Example: Bidder X wishes to place the minimum accepted bid for Market 1. The standing high bid for this market after Round 19 of the auction is $1 million. The minimum bid increment is set at ten percent. Thus, the minimum accepted bid for Market 1 in Round 20 would be $1.1 million. In Round 20, Bidder X erroneously submits a bid of $110 million. If Bidder X withdraws it erroneous bid during the bid withdrawal period for Round 20, it would be subject to a bid withdrawal payment of the minimum bid increment for Round 20, $100,000, or the difference between $1.1 million and the subsequent winning bid, whichever is greater. If Bidder X does not withdraw its bid until Round 21, and the auction is in Stage I or Stage II, it would be subject to a bid withdrawal payment of two times the minimum bid increment, $200,000, or the difference between $1.2 million and the subsequent winning bid, whichever is greater. If Bidder X waits until Round 22 or later to withdraw its erroneous bid, it would be subject to the standard bid withdrawal payment. Similarly, if the auction is in Stage III, and Bidder X fails to withdraw its erroneous bid in Round 20, it would be subject to the standard bid withdrawal payment.

19. Under this approach, the required bid withdrawal payment would be substantial enough to discourage strategic placement of erroneous bids without being so severe as to impose an untenable burden on bidders. In addition, the payment is tailored to the size of the license and the point in the auction when the mistaken bid was submitted. For example, if a mistaken bid is submitted early in a simultaneous, multiple round auction, the potential damage to the economic efficiency of the auction is lower than if it were submitted during the later stages of the auction, and the required bid withdrawal payment would be correspondingly lower. As an auction progresses, however, the potential gain from a strategically-placed erroneous bid is higher, and the potential damage to the efficiency of the auction process is higher. In other words, erroneous bids cause greater damage to the economic efficiency of the auction process as market prices approach their final valuation. Thus, the cost of submitting an erroneous bid during the later stages of an auction is higher than it would be if it were submitted earlier in an auction.

20. We have decided to grant ATA and MAP relief from full enforcement of the bid withdrawal payment rules. Specifically, we will utilize the approach described above to reduce ATA's bid withdrawal payment to two times the minimum bid increment for license 11P in Round 9, or $45,594. Similarly, we will utilize the approach described above to reduce MAP's bid withdrawal payment to the minimum bid increment for license B–380 in Round 10 of the broadband PCS C block auction, or $206,400.

21. We delegate to the Wireless Telecommunications Bureau (the ''Bureau'') the authority to resolve similar requests for waiver of the Commission's bid withdrawal provisions. In order for a party to be eligible for such a waiver, it must submit a request for waiver accompanied by a sworn declaration attesting to the veracity of the factual circumstances surrounding the erroneous bid submission. We will continue to evaluate these requests on a case-by-case basis. We caution that relief will not be available to bidders if there is evidence that they have engaged in insincere or frivolous bidding or have otherwise acted in bad faith. We consider all allegations of bidder misconduct very seriously.

IV. Ordering Clauses

22. Accordingly, *it is ordered* That the waiver request submitted by Atlanta Trunking Associates, Inc. is granted to the extent indicated above.

23. *It is further ordered* That Atlanta Trunking Associates, Inc. is subject to a bid withdrawal payment requirement of $45,594.

24. *It is further ordered* That the waiver request submitted by MAP Wireless, L.L.C. is granted to the extent indicated above.

25. *It is further ordered* That MAP Wireless, L.L.C. is subject to a bid withdrawal payment requirement of $206,400.

26. *It is further ordered* That we delegate to the Wireless Telecommunications Bureau the authority to resolve bid withdrawal payment waiver requests involving factual circumstances similar to those presented here.

Federal Communications Commission.

William F. Caton,

Acting Secretary.

[FR Doc. 96–12967 Filed 5–22–95; 8:45 am]

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DEPARTMENT OF THE INTERIOR

Fish and Wildlife Service

50 CFR Part 17

RIN 1018–AC 34

Endangered and Threatened Wildlife and Plants; Determination of Threatened Status for the California Red-Legged Frog

AGENCY: Fish and Wildlife Service, Interior.

ACTION: Final rule.

SUMMARY: The U.S. Fish and Wildlife Service (Service) determines threatened status for the California red-legged frog (*Rana aurora draytonii*) pursuant to the Endangered Species Act of 1973, as amended (Act). The Service originally proposed to list the California red-legged frog as endangered, but information obtained during the comment period suggests that this taxon is found in more localities within its current range than previously identified. The California red-legged frog is now found primarily in wetlands and streams in coastal drainages of central California. It has been extirpated from 70 percent of its former range. The California red-legged frog is threatened within its remaining range by a wide variety of human impacts, including urban encroachment, construction of reservoirs and water diversions, introduction of exotic predators and competitors, livestock grazing, and habitat fragmentation. This rule implements the Federal protection and recovery provisions afforded by the Act for this species.

EFFECTIVE DATE: June 24, 1996.

ADDRESSES: The complete file for this rule is available for public inspection, by appointment, during normal business hours at the U.S. Fish and Wildlife Service, 2800 Cottage Way, Room E–1803, Sacramento, CA 95825–1846.

FOR FURTHER INFORMATION CONTACT: Karen J. Miller, at the above address (916 979–2725).

SUPPLEMENTARY INFORMATION:

Background

The California red-legged frog (*Rana aurora draytonii*) is one of two subspecies of the red-legged frog (*Rana aurora*) found on the Pacific coast. *Rana a. draytonii* was first described by Baird and Girard in 1852 from specimens collected at or near the City of San Francisco in 1841 (Storer 1925, Cochran 1961). The California red-legged frog is the largest native frog in the western United States (Wright and Wright 1949),

ranging from 4 to 13 centimeters (cm) (1.5 to 5.1 inches (in.)) in length (Stebbins 1985). The abdomen and hind legs of adults are largely red; the back is characterized by small black flecks and larger irregular dark blotches with indistinct outlines on a brown, gray, olive, or reddish background color. Dorsal spots usually have light centers (Stebbins 1985). Dorsolateral folds are prominent on the back. Larvae (tadpoles) range from 14 to 80 millimeters (mm) (0.6 to 3.1 in.) in length and the background color of the body is dark brown and yellow with darker spots (Storer 1925).

The historical range of the California red-legged frog extended coastally from the vicinity of Point Reyes National Seashore, Marin County, California, and inland from the vicinity of Redding, Shasta County, California, southward to northwestern Baja California, Mexico (Jennings and Hayes 1985, Hayes and Krempels 1986). The northern red-legged frog (*Rana aurora aurora*) ranges from Vancouver Island, British Columbia, Canada, south along the Pacific coast west of the Cascade ranges to northern California (northern Del Norte County). Red-legged frogs found in the intervening area (southern Del Norte to northern Marin County) exhibit intergrade characteristics of both *R. a. aurora* and *R. a. draytonii* (Hayes and Krempels 1986). Systematic relationships between the two subspecies are not completely understood (Hayes and Miyamoto 1984, Green 1985a, Green 1986, Hayes and Krempels 1986). However, significant morphological and behavioral differences between the two subspecies suggest that they may actually be two species in secondary contact (Hayes and Krempels 1986).

Northern Marin County represents the approximate dividing line between *R. a. draytonii* and the intergrade zone along the coastal range (Mark Jennings, National Biological Service, pers. comm., 1993). California red-legged frogs found in Nevada (Linsdale 1938, Green 1985b) were introduced. This rule does not extend the Act's protection to any *R. aurora* in (1) The State of Nevada; (2) Humboldt, Trinity, and Mendocino counties, California; (3) Glenn, Lake, and Sonoma counties, California, west of the Central Valley Hydrological Basin; or (4) Sonoma and Marin counties north and west of the Napa River, Sonoma Creek, and Petaluma River drainages, which drain into San Francisco Bay, and north of the Walker Creek drainage, which drains to the Pacific Ocean.

Several morphological and behavioral characteristics differentiate California red-legged frogs from northern red-legged frogs. Adult California red-legged frogs are significantly larger than northern red-legged frogs by 35 to 40 mm (1.4 to 1.6 in.) (Hayes and Miyamoto 1984). Dorsal spots of northern red-legged frogs usually lack light centers common to California red-legged frogs (Stebbins 1985), but this is not a strong diagnostic character. California red-legged frogs have paired vocal sacs and call in air (Hayes and Krempels 1986), whereas northern red-legged frogs lack vocal sacs (Hayes and Krempels 1986) and call underwater (Licht 1969). Female California red-legged frogs deposit egg masses on emergent vegetation so that the egg mass floats on the surface of the water (Hayes and Miyamoto 1984). Northern red-legged frogs also attach their egg masses to emergent vegetation, but the mass is submerged (Licht 1969).

California red-legged frogs breed from November through March with earlier breeding records occurring in southern localities (Storer 1925). Northern red-legged frogs breed in January to March soon after the ice melts (Nussbaum *et al.* 1983). California red-legged frogs found in coastal drainages are rarely inactive (Jennings *et al.* 1992), whereas those found in interior sites may hibernate (Storer 1925).

The California red-legged frog occupies a fairly distinct habitat, combining both specific aquatic and riparian components (Hayes and Jennings 1988, Jennings 1988b). The adults require dense, shrubby or emergent riparian vegetation closely associated with deep (>0.7 meters (m)) still or slow moving water (Hayes and Jennings 1988). The largest densities of California red-legged frogs are associated with deep-water pools with dense stands of overhanging willows (*Salix* spp.) and an intermixed fringe of cattails (*Typha latifolia*) (Jennings 1988b). Well-vegetated terrestrial areas within the riparian corridor may provide important sheltering habitat during winter. California red-legged frogs estivate in small mammal burrows and moist leaf litter (Jennings and Hayes 1994b). California red-legged frogs have been found up to 30 m (98 feet (ft)) from water in adjacent dense riparian vegetation for up to 77 days (Rathbun *et al.* 1993, Galen Rathbun, National Biological Service, *in litt.*, 1994). Rathbun (*in litt.*, 1994) found that the use of the adjacent riparian corridor was most often associated with drying of coastal creeks in mid to late summer.

California red-legged frogs disperse upstream and downstream of their breeding habitat to forage and seek estivation habitat. Estivation habitat is essential for the survival of California red-legged frogs within a watershed. Estivation habitat, and the ability to reach estivation habitat can be limiting factors in California red-legged frog population numbers and survival.

Estivation habitat for the California red-legged frog is potentially all aquatic and riparian areas within the range of the species and includes any landscape features that provide cover and moisture during the dry season within 300 feet of a riparian area. This could include boulders or rocks and organic debris such as downed trees or logs; industrial debris; and agricultural features, such as drains, watering troughs, spring boxes, abandoned sheds, or hay-ricks. Incised stream channels with portions narrower than 18 inches and depths greater than 18 inches may also provide estivation habitat.

Egg masses that contain about 2,000 to 5,000 moderate-sized (2.0 to 2.8 mm (0.08 to 0.11 in.) in diameter), dark reddish brown eggs are typically attached to vertical emergent vegetation, such as bulrushes (*Scirpus* spp.) or cattails (*Typha* spp.) (Jennings *et al.* 1992). California red-legged frogs are often prolific breeders, laying their eggs during or shortly after large rainfall events in late winter and early spring (Hayes and Miyamoto 1984). Eggs hatch in 6 to 14 days (Jennings 1988b). In coastal lagoons, the most significant mortality factor in the pre-hatching stage is water salinity (Jennings *et al.* 1992). One hundred percent mortality occurs in eggs exposed to salinity levels greater than 4.5 parts per thousand (Jennings and Hayes 1990). Larvae die when exposed to salinities greater than 7.0 parts per thousand (Mark Jennings, National Biological Service, *in litt.*, 1994). Larvae undergo metamorphosis 3.5 to 7 months after hatching (Storer 1925, Wright and Wright 1949, Jennings and Hayes 1990). Of the various life stages, larvae probably experience the highest mortality rates, with less than 1 percent of eggs laid reaching metamorphosis (Jennings *et al.* 1992). Sexual maturity normally is reached at 3 to 4 years of age (Storer 1925, Jennings and Hayes 1985), and California red-legged frogs may live 8 to 10 years (Jennings *et al.* 1992).

The diet of California red-legged frogs is highly variable. Larvae probably eat algae (Jennings *et al.* 1992). Hayes and Tennant (1985) found invertebrates to be the most common food items of adult frogs. Vertebrates, such as Pacific tree frogs (*Hyla regilla*) and California mice (*Peromyscus californicus*), represented over half of the prey mass eaten by larger frogs (Hayes and Tennant 1985). Hayes and Tennant (1985) found

juvenile frogs to be active diurnally and nocturnally, whereas adult frogs were largely nocturnal. Feeding activity likely occurs along the shoreline and on the surface of the water (Hayes and Tennant 1985).

The California red-legged frog has sustained a 70 percent reduction in its geographic range in California as a result of several factors acting singly or in combination (Jennings *et al.* 1992). Habitat loss and alteration, overexploitation, and introduction of exotic predators were significant factors in the California red-legged frog's decline in the early to mid 1900s. It is estimated that California red-legged frogs were extirpated from the Central Valley floor before 1960. Remaining aggregations (assemblages of one or more individuals, not necessarily a viable population) of California red-legged frogs in the Sierran foothills became fragmented and were later eliminated by reservoir construction, continued expansion of exotic predators, grazing, and prolonged drought. Within the Central Valley hydrographic basin, only 14 drainages on the Coast Ranges slope of the San Joaquin Valley and one drainage in the Sierran foothills are actually known to support or may support California red-legged frogs, compared to over 60 historic locality records for this basin (a 77 percent reduction). The pattern of disappearance of California red-legged frogs in southern California is similar to that in the Central Valley, except that urbanization and associated roadway, large reservoir (introduction of exotic predators), and stream channelization projects were the primary factors causing population declines. In southern California, California red-legged frogs are known from only five locations south of the Tehachapi Mountains, compared to over 80 historic locality records for this region (a reduction of 94 percent).

California red-legged frogs are known to occur in 243 streams or drainages in 22 counties, primarily in the central coastal region of California. The current number of occupied drainages represents information obtained during the public comment period and re-evaluation of Service records. This re-evaluation resulted in the compilation of a threat matrix for all drainages known to support California red-legged frogs (U.S. Fish and Wildlife Service 1995). The term ''drainage'' will be used to describe named streams, creeks, and tributaries from which California red-legged frogs have been observed. For purposes of this final rule, a single occurrence of California red-legged frog is sufficient to designate a drainage as occupied by, or supporting California red-legged frogs. Monterey (32), San Luis Obispo (36), and Santa Barbara (36) counties support the greatest number of currently occupied drainages. Historically the California red-legged frog was known from 46 counties, but the taxon is now extirpated from 24 of those counties (a 52 percent reduction in county occurrences). In seven of the 22 occupied counties (32 percent), California red-legged frogs are known from a single occurrence. The most secure aggregations of California red-legged frogs are found in aquatic sites that support substantial riparian and aquatic vegetation and lack exotic predators (e.g., bullfrogs (*Rana catesbeiana*), bass (*Micropterus* spp.), and sunfish (*Lepomis* spp.)). Only three areas within the entire historic range of the California red-legged frog may currently support more than 350 adults, Pescardero Marsh Nature Preserve (San Mateo County), Point Reyes National Seashore (Marin County), and Rancho San Carlos (Monterey County). The San Francisco Airport drainage location, identified in the proposed rule as containing over 350 individuals, is now thought to be nearly extirpated. Threats, such as expansion of exotic predators, proposed residential development, and water storage projects, occur in the majority of drainages known to support California red-legged frogs.

Previous Federal Action

On January 29, 1992, the Service received a petition from Drs. Mark R. Jennings and Marc P. Hayes, and Mr. Dan Holland to list the California red-legged frog (*Rana aurora draytonii*). The petition specified endangered or threatened status by distinct drainages (watersheds) within the range of the species. On October 5, 1992, the Service published a 90-day petition finding (57 FR 45761) that substantial information had been presented indicating the requested action may be warranted. Public comments were requested and a review of the species' status was initiated. The California red-legged frog had been included as a Category 1 candidate species in the Service's November 21, 1991, Animal Notice of Review (56 FR 58804). Category 1 candidates (now known simply as candidates) are species for which the Service has sufficient information on biological vulnerability and threat to support proposals to list them as endangered or threatened. On July 19, 1993, the Service published a 12-month finding on the petitioned action (58 FR 38553). This finding indicated that listing of the California red-legged frog was warranted and that a proposed rule would be published promptly. On February 2, 1994 (59 FR 4888), the Service published a proposal to list the California red-legged frog as an endangered species. Based on new information received during the comment period on the proposed rule, the Service now determines the California red-legged frog to be a threatened species.

Summary of Comments and Recommendations

In the February 2, 1994 proposed rule (58 FR 4888) and associated notifications, all interested parties were requested to submit factual reports or information that might contribute to development of a final rule. Appropriate State agencies and representatives, County and City governments, Federal agencies and representatives, scientific organizations, and other interested parties were contacted and requested to comment. Newspaper notices were published in the San Francisco Chronicle on February 9, 1994, and the Sacramento Bee on February 10, 1994, both of which invited public comment.

The Service received eight written requests for a public hearing. Three requests came from the Mosquito and Vector Control Districts of Glenn, Sutter/Yuba, and Butte counties. Additional requests came from William Hazeltine, a private consultant; the California Cattlemen's Association; the Cambria Community Services District; the United Residential Lot Owners of Cambria, Inc.; and Price, Postel, and Parma, a Santa Barbara law firm. As a result, the Service published a notice of public hearing on April 8, 1994 (59 FR 16792), and reopened the comment period until May 27, 1994. Appropriate State agencies and representatives, County and City governments, Federal agencies and representatives, scientific organizations, and other interested parties were contacted regarding the hearing. A newspaper notice of the public hearing was published in the Sacramento Bee on April 25, 1994, which invited general public comment. A public hearing was conducted at the Radisson Hotel in Sacramento, California on May 12, 1994. Testimony was taken from 6:00 p.m. to 8:00 p.m. Seventeen individuals testified at the hearing.

During the comment periods, the Service received 72 comments (i.e., letters and oral testimony) from 57 individuals or agencies. Of the 31 commenters that stated a position, 22 (71 percent) supported listing and 9 (29 percent) did not.

Support for the listing was expressed by one State agency (California

Department of Parks and Recreation) and 18 other interested parties. Three commenters recommended listing the California red-legged frog as threatened. Opposition to the listing was expressed by two mosquito abatement or vector control districts and seven other interested parties. Of the 26 respondents indicating no position on the listing, several expressed concern regarding the impact of listing.

Written comments and oral statements obtained during the public hearing and comment periods are combined in the following discussion. Opposing comments and other comments questioning the rule can be placed in 10 general groups based on content. These categories of comment, and the Service's response to each, are listed below.

Issue 1: Insufficiency of Scientific Data

Comment: Several commenters stated that insufficient data are available to warrant listing of the California red-legged frog. They suggested that the distribution of the California red-legged frog is more widespread and that many more sites may exist than were reported in the proposed rule because surveying within the historic range of the taxon has not been complete. One commenter suggested that only easily accessible areas on the coast seemed to have been surveyed and if a watershed approach had been taken, the range of the species would be greater than 30 percent of its historical range. Another commenter suggested that many surveys were done in drought years, which would bias the data.

Service Response: The Service mapped the current range of the California red-legged frog based on survey results. Wherever a watershed was known to support California red-legged frogs, the entire watershed was included as being within the species' current range. The only watersheds that were not included in their entirety are those in the Sierra Nevada where the upper reaches are too high in elevation to provide habitat for the California red-legged frog, and portions of watersheds located on the Central Valley floor. In the Coast Ranges, watersheds lacking information on California red-legged frogs were included within the current range of the California red-legged frog from Marin County south to Ventura County.

Over the last 15 years, the petitioners have conducted multiple surveys, visiting each survey site a minimum of three times, to determine the status of the California red-legged frog throughout its entire range. The petitioners rechecked 75 percent of the historic sites in the coastal region of the range of the California red-legged frog and all suitable habitat within the species historic range in the Central Valley and Sierra Nevada foothills including all but one of the historic sites. This site was surveyed by another herpetologist, Dave Martin (Jennings, pers. comm., 1995). In surveying suitable habitat, access to some areas was denied by private landowners. Even so, surveyors were able to obtain access to all major drainages within their survey area (Jennings, pers. comm., 1995). Many of the surveys were conducted between 1986 and 1990, which were considered drought years. However, in the majority of cases reasons other than drought were considered responsible for the absence of frogs (Jennings, pers. comm., 1995). Where drought was thought to be the case, repeat surveys were performed in subsequent wet years (Jennings, pers. comm., 1995). Approximately half of the sites surveyed were along roadsides and easily accessible. The remaining sites were difficult to access, often requiring strenuous hikes (Jennings, pers. comm., 1995). Surveying by the petitioners and others is ongoing in many portions of the State.

Surveys conducted by other researchers support the conclusions of the petitioners. Extensive surveying has been conducted in years with and without drought conditions in Sierran national forests by David Martin (University of California, Santa Barbara,, pers. comm., 1994); Santa Clara County and the foothills of the western Sierra Nevada between Modesto and Fresno by the Coyote Creek Riparian Station (*in litt.*, 1993); the Sacramento Valley, San Joaquin Valley and inner Coast Ranges by the University of California at Davis (H. Bradley Shaffer, University of California, Davis, *in litt.*, 1994); Santa Cruz County by the University of California at Santa Cruz (Nauman 1992); Santa Cruz and San Mateo counties (Mike Westphal, Coyote Creek Riparian Station, 1995), and the Point Reyes Peninsula by the National Park Service (Gary Fellers, National Biological Service, *in litt.*, 1994).

As a result of these surveys and additional information received during the public comment period following publication of the proposed rule, 54 new localities of California red-legged frogs were identified. The majority of these sightings, however, are within the current range of the California red-legged frog as identified in the proposed rule. The exceptions are the discovery of California red-legged frogs in the Sierran foothills (Butte County, Pinkard Creek), the Transverse mountain range (Los Angeles county near Palmdale), Sulphur Springs Creek in Solano County, and Mine Creek in Fresno County; the latter two representing minor range extensions to the east. The Service is confident that the Central Valley floor, Sierra Nevada foothills, and southern California (south of the Tehachapi Mountains) have been surveyed sufficiently to draw the conclusion that California red-legged frogs have been extirpated or nearly extirpated from these regions. These three regions comprise over 70 percent of the California red-legged frog's historic range.

Section 4(b)(1)(A) of the Act requires that a listing determination be based on the best scientific and commercial data available. The Service bases this listing determination on data collected over a period of 15 years by the petitioners and numerous other qualified herpetologists. All data indicate a downward trend in the range of the California red-legged frog and a preponderance of small, fragmented aggregations of frogs. The viability of the remaining California red-legged frog aggregations is threatened by numerous factors which are discussed in detail in this rule. The Service maintains, therefore, that sufficient data are available to warrant listing the California red-legged frog. However, because the Service received significant additional information on locations of California red-legged frog aggregations within their current range during the comment period, listing the taxon as threatened rather than endangered is deemed more appropriate.

Comment: Another commenter stated that the conclusion in the proposed rule that 75 percent of the species' remaining range is threatened by one or more factors has no basis in scientific fact and is not supported by any substantial scientific evidence.

Service Response: The proposed rule stated that the California red-legged frog has been extirpated from 75 percent of the historic range of the taxon. Because of the inclusion of 54 additional streams or drainages known to support California red-legged frogs, the final rule has been revised to state that extirpation has occurred in 70 percent of the historic range. The commenter misinterpreted the information in the proposed rule. The estimate of extirpated range is based on information published in the literature and presented to the Service by the petitioners and other herpetologists, survey biologists, and consultants.

Comment: One commenter stated that an article in the March 1, 1994, San Ramon Valley Times reported that the East Bay Regional Park District had not

surveyed for frogs on its properties. Given that the District comprises over 75,000 acres, the commenter believed that this lack of information was a significant data gap.

Service Response: East Bay Regional Park District biologists and private consultants in 1990, 1993, and 1994 surveyed an estimated 95 percent of District properties that could contain California red-legged frog habitat (Joseph DiDonato, East Bay Regional Park District, pers. comm. and *in litt.*, 1994; Karen Swaim, LSA Associates, Inc., *in litt.*, 1994). California red-legged frogs were found in 5 of 53 District parks. Included in the survey results were 8 streams or drainages not previously known to be inhabited by California red-legged frogs.

Comment: One commenter stated that the information on California red-legged frog locations in Alameda County is probably not complete. The commenter contended that California red-legged frogs are probably not as rare in Alameda County as purported in the proposed rule.

Service Response: California red-legged frogs are known from 21 drainages in the county. Many other drainages in the county that have been surveyed by the East Bay Regional Park District and LSA Associates, Inc. harbor only bullfrogs. Of the 22 counties known to support aggregations of California red-legged frogs, Alameda County ranks ninth in total number of drainages supporting the taxon. Over half of the known frog aggregations in the county, however, are threatened by various factors including exotic predators, urban development, off-road vehicles, and grazing. While it is possible that some California red-legged frog locations have yet to be discovered, the Service believes it is unlikely that California red-legged frogs inhabit more than the 21 known drainages in Alameda County.

Comment: One commenter stated that the Service's data on locations of California red-legged frogs does not match information contained in the California Department of Fish and Game Natural Diversity Database (NDDB).

Service Response: The researchers who petitioned the Service to list this species and the Service have reviewed all data available from the NDDB regarding locations of California red-legged frogs. The NDDB currently contains approximately 122 records of California red-legged frogs. The petitioners have determined current and historic range of the taxon from 1,205 museum records and 250 records from other sources coupled with extensive field checking of records. All locations identified in the NDDB prior to 1992 were field checked by the petitioners. All new locations identified in the NDDB from 1992 to the present have been added to the Service's analysis of the current range of the California red-legged frog. These additional records have not appreciably extended the currently known range of the taxon.

Comment: Several commenters noted that the proposed rule indicated uncertainty in biology, life cycle, habitat requirements, and predators of the California red-legged frog, including identifying where frogs overwinter, where post-metamorphic frogs feed, what larvae eat, and site specific predators. The commenters believed that listing of the taxon was not warranted until these data gaps were filled.

Service Response: The Service has relied on the best available scientific and commercial data in making this listing determination. The Service concurs that many aspects of the biology, predator-prey interactions, and microhabitat requirements of the California red-legged frog are not completely understood. This is true for most species of wildlife, including common species that have been studied extensively. Sufficient knowledge of the biology and habitat requirements of the California red-legged frog exists to identify suitable habitats for the taxon, and document population sizes, threats, and its status over time. It is this latter information along with the scientific and commercial information that is used in determining whether or not to list a species under section 4(a) of the Act. A complete understanding of the biology and microhabitat requirements of a listed species are most important in the recovery process. However, a significant delay in listing a species due to large, long-term biological or ecological research efforts could compromise the survival of the California red-legged frog.

Comment: Several commenters stated that the proposed rule cites livestock grazing as a major factor in the decline of the California red-legged frog, but fails to offer site-specific examples of habitat degradation and ''take'' of the species as a result of grazing. One commenter thought that the Service, therefore, could not restrict grazing practices in any way if the species is listed.

Service Response: The proposed rule includes livestock grazing as one of many factors affecting the California red-legged frog, and ranks it as a contributing factor, rather than as a major factor. No site specific studies have been done that document the decline and disappearance of California red-legged frogs once grazing is introduced into an area. Most evidence on the effects of grazing on the California red-legged frog is circumstantial. However, extensive research has been done on the effects of livestock grazing on the aquatic environment. As stated in the proposed rule, the petitioners found that grazing occurred at all historic sites known to support California red-legged frogs in the Central Valley hydrologic basin. Combining this information with information about the habitat preferences of the California red-legged frog leads to the logical conclusion that grazing, where it has dramatically altered California red-legged frog habitat, has played a role in the decline of this taxon.

Comment: One commenter stated that the petition to list the California red-legged frog relies heavily on personal observations, personal communications, and unpublished data. Although the Service is required to base listings on the ''best available data'', the commenter believed that such information did not meet the definition of scientific data because they would be impossible to verify. Three commenters recommended that the proposed listing action be halted and a comprehensive, unbiased scientific review of the status of the California red-legged frog be initiated and published.

Service Response: The researchers who petitioned the Service to list the California red-legged frog are acknowledged experts on this taxon as evidenced by numerous peer reviewed publications on the subject. The majority of the personal observations cited in the petition refer to specific aspects of California red-legged frog biology, which is relevant to the species' management, but less important in determining species' status. Many of the references to unpublished data in the petition refer to distribution and status information that had been collected by the petitioners as part of their ongoing research to follow the status of the California red-legged frog. Much of their status information is supported by surveys conducted by numerous other qualified herpetologists. The Service, therefore, finds that the data presented by the petitioners are credible and have been verified by other experts in the field.

Comment: Several commenters requested that prior to listing the California red-legged frog, the Service quantify impacts to the various life stages of the frog caused by storm damage repair, flood control efforts, reservoir creation, diking and ditching,

regular road maintenance, disease, livestock grazing, off-road vehicle use, timber harvest, predation by native and non-native predators, competition, ultraviolet radiation, water quality, agricultural practices, recreation, reproductive interference, drought, wildfires, flooding, and natural population fluctuations.

Service Response: Section 4(a)(1) of the Act requires the Service to evaluate threats to the species. The Service is unable to quantify how each of the above individual threats has impacted the California red-legged frog. Many threats work synergistically to cause population declines. Thus, the effect of each threat cannot be quantified separately. The above factors are believed to contribute to significant population declines. Completing research in all these areas prior to listing the California red-legged frog could seriously compromise its survival because of lengthy time periods needed to quantify impacts. Further research in these areas, however, would aid the Service in future recovery actions for this species.

Comment: One commenter recommended that the Service delineate the current range and habitat locations of the California red-legged frog in San Joaquin County prior to listing.

Service Response: The Service has delineated the current range and specific habitat locations of California red-legged frogs in San Joaquin County. Two locations of the California red-legged frog occur in San Joaquin County, both in western portions of the county. The distribution map for the California red-legged frog includes all portions of western San Joaquin County that lie on the east slope of the coast range, west of Highway 580.

Comment: One commenter recommended that the Service quantify California red-legged frog population numbers in lotic and lentic habitat and establish management and recovery programs for each habitat type prior to listing the taxon.

Service Response: A recovery plan will be prepared for the California red-legged frog after the taxon is listed. Completion of the above recommended research would be most appropriate during the recovery process for the California red-legged frog.

Issue 2: Causes for California Red-Legged Frog Decline

Comment: Several commenters suggested that ultraviolet-B (UV–B) radiation or estrogen mimics, which have been implicated in the current observed worldwide decline in amphibians, may be significant causes of observed declines in the range and numbers of California red-legged frogs.

Service Response: The Service has reviewed the paper by Blaustein *et al.* (1994) regarding the possible effect of UV–B radiation on the eggs of three amphibian species, the Pacific treefrog (*Pseudacris regilla*), western toad (*Bufo boreas*), and Cascade frog (*Rana cascadae*). Our review focused on results reported for the Cascade frog, because this species is most closely related to the California red-legged frog. Results of tests on Cascade frog eggs from two sites showed mixed results. One site showed that hatching success of *R. cascadae* was greater under sunlight lacking UV–B than under unfiltered sunlight. At the second site, however, the hatching success under UV–B blocking filters was not significantly different from success under unfiltered sunlight. Thus, these data do not present sufficient evidence of a correlation between UV–B radiation and hatching success in the related Cascade frog.

Because UV–B radiation would have greater adverse effects at higher elevations, the Cascade frog, which is a higher elevation species than the California red-legged frog, would be expected to be more severely affected by UV–B radiation, if indeed this is an important factor. Also, because the California red-legged frog attaches its egg masses to aquatic vegetation and prefers aquatic habitats with overhanging vegetation, the effects of UV–B radiation would be expected to be less than for the Cascade frog, whose eggs are typically laid in shallow open water (Nussbaum *et al.* 1983). In addition, the majority of the observed decline in the California red-legged frog occurred prior to the late 1970's, which is when noticeable declines in amphibian species began in western North America (M. Jennings, pers. comm, 1994).

A number of recent studies address certain contaminants that disrupt biological processes by mimicking the effects of naturally produced hormones, such as the female hormone estrogen (Raloff 1994). This phenomenon has been implicated in the recent worldwide decline in amphibians. Several studies have been done on reptiles, including the American alligator (*Alligator mississippiensis*) and red-eared slider turtle (*Pseudemys scripta elegans*). To our knowledge, no studies have been done on amphibians. The potential effects of estrogen mimics on California red-legged frogs are unknown. In addition, the majority of the observed decline in the California red-legged frog occurred prior to the late 1970's, which is when noticeable declines in amphibian species began in western North America (M. Jennings, pers. comm, 1994).

Comment: Several commenters stated that evidence suggesting mosquitofish (*Gambusia affinis*) are significant predators of California red-legged frog larvae is not strong. The commenters stated that infrequent co-occurrence of fish and frogs does not explain potential causation. Other factors may be involved in population decline including microhabitat features of wetlands, which cannot be successfully duplicated in a laboratory setting. Also in a natural setting, the vulnerable stage for California red-legged frog tadpoles (February through April) normally does not coincide with the time of year when mosquitofish numbers are high. Microhabitat usage may not overlap. The commenters pointed out that there are sites where mosquitofish and California red-legged frogs coexist. One commenter objected to the mosquitofish being included as a verified predator of California red-legged frogs and especially as an organism more harmful than introduced centrarchid fishes or bullfrogs.

Service Response: The Service is aware of only one study that has indicated that in laboratory settings mosquitofish prey on the larvae of California red-legged frogs (Schmieder and Nauman 1994). However, there is a strong correlation between the absence of California red-legged frogs and the presence of mosquitofish in the field. The Service is aware of several sites where mosquitofish and California red-legged frogs are currently coexisting. This evidence suggests that the relationship between mosquitofish and California red-legged frogs is complex. Additional research clearly is needed to more fully understand how these two species interact. The final rule has been revised to reflect current knowledge on this issue. The Service cannot determine whether mosquitofish are harmful to California red-legged frogs.

Comment: Several commenters disagreed that mosquitofish could be significant predators of California red-legged frogs. They cited observations in mosquitofish ponds of mosquitofish numbers decreasing as a result of infestations by bullfrogs. These commenters noted that no predation of bullfrog tadpoles by mosquitofish was observed.

Service Response: Mosquitofish would not be expected to prey on larval bullfrogs because of the apparent olfactory rejection (unpalatability) of bullfrog larvae by predatory fish (Kruse and Francis 1977). California red-legged

frogs lack this olfactory rejection effect, and, therefore, cannot be compared to bullfrogs (Schmieder and Nauman 1994).

Comment: One commenter pointed out that widespread, large scale use of mosquitofish in California began in the mid to late 1970's, and therefore, could not be responsible for the extirpation of California red-legged frogs from the Central Valley floor because frogs were extirpated from this region before 1960.

Service Response: The Service concurs that mosquitofish were not a major factor in the decline and disappearance of California red-legged frogs from the Central Valley floor. The proposed and final rules point to overharvest combined with the loss of over 3,800,000 acres of wetlands as the major reasons for extirpation of California red-legged frogs from the valley floor (Frayer, *et al.* 1989). However, significant introductions of mosquitofish began in the Central Valley as early as 1922 (Moyle 1976). Thus it is possible that mosquitofish played a role in the decline of California red-legged frogs on the Central Valley floor.

Comment: Two commenters stated that mosquitofish are not significant predators of California red-legged frogs because the two species coexist in wetlands in Shasta and Colusa counties.

Service Response: California red-legged frogs were extirpated from Shasta and Colusa counties before 1960 (Jennings *et al.* 1992).

Comment: Several commenters provided more specific or additional information on threats to California red-legged frogs within their current range. Several commenters provided information regarding potential threats, including road kills, current harvesting of California red-legged frogs for food, construction activities, and poor management of flood control basins.

Service Response: These comments have been noted and included in this final rule.

Comment: One commenter stated that massive predation by introduced predators, not grazing, is in large part responsible for any observed population declines in the California red-legged frog. Similarly, another commenter stated that the decline and disappearance of California red-legged frogs in the foothill portions of Madera, Fresno, and Mariposa counties were due to dispersal of bullfrogs into stock ponds, and not due to grazing. The commenter stated that California red-legged frogs coexisted with grazing until about 1940, when bullfrogs were introduced into the San Joaquin Valley.

Service Response: Of the identified threats facing the California red-legged frog, introduced predators, including bullfrogs, are considered to be a significant and widespread threat. Over 50 percent of streams and drainages inhabited by California red-legged frogs are known to support bullfrogs or other exotic predators in some portion of that drainage. Grazing, however, can threaten the California red-legged frog where grazing pressure results in dramatic changes in riparian and wetland habitat. As discussed in this final rule, California red-legged frogs generally prefer densely-shaded wetland habitats, whereas bullfrogs prefer more open wetland habitats. Overgrazing in riparian areas, therefore, exacerbates the threat of bullfrog expansion by creating habitat bullfrogs prefer.

Comment: One commenter stated that profitable livestock operations and high quality riparian habitat areas are not mutually exclusive. The commenter points to Point Reyes National Seashore as an example of where cattle grazing and California red-legged frogs successfully coexist. The commenter stressed that livestock grazing is the only economic activity in the region that provides large contiguous areas of open space.

Service Response: The Service concurs that properly managed livestock grazing can be compatible with preservation of California red-legged frog populations. California red-legged frogs and cattle grazing are able to coexist at Point Reyes National Seashore because the National Park Service maintains tight control over grazing pressure (Gary Fellers, National Biological Service, pers. comm., 1994). The Service acknowledges that preservation and proper management of open space, especially in riparian areas, is a fundamental requirement in the survival and recovery of the California red-legged frog.

Comment: One commenter stated that the single most devastating change in wildlife habitat in California in the last 200 years has been urbanization. The commenter thought that the proposed rule had not given this factor proper recognition, but instead condemned activities such as livestock grazing.

Service Response: The proposed rule and this final rule do not single out livestock grazing as the greatest threat to the California red-legged frog, but instead discusses all factors known or likely to threaten California red-legged frog populations. The proposed and final rules list numerous proposed developments that threaten remaining populations of California red-legged frogs. The Service believes urbanization, as well as agriculture, have caused substantial changes in wildlife habitat in California. This is especially the case in the Central Valley, which historically was the stronghold of the California red-legged frog.

Comment: Several commenters stated that climatic conditions (i.e., drought and above average rainfall events) were more to blame for California red-legged frog declines than human activities, including timber harvest and historic commercial harvest of the California red-legged frog itself. One commenter noted that dramatic declines in historic frog harvest information could indicate that the species is subject to wide variation in population numbers due to climatic conditions rather than an indication of overharvest. The commenter requested that an historical survey of the variations in population numbers due to climatic changes be undertaken prior to publication of a final rule.

Service Response: The rule includes a discussion of natural factors, such as drought and heavy rainfall events, that are known to adversely affect California red-legged frog populations. It is difficult to separate the effects of natural events from human activities when attempting to determine the cause for a population's decline in a particular area. A single factor is seldom the cause of the decline of a species. Many of the factors discussed in the proposed rule and this final rule work synergistically. Regardless of which factors resulted in historic population declines, California red-legged frog populations in the Central Valley and Sierra Nevada, in particular, could not rebound from this decline because at the same time their wetland and riparian habitat was being converted to agricultural land and urban areas.

Populations of most species are cyclic in nature, responding to such natural factors as weather events, disease, and predation. Natural events, however, including long-term drought or extreme rainfall, have less of a negative effect overall on a species when that species is widely and continuously distributed. Where populations are small, fragmented, or isolated by various human-related factors including habitat loss, water development, and water diversion, these populations are more vulnerable to extirpation by stochastic or random events and cumulative effects.

It is likely that over time, California red-legged frogs experienced wide variations in population size as a result of climatic events. A historical survey dating back to the early 1900's focusing on the variation in frog population

numbers due to climatic changes is not possible because no range wide population information was collected on the California red-legged frog dating back that far. If such data existed, conclusions drawn from such an historical survey would be tenuous. The many adverse human factors that have contributed to California red-legged frog population declines since 1900 would cloud any analysis of the effects of drought or high rainfall events.

Comment: One commenter disagreed with the conclusion that pre-1900 overharvesting of the California red-legged frog in the Central Valley led to their decline. The commenter stated that other known historical factors were not cited in the proposed rule.

Service Response: No studies were conducted in the late 1800's or early 1900's documenting the cause or causes of declines in California red-legged frog populations in the Central Valley. Extremely high numbers of California red-legged frogs reported in the San Francisco markets followed by a collapse of the market around the turn of the century strongly suggests that commercial harvesting had a significant effect on California red-legged frog numbers. The Central Valley, and particularly the San Joaquin Valley, were reported at the time to be prime habitat for the California red-legged frog. The proposed rule and this final rule reported all known historical factors that may have contributed to the decline of California red-legged frogs in the Central Valley. Overharvesting was certainly not the only factor impacting California red-legged frog populations. Conversion of over 3,800,000 acres of wetland and riparian habitats in the Central Valley to agricultural land and urban areas began during the same period, resulting in the elimination of California red-legged frogs from the valley floor before 1960.

Comment: Several commenters stated that many of the urban development projects referred to in the proposed rule in the Central Coast region may or may not be constructed during the next 5 or 10 years.

Service Response: The Service recognizes that all projects proposed are not necessarily completed. This may be due to lack of proper permits necessary for construction, or interruption of planning efforts. The fact that projects have been proposed presents a future threat to California red-legged frog aggregations in the central coast region, especially if these projects result in direct or indirect riparian habitat degradation.

Comment: One commenter stated the proposed rule incorrectly includes the Cambria Meadows drainage as an area where California red-legged frog habitat has been directly degraded through stream reductions to accommodate new urban growth.

Service Response: This final rule states that proposed urban and/or recreational development could degrade or eliminate California red-legged frog habitat in Cambria Meadows Creek.

Comment: One commenter thought that support of the proposed listing appeared to rely heavily on conditions reported for the north coast of San Luis Obispo County.

Service Response: Neither the proposed rule nor this final rule rely heavily on conditions reported for the north coast of San Luis Obispo County in determining the need to list the California red-legged frog. San Luis Obispo County contains the third highest number of drainages known to support California red-legged frogs. Although California red-legged frog aggregations in streams in the county are threatened by a variety of factors, many other counties have comparable threats that are reported in the proposed and final rule.

Comment: Several commenters were concerned about the accuracy of the conclusions drawn by Rathbun *et al.* (1991) as cited in the proposed rule regarding the combined effects of water extraction and drought on populations of California red-legged frogs in lower Santa Rosa Creek. Numerous commenters presented data both to support and refute the hypothesis that water extractions from Santa Rosa Creek have significantly changed its hydrology.

Service Response: The Service recognizes that controversy exists regarding the environmental effects of water extraction from Santa Rosa Creek. The information and data presented by the many commenters on this subject will be thoroughly reviewed by Service field biologists during recovery planning efforts and when consulting on any proposed projects that could adversely affect California red-legged frogs in Santa Rosa Creek.

Ground water and surface water supplies in Santa Rosa Creek are finite. Unchecked water extraction may exceed input and significantly reduce the availability of riparian and aquatic habitat for California red-legged frogs in the future. Drought accentuates the effect, and if not considered in water planning, overallocation of stream flows and overdraft of groundwater resources combined with long-term drought could result in permanent elimination of California red-legged frogs from all or a large part of the drainage.

Comment: Several commenters pointed out that although California red-legged frogs were absent from lower Santa Rosa Creek during the drought (Rathbun *et al.* 1991), red-legged frogs have been sighted in recent years in the lower reaches of the creek, presumably because of the above average rainfall in the winter of 1992–1993. California red-legged frogs, which were known to inhabit upper reaches of the creek during the drought years, were presumed to have traveled downstream to reoccupy former habitat. One commenter suggested that the Service should study an entire watershed prior to concluding that the California red-legged frog is threatened in that watershed.

Service Response: The Service is aware that California red-legged frogs occur in the upper reaches of Santa Rosa Creek. Santa Rosa Creek is one of 32 drainages in San Luis Obispo County known to provide habitat for the California red-legged frog. Neither the Service nor Rathbun et al. (1991) have concluded that California red-legged frogs have disappeared from Santa Rosa Creek. Rathbun *et al.* (1991) refers only to conditions in the lower portions of the creek and lagoon.

The Service recognizes that the California red-legged frog is capable of repopulating former habitat when rainfall returns. However, other factors, including overallocation of water, may exacerbate the effects of drought through loss of riparian habitat or increased salinity in coastal lagoons. Where appropriate riparian or wetland habitat is degraded over the long-term by these hydrologic modifications, repopulation by California red-legged frogs in altered portions of the drainage is not possible regardless of whether red-legged frogs occur in upstream reaches. As portions of the drainage become unsuitable habitat for California red-legged frogs, isolated aggregations of frogs become more susceptible to stochastic extinction. The Service is not basing this listing determination on the status of the California red-legged frog in any one specific watershed, but rather on the continuing population decline and threats to the remainder of its range.

Comment: One commenter noted that California red-legged frogs persist in upstream portions of Carmel River despite the fact that bullfrogs are found in the lower river and two reservoirs. The commenter felt that this evidence refuted the assertion that California red-legged frog populations usually disappear from a drainage within 5 years after a reservoir is built.

Service Response: The proposed rule and this final rule state that California red-legged frogs generally are extirpated from downstream portions of a drainage 1 to 5 years after filling of a reservoir. Hayes and Jennings (1988), which is cited as the source of this information, does not present this cause and effect relationship as an absolute. The authors state that this relationship depends on the size of the drainage. In larger drainages, isolated populations can persist upstream. This final rule has been revised to clarify this point.

Comment: One commenter thought that too much emphasis was given to the negative impacts of salinity levels in coastal lagoons. Natural overwash of salt water into coastal lagoons makes these areas unreliable habitat for California red-legged frogs.

Service Response: The Service acknowledges that coastal lagoons provide unreliable habitat for California red-legged frogs because of natural salinity changes caused by wave overwash. However, large populations of California red-legged frogs do occur in coastal lagoons, with Pescadero Marsh supporting one of the largest remaining populations. Therefore, the larger lagoon systems should not be discounted. Overallocation of stream water resources intensifies the effect of drought on coastal lagoon populations, which over the long-term could result in changes in lagoon vegetation and hydrology that are unfavorable to California red-legged frogs.

Comment: One commenter suggested that competition with tree frogs and foothill yellow-legged frogs (*Rana boylii*) may be a contributing factor in the decline of California red-legged frog.

Service Response: No evidence exists in the literature to support the theory that competition between California red-legged frogs and Pacific tree frogs or foothill yellow-legged frogs resulted in California red-legged frog declines.

Issue 3: Economic and Environmental Effects of Listing

Comment: Several commenters stated that listing of the California red-legged frog may act to limit or curtail existing uses of private property, and therefore, a takings implication assessment should be made prior to taking any final action.

Service Response: Regarding Executive Order 12630, Governmental Actions and Interference with Constitutionally Protected Property Rights, the Attorney General has issued guidelines to the Department of the Interior (Department) on implementation of the Executive Order. Under these guidelines, a special rule applies when an agency within the Department is required by law to act without exercising its usual discretion—that is, to act solely upon specified criteria that leave the agency no discretion.

In this context, the Service might be subject to legal challenge if it considered or acted upon economic data. In these cases, the Attorney General's guidelines state that Takings Implications Assessments (TIAs) shall be prepared after, rather than before, the agency makes the decision upon which its discretion is restricted. The purpose of TIAs in these special circumstances is to inform policy makers of areas where unavoidable taking exposures exist. Such TIAs shall not be considered in the making of administrative decisions that must, by law, be made without regard to their economic impact. In enacting the Act, Congress required the Department to list species based solely upon scientific and commercial data indicating whether or not they are in danger of extinction. The Act does not allow the Service to withhold a listing based on concerns regarding economic impact. The provisions of the guidelines relating to nondiscretionary actions clearly are applicable to the determination of threatened status for the California red-legged frog.

Comment: Several commenters expressed concern about an adverse effect of listing the California red-legged frog on the economy. Another commenter stated that the economic impact of listing the California red-legged frog would be devastating to an already sluggish State economy.

Service Response: Under section 4(b)(1)(A) of the Act, a listing determination must be based 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 considerations 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 the Service is specifically precluded from considering economic impacts, either positive or negative, in a final decision on a proposed listing, the Service need not evaluate or consider the economic impacts of listing this species.

Comment: One commenter suggested that the researchers who petitioned the Service to list this species were using the Endangered Species Act as a method of furthering their personal agenda to remove livestock from public and private rangeland.

Service Response: The Service is unaware that the researchers who petitioned the Service to list the California red-legged frog have a personal agenda to remove livestock from public and private rangeland. Management of livestock on rangelands is one of many possible alternatives available to address adverse effects of grazing on California red-legged frog populations. For example, minor alterations in management practices and fencing of key riparian areas are two alternatives that preserve grazing opportunities while protecting California red-legged frogs.

Comment: Numerous commenters stated that the Service should consider the human health implications of eliminating the use of mosquitofish, draining of wetlands, and insecticides to control mosquitos.

Service Response: California red-legged frogs require still or slow-moving water with dense emergent and overhanging riparian vegetation for survival. Sites with these habitat attributes are often at great distances from urban areas and are not regularly stocked with mosquitofish or otherwise managed to control mosquitos. Therefore, at the majority of remaining sites inhabited by California red-legged frogs, mosquito control is not likely to be an issue. Where mosquitos are an issue, other biological control methods are available and may be more appropriate in California red-legged frog habitat. These methods include application of several species of bacteria (*Bacillus* sp.), and more recently, application of a fungus (*Lagenidium giganteum*), which apparently attacks and kills only mosquitos. The Service is willing to work with mosquito and vector control districts to minimize conflicts between public health and the California red-legged frog.

The Service concludes that listing the California red-legged frog as a threatened species is not likely to hinder efforts of any Mosquito and Vector Control Districts to control mosquitos in California.

Comment: One commenter stated that cessation or curtailment of water releases from reservoirs to accommodate the California red-legged frog could adversely impact other species, including several species of anadromous fish.

Service Response: If changes in reservoir release schedules are needed, the Service, in conjunction with the California Department of Fish and Game, will consider the needs of all

species that could be affected as recommendations are made.

Issue 4: Designation of Critical Habitat

Comment: Several commenters recommended that the Service designate critical habitat for the California red-legged frog so that it would be easier for interested parties to locate known and additional populations of the species, and thus, contribute to an accurate determination of the need for protection. One commenter recommended designation of critical habitat as an additional way to protect California red-legged frogs on private land. One commenter stated that an economic analysis should be conducted prior to designating critical habitat.

Service Response: The Service has determined that designation of critical habitat for the California red-legged frog would be more detrimental than beneficial to the species. Concern for the potential ''take'' of the species (as defined in the Act) through acts of vandalism has been expressed by the petitioners and other parties (see further discussion in ''Summary of Factors Affecting the Species'' (Factor B) and ''Critical Habitat'' sections, below). Revealing of the precise locations of California red-legged frog habitat, as required through critical habitat designation, would make the species more vulnerable to vandalism and unauthorized takings. The Service has determined that designation of critical habitat is not prudent for the California red-legged frog, therefore, preparation of an economic analysis is not required. However, the Service has identified recovery units for the species.

Designation of critical habitat would not necessarily provide additional protection for California red-legged frog aggregations on private land. Critical habitat legally applies only to Federal lands or activities on non-federal lands regulated, sponsored, or funded by a Federal agency. For example, designation of critical habitat on private grazing lands would not provide added protection against the impacts of grazing on California red-legged frog habitat because there is no federal nexus. Conversely, activities on private lands that are authorized, funded or carried out by a Federal agency, such as permit actions authorized under section 404 of the Clean Water Act, would require consultation with the Service if the activity was expected to adversely affect a Federally listed endangered or threatened species. This would apply regardless of whether critical habitat was designated or not.

Issue 5: National Environmental Policy Act

Comment: Several commenters stated that the proposal to list the California red-legged frog requires preparation of an Environmental Impact Statement (EIS) under the National Environmental Policy Act (NEPA). Another commenter stated that an Environmental Assessment may be necessary to determine the effects of the listing on other native species, disease-producing organisms, and humans.

Service Response: The Service need not prepare environmental assessments or environmental impacts statements pursuant to the National Environmental Policy Act (NEPA) for reasons outlined in the Federal Register on October 25, 1983 (48 FR 49244). Basically the listing of a species is exempt as a matter of law from NEPA review. Listing decisions are based on biological, not sociological or economic considerations. This view was upheld in the court case *Pacific Legal Foundation* v. *Andrus*, 657 F. 2d 829 (1981).

Issue 6: Alternate Listing Status Recommended

Comment: Several commenters recommended that the California red-legged frog be listed as a threatened rather than an endangered species in various watersheds because measures are already being taken through Federal, State, and/or private efforts to protect California red-legged frog habitat, or because the numbers of California red-legged frogs in these watersheds are greater and the threats less than in other watersheds within the California red-legged frog's distribution. One commenter provided examples of specific streams including—(1) Sespe Creek, where 31 miles within the Forest Service's Sespe Wilderness Area have been designated as Wild and Scenic, and a portion of Sespe Creek is included within the Sespe Condor Sanctuary; and (2) Piru Creek, where flow releases have been modified to protect the Arroyo southwestern toad (*Bufo microscaphus californicus*), an endangered species.

Service Response: Additional information received during the public comment period regarding new locations of California red-legged frogs confirmed that the taxon is more widespread within its current range than previously thought. The existence of 54 new drainage localities, and some drainages with non-imminent threats, indicates that listing as a threatened rather than an endangered species is presently more appropriate for the California red-legged frog. The species is not now in danger of extinction throughout all or a significant portion of its range in the near future, however, evidence does indicate that it may become endangered.

The Service acknowledges that a portion of Sespe Creek is designated as ''Wild and Scenic'' under the Wild and Scenic River Act, 16 U.S.C. 1271 *et seq.*, and that activities such as reservoir development or channelization, may be prohibited in this area. The Service also recognizes that the portion of the creek within the Sespe Condor Sanctuary may be protected in certain ways. However, designation as such does not eliminate all potential threats to the California red-legged frog. For example, designation as Wild and Scenic does not protect against invasion of bullfrogs or other exotic predators, which are known to occur in other portions of Sespe Creek. Planned reservoir development downstream of the Wild and Scenic portion of Sespe Creek increases the likelihood that bullfrogs and introduced fishes could disperse into upstream protected portions of the creek. Also, the Wild and Scenic designation does not eliminate recreational uses of the creek, including such activities as fishing, camping, mountain biking, and horseback riding. The Sespe Creek portion of the Sespe Condor Sanctuary is not closed to recreational use by the public.

On Piru Creek, studies suggest that modified water releases from Lake Pyramid over the last four years have resulted in increased Arroyo southwestern toad populations (Cat Brown, Fish and Wildlife Service, pers. comm., 1994). No research has been conducted to document the effect of these flow releases on California red-legged frogs.

Although the status of the California red-legged frog is not uniform throughout its range, the overall picture is one of a threatened species. Recovery planning and consultations under section 7 of the Act will take into account the status of the California red-legged frog within recovery units of its range (see ''Available Conservation Measures'' section).

Comment: One commenter from Santa Barbara County recommended that the California red-legged frog be listed as a threatened species because the current range of the California red-legged frog is broad and includes most of its historic range. Another commenter thought that the current range of the California red-legged frog, which is 300 miles north to south, did not fit the definition of an endangered species.

Service Response: Section 3(20) of the Act defines a threatened species as one which is likely to become an

endangered species within the foreseeable future throughout all or a significant portion of its range. Although the current range of the California red-legged frog encompasses less than 30 percent of its historic distribution, new information received during the public comment period suggests that California red-legged frogs are more widespread within their current range than previously believed. For this reason and the fact that 17 percent of the remaining drainages occupied by frogs are not known to be imminently threatened, the Service has concluded that the California red-legged frog more appropriately meets the definition of a threatened species.

Comment: Several commenters requested that California red-legged frogs in specific drainages of the Central Coast or the entire Central Coast be exempt from endangered species status because California red-legged frogs seem to be adequately managed in this area, have not shown population declines, or have fewer exotic species problems.

Service Response: Section 3(16) the Act defines the term ''species'' to include any subspecies of fish, wildlife, or plants, and any distinct population segment of any species of vertebrate fish or wildlife that interbreeds when mature. California red-legged frog aggregations in certain drainages of the central coast of California or in the entire central coast region do not constitute distinct vertebrate population segments. The Service cannot exclude these areas and intends to list the taxon as threatened throughout its range.

Issue 7: Research and Education Needs

Comment: Several commenters recommended the following research topics be explored in relation to conservation of the California red-legged frog: (1) Seasonal utilization of patchy habitats for breeding, refugia and estivation; (2) migration timing; (3) estivation timing; (4) surveying methodology in marginal habitat; and (5) the effects of pesticide and herbicide runoff.

Service Response: These comments have been noted and will be considered during preparation of a recovery plan for the California red-legged frog.

Comment: One commenter committed to assisting the Service with cooperative research on mosquitofish/California red-legged frog interactions.

Service Response: The Service concurs fully with the need for further research in this area and acknowledges the commenter's commitment to this effort.

Comment: One commenter asked if a program could be developed that would allow for variable treatment/management of California red-legged frog habitat that was found to produce significant numbers of mosquitoes.

Service Response: Because California red-legged frog habitat is variable, it is likely that management programs for mosquitoes will also be variable and depend on the situation under review. Research into the effects of various methods of mosquito control on California red-legged frogs should aid the Service in any recovery planning undertaken for the taxon.

Comment: One commenter recommended a number of ways to educate the general public regarding listed species and elicit their support, including publishing information in trade journals, posting signs at storm drains to discourage dumping of contaminants, reevaluating the need for channelized creeks, educating the public regarding the effects of bullfrogs on native amphibians, teaching classes in grade schools, starting riparian revegetation projects, and encouraging participation of landowners by providing incentives.

Service Response: The comments have been noted. The Service welcomes recommendations from the public on how to further the purposes of the Endangered Species Act. The Service has implemented many of these recommendations in regard to other listed species and will give them due consideration in public education programs related to recovery of the California red-legged frog.

Issue 8: Systematic Relationships Between Red-legged Frog Subspecies

Comment: Several commenters questioned the Service's exclusion of the intergrade zone between the northern red-legged frog (*Rana aurora aurora*) and the California red-legged frog (*Rana aurora draytonii*) in northwestern California. They argued that this segment of the subspecies' range does not constitute a distinct population segment and, therefore, cannot be excluded from the listing package. One commenter suggested that the Service excluded this segment of the subspecies' range to make the subspecies distribution seem smaller and in greater need of protection.

Another commenter suggested that the two subspecies are actually different populations of the same species displaying morphological differences due to climatic and habitat variations. In this case, the population numbers and distribution of the species would be much greater and the need for listing nonexistent.

Service Response: The California red-legged frog is a recognized subspecies of the red-legged frog (Storer 1925, Cochran 1961, Stebbins 1985). As discussed in the background section of this rule, the range of the California red-legged frog is the vicinity of Point Reyes National Seashore, Marin County, California, coastally and from the vicinity of Redding, Shasta County, California, inland southward to northwestern Baja California, Mexico (Jennings and Hayes 1985, Hayes and Krempels 1986). Red-legged frogs found in the intergrade zone from northern Marin County to southern Del Norte County are not considered a population segment of the California red-legged frog. At this time, researchers have not assigned the intergrade zone to either subspecies.

Among other differences, red-legged frogs within the intergrade zone are distinct morphologically from either subspecies of *Rana aurora*. The California red-legged frog possesses paired vocal sacs whereas the northern red-legged frog lacks vocal sacs. Most red-legged frogs found in the intergrade zone from northern Marin County to southern Del Norte County possess only one vocal sac. Based on this pronounced morphological difference in red-legged frogs in the intergrade zone, some researchers have concluded that the California and northern red-legged frogs may be two distinct species, and that the intergrade zone represents a zone of secondary contact or hybridization between the two species (Hayes and Krempels 1986). Genetic research has been proposed to clarify systematic relationships (i.e., to determine if *R. a. aurora* and *R. a. draytonii* should be classified as two species or should remain as subspecies) and allow a more precise identification of the northern limits of the geographic distribution of the California red-legged frog (Jennings *et al.* 1992). In addition, habitat within the majority of the intergrade zone (moist evergreen/hardwood forest) is more indicative of habitat preferred by the northern red-legged frog. Thus, if the Service were to assign the intergrade zone to either subspecies based on habitat preference alone, the intergrade zone would be more appropriately placed within the range of the northern red-legged frog.

Comment: One commenter noted that the California Academy of Sciences has 66 specimens identified as *Rana aurora draytonii* that were collected from Redwood National Park in Humboldt County between 1911 and 1940. The commenter stated that more specific identification of herpetological subspecies would be needed to

determine the boundary of California red-legged frogs as far north as Del Norte County.

Service Response: The specimens referred to by the commenter were identified as *R. a. draytonii* in the 1940's based on size, skin characteristics, and prominence of dorsolateral folds as described by Camp (1917). More recent research (see Hayes and Miyamoto 1984, Hayes and Krempels 1986), has identified vocal sac condition as a distinct morphological characteristic differentiating the two subspecies. Using these new findings, the researchers who petitioned the Service to list the species have reviewed the specimens in question and found that they should have been identified as intergrades between *R. a. aurora* and *R. a. draytonii*. As discussed above, research currently underway is designed to further refine the northern boundary of the California subspecies' range.

Comment: Another commenter suggested that the listing package should only consider red-legged frogs at the species level, and, therefore, if red-legged frogs were temporarily eliminated from some part of their range in California, frogs from other areas would recolonize suitable habitat.

Service Response: Section 3(15) of the Endangered Species Act defines a species to include ''any subspecies of fish or wildlife or plants* * *''. Therefore, listing of a recognized subspecies is authorized in the Act.

The ability of red-legged frogs to migrate from one drainage to another would be dependent upon the distance, topography and habitat type through which the frogs would be required to migrate. Considering the Mediterranean climate in California, with its seasonal dryness, it is unlikely that red-legged frogs could very successfully migrate long distances to repopulate formerly occupied habitat.

Issue 9: Existing Regulatory Mechanisms

Comment: Several commenters believed that existing regulations (i.e., Clean Water Act, California Environmental Quality Act) and monitoring by several Federal agencies are providing adequate protection for the California red-legged frog, and, therefore, listing is not needed.

Service Response: The Service believes that existing regulatory mechanisms do not currently provide adequate protection for the California red-legged frog. A discussion of existing regulations can be found below in Factor D of the ''Summary of Factors Affecting the Species'' section and the ''Available Conservation Measures'' section.

Issue 10: Miscellaneous

Comment: One commenter pointed out that the Cambria Community Services District acts responsibly in protecting Santa Rosa and San Simeon Creek, including reductions in pumping during drought periods, promoting retrofit programs to reduce water usage, research into desalination alternatives and reverse osmosis treatment of wastewater, and approval of riparian habitat improvements.

Service Response: The Service acknowledges the District's efforts to protect stream flows and the natural environment of Santa Rosa and San Simeon Creeks. However, the Service has identified threats in these drainages and other drainages as well.

Comment: One commenter indicated that mosquito abatement districts have modified their mosquitofish planning protocol to carefully consider the introduction of mosquitofish in areas inhabited by listed species.

Service Response: The Service acknowledges the program modifications made by many mosquito abatement districts to protect listed species and their habitat.

Summary of Factors Affecting the Species

After a thorough review and consideration of all information available, the Service has determined that the California red-legged frog should be listed as a threatened species. Procedures found at section 4 of the Act (16 U.S.C. 1533 *et seq.*) and regulations (50 CFR Part 424) promulgated to implement the listing provisions of the Act were followed. A species may be determined to be an endangered or threatened species due to one or more of the five factors described in section 4(a)(1). These factors and their application to the California red-legged frog (*Rana aurora draytonii*) are as follows:

A. The present or threatened destruction, modification, or curtailment of its habitat or range. Herpetologists have noted the decline or extirpation of California red-legged frogs from the San Francisco Bay area (Sean J. Barry, University of California, Davis, *in litt.*, 1992; Robert C. Stebbins, University of California, Berkeley, *in litt.*, 1993; John S. Applegarth, herpetologist, *in litt.*, 1993; Ed Ely, herpetologist, *in litt.*, 1993), the Salinas River drainage (Lawrence E. Hunt, University of California, Santa Barbara, *in litt.*, 1993), the San Luis Obispo, Santa Barbara, and Ventura County area (Aryan I. Roest, California Polytechnic State University, San Luis Obispo, *in litt.*, 1993; Samuel S. Sweet, University of California, Santa Barbara, *in litt.*, 1993), southern California (Patrick McMonagle, herpetologist, *in litt.*, 1993; John D. Goodman, zoologist, *in litt.*, 1992; Robert B. Sanders, San Bernardino County Museum, *in litt.*, 1992; John Stephenson, U.S. Forest Service, *in litt.*, 1993; Michael C. Long, Eaton Canyon Park Nature Center, *in litt.*, 1992; Joseph F. Copp, herpetologist, *in litt.*, 1993; Glenn R. Stewart, California Polytechnic University, Pomona, *in litt.*, 1993; Robert Fisher, University of California, Davis, *in litt.*, 1993), central California (Martin R. Brittan, California State University, Sacramento, *in litt.*, 1993), and the northern and southern Sierra Nevada foothills (Jay Wright, Feather River College, Quincy, *in litt.*, 1993; Alan M. McCready, California State University, Sacramento, *in litt.*, 1992).

These observations from herpetologists and data provided by the researchers who petitioned the Service to list the species indicate that the California red-legged frog has sustained a reduction of over 70 percent in its historic geographic range in California. Large aggregations of greater than 350 adults have been documented from only four areas. These areas included Pescadero Marsh Natural Preserve in coastal San Mateo County, Point Reyes National Seashore in Marin County, canals west of San Francisco International Airport in the San Francisco Bay area (Jennings *et al.* 1992), and Rancho San Carlos in Monterey County (Jeff Froke, Rancho San Carlos, *in litt.*, 1994). The aggregation west of San Francisco International Airport is now thought to be extirpated (U.S. Fish and Wildlife Service, 1995; David Mullen, private consultant, pers. comm., 1994).

Habitat loss and alteration are the primary factors that have negatively affected the California red-legged frog throughout its range. For example, in the Central Valley of California, over 90 percent of historic wetlands have been diked, drained, or filled primarily for agricultural development and secondarily for urban development (U.S. Fish and Wildlife Service, 1978). Wetland alterations, clearing of vegetation, and water diversions that often accompany agricultural development make aquatic sites unsuitable for California red-legged frogs. Urbanization with its associated roadway, stream channelization, and large reservoir construction projects has significantly altered or eliminated California red-legged frog habitat, with the greatest impact occurring in

southern California. The majority of extant localities are isolated and fragmented remnants of larger historical populations.

Current and future urbanization poses a significant threat to the California red-legged frog. Sixty-five drainages (27 percent of the known occurrences) are associated with urbanization threats (U.S. Fish and Wildlife Service, 1995). Proposed urban developments include the East County Area Plan in Alameda County, which involves development of up to 52,000 acres, and projects currently proposed in the Ruby Hills/Arroyo Del Valle watershed and south Livermore Valley; Reservoir Canyon ponds in Santa Clara County; Alamo, Shadow, and Brookside Creeks in Contra Costa County; the Carmel River in Monterey County; and the Santa Ynez River in Santa Barbara County. In Santa Cruz County, a proposed commuter rail project linking Santa Cruz to Watsonville could increase urban development in southern portions of the county (Patricia O'Keefe, R.A.I.L.S., *in litt.*, 1994). In San Luis Obispo County, one of three counties with numerous drainages supporting California red-legged frogs, proposed residential and/or recreational development adjacent to San Simeon, Santa Rosa, San Juan, and Cambria Meadows Creeks and Estrella and Salinas Rivers could degrade or eliminate California red-legged frog habitat. Updates to area plans for the North Coast, San Luis Obispo, and Paso Robles/Atascadero areas in San Luis Obispo County propose rezoning of over 240,000 acres primarily for urban development. Between the cities of Ventura and San Luis Obispo, development already has eliminated California red-legged frogs from at least eight drainages along the coast (G. Rathbun and M. Jennings, *in litt.*, 1993).

Loss of habitat and decreases in habitat quality will occur as a result of on-site degradation of the stream environment and/or riparian corridor, or through modification of instream flow. Where streams or wetlands occur in urban areas, the quality of California red-legged frog habitat is degraded by a variety of factors. Among these factors are introduction of exotic predators, elimination of streambank vegetation, collecting, and loss of upland habitat.

Water projects, which accompany urban and agricultural growth, have had a negative effect on California red-legged frogs and their habitat. The construction of large reservoirs, such as Lake Oroville, Whiskeytown Reservoir, Don Pedro Reservoir, Lake Berryessa, San Luis Reservoir, Lake Silverwood, Lake Piru, Pyramid Lake, and Lower Otay Lake, have eliminated California red-legged frog habitat or fragmented remaining aggregations (Jennings *et al,*. 1992).

The timing and duration of water releases from reservoirs, particularly on the central California coast, can render a stream unsuitable for California red-legged frog reproduction (M. Jennings, *in litt.*, 1993) and maintain populations of exotic predators in downstream areas that would normally be dry in summer (S. Sweet, *in litt.*, 1993). Reservoirs are typically stocked with predatory species of fish and bullfrogs. These species often disperse into surrounding California red-legged frog habitat disrupting natural community dynamics. Hayes and Jennings (1988) found that California red-legged frogs generally were extirpated from downstream portions of a drainage 1 to 5 years after filling of a reservoir. In some larger drainages, however, isolated California red-legged frog populations have persisted upstream. A discussion of exotic predators appears below in Factor C: ''Disease or predation.''

A variety of proposed water projects threaten remaining California red-legged frog aggregations. Construction of major reservoirs is proposed on Los Banos Creek (Merced County), with Orestimba Creek (Stanislaus County) as an alternative reservoir site (California Department of Water Resources and the U.S. Bureau of Reclamation, 1990), and on Kellogg Creek (Contra Costa County) (Contra Costa Water District, 1993). These drainages represent three of 14 sites remaining in the Central Valley hydrographic basin with known or potential localities of California red-legged frogs. On the Salinas River along the central coast, raising the height of Salinas Dam (Santa Margarita Lake) is proposed in San Luis Obispo County. Reservoir construction at this site may allow exotic predators access to formerly secure aggregations of California red-legged frogs isolated in upper portions of the watershed (L. Hunt, *in litt.*, 1993). Other large reservoir projects proposed in California red-legged frog habitat include the Upper Nacimiento River Project and Arroyo Seco Dam Project in Monterey County. In Santa Barbara and Ventura counties, proposed dams on the Santa Ynez River, Sisquoc River, and Sespe Creek also would eliminate or degrade California red-legged frog habitat (Sam Sweet, pers. comm., 1993).

Water diversions, groundwater well development, and stock pond or small reservoir construction projects degrade or eliminate habitat. Diverting water from natural habitats to these projects disrupts the natural hydrologic regime. During periods of drought, reduced availability of water within natural drainages combined with drawdown from the impoundments, disrupts reproduction, foraging, estivation and dispersal (U.S. Fish and Wildlife Service, 1995) (see Factor E, ''Other natural or man-made factors affecting its continued existence'' below for additional discussion of the effects of drought). Proposed or existing water diversions on the central coast potentially affect the following drainages: San Simeon, Santa Rosa, Van Gordon, Villa, San Luis Obispo, Pico, and Little Pico Creeks, Arroyo del Puerta, and Arroyo Laguna in San Luis Obispo County; the Carmel and Salinas Rivers in Monterey County; and Canada del Refugio in Santa Barbara County. Most waterways on the south coast of Santa Barbara County are diverted to agriculture and other uses, leaving some completely desiccated (Brian Trautwein, Santa Barbara Urban Creeks Council, *in litt.*, 1994). Stock ponds and small reservoirs also support populations of exotic fishes and bullfrogs (G. Rathbun and M. Jennings, *in litt.*, 1993). The proposed coastal branch of the State Water Project is likely to result in a number of adverse effects to California red-legged frogs in many of the 24 areas receiving State water. These effects include, (1) altered water regimes in existing and any proposed delivery facilities of individual water districts, (2) spills, leaks, malfunctions, and operational errors that lead to introduction of exotic predators into isolated stream segments currently occupied by California red-legged frogs, and (3) indirect effects associated with expanded urbanization.

Storm damage repair and flood control maintenance on streams are current threats to California red-legged frogs. Routine flood control maintenance includes vegetation removal, herbicide spraying, shaping of banks to control erosion, and desilting of the creek, all of which degrade California red-legged frog habitat. In San Luis Obispo and Santa Barbara counties, maintenance work is planned for 14 and 11 drainages, respectively. All 25 drainages are known to be inhabited by California red-legged frogs and represent 35 percent of the occupied drainages in these two counties (U.S. Fish and Wildlife Service 1995). In Santa Barbara County, a larger channel maintenance project is proposed for a 4.5-mile stretch of the Santa Ynez River near Lompoc and a 10-mile segment of San Antonio Creek, both of which support California red-legged frog habitat.

Management of water bodies for flood control also has the potential to adversely impact California red-legged

frog localities. In San Mateo County, poorly timed releases of storm water from Horse Stable Pond at Sharp Park in February 1992, resulted in exposure and desiccation of 62 California red-legged frog egg masses (Todd Steiner, Earth Island Institute, *in litt.*, 1994). Channel maintenance at San Francisco International Airport may have contributed to extirpation of one of the four largest remaining aggregations of the California red-legged frog.

Routine road maintenance, trail development, and facilities construction activities associated with parks in or adjacent to California red-legged frog habitat can result in increased siltation in the stream. If this siltation occurs during the breeding season, asphyxiation of eggs and small California red-legged frog larvae can result. On the upper Santa Ynez River and Sespe Creek in Los Padres National Forest, Sweet (pers. comm., 1993) observed California red-legged frog egg masses smothered with silt. Construction activities in or adjacent to streams at Butano and Portola State Parks in San Mateo County; Big Basin, Wilder Ranch, and Henry Cowell State Parks in Santa Cruz County; and Mt. Diablo State Park in Contra Costa County have the potential to adversely affect California red-legged frogs inhabiting downstream reaches (Coyote Creek Riparian Station, *in litt.*, 1993).

Placer mining may threaten California red-legged frog habitat. Jennings (pers. comm., 1994) observed heavy siltation in late spring and summer in portions of Piru Creek known to support California red-legged frogs. The siltation resulted from upstream gold mining. Deep holes in streams created by instream placer mining also may provide habitat for exotic predatory fish (Jennings, pers. comm., 1994). Creeks, streams and rivers are open to suction dredging throughout the year in 13 of 22 counties within the current range of the California red-legged frog (State of California 1994).

Road-killed California red-legged frogs have been documented at several locations in San Mateo and Santa Cruz Counties (Coyote Creek Riparian Station, *in litt.*, 1993; Mike Westphal, Coyote Creek Riparian Station, *in litt.*, 1995). Road kills may deplete frog aggregations in borderline habitat and otherwise protected areas. Where roads cross or lie adjacent to California red-legged frog habitat, they may act as barriers to seasonal movement and dispersal.

Livestock grazing is another form of habitat alteration that is contributing to declines in the California red-legged frog. Numerous studies, summarized in Behnke and Raleigh (1978) and Kauffman and Krueger (1984), have shown that livestock grazing negatively affects riparian habitat. Cattle have an adverse affect on riparian and other wetland habitats because they tend to concentrate in these areas, particularly during the dry season (Marlow and Pogacnik 1985). Cattle trample and eat emergent and riparian vegetation, often eliminating or severely reducing plant cover (Gunderson 1968, Duff 1979). Loss of riparian vegetation results in increased water temperatures (Van Velson 1979), which encourage bullfrog reproduction. Riparian vegetation loss due to cattle grazing includes the loss of willows (Duff 1979), which are associated with the highest densities of California red-legged frogs (Hayes and Jennings 1988, Jennings 1988b). Cattle grazing also results in increased erosion in the watershed (Lusby 1970, Winegar 1977), which accelerates the sedimentation of deep pools (Gunderson 1968) used by California red-legged frogs and adversely affects aquatic invertebrates (Cordone and Kelley 1961). Aquatic invertebrates are common prey items of California red-legged frogs.

Behnke and Zarn (1976) identified livestock grazing as the greatest threat to the integrity of stream habitat in the western United States. Numerous symposia and publications have documented the detrimental effects of livestock grazing on streams and riparian habitats (Johnson and Jones 1977; Meehan and Platts 1978; Behnke and Raleigh 1979; Bowers *et al.* 1979; Cope 1979; Platts 1981; Ohmart and Anderson 1982 and 1986; Peek and Dalke 1982; Kauffman *et al.* 1983; Menke 1983; Kauffman and Krueger 1984; Johnson *et al.* 1985; GAO 1988; Clary and Webster 1989; Gresswell *et al.* 1989; Kinch 1989; Minshall *et al.* 1989; Chaney *et al.* 1990 and 1993). These effects include nutrient loading, reduction of shade and cover with resultant increases in water temperature, increased intermittent flows, changes in stream channel morphology, and the addition of sediment due to bank degradation and off-site soil erosion. Indirect effects of increased water temperatures can be lethal to aquatic species and include: creating a more favorable environment for introduced species, changing the food chain, degrading water quality through decreased dissolved oxygen, increased production of algae, and increased pH and ammonia.

Various studies have shown that water temperatures have been reduced when streambank vegetative cover is protected from grazing. Storch (1979) found that daily fluctuations of water temperatures in late August and early September averaged 27° F outside an exclosure on Camp Creek, Oregon that was ungrazed for 10 years, compared to 13° F inside the exclosure. Also, maximum water temperatures outside the exclosure averaged 11° F higher than inside the exclosure. Van Velson (1979) reported that average water temperatures in Otter Creek, Nebraska, decreased 3° F after livestock were excluded for 1 year.

Grazing effects are not limited to riparian areas. Improper grazing of upland vegetation can expose soils to erosive impacts of rain drops, reduce water infiltration, and accelerate runoff. This can erode topsoil and cut rills and gullies, concentrating runoff, deepening gullies, lowering water tables, and increasing sediment production (Chaney *et al.* 1993). Sediment introduced into streams can alter primary productivity and food supply, fill interstitial spaces in stream bed material, impeding water flow, reducing dissolved oxygen levels, and restricting waste removal (Chapman 1988). Suspended sediments reduce light penetration to plants and reduce oxygen carrying capacity of the water (Ohmart and Anderson 1982). Reduction in photosynthesis and primary production decreases productivity of the entire ecosystem (Minshall *et al.* 1989).

Livestock grazing can cause a nutrient loading problem (due to urination and defecation) in areas where cattle are concentrated near the water (Doran *et al.* 1981), but in other areas it can reduce nutrients through removal of riparian vegetation (Fisher 1972). Riparian vegetation provides organic material for approximately 50 percent of a stream's nutrient energy (Cummins 1974). Detritus from such plants is a principal source of food for aquatic invertebrates (Minshall 1967; Meehan *et al.* 1977). Streamside vegetation also provides habitat for terrestrial insects, another important dietary component for other aquatic or riparian associated species.

Jennings *et al.* (1992) found livestock grazing to occur at all known historic locations of the California red-legged frog in the Central Valley hydrographic basin. Livestock grazing also has been implicated as a contributing factor in the decline and disappearance of California red-legged frogs from the lower Salinas River (L. Hunt, *in litt.*, 1993) and the San Francisco peninsula (S. Barry, *in litt.*, 1992). Two of the 14 remaining aggregations of California red-legged frogs in the Central Valley hydrographic basin (Corral Hollow Ecological Reserve and Frank Raines Regional Park) are threatened by

sedimentation of aquatic habitats either directly or indirectly caused by livestock grazing and off-road vehicle use (Jennings *et al.* 1992). Galen Rathbun (National Biological Service, pers. comm., 1993) reports that grazing is adversely altering California red-legged frog habitat on Pico, Van Gordon, San Simeon, Santa Rosa, Cambria Meadows, and Cayucos Creeks in San Luis Obispo County. Grazing practices can, however, be modified to minimize impacts to California red-legged frogs. Five-fold increases in California red-legged frog populations on Rancho San Carlos in Monterey County may be attributable in part to modifications of grazing programs (J. Froke, *in litt.*, 1994).

In addition to cattle, feral pigs (*Sus scrofa*) also disturb the riparian zone through their rooting, wallowing and foraging behavior in the shallow margins of water bodies. Feral pigs disturb and destroy vegetative cover, trample plants and seedlings, and cause erosion. At Pinnacles National Monument, soil compaction and possible disturbance of frog eggs caused by feral pigs have been noted in California red-legged frog habitat (Stanley Albright, National Park Service, *in litt.*, 1994).

Off-road vehicle use adversely affects California red-legged frogs in ways similar to livestock grazing and feral pig disturbance. Off-road vehicles damage riparian vegetation, increase siltation in pools, disturb the water in stream channels and crush eggs, larvae, juveniles, and adults. California red-legged frogs were eliminated in part by off-road vehicle activities at the Mojave River above Hesperia, at Rincon Station on the west fork of the San Gabriel River, and in Piru Creek above Pyramid Lake (M. Jennings, pers. comm., 1993).

Heavy recreational use of parks (e.g., fishing, hiking, exploring) also can degrade habitat for the California red-legged frog. At Big Basin Redwood Park in Santa Cruz County, heavy recreational use may have contributed to the disappearance of California red-legged frogs from Opal Creek (Coyote Creek Riparian Station, *in litt.*, 1993).

Timber harvest threatens California red-legged frogs through loss of riparian vegetation and increased erosion in the watershed, which fills pools with sediment and smothers egg masses. In Santa Cruz County, timber harvest is proposed adjacent to Adams Creek (Celia Scott, private citizen, pers. comm., 1993), Whitehouse Creek (U.S. Fish and Wildlife Service 1995) and occurs periodically on a tributary of Blooms Creek (Coyote Creek Riparian Station, *in litt.*, 1993). The proposed timber harvests would occur in three of 18 streams in the County that support California red-legged frogs. In Pescadero Creek at Portola State Park (San Mateo County), erosion and siltation caused by severe winter storms and upstream logging operations may have been the cause of the disappearance of California red-legged frogs from this portion of the stream (Coyote Creek Riparian Station, *in litt.*, 1993).

B. Overutilization for commercial, recreational, scientific, or educational purposes. Records of harvesting California red-legged frogs for human consumption date back to an account by Lockington (1879) of the commercial harvest of this species for San Francisco fish markets. From 1890 to 1900, the California red-legged frog supported a significant commercial harvest (Smith 1895) of about 80,000 frogs annually (Jennings and Hayes 1984). Counties surrounding San Francisco Bay provided the bulk of the frog harvest in the early to mid 1890s, with the Sacramento and San Joaquin Valleys increasing in importance by the end of the decade (Chamberlain 1898, Jennings and Hayes 1985). By 1900, harvest figures for California red-legged frogs fell dramatically, indicating that overharvesting may have occurred. Jennings and Hayes (1985) hypothesized that this rapid decline in the California red-legged frog population was the result of selective harvesting of the larger females. Introduction of the bullfrog in California in 1896 was probably in response to the dwindling California red-legged frog population (Jennings and Hayes 1985). Continued harvesting of California red-legged frogs for food by local individuals has been reported for the Central Coast region (Coyote Creek Riparian Station, *in litt.*, 1993). California red-legged frogs reportedly taste better than bullfrogs, a statement first made by Dickerson (1906).

Prior to 1950, California red-legged frogs were used sporadically for research in high schools and universities. At present, the California red-legged frog is available commercially from suppliers located outside California in the pet trade. Because the State of California prohibits possession of wild California red-legged frogs without a permit, frogs sold in the pet trade presumably are reared in captivity (M. Jennings, pers. comm., 1993).

C. Disease or predation. There have been no documented instances of disease adversely affecting the California red-legged frog.

Few data are available on the effect of native predators on the California red-legged frog. Bitterns (*Botaurus lentiginosus*) and black-crowned night herons (*Nycticorax nycticorax*) are likely predators of adult frogs (Jennings and Hayes 1990). Juvenile California red-legged frogs, which are more active diurnally and less wary than adults, may be more susceptible to predation by diurnal predators, such as the great blue heron (*Ardea herodias*) and several species of garter snakes (*Thamnophis* spp.) (Fitch 1940, Fox 1952), including the endangered San Francisco garter snake (*Thamnophis sirtalis tetrataenia*) (Barry 1978, Wharton *et al.* 1986). Recent postmetamorphs also may be particularly vulnerable to predation by garter snakes, as was found in other species of ranid frogs by Arnold and Wassersug (1978). Raccoons (*Procyon lotor*), which are abundant in urban settings, were the likely predator of eight radio-tagged California red-legged frogs in the riparian corridor of Pico and San Simeon Creeks in San Luis Obispo County (Rathbun, *in litt.*, 1994). Other possible, but undocumented mammalian predators include striped skunks (*Mephitis mephitis*), spotted skunks (*Spilogale putorius*), and red fox (*Vulpes fulva*). Larvae may be preyed upon by aquatic beetles and damsel fly naiads (Karl Malamud-Roam, Contra Costa County Mosquito and Vector Control District, *in litt.*, 1994).

Introduced predators of particular concern are the bullfrog, red swamp crayfish (*Procambarus clarkii*), signal crayfish (*Pacifastacus leniusculus*), and several species of fish, including bass, catfish (*Ictalurus* spp.), sunfish, and mosquitofish (Moyle 1973; Hayes and Jennings 1986, 1988). All species were introduced into California in the late 1800s and early 1900s, and through range expansions, reintroductions, and transplants have become established throughout most of the State (Riegel 1959, Bury and Luckenbach 1976, Moyle 1976).

Several researchers in central California have noted the decline and eventual disappearance of California red-legged frogs once bullfrogs become established at the same site (L. Hunt, in litt, 1993; S. Barry, *in litt.*, 1992; S. Sweet, *in litt.*, 1993). Joseph DiDonato (East Bay Regional Park District, pers. comm., 1994) has observed the disappearance of California red-legged frogs from Pleasanton Ridge in Alameda County within the last ten years. Today, all former California red-legged frog habitat on Pleasanton Ridge is occupied by bullfrogs. Moyle (1973) attributed the disappearance of California red-legged frogs from the San Joaquin Valley and Sierran foothill region primarily to a combination of bullfrog predation and

competition. All sites in the Sierra Nevada foothills that supported California red-legged frogs in the 1970s now are inhabited by bullfrogs (M. Jennings, *in litt.*, 1993). Over the last decade, Jennings (*in litt.*, 1993) has observed bullfrogs moving upstream and/or downstream into formerly pristine California red-legged frog habitat in a number of drainages, including streams in Ventura, Santa Barbara, San Luis Obispo, Merced, Stanislaus, and San Mateo counties. Bullfrogs are introduced into drainages by stocking of reservoirs and stock ponds, dispersal and colonization, conveyance of project water from other streams inhabited by these exotics, and releases by individuals. At The Nature Conservancy's Santa Rosa Plateau Reserve in Riverside County (the only site south of the Santa Clara River drainage supporting California red-legged frogs), a docent found a school teacher attempting to introduce bullfrog tadpoles into the preserve in the 1980s (M. Jennings, *in litt.*, 1993). Additional bullfrogs were removed from the preserve in 1989 after apparent introductions from a nearby frog jumping contest (M. Jennings, *in litt.*, 1994). Once established, it is extremely difficult to eliminate bullfrogs (M. Jennings, *in litt.*, 1993; Cecil Schwalbe, National Park Service, Tuscon, Arizona, pers. comm., 1993; Frank Slavens, Woodland Park Zoological Gardens, Seattle, Washington, pers. comm., 1993). Over 60 percent of the streams or drainages currently known to support California red-legged frogs also are inhabited by bullfrogs, either in association with California red-legged frogs or in other portions of the drainage (U.S. Fish and Wildlife Service 1995). Based on documented rates of local extinction, the Service concludes that eventually California red-legged frogs will be locally extirpated from these 149 streams.

Bullfrogs prey on California red-legged frogs (S. Sweet, *in litt.*, 1993), other ranid frogs (Twedt 1993) and other amphibians and aquatic reptiles (Schwalbe and Rosen 1988). Twedt (1993) documented four juvenile northern red-legged frogs among the contents of 22 adult bullfrog stomachs. He also found a subadult bullfrog in one of the adult bullfrog stomachs. This prey item was between the size of an adult male (approximately 80 mm (3.1 in.)) and adult female (approximately 85 mm (3.3 in.)) red-legged frog, indicating that bullfrogs could prey on subadult red-legged frogs. Stuart and Painter (1993) found evidence of cannibalistic behavior in bullfrogs. A stomach content analysis revealed 87 percent of total volume by weight was composed of newly-metamorphosed and larval Rana. Bullfrogs may have a competitive advantage over California red-legged frogs because of their (1) larger size, (2) generalized food habits (Bury and Whelan 1984), (3) extended breeding season (Storer 1933), which allows for production of two clutches of up to 20,000 eggs during a breeding season (Emlen 1977), and (4) larvae being unpalatable to predatory fish (Kruse and Francis 1977). Bullfrogs also interfere with red-legged frog reproduction. Several researchers have noted male red-legged frogs in amplexus with (mounted on) both male and female bullfrogs (Jennings and Hayes 1990; Twedt 1993; M. Jennings, *in litt.*, 1993; Stebbins *in litt.*, 1993). However, the extent to which bullfrog predation, competition, and reproductive interference adversely affects red-legged frogs has not been studied in the field (Hayes and Jennings 1986). Habitat alterations, including removal of riparian or aquatic vegetation, reduced stream flows, and sedimentation of pools, often provide conditions detrimental to red-legged frogs but favorable to bullfrogs (Hayes and Jennings 1986; Jennings 1988b; Jennings, pers. comm., 1993).

Hayes and Jennings (1986, 1988) found a negative correlation between the abundance of introduced fish species and California red-legged frogs. These authors noted that aquatic sites where introduced fishes were abundant rarely had native ranids, and when present, ranid populations were small. A similar negative correlation was reported by Hunt (*in litt.*, 1993) for California red-legged frogs in the Salinas River drainage, by DiDonato (*in litt.*, 1994) on East Bay Regional Park District properties in the San Francisco Bay area, by Shaffer (*in litt.*, 1994) for the inner coast range, and by Moyle (1973) for the foothill yellow-legged frog. These references suggest that the observed negative correlation between California red-legged frogs and non-native fish is a general principal. Of 32 streams examined by Hayes and Jennings (1988), introduced fishes were found in 44 percent.

Results of a recent study in artificial ponds showed that mosquitofish and bluegill (*Lepomis macrochirus*) were significant predators of California red-legged frog larvae (Schmieder and Nauman 1994). However, California red-legged frogs have been found in association with mosquitofish in Corral Hollow Creek (Alameda and San Joaquin counties) (T. Strange, pers. comm., 1994) and in three waterbodies on East Bay Regional Park properties in Contra Costa County (K. Swaim, *in litt.*, 1994). Malamud-Roam (*in litt*, 1994) reported that mosquitofish occur in at least four streams in Contra Costa County known to support California red-legged frogs. Mosquitofish also may compete with California red-legged frogs by consuming aquatic insects that are potential food sources for postmetamorphic frogs. Mosquitofish have become established statewide and are stocked routinely by mosquito abatement districts as a mosquito control measure (Moyle 1976).

D. The inadequacy of existing regulatory mechanisms. Although the California red-legged frog is classified as a ''Species of Special Concern'' by the State of California (Steinhart 1990) and may not be taken without an approved scientific collecting permit, this designation provides no special, legally mandated protection of the species and its habitat. In 1972, the California Fish and Game Commission amended its sport fishing regulations to prohibit take or possession of California red-legged frogs (Bury and Stewart 1973). However, because of the rarity of the California red-legged frog and similarity to the more common bullfrog, protection of this taxon by State wardens and rangers may be compromised (Coyote Creek Riparian Station, *in litt.*, 1993).

Section 1603 of the California Fish and Game Code authorizes the Department of Fish and Game (CDFG) to regulate streambed alteration. The Department must be notified and approve any work that substantially diverts, alters, or obstructs the natural flow or substantially changes the bed, channel or banks of any river, stream, or lake. If an existing fish or wildlife resource may be substantially adversely affected by a project, CDFG must submit proposals to protect the species within 30 days. However, if the Department does not respond within 30 days of notification, the applicant may proceed with the work.

Section 404 of the Clean Water Act is the primary Federal law that potentially provides some protection for aquatic habitats of the California red-legged frog, if the habitats are determined by the U.S. Army Corps of Engineers (Corps) to be jurisdictional areas (i.e., waters of the United States). Under section 404, nationwide permits, which undergo minimal public and agency review, can be issued for projects involving less than 10 acres of wetlands above the headwaters (i.e., streams with less than five cubic feet per second (cfs) mean annual flow) or for isolated waters, unless a listed species may be adversely affected. Many aggregations of

California red-legged frogs occur in isolated wetlands and coastal streams that may have mean annual flows less than five cfs. Individual permits, which are subject to more extensive review, could be required for projects that have more than minimal impacts to waters of the United States. The Clean Water Act does not afford any special protection for candidate species. However, when the California red-legged frog is listed, the Corps will be required by section 7 of the Act to consult and obtain the concurrence of the Service prior to the authorization of any section 404 permit affecting California red-legged frog habitat.

Additionally and equally important, the upland habitats adjacent to riparian zones are not provided any protection by Section 404 of the Clean Water Act. Upland areas provide estivation and dispersal habitats for this species.

Federal lands, including those of the Forest Service, National Park Service, Bureau of Land Management, Bureau of Reclamation, and Department of Defense, encompass approximately 10 percent of the current known range of the California red-legged frog. Multiple land use management, as currently practiced by the Forest Service, Bureau of Land Management, and National Park Service, does not provide long-term protection for the California red-legged frog. State, County, and Regional Park lands provide some protection from some threats, however, these parks are managed for multiple uses.

The National Environmental Policy Act (NEPA) and California Environmental Quality Act (CEQA) require an intensive environmental review of projects that may adversely affect a Federally listed species. However, project proponents are not required to avoid impacts to non-listed species, and proposed mitigation measures are frequently not adequately implemented. As with section 404 permits, the Service's comments through these environmental review processes are only advisory. The Service is aware of a proposed recreational development in Santa Cruz County undergoing environmental review that is expected to extirpate an estimated 10 percent of the total remaining numbers of the California red-legged frog (Westphal *in litt.* 1995).

The California Coastal Act regulates the approval of developments within the costal zone. Although a significant slowing in wetland losses has occurred, the continued loss and degradation of coastal wetlands since the California Coastal Act was enacted in 1974 attests to the limitations of this legislation.

E. Other natural or man-made factors affecting its continued existence. Six consecutive years of drought (1986–1992) in California severely affected remaining California red-legged frogs in the Sierran foothills. Many sites in intermittent streams that held California red-legged frogs before the drought were completely dry during field surveys conducted between 1985 to 1992 (Jennings *et al.* 1992). Sites still holding pools of water had water levels so low that access by predators was enhanced. Livestock grazing at many sites exacerbated effects of the drought by limiting or preventing riparian habitat regeneration (Jennings *et al.* 1992). Long-term survival of California red-legged frogs may be compromised by the elimination of refuge areas during times of the year when the stream is dry (Rathbun, *in litt.*, 1994). However, California red-legged frog populations are undoubtedly capable of recovering from drought, provided other factors have not irreparably degraded their habitat, or California red-legged frogs have not been completely extirpated from the drainage.

Drought also may play a role in decreased California red-legged frog reproduction where frogs occur in coastal lagoons. High salinities in the Pescadero Marsh (San Mateo County) have been attributed to drought conditions in the watershed. At the Pescadero Marsh Natural Preserve, Jennings and Hayes (1990) found many dead egg masses in a portion of the marsh that were killed by excessive (>4.5 parts per thousand) salinity levels. Rathbun *et al.* (1991) speculated that the absence of California red-legged frogs in lower Santa Rosa Creek and lagoon in San Luis Obispo County was due to long-term drought exacerbated by instream flow withdrawals. Since the end of the drought California red-legged frog numbers reportedly have increased in lower Santa Rosa Creek (Rathbun *in litt.* 1994; G. Schmitt, United Residential Lot Owners of Cambria, Inc. *in litt.* 1994) probably as a result of increased rainfall in the winter of 1992–1993. Increased salinities were recorded in several other coastal lagoons during the drought years (C. Swift and K. Worcester, pers. comm. *in* Jennings *et al.* 1992). Increased salinity could also result from periodic overtopping of the beach bar during high tides or by storm waves (D. Asquith, private consultant, *in litt.* 1994). In 1993, Jennings (pers. comm., 1993) reported the loss of California red-legged frog egg masses from increased salinity and unusual flooding in Arroyo Laguna in San Luis Obispo County. Because significant numbers of California red-legged frogs occur in coastal lagoons on the central California coast, drought has the potential to severely reduce production of California red-legged frogs over a significant portion of their remaining range.

The overall effect of contaminants on California red-legged frogs has not been studied. Only one incident of California red-legged frog mortality is known from a diesel and gasoline spill in a tributary of Blooms Creek (Santa Cruz County) (Coyote Creek Riparian Station, *in litt.*, 1993).

Periodic wildfires may adversely affect California red-legged frogs by causing direct mortality, destroying streamside vegetation, or eliminating vegetation that protects the watershed. The 1991 Lions Fire on upper Sespe Creek in the Los Padres National Forest destroyed known California red-legged frog habitat (S. Sweet, pers. comm., 1993). Following the fire, extensive erosion in the watershed also negatively affected California red-legged frogs and their habitat (S. Sweet, pers. comm., 1993).

Extensive flooding has been cited by Jennings and Hayes (1994a) as a significant contributing factor in the extirpation of the California red-legged frog from desert drainages of southern California. For example, in the Mojave River drainage, no verifiable records or sightings exist of California red-legged frogs after 1968 (Jennings and Hayes 1994a). The disappearance of this species from the drainage coincided with a catastrophic flood event in the Mojave River in the winters of 1968 and 1969. Extensive flooding in other portions of the California red-legged frog range may have combined with other factors to eliminate California red-legged frog aggregations (Richard Seymour, Coyote Creek Riparian Station, *in litt.*, 1993; D. Martin, pers. comm., 1994).

A considerable amount of occupied California red-legged habitat exists in the form of isolated patches along stream courses. These patches of suitable habitat represent mere remnants of a much larger historical habitat that once covered whole drainages. Fragments of formerly extensive populations of California red-legged frogs are now isolated from other populations. Populations isolated in habitat fragments are vulnerable to extinction through random environmental events or anthropogenic catastrophes. With only three of 243 known creeks or drainages supporting populations of over 350 adults, all remaining occurrences are considered vulnerable to these threats. Once a local

extinction event occurs in an isolated habitat fragment, the opportunity for recolonization from a source population is reduced. Thus, local extinctions via stochastic processes, coupled with habitat fragmentation may represent a substantial threat to the continued existence of the California red-legged frog over much of its range.

The Service has carefully assessed the best scientific and commercial data available regarding the past, present, and future threats faced by the California red-legged frog in determining to make this final decision. Based on this evaluation, the preferred action is to list the California red-legged frog (*Rana aurora draytonii*) as threatened. This taxon has been extirpated from 70 percent of its former range. Although California red-legged frogs are now known to be found in more locations within their present range than previously thought, factors adversely affecting the California red-legged frog are known to exist in 83 percent of the drainages supporting the taxon (U.S. Fish and Wildlife Service 1995). These factors include but are not limited to (1) urban encroachment, (2) construction of large and small reservoirs, water diversions and well development, (3) flood control maintenance, (4) road maintenance, (5) placer mining, (6) livestock grazing and feral pigs, (7) off-road vehicle use, and (8) introduction or presence of exotic predators and competitors. The remaining 17 percent of occupied drainages, the majority located in Monterey, Santa Barbara, and San Luis Obispo counties, currently are not known to be subject to the above threats. The California red-legged frog, therefore, more appropriately fits the definition of a threatened species. For the reasons discussed below, critical habitat has not been proposed.

Critical Habitat

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

Section 4(a)(3) of the Act, as amended, and implementing regulations (50 CFR 424.12) require that, to the maximum extent prudent and determinable, the Secretary designate critical habitat at the time a species is determined to be endangered or threatened. The Service finds that designation of critical habitat is not prudent for the California red-legged frog at this time. Service regulations (50 CFR 424.12(a)(1)) state that designation of critical habitat is not prudent when one or both of the following situations exist—(1) The species is threatened by taking or other human activity, and identification of critical habitat can be expected to increase the degree of threat to the species, or (2) such designation of critical habitat would not be beneficial to the species.

As discussed under Factor B in the ''Summary of Factors Affecting the Species'' section, the California red-legged frog has been and continues to be threatened by taking, an activity difficult to control. Listing of the frog may result in an increase in the threat of vandalism, a concern expressed by the petitioners and other experts (M. Jennings, S. Sweet, pers. comm., 1993; D. Martin, pers. comm., 1994). California red-legged frogs occur in isolated and fragmented wetland habitat on private property and are at risk from vandalism. Publication of specific localities, which would be required in proposing critical habitat, would reveal precise locality data and thereby make the species more vulnerable to acts of vandalism, and increase the difficulties of enforcement. Martin (pers. comm., 1994) has observed acts of vandalism by private landowners once they learned of the presence of Yosemite toads (*Bufo canorus*), on their property. The Yosemite toad is a species of concern to the Service (former category 2 species, 59 FR 58995).

In addition, a significant market exists in California for frog meat, with bullfrogs as the primary species sold. In 1993, the California Department of Fish and Game arrested a number of individuals involved in illegal collection and sale of large numbers of bullfrogs to San Francisco fish markets (California Department of Fish and Game 1993). To the untrained eye, the California red-legged frog looks very similar to a bullfrog and could be accidentally taken for the market. California red-legged frogs also could be taken intentionally as they are reported to be more palatable (Coyote Creek Riparian Station, *in litt.*, 1993; Jennings, pers. comm., 1994). The California red-legged frog would be more vulnerable to collection for market consumption if precise locality data were published for this species. Protection of California red-legged frog habitat will be addressed in the recovery process and through the section 7 consultation process. Therefore, due to the serious potential for increased, unauthorized take, the Service has determined that designation of critical habitat for the California red-legged frog is not prudent.

Available Conservation Measures

Conservation measures provided to species listed as endangered or threatened under the Endangered Species 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 States and requires that recovery actions be carried out for all listed species. The protection required of Federal agencies and the prohibitions against taking and harm are discussed, in part, below.

Section 7(a) of the Act, as amended, requires Federal agencies to evaluate their actions with respect to any species that is proposed or listed as endangered or threatened and with respect to its critical habitat, if any is being designated. Regulations implementing this interagency cooperation provision of the Act are codified at 50 CFR part 402. Section 7(a)(4) of the Act requires Federal agencies to confer with the Service on any action that is likely to jeopardize the continued existence of a species proposed for listing or result in destruction or adverse modification of proposed critical habitat. If a species is listed subsequently, section 7(a)(2) requires Federal agencies to ensure that activities they authorize, fund, or carry out are not likely to jeopardize the continued existence of the species or destroy or adversely modify its critical habitat. If a Federal action may affect a listed species or its critical habitat, the responsible Federal agency must enter into formal consultation with the Service.

Federal agencies that may be involved as a result of this final rule are the Bureau of Reclamation, Bureau of Land Management, National Park Service, Forest Service, and the Departments of the Army, Navy and Air Force. At several parks, the National Park Service has conducted or is planning to conduct status surveys for California red-legged frogs (Daphne A. Hatch, National Park Service, *in litt.*, 1993; James Sleznick, National Park Service, *in litt.*, 1992;

Gary Fellers, National Park Service, pers. comm., 1993). The Forest Service has conducted and has ongoing amphibian surveys in many National Forests within the historic range of the California red-legged frog (J. Stephenson, pers. comm., 1993; D. Martin, pers. comm., 1993; Maeton Freel, U.S. Forest Service, pers. comm., 1994). In Los Padres National Forest, the Forest Service, in a cooperative effort with other Federal and State agencies, has altered flow regimes in Piru Creek between Lake Pyramid Lake and Lake Piru to benefit the endangered arroyo southwestern toad. Although no specific studies have been done, these flow regime changes also may benefit the California red-legged frog (Frederick Gientke, United Water Conservation District, *in litt.*, 1994). The Forest Service has also designated more than 31 miles of Sespe Creek in Los Padres National Forest as ''Wild and Scenic'' under the National Wild and Scenic Rivers Act of 1968.

The Contra Costa Water District is constructing a large reservoir construction project (Los Vaqueros Reservoir) on Kellogg Creek, Contra Costa County (Contra Costa Water District 1993). The Bureau of Reclamation's role in this project is to amend water service contracts and modify water rights to facilitate project construction (Penny Howard, U.S. Bureau of Reclamation, *in litt.*, 1994). A mitigation and monitoring program is proposed to compensate for California red-legged frog habitat losses at Los Vaqueros. The mitigation plan includes a bullfrog and exotic fish control program to be carried out for the life of the reservoir project (Contra Costa Water District 1993). The potential for success of the mitigation plan is unknown. In addition, Bureau of Reclamation projects, including small loan projects in Monterey County, the Cachuma project in Santa Barbara County, the San Felipe project in San Benito and Santa Clara counties, and the Solano project in Solano County, involve water contract renewals as well as road maintenance activities and grazing leases, all of which may affect California red-legged frogs. The U.S. Army Corps of Engineers would be involved in many of these projects through their permitting authority under section 404 of the Clean Water Act.

Any of the above mentioned Federal agencies would be required to consult with the Service if any action they fund, authorize, or carry out may affect the California red-legged frog. To the extent that their habitats overlap in lagoon areas, efforts made to conserve and recover the tidewater goby (*Eucyclogobius newberryi*), a Federally listed endangered species, may also help to conserve and recover the California red-legged frog.

The Service is currently involved in the development of two Habitat Conservation Plans (HCP's) that could potentially protect three localities of California red-legged frogs. The Kern County Valley Floor HCP will protect a minimum of 75 percent of the existing California red-legged frog habitat in the Bitterwater Creek drainage. The San Joaquin County multispecies HCP may also protect two localities, Corral Hollow Creek and Lone Tree Creek. Although the development of these HCP's will not preclude the need to list the California red-legged frog, these plans, if implemented, will protect habitat for the taxon.

The Ventura Field Office is assisting with the Santa Clara River Enhancement and Management Plan, which is progressing but is not finalized at this time. A similar plan for Rancho San Carlos (in the Carmel River drainage) is also underway. Early planning efforts are beginning for the Ventura and Santa Ynez rivers. None of these planning efforts preclude the need to list the species, but will provide future protection of habitat for the species.

One known California red-legged frog locality in Riverside County and any newly discovered localities in the historic range of the species could be protected by ongoing ecosystem-based planning efforts in southern California. In 1991, the State of California established the Natural Communities Conservation Planning (NCCP) Program to address conservation needs of natural ecosystems throughout the State. The initial focus of the program is the coastal sage scrub community in southern California, however, riparian habitats will also be addressed. Several regional plans, including the Multi-species Conservation Plan (MSCP) and the Multi-habitat Conservation Plan (MHCP) of San Diego County, the Southern and Central Coastal Subregional NCCP/Habitat Conservation Plans (Southern/Central/Coastal NCCP) of Orange County, and the Riverside County Stephens Kangaroo rat HCP and San Bernardino County MSCP are under development by a consortium of county and municipal governments and other parties, including the California Department of Fish and Game and the Service. Though no plans have been completed to date, protection could be provided if the California red-legged frog occurs in any of the planning areas. The one known extant population occurs on the Santa Rosa Plateau Reserve managed by The Nature Conservancy.

The Service establishes the following recovery units within the historical range of the California red-legged frog: (1) The western foothills and Sierran foothills to 5,000 feet in elevation in the Central Valley Hydrographic Basin; (2) the central coast ranges from San Mateo and Santa Clara counties south to Ventura and Los Angeles counties; (3) the San Francisco Bay/Suisun Bay hydrologic basin; (4) southern California, south of the Tehachapi Mountains; and (5) the northern coast range in Marin and Sonoma counties. These five units are essential to the survival and recovery of the California red-legged frog. Designation of recovery units assists the Service and other agencies in identifying priority areas for conservation planning under the consultation (section 7) and recovery (section 4) programs.

The Act and implementing regulations found at 50 CFR 17.32 set forth a series of general prohibitions and exceptions that apply to all threatened wildlife not covered by a special rule. With respect to the California red-legged frog, 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, collect, or attempt any such conduct), import or export, transport in interstate or foreign commerce in the course of commercial activity, or sell or offer for sale in interstate or foreign commerce any listed species. It also is illegal to possess, sell, deliver, carry, transport, or ship any such wildlife that has been taken illegally. Certain exceptions apply to agents of the Service and State conservation agencies.

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

It is the policy of the Service, published in the Federal Register on July 1, 1994 (59 FR 34272), to identify to the maximum extent practicable at the time a species is listed those activities that would or would not constitute a violation of section 9 of the Act. The intent of this policy is to increase public awareness of the effect of this listing on proposed and ongoing activities within the species' range. The Service believes that, based on the best available information, the following

actions will not result in a violation of section 9:

(1) Road-kills or injuries caused by vehicles operated lawfully on designated public roads;

(2) Light to moderate carefully managed livestock grazing that prevents or minimizes the excessive trampling of riparian and wetland habitat;

(3) Possession of legally acquired California red-legged frogs;

(4) Unintentional hooking of a frog or tadpole during otherwise lawful engagement in fishing, and;

(5) Federally approved projects that involve activities such as, discharge of fill material, draining, ditching, tiling, pond construction stream channelization or diversion, or alteration of surface or ground water into or out of a wetland (i.e., due to roads, impoundments, discharge pipes, storm water detention basins, etc.), when such activity is conducted in accordance with any reasonable and prudent measures given by the Service in accordance with section 7 of the Act.

Activities that the Service believes could potentially harm the California red-legged frog and result in ''take'', include, but are not limited to:

(1) Unauthorized collecting or handling of the species;

(2) Introduction of exotic species such as fish or other species of frogs directly into, or within dispersal distance of, known California red-legged frog habitat;

(3) Unauthorized destruction/alteration of the species' habitat such as discharge of fill material, draining, ditching, tiling, pond construction, diversion or alteration of stream channels or surface or ground water flow into or out of a wetland (i.e., due to roads, impoundments, discharge pipes, storm water detention basins, etc.), operation of any vehicles within the stream channel;

(4) Violation of discharge permits;

(5) Burning, cutting or mowing of wetland or riparian vegetation, if conducted in an untimely or inappropriate manner (e.g., when California red-legged frogs would be killed or injured, or their occupied habitat would be degraded or rendered unsuitable);

(6) Pesticide applications in violation of label restrictions;

(7) Discharges or dumping of toxic chemicals, silt, or other pollutants (i.e., sewage, oil and gasoline) into waters, or riparian and upland habitats supporting the species;

(8) Interstate and foreign commerce (commerce across State lines and international boundaries) and import/export (as discussed earlier in this section) without prior obtainment of an endangered species permit. Permits to conduct these activities are available for purposes of scientific research and enhancement of propagation or survival of the species.

Questions regarding whether specific activities will constitute a violation of section 9 should be directed to the Field Supervisor of the Service's Sacramento Field Office (see **ADDRESSES** section). Requests for copies of the regulations concerning listed plants and general inquiries regarding prohibitions and permits may be addressed to the U.S. Fish and Wildlife Service, Ecological Services, Endangered Species Permits, 911 N.E. 11th Avenue, Portland, Oregon, 97232–4181 (telephone 503/231–2063; facsimile 503/231–6243).

National Environmental Policy Act

The Fish and Wildlife Service has determined that Environmental Assessments and Environmental Impact Statements, as defined under the authority of the National Environmental Policy Act of 1969, need not be prepared in connection with regulations adopted pursuant to section 4(a) of the Endangered Species Act of 1973, as amended. A notice outlining the Service's reasons for this determination was published in the Federal Register on October 25, 1983 (48 FR 49244).

References Cited

A complete list of all references cited herein is available upon request from the Field Supervisor, Sacramento Field Office (see **ADDRESSES** section).

Author

The primary authors of this final rule are Karen J. Miller, Alison Willy, Sheila Larsen, and Steven Morey, Sacramento Field Office (see **ADDRESSES** section), telephone 916/978–4866.

List of Subjects in 50 CFR Part 17

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

Proposed Regulation Promulgation

Accordingly, the Service hereby proposes to amend part 17, subchapter B of chapter I, title 50 of the Code of Federal Regulations, as set forth below:

PART 17—[AMENDED]

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

Authority: 16 U.S.C. 1361–1407; 16 U.S.C. 1531–1544; 16 U.S.C. 4201–4245; Pub. L. 99–625, 10080 Stat. 3500, unless otherwise noted.

2. Section 17.11(h) is amended by adding the following, in alphabetical order under AMPHIBIANS, to the List of Endangered and Threatened Wildlife to read as follows:

§ 17.11 Endangered and threatened wildlife.

* * * * *

(h) * * *

Species		Historic range	Vertebrate population where endangered or threatened	Status	When listed	Critical habitat	Special rules
Common name	Scientific name						
AMPHIBIANS							
*	*	*	*	*	*		*
Frog, California red-legged.	*Rana aurora draytonii*	U.S.A. (CA).	Entire (excluding Del Norte, Humboldt, Trinity, & Mendocino Cos., CA; Glenn, Lake, & Sonoma Cos., CA, west of the Central Valley Hydrologic Basin; Sonoma & Marin Cos., CA, west & north of San Francisco Bay drainages and Walker Creek drainage; and NV).	T		NA	NA
*	*	*	*	*	*		*

Dated: May 17, 1996
Mollie H. Beattie,
Director, Fish and Wildlife Service.
[FR Doc. 96–12901 Filed 5–22–96; 8:45 am]
BILLING CODE 4310–55–P

DEPARTMENT OF COMMERCE

National Oceanic and Atmospheric Administration

50 CFR Part 641

[Docket No. 951221305–6038–02; I.D. 020296B]

Reef Fish Fishery of the Gulf of Mexico; Correction

AGENCY: National Marine Fisheries Service (NMFS), National Oceanic and Atmospheric Administration (NOAA), Commerce.

ACTION: Correction to emergency interim rule.

SUMMARY: This document corrects the delay of effective date in an emergency interim rule published on February 29, 1996 (61 FR 7751). The emergency interim rule delayed indefinitely the effective date for implementation of the red snapper Individual Transferable Quota (ITQ) system for the Gulf of Mexico, previously scheduled to begin April 1, 1996.

EFFECTIVE DATE: The delay of effective date published February 29, 1996 (61 FR 7751) for amendments originally published on November 29, 1995 (60 FR 61202) is corrected as of February 23, 1996, to extend through May 29, 1996.

FOR FURTHER INFORMATION CONTACT: Robert A, Sadler, Fishery Management Specialist, Southeast Regional Office, 813–570–5305.

SUPPLEMENTARY INFORMATION:

Background

In issuing an emergency interim rule on February 29, 1996, NMFS inadvertently indicated that the scheduled April 1, 1996, effective date for the Gulf of Mexico red snapper ITQ system, implemented under FMP Amendment 8 (60 FR 61200, November 29, 1995), would be delayed indefinitely. Because an emergency interim rule issued under section 305(c) of the Magnuson Fishery Conservation and Management Act can amend a fishery management plan or plan amendment and its implementing rule only for the emergency period (limited to 90 days), the indefinite delay was in error.

Need for Correction

Accordingly, this action corrects the emergency interim rule to specify the correct ending date for the delay in the effective date for the final rule implementing the ITQ system. As published, the effective date section and amendatory instruction 2 are incorrect and need to be changed.

Correction of Publication

The publication on February 29, 1995, of the emergency interim rule (I.D. 020296B), which was the subject of FR DOC. 96–4432, is corrected as follows:

On page 7751, in the third column, under the preamble caption **EFFECTIVE DATES**, in the last paragraph, the phrase ''are delayed indefinitely.'' is corrected to read ''is delayed through May 29, 1996.''

On page 7753, in the third column, on the last line of the introductory text of the amendatory instruction 2, the word ''indefinitely'' is corrected to read ''through May 29, 1996.''

Dated: May 15, 1996.
Richard H. Schaefer,
Acting, Assistant Administrator for Fisheries, National Marine Fisheries Service.
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