites to roads are presented in the ''Status and Distribution'' and ''Summary of Factors Affecting the Species'' sections.

The conclusions we have drawn as to the impact of farming and overgrazing on California tiger salamanders are based upon what is known about how specific activities are conducted, the likely physical and chemical effects of those activities on the landscape, and the likelihood that these effects on the landscape will in turn have an impact on California tiger salamanders, given what we know about their biology. For example, deep ripping of soil is very likely to kill any salamanders in the layers of soil being ripped, including those inside burrows, at other locations in the soil, or on the surface. Other alterations of the salamander's habitat, such as road-building and conversion to fields of seasonal crops and vineyards, can also kill salamanders directly during conversions (see factor E, below).

Such alterations can dramatically change the physical and chemical structure of the habitat through which salamanders migrate to breeding ponds or upland habitat. When considered in light of the biology of California tiger salamanders, these alterations of the environment reduce the chances that salamanders will be able to traverse these habitats successfully. For

example, changes in the moisture regimes, microlandscape, and ground cover could require migrating salamanders to cross rapid runoff; expose animals to toxic levels of fertilizers, pesticides, fungicides, and herbicides; interfere with the ability of salamanders to travel the distances necessary to make it to the breeding pond or upland habitat while rain or moisture conditions are suitable; or increase their susceptibility to predators. We do not have data generated from studies that demonstrate such effects unequivocally. We are basing these conclusions on our interpretations of what we do know about these human activities, the biology and life history of salamanders, and studies that have documented the changes in species numbers and abundances as a result of land use changes (see factor E discussion).

Issue 20: Several commenters expressed concern that all rodent control operations would have to be halted, with devastating effects to agricultural operations. Some stated that halting such programs would also jeopardize those ponds that have been created or modified by damming and berming, as the burrowing activities could cause failures of those dams and berms.

Our Response: Not all methods of rodent control are expected to have the same level of effects on California tiger salamander populations. We have recommended to landowners that they avoid destruction of burrows or the release of toxic chemicals, including pesticides, into burrows of ground squirrels and gophers within 2 km (1.2 mi) of breeding ponds. As stated in the emergency rule, ''Rodent control programs must be analyzed and implemented carefully in California tiger salamander habitat so the persistence of the salamanders is not threatened.'' Appropriate methods and timing of control efforts can be determined through the Act's section 10 incidental take permit process as habitat conservation plans (HCP) for the salamanders are developed, evaluated once implemented, and revised if necessary. Likewise, the impacts of burrowing rodents on dams and berms, and methods to reduce those impacts, can be addressed in HCPs.

Issue 21: The reasons for the emergency determination were not clearly demonstrated.

Our Response: We respectfully disagree. We believe that, in both the emergency rule and this document, we have clearly presented and documented the status and distribution of this distinct population segment, the threats facing the remaining subpopulations, and the imminency of those threats.

Issue 22: Several commenters stated that several landowners were in the process of developing habitat conservation plans, of which the Service was unaware or chose to ignore. Another commenter stated that the Service should offer farmers and ranchers a proposal to create a habitat conservation plan for the area, and that to use the threat of regulation to forward this plan only ensures its failure.

Our Response: Although we did not discuss it in the emergency listing, we were aware of conservation efforts by several landowners. We met with one vineyard manager in the Fall of 1998 to try to ensure sufficient protection of California tiger salamander habitat following violations of the Clean Water Act. The management plan that was developed after that meeting, without further Service input, may not, in our opinion, ensure protection for the salamander and its habitat that is adequate to ensure the survival of the population in perpetuity. In another case the Service has provided funds to assist other agencies and landowners in developing conservation plans, including the purchase of conservation easements. To date, no final agreements have been reached.

We cannot defer or avoid listing a species that is at risk of extinction on the basis of intentions to develop conservation agreements or plans. We cannot assume that such plans will be developed and implemented, or that they will be successful in providing long-term protection.

A habitat conservation plan is a document required when applying for an incidental take permit pursuant to section 10(a)(1)(B) of the Act. Incidental take permits are required when activities will result in ''take'' of threatened or endangered species. While Service personnel provide detailed guidance and technical assistance throughout the process, the development of an HCP is driven by the applicant. The purpose of the habitat conservation plan is to ensure that the effects of incidental take authorized under the permit will be adequately minimized and mitigated.

Issue 23: Several commentors suggested that we should be focusing on public, not private lands to conserve the Santa Barbara County population of California tiger salamanders, and that we should move salamanders onto government property. One commenter stated that landowners have offered to set up preserves on their land.

Our Response: One purpose of the Act (section 2(b)) is to provide a means to protect the ecosystems upon which threatened and endangered species depend. Although species introductions may be a potentially important recovery tool, they are less effective when they occur in habitat that has not been occupied by the species in the past. Vandenberg Air Force Base, the closest government property near the range of the California tiger salamander in Santa Barbara County, has been surveyed extensively for tiger salamanders; to date, tiger salamanders have not been found there. Similarly, tiger salamanders have not been found on Los Padres National Forest. This may be due to differences in soil types and microclimate conditions, or it may be an historical artifact of where California tiger salamanders were able to disperse. Transplanting California tiger salamanders to lands where they do not occur naturally would do nothing to protect the ecosystems in which they evolved and are found, and probably would not be successful. Therefore, the need to list the species would not be precluded. We must address all causes of losses and threats to the population, including those that occur on private lands.

Issue 24: One commenter states that the 2 km (1.2 mi) home range reported in the emergency listing is too generous an estimate of how far California tiger salamanders will actually migrate from breeding ponds to summer retreat habitat. The commenter believes that it is more important that the Service focus on (1) preserving the watersheds that support California tiger salamander breeding ponds and, (2) ensuring that adequate rodent populations occur within these watersheds so as to provide adequate summer retreat habitat for particular California tiger salamander breeding ponds.

Our Response: California tiger salamanders have been known to travel 2 km (1.2 mi) or more from their breeding pond. We agree that 2 km overestimates the distance that most California tiger salamanders are likely to travel from breeding ponds. As stated in the emergency rule and this document, the distance traveled from breeding sites depends on many site-specific factors, such as topography and vegetation, the distribution of ground squirrel or other rodent burrows, and climatic conditions. Although the likelihood of encountering these salamanders tends to decrease with distance from their breeding pond, we cannot provide a firm distance beyond which there is no risk. No studies have been undertaken in Santa Barbara County to determine how far California tiger salamanders disperse from breeding ponds. The

colonization of a newly created pond in the Los Alamos Valley from a pond approximately 227 m (750 ft) away suggests that California tiger salamander regularly move large distances. Additionally, a 5 year study at the Hastings preserve in Monterey found that a large portion (20 percent) of California tiger salamanders traveled to ponds that were 580 m (1900 ft) away (see the Background section).

We agree that preserving the watersheds supporting California tiger salamander breeding ponds and maintaining adequate rodent populations to supply refugia for salamanders is more important than establishing a fixed boundary beyond which salamanders are likely to be found. It is possible, in some cases, that a 2 km (1.2 mi) distance would not incorporate all of the watershed, or that lands beyond that distance should be evaluated as dispersal habitat. The exact configuration of habitat necessary to protect the salamanders will be site-specific.

Issue 25: Some commenters believe farmers have helped salamanders by building dams which prolonged optimum conditions for the salamanders, giving the larvae the maximum opportunity to grow large and healthy before completing metamorphosis.

Our Response: The enlarging of existing natural ponds or the creation of new ponds within a grazing-dominated landscape may have been beneficial to the California tiger salamander in many cases. However, the creation and maintenance of permanent or nearly permanent bodies of water within intensely cropped areas or vineyards has not been documented as providing suitable habitat for tiger salamanders. In many cases, California tiger salamanders are no longer found in ponds within such systems (Shaffer *et al.* 1993). Management of such ponds for agricultural uses, such as drawing down the ponds for frost protection, which is likely to occur when California tiger salamander larvae are present, can be in conflict with the needs of the salamanders. Permanent ponds also provide breeding habitat for exotic fish and frogs that can prey on and compete with California tiger salamanders.

Issue 26: Many commenters stated that the Service should compensate private landowners for the loss of revenue that occurs when California tiger salamanders are found on their land. Another reminded us that the ''taking'' of land is unconstitutional without compensation.

Our Response: Listing under the Act does not imply that private land would be ''locked up'' without the ability for reasonable use. Recovery planning for this species may include recommendations for land acquisition or easements involving private landowners. These efforts would be undertaken with the cooperation of the landowners. We do work with landowners to identify activities and modifications to activities that will not result in take, to develop measures to minimize the potential for take, and to provide authorizations for take through section 7 and 10 of the Act. We encourage landowners to work in partnership with us to develop plans that ensure land uses can be carried out in a manner consistent with the conservation of listed species.

Issue 27: Several commenters stated that we should take the potential economic impacts of the listing into account in our decision-making process. One commenter stated that we must take into account the economic impact of identifying any particular area as critical habitat.

Our Response: Under section 4(b)(1)(A) of the Act, we must base a listing decision solely on the best scientific and commercial data available. The legislative history of this provision clearly states the intent of Congress to ''ensure'' that listing decisions are ''* * * based solely on biological criteria and to prevent nonbiological criteria from affecting such decisions * * *'' H.R. Rep. No. 97–835, 97th Cong., 2d Sess. 19 (1982). As further stated in the legislative history, ''* * * economic considerations have no relevance to determinations regarding the status of species * * *'' Id. at 20. Because we are specifically precluded from considering economic impacts, either positive or negative, in a final decision on a proposed listing, we did not consider the economic impacts of listing the Santa Barbara County population of the California tiger salamander.

We agree that we must take into account the economic impact of identifying a particular area as critical habitat. We have not proposed or designated critical habitat for the California tiger salamander. If the decision is made to designate critical habitat for the Santa Barbara County DPS of the California tiger salamander, we will publish a proposed rule and a draft economic analysis of the proposed designation, and accept public comments on both. Following the receipt of public comments, we will complete the economic analysis of the impact of the critical habitat designation and then publish a final rule.

Issue 28: Several commenters believe that the issuance of permits by the Service serves to unfairly restrict the number of people allowed to conduct surveys and habitat assessments and thus limits public input and avoids peer review.

Our Response: The Service does not require permits for conducting habitat assessments and thus does not limit the number of people able to conduct surveys for suitable habitat or to provide us with information regarding habitat quality. However, in order to properly assess the validity and reliability of such reports and information, it is incumbent on us to examine the qualifications of people submitting the reports and information. Relative to the issuance of recovery permits under Section 10 of the Act, which allow sampling for larvae and adults in suitable habitat, the law requires us to review all applications for such permits to ensure that only those people with appropriate training and experience conduct activities that will actually ''take'' a salamander (*e.g.,* netting, trapping, hand capture, harassing). This requirement reduces the risks to the animals, and promotes the conservation and recovery of the species.

Peer Review

In accordance with our July 1, 1994, Interagency Cooperative Policy for Peer Review in Endangered Species Act Activities (59 FR 34270), we solicited review from eight experts in the fields of ecology, conservation, genetics, taxonomy and management. The purpose of such a review is to ensure that listing decisions are based on scientifically sound data, assumptions, and analyses, including input from appropriate experts. Six reviewers sent us letters during the public comment periods supporting the listing of the Santa Barbara County DPS of the California tiger salamander. Several provided additional documentation on the distribution of and threats to the salamanders; one provided additional genetic data. Their information has been incorporated, as appropriate. Two reviewers specifically evaluated the genetic data on which the determination of the DPS was made; both stated that the data clearly and strongly supported our interpretations and decision.

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 species.

We followed procedures found at section 4 of the Act and regulations (50 CFR Part 424) issued 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 six isolated areas or metapopulations across the species' 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 1930s through the year 2000 (archived at the Santa Barbara County Planning and Development Department), 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 prevent 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 (L. Hunt *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), and 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 more than 130 years ago (Elihu Gevirtz, Santa Barbara County Planning and Development Department, 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, through 1997, in row crop acreage by more than 9,900 hectares (ha) (more than 25,000 acres (ac)) since 1986 and the installation of approximately 4,000 ha (10,000 ac) of vineyards from 1996 to 1999, more than doubling the acreage planted to grapes (Gira *et al.* 1999). This is further supported by the fact that, since 1992, irrigated cropland in Santa Barbara County has increased by approximately 15,700 ha (38,850 ac) to a total of 47,700 hectares (118,270 acres), or a 49 percent increase; approximately 5,670 ha (14,000 ac), or 36 percent of the growth, occurred from 1997 through 1999 (Santa Barbara County Planning and Development Department 2000). We noted in the emergency rule that 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 Department 1998). Of the ponds discovered since the emergency rule, a substantial portion of the adjacent upland habitat of at least one has been graded in the past year (B. Fahey, pers. obs. 2000; Santa Barbara County Planning and Development Department aerial photography collection). There are proposals to develop vineyards around 7 other documented breeding ponds in 2 complexes, but we are involved in discussions with the landowners and managers to provide for the protection of the California tiger salamander and its habitat (Hunt 1998; G. McLaughlin, pers. obs. 1998, 2000; Santa Barbara County Planning and Development 1998; Sweet *et al.* 1998; S. Sweet *in litt.* 1998a,b, 2000b; Monk & Associates 2000a). The threats from agriculture, urbanization, overgrazing, fragmentation, and roadkill are severe in four metapopulations, moderate in one, and minimal in the sixth. The current and potential threats are discussed below by region (West Orcutt, Bradley-Dominion, North Los Alamos, East Los Alamos, Purisima Hills, and Santa Rita).

The five 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 breeding site in this metapopulation; California tiger salamanders have been reported from water meter vaults at residences within this development (L. Hunt *in litt.* 2000). Ongoing agriculture within the vernal pool complex can have negative effects on the hydrology, expose salamanders to contaminants, and kill terrestrial phase salamanders outright. Two sites are subject to mortality from roadkill due to their proximity to roads: One is by the heavily-traveled Black Road and the other is near a dirt road subject to yearly grading. Two remaining breeding ponds are separated from each other by a railroad that may disrupt migration routes and reduce genetic interchange. These sites are also threatened by overgrazing, as evidenced by terracing of the hillsides and a lack of vegetative cover (G. McLaughlin, pers. obs. 1998; Jones and Stokes Associates, Inc., no date) (see discussion on grazing in Factors C and E, below).

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. This is probably the most at-risk metapopulation, due to agricultural intensification. 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 1980s, salamanders have not been observed since the early 1990s, when the grazing lands were converted to vineyards (S. Sweet *in litt.* 1998a). One documented breeding site may not have held water long enough in 2000 to support successful breeding (Bridget Fahey, Service, pers. obs. 2000), and although surveys of two other breeding sites were not conducted, the uplands surrounding one pond have been converted to intensive agriculture (S. Sweet *in litt.* 1998a,b; G. McLaughlin, pers. obs. 1998, 2000). It is likely that

the adult breeding population at that site has been greatly reduced.

A storage facility for agricultural products 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). 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 make the habitat less suitable for salamanders during the breeding or development seasons. 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 North 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). California tiger salamanders were not found during a survey of the remaining pond in March 2000 (Walter Sadinski, Service, pers. obs. 2000), although they were present in other ponds in the metapopulation at that time (Monk & Associates 2000b). Additional surveys and monitoring will be needed to determine if adult California tiger salamanders are still present in the vicinity of the pool and if the remaining upland habitat around the pond is sufficient to support a California tiger salamander population. We still have concerns that habitat around seven vernal pools and seasonal ponds on the west side of Highway 101 that are documented breeding sites may be converted from grazing lands to intensive agriculture (Santa Barbara County Planning and Development Department 1998; S. Sweet *in litt.* 1998a; L. Hunt *in litt.* 1999; Abe Lieder, Santa Barbara County Planning and Development Department, *in litt.* 1999; Morgan Wehtje, California Department of Fish and Game (CDFG), pers. comm. 1999), but we are involved in discussions with landowners and managers regarding protections for the salamander and its habitat. One of these ponds is in danger of being completely filled in by siltation due to increased soil erosion from the vineyard on the east side of the highway (P. Collins *in litt.* 2000a; Jeanette Sainz, landowner, pers. comm. to B. Fahey 2000). Half of the uplands adjacent to a recently-discovered California tiger salamander breeding pond were converted to intensive agriculture in the fall of 1999, probably killing many of the adult salamanders in the uplands associated with that pond (P. Collins *in litt.* 2000a; B. Fahey and G. McLaughlin, pers. obs. 2000). Continued farming of that area will likely result in further losses.

The recently discovered Purisima Hills metapopulation, consisting of six small ponds and surrounding upland habitats on the crest of the Purisima Hills, is in an area previously identified as probable California tiger salamander habitat (Sweet *et al.* 1998). The ponds are probably satellites to the larger Laguna Seca pond, a reported although unconfirmed California tiger salamander breeding site (S. Sweet *in litt.* 2000b). Salamanders from this metapopulation may provide evidence of an historic genetic link between the Los Alamos and Santa Rita Valley metapopulations, although the intensive agriculture currently along State Highway 135 in the Los Alamos Valley probably now constitutes a barrier to gene flow. This metapopulation is the least threatened of the Santa Barbara County California tiger salamander metapopulations; the owner of the property has expressed interest in working with the Land Trust of Santa Barbara County to establish conservation easements protecting both the California tiger salamanders and open land on the site (Van de Kamp 2000). The land use around these ponds consists of cattle grazing.

The east Los Alamos metapopulation consists of three small ponds in an open savannah grassland (Monk & Associates 2000a). Currently, the property is used for cattle grazing (G. McLaughlin, pers. obs. 2000); however, the site is proposed for vineyard installation (Tony Korman and Susan Cagann, Kendall Jackson, pers. comm. 2000). The property is bordered to the north by Highway 101, which, along with extensive vineyards, probably serves as a barrier between this site and some potential breeding ponds on the north side of the highway.

In the Santa Rita Valley metapopulation, the westernmost area occupied by the California tiger salamander has been severely affected by agricultural grading, conversion to row crops, and livestock facilities (S. Sweet *in litt.* 1993, 1998a,b; G. McLaughlin, pers. obs. 1998, 2000; Service files). A site in the eastern part of the valley 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.). Bullfrogs also are at the site (G. McLaughlin, pers. obs. 2000). The upland habitat to the north of the pools is still in very good condition. The pools are adjacent to Highway 246, resulting in considerable road mortality of salamanders during their breeding migrations (S. Sweet *in litt.* 1993, 1998a). Efforts to reduce roadkill are under discussion. Upland habitats around two possible breeding ponds northeast of the second site were deep-ripped in 1998 in preparation for conversion to vineyards (L. Hunt *in litt.* 1998; Santa Barbara County Planning and Development Department 1998). Vineyards have been installed (G. McLaughlin pers. obs. 1999, 2000), and one of the ponds was enlarged and deepened in 1999 (E. Gevirtz, 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. The remaining undisturbed habitat is probably insufficient to support California tiger salamanders over the long term.

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. Gevirtz, 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).

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. Gevirtz *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 indicating that California tiger salamanders are used for this purpose (see discussion under Factor E of this section). Therefore, we do not believe overutilization is a threat to the Santa Barbara County population of California tiger salamanders.

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 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 at least four of the six Santa Barbara County California tiger salamander metapopulations. 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), and within two other pond complexes (L. Hunt *in litt.* 2000; G. McLaughlin, pers. obs. 2000), posing threats to those three metapopulations.

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 (Semlitsch *et al.* 1988; Morey 1998). Salamanders may be especially vulnerable to mosquitofish predation due to their fluttering external gills, which may attract these visual predators (Graf 1993). Loredo-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.

In addition to mosquitofish, other introduced fish, both native and non-native, threaten the California tiger salamander. The introduction of bass and sunfish to many ponds that may have been breeding habitat for California tiger salamanders has probably eliminated salamanders from those sites. The distribution of the California tiger salamander in the north Los Alamos metapopulation may be limited by catfish (*Ictalurus* sp.) that were introduced several years ago into a pond that appears to have suitable breeding habitat. Although a pond less than 76 m (250 ft) away appears less suitable for breeding, it is occupied by California tiger salamanders (S. Sweet *in litt.* 2000b). If the reproductive output from the smaller pond is not enough to sustain the population and the fish are not removed, that breeding population could be lost. Two other ponds in the north Los Alamos metapopulation had bluegill (*Lepomis macrochirus*), largemouth bass (*Micropterus salmoides*), and fathead minnow (*Pimephales promelas*) in 1999 (P. Collins *in litt.* 2000a). The introduced fish populations were extirpated when the ponds dried in the fall, but they may have caused the loss of most or all of the larvae produced that year. A number of ponds in or near occupied California tiger salamander habitat in the West Orcutt area have been home to introduced fish for 20 years (Brady Daniels, Kiewitt Pacific, pers. comm. 2000), probably eliminating any California tiger salamanders that may have bred there.

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* species.), larger California tiger salamander larvae, larger spadefoot toad (*Scaphiopus hammondii*) 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 perennial, intermittent, and ephemeral streams, wetlands (*e.g.,* vernal pools), and other seasonal ponds typically used by breeding salamanders. Projects that involve only the excavation of pools whereby the discharge is limited to ''incidental fallback'' of fill material, and projects 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 Permits (NWP) (33 CFR part 330 Appendix A). Previously, NWP 26 covered fill of wetlands up to 3 acres; as of March 9, 2000, new NWPs 39, 41, 42, and 43, and modifications to NWPs 3, 7, 12, 14, 27, and 40 replace NWP 26 (65 FR 12817). The new and modified NWPs authorize many of the

same activities that NWP 26 authorized, but are activity-specific. The maximum acreage limits of most of the new and modified NWPs is 0.2 ha (0.5 ac). Most of the new and modified NWPs require notification to the District Engineer for activities that result in the loss of greater than 0.04 ha (0.1 ac). These permits thus authorize less fill than the previous NWP 26. Under several of the NWPs that authorize activities that might impact California tiger salamanders, the filling of less than 0.04 ha (0.1 ac) of isolated waters can be undertaken without notifying the Corps of the proposed activity unless a listed species or designated critical habitat might be affected or is in the vicinity of the project (NWP General Condition 11). However, the determination of the potential presence of and/or impacts to listed species or designated critical habitat is left to the applicant, who may not have sufficient expertise to make such a determination.

Under several NWPs, if the activity will affect between 0.04 and 0.2 ha (0.1 and 0.5 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 NWPs. 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 more than 0.2 ha (0.5 ac) of isolated waters also can be authorized under NWPs after the Corps circulates a pre-construction notification (PCN) 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 NWPs. The Corps must require an individual permit for these projects if it determines the project will have more than minimal individual or cumulative effects. However, the Corps generally is reluctant to withhold authorization under NWPs 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). One review of ambystomatid salamander studies reported that 100 percent of post-breeding adults and newly metamorphosed juveniles were found outside the federally delineated wetland boundary (Semlitsch 1998). Therefore, existing federal regulations are inadequate to protect tiger salamanders, as 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, even with the new limits on filling of wetlands, section 404 is unlikely to provide sufficient protection of small isolated wetlands and the surrounding watersheds.

An individual permit is required for projects that do not qualify under the terms of a General Permit, and for projects that are determined by the Corps to have greater than minimal impacts or to be contrary to the public interest. 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. However, the long-term viability and suitability of artificially created wetlands has not been established. 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 three to five years old, and eight projects were greater than five years old at the time of the study. We found that, although it appeared our 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 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 (243 ha) 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 (41 cm), 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, EPA, 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 (CESA), 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 depends, first, on whether discretionary approval is required for a project and, second, where such approval is required, on how the agency exercises its discretion. 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 of 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. Santa Barbara County is developing new regulations to address the protection of various components of California tiger salamander habitat, but those have not been completed, nor do we know how effectively those regulations will be implemented and enforced (John Patton, Santa Barbara County Planning and Development, *in litt.* 2000).

A recent report on the status of agricultural grading and the enforcement of the County's grading ordinance found that 93 percent of the new cultivation since 1997 in Santa Barbara County has taken place without the need for County permits (Santa Barbara County Planning and Development Department 2000). This same report states that ''overall, the County's enforcement of the Grading Ordinance appears to have had little negative direct effect on the agricultural industry * * *'' and that ''the program has not succeeded in encouraging operators of agricultural expansion projects to consult with the agricultural assistance team on whether permits are required prior to beginning grading.'' Finally, a Grand Jury report published in 1999 states that the Santa Barbara County agricultural community frequently proceeds with agricultural conversions without a permit, preferring to suffer the consequences later rather than undertake the time-consuming permit process (Santa Barbara County Grand Jury 1999).

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 more than 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 are prone to local extinction due to human-caused fragmentation (Findlay and Houlahan 1996, Gibbs 1998). This risk is heightened for the California tiger salamander, as it is distributed throughout the landscape in a metapopulation framework, with salamanders at some sites temporarily extirpated and then recolonizing from neighboring sites. Reducing the California tiger salamander's distribution to a few isolated ponds greatly reduces the species' ability to persist over time (H.B. Shaffer *in litt.* 2000b). 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. Even the relatively pristine Purisima Hills ponds are either bounded by or very close to a dirt road (S. Sweet *in litt.* 2000b). The dispersal and migration distances of California tiger salamanders require a large amount of barrier-free landscape (Shaffer *et al.* 1993; Loredo *et al.* 1996). 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. Roads can accelerate fragmentation by increasing mortality and preventing recolonization of sites that would otherwise be only temporarily extirpated (Trombulak and Frissell 2000).

Road construction can significantly reduce the breeding population of a pond and, in some cases, cause the loss of a large portion of a metapopulation. Road construction results in the death of slow-moving animals and causes soil compaction underneath and adjacent to the road bed (Trombulak and Frissell 2000). Any California tiger salamanders in underground burrows in the path of the road or in the impact area are likely to be crushed during road construction. Once the road is open to traffic, salamanders are at risk of being run over on their first dispersal migration from the pond, and on future migrations to and from the ponds for breeding.

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 of the remaining breeding sites in Santa Barbara County are near roads of various sizes. Eight are within 0.5 km (0.3 mi) of a major U.S. highway, one is bounded by a State highway, two are adjacent to secondary roads (as was the pond destroyed in 1998), and five are within 0.5 km (0.3 mi) of secondary roads. Although the remaining ponds are adjacent to or near dirt roads (Sweet *et al.* 1998a; Service files), the threats to those ponds from roadkill and the effects of fragmentation are less than the threats to ponds bounded by or near heavily traveled paved roads. 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. Roads alter many of the physical characteristics of the environment that may be important to California tiger salamanders, including soil density, soil water content, dust, surface-water flow, patterns of runoff, and sedimentation (Trombulak and Frissell 2000). The deleterious effects of roads on many ecological factors reach an average of 0.6 km (0.4 mi) from the road itself and are especially harmful to species such as salamanders that are often genetically programmed to migrate in a certain direction for breeding (Forman and Deblinger 2000).

Amphibians are especially vulnerable to being killed on roads due to life histories involving migration between breeding and upland habitats and their slow movements (Trombulak and Frissell 2000). Large numbers of California tiger salamanders, up to 9 to 12 per km (15 to 20 per mi) 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). Of California tiger salamanders found on roads, 25 to 72 percent are dead (Twitty 1941; S. Sweet *in litt.* 1993; Launer and Fee 1996). However, Sweet's report states that ''the sizes of breeding adults do *not* point toward a major influence by road-kill.'' (Emphasis in original.) 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 and 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 offered in the Bradley-Dominion area (G. McLaughlin, pers. obs. 1998, 2000).

Contaminants

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

Direct 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 (*Ambystoma 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.

Sedimentation from road construction, maintenance, and runoff is another form of contamination that may affect California tiger salamander breeding ponds. Roads alter the hydrology of slopes, in part by diverting water into surface-water systems that can cause erosion, create gullies, and deposit increased loads of sediments into wetland systems (Trombulak and Frissell 2000). Road traffic can spread dust, which can settle into ponds, affecting aquatic and emergent vegetation and causing asphyxiation of eggs. Increased sedimentation could also degrade habitat by filling pools otherwise usable by the species; there is evidence that this is occurring at one pond in the Solomon Hills/west Los Alamos metapopulation (P. Collins *in litt.* 2000a, J. Sainz pers. comm. to B. Fahey 2000). The ability of the California tiger salamander to detect aquatic food items could be impaired from increased sedimentation, as can

susceptibility to diseases (see factor C, above).

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, more than 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, fenamiphos, malathion, and endosulfan; some of these are extremely toxic to aquatic organisms, including amphibians and the organisms on which they prey. Many more agricultural chemicals may have lethal or sublethal effects on California tiger salamanders; those discussed here provide only a sample of the actual and potential threats.

Metam-sodium, a broad spectrum carbamate used for soil sterilization, was one of the main chemicals applied on broccoli and lettuce grown in 1994, when more than 114,000 kg (more than 250,000 lb) were used in Santa Barbara County (CDFA). Metam-sodium is extremely toxic to fish (Meister 1997). Although no test data are available for amphibians, the effects are likely to be similar.

Chlorpyrifos is a highly toxic organophosphate insecticide applied as granules, wettable powder, dustable powder, or emulsifiable concentrate (EXTOXNET 1996a). Chlorpyrifos was detected at a concentration of 0.006 micrograms/liter (µg/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 1996a); 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 1996a). More than 6,000 kg (13,000 lb) were used in Santa Barbara County in 1994 (CDFA).

Fenamiphos, a phosphorothioate, is used on many crops to control a wide variety of nematodes (roundworms). The compound is absorbed by roots and translocated throughout the plant. The toxicity of fenamiphos to aquatic species varies from moderate to high. Fish are extremely sensitive to fenamiphos (EXTOXNET 1996b). Fenamiphos has been linked to fish and bird kills and is known to have a high potential of leaching into the groundwater. Nearly 12,000 kg (26,000 pounds) 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 µg/l in test wells near fields on which it has been used (Burow 1998a). More than 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). More than 225,000 kg (500,000 lb) were used in Santa Barbara County in 1994 (CDFA).

Azinphos-methyl (AZM) is an organophosphate insecticide and miticide used on many crops. The EPA (EXTOXNET 1996c) classifies this pesticide as class I, which are highly toxic compounds. Harris *et al.* (1998) reported a green frog (*Rana clamitans*) 16-day LC50 of >5.0 mg/L for Guthion WP, a preparation of 50 percent AZM. Dolah *et al.* (1997) reported that, in South Carolina streams, measured concentrations of AZM at greater than 17 µg/L have coincided with documented fish kills. They reported that at a concentration of 20 µg/L, 100 percent mortality occurs within a short time. The use of AZM in the vicinity of the California tiger salamander could affect recruitment and survival directly, or affect the food supply.

Endosulfan is a sulfur-containing organochlorine used for the control of many insects on a wide variety of crops. Studies by Berrill *et al.* (1998) reported severe toxicity to amphibians from exposure to endosulfan, including extensive paralysis to several species of frog and toad tadpoles, delayed metamorphosis and high death rates. Harris *et al.* (1998) reported that green frogs exposed to Thiodan® (a 47 percent mixture of endosulfan) had a 16-d LC50 of greater than 5.0 mg/L. It is apparent that endosulfan is extremely toxic at low concentrations to amphibians.

Five of the six metapopulations of California tiger salamanders 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 directly 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 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.

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 (Rosemary Thompson, Senior Biologist, SAIC, *in litt.* 1998).

Until about 1990, ground squirrel control programs using compound 1080 (sodium fluoroacetate) were carried out

on lands in Santa Barbara County (R. Thompson *in litt.* 1998). Compound 1080 is extremely toxic to nontarget fish, birds, and mammals (EPA 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, EXTOXNET 1996d). 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 and its affect on salamanders 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. 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 thuringensis 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).

Introduced Tiger Salamanders

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). A recently discovered breeding population on the Lompoc Federal Prison property are probably non-native tiger salamanders as well (Storrer *in litt.* 2000); tissue from these larvae are being analyzed to confirm their identity. 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 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 maintain large, sustainable populations. Although Melanson (*in litt.* 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 pond's 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).

Water Drawdowns

Many of the ponds in northern Santa Barbara County are subject to drawdowns for agricultural uses, including irrigation and frost control. Water is removed from the pond using submersible pumps. This has a two-fold effect to California tiger salamander inhabiting these ponds: (1) Salamander larvae and adults may be sucked into the pump mechanism during drawdowns for frost control, killing them in the process (P. Collins *in litt.* 2000a), and (2) ponds may be subject to premature drying in the spring and summer, resulting in the stranding of larvae before they are able to metamorphose.

In developing this final rule, 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, probably deserving recognition as a separate species, and is restricted to very few areas, all of which are threatened to some degree by agricultural conversion, fragmentation, or urban development. As discussed under Factor A of this section, ponds and upland habitats are being lost at a rapid rate in five of the six 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.

Of the 26 known breeding sites, 24 are located exclusively on privately owned land and the other 2 are partially on Santa Barbara County property. Upland habitats surrounding 25 of the ponds are exclusively privately owned; the remaining habitat is a patchwork of county and private lands. No conservation agreements or easements adequate to ensure the long term viability of any metapopulation are in place. Given the extremely rapid rate of recent and projected habitat loss and degradation, this Santa Barbara DPS is in imminent danger of extinction throughout most of its historic range, and may have been eliminated from one area (Bradley-Dominion) in the last 2 years. The survival of the Santa Barbara DPS of the California tiger salamander now depends on protecting as many breeding sites and their 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. Immediately upon publication, this final rule will continue the protection for this DPS of California tiger salamanders, which began when we emergency listed this DPS on January 19, 2000.

Critical Habitat

In the last few years, a series of court decisions have overturned our 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. 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.

Critical habitat is not determinable when one or both of the following situations exist: the information needed to analyze the impacts of the designation is lacking, or the biological needs of the species are not sufficiently well known to permit identification of an area as critical habitat (50 CFR 424.12). We believe we understand the biological needs of the Santa Barbara County California tiger salamander sufficiently well to identify an area appropriate to designate as critical habitat. However, our review of the comments we received following the emergency listing of the Santa Barbara County California tiger salamander indicates the potential impacts of a critical habitat designation are not so well understood that we can complete the analyses required under subsection 4(b) of the Act. Accordingly, we have found that critical habitat for the California tiger salamander is not determinable at this time.

When we find that critical habitat is not determinable, our regulations (50 CFR 424.17) provide that, within one year of the date of the final rule listing the species, we must publish a final rule designating critical habitat, based on the best information available at the time. We will undertake critical habitat determinations and designations during FY 2001 as allowed by our funding allocation for that year. As explained in detail in the Listing Priority Guidance (64 FR 57114), our listing budget is currently insufficient to allow us to immediately complete all of the listing actions required by the Act. 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 and available funding.

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 the species' 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 subsequently is listed, 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.

Listing this species provides for the development of a recovery plan, which would bring together Federal, State, local, and private efforts for the conservation of the species. The plan would establish a framework for agencies to coordinate activities and cooperate with each other in conservation efforts. The plan would set recovery priorities and estimate costs of various tasks necessary to accomplish them. It also would describe site-specific management actions necessary to achieve conservation and survival of the Santa Barbara County population of California tiger salamanders. Additionally, pursuant to section 6 of the Act, we would be able to grant funds to the State for management actions promoting the protection and recovery of the salamander.

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 the emergency rule, published on January 19, 2000, and being held consistent with regulations at 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 permit issued by us under section 10(a)(1)(B) of the Act. To obtain a permit, an applicant must develop a habitat conservation plan and apply for an incidental take permit that minimizes and mitigates impacts to the species to the maximum 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, without appropriate authorization from us pursuant to sections 7 and 10 of the Act, the following actions may result in a violation of section 9; however, possible violations are not limited to these actions:

(1) Unauthorized collecting, trapping, capturing, killing, harassing, sale, delivery, or movement, including 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 final rule are Grace McLaughlin and Bridget Fahey, 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

Accordingly, we amend part 17, subchapter B of chapter I, title 50 of the Code of Federal Regulations, as follows:

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 section 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	*Ambystoma californiense*	U.S.A. (CA)	U.S.A. (CA–Santa Barbara County).	E	667E, 702	NA	NA

Dated: September 14, 2000.

Jamie Rappaport Clark,

Director, Fish and Wildlife Service.

[FR Doc. 00–24173 Filed 9–15–00; 3:09 pm]

BILLING CODE 4310–55–P