State of California
Natural Resources Agency
Department of Fish and Game

REPORT TO THE FISH AND GAME COMMISSION

A STATUS REVIEW OF THE MOUNTAIN YELLOW-LEGGED FROG (*Rana sierrae* and *Rana muscosa*)

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1. EXECUTIVE SUMMARY

This document describes the current status of the Mountain Yellow-Legged Frog (*Rana sierrae* and *Rana muscosa*) (MYLF) in California as informed by the scientific information available to the Department of Fish and Game (Department). The Department recommends to the Fish and Game Commission (Commission) that designation of the MYLF in California as threatened/endangered is warranted.

1.1. Background

On January 27, 2010, the Fish and Game Commission (Commission) received a petition from the Center for Biological Diversity (Center) to list all populations of MYLF as "Endangered" under California Endangered Species Act (CESA).

On February 4, 2010, Commission staff transmitted the petition to the Department of Fish and Game (Department) for evaluation.

On February 26, 2010, Commission staff published formal notice of receipt of the Petition. (Cal. Reg. Notice Register 2010, No. 9-Z, p. 333.).

On April 22, 2010, the Department requested that the Commission grant the Department an extension to allow the Department additional time to further analyze and evaluate the petition and complete the evaluation report.

On May 20, 2010, the Commission granted the Department an extension to complete the petition evaluation report.

On June 22, 2010, the Department provided the Commission with a written evaluation of the petition pursuant to FGC section 2073.5, indicating that the Department believed the petition provided sufficient information to indicate the petitioned action may be warranted.

On September 15, 2010, at a public meeting in McClellan, California, the Commission considered the petition, the Department's evaluation report and recommendation, and other information presented to the Commission, and determined that sufficient information existed to indicate that the petitioned action may be warranted. At the meeting, the Commission also adopted an emergency regulation pursuant to FGC section 2084 to allow incidental take of MYLF during its candidacy period subject to specified conditions. (Cal. Reg. Notice Register 2010, No. 43-Z, p. 1782 (October 22, 2010).)

On September 23, 2010, the Commission sent a Notice of Proposed Emergency Changes in Regulations relating to incidental take of MYLF to interested parties.

On October 1, 2010, the Commission published a Notice of Findings in the California Regulatory Notice Register accepting for consideration the petition to list the MYLF under the CESA. (Cal. Reg. Notice Register 2010, No 40-Z, p. 1601 (October 1, 2010).)

On October 11, 2010, the Office of Administrative Law approved the Commission's Emergency Changes in Regulations relating to incidental take of MYLF during the candidacy period.

1.2. Summary of Findings

MYLF (*Rana sierrae* and *Rana muscosa*) are moderate-sized ranid frogs inhabiting lakes, ponds, marshes, and streams at elevations below 3,690 m. *R. sierrae* is endemic to the Sierra

Nevada of California and adjacent Nevada. Within the Sierra Nevada, the range of *R. muscosa* extends from the Monarch Divide and Cirque Crest (Fresno County) in the north to Taylor and Dunlap Meadows (Tulare County) in the south. In southern California, *R. muscosa* occurs in the Transverse and Peninsular Ranges, including the San Gabriel Mountains (Los Angeles and San Bernardino Counties), San Bernardino Mountains (San Bernardino County), and San Jacinto Mountains (Riverside County). In the Sierra Nevada, the elevation range historically occupied by *R. muscosa* and *R. sierrae* extended from approximately 1400 m to 3690 m. In southern California, *R. muscosa* occurred from approximately 350 to 2780 m (Vredenburg et al. 2007; Stebbins 2003; Zweifel 1955).

Because of the relatively short growing season characteristic of the high elevation habitats occupied by MYLF, tadpoles cannot metamorphose into juvenile frogs in a single season. Instead, tadpoles typically require 2-3 summers before metamorphosis, and therefore overwinter 1-2 times. Breeding at higher elevations occurs primarily in permanent lakes and ponds deeper than 4 meters. In lower elevation areas, most breeding takes place in low-gradient stretches of perennial streams. These types of habitats are used for breeding because they do not dry up during the summer or freeze to the bottom during winter and therefore provide high-quality habitat for overwintering tadpoles.

After metamorphosis, juvenile frogs require 3-4 years to reach sexual maturity and adults can live for at least ten years. Even older ages are likely. Given that the tadpole stage can last 2-3 years, the maximum age of MYLF (including tadpole + post-metamorphic stages) is likely to exceed 12-13 years.

Historically, MYLF were abundant in the Sierra Nevada (California and adjacent Nevada) and the mountain ranges of southern California. During the past century, both species have declined throughout their ranges. These declines are well documented in a series of papers, all of which are consistent in their finding of widespread population extirpations across the ranges of both *R. muscosa* and *R. sierrae*. The most recent and extensively researched estimate of the extent of the species' declines estimates 94% of historical MYLF populations are now extirpated.

For this status review, the Department developed the most complete data set of MYLF localities (1899–2010) and used these data to estimate the range-wide status of MYLF. This data set significantly increases the proportion of the ranges of both species covered, as compared to previous analyses. Using these data, the Department estimates that 76% of historical MYLF populations are now extirpated. These data also indicate recent, ongoing declines since 1995. The Department estimates that 54% of populations extant in 1995 are currently extirpated and those that remain have witnessed a 19% decline in post-metamorphic frog abundance. Details of these analyses are presented in **Section 4. Species Status and Population Trends.**

1.3. Threats

Threats to the continued survival of MYLF are discussed in detail in **Section 5. Factors Affecting Ability to Survive and Reproduce**. MYLF are extirpated from most of their historic range due primarily to disease and introductions of non-native trout. Several other factors that may affect the ability of MYLF to survive are discussed in this Status Review, including airborne contaminants, wildland fires, fire suppression activities, climate change, livestock grazing, water developments, and recreational activities. Although these factors may have localized impacts on MYLF, they are not considered to be the primary stressors that have caused the observed range-wide declines.

1.4. Petitioned Action

The Department recommends the Commission find as warranted the petition to list the MYLF as threatened/endangered, and the Commission should publish notice of its intent to amend Title CCR §670.5 to list MYLF as follows:

The southern mountain yellow-legged frog (*R. muscosa*) is warranted as Endangered. The Sierra Nevada yellow-legged frog (*R. sierrae*) is warranted as Threatened.

1.5. Management and Recovery Recommendations

The Department provides several actions described herein that it believes would have population-level benefits for MYLF and their habitat.

2. INTRODUCTION

2.1. Petition History

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On February 4, 2010, Commission staff transmitted the petition to the Department of Fish and Game (Department) for evaluation in accordance with Fish and Game Code (FGC) section 2073.

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On October 11, 2010, the Office of Administrative Law approved the Commission's Emergency Changes in Regulations relating to incidental take of MYLF during the candidacy period.

2.2. Department Review

This report, pursuant to FGC Section 2074.6, provides the Department's review and recommendations to the Commission regarding the proposed listing of the MYLF as a threatened or endangered species under CESA. The discussion and analysis set forth below is based on the best scientific information available. Further, this status review preliminarily identifies habitats that may be essential to the continued existence of the species and suggests management activities and other recommendations for recovery of the species.

Until recently, the name "mountain yellow-legged frog" referred to a single species, *Rana muscosa*. However, the mountain yellow-legged frog was recently re-described as two species, the Sierra Nevada yellow-legged frog (*Rana sierrae*), and the southern mountain yellow-legged frog (*Rana muscosa*), and both species together are referred to as the "mountain yellow-legged frog species complex" (Vredenburg et al. 2007). Because the recognition of two species of mountain yellow-legged frogs is recent, most available publications and data use the older nomenclature. In this document, the term "mountain yellow-legged frog", "MYLF" or "frog" refers to both species. This document also uses either the common name or the scientific name when specifically referring to one of the two species.

The Department has contacted affected and interested parties, invited comment on the petition, and requested any additional scientific information that may be available, as required under Section 2074.4, Fish and Game Code.

3. BIOLOGY

3.1. Species Description

Mountain yellow-legged frogs (*Rana sierrae* and *Rana muscosa*) are moderate-sized (ca. 40-95 mm snout-vent length (SVL)) ranid frogs (Figure 1; (Stebbins 2003; Zweifel 1955)). As is common among ranid frogs of western North America, females are larger (up to 95 mm SVL) on average than males (up to 85 mm SVL), and males have swollen darkened thumb bases, termed nuptial pads. Dorsolateral folds are present, but usually not prominent. Both species lack vocal sacs, and have smoother tympana and darker toe tips than the foothill yellow-legged frog (*Rana boylii*), with which they may be confused. The two species of MYLF are similar in appearance, but *R. muscosa* has longer limbs than *R. sierrae*; the morphological feature that best distinguishes the two species is the ratio of the length of the lower leg (fibulotibia) to

Figure 1. Adult mountain yellow-legged frog (*Rana sierrae*) photographed at a lake in Yosemite National Park.

SVL, which is typically ≥0.55 in *R. muscosa*, but <0.55 in *R. sierrae*, though limited overlap exists (Vredenburg et al. 2007).

Figure 2. *Rana sierrae* tadpoles basking in an alpine lake in the Sierra Nevada.

Adult coloration is highly variable, with a dorsal pattern ranging from a few large to many small discrete dark spots within a variably colored mosaic of pale spots of different sizes and shapes. Irregular lichen-like patches (origin of the name "*muscosa*") or a poorly defined reticulum may also exist. Dorsal coloration is usually a mix of brown and yellow, but often with gray, red, or green-brown, and some individuals may be a dark brown with little pattern. The venter and undersurfaces of the hind limbs range in hue from pale lemon yellow to an intense sun yellow, and may include a faint orange tint in the largest individuals. The throat is white or yellow, sometimes with a mottling of dark pigment (Stebbins 2003; Zweifel 1955).

MYLF tadpoles (larvae) are generally dark brown in dorsal coloration, with a faintly yellow venter (Figure 2; (Stebbins 2003)). Tadpole body shape is generally depressed, with a low dorsal fin that originates near the tail-body junction. Tadpoles range in size up to 90 mm total length. A maximum of eight labial tooth rows (2-4 upper and 4 lower) are used to scrape algae from substrates. Labial tooth row numbers increase during tadpole development.

Individual egg size ranges from 1.8-2.6 mm in diameter. Each egg is surrounded by a transparent jelly envelope, with an outside diameter of 6.4-7.9 mm. The jelly envelopes are transparent. Eggs are laid in clumps that may or may not be attached to substrates, and that usually contain 100 to 350 eggs, though small clumps with as few as 10 eggs have been reported (Zweifel 1955). The diameter of egg masses is variable, with the smallest masses being no larger than a walnut and the largest being grapefruit-sized (Stebbins 2003).

3.2. Range and Distribution

The mountain yellow-legged frog is a species complex made up of two species (Vredenburg et al. 2007), the Sierra Nevada yellow-legged frog (*Rana sierrae*) and the southern mountain yellow-legged frog (*Rana muscosa*; see **Section 3.3. Taxonomy** for details). *Rana sierrae* is endemic to the Sierra Nevada of California and adjacent Nevada. The northern extent of its range is north of the Feather River (Butte and Plumas Counties). West of the Sierra Nevada crest, its range extends south to the Monarch Divide and Cirque Crest (Fresno County), and to at least Independence Creek (Inyo County) east of the Sierra Nevada crest. The only known localities in Nevada are those in the sub-range on the east and north-east sides of Lake Tahoe (Carson Range and vicinity). Within the Sierra Nevada, the range of *R. muscosa* extends from the Monarch Divide and Cirque Crest (Fresno County) in the north to Taylor and Dunlap Meadows (Tulare County) in the south. An isolated population also occurred on Breckenridge Mountain (Kern County). In southern California, *R. muscosa* occurred in the Transverse and Peninsular Ranges, including the San Gabriel Mountains (Los Angeles and San Bernardino Counties), San Bernardino Mountains (San Bernardino County), and San Jacinto Mountains (Riverside County). A disjunct population also existed on Mt. Palomar (San Diego County). In the Sierra Nevada, the elevation range historically occupied by *R. muscosa* and *R. sierrae*

extended from approximately 1400 m to 3690 m. In southern California, *R. muscosa* occurred from approximately 250 to 2780 m (Vredenburg et al. 2007; Stebbins 2003;Zweifel 1955).

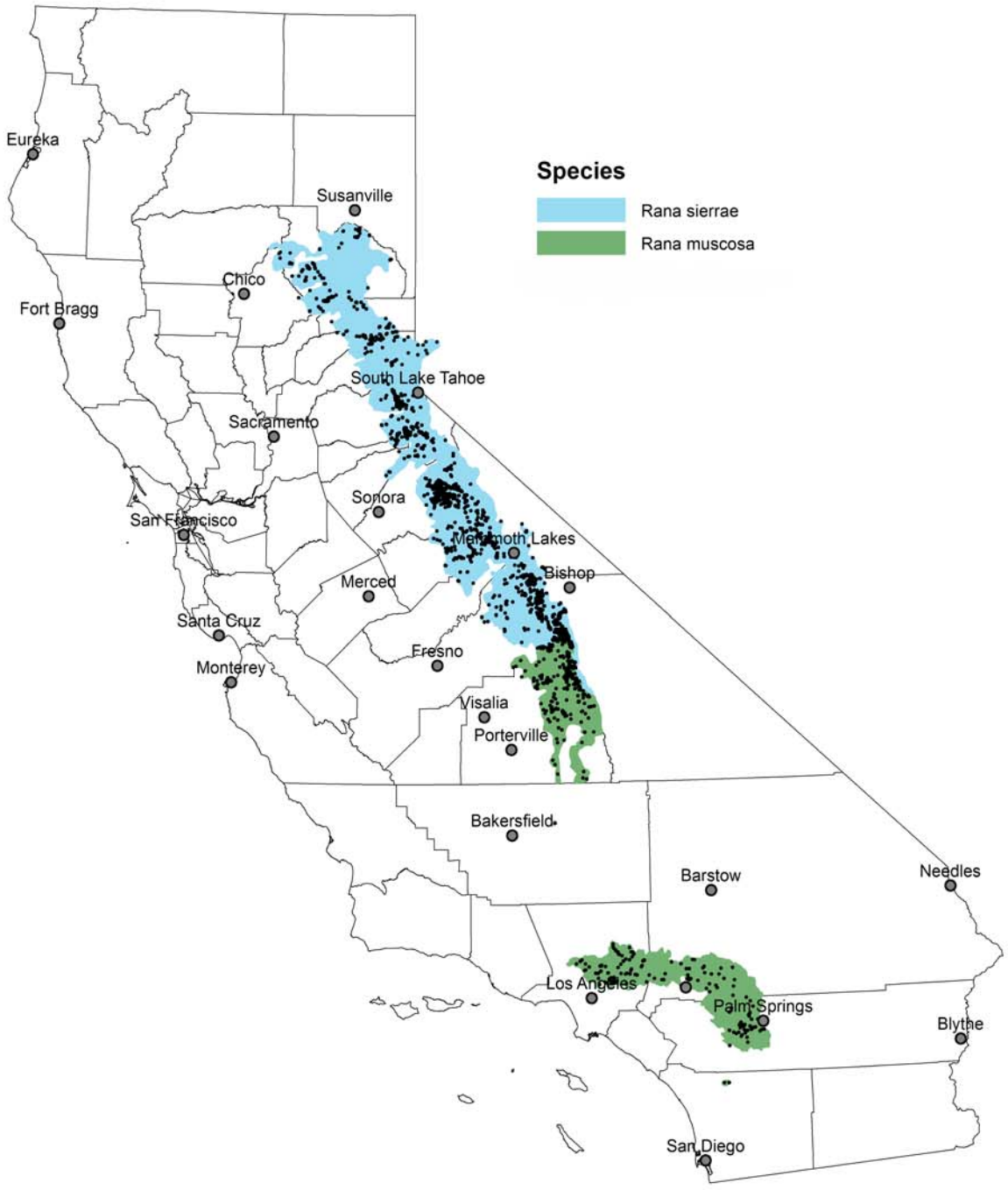
The description of the general historical range of *R. muscosa* and *R. sierrae* was compiled from hundreds of museum specimens collected from many localities, and historic and recent surveys conducted at thousands of sites across the range of both species. However, available collections represent only a fraction of the historic localities, and the majority of surveys were conducted after MYLF had already disappeared from the majority of their native range. As a consequence, the actual historical range remains somewhat uncertain. For the purposes of this status review, it was important to provide the most accurate delineation possible of the native ranges of *R. muscosa* and *R. sierrae,* and to quantify habitat quality for both species across these ranges. A species distribution model for *R. muscosa* and *R. sierrae* using nine climatic and habitat variables and 2,842 historic localities in the species distribution modeling software, MaxEnt (Elith et al. 2011; Phillips et al. 2006), was utilized to provide a quantitative description of the range of both species and their probabilities of occurrence across those ranges (Appendix: Map A1). The model results indicate a close correspondence between the historical records and probability of occurrence for both species (Map 1). In addition to providing a robust description of the native range, the model results will be used guiding future management, including evaluation of potential impacts of land management activities, aid in the prioritization of future MYLF survey efforts, and identify highly suitable locations for future recovery efforts. See **Section 14. Appendix I – MaxEnt Model** for additional information.

3.3. Taxonomy

Mountain yellow-legged frogs are members of the true frog family Ranidae (Macey et al. 2001). Camp (1917) originally described mountain yellow-legged frogs as two subspecies of the foothill yellow-legged frog: *R. boylii sierrae* and *R. boylii muscosa*. Vredenburg et al. (2007) using new molecular (mitochondrial DNA), morphological, habitat, and male advertisement call data, found unequivocal evidence for recognizing two species of mountain yellow-legged frog: *Rana sierrae*, with a distribution in the northern and central Sierra Nevada, and *Rana muscosa*, with a distribution in the southern Sierra Nevada and southern California. The contact zone for the species is in the vicinity of Mather Pass and the Monarch Divide, Fresno County (Vredenburg et al. 2007).

Vredenburg et al. (2007) also identified substantial genetic subdivisions within the two species. *Rana sierrae* is well differentiated into three clades: one that occupies the Feather River drainage; a second that ranges from the Diamond Mountains (Plumas County) to the Ritter Range (Madera County); and a third that ranges from the Merced River (Mariposa County) to the Monarch Divide (Fresno County) and east of the Sierra Nevada crest from the Glass Mountains (Mono County) southward into northern Inyo County. *Rana muscosa* in the Sierra Nevada is differentiated into two clades: one that ranges from south of the Monarch Divide to the headwaters of the Kern River and Mount Whitney (Tulare County), and a second clade restricted to the remainder of the Kern River watershed, overlapping the first clade near Lake South America in the headwaters of the Kern River. A third clade of *R. muscosa* occurs outside the Sierra Nevada in the Transverse and Peninsular ranges of southern California. These subdivisions may be critical to the design of future conservation actions (Vredenburg et al. 2007).

In southern California, nine extant populations inhabit watersheds in three isolated mountain ranges: the San Gabriel (Los Angeles and San Bernardino counties), San Bernardino (San Bernardino County), and San Jacinto mountains (Riverside County). Recent genetic studies



Map 1. Range of *Rana sierrae* (blue) and *Rana muscosa* (green) as determined based on historical occurrence records (black dots) and MaxEnt-based habitat modeling. County boundaries and select cities are provided for reference. See **Section 14. Appendix I – MaxEnt Model** for additional information.

indicate that these populations have extremely low levels of genetic variation within each population and evidence of genetic bottlenecks. Additionally, substantial population structure is evident, suggesting a high degree of historical isolation within and between mountain ranges.Based on estimates from a multi-population isolation with migration analysis, these populations diversified during glacial episodes of the Pleistocene, with little gene flow during population divergence. Analysis of data indicates that, to protect unique evolutionary lineages of *R. muscosa,* each mountain range in southern California should be managed separately (Schoville et al., in review).

3.4. Life History

Life Cycle - MYLF emerge from overwintering sites at spring thaw or snowmelt, and commence breeding soon thereafter. Breeding activities occur earlier (April-May) at lower elevations and progressively later (June-July) at higher elevations (Zweifel 1955). During breeding, females lay a single egg mass that can contain ten to hundreds of embryos. Eggs hatch in approximately 16 to 21 days (Vredenburg et al. 2005).

Following hatching, tadpoles are free-swimming and feed on algae and detritus. Tadpoles actively seek out warm water in near-shore areas, likely increasing growth rate (Bradford 1984), and may form aggregations of hundreds or even thousands of animals (Figure 2). Because of the relatively short growing season characteristic of the high elevation habitats occupied by MYLF throughout the majority of species' range, tadpoles cannot metamorphose into juvenile frogs in a single season. Instead, tadpoles typically require 2-3 summers before metamorphosis, and therefore overwinter 1-2 times (Vredenburg et al. 2005). During these 6-9 month overwintering periods, tadpoles are relatively inactive, feed little, and can tolerate relatively low oxygen conditions (Bradford 1983). However, tadpole mortality may occur during these times if oxygen levels become extremely depleted (e.g., if a pond freezes to the bottom for an extended period) or the habitat dries completely.

In specialized circumstances, MYLF tadpoles can grow more quickly. The Department has observed a tadpole metamorphose into a frog within a single summer in a laboratory setting. At low elevation habitats with long growing seasons, tadpoles may be able to grow sufficiently to metamorphose in a single summer (Storer 1925).

During metamorphosis, tadpoles undergo major morphological changes, including replacing their gills with lungs, resorbing their tails, and developing legs. At the completion of metamorphosis, juveniles are approximately 25-30 mm in size SVL. Mortality at this life stage is high, often exceeding 80% per year (Knapp, unpublished data). Juvenile frogs mature at 3-4 years, typically at approximately 40 mm SVL (Zweifel 1955).

In contrast to the high mortality of juveniles, the annual mortality of adults is often <10% (Briggs et al. 2010; Pope 2001) and adults are long-lived. Skeletochronological analysis indicates that males and females attain ages of at least eight and ten years, respectively (Matthews and Miaud 2007), and even older ages are likely. Given that the tadpole stage can last 2-3 years, the maximum age of MYLF (tadpole + post-metamorphic stages) is likely to exceed 12-13 years. Frogs from lower elevation sites are typically larger at a given age than those from higher elevations, likely indicating slower growth at higher elevations due to shorter growing seasons and colder temperatures (Matthews and Miaud 2007).

During the active season, post-metamorphic frogs maximize body temperatures during a majority of the day by basking in the sun, moving between water and land (depending on which is warmer), and concentrating in the warmer shallows along the shoreline (Pope and Mathews

2001; Mathews and Pope 1999; Bradford 1984). Bradford (1984) found that individuals would bask in the sun on wet soil in the morning, move to shallow water in the afternoon, and then move to deeper water at night. As temperatures decrease in the fall, frogs become less active and move to overwintering habitats (Pope and Mathews 2001; Mathews and Pope 1999; Bradford 1984). In years with exceptionally heavy snow packs, frog populations at high elevations may be active for only about 90 days during the warmest part of the summer.

Habitat Use - Both species are highly aquatic during all times of the year. During the summer season, adults and juveniles remain mostly in water or at the water's edge, and both frogs and tadpoles overwinter underwater (Vredenburn et al. 2005; Bradford 1983). In areas with abundant lentic (stillwater) habitats (e.g., glaciated portions of the Sierra Nevada), frogs occupy lakes, ponds, marshes, and streams at elevations below 3,690 m and reach their greatest densities in relatively large, deeper lakes (Knapp 2005; Knapp et al. 2003). Occupied lentic sites vary widely in habitat conditions, and include lakes in the forested montane zone with conifer-shaded shorelines and abundant downed logs, to lakes above timberline in the alpine zone with exposed rocky shorelines and fringing meadows. In areas where lakes are rare, at lower elevations along the west slope of the Sierra Nevada <2,000 m and in southern California, frogs primarily occupy low to high-gradient streams ranging from chaparral to montane zones (Vredenburg 2000; Zweifel 1955). During warm days throughout the active season, adults and juveniles gather in large numbers utilizing open areas along shorelines to bask and forage (Bradford 1984). Frogs spend most of their time directly at the water-land interface and are rarely found more than one meter away from water. On cold days and at night they move into deeper waters. Tadpoles also utilize the warmest portions of water bodies during the day and deeper areas at night.

Breeding at higher elevations occurs primarily in permanent lakes and ponds deeper than 4 meters (Knapp et al. 2003; Knapp and Mathews 2000). In lower elevation areas, most breeding takes place in low-gradient stretches of perennial streams. These types of habitats are used for breeding because they do not dry up during the summer or freeze to the bottom during winter and provide high-quality habitat for tadpoles (Vredenburg et al. 2005). In the spring, as lakes and streams are becoming ice-free, males attract females to suitable breeding locations with underwater calls (Vredenburg et al. 2007; Zweifel 1955). Egg masses are laid underwater and are typically attached to submerged logs and branches, banks, aquatic vegetation, rocks, or laid on the bottom of the lake or stream. Large numbers of egg masses are occasionally laid in inlet or outlet streams immediately adjacent to lakes (Vredenburg 2002).

Following breeding, frogs move to a wide variety of water bodies to forage, including streams, ephemeral ponds, marshes, and lakes. In late summer frogs leave ephemeral habitats as they begin to dry up and move to permanent water bodies. In the fall, frogs concentrate into deeper lakes and perennial streams in which they overwinter (Pope and Mathews 2001; Mathews and Pope 1999). At high elevations, frogs remain in overwinter habitats under the ice for 6-9 months. Frogs do not feed during the overwintering period but tadpoles forage to some extent (Bradford 1983). Overwintering frogs occupy lake and stream bottoms, banks, near-shore bedrock crevices, and springs.

Movement - Data from adult frogs tagged in both lake and stream habitats suggest that they generally move over a relatively small area and are almost always found in or immediately adjacent to water. During the active season, total movement distances are typically less than a few hundred meters (Vredenburg et al. 2004; Pope and Mathews 2001; Mathews and Pope 1999), but movements of greater than 1 km are known to occur (Pope and Mathews 2001). These movements are typically made by adults moving between breeding, foraging, and

overwintering habitats during the course of each active season. Immediately after ice-out, adults sometimes travel over ice or snow to reach preferred breeding sites (Pope and Mathews 2001; Vredenburg 2002). Following breeding, adults may subsequently move to foraging habitats where they spend the majority of the active season before moving to overwintering habitats. Adults generally use aquatic habitats such as streams to move between these habitats, but can also move considerable distances over dry land (66-400 m)(Mathews and Pope 1999). These movements not only allow utilization of different breeding, feeding, and overwintering habitats, but also allow the re-colonization of sites from which frog populations were extirpated. For example, following the disappearance or active removal of non-native trout from lakes, frogs rapidly recolonized these sites from nearby source populations (Knapp et al. 2007; Knapp et al. 2005; Vredenburg 2004; Knapp et al. 2001).

Diet - While onshore and in shallow water, adults and juveniles feed opportunistically on terrestrial insects and adult stages of aquatic insects (Finlay and Vredenburg 2007; Vredenburg et al. 2005). The relative importance of terrestrial versus aquatic prey may vary between habitats. In alpine habitats in the Sierra Nevada, frog diets were dominated by adult stages of benthic (aquatic bottom dwelling) macroinvertebrates (Finlay and Vredenburg 2007), whereas stream-dwelling frogs in southern California are reported to have a diet heavy in terrestrial invertebrates (Long 1970). Adult frogs have also been observed eating other amphibians, including Yosemite toad tadpoles (*Anaxyrus canorus*) (Mullally 1953) and Sierran treefrog (*Pseudacris sierra*) (Pope and Mathews 2002; Pope 1999; Mullally 1953) and adults are occasionally cannibalistic (Heller 1960).

Presence of amphibian prey, such as the Sierran treefrog, may be an important factor in MYLF selection of active season habitat because anurans may provide highly nutritious food when compared to other available prey. Study results suggest that during summer months some adults actively seek out water bodies that harbor amphibian prey and that amphibian tadpoles provide a nutritious food source that increases the body condition and, therefore, survival of adults (Pope and Mathews 2002).

Tadpoles graze on algae and diatoms along rocky or silty stream, lake, and pond bottoms. Late-stage tadpoles sometimes cannibalize conspecific eggs (Vredenburg 2000), and also feed on the carcasses of dead adults (Vredenburg et al. 2005).

Predators - Historically, MYLF were very abundant across much of their native range, and as such were an important prey item for a diversity of predators. Native vertebrate predators known to prey on MYLF adults, juveniles, and tadpoles include three species of garter snakes; western terrestrial garter snake (*Thamnophis elegans*); common garter snake (*Thamnophis sirtalis*); Sierra garter snake (*Thamnophis couchii*); several bird species (Brewer's blackbird (*Euphagus cyanocephalus*); Clark's nutcracker (*Nucifraga columbiana*); common raven (*Corvus corax*); and at least two mammals (black bear (*Ursus americanus*); coyote (*Canis latrans*)) (Knapp 2005; Mathews et al. 2002; Feldman and Wilkinson 2000; Jennings et al. 1992).

Cannibalism by adults on juveniles and tadpoles has also been observed occasionally (Heller 1960). Some species of large aquatic invertebrates are known to prey on MYLF tadpoles and juveniles, including several species of predacious diving beetles (Family Dytiscidae) and dragonflies and damselflies (Suborder Anisoptera and Zygoptera, respectively) (Feldman and Wilkinson 2000). Predation on eggs is thought to be relatively rare. However, Sierra newts *(Taricha sierrae)* are known to prey on *R. sierrae* egg masses, and cannibalism of eggs by MYLF tadpoles may be a common occurrence in some habitats (Vredenburg 2000).

Introduced rainbow trout (*Oncorynchus mykiss*), golden trout (*O. mykiss* ssp. *aguabonita, gilberti, and whitei*); brook trout (*Salvelinus fontinalis*); and brown trout (*Salmo trutta*) are all known to prey on tadpole and post-metamorphic life stages of MYLF (Vredenburg et al. 2005; Vredenburg 2002; Needham and Vestal 1938; Grinnell and Storer 1924). Vredenburg (2004) confirmed introduced rainbow trout predation on MYLF tadpoles in an experimental field enclosure. Predation by introduced trout species on MYLF has been determined to be an important cause of the decline of MYLF across their historical range (Knapp et al. 2007; Knapp 2005; Vredenburg 2004; Knapp et al. 2003; Knapp and Mathews 2000; Bradford et al. 1993; Bradford 1989).

Several other fish species have also been introduced into the range of MYLF, including golden shiner (*Notemigonus crysoleucas*); Owens tui chub (*Siphateles bicolor snyderi*); largemouth bass (*Micropterus salmoides*); smallmouth bass (*Micropterus dolomieu*); bluegill (*Lepomis macrochirus*); brown bullhead (*Ameiurus nebulosus*); and black bullhead (*Ameirurus melas*) (Moyle 2002). One or more of these species are known to co-occur with MYLF at several locations, but interactions and impacts of warm-water and non-game fishes on MYLF have not been studied.

3.5. Habitat Essential for the Continued Existence of the Species

Several life history characteristics of MYLF make them uniquely adapted to utilize the high elevation portions of the Sierra Nevada and southern California mountains. These characteristics include a multi-year tadpole stage and a long-lived adult stage that is highly aquatic and able to overwinter underwater during extended periods of cold temperatures and snow and ice cover (Vredenburg et al. 2005; Bradford 1983; Zweifel 1955). As a consequence, habitats occupied by both species of MYLF are lakes, ponds, marshes, and streams that are sufficiently deep or have sufficient flow to not dry up during summer months or freeze to the bottom during winter months (Knapp et al. 2003; Knapp and Mathews 2000). Occupancy of these habitats also requires that they contain suitable oviposition sites, deep-water rearing habitats, foraging habitats for post-metamorphic frogs, and basking habitats for tadpoles and post-metamorphic life stages (Pope and Mathews 2001; Bradford 1984; Bradford 1983). In addition, complementary habitats (i.e., breeding, foraging, overwintering) must be connected by habitats (e.g., streams) that allow movement between these habitats. The presence of non-native trout in these habitats renders them largely unsuitable (Knapp et al. 2003; Bradford et al. 1993).

Habitats essential for the continued existence of both MYLF species differ across their historical ranges. In areas of the historical range that are dominated by lentic habitats (e.g., glaciated portions of the Sierra Nevada), the essential habitat for MYLF is trout-free watersheds (or sub-watersheds) that contain a mix of large (>1 ha), deep (> 4 m) lakes, shallow ponds, and wet meadows interconnected with perennial streams (Knapp et al. 2003; Pope and Mathews 2001; Mathews and Pope 1999; Bradford et al. 1993). In unglaciated areas where lotic habitats predominate (e.g., northern, western, and southern-most portions of the MYLF range in the Sierra Nevada, all of the MYLF range in southern California), the essential habitat for MYLF is trout-free watersheds (or sub-watersheds) with an extensive network of low and moderate gradient perennial stream reaches containing deep pools and other key habitat elements necessary for all life stages (Zweifel 1955). For the long-term viability of MYLF, these essential habitats need to be well-represented across the range of both species.

4. SPECIES STATUS AND POPULATION TRENDS

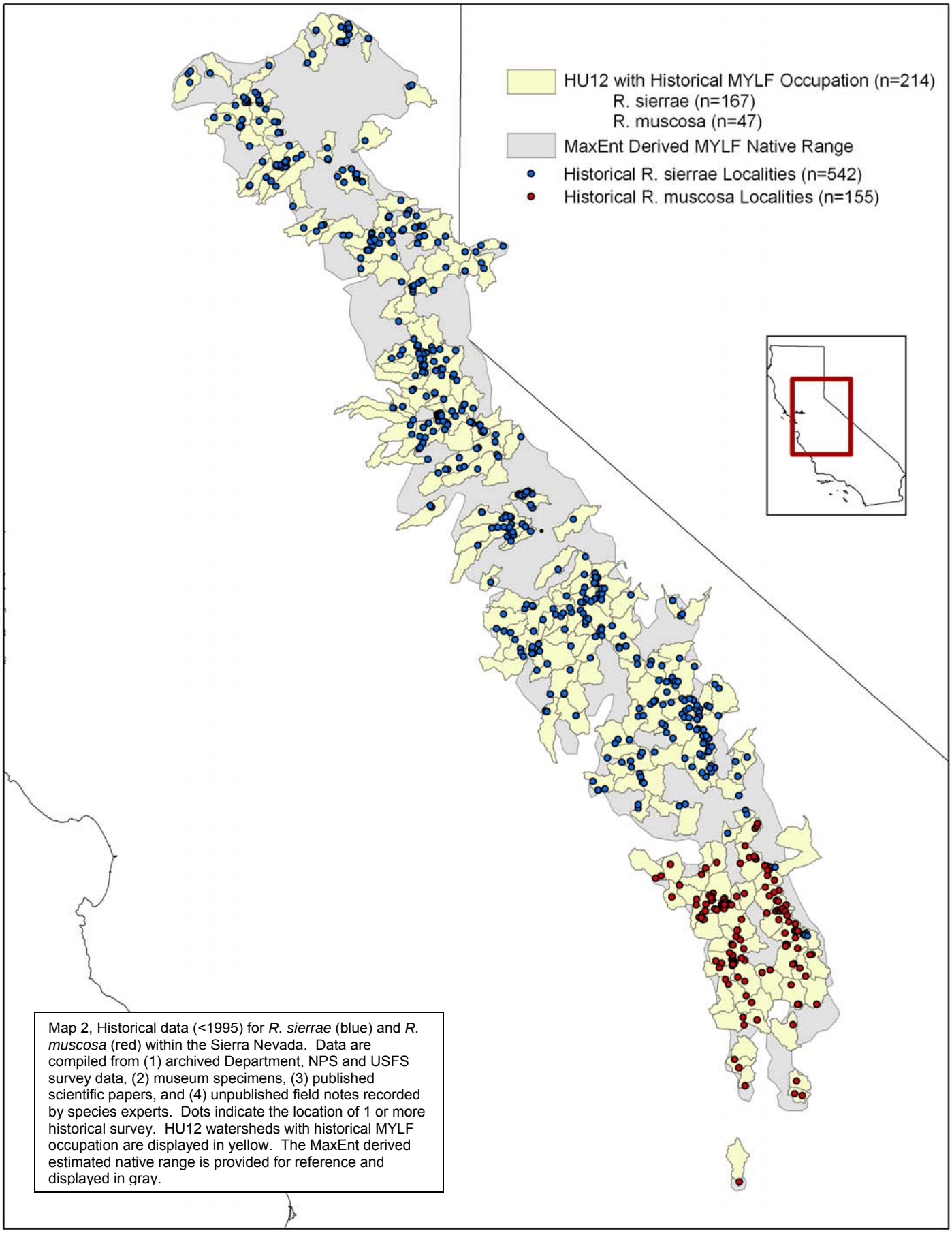
Historically, MYLF were abundant in the Sierra Nevada (California and adjacent Nevada) and the mountain ranges of southern California. During the past century, both species have declined throughout their ranges. These declines are well documented in a series of papers, all of which are consistent in their finding of widespread population extirpations across the ranges of both *R. muscosa* and *R. sierrae* (Knapp 2005; Knapp and Mathews 2000; Bradford et al. 1998; Drost and Fellers 1996; Bradford et al. 1994; Jennings and Hayes 1994; Bradford 1991; Bradford 1989). The most recent and extensively researched estimate of the extent of the species' declines is that provided in Vredenburg et al. (2007). This analysis is based on the results from surveys conducted since 1995 at 225 historical localities derived from museum specimens collected during 1899–1994. Estimates provided by Vredenburg et al. indicate that 92% of historical *R. sierrae* populations (*n*=146) and 96% of *R. muscosa* populations (*n*=79) are now extirpated.

For this status review, the Department developed the most complete data set of MYLF localities compiled to date and used the data set to estimate the range-wide status of MYLF. The Department used the same definitions of historical localities (1899–1994) and recent localities (1995-2010) as those provided by Vredenburg et al. (2007). Historical records were obtained from (1) archived Department, National Park Service (NPS) and USDA Forest Service (USFS) survey data, (2) museum specimens, (3) published scientific papers, and (4) unpublished field notes recorded by species experts. In total, the data set included 2,842 MYLF detections at an estimated 836 unique sites (Maps 2 and 3). Although the data set is large and comprehensive, it is a compilation from several disparate sources and without consistent survey methods. In addition, it contains only positive MYLF detections. These two limitations restrict considerably the comparisons that can that can be made between the historical and recent data sets.

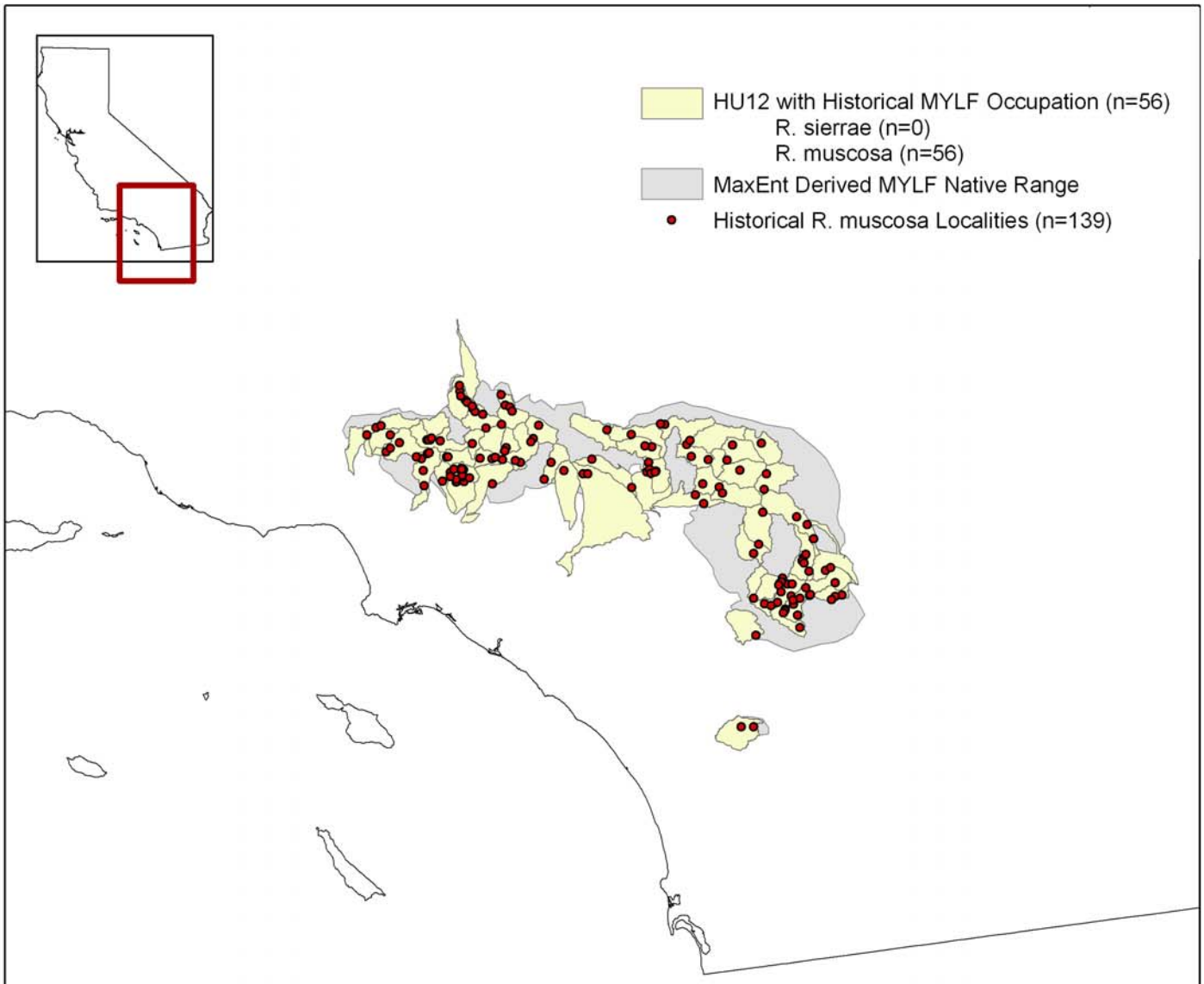
Recent records were compiled from surveys conducted since 1995 by University of California scientists, NPS, USFS, U.S. Geological Survey (USGS), and the Department. In total, over 18,000 surveys across 15,908 locations were included (Maps 4 and 5). In contrast to the historical data set, the recent data were collected using similar standardized protocols and therefore there is consistency between records even when collected by different entities. Furthermore, the data set includes surveys and localities at sites where MYLF have since been extirpated – information that is critically important to describing the current status.

This historical and recent occurrence data set significantly increases the proportion of the ranges of both species covered in the analysis, as compared to Vredenburg (2007). However, one difficulty in comparing these data sets is that the survey method employed, the visual encounter survey (VES), has a less than 100% probability of detecting animals (when they are present). As a result, VES data can underestimate occurrences, and the severity of this bias increases with decreasing detection probability. Fortunately, detection probabilities for MYLF are very high (>80%), minimizing the severity of this bias.

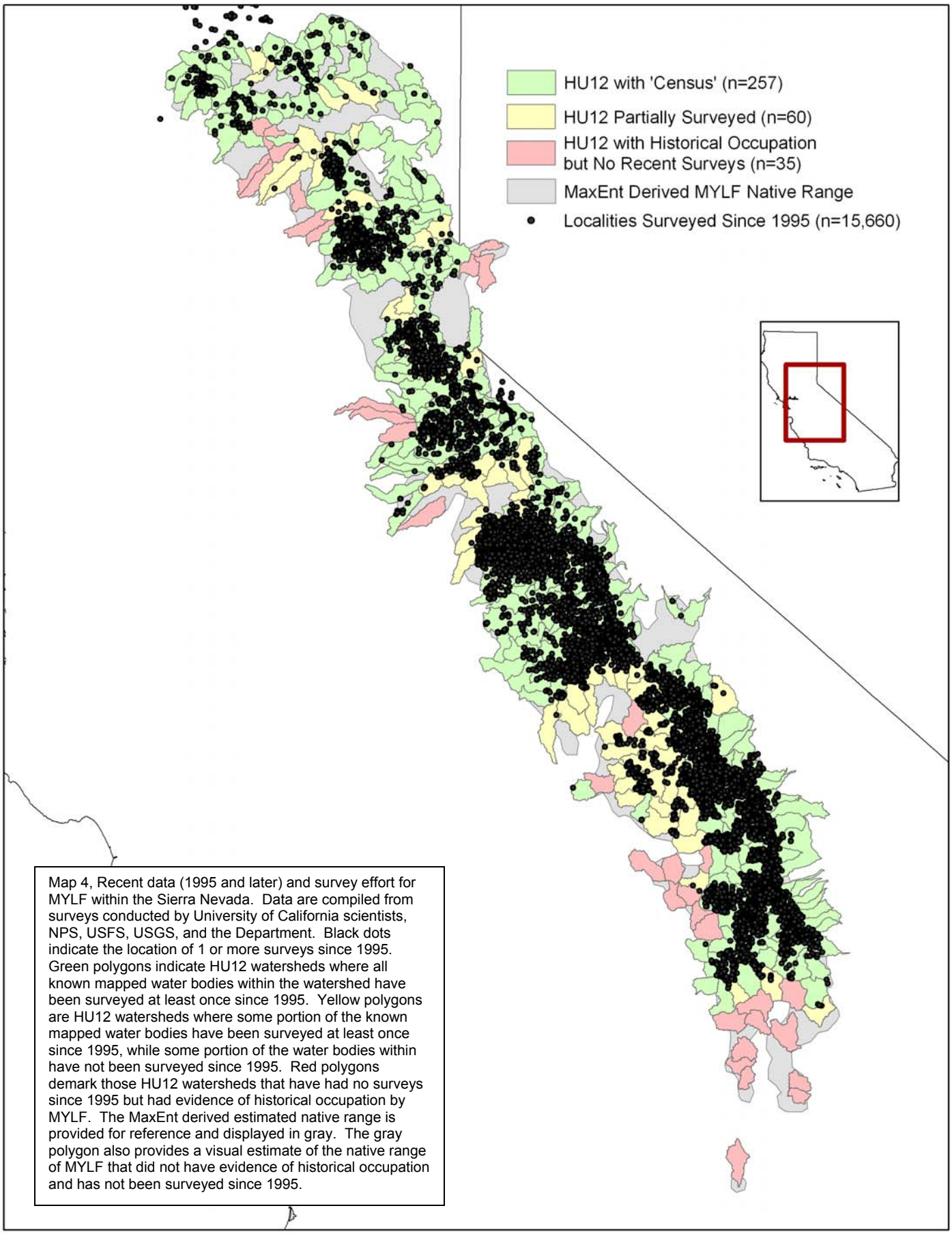
To determine the status and trends of MYLF, the Department analyzed these data at two spatial scales: sites and watersheds. A site is defined as a discrete pond, lake, reservoir, meadow, marsh, spring, or stream reach. For the purposes of this document, these terms are used interchangeably. Watersheds are defined by the USGS HU (Hydrologic Unit) system. The HU system is a standardized designation based on mapped watershed boundaries. For this document, the Department used HU12 watershed boundaries, the smallest standardized unit in the HU system.



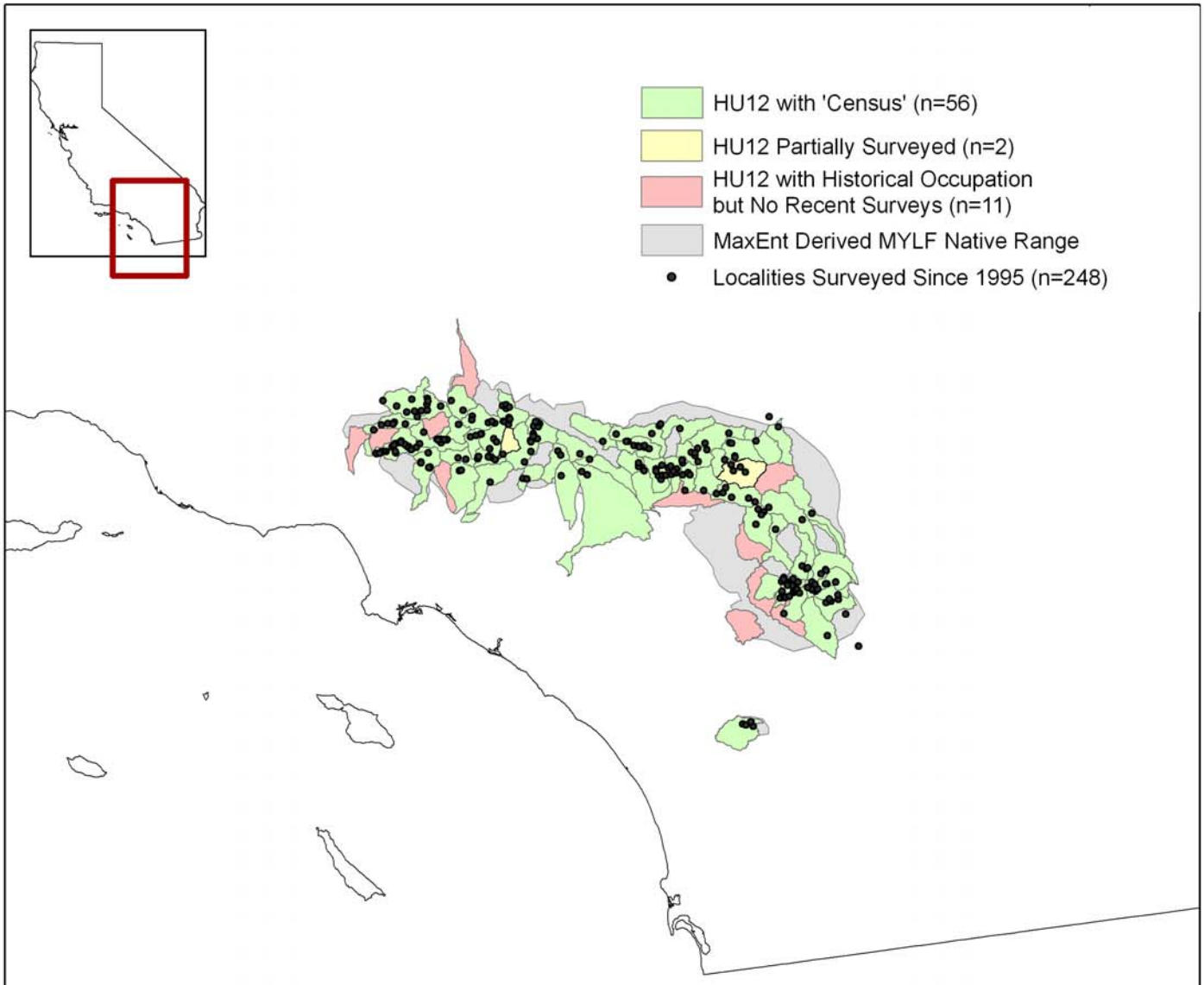
Map 2, Historical data (<1995) for *R. sierrae* (blue) and *R. muscosa* (red) within the Sierra Nevada. Data are compiled from (1) archived Department, NPS and USFS survey data, (2) museum specimens, (3) published scientific papers, and (4) unpublished field notes recorded by species experts. Dots indicate the location of 1 or more historical survey. HU12 watersheds with historical MYLF occupation are displayed in yellow. The MaxEnt derived estimated native range is provided for reference and displayed in gray.



Map 3, Historical data (<1995) for *R. muscosa* within the mountain ranges of southern California. Data are compiled from (1) archived Department, NPS and USFS survey data, (2) museum specimens, (3) published scientific papers, and (4) unpublished field notes recorded by species experts. Dots indicate the location of 1 or more historical survey. HU12 watersheds with historical occupation are displayed in yellow. The MaxEnt derived estimated native range is provided for reference and displayed in gray.



Map 4, Recent data (1995 and later) and survey effort for MYLF within the Sierra Nevada. Data are compiled from surveys conducted by University of California scientists, NPS, USFS, USGS, and the Department. Black dots indicate the location of 1 or more surveys since 1995. Green polygons indicate HU12 watersheds where all known mapped water bodies within the watershed have been surveyed at least once since 1995. Yellow polygons are HU12 watersheds where some portion of the known mapped water bodies have been surveyed at least once since 1995, while some portion of the water bodies within have not been surveyed since 1995. Red polygons demark those HU12 watersheds that have had no surveys since 1995 but had evidence of historical occupation by MYLF. The MaxEnt derived estimated native range is provided for reference and displayed in gray. The gray polygon also provides a visual estimate of the native range of MYLF that did not have evidence of historical occupation and has not been surveyed since 1995.



Map 5, Recent data (1995 and later) and survey effort for MYLF within the mountain ranges of southern California. Data are compiled from surveys conducted by University of California scientists, NPS, USFS, USGS, and the Department. Black dots indicate the location of 1 or more surveys since 1995. Green polygons indicate HU12 watersheds where all known mapped water bodies within the watershed have been surveyed at least once since 1995. Yellow polygons are HU12 watersheds where some portion of the known mapped water bodies have been surveyed at least once since 1995, while some portion of the water bodies within have not been surveyed since 1995. Red polygons demark those HU12 watersheds that have had no surveys since 1995 but had evidence of historical occupation by MYLF. The MaxEnt derived estimated native range is provided for reference and displayed in gray. The gray polygon also provides a visual estimate of the native range of MYLF that did not have evidence of historical occupation and has not been surveyed since 1995.

4.1. Current Status

Recent locality data (collected from 1995 to 2010) were used to determine the status of MYLF localities (extirpated or extant) across as much of the estimated native range as possible. The Department defined a population as extant if animals were observed during the most recent survey at a given locality. A population was defined as extirpated if two or more consecutive surveys did not detect animals at a previously-occupied locality. Maps 6 and 7 display the current status of MYLF in the Sierra Nevada and in the mountain ranges of southern California, respectively. Of the 15,660 sites within 317 HU12 watersheds surveyed in the Sierra Nevada, *R. sierrae* currently occupy 1,199 sites across 94 watersheds. *Rana muscosa* currently occupy 129 localities within 17 HU12 watersheds in the Sierra Nevada and 16 localities across 8 watersheds in the Transverse and Peninsular ranges of southern California.

However, the remaining extant MYLF populations are generally very small. Of the 119 HU12 watersheds with extant MYLF, 106 watersheds had at least one post-metamorphic (adult and juvenile life stages) observed during the latest survey and did not have active fish removal projects. .Only 35 (33%) HU12 watersheds analyzed contain more than 100 post-metamorphic MYLF and 39 (37%) watersheds contained only 10 or fewer post-metamorphic MYLF (Figure 3). These low abundances are in stark contrast to historical accounts that describe MYLF in the Sierra Nevada as extremely abundant (Grinnell and Storer 1924; Mullally and Cunningham 1956).

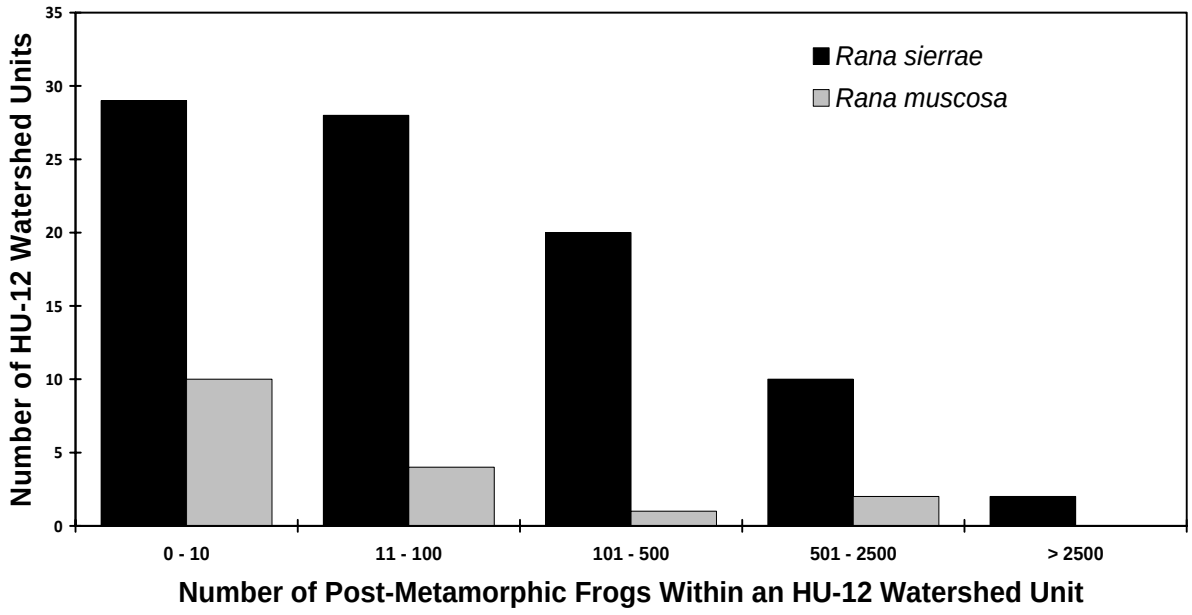
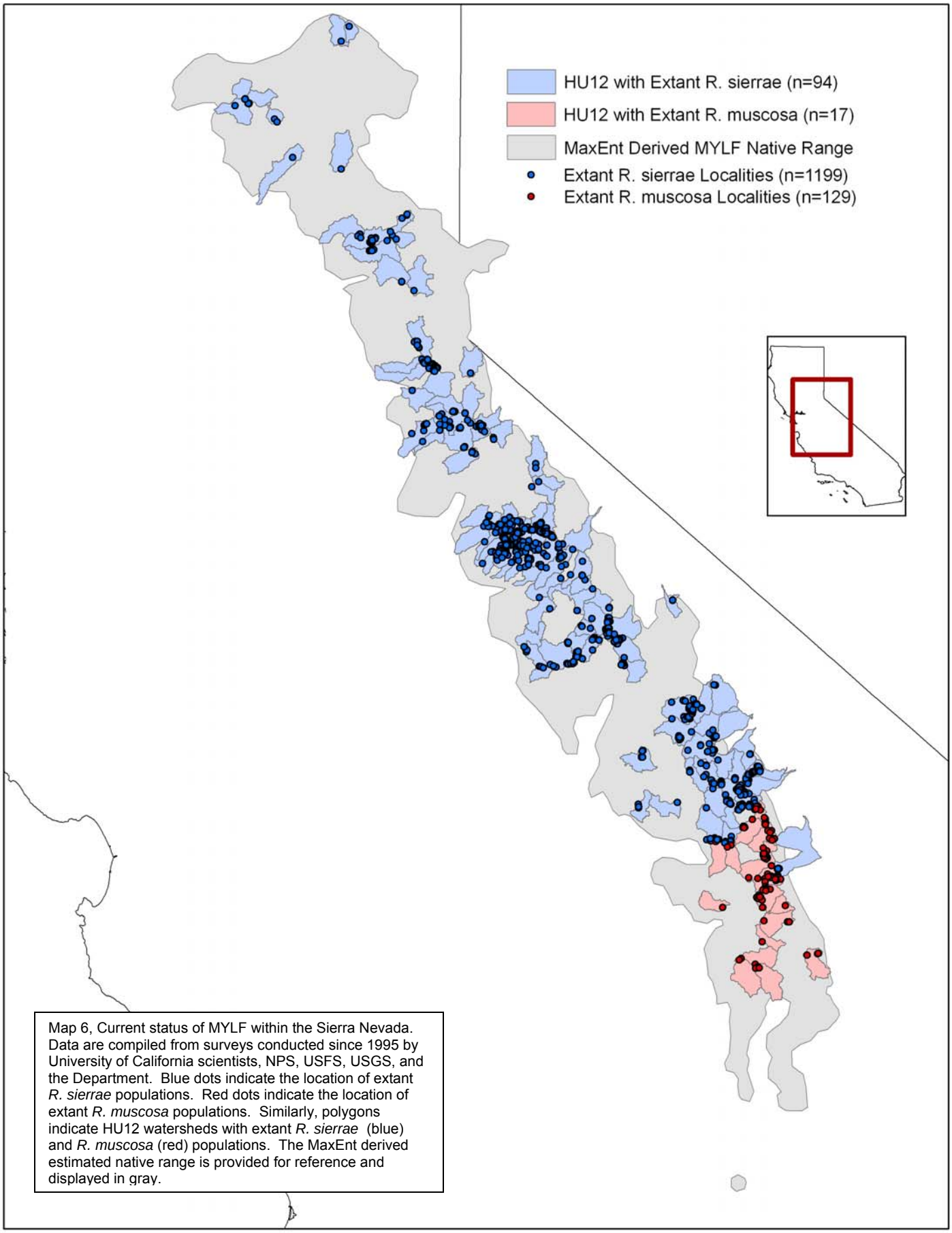


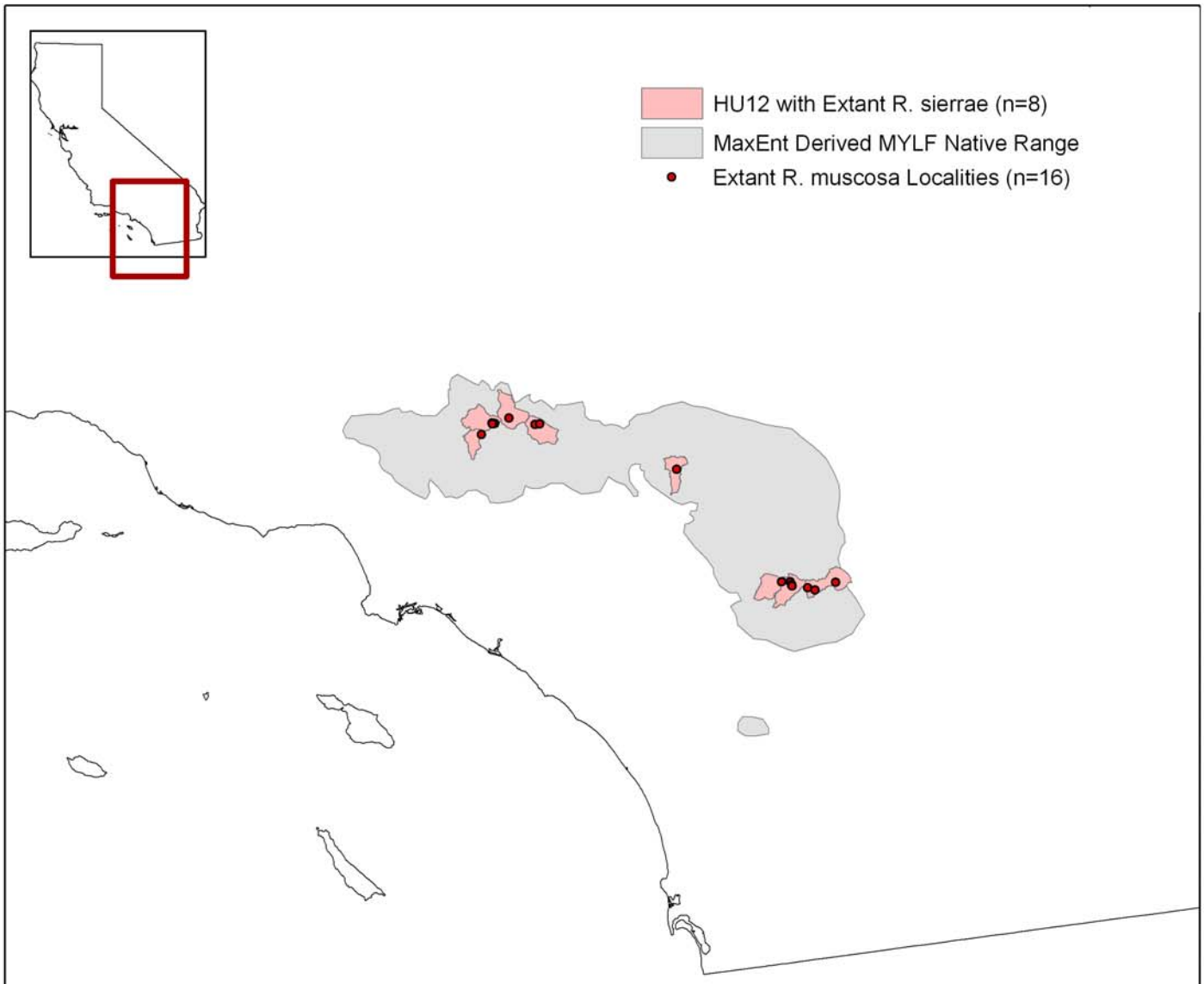
Figure 3, Frequency of five categories of frog population sizes across HU12 watersheds within the range of MYLF and between the years 1995 to 2010. Frog population size is defined as the total number of post-metamorphic frogs within an HU12 watershed. Data are shown separately for *Rana sierrae* and *Rana muscosa*.

4.2. Historical Versus Recent Trends

Recent locality data (collected from 1995 to 2010) were used to determine the status (extirpated or extant) for as many historical localities as possible. The Department defined an extirpated population as one where no MYLF were found within 1 km of the historical locality. Only those historical localities in which all known mapped habitats within 1 km had been surveyed at least once since 1995 were included in the analysis. An important limitation of this analysis is that it only describes the recent status of historical localities, ignoring all MYLF localities found during more recent surveys. Therefore, it is limited in its coverage of the MYLF historical range.



Map 6, Current status of MYLF within the Sierra Nevada. Data are compiled from surveys conducted since 1995 by University of California scientists, NPS, USFS, USGS, and the Department. Blue dots indicate the location of extant *R. sierrae* populations. Red dots indicate the location of extant *R. muscosa* populations. Similarly, polygons indicate HU12 watersheds with extant *R. sierrae* (blue) and *R. muscosa* (red) populations. The MaxEnt derived estimated native range is provided for reference and displayed in gray.



Map 7, Current status of *R. muscosa* within the Transverse and Peninsular ranges of southern California. Data are compiled from surveys conducted since 1995 by University of California scientists, NPS, USFS, USGS, and the Department. Red dots indicate the location of extant *R. muscosa* populations. Similarly, polygons indicate HU12 watersheds with extant *R. muscosa* (red) populations. The MaxEnt derived estimated native range is provided for reference and displayed in gray.

Four hundred and eighty-seven of the 836 historical localities met the requirements. Recent surveys detected at least one extant MYLF population within 1 km of 119 of the 487 (24%) historical localities analyzed. Therefore, 368 (76%) of historical MYLF populations analyzed are now extirpated. Within the Sierra Nevada, 220 of 318 (69%) historical *R. sierrae* localities analyzed and 94 of 109 (86%) *R. muscosa* localities analyzed are currently extirpated (Map 8). Within the mountain ranges of southern California, 48 of 54 (89%) historical *R. muscosa* localities analyzed are extirpated (Map 9).

In addition to comparisons based on individual MYLF localities, historical and recent occupancy was compared at the watershed scale, using USGS HU12-level watersheds. The USGS HU (Hydrologic Unit) system is a standardized watershed designation based on mapped watershed boundaries, and HU12 level is the smallest standardized unit in the HU system. In this analysis, a watershed was defined as occupied based on the presence of one or more historical MYLF localities in the HU12 watershed. Recent watershed-level occupancy was defined likewise, but using the most current occupancy information collected from 1995 to 2010. Any historically occupied watershed with one or more extant MYLF populations was included in the analysis. For MYLF to be considered extirpated, only watersheds that had been completely surveyed since 1995 were included to limit the likelihood of falsely considering MYLF to be extirpated from a watershed with incomplete assessments. Because recent survey efforts generally used a much more thorough approach (i.e., targeted all aquatic habitats in each surveyed HU12 watershed) than did historical efforts, this watershed-level comparison likely underestimates the decline of MYLF at this scale.

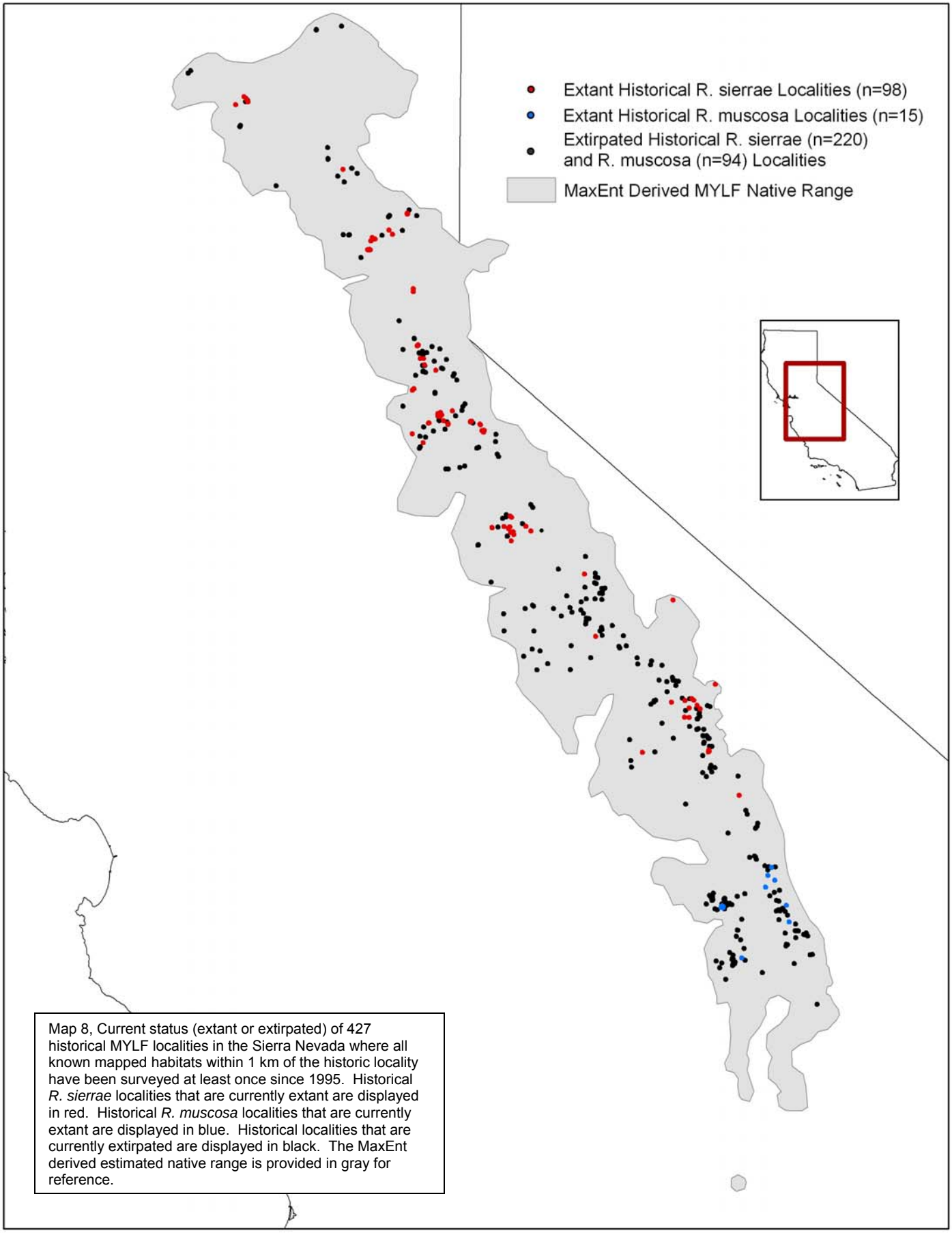
Two hundred and seventy HU12 watersheds were categorized as occupied historically, (Maps 2 and 3) and of these, 194 watersheds met the criteria described above. Of these, 107 watersheds (55%) are no longer occupied by MYLF. Within the Sierra Nevada, 55 of 124 (44%) HU12 watersheds historically occupied by *R. sierrae* and 16 of 27 (59%) watersheds historically occupied by *R. muscosa* no longer have MYLF populations (Map 10). In the mountain ranges of southern California, *R muscosa* are extirpated from 36 of 43 (88%) watersheds that met the above criteria (Map 11).

4.3. Trends Since 1995

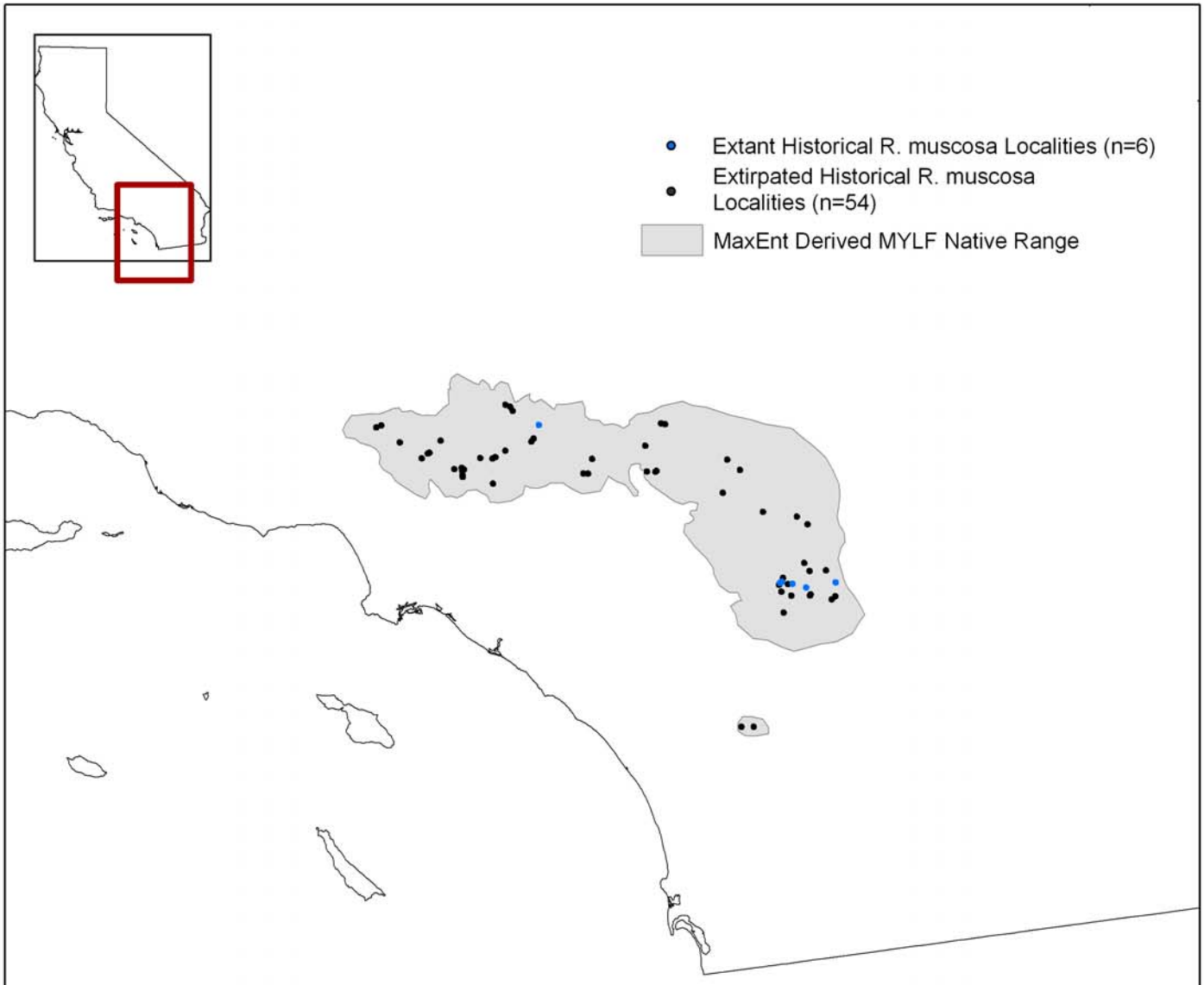
In addition to long-term declines, MYLF populations documented since 1995 have demonstrated recent declining trends. Standardized surveys conducted from 1995 to 2010 were used to describe trends in (1) relative abundance, (2) total number of sites occupied by MYLF, and (3) the average number of sites per HU12 watershed occupied by MYLF.

To evaluate the change in relative abundance of frogs, the Department analyzed data from the subset of sites at which at least two surveys had been conducted since 1995 and were separated by 5+ years, and where MYLF were detected during the earliest and latest surveys. Sites that are part of or influenced by amphibian restoration projects were removed from this analysis. The total number of post-metamorphic frogs detected during the earliest survey at the 481 sites that met the criteria above, was 20,501. The total number of post-metamorphic frogs from the most recent surveys was 16,619, a 19% decline.

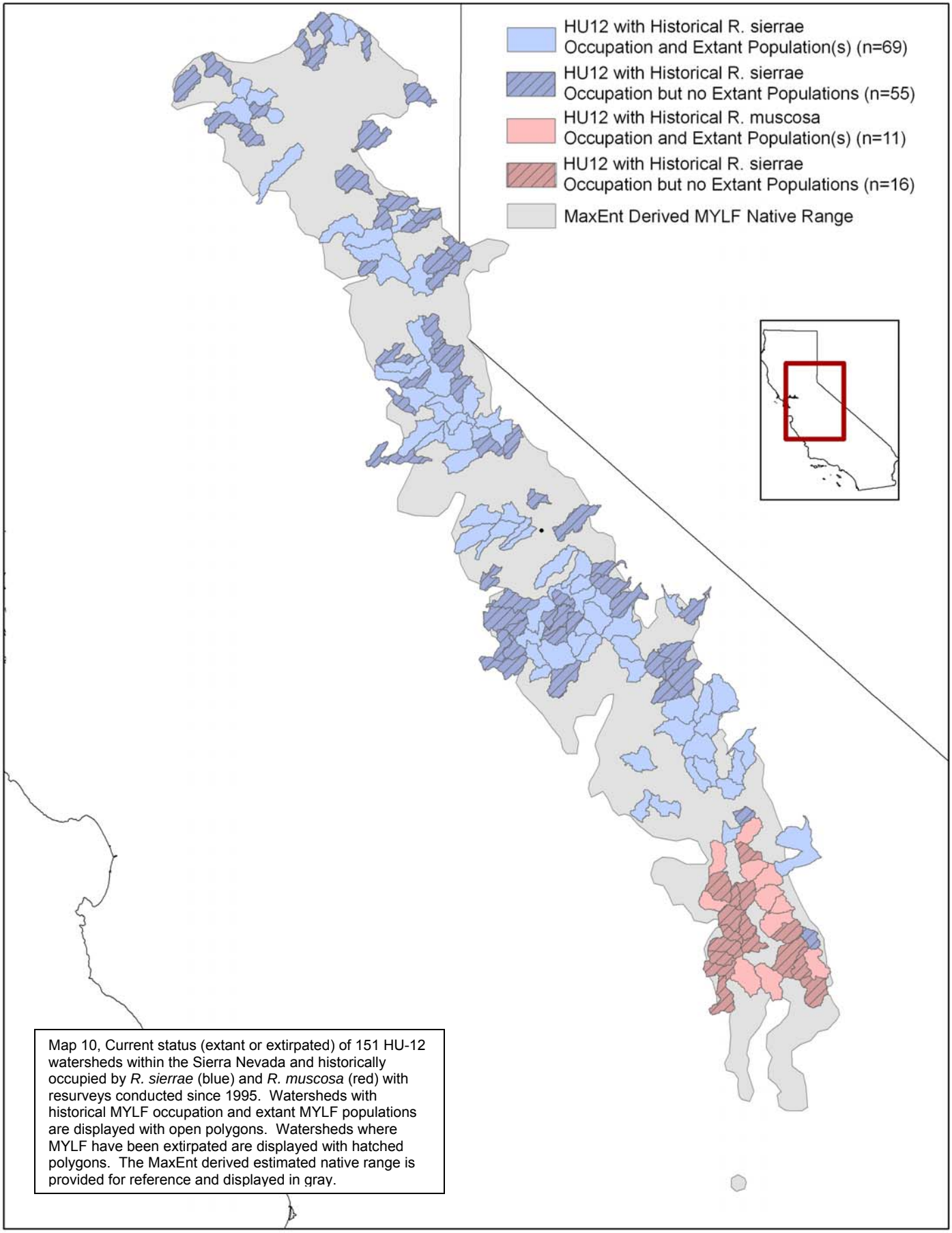
Since 1995, the number of sites occupied by MYLF has decreased. To determine the scope of the decline, 1,050 sites where multiple surveys at least five years apart and MYLF were observed in the earliest survey were chosen. During the most recent survey of these sites, MYLF were not detected at 569 sites, indicating a maximum decline of 54% in the number of sites occupied by MYLF. *Rana muscosa* again had the steeper decline, 81% (n=265) compared to 45% decline for *R. sierrae* (n=785).



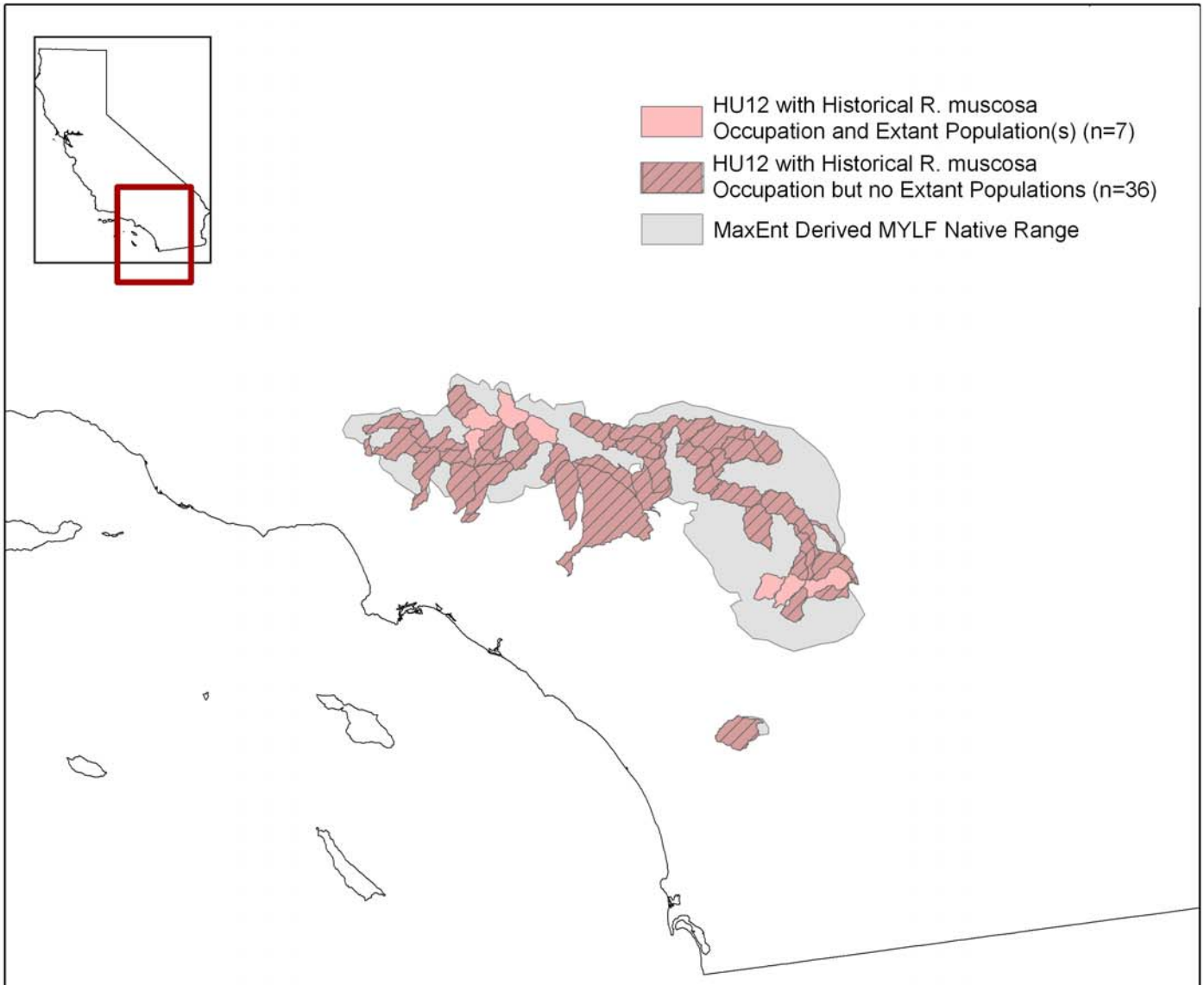
Map 8, Current status (extant or extirpated) of 427 historical MYLF localities in the Sierra Nevada where all known mapped habitats within 1 km of the historic locality have been surveyed at least once since 1995. Historical *R. sierrae* localities that are currently extant are displayed in red. Historical *R. muscosa* localities that are currently extant are displayed in blue. Historical localities that are currently extirpated are displayed in black. The MaxEnt derived estimated native range is provided in gray for reference.



Map 9, Current status (extant or extirpated) of 60 historical MYLF localities in the Transverse and Peninsular ranges of southern California where all known mapped habitats within 1 km of the historic locality have been surveyed at least once since 1995. Historical *R. muscosa* localities that are currently extant are displayed in blue. Historical localities that are currently extirpated are displayed in black. The MaxEnt derived estimated native range is provided in gray for reference.



Map 10, Current status (extant or extirpated) of 151 HU-12 watersheds within the Sierra Nevada and historically occupied by *R. sierrae* (blue) and *R. muscosa* (red) with resurveys conducted since 1995. Watersheds with historical MYLF occupation and extant MYLF populations are displayed with open polygons. Watersheds where MYLF have been extirpated are displayed with hatched polygons. The MaxEnt derived estimated native range is provided for reference and displayed in gray.



Map 11, Current status (extant or extirpated) of 43 HU-12 watersheds within the Transverse and Peninsular mountain ranges of southern California historically occupied by *R. muscosa* with resurveys conducted since 1995. Watersheds with historical MYLF occupation and extant MYLF populations are displayed with open polygons. Watersheds where MYLF have been extirpated are displayed with hatched polygons. The MaxEnt derived estimated native range is provided for reference and displayed in gray.

Many currently occupied watersheds contain only a single extant MYLF population, occupying one to several adjacent water bodies. Evaluating the subset of sites at which at least two surveys had been conducted since 1995 and were separated by 5+ years, and where MYLF were detected during the earliest and latest surveys; the average number of MYLF occupied sites within MYLF occupied watersheds declined by 31% since 1995 (from an average of 12.34 to 8.37 sites per HU12). Once again, *R. muscosa* demonstrated a larger decline (71%; from an average of 22.00 to 6.46 sites per HU12) than did *R. sierrae* (19%; from an average of 10.73 to 8.69 sites per HU12). A portion of those losses were extirpations from entire watersheds. For instance, the 1,123 sites used for this analysis were distributed across 90 HU12 watersheds, whereas 80 watersheds were occupied during the most recent survey, an 11% decline in the number of occupied watersheds.

5. FACTORS AFFECTING ABILITY TO SURVIVE AND REPRODUCE

5.1. Predation and Competition from Non-native Trout

Predation by introduced trout is a well-documented cause of the decline of MYLF in the Sierra Nevada (Knapp et al. 2007; Vredenburg 2004; Knapp et al. 2003; Knapp and Mathews 2000; Bradford et al. 1998; Bradford et al. 1993; Bradford 1989). Until the mid-1800s, fish were absent from nearly all high elevation habitats in California (Moyle 2002; Knapp 1996; Moyle et al. 1996) (Map 12). Stocking trout into high elevation lakes became a common practice during the early 1900s (Knapp 1996) and targeted larger, perennial lakes and streams. As a result, 87% (n=450) of these historically fishless lakes that are 4 hectares (10 acres) or larger in surface area and 3 meters deep (10 feet) or deeper currently have introduced trout populations (Department unpublished data).

Map 12. Historical distribution of native trout species in California. Prior to the beginning of trout stocking in the late 1800s, trout occupied the colored area. The area shown in white lacked any trout species (Department, unpublished data).

Because of their need to overwinter underwater, MYLF and trout are both typically restricted to large, deep water bodies. However, the majority of lentic water bodies within the Sierra Nevada are relatively small and shallow (Figure 4). Therefore, the critical habitat necessary for both MYLF and trout to overwinter is relatively uncommon. With the widespread introduction of non-native trout, nearly all large, deep lakes that could provide suitable overwintering habitat for MYLF are now occupied by introduced trout (Figure 4).

Introduced trout are significant predators on MYLF (Needham and Vestal 1938; Grinnell and Storer 1924), and have also prevented the re-colonization of locally depleted or extirpated frog populations by severing dispersal corridors (Bradford et al. 1993). For example, based on surveys of more than 1,700 water bodies, MYLF were much more common in Kings Canyon National Park where a lower proportion of lakes contain trout, than in the adjacent John Muir Wilderness where trout occupy most lakes. After accounting for effects of habitat, frogs were three times more likely to be detected and six times more abundant in fishless than in fish-containing water bodies (Knapp and Mathews 2000).The same negative effect of trout on MYLF has been reported for lower elevation lakes in Yosemite National Park (Knapp 2005). Co-occurrence of trout and breeding populations of MYLF is rare and is associated with

low trout density (Department, unpublished data; Knapp, unpublished data) and the availability of habitat features that limit trout access to frogs (e.g., shallow lagoons) (Bradford et al. 1998).

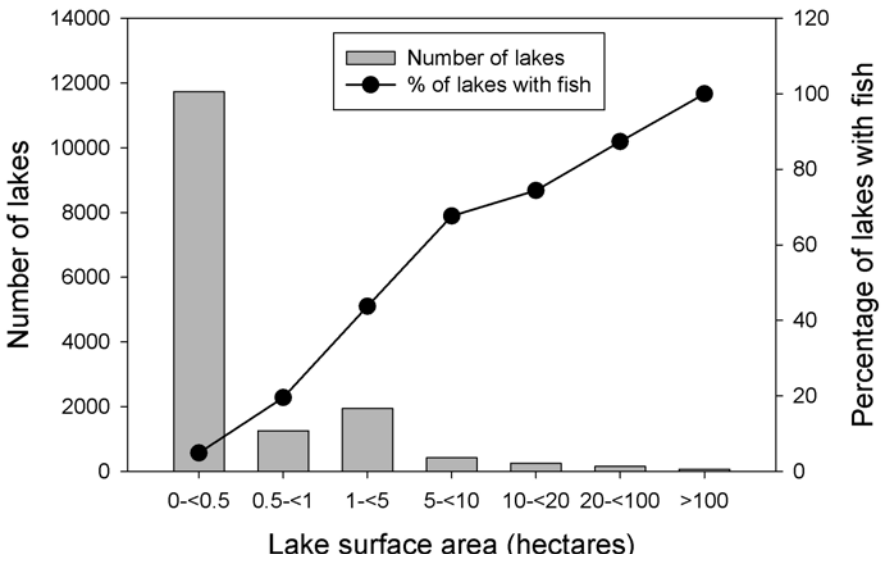


Figure 4. Within the range of MYLF in the Sierra Nevada, the total number of lakes (left y-axis) and the percentage of these lakes that are occupied by fish (right y-axis), as a function of lake surface area (Department, unpublished data).

Some of the strongest evidence of a negative effect of trout on MYLF is provided by recent trout removal experiments and agency-implemented management efforts (Knapp et al. 2007; Vredenburg 2004; Deparment, unpublished data; Sequoia-Kings Canyon National Park, unpublished data). Vredenburg (2004) and Knapp et al. (2007) removed trout from selected lakes in the Sierra Nevada using gill nets (Knapp and Mathews 1998) and compared MYLF populations at these sites with those in adjacent fish-containing control lakes. In both studies, after fish were removed, the number of tadpoles and post-metamorphic frogs increased dramatically and increases were significantly greater in fish-removal lakes than in fish-occupied control lakes. Similar increases have resulted from fish eradication/frog restoration projects conducted by the Department, U.S. Forest Service, and National Park Service across the range of the MYLF (see **Section 7.3. Removal of Non-native Trout Populations**, for details).

In addition to direct predation on MYLF, introduced trout may also have secondary effects on MYLF populations. Bradford et al. (1993) showed that trout introductions into aquatic habitats in the Sierra Nevada have markedly decreased the degree of connectivity between MYLF populations. Therefore, the presence of trout has caused the isolation of remaining frog populations, thereby increasing their vulnerability to extirpation even in fishless water bodies Knapp et al. 2003. Habitat fragmentation reduces the chances that sites formerly occupied by MYLF will be re-colonized in the future (see **Section 5.3. Habitat Degradation and Fragmentation**, for details).

Trout are also competitors for the same invertebrate species that MYLF rely on for food (e.g., terrestrial invertebrates and adult stages of aquatic insects). In Sierra Nevada lakes, large, conspicuous invertebrate taxa are rare or absent in trout-containing lakes but are relatively common in lakes without trout (Knapp et al. 2005; Knapp et al. 2001; Bradford et al. 1998). In addition, studies have reported that the invertebrate communities in fish-containing lakes recover to closely resemble those in fishless lakes following trout disappearance (Knapp et al. 2005; Knapp et al. 2001). The direct impacts of trout predation on invertebrates can have a negative effect on frogs via competition for invertebrate prey (Finlay and Vredenburg 2007) and

can alter lake nutrient cycles (Sarnelle and Knapp 2005; Schindler et al. 2001) resulting in negative impacts to frogs and other native species.

In summary, introductions of non-native trout were historically widespread throughout the geographic range of MYLF and have played a major role in the decline in the Sierra Nevada, as demonstrated by both correlative and experimental studies. Trout introductions have been one of the prime causes of local MYLF extirpations and have precluded successful re-colonization of habitats where MYLF extirpations occurred historically even in the absence of fish.

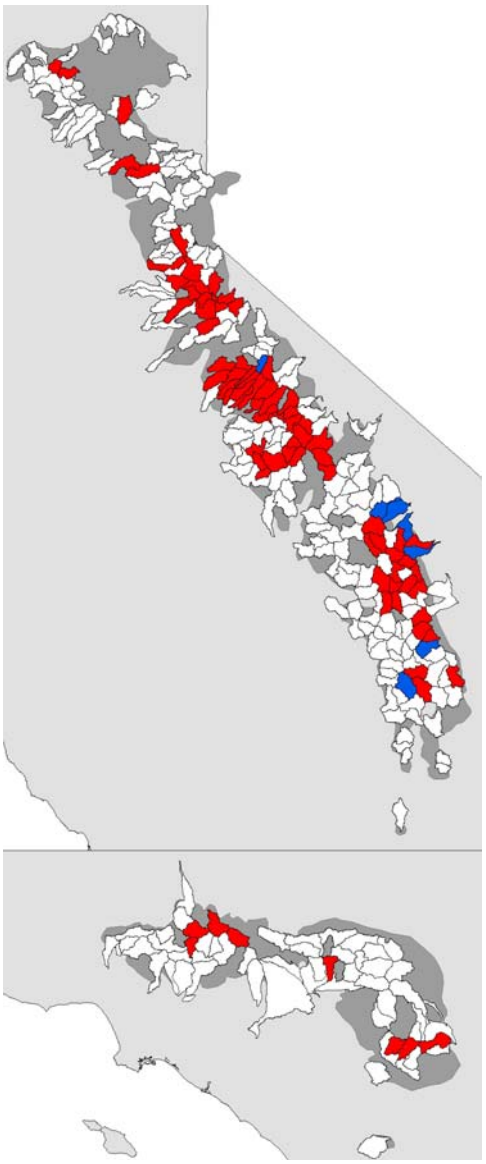
5.2. Disease

Amphibians are susceptible to a wide variety of diseases. Of known diseases affecting MYLF populations, the one of greatest conservation concern is chytridiomycosis (Skerratt et al. 2007), an amphibian-specific disease caused by the amphibian chytrid fungus, *Batrachochytrium dendrobatidis* (Bd) (Longcore et al. 1999; Berger et al. 1998). Bd is a waterborne fungus with a simple life cycle in which a free-swimming zoospore encysts into keratinized amphibian tissues (i.e., mouthparts of tadpoles, skin of post-metamorphic frogs) and develops into a zoosporangium. Zoospores are subsequently produced inside the zoosporangium and are released back into the aquatic environment via a discharge tube (Rosenblum et al. 2010). Chytridiomycosis generally has much stronger negative effects on post-metamorphic frogs than on tadpoles. Infection in tadpoles produces only mouthpart deformities (Knapp and Morgan 2006) but infection in post-metamorphic animals can severely disrupt critical skin functions, such as osmoregulation (Voyles et al. 2007).

Bd was first described in 1999 (Longcore et al. 1999) and has since been linked to the decline or extinction of hundreds of amphibian species worldwide (Skerratt et al. 2007). Retrospective analyses of museum specimens indicate its presence in Africa and Asia in the early 1900s (Weldon et al. 2004) and its subsequent spread to other continents in the following decades. Bd first appeared in California during the early 1960s and is now widespread across the state (Padgett-Flohr and Hopkins 2009). All populations of *R. muscosa* in southern California are infected with Bd. In Yosemite National Park, more than 80% of all *R. sierrae* populations tested positive for Bd (Knapp, in review). MYLF are highly susceptible to chytridiomycosis, and results from several studies indicate unequivocally that Bd is a major contributor to declines observed since the 1970s (Briggs et al. 2010; Vredenburg et al. 2010; Rachowicz et al. 2006).

The arrival of Bd in a MYLF population typically results in rapid increases in disease prevalence and infection intensity, eventually resulting in mass frog die-offs that nearly always cause the extirpation of populations. Following its initial arrival in three widely separated frog metapopulations (two *R. muscosa* metapopulations, one *R. sierrae* metapopulation) in the southern Sierra Nevada Vredenburg et al. (2010) determined that in all three metapopulations, following arrival of Bd in an individual frog population, prevalence and infection intensity increased exponentially and eventually caused population crashes. Bd spread from population to population at a rate of approximately 1 km per year. Within 1-4 years of its initial detection, Bd had spread across all frog populations and reduced the total number of frogs in each metapopulation by more than 90%.

Despite the negative effects of Bd on MYLF, not all populations are driven to extirpation following Bd outbreaks. Although more than 90% of frog populations that experience Bd outbreaks are eventually extirpated, some populations survive the initial population crash and persist despite ongoing chytridiomycosis (Briggs et al. 2010; Briggs et al. 2005). Most of these persistent populations exist at relatively low densities, but densities in some populations have recovered to levels approaching those of Bd-negative populations (Knapp, unpublished data). It



Map 13. Map of the HU12 watershed units within the historical MYLF range in the Sierra Nevada (top) and southern California (bottom), showing the current distribution of Bd in MYLF populations. Red: at least one sampled frog population was Bd-positive; blue: all sampled populations were Bd-negative; gray: populations were not sampled so Bd status is unknown; white: no MYLF populations exist.

remains unclear what factors allow some frog populations to persist despite chytridiomycosis, but results from a recent experiment (Briggs, unpublished data) indicate that MYLF from persistent populations are less susceptible to chytridiomycosis than are MYLF that have never been exposed to Bd.

Large scale sampling and monitoring efforts are underway to determine the distribution of Bd across the range of MYLF. Resulting data show that Bd is present in at least one MYLF population in all but seven of the HU12 watersheds that have extant MYLF populations (Map 13).

At present, few effective measures against chytridiomycosis exist, but the development of such interventions is the subject of intense research. Increasing evidence indicates that removing other stressors from Bd-positive frog populations can produce benefits despite ongoing chytridiomycosis. For example, Little Rock Creek on the Angeles National Forest is one of only a few remaining *R. muscosa* populations in southern California. This population is Bd-positive and in 2000 contained 5-15 adult frogs. In 2002, an effort was initiated to remove non-native trout from this stream segment and was completed in 2010. Since the initiation of the project, the *R. muscosa* population increased to over 50 adults, and is now the largest remaining population in southern California (Backlin, unpublished data). Similar responses by Bd-positive *R. sierrae* populations have been observed in Yosemite and Kings Canyon National Park following trout removal (Sequoia-Kings Canyon National Park, unpublished data; Yosemite National Park, unpublished data).

In summary, chytridiomycosis is a major threat to the survival of MYLF across their historic range. Despite the severe effects of this disease, management actions that remove other stressors can increase the likelihood that MYLF populations will persist despite the presence of chytridiomycosis.

5.3. Habitat Degradation and Fragmentation

Direct habitat loss has had a comparatively minor impact on MYLF because much of the range of these species is on relatively undisturbed federal lands, including extensive high elevation areas within national forest wilderness areas and national parks. However, the creation of reservoirs within the MYLF range has caused localized loss of habitats, and these losses could have negatively affected some populations. Habitat loss has also occurred as a consequence of intensive livestock grazing, as discussed in **Section 5.6. Other Risk Factors**.

The introduction of non-native fish species, especially trout, has reduced the amount of habitat available to MYLF and served to isolate and fragment remaining MYLF populations (Knapp et al. 2003; Bradford et al. 1993). Adult frogs may occasionally be observed in waters that also contain trout however tadpoles and juvenile frogs are susceptible to fish predation and rarely observed in fish-occupied streams and lakes. For this reason, trout presence can restrict frog movement between populations, or to suitable habitats (Bradford et al. 1993).

Although nearly all streams and rivers within the MYLF range were naturally fishless, the majority now contain one or more species of non-native trout. Table 1 provides estimates of the percent of trout-bearing and trout-free perennial streams in representative drainages within Yosemite National Park (YOSE), Sequoia-Kings National Park (SEKI), and the John Muir Wilderness (JMW). These five drainages were all naturally fishless, but now have one or more trout species in 40-63% of streams. These trout populations reduce the chance of MYLF occupancy of these streams, and preclude movement by MYLF between most remaining populations.

Table 1: For five example drainages, the percentage of stream length (km) that is occupied by trout or that remains in the original fishless condition.

Location	Drainage	Fish (km)	Fishless (km)	%Fish	%Fishless
YOSE	Tuolumne River	1125	664	63	37
SEKI	Palisade Creek	26	39	40	60
SEKI	Upper Kern River	54	40	57	43
JMW	Piute Creek	54	32	63	37
JMW	Mono Creek	77	95	45	55

To further examine this relationship, an analysis of the distribution of introduced trout in relation to extant *R. sierrae* populations (occupation documented at least once since 1995) was conducted for the headwaters of Mono Creek (Sierra National Forest, Fresno County). Nearly all mapped perennial streams (172 km) and lakes in the Mono Creek watershed were surveyed for fish and amphibians by the Department. Trout occupy all of the larger stream segments, and only the headwater portions typically remain fishless (Map 14A).

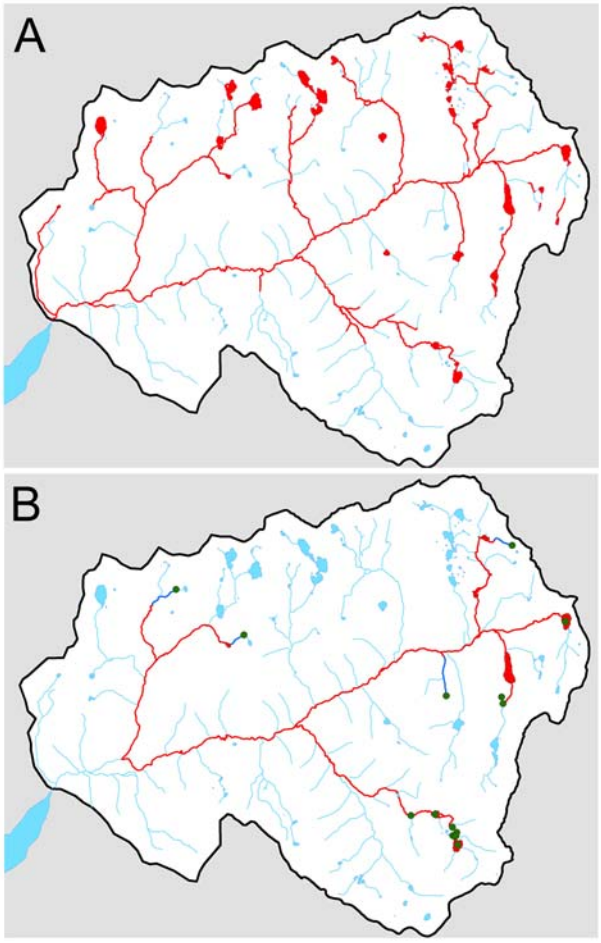
The current distribution of trout in the Mono Creek watershed has isolated the remaining MYLF populations. Map 14B shows the trout distribution in stream segments that connect the remaining MYLF populations in this watershed. The total length of stream connecting MYLF populations is 40.6 km, 37.4 km (92%) of which is occupied by trout. Given the current trout distribution, it is difficult for MYLF to move between existing populations, and the remaining isolated populations (Bradford et al. 1993) are consequently more vulnerable to extirpation from random events such as prolonged drought, severe winters (Bradford 1983), or disease outbreaks. As extirpations of MYLF populations continue, this will further isolate populations and make MYLF more vulnerable to extirpation from entire watersheds.

5.4. Airborne Contaminants

Exposure to atmospherically transported pesticides from the Central Valley of California is one of the oldest hypotheses to explain the population declines of MYLF (Drost and Fellers 1996). This hypothesis stemmed initially from observations that frogs had disappeared from remote and largely undisturbed locations in national parks and wilderness areas that lie downwind of the Central Valley, one of the most intensively cultivated areas in the world (Davidson 2004). Both historic- and current-use pesticides have been found across the elevation range of these

frog species, and have been detected in samples of air, rain, snow, surface water, lake sediment, vegetation, amphibians, and fish (Hageman et al. 2006; Fellers et al. 2004; LeNoir et al. 1999; McConnell et al. 1998; Cory et al. 1970). Recent studies indicate that the Central Valley is indeed the primary source of pesticides to the high elevation Sierra Nevada during both winter and summer (Bradford et al. 2010a).

Pesticides can affect amphibian populations via either direct effects such as mortality, or indirect effects such as increased susceptibility to predation or disease. Evidence that airborne contaminants have contributed to MYLF population declines derives from two types of studies. First, occurrence of these species is negatively related to estimated upwind pesticide use (Davidson and Knapp 2007; Davidson 2004). Second, frog population persistence was negatively related to pesticide levels in water and tissue of *R. muscosa* adults (Fellers et al. 2004) and a bioindicator of pesticide exposure (Sparling et al. 2001).



Map 14. (A) Presence (red) or absence (light blue) of non-native trout in lakes and streams in the Mono Creek watershed. 77 km of stream (45%) contain trout and 95 km of stream (55%) remain in their original fishless condition. (B) Isolation of remaining MYLF populations (green dots) caused by the presence of non-native trout. Stream reaches between MYLF populations that contain trout are shown in red (37.4 km, 92%), and stream reaches between MYLF populations that lack trout are shown in dark blue (3.2 km, 8%).

Previous pesticide-related studies contained unvalidated estimates of pesticide exposure (Davidson and Knapp 2007; Davidson 2004) and pesticide measurements were made at a small number of sites (Fellers et al. 2004). In a recent study, concentrations of both historic- and current-use pesticides were measured over a wide area in the southern Sierra Nevada, and resulting pesticide concentrations were compared with the population status of *R. muscosa* and *R. sierrae* in the vicinity of each site (Bradford et al. 2011). Analysis of the results demonstrated no association between frog population status and measured pesticide concentration. Additionally, pesticide concentrations in this and previous studies have consistently indicated very low concentrations in water and tissue from Sierran treefrog tadpoles from the high-elevation portion of the MYLF range (Bradford et al. 2010a; Bradford et al. 2010b), and these values are well below the concentrations toxic to amphibians (Bradford et al. 2011). Bradford et al. (2011) concluded that there is little support for the hypothesis that airborne pesticides have contributed to population declines of MYLF.

In addition to pesticides, mercury and nitrogen are airborne contaminants of potential concern in the Sierra Nevada. Mercury concentrations in brook trout (*Salvelinus fontinalis*) in an area of the southern Sierra Nevada at high elevation were associated with tissue damage of these fish, suggesting that mercury or an associated pollutant has affected fish health (Schwindt et al.

2008). However, mercury concentrations in Sierran treefrog tadpoles in the southern Sierra within the range of MYLF were low and below levels thought to be toxic to the tadpoles or harmful to predaceous wildlife (Bradford et al. 2011). In southern California, nitrogen deposition may be contributing to the decline of *R. muscosa*. Experiments have shown that elevated nitrate and nitrite concentrations cause developmental effects in western amphibians (Marco et al. 1999). Much of the MYLF habitat in southern California is bordered by the Los Angeles Basin, and because of the large amount of aerial pollutants produced here, this area receives the highest levels of nitrogen deposition in the country (Fenn et al. 2003). Additional research is needed to determine whether these nitrate concentrations are impacting MYLF populations.

5.5. Wildland Fire

Wildland fires are a natural phenomenon in California. In recent decades, the frequency of fires and the proportion of large fires have increased (Westerling et al. 2006), especially in southern California. Eight megafires (≥ 50,000 ha) have been recorded for southern California over the last 135 years, four of which occurred in the last six years. Wildland fires and post-fire processes can drastically alter riparian habitats. The riparian vegetation can be reduced or eliminated, allowing for large daily fluctuations in water temperature. Increased flooding and sedimentation can alter stream morphology (Gamradt and Kats 1997). Because the mountain yellow-legged frog is closely associated with the aquatic environment and rarely uses upland habitat, it is extremely susceptible to such stream alterations. In recent years, these threats have led to large declines in at least one *R. muscosa* population and continue to threaten several other populations in southern California (Backlin, unpublished data).

Wildland fires will continue to impact mountain yellow-legged frog populations across southern California. With nine isolated extant populations across three mountain ranges in southern California, the risk of losing additional populations from these events is high. Little can be changed to reduce the frequency or size of wildland fires in southern California, but preventative guidelines for fire-fighting and post-fire activities can help reduce direct impacts to riparian habitat utilized by extant frog populations. Moreover, emergency animal salvage can be implemented post-fire to prevent extirpation. Proactive planning is necessary to ensure the required permits are in place and facilities are available to harbor salvaged animals.

5.6. Other Risk Factors

Climate Change - Climate change has the potential to cause marked changes in wildlife populations, including amphibians. In California, temperatures are predicted to increase 1.5 – 4.5^{o}C by the end of the 21st century (Cayan et al. 2008), and rainfall may be subject to increased fluctuations. Such changes would directly increase the risk of population decline and extirpation. Additionally, other effects, such as rising temperatures at many high elevation localities, may increase the suitability of these habitats for Bd, thereby potentially facilitating disease outbreaks (Pounds et al. 2006).

Between-year variation in winter snowpack and summer rainfall causes large fluctuations in the hydroperiod of small lakes in higher elevation Sierra Nevada watersheds. These small lakes have become increasingly important for Sierra Nevada populations of MYLF due to the occupation of the majority of the larger and deeper lakes by introduced trout. Climate change is predicted to increase fluctuations in lake surface elevation, potentially leading to more frequent summer drying of shallow water bodies that in some watersheds provide the only fishless habitats remaining for MYLF for breeding. Lacan et al. (2008) found that there was significantly greater abundance of MYLF juveniles in permanent lakes than in lakes that had dried even once during a 10 year period. Similarly, those lakes that retained water during any two preceding years contained significantly more juveniles than lakes that had dried up during that period.

These results suggest that any increase in drying of small ponds could severely reduce frog recruitment in some areas.

Although climate change is likely a minor factor in the decline of MYLF, Bd may respond to increasing temperatures by generating a higher frequency of disease outbreaks. In addition, frog populations that rely solely on shallow lakes may be subject to a higher risk of extirpation. As summarized by Corn (2003), "climate change may be a relatively minor cause of current amphibian declines, but it may be the biggest future challenge to the persistence of many species." In areas in which few water bodies remain in their natural fishless state, the restoration of a small percentage of deep lakes (>3 meters) to a fish-free condition could help offset expected impacts of future climate change to MYLF.

Forestry Activities – Land management practices on national forests such as timber harvest, road construction and fire suppression may have impacts on MYLF, however, there are no studies available investigating the potential impacts of forestry activities. MYLF occur primarily in roadless areas with little or no timber harvest or fire suppression activities, therefore forestry activities are not considered to be the primary stressors that have caused the observed range-wide declines. .

Locally Applied Pesticides - National forests and private timberlands that adjoin national forest lands occasionally use pesticides and herbicides to control rodents, insects, fungi, noxious weeds, and brush. . Hydropower facilities may use pesticides to control herbaceous growth along canals or reservoirs. The direct or synergistic effects of locally applied pesticides and herbicides on MYLF are unknown. Some level of risk of various pesticides to MYLF is suggested from studies conducted on other amphibian species, but no studies currently exist that directly evaluate the level of risk of these pesticides to MYLF. Most of the conifer plantations where herbicides are commonly used lie below the elevation range of the MYLF, although there are some plantations adjacent to lower elevation MYLF populations.

Livestock grazing - Livestock grazing remains widespread across the geographic range of MYLF, and populations within meadows and riparian zones along streams are more likely to encounter livestock grazing than populations found in high-elevation alpine watersheds. Potential impacts of livestock grazing on MYLF include trampling and habitat degradation. The Sierra Nevada Ecosystem Project's Final Report to Congress stated that current livestock management continues to impact many mid-to-high elevation rangelands and restoration efforts are needed (Menke et al. 1996). Localized habitat disturbance as a result of livestock grazing and the negative effects on MYLF have been observed in Sierra Nevada national forests, but the effect was not quantified and the data are anecdotal.

The vulnerability of each MYLF life stage to the impacts of grazing are unknown, but all life stages have some level of trampling risk because of their tendency to concentrate along aquatic edges where livestock tend to forage and gain access to water. Current standards in the Sierra Nevada Forest Plan Amendment are intended to minimize this trampling risk. Poorly managed grazing allotments that harbor MYLF populations have the potential to cause persistent declines in habitat quality. Because livestock move between habitats, the potential to transfer aquatic pathogens between sites is possible (see **Section 5.2. Disease**, for details).

Suction Dredging - Suction dredge mining is used in streams, rivers, or lakes to extract minerals, especially gold. The Department is completing a suction dredging Supplemental Environmental Impact Report (EIR) that will propose new permit rules to be followed by suction dredge miners. The initial study for the EIR identified several potential impacts from suction

dredging activities on amphibians (including MYLF), including entrainment/excavation, turbidity and sedimentation, impacts to the stream benthic community (prey base), changes to channel morphology and associated habitat, mercury contamination or other toxicological effects, and effects on behavior. No studies exist that have described the impacts of suction dredge mining on MYLF, but due to the potential for impacts, the EIR will designate waters within the range of MYLF that are closed to suction dredging. Exceptions will be made for seasonal suction dredging activities on rivers that are subject to regulated flows and are therefore not conducive to MYLF occurrence.

Water Development and Diversion - Water developments, such as dams and diversions, can radically change aquatic habitat and are a prominent component of the landscape in the Sierra Nevada of California (Moyle and Randall 1998). However, the vast majority of water development, whether assessed based on number, scale, or size, has occurred below most of the elevation range of MYLF. Nonetheless, there are numerous small impoundments and diversions that occur alongside historic and extant MYLF populations. Although the creation of pond and lake habitats can be beneficial to MYLF, most reservoirs now harbor fish (Moyle 2002) and bullfrogs, both of which would prey on MYLF and affect potential benefits. For example, Lake Aloha in the Desolation Wilderness (Eldorado National Forest) was created in 1923 by the construction of a small dam. The impoundment flooded 627 acres of fish-free lakes and small ponds that were historically occupied by MYLF. Brook trout and rainbow trout were subsequently introduced and frogs were relegated to nearby small ponds that were not inundated by the impoundment.

Water diversions or developments can also be detrimental to MYLF if they shorten the length of time a habitat has water, or change the hydrologic regime. For example, many hydroelectric water developments produce short-term fluctuations in water level and changes in water flow and velocity that can discourage oviposition or result in the stranding of eggs and tadpoles and the potential to injure and increase mortality in amphibians. In addition, removal or diversion of water in winter could create artificially low water levels in a pond or lake that can lead to freezing of the entire water body or reduced oxygen levels, resulting in increased frog mortality. For instance, the water level of Lake Aloha is drawn down in late summer, exposing broad mud flats along the reservoir's margins. Tadpoles produced from the limited MYLF breeding that occurs within Lake Aloha become stranded in the remaining isolated pools, risking desiccation and increased predation due to lack of cover.

In southern California, activities associated with illegal marijuana plantations may have multiple negative impacts on MYLF. Activities on illegal plantations may lead to habitat alterations such as the construction of small dams; water diversions from creeks that already have low flow; or stream bank trampling. Such habitat alterations could result in MYLF tadpoles being isolated and/or desiccated;, overwintering habitat being destroyed; or the destruction of undercut banks, an important refuge microhabitat for MYLF and often used for oviposition (Backlin, unpublished data). Lastly, the marijuana farmers live for extended periods near the plantation and often leave behind large amounts of trash, equipment, and chemicals (including herbicides, pesticides, and kerosene).

The observations indicating that water development has negatively affected MYLF have not been quantified and are anecdotal, and the level of risk posed by water development and diversion to the MYLF is unknown. Currently, dams and diversions do not appear to be a widespread risk to the species, but could have significant localized impacts.

Recreational Activities - Most of the habitats occupied by MYLF are on federal lands. Although afforded a considerable degree of protection as a consequence, these lands are used for a wide variety of recreational activities, including hiking, fishing, swimming, horseback riding, and camping. Few studies have examined the effects of recreation on amphibians, but recreational activities around streams and lakes could cause unintentional trampling of all life stages of MYLF.

Impacts to MYLF from recreationists have occurred in southern California, where recreational use of riparian and aquatic habitats is very high. These include documented take on the San Bernardino National Forest of federally Endangered *R. muscosa*, even with a creek closure, exclusion fencing, and ample signage. On the Angeles National Forest, a reach of Little Rock Creek contains an extant population of MYLF and is adjacent to Williamson Rock, a popular climbing area. The improper disposal of human waste resulted in regular contamination of the creek (Backlin, unpublished data). In response, the Forest Service implemented closures around the Williamson Rock area and a creek closure adjacent to a campground on the San Bernardino National Forest to reduce the impacts to MYLF from recreational activities.

Off-highway vehicle (OHV) use is implicated as an impact to many amphibian species. However, MYLF do not typically occur in areas with OHV access or in designated OHV recreation areas. Potential overlap of MYLF and OHV use is most likely in the northern Sierra Nevada. Regardless, OHV use is not considered to be an impact that has contributed to the decline of MYLF.

5.7. Degree and Immediacy of Threats

MYLF are extirpated from most of their historic range due primarily to disease and introductions of non-native trout. More than 80% of historical localities now lack MYLF, and population losses are continuing due to the extreme isolation and fragmentation of many of the remaining MYLF populations and the ongoing spread of Bd into currently Bd-negative populations. The probability of these losses continuing to occur is high with or without CESA listing.

Introductions of non-native trout into previously fishless water bodies in the mountain ranges of California had significant and severe impacts on MYLF. As a result of these introductions, trout occupy the majority of the highest quality habitats (e.g. large deep lakes) and their presence significantly reduces the likelihood of occupation by MYLF. In addition, fish-bearing waters serve as a predation and competition threat to nearby MYLF populations and thereby limit tadpole rearing habitat and movement of juvenile and adult frogs.

Although the impacts of non-native trout introductions were severe, by the 1970s novel introductions had largely ceased in California. However, the Department continued to plant trout in water bodies that were already fish-bearing. This may have served to increase trout density within a water body thus increasing the potential for predation and competition to local native species populations compared to fish-bearing waters that were not continuously planted. Regardless, impacts of continued stocking were reduced or eliminated by the amended trout stocking guidelines issued in 2000. For additional discussion of changes to the Department's stocking program for the benefit of MYLF, see **Section 7. Existing Management Efforts**.

The immediate threats to MYLF recovery from non-native trout are those naturally reproducing trout populations that are in direct conflict with extant MYLF populations. Fish eradication has been proven to be an effective tool to ameliorate the threat of remnant self-sustaining trout populations, expand MYLF populations and reduce fragmentation between MYLF populations. See **Section 7. Existing Management Efforts** for additional information.

Bd, on the other hand, is also implicated in the observed decline of MYLF, however it remains an immediate threat to the conservation of MYLF. The pathogen has spread across most of the historical range of MYLF and is expected to continue to spread to the remaining Bd-negative populations. Moreover, at this time there are no management tools available to mitigate the impacts of the disease upon an MYLF population. See **Section 7. Existing Management Efforts** for additional information.

Several other factors that may affect the ability of MYLF to survive were discussed in this Status Review, including airborne contaminants, wildland fires, fire suppression activities, climate change, livestock grazing, water developments, and recreational activities. These factors may have localized impacts on MYLF, but the effects are minor compared to the primary stressors, Bd outbreak and non-native trout introduction, that have caused the observed range-wide declines.

6. REGULATORY STATUS

6.1. Federal

Federal Endangered Species Act - In 2002, the U.S. Fish and Wildlife Service (USFWS) listed the southern California Distinct Population Segment (DPS) (inhabiting the San Gabriel, San Bernardino, and San Jacinto mountain ranges) of *R. muscosa* as Endangered under the Federal Endangered Species Act (FESA) (16 U.S.C. § 1531 et seq.) (See 67 Fed.Reg. 44382 (July 2, 2002)). A recovery plan for the southern California *R. muscosa* DPS has yet to be been developed. The USFWS is currently preparing a five-year status review and a recovery plan outline for the *R. muscosa* DPS, and both documents are expected to be completed in 2011 (S. North, USFWS, personal communication). In October 2000, the USFWS designated MYLF in the Sierra Nevada DPS as a federal Candidate Species (65 Fed.Reg. 60603 (October 12, 2000)). In 2003 and again in 2007, the USFWS determined that listing the MYLF Sierra Nevada DPS was warranted, but precluded by other higher priority listing actions under FESA (68 Fed.Reg. 2283 (January 16, 2003); 72 Fed.Reg. 34657 (June 25, 2007)). In January 2011, the USFWS announced its intent to initiate a proposed rule in 2012 to list the Sierra Nevada DPS.

Critical Habitat - On October 16, 2006, the USFWS designated approximately 8,283 acres (3,352 ha) of critical habitat for the southern California *R. muscosa* DPS. The critical habitat is located within Los Angeles, San Bernardino, and Riverside counties, California.

Section 7 Consultations - Before initiating an action, the Federal agency or its non-federal permit applicant is required to coordinate with the USFWS to determine what species may be within the action area. If a FESA-listed species is present, the Federal agency must determine whether the project will affect it. If so, consultation may be required. Section 7 consultations may be required for projects proposed within the southern California *R. muscosa* DPS.

Forest Plan - On September 15, 2005, the USFWS issued a biological opinion on the Forest Plan for the four southern California national forests. At issue were the effects of the Forest Plan on federally-listed species, including MYLF. Future activities and projects will need to conform to Forest Plan guidance, require site-specific environmental review, and Section 7 consultations (USFWS 2006).

Habitat Conservation Plans (HCPs) - The Western Riverside County Multiple Species Habitat Conservation Plan (MSHCP) is a 1.26-million ac (510,000 ha) multi-jurisdictional habitat conservation plan that addresses 146 listed and unlisted ‘‘Covered Species,’’ including *R. muscosa*.

Conservation objectives for the mountain yellow-legged frog in the MSHCP include (Riverside County Integrated Project (RCIP) Volume I, Section 9, Table 9–2, pp. 9– 37 and 9–38) (USFWS 2006):

- Conserving primary breeding habitat, secondary wooded habitat, and core areas within the San Jacinto Mountains;
- Conducting MYLF surveys as part of the MSHCP project review;
- Conserving mountain yellow-legged frog localities identified by these survey efforts;
- Maintaining and restoring ecological processes within occupied habitat and suitable new areas; and
- Maintaining and monitoring successful reproduction of the species.

Safe Harbor Agreements - Safe Harbor Agreements are voluntary arrangements between the USFWS and cooperating non-federal landowners. The main purpose is to promote voluntary, beneficial management for listed species on non-federal property while giving assurances to participating landowners that no additional future regulatory restrictions will be imposed. The USFWS must determine that the agreement will have a net conservation benefit to the species and describe how it contributes, directly or indirectly, to the recovery of the covered species. A Safe Harbor Agreement is currently being discussed between the USFWS and California State Parks (Mount San Jacinto State Park). This agreement would help facilitate *R. muscosa* recovery efforts within the park boundary.

6.2. State

The Department designated MYLF as a Species of Special Concern (SSC) in 1994. The Department's California Wildlife Action Plan (2007) also identifies MYLF as a Species of Greatest Conservation Need. Finally, the Department identified MYLF as a "decision species" in the recent Hatchery and Stocking Program Environmental Impact Report/Environmental Impact Statement (SCH No. 2008082025) prepared and certified by the Department in coordination with the USFWS in January 2010.

7. EXISTING MANAGEMENT EFFORTS

7.1. Watershed-based Planning

Since 1998, the Department's High Mountain Lakes (HML) project has been developing Aquatic Biodiversity Management Plans (ABMPs) for high elevation watersheds in the Sierra Nevada. Twenty-six plans covering 5,800 water bodies within the historic range of the Sierra Nevada mountain yellow-legged frog have been completed or are in draft form. These plans provide watershed-based descriptions of aquatic resources, including amphibian and fish populations, and describe future amphibian and fish management direction.

The goal of the HML project is to manage high elevation aquatic resources to maintain or increase native biodiversity and habitat quality, support viable populations of native species, and provide recreational angling opportunities considering historical and future use patterns. The Department is shifting management toward a greater protection for native species while still providing a reasonable level of angling recreation. The HML project is the first large-scale endeavor to apply both game and non-game management principles to California's high elevation aquatic ecosystems. ABMPs guide the application of those principles (see **Sections 7.2**, **7.3**, and **7.4** for additional details).

7.2. Trout Stocking

Since the late 1800s, the State of California has been involved in the operation of fish hatcheries and the stocking of fish. Even before this time, trout were being moved into fishless waters within the range of MYLF. This practice was not substantially altered to benefit native amphibians until 2000, when the Department's Fisheries Branch declared that no waters would be approved for future stocking in which MYLF were present or where the presence of MYLF was unknown due to a lack of recent surveys. This action initiated a massive Department resource assessment effort to determine the status and distribution of MYLF and the impacts of fisheries on MYLF. The result was a 77% reduction in the number of high elevation Sierra Nevada waters stocked. This substantial reduction was due in part to efforts to eliminate stocking of waters in the immediate vicinity of MYLF populations, but also due to results from resource assessments that showed that many trout populations were self-sustaining and did not require stocking to persist. Additionally, stocking was discontinued in several streams and one lake in southern California where *R. muscosa* were found.

Of the 617 lakes in the Sierra Nevada that are no longer stocked, 329 are expected to continue to provide self-sustaining trout fisheries. An additional 193 lakes have little to no natural reproduction and as a consequence, have gone fishless or will become fishless within the next ten years. The status of fish populations in the remaining 95 lakes is unknown. Of the 617 lakes that are no longer stocked, 283 lakes are located within two kilometers of an extant MYLF population and 113 lakes are within areas specifically designated by the Department for MYLF conservation. Some of these waters may require future frog translocations to re-establish MYLF.

In 2010, the Department completed the Hatchery and Stocking Program Environmental Impact Report/Environmental Impact Statement (EIR), which includes mitigation measures to reduce or eliminate current impacts of hatchery operations and fish stocking on native species, including MYLF. Under the EIR, all Department fish stocking must be evaluated using the Pre-Stocking Evaluation Protocol (PSEP) found in Appendix K of the EIR. Because of stocking changes related to MYLF made in 2000, the EIR requirements did not result in additional reductions in Department stocking to benefit MYLF.

The EIR also addresses potential impacts from private fish stocking. Where the Department has the authority to issue private stocking permits, a PSEP is implemented to determine if stocking may impact MYLF. In areas where the Department does not currently have private stocking permit authority, the Department plans to submit to the Fish and Game Commission a proposal to amend Section 238.5 of Title 14, California Code of Regulations that would eliminate private stocking permit exemptions throughout California. If the amendment is accepted, all private stocking permits would be subject to the PSEP process.

Finally, to address concerns on the potential for fish stocking activities to accelerate the spread of disease and invasive species, the EIR included mitigation that will propose new disease and invasive species testing and certification requirements for private aquaculture facilities that stock fish into California waters. The details of these requirements and the protocols for disease testing are being developed by Department pathologists working closely with industry and academic representatives.

7.3. Removal of Non-native Trout

Starting in 1997, numerous selected lakes, ponds, and short stream sections have been targeted for non-native fish removal to benefit MYLF. In most cases, these efforts have dramatically increased frog abundances in or adjacent to removal waters. Efforts by University

of California researchers, the Department, NPS, USFWS, USGS, and USFS are summarized below.

University Researchers - As detailed in Knapp et al. (2007), trout populations were removed from five lakes in Humphreys Basin (Sierra National Forest, Fresno County) during 1997-2002. Small numbers of *R. sierrae* co-occurred with trout in one of these lakes and the expansion of this population following trout removal was quantified over a 7-10 year period. Following trout removal, the *R. sierrae* population expanded rapidly and within a few years occupied all fishless lakes in the immediate vicinity. This lake complex now harbors one of the largest *R. sierrae* populations remaining anywhere in the Sierra Nevada. These findings support the case for the negative effect of trout on *R. sierrae.*

Vredenburg (2004) removed fish from five lakes in Sixty Lake Basin, Kings Canyon National Park, Fresno County, and compared frog numbers in these lakes to those in eight fish-containing and eight fishless control lakes. After one year following fish removal, frog and tadpole numbers were significantly higher than fish-containing control lakes. Three years after fish removal, frog abundances were similar to those in fishless control lakes, suggesting complete recovery.

Department - The Department is engaged in fish removal projects to restore MYLF populations in both the Sierra Nevada and southern California. These projects have relied solely on mechanical fish removal methods, including the use of gill nets in lakes and electrofishing in streams. The Department initiated its first Sierra Nevada fish removal project in 1999 in the Big Pine watershed (Inyo National Forest, Inyo County). Based on the success of this project, this effort has expanded to include additional sites. As of 2010, the Department has initiated fish removal at 48 sites and removed nearly 47,000 fish from targeted lakes and streams. Fish eradication has been completed at 39 lakes and their connecting streams. Twenty-five of these sites were chosen based on the discovery of MYLF populations nearby, and feasibility of fish removal. The remaining 14 sites did not have MYLF nearby but have suitable frog habitat. In an effort to re-establish MYLF at some of these sites, MYLF have been translocated to five of these sites since 2002. For a discussion of results see **Section 7.4. Frog Translocations**.

Monitoring surveys are being conducted at fish removal sites to describe MYLF abundance before, during, and after fish removal. Survey results demonstrate that the average number of frogs observed at each site increased 12-fold following fish removal (from 4 to 47 per survey), and the average number of tadpoles counted increased 20-fold (from 10 to 198 per survey).

The Department, in coordination with USFS, USGS, and USFWS, has been removing trout in upper Little Rock Creek, Angeles National Forest since 2002, to benefit *R. muscosa*. Fish removal occurred upstream of a fish barrier constructed by the USFS in 2001. Survey results from 2010 indicate that all non-native trout have been removed and frogs have extended their pre-project range into newly fish-free habitats. The Little Rock Creek population has increased from a population of 5 - 15 adult frogs to over 50 adults in 2010 and is now one of the largest *R. muscosa* populations in southern California (Backlin, unpublished data). Another fish removal project is now underway in sections of Fuller Mill Creek and the North Fork San Jacinto River that will reconnect two remnant *R. muscosa* populations.

National Park Service - In 2001, an Environmental Assessment entitled “Preliminary Restoration of Mountain Yellow-legged Frogs” was completed by Sequoia and Kings Canyon National Park (SEKI), initiating non-native trout removal, which is still underway. From 2001-2010, SEKI removed nearly 42,000 fish from targeted lakes and streams. By 2010, fish were fully eradicated

from 8 lakes and nearly eradicated from 3 other lakes. During this time, average larvae counts increased 13-fold (from 38 to 505 per survey) and average abundance of adult and juvenile frogs increased 14-fold (from 42 to 516 per survey). Several of these MYLF populations are now among the largest in the Sierra Nevada. In addition, average western terrestrial garter snake counts increased 7-fold after fish removal.

Yosemite National Park (YOSE) initiated a 4-year experimental non-native fish removal project in 2007 to restore the aquatic ecosystems to more natural conditions, including recovery of *R. sierrae*, and to inform future management. This effort targeted eight lakes in four watersheds that either contained MYLF or had MYLF populations in the immediate vicinity. By 2010, fish removal was complete in six of the eight lakes and complete eradication of fish in the remaining two lakes is anticipated by 2011.

SEKI and YOSE are currently developing management plans for their aquatic ecosystems (SEKI: Restoration of Native Species in High Elevation Aquatic Ecosystems Plan and associated draft Environmental Impact Statement; YOSE: High Elevation Aquatic Resources Management Plan and associated draft Environmental Assessment) that will guide management of aquatic ecosystems in the park for the next several decades. Both plans will likely include proposals for extensive fish removal efforts.

U.S. Forest Service - In 2008, the U.S. Forest Service Lake Tahoe Basin Management Unit (LTBMU), in coordination with the Department, initiated mechanical removal of trout at seven lakes in the Desolation Wilderness (El Dorado County). As of 2010, approximately 3,400 fish had been removed from the seven lakes, four of which are currently fishless. LTBMU will continue eradication efforts through the 2011 summer season. Despite prior detections of MYLF at one lake, there have been no recent MYLF observations within the project area. As a result, once the lakes are fishless, it will be necessary to translocate frogs from a nearby source population.

7.4. Frog Translocations

Translocation (the capture of individuals from the wild, and their subsequent transport and release at a new location) is an important management tool for recovery of MYLF when MYLF are entirely absent from the vicinity of a suitable site. Given that MYLF have disappeared from more than 80% of their historic range and are now completely extirpated from numerous watersheds, translocation will be an essential tool for MYLF recovery and conservation. To date, translocation efforts have produced mixed results, and are summarized below in chronological order.

Fellers et al. conducted four translocations in 1994-1995 (2007). *Rana muscosa* of all life stages (egg masses, tadpoles, juveniles, adults) were obtained from Sixty Lake Basin, Kings Canyon National Park (KCNP) and moved to four previously-occupied lakes on the Tablelands, Sequoia National Park (SNP). Following translocation, numbers of all life stages declined rapidly after the first summer, and evidence of reproduction was observed at only one of the four sites. All translocated populations were extirpated within three years. Although, these translocations were conducted before Bd was described in 1999 and before techniques for detecting Bd in the field had been developed, subsequent analysis suggests that *Rana muscosa* may have been extirpated from the Tablelands in the 1980s due to chytridiomycosis; *R. muscosa* in Sixty Lake Basin were Bd-negative; and extirpation of MYLF at the translocation sites was likely caused by chytridiomycosis.

Between 2001 and 2003, Knapp (unpublished data) conducted four translocations in Humphreys Basin, Sierra National Forest. All *R. sierrae* were obtained from Marmot Lake, a Bd-negative population in the eastern portion of the basin. Translocated animals included adults, juveniles, and tadpoles. Both translocations into the western (lowest elevation) portion of the basin (Square and Knob Lakes) failed after two years due to chytridiomycosis. The two translocations into the eastern portion of the basin have resulted in self-sustaining populations of more than 50 frogs and more than 500 tadpoles. Both extant populations remain Bd-negative. In 2010, Knapp conducted an additional three translocations, two into Square and Knob Lakes (the sites of previous translocation efforts) and one into upper French Canyon. Each translocation included 40 adult *R. sierrae*. Surveys conducted following the translocation suggested high survival of translocated animals.

In 2004, 247 *R. sierrae* tadpoles were salvaged from a drying pond in the Horton Lakes drainage (Inyo National Forest, Inyo County) and translocated to the fishless Horton Lake #4. Subsequent surveys have not detected MYLF and the translocation appears to have failed. MYLF populations in adjacent watersheds are currently Bd negative but the status of Bd in the Horton Lakes drainage is unknown. In 2011, the Department sampled the Horton Lakes MYLF population for Bd presence and results are pending.

The Department began eradicating trout at Gable lakes (Inyo National Forest, Inyo County) in 1996. Once fish were removed, tadpoles and recent metamorphosed juveniles salvaged from drying ponds in 2004-2006 were translocated to Gable Lake #3 and #4. A total of approximately 5,000 Bd-negative animals were moved. Subsequent monitoring surveys of Gable Lake 3 and 4 have detected tadpoles and post-metamorphic frogs, but additional monitoring will be necessary to determine whether these populations become established.

Vredenburg (unpublished data) conducted three translocations in 2005. Bd-negative *R. muscosa* adults and juveniles were moved from Sixty Lakes Basin (KCNP) to one lake each in Gardiner Basin (KCNP), Vidette Basin (KCNP), and the Tablelands (SNP). Sites chosen for the translocations were historic habitat for *R. muscosa* but these populations were extirpated 1-20 years prior to the translocations. Post-translocation surveys provided evidence of reproduction at two of the three sites, but frogs in all three populations developed chytridiomycosis within 1-3 years of translocation. By 2010, the Tablelands population was extirpated and the Vidette and Gardiner Basin populations were extant but small.

In 2005, the Department translocated MYLF tadpoles to Emerald Lake (Inyo National Forest, Madera County) following the removal of introduced trout from this site. All populations in this area are Bd-positive, and 502 Bd-positive *R. sierrae* tadpoles were collected from three sources near Thousand Island Lake (Inyo National Forest, Madera County) and moved to Emerald Lake. Subsequent surveys have detected a small number of adult frogs but no evidence of reproduction has been observed. Additional translocations to this site may be necessary to protect this population from extirpation.

In 2005, the Department began an effort to re-establish *R. sierrae* in the Eastern Brook lakes in the Rock Creek watershed (Inyo National Forest, Inyo County). Both lakes were previously stocked but reverted to a fishless condition when stocking was halted. Bd-negative tadpoles were translocated from a site in the lower portion of the Rock Creek watershed to the Eastern Brook Lakes on an annual basis, and by 2008 more than 2,700 tadpoles had been translocated. However, during subsequent annual surveys only a single juvenile frog was detected. The failure of this translocation effort is believed to be the result of the poor condition of tadpoles from Birch Creek. The Department is now experimenting with a captive rearing effort using the

same source of tadpoles (see **Section 7.5. Captive Rearing and Breeding**, for details). In 2010, 70 Bd-negative frogs between 35 to 60 mm SVL were captured from the rearing facility and relocated to the Eastern Brook lakes. This effort will be repeated for several additional years, at which time the success of the translocation will be determined.

In 2006, Knapp conducted three translocations of *R. sierrae* in Yosemite in which Bd-positive *R. sierrae* adults were moved to three nearby lakes. Each lake received approximately 40 to 50 adult frogs. Bd is essentially ubiquitous in Yosemite so all sites are assumed to be Bd-positive. An additional translocation of 35 frogs from the same source population to each of two additional sites was conducted in 2008. Four of the five populations showed no evidence of reproduction and declined rapidly to extirpation or near-extirpation. However, one of the five populations showed evidence of reproduction in every year since 2007 and some of these animals recruited into the adult population in both 2009 and 2010. Therefore, these early indications suggest that one of the five Yosemite translocations may result in a self-sustaining population.

In 2010, 204 Bd-positive *R. sierrae* tadpoles were collected from three sources near Thousand Island Lake (Inyo National Forest, Madera County) and moved to Badger Lake (Inyo National Forest, Madera County). Fish stocking was discontinued at Badger Lake in 2000 and Department surveys in 2009 showed that fish were no longer present. Budget and personnel permitting, Badger Lake will be augmented with approximately 200 tadpoles each year for the next four years. Annual monitoring results will determine the success of the translocation effort.

In summary, preliminary results from MYLF translocations indicate mixed results. Although translocation can be an effective means of re-establishing populations, the probability of success from these efforts is likely to be low. Because of these findings, further research into the most effective translocation techniques is critically needed.

7.5. Frog Captive Rearing and Breeding

The use of captive rearing and breeding are increasing in both the Sierra Nevada and in southern California to restore MYLF populations. In the Sierra Nevada, captive rearing of *R. sierrae* tadpoles is being used to assist frog recovery in the headwaters of Rock Creek (Inyo National Forest, Inyo County). A small complex of artificial ponds with connecting streams located on private land was made available to the Department in 2008. Several hundred tadpoles from an isolated MYLF population within the Rock Creek watershed have been translocated to the rearing ponds annually since 2008, and Bd samples collected from frogs at the source site and rearing ponds were negative. No significant observable mortality has occurred at the rearing location to date. In 2010, 70 juvenile and adult frogs (from 35 to 60 mm SVL) were relocated by the Department from the rearing facility to the Eastern Brook lakes on upper Rock Creek. Frogs from this rearing facility may be used for additional reintroductions into nearby drainages.

In southern California, USGS collected 84 *R. muscosa* tadpoles in 2006 as an emergency salvage to prevent mortality at a site that was going dry on the North Fork San Jacinto River on the San Bernardino National Forest (Riverside County). The frogs were relocated to the San Diego Zoo Institute for Conservation Research where they were raised to maturity and subsequently used for captive breeding. These adults bred successfully for the first time in 2008, producing an egg mass with approximately 200 eggs. In 2010, 70 tadpoles were released into Indian Creek, on the San Bernardino National Forest (Riverside County). The success of these initial efforts has supported the expansion of the captive breeding program. In 2010, 10 adult captive frogs were transferred to the Los Angeles Zoo. Both the San Diego and Los

Angeles Zoos are anticipating breeding in 2011, and resulting progeny will be released at the Indian Creek site. Other sites are under consideration for future releases, including Stone Creek on the San Bernardino National Forest (Riverside County).

In 2009, USGS and CDFG collected 106 *R. muscosa* tadpoles as an emergency salvage from Devils Canyon on the Angeles National Forest (Los Angeles County). This salvage was completed following the Station Fire that burned approximately 166,000 acres, including the entire watershed surrounding the Devils Canyon population of *R. muscosa*. Previous research in southern California has shown that wildland fires and post-fire processes can reduce and/or eliminate *R. muscosa* populations, and that tadpoles are the most impacted life stage (USGS, unpublished data). Salvaged tadpoles were relocated to the Fresno Chaffee Zoo to be used for captive breeding and future reintroductions to the San Gabriel Mountains. However, in 2011 water quality issues within the zoo's facilities resulted in 104 tadpole mortalities.

7.6. Disease

To date, chytridiomycosis and ranaviral disease are the only amphibian diseases with impacts severe enough to warrant regulations. In 2008, the World Organization for Animal Health (OIE) declared that both chytridiomycosis and ranaviral disease were "notifiable diseases" and therefore subject to OIE standards, which aim to assure the sanitary safety of international trade in live amphibians (Schloegel et al. 2010). This is a first step in promoting global monitoring and control, and OIE member countries are advised to report semi-annually on the status of notifiable diseases in their country and control measures that are being taken. The U.S. is a member of the OIE but it did not take immediate action following the OIE's declaration. In 2009, the U.S. Departments of Interior and Agriculture were petitioned to follow the OIE advice and take actions to regulate the amphibian trade to reduce the spread of chytridiomycosis and ranaviral disease. In 2010, the USFWS published a notice in the Federal Register requesting public comment on the possibility of regulating the amphibian trade.

Of these two diseases, chytridiomycosis is much more widespread and has stronger negative effects on MYLF populations. Therefore, chytridiomycosis is the primary focus of ongoing disease-related management efforts including disease monitoring and implementation of measures to minimize the risk of human-mediated disease spread. In recent years, there has been a concerted effort to determine the distribution of Bd across the range of the MYLF. This has required the collection of skin swabs from hundreds of MYLF populations. Results to date indicate that although Bd is virtually ubiquitous across the range of both *R. muscosa* and *R. sierrae*, a few areas remain Bd-negative. This information has important implications for MYLF restoration efforts, including frog translocations. In areas where all MYLF populations are Bd-positive, Bd-positive frogs have been translocated between sites. Although this necessarily entails moving disease between sites, this is deemed acceptable when Bd is ubiquitous. However, to minimize the chances of introducing a novel Bd strain into an area, translocations involving Bd-positive frogs have only been conducted between sites that are in relatively close proximity (i.e., separated by less than 10 km). The increased effort in recent years to survey and monitor MYLF populations has also necessitated greater focus on ensuring that these activities do not transmit diseases between populations. As such, research and collecting permits issued by the Department and the National Park Service for amphibian-related studies both require disinfection protocol for sampling survey gear between study sites using agents effective against both Bd and ranaviruses.

Future disease-related management efforts should attempt to determine the Bd status of MYLF populations in those portions of the range that to date have been relatively poorly sampled. In particular, this effort should focus on MYLF populations in the northern Sierra Nevada.

7.7. Monitoring and Research Programs

MYLF have been the subject of extensive research during the past two decades and, as a result, are one of the best-studied amphibians in the world. Current areas of research include (1) developing methods to mitigate the effects of chytridiomycosis, (2) translocation methods that maximize the chances of frog population establishment, and (3) the role of airborne contaminants in causing MYLF declines.

In the past, the Department, the USFS, NPS, USGS, and University of California scientists have implemented large-scale resource assessment and inventory efforts across the range of MYLF, generally using a census-level approach, in which all aquatic habitats in each targeted watershed were surveyed. The combined effort has resulted in the survey of all mapped lentic water bodies in 85% of the watersheds (USGS HU-12 watershed units) with known historical and/or recent occupancy by MYLF. Many previously unsurveyed watersheds have now been subject to thorough amphibian and fish surveys. In total, nearly 18,000 water bodies throughout the Sierra Nevada and southern California have been surveyed for MYLF at least once, and ongoing assessment efforts continue to target areas that have so far received relatively little attention. These projects have provided information on MYLF population trends across their historical range and on within-population patterns of Bd infection over time. The assessment projects are ongoing and are providing critical information for the development of effective MYLF restoration plans.

Bd interventions - Recent results from several studies of MYLF-Bd dynamics suggested possible intervention strategies that could change the outcome of Bd epidemics from population extirpation to persistence. These include treating frogs during Bd-caused die-offs with antifungal drugs to reduce infection intensities, and augmenting the microbial community that exists naturally on MYLF skin with bacteria that have potent anti-Bd properties. Experiments testing the effectiveness of both of these interventions have now been conducted in the field, and preliminary results suggest that drug treatments may be ineffective in changing long-term disease outcomes. Additional monitoring of the bacterial augmentation experiment is necessary before the effectiveness of this approach can be determined.

Frog translocations - MYLF translocation studies conducted to date have produced mixed results. Although, translocations have resulted in new reproducing frog populations, methods used have had high failure rates. Ongoing translocation studies in which a wide range of methods are being used (e.g., different life stages, different numbers of frogs moved) will hopefully provide important insight into more effective translocation methods. Developing such methods will be critical to the success of any effort to restore MYLF across even a fraction of their native range.

Airborne contaminants - The role of airborne contaminants in causing the decline of California amphibians, including MYLF in the Sierra Nevada, is the subject of ongoing research. Recent efforts have, for the first time, quantified the temporal and spatial patterns of airborne contaminants in the southern Sierra Nevada. This research indicates that although a large number of pesticides and other contaminants are present, their concentrations are well below levels known to cause direct effects. Future research is likely to focus on whether airborne contaminants could influence amphibian immune systems and make amphibians more susceptible to diseases such as chytridiomycosis.

7.8. Impacts of Existing Management Efforts

To date, the most effective management effort undertaken to reverse MYLF population declines across their native range has been the mechanical removal of introduced trout populations from

key habitats. This approach has resulted in impressive recovery in basins with extant MYLF populations, especially those that are Bd-negative. Although fish removal is clearly a critically important tool, fish removal is difficult and expensive to achieve using the mechanical means currently available (gill netting and electrofishing), and usually requires sustained efforts that extend between 2 and 8 years per site. Additionally, this approach is limited to sub-basins with defined fish barriers and minimal stream habitat, which greatly reduces applicability across the range of MYLF.

In addition to the mechanical removal of trout populations to restore habitat for MYLF, the selective termination of fish stocking allotments has also resulted in some waters reverting to a fishless condition. In 2000, the Department discontinued the stocking of trout in waters where MYLF were present, where MYLF presence was unknown, and where the potential existed for MYLF restoration. The exact number of these waters that reverted to a fishless condition is not yet known but is likely 30-50% of the total. The remaining waters support self-sustaining trout populations, some of which will be assessed for mechanical removal projects in the future.

MYLF have disappeared from the majority of their historic ranges, and restoring them to portions of that range will require translocations, in which frogs are collected from stable populations and moved to other suitable habitats. Several MYLF translocations have been attempted, and although results have been highly variable, studies have indicated that translocations can result in the development of new self-sustaining populations. Although the success of translocations is high when populations are Bd-negative, success rates are much lower in the presence of Bd. Given the importance of translocations to reversing MYLF declines, developing translocation methods that are effective in Bd positive areas is of critical importance.

Captive breeding is generally undertaken only as a measure of last resort to prevent the extinction of a species. Anytime animals are held in captivity, there is risk of captive mortality. In addition, releasing animals from captivity or laboratory setting poses the risk of introducing novel pathogens to wild populations. Given the severe decline of *R. muscosa* in southern California, captive breeding efforts were initiated in 2006. Breeding of captive animals is now occurring, but reintroduction efforts using progeny from these captive populations have only just begun and additional monitoring and analysis will be necessary to determine the success of this effort.

7.9. Management Recommendations and Recovery Measures

The goal of the Department is to secure recovery and long-term survival of both MYLF species across their historic ranges by conserving existing populations and establishing networks of self-sustaining populations representing each of the six major genetic clades. The Department has evaluated existing management measures and has identified the following actions, listed in no particular order, as necessary to achieve the aforementioned goal:

- Continue resource assessment efforts, throughout the historical range, to discover previously unknown MYLF populations. Special focus should be given those watersheds that have not been surveyed within the past 10 years but have historical MYLF occurrences, or high probability of occurrence as determined by the species distribution model discussed in **Section 3.2. Range and Distribution**.
- Continue to implement and support projects that stabilize existing MYLF populations and/or expand MYLF distribution within each of the six genetic clades, such as:
    - Removing non-native trout from targeted water bodies to benefit resident MYLF populations.

    - Identifying water bodies whose non-native fish population will likely expire naturally and provide fish free habitat for MYLF translocations.
    - Removing non-native trout from targeted water bodies to provide fish free habitat for MYLF translocations.
- Continue to manage fisheries within the historical range of MYLF in a manner that does not conflict with MYLF conservation goals, such as:
    - Halting fish stocking in areas harboring existing MYLF populations or in areas identified for native species management in an Aquatic Biodiversity Management Plan.
    - Evaluating current stocking techniques and protocols to minimize stocking related impacts on MYLF.
    - Evaluating potential impacts to non-game species, via the PSEP process, as mandated by the Hatchery and Stocking Program Environmental Impact Report/Environmental Impact Statement.
- Continue monitoring MYLF population trends and Bd infection levels to establish long-term population baselines and evaluate conservation efforts.
- Continue activities that support research directed at MYLF conservation goals, with special focus given research directed at translocating MYLF in a Bd positive environment and captive breeding and rearing, such as:
    - Sharing Department data sets and analyses with the research community.
    - Collaborating with scientists to implement translocations in a manner appropriate to test a hypothesis.
    - Continuing to issue scientific collecting permits for research critical to the conservation and recovery of MYLF.

8. RECOMMENDATION FOR PETITIONED ACTION

The mountain yellow-legged frog consists of two distinct species endemic to high elevation lakes and streams of the Sierra Nevada and mountain ranges of southern California. The adult frog spends most of its time in or near water and breeds in lakes, ponds and streams. Unique among California native frogs, the larval life stage can persist for up to four years. This necessitates the tadpoles survive multiple winters before metamorphosis, and restricts successful breeding to relatively deep, permanent lakes, ponds, and streams.

The Department has been actively engaged in MYLF conservation for over ten years and has documented, along with other resource agencies and research groups, precipitous range-wide declines. Introduction of non-native fishes and disease are the principle drivers of decline although other cumulative factors may be contributing or causing synergistic impacts. The Department estimates that 84% of historical MYLF populations are now extirpated and MYLF are completely absent from 61% of historically occupied watersheds.

Based on the scientific information evaluated, the Department recommends that the Fish and Game Commission find that the petition to list the mountain yellow-legged frog as threatened/endangered is warranted. With such a finding, the Commission should publish notice of its intent to amend Title 14 CCR §670.5 to list the mountain yellow-legged frog.

9. PROTECTION AFFORDED BY LISTING

If MYLF is listed as Threatened or Endangered under CESA, take of MYLF would be unlawful absent take authorization from the Department (FGC §§2080 et seq. and 2835). CESA defines "take" to mean "hunt, pursue, catch, capture, or kill, or attempt to hunt, pursue, catch, capture,

or kill." (FGC, §86). Take can be authorized by the Department pursuant to FGC sections 2081.1, 2081, 2086, 2087 and 2835.

FGC section 2080.1 allows an applicant who has obtained a federal incidental take statement pursuant to a federal Section 7 consultation or a federal Section 10(a) incidental take permit to notify the Department in writing that the applicant has been issued an incidental take statement or an incidental take permit pursuant to the FESA. The applicant must submit the federal opinion incidental take statement or permit to the Department for a determination as to whether or not the federal document is "consistent" with CESA. Receipt of the application by the Department starts a 30-day clock for processing the Consistency Determination. To issue a Consistency Determination, the Department must determine that the conditions specified in the federal incidental take statement or the federal incidental take permit are consistent with CESA. If the Department determines that the federal statement/permit is not consistent with CESA, the applicant must apply for a State Incidental Take Permit under FGC §2081(b).

The exception provided in FGC §2080.1 to the CESA take prohibition can be used only for species that are listed under both FESA and CESA, and cannot be applied to species that are listed by the State but not federally listed.

FGC §2081(b) permits are usually preferable to 2080.1 Consistency Determinations for the reasons listed below. Under a Consistency Determination:

- the Department cannot add any conditions to the federal incidental take statement/permit or biological opinion to meet the full mitigation standard, and must accept it as written, if the Department determines it to be consistent;
- Often the biological opinion does not contain enough details in describing mitigation measures;
- If the pertinent section of FESA changes, the Consistency Determination could become invalid, and the Department would have to issue 2081(b) permits for those projects;
- If a Federal Biological Opinion/Incidental Take Permit is amended, the Consistency Determination is invalidated and either a new Consistency Determination or 2081(b) permit is needed; and
- If there are compliance problems with a Biological Opinion, the only remedy is to rely on USFWS ability to enforce the terms of the federal permit, or in the case of direct take, involve Department enforcement, i.e., the Department does not have a permit to enforce, suspend, or revoke.

Take under FGC section 2081(b) may be authorized by permit if certain conditions are met, including:

- The impacts of the take are minimized and fully mitigated;
- The measures are capable of successful implementation;
- The applicant ensures adequate funding to implement and monitor the effectiveness of the measures;
- The measures are roughly proportional in extent to the impact;
- Where various measures are available, the measures shall maintain the applicant's objectives to the greatest extent possible;
- Issuance of the permit will not jeopardize the continued existence of a species.

Take under FGC §2081(a) may be authorized by the Department via permits or memoranda of understanding for individuals, public agencies, universities, zoological gardens, and scientific or

educational institutions, to import, export, take, or possess any Endangered species, Threatened species, or candidate species for scientific, educational, or management purposes.

FGC §2086 authorizes locally-designed voluntary programs for routine and ongoing agricultural activities on farms or ranches that encourage habitat for candidate, Threatened, and Endangered species, and wildlife generally. Agricultural commissioners, extension agents, farmers, ranchers, or other agricultural experts, in cooperation with conservation groups, may propose such programs to the Department. Take of candidate, Threatened, or Endangered species, incidental to routine and ongoing agricultural activities that occur consistent with the management practices identified in the code section, is authorized.

FGC section 2087 authorizes accidental take of candidate, Threatened, or Endangered species resulting from acts that occur on a farm or a ranch in the course of otherwise lawful routine and ongoing agricultural activities.

FGC section 2835 authorizes take of CESA listed species that are also designated as covered species pursuant to a Natural Community Conservation Plan (FGC §2800 et seq.) As a CESA listed species, MYLF would be more likely to be included in Natural Community Conservation Plans and benefit from large scale planning.

10. PUBLIC RESPONSE

Comments were invited in response to the current petition in a press release dated February 16, 2011. Comments received are included in Appendix II.

11. PEER REVIEW

Independent MYLF experts were invited to review the document prior to submission to the Fish and Game Commission. The letters of invitation and all comments received are included in Appendix III.

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14. APPENDIX I – MaxEnt Model

14.1. Methods

Frog Occurrence Records - Previous efforts to describe the historical distribution and decline of the mountain yellow-legged frog have relied largely on museum records (Vredenburg et al. 2007; Drost and Fellers 1996; Jennings 1996; Jennings and Hayes 1994). The strength of this approach is its relatively high accuracy, because specimens can be checked for species identity and collection localities are generally well-described. Reliance on museum records also has important limitations, however, most importantly that they are often geographically biased toward accessible sites and are often not available for the entire original range of the species. In an effort to provide as a detailed a historical distribution as possible, we opted to use all known locality information. This included museum records from the HerpNet consortium, field records from 11 national forests in the Sierra Nevada and southern California, field records from the U.S. Geological Survey (for southern California localities), published accounts and unpublished reports, amphibian survey databases maintained by researchers (R. A. Knapp), the California Department of Fish and Game, and Forest Service Sierra Nevada Amphibian Monitoring Program, and unpublished field notes from amphibian researchers. All obtained records had x-y coordinates and a location description, and were compiled into a single database. Those records from prior to 1995 were categorized as "historical" and those that occurred during or after 1995 were categorized as "current". Given the lesser accuracy of locality information for historical records relative to current records, historical records within 200 m of each other were identified and within each cluster the record with most detailed location information was retained and the others were deleted. We also deleted records that had location data that were too imprecise to justify the x-y coordinates. Because *R. muscosa* and *R. sierrae* were only recently recognized as distinct species, most records were originally identified as *R. muscosa*. We revised the species names in each record based on their location relative to the species contact zone described by Vredenburg et al. (2007). The final database contained 2847 records and covered the period 1891-2010. Of these records, 678 were for *R. muscosa* and 2169 were for *R. sierrae*. This database represents by far the most complete description of localities for these two species assembled to date.

Species Distribution Modeling - We used MaxEnt 3.3.3e (Phillips and Dudík 2008; Phillips et al. 2006) to model historical probability of occurrence for both mountain yellow-legged frog species. MaxEnt is increasingly one of the most commonly used tools for species distribution model (SDM) analysis, due to it requiring only presence records, ability to account for interactions among predictor variables, and its ability to fit nonlinear relationships using a diversity of feature classes. The available environmental space is described by random points from across the area of interest ("background sample"). Recent comparisons of SDM methods indicated that MaxEnt generally outperforms other SDM algorithms, including those that utilize either presence-absence data or presence-only data (Wisz et al. 2008; Elith et al. 2006). Our analysis utilized all 2847 frog occurrence records and ten environmental layers (Table A1). These environmental variables were all continuous in nature, and were selected because of their likely association with well-described physiological tolerances of the species related to temperature and water availability (Vredenburg et al. 2005; Bradford 1984; Zweifel 1955). Given the close association of both species with permanent water (Knapp et al. 2003; Bradford 1983), in addition to precipitation variables we also included two additional variables related to water: distance to water (lakes or streams), and lake density (Table A1). The lake density variable, in addition to describing the availability of lentic habitats, also takes into consideration the fact that historically mountain yellow-

Variable Name	Description
Elevation	From 30 m California digital elevation model (DEM)
Maximum watershed elevation	Maximum elevation (from 30 m DEM) of each HU-8 level hydrologic unit. Hydrologic units are from the national Watershed Boundary Dataset.
Slope	Calculated from 30 m California digital elevation model
Average annual temperature	Average of PRISM monthly minimum and maximum temperatures (1971-2000)
Average temperature of the coldest quarter	Average of PRISM monthly minimum and maximum temperatures for December, January, and February (1971-2000)
Average temperature of the warmest month	Maximum value of all PRISM monthly maximum temperatures (1971-2000)
Annual precipitation	Sum of PRISM monthly average precipitation across all months (1971-2000)
Precipitation of the driest quarter	Sum of PRISM monthly average precipitation across June, July, and August (1971-2000)
Distance to water	Calculated from combined California 24k lakes and 100k streams layers.
Lake density	Calculated from California 24k lakes layer using a 5000 m search radius.

Table A1. Description of environmental variables used as inputs in the MaxEnt model.

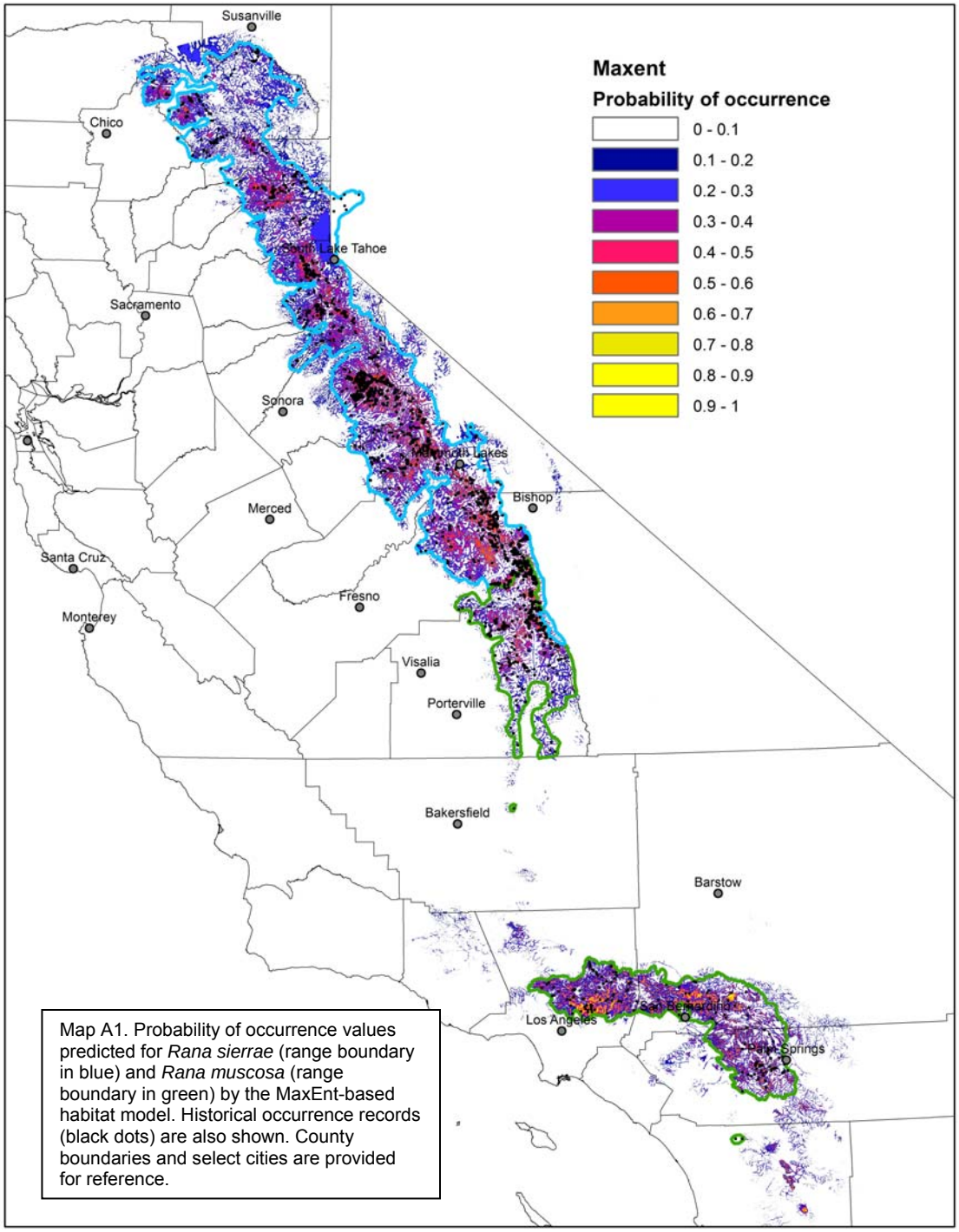
legged frog populations were likely structured as metapopulations (Bradford et al. 1993) in which frog populations were connected by dispersal. As such, areas with a higher density of lakes may have provided higher quality habitat than areas with low lake density (Knapp et al. 2003). The presence of native predatory fish may have influenced the original distribution of mountain yellow-legged frogs (Vredenburg et al. 2005), but the original distributions of native fishes (especially trout) are poorly described and this precluded using a fish presence/absence variable in our analysis.

Original data layers were based on cell sizes of 30 to 1000 m (elevation and temperature, respectively) so all layers were resampled to a common cell size of 100 m (using bilinear resampling) and projected to the Albers equal area projection for analysis. All raster calculations were conducted using ArcGIS 9.3. The spatial extent of the analysis included all historical localities with a buffer of approximately 30 km. Two exceptions were along the California-Nevada border and at the northern range limit of *R. sierrae*. Because of inconsistencies between California and Nevada in available data layers, we were only able to model frog distributions in California. This excluded a few historical localities from a small area of far western Nevada near Lake Tahoe. At the northern range boundary, we drew the analysis mask immediately adjacent to the known historical localities because of the well-documented absence of *R. sierrae* north of this area despite the existence of some apparently suitable habitat (Zweifel 1955), presumably due to frog dispersal limitations. We chose an analysis extent that was somewhat larger than the known distribution to ensure that the full extent of the predicted range was included. The actual width of the buffer likely had minimal effect on the analysis results (VanDerWal et al. 2009) because preliminary models that were based on all of California or only the reduced analysis extent described above produced very similar results.

In the Sierra Nevada, *R. muscosa* and *R. sierrae* have habitat preferences that are indistinguishable (Knapp et al. 2003), suggesting that a single MaxEnt model could be constructed for the entire range of the mountain yellow-legged frog. However, habitats utilized by mountain yellow-legged frogs in the Sierra Nevada and southern California differ markedly, with frogs in the Sierra Nevada utilizing primarily lentic habitats and those habitats are almost entirely lacking in southern California. This habitat disparity combined with the fact that many fewer occurrence records exist for southern California than for the Sierra Nevada raised the possibility that a single model developed for the entire mountain yellow-legged frog range may appear to fit the occurrence data quite well, but in fact be fitting the data from the Sierra Nevada very well but fit the southern California data relatively poorly. Preliminary analyses indicated exactly this problem. In these analyses, we first developed a single model for the entire mountain yellow-legged frog range. Model evaluation (see below) indicated very good model fit. Next we developed a model for *R. muscosa* in the Sierra Nevada and then projected this model to *R. sierrae* (found only in the Sierra Nevada) and *R. muscosa* in southern California. Results indicated a very good fit of the projected model to *R. sierrae* but a poor fit to *R. muscosa* in southern California. Therefore, we opted to develop separate models for *R. muscosa*/*R. sierrae* in the Sierra Nevada and *R. muscosa* in southern California. All models used the default value (1) for the regularization multiplier, unique sets of training data (75% of occurrence points) and test data (25% of occurrence points), 10000 randomly selected background points, and cross-validation (N = 10) to assess uncertainty in model fit. Model accuracy (based on test data) was assessed with the area under the curve (AUC) of the receiver operator characteristic (ROC). An AUC value of 1 indicates perfect prediction and a value of 0.5 indicates prediction no better than that expected at random (Fielding and Bell 1997).

The final Sierra Nevada model (*R. muscosa*/*R. sierrae*) and southern California model fit the data very well, with AUC values for the test data of 0.916 (standard deviation = 0.002) and 0.964 (0.006), respectively. The locations of almost all historical and current records fell within regions predicted to have probabilities of frog occurrence of ≥0.4. Therefore, the proposed historical ranges for both *R. muscosa* and *R. sierrae* in the Sierra Nevada were drawn to include all pixels with probability of occurrence values ≥0.4. In southern California, a few areas were predicted to have relatively high probability of occurrence but were not associated with any historical records. We suggest that the inability of our stream GIS layer to accurately distinguish between perennial and ephemeral water bodies caused the model to overpredict frog occupancy. In fact, the streams shown in the GIS layer in these areas are all ephemeral and these areas are therefore not habitable by mountain yellow-legged frogs. Therefore, we excluded those areas from the proposed range boundary.

14.2. Model Output



Map A1. Probability of occurrence values predicted for *Rana sierrae* (range boundary in blue) and *Rana muscosa* (range boundary in green) by the MaxEnt-based habitat model. Historical occurrence records (black dots) are also shown. County boundaries and select cities are provided for reference.

14.3. References

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15. APPENDIX II – Public Comments

Comments were invited in response to the current petition in a Press Release dated February 16, 2011. Due to technical difficulties with the Department website and email address, a notice to extend the comment period was released March 17, 2011.

"DFG Seeking Public Comment Regarding Proposed Listing of Mountain Yellow-Legged Frogs"

February 16, 2011

Media Contact:
Mitch Lockhart, DFG Fisheries Branch, (530) 906-3934
Dana Michaels, DFG Communications, (916) 322-2420
Public Contact:
MYLF@dfg.ca.gov

The Department of Fish and Game (DFG) is now accepting public comment on a proposal to add two species of frogs to California's endangered species list. The proposal, initiated by the Center for Biological Diversity, addresses the Sierra Nevada yellow-legged frog (*Rana sierrae*) and the southern mountain yellow-legged frog (*Rana muscosa*), collectively known as mountain yellow-legged frogs.

The public is invited to submit relevant scientific data or comments about mountain yellow-legged frogs' taxonomic status, ecology, biology, life history, management recommendations, distribution, abundance, threats and essential habitat, or other factors related to the status of the species.

All comments or other information must be submitted in writing by 5 p.m. on Friday March 18th, 2011. Comments can be emailed to MYLF@dfg.ca.gov or mailed to:

Fisheries Branch – High Mountain Lakes Program
Department of Fish and Game
Attn: Mitch Lockhart
830 S St.
Sacramento, CA 95811

Comments received by the due date will be included in the status evaluation report being prepared for the Commission. The report, which is due to be completed at or before the September 2011 Commission meeting, will address existing threats to mountain yellow-legged frogs and the effectiveness of the current regulations regarding the species. The public will also have a 30-day comment period after issuance of the report.

"DFG Extends Public Comment Period Regarding Mountain Yellow-Legged Frogs"

March 17, 2011

Contact:
Andrew Hughan, DFG Communications, (916) 344-8944
Mitch Lockhart, DFG Fisheries Branch (530) 906-3934

The public comment period regarding the proposed listing of mountain yellow-legged frogs is extended until April 1, 2011. The Department of Fish and Game (DFG) public comment website malfunctioned and comments could not be submitted electronically. Because of this, the public comment period is extended by two weeks.

All comments or other information must be submitted in writing by 5 p.m. on Friday, April 1, 2011. Comments can be e-mailed to MYLF@dfg.ca.gov or mailed to:

Fisheries Branch – High Mountain Lakes Program
Department of Fish and Game
Attn: Mitch Lockhart
830 S St.
Sacramento, CA 95811

Comments received by the due date will be included in the status evaluation report being prepared for the Commission. The report, which is due to be completed at or before the September 2011 Commission meeting, will address existing threats to mountain yellow-legged frogs and the effectiveness of the current regulations regarding the species. The public will also have a 30-day comment period after issuance of the report.

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The public is invited to submit relevant scientific data or comments about mountain yellow-legged frogs' taxonomic status, ecology, biology, life history, management recommendations, distribution, abundance, threats and essential habitat, or other factors related to the status of the species.

Mr. Lockhart,

I am writing this after just recently becoming aware of the possible placement of the Mountain Yellow-Legged Frog on the Endangered Species List. All of the data I can find seems to place the blame, for population decline, on the Department of Fish and Game's fish stocking practices (e.g. http://www.biologicaldiversity.org/news/press_releases/2010/mountain-yellow-legged-frog-01-25-2010.html). It appears that terminating the stocking of non-native fish in the frog's habitat would allow the frog population a good opportunity for rebound; and placement on the Endangered Species List would not afford the frog the same opportunity.

I am in favor of a "No-Action Alternative" on this proposal.

Thank you for your time.

Sincerely,

Adam Osborn
Anderson, CA

March 18, 2011

Fisheries Branch – High Mountain Lakes Program
Department of Fish and Game
Attn: Mitch Lockhard
830 S Street
Sacramento, CA 95811

mailto:MYLF@dfg.ca.gov

The following are comments on behalf of the California Association of 4 Wheel Drive Clubs, Inc. addressing the proposed listing of the Mountain Yellow-Legged Frog by the California Department of Fish and Game. The California Association of 4 Wheel Drive Clubs, Inc. (CA4WDC) has been representing 4 wheel drive enthusiasts and their families around the state, and in Arizona, Nevada and Oregon, for over 52 years. Our members pursue a wide variety of recreational activities in the National Forests that will be significantly harmed by this proposed listing, and we ask the Department of Fish and Game to deny this proposal.

When a species is proposed for listing on the endangered species list, the presumption has to be that the species will benefit by this listing, and that human activity has been the cause of the problems with the species. With Mountain Yellow-Legged Frogs we have found that this is not the case. In a study released by the United States Geographical Survey (USGS), Adam R. Backlin of the Western Ecological Research Center[1] clearly linked Chytridiomycosis, an infectious skin disease to *"population declines and mass mortalities of amphibians in many parts of the world*". According to Mr. Backlin, this fungal infection has caused destruction in frog populations throughout the world, including isolated and geographically separate locations.

The same conclusion has been reached in a 2007 study published in the Proceedings of the National Academy of Sciences, written by David Wake, Professor of Integrative Biology at UC Berkeley, and Vance Vredenburg, research associate at the Museum of Vertebrate Zoology at UC Berkeley and Assistant Professor of Biology at San Francisco State University. The authors state

1 http://microbiology.usgs.gov/wildlife_health_amphibians.html

that there are very specific causes attributable to the problems facing worldwide amphibian populations. Again it is confirmed that numerous frog species have been in a decline due to the pathogenic fungus that causes the disease chytridiomycosis. This disease is endemic worldwide, including tropical areas with high amphibian diversity, and has resulted in significant amphibian mortality. From these studies we can conclude that this fungus is not specific nor unique to California. Events in California are not responsible for the fungus, and consequently are not responsible for the decline in the Mountain Yellow-Legged Frog population.

In an article published by sciencedaily.com[2] , as a follow-up to the aforementioned study, included a comment praising current ongoing efforts in California to protect the Mountain Yellow-Legged Frog. Professor Wake stated; *"We have these great national parks here that are about as close as you can get to absolute preserves, and there have been really startling drops in amphibian populations there, too"* . Professor Wake continued to observe; "*...for two of these species, the Sierra Nevada Yellow-legged Frog and the Southern Yellow-legged Frog, populations over the last few years declined by 95 to 98 percent, even in highly protected areas such as Yosemite National Park'*. [emphasis added].

There had been a previous hypothesis that stocking of non-native trout in mountain streams was responsible for the decline in frog populations, but Professor Wake refuted this hypothesis by saying; *"The first hint of frog decline in this area came in the 1990s, and researchers originally thought that rainbow trout introduced to this area were the culprits - they like to snack on tadpoles and frog eggs. The UC Berkeley team did experiments in which it physically removed trout from some areas, and the result was that frog populations started to recover. But then they disappeared again, and this time there were carcasses," Wake said. The culprit is a nasty pathogenic fungus that causes the disease chytridiomycosis"* [emphasis added].

Professor Wake also spoke of the theory of 'mass extinction events' that may be contributing to the decline in amphibian populations. Mass extinction is posited to have started approximately 10,000 years ago, but is extremely difficult to accurately assess. There is consensus that we have been in a state of flux with new species evolving, and others experience a decline in population for eons, as a natural consequence of the evolving world. The decline of amphibians worldwide fits into this hypothesis.

To counter the effects of this fungal infection, scientists from the USGS, working with staff of the San Diego Zoo have successfully conducted two releases of Mountain Yellow-Legged Frog

2 http://www.sciencedaily.com/releases/2008/08/080812135654.htm

tadpoles in an controlled setting. Through a captive breeding program in conjunction with the San Diego Zoo Institute for Conservation Research, a total of 500 eggs have been reintroduced in the San Jacinto Mountains. According to Jeff Lemm, research coordinator San Diego Zoo, this program has been "wildly successful".[3] In 2009, A population of previously unknown Mountain Yellow-Legged Frogs has also been found the San Bernardino National Forest, in the San Jacinto Wilderness ear Idyllwild. Although the numbers of frogs has not be definitively determined, scientists have indicated that this is a significant population. [4] This discovery has been called a 'windfall' for all and indicates that the species may have a more diverse habitat than previously thought.

on September 8, 2010 , the Daily News of Los Angeles celebrated another step forward by published an article, entitled "Yellow-legged frog back from the brink", describing the successful rescue efforts of dozens of Mountain Yellow-Legged Frogs after the devastating Station Fire[5]. Almost all of the 106 frogs rescued from the burn area survived a relocation to the Fresno Chaffee Zoo, and the USGS announced plans to relocate approximately 70 of the frogs back to the native habitat. In describing the problem related to the decline in frog population, Adam Backlin, head of the USGS frog reintroduction and monitoring project, stated his primary theory behind the demise of the frog; "*....that sometime around 1970 the amphibian chytrid fungus started killing them off. The fungus has been around for at least 100 years, and scientists are trying to figure out why it became so deadly....No one really knows for sure what happened* ".

In every proposal to list yet another species on the endangered species list, the taxpayer is asked to pay the price for the listing. According to attorney Karen Budd-Falen, of the Western Legacy Alliance*; "The California red and yellow-legged frogs have cost the taxpayers $445,924 just in litigation attorneys fees.....Between 2000 and 2009, in just 12 states and the District of Columbia, 14 environmental groups filed 180 federal court complaints to get species listed under the ESA and were paid $11,743,287 in attorneys fees and costs."*[6]

The California Department of Fish and Game has a responsibility to the residents of the state to act responsibility, but conservatively. Given the evidence, there is little to be gained by listing the Mountain Yellow-Legged Frog to the endangered species list. Efforts are already in place to restore the frogs, and investigate the fungal disease that is at the basis of their decline. Please

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3 http://www.usgs.gov/newsroom/article.asp?ID=2441

4 http://www.sciencedaily.com/releases/2009/07/090726093404.htm

5 http://www.dailynews.com/news/ci_16025371?source=pkg

6 http://westinstenv.org/wildpeop/category/endangered-specious/page/2/

support the ongoing positive efforts with funding, which will be available if the department is not forced to spend thousands on senseless efforts and litigation.

The people of California depend on all our state agencies to resist the efforts of those organization that seek to manipulate in order to profit from the state's taxpayers. The California Association of 4 Wheel Drive Clubs thanks the Department for all their efforts, and appreciates the opportunity to submit these comments.

Sincerely,

Amy Granat
Natural Resources Consultant
California Association of 4 Wheel Drive Clubs, Inc.

P. O. Box 298
Clarksburg, CA 95612
916-710-1950

Art & Letty Elliott aelliott12@adelphia.net

Mitch Lockhart
Dept. of Fish and Game
830 S St
Sacramento, CA 95811

RE: Mountain Yellow-legged Frog

March 16, 2011

These comments are in response to the proposed listing of the Mountain Yellow-legged frog as an endangered species under the California Endangered Species Act.

All of the gathered data seems to point directly to the DFG as the main source in the demise of this species. The DFG's continued efforts to stockfish in the habitat for the Sierra Mountain yellow-legged Frog is the primary cause of the decline of the species. Unless this practice is stopped immediately and all of the trout are removed from the lakes, streams and waterways that the frog inhabits, then the species will continue to decline. Listing the species as endangered will do no good.

The U.S. Fish and Wildlife declined to list the Rana Sierrae as an endangered species, but placed the population on the candidate list. This should be sufficient until the DFG takes the actions necessary to protect the species such as stopping trout stocking, and pesticide release.

I both fish and prospect and am really getting disgusted with all the environmentalist wanting to stop any recreation in the rivers and streams here in Ca.

I favor the no-action alternative in this action.

Sincerely,

Art Elliott

1519 Whiteoak Dr.

Perris, Ca. 92571

Art & Letty Elliott

Dear Department of Fish and Game,

The undersigned students of the 5th / 6th grade class of Sequoyah School think that the Sierra Nevada and Mountain Yellow Legged Frogs should be place on the endangered species list. We also think that the stocked trout should be reduced in Sierra streams and high lakes. We take this stand for the following reasons. If this essential link in the food chain were lost, the whole ecosystem would be negatively affected. Aquatic insect population could rise to upset the natural balance for example. With a larger number of aquatic insects there would be an increase in mosquitoes, which would be problematic for backpackers and vacationers. Predators such as bears, coyotes, snakes and birds of prey would be deprived of an essential food source as well. The frog with its changing morphology during its metamorphosis is unique in that it occupies multiple positions in the food chain. It is a primary consumer when a tadpole and a secondary consumer when it matures. This alone makes it an important life form in preserving the ecosystem.

The three main threats that endanger the Yellow Legged Frog originate from human sources. Trout, which were introduced by humans to the alpine lakes and streams not only eat the Yellow-legged frog tadpoles and eggs, but also eat other native species, causing life forms that are not as well suited to the Sierras to dominate. The Chytrid Fungus was introduced by people who brought non-native amphibious animals in that carried the disease. The particulates and pesticides, originating mainly from the Central Valley, were foisted on these animals that are sensitive to any chemical changes in the environment because of their permeable skin. Because humans have endangered the frogs, we have the obligation to overcome the obstacles we have thrown in its path.

As stewards of the environment and avid campers ourselves, we are sympathetic to the backpackers and fisherman who would be inconvenienced by the reduction of trout from potential frog habitats. On the other hand, we feel that some sacrifices should be made to make it possible for this beautiful and essential creature to thrive. We realize that the Yellow-legged frog would still face disease and pollution even if the stocked trout were eliminated. Taking away a primary threat, though would give them a more fighting chance. Please decide to place the Sierra Nevada Yellow-legged frog on the Endangered Species list. At the same time, implement a policy of keeping Yellow-legged frog sanctuaries free of introduced trout. This would represent a commitment to supporting the comeback of native species and extraction of invasive species where it is least painful – in high mountain lakes and streams.

Students:
Avery Tyler,
Anthony Cho,
Isley Griffith,
Diego Tobar,
Henry Robins,
Harry Burke
Farah Sevareid,
Piers Donald,
Marco Sanchez,
Marcello Chunn-Gnaulati,
Will Scott,
Grace Barar,
Cali Hudnut,
Piper Lewis,
Ella Brown,
Harris Harper,
Diego Hernandez Solis
Ellis Holland
Ethan Abderrahman
Violet King

Art Phiffer, teacher

aphiffer@ca.rr.com<mailto:aphiffer@ca.rr.com>
aphiffer@sequoyahschool.org
Cell phone: 818-389-9385
11023 Cardamine Drive
Tujunga, CA. 91042

No to MYLF on the endangered list. Your agency is more responsible for their demize than anyone.

Bill Griffith

To e-mail MYLF@dfg.ca.gov

Department of Fish and Game,

Ref your posting on Department of Fish and Game News:

The Department of Fish and Game (DFG) is now accepting public comment on a proposal to add two species of frogs to California's endangered species list. The proposal, initiated by the Center for Biological Diversity, addresses the Sierra Nevada yellow-legged frog (Rana sierrae) and the southern mountain yellow-legged frog (Rana muscosa), collectively known as mountain yellow-legged frogs.

I am urging the DFG refrain from adding the two species of frogs (listed above) to the endangered species list.

There have been several actions that have caused the decline in the population - the main one seem to be the frogs predators, so unless we are going to limit the stocking of trout, getting rid of other predators such as bears, and otters, as well as pesticides - it won't really matter. Putting them on the endangered list will be unable to bring forth changes in the frogs predators - and may in fact only limit the use of public lands by the human population.

I do not entirely believe in this following quote from Knapp at the Center for Biological Diversity, but it just shows how far some people will go to blame someone for what I consider the natural or unnatural progression of a species.:

"Mountain yellow-legged frogs are adapted to high elevations without aquatic predators. Widespread stocking of non -native trout in high elevation Sierra Lakes by the Dept. of Fish and Game has been the Primary cause of the decline for the species."

Sincerely,

Bonnie Vanderbaan

e-mail: bonnie@watermansupply.com

--- On Thu, 3/17/11, Brian Clubb <brianclubb@yahoo.com> wrote:

From: Brian Clubb <brianclubb@yahoo.com>
Subject: public comment on MYLF
To: MYLF@dfg.ca.gov
Date: Thursday, March 17, 2011, 7:08 AM

My name is Brian Clubb. I live in Carson City Nevada. I am an avid flyfisher, and enjoy fishing the the Eastern Sierras.

I am torn about listing the MYLF as endangered. I dont want to see species go extinct. On the other hand, I dont want to see fisheries that are currently "destinations" go away. The small communities in the Sierra depend on fishermens' dollars. Many of us fish year-round (lower elevations in the winter), not just in the spring/summer months.

Humans have been affecting their environments since we've been on this earth. I just hope the extreme environmental conservation mindset does not win out. I know many would have all fish removed from most of the Sierra waters. This would be a huge mistake in my opinion. We need solutions, but not extreme solutions. There needs to be middle ground. We have altered our waters. Getting them back to the way they were before we settled this land is probably not feasible.

How do we know the Native Americans weren't "bucket biologists"? It's just something to think about. I know the extreme environmentalists think the fish stocking program is evil, but how many waterways are truely pristine or orignal anymore? My point is, artificial or not, some of these great fisheries are worth saving in my opinion. And I know I speak for thousands of fishermen in this part of the country.

Brian Clubb

Subject: Frogs
Created By: **catchamcd@att.net**
Scheduled Date:
Creation Date: 3/16/2011 8:42 PM
From: "catchamcd@att.net" <catchamcd@att.net>

Mitch Lockhart
Dept. of Fish and Game
830 S St
Sacramento, CA. 95811

RE: Mountain Yellow-legged Frog

March 14, 2011

These comments are in response to the proposed listing of the Mountain Yellow-legged frog as an endangered species under the California Endangered Species Act.

We sincerly hope that a better alternative is found. The assumption that dredging should be stopped for this frog is wrong. There are many other things that need to be looked into as a cause for their decline. The transport of species of fish that are not native is just one of the many causes. Along with fungi and pesticides. This needs a long hard look before such action is taken.

The DFG's continued efforts to stock fish in the habitat for the Sierra Mountian yellow-legged Frog is the primary cause of the decline of the species. Unless this practice is stopped immediately and all of the trout are removed from the lakes, streams and waterways that the frog inhabits, then the species will continue to decline. Listing the species as endangered will do no good.

The U.S Fish and Wildlife declined to list the Rana Sierrae as an endangered species, but placed the population on the candidate list. This should be sufficient until the DFG takes the actions necessary to protect the species such as stopping trout stocking, pesticide release, and fisherman from tromping through the shallow waters that the frog lay their eggs in.

I favor the no-action alternative in this action.

All of the scientific data seems to point directly to the DFG as the main culprit in the demise of this species.

March 17, 2011

Mitch Lockhart
Dept of Fish and Game
830 S Street
Sacramento,
CA 95811

Re: The proposed listing of Mountain Yellow-legged Frog as an endangered species under the California Endangered Species Act.

Once a thriving species, it was noticed more than 30 years ago that Yellow-legged Frog was absent from a significant part of its historic range. It is known that "Mountain yellow-legged frogs are adapted to high elevations without aquatic predators. Widespread stocking of non-native trout in high elevation Sierra Lakes by the Dept of Fish and Game has been the primary cause of the decline for the species." This quote is from Knapp from the Center for Biological Diversity. It places most of the blame squarely at the feet of the California DFG. The continual stocking of hungry fish into rivers and streams that had few or no fish a century ago when the frogs thrived is clearly leading to the destruction of the frog habitat. The hungry fish consume tadpoles making it impossible for the frogs to thrive and multiply. It is imperative in my opinion that the CA DFG immediately cease and desist from stocking all waters of the Sierra Nevada and Southern California mountains that once were habitat to the yellow-legged frogs. A demonstration project at several California lakes, including Black Giant, Cony, Lower LeConte, Marmot, No Good, and Upper LeConte has shown the impacts of non-native fish. Prior to the fish being removed, Black Giant, Cony, and No Good lakes all lacked the Yellow-legged Frog. After the removal of fish at these lakes, the frog was once again present.

Other reasons for the decline of the species, especially in the lower elevations, appear to be disease and pesticides. Pesticides are widely used for agricultural purposes in these areas. Why doesn't the DFG work with the National Park Service to remove the trout from the National Parks and get a healthy and thriving population of frogs there and then work on one lake at a time to remove the trout.

The most important thing is to actually take action to remove negative pressure on frog populations as soon as possible. I support the immediate cessation of stocking fish in all lakes and streams of the Sierra Nevada and mountains of Southern California which were once home to the yellow-legged frogs. Actions to help the frog are far more important than legal restrictions and species listing. It would also seem that as a primary cause of the loss of frog habitat, the DFG would be at some considerable liability with respect to citizen lawsuits if the frog is listed and the DFG continues to knowingly kill the yellow-legged frog through the addition of fish that have been scientifically confirmed to eat the frog offspring and prevent its propagation.

The species, Rana sierrae, or the Sierra mountain yellow-legged frog is already a candidate species under the U.S fish and Wildlife. They have declined to list the species as endangered, but placed the population on the candidate list. This should be sufficient until the DFG takes the concrete actions necessary to protect the species such as stopping trout stocking, and limiting pesticide releases. As the US fish and Wildlife have already deemed listing at this time as unnecessary, the listing by the California DFG is also unnecessary. Listing the species will not help it recover and I support the no action alternative.

Sincerely,

Chris Ralph

California property owner

Hello,

I am emailing my concern about the possible ESL for the MYLF that could place restrictions on the plantings of trout in locations around California. Trout fishing is an important activity for businesses throughout the state and I am not sure that enough data has been collected and analyzed to show that there is a direct correlation to the recent decline of the MYLF due to trout plantings which have occurred in the state for a very long time.

The Center for Biological Diversity has continued to take aim at trout plantings even in locations that are man made environments thus it seems there motivations are not just to protect MYLF and other frogs but to harm communities that are based on fishing for trout and other species. Please reconsider such a quick move to place MYLF on the ESL and restrict trout plantings in locations.

Thanks for listening to my concerns, I would have written a letter, but just found about the public commenting period would only be open for another day.

As an active outdoorsmen I pay my license fees to the state of California through the DFG to enjoy our wonderful outdoor locations and fishing is part of that enjoyment.

Best,

Chris

Chris Zelenka
Senior Consultant
Urgent Business Care Department
Access Growth LLC

2953 Bunker Hill Lane, Ste. 400
Santa Clara, CA 95054
<http://www.accessgrowth.com/> http://www.accessgrowth.com
408-449-6816

Dear Mr. Lockhart,

The Mountain Yellow legged frog ..
It has come to my attention, that the MYLF is about to be placed on the Cali. endangered species list . I oppose this, based on these facts .
1- It is proven that the decline in said frog, is due to the DFG's practice of stocking non-native
fish (trout), in the MYLF's habitat . These fish then prey on the frogs .
In 2008, the DFG agreed to limit the stockings of trout in sensitive frog habitat .
In my opinion, this practice must first stop completly, and all trout remaining removed .
2- The last EIR done was in 2009.That has not given enough time to determine the recovery rate of the MYLF ..In fact, since there has been no new survey done, we are basing this ESL
designation on dated information . More time must be given,after protective measures are
implemented (cease stocking the trout,and remove the remaining trout), in order to
determine if these measures are working .
3- The ESL designation would cover all waters where the MYFL habitates ..This is totally unreasonable ..Especially since the cause of the decline has been identified, and
the removal of this cause, has not been fully implemented, and it's results examined .

I respectfully request, that the ESL designation be halted at this time ..
Sincerely,
Claes Nordin

dalemyer <dalemyer@aol.com

Fisheries Branch – High Mountain Lakes Program
Department of Fish and Game
Attn: Mitch Lockhart
830 S St.
Sacramento, CA 95811

Mr Lockhart:

I won't write a long letter as it sounds like DFG contributed to the problem by stocking non-native trout in the regions where the frogs are now scare. DFG should use sound science and develop a sound plan to help the frogs recover without the endangered listing that will impact many many other outdoor activities. This listing will definitely cause economy suffering to those whose livelihoods depend on the public's outdoor recreation activities. California has enough economic problems as it is and does not need anymore problems to deal with that would be caused by the MYLF listing. The cost of educating the public of what they can't do or where they can't step plus the added burden on wardens to enforce unnecessary restrictions would simply be over the top.

Dale Myer
Clayton, CA

To whom it may concern,

I recently read that the DFG is preparing to list a couple mountain frogs as endangered and is seeking public comment. The article I read in the newspaper did not include any information why the frogs are to be listed or what the plan is to restore its population.

The public has little knowledge of frogs. I doubt that the DFG has significant knowledge on the frogs it wants to list, other than the introduction of bullfrogs to California decimated many populations of native frogs.

All that I could find on your website, other than the petition to list the frogs, was the detrimental effect of non-native frogs and turtles on native frogs. Bullfrogs are in California ponds and cannot be eliminated. It's not economically feasible or practical in any way. Red-eared turtles are common pets and are often released into the wild -- most notably at public accessed ponds in rural areas. As an outdoorsman and angler, I haven't come across any red-eared turtles during my California travels. I have seen thousands of California pond turtles, which is listed as a species of concern. It's ok for a DFG introduced Florida strain of largemouth bass to eat native frogs? How about turkeys, they go to the ponds. Do they eat frogs?

If you walk any mountain stream you are going to see frogs that are not bullfrogs. That is a fact.

My comment is that a plan associated with the listing of Rana sierrae and Rana Muscosa needs to be posted for public comment. I do not believe in the ethnic cleansing of bullfrogs or turtles or people.

Please do not let the Center for Biological Diversity cast its species intolerant line into California water. The diversity of California wildlife has been increased through introduction of non-native species. The environment and ecology is dynamic and will change despite any human intervention.

Please reply that you have received this email.

Thank You, Dan Howell

HOWELL IT IS

Dan Howell

(530) 846-7962

Fax (530) 846-7962

dan@howellitis.com

www.howellitis.com

California Registered Professional Forester #2500

ISA Certified Arborist WE6478 A

Reduced

Greetings,

Thanks for the opportunity to comment on mountain yellow-legged frog listing. I support listing Rana sierra and Rana muscosa under California's Endangered Species Act. I have been fortunate enough to see MYL frogs in their native habitat in and near lakes and streams in the High Sierra. I have also come upon research sites at high altitude lakes that are working to determine the resistance of tadpoles to the chytrid fungus.

Threats like the chytrid fungus, introduced non-native trout, and drifting pesticide residues make it essential that steps are taken to protect and increase remaining populations of these native species. I support management actions addressing these threats in order help ensure the future mountain yellow-legged frogs.

Thank you,

Darla S. DeRuiter, Ph.D.
Associate Professor
Environmental Studies & Outdoor Recreation Leadership
Feather River College
570 Golden Eagle Drive
Quincy, CA 95971
(530)283-0202 x262
dderuiter@frc.edu

Dear DFG,

Thank you for allowing an extended period for comment until 1 April, 2011.

Please extend the highest protections for these amphibians.
In considering possible protected habitat, please make sure that
airborne pollution is accounted for by extending the protected habitat
so that areas that contribute pollution to the Sierra Nevada are
prohibited from using any chemical that may be airborne or become
airborne that has negative effects on MYL frog physiology or reproduction.

Thank You,

Dennis P. Davie

Date: March 18, 2011
To: California Fish and Game Commission
RE: Proposed listing of frogs as endangered species
From: Dick Bolcerek

In response to the Center for Biological Diversity (CBD) petition voted to designate all population of the Mountain Yellow Legged Frog, the following are my comments.

This petition was done because the CBD was unable to get the federal government to extend the Endangered Species Act protection to the Yellow Legged Frog.
The CBD was also upset with the Department of Fish & Game (DFG) "emergency rules" allowing exemption from "incidental take" prohibitions for frogs. CBD has twice sued DFG to force evaluation of the full environmental impacts of the fish-stocking program.

In 2010, DFG released a FLAWED environmental impact report regarding the fish stocking program, leading to another CBD lawsuit. I believe this FLAWED report is the reason we are in this situation in 2011.

The US Fish and Wildlife Service has sent a message to the CBD that they refuse to bend on their findings. I agree with the US Fish and Wildlife Service.

Let's look at some of the reasons the "Yellow Legged Frog" has lost population in the California Sierra Nevada and Transverse ranges. (not in any specific order)
1. Chytrid fungus - the number one killer of all frogs throughout the world.
2. Pesticides
3. Live stock grazing
4. Logging
5. Non native trout
6. Stocking of High Mountain Lakes by DFG
7. Off road vehicles
8. Forest fires
9. Barred owls
10. Drought
11. Flooding

I want to reiterate that I agree with the US Fish and Wildlife Service against the CBD unless they can produce fluent proof to back their lawsuit claims. Although they do not have biologists on staff, I would like to see CBD do their own in-field research than rely on old information and material.

Thank You

Dear Mitch Lockhart,

I understand that the future of california's trout stocking program is hinging on a yellow legged frog? If I may, i am 50 years young and have been trout fishing most of my life. I cannot say that I have ever seen a trout, have frogs or tadpoles in their stomachs. Even larger trout over 5 pounds, river or lake caught, trout have not contained any frog or amphibian for that matter.

Most trout contain, bugs, worms, small fish, lots of crawfish, cigarette butts, fake worms, even gravel. But alas no frogs or tadpoles.

Please don't stop this great states planting program, I have three young adults who have grown up trout fishing all over the state. The past few years have been tough, as the planting has ceased in some of our favorite places.

Thank you

Dino konrai

30 park avenue

Walnut creek, ca

I am writing to you after reading an article in our local paper, The Tahoe Daily Tribune, about a group seeking endangered status for the mountain yellow-legged frog. It is extremely upsetting to think that this status could lead to the killing of more Golden Trout, our state fish. These beautiful and rare fish deserve as much respect as the yellow legged frog. To "remove" more of these beautiful fish from our high mountain lakes is both short sighted and in many cases unnecessary. While my wife and I were backpacking in "Dusy Basin" last year we met a biologist who was catching, examining, tagging, and counting Mountain yellow-legged frogs. In several cases the frogs were coexisting in the same lakes as the golden trout, and as he said "they seem to be doing fine". It is yet to be determined if fish are the primary cause of the frogs decline, or if it's caused by a fungus or other factors. It was evident after our long conversation with the biologist that there are a lot of unanswered questions and much more study needs to be done. Many lakes have already been cleared of fish, much to the distress of the anglers who have fished those lakes for years. This shameful practice should be STOPPED!!.. Continue to study the frogs in the waters that they now live in and gather more data, and a better understanding of the frogs, before broadening the fish removal.

To those of us who passionately love the "High Sierra" this is a very important issue. I'm 53 years old and have spent my life hiking and fishing the Sierra. There is nothing better than going to the highest lakes in the range and fishing for golden trout. Please do not remove any more of them from these lakes we love so much!

I've included a few photos from our trip to Dusy Basin last summer. Thank you for allowing me to comment on this issue, and please realize how important these fish and the beautiful lakes they inhabit are to us. They are truly a national treasure.

Erich Alexander
530-577-8831

P.S. please confirm receipt of this email, thank you

eandj2@sbcglobal.net

Mitch Lockhart
Dept. of Fish and Game
830 S St
Sacramento, CA. 95811

RE: Mountain Yellow-legged Frog

The U.S Fish and Wildlife declined to list the Rana Sierrae as an endangered species, but placed the population on the candidate list.

"Mountain yellow-legged frogs are adapted to high elevations without aquatic predators. Widespread stocking of non -native trout in high elevation Sierra Lakes by the Dept of Fish and Game has been the Primary cause of the decline for the species." This quote is from Knapp from the Center for Biological Diversity. It places most of the blame at the feet of CA DFG. However, it also seems to lay some blame on all other predators of the frog such as otters, bears, and even German browns which eat everything. If All of these are removed, then we would seem to have a rebound of the frog but at what cost to the other species?

FISH-STOCKING REFORM
Native trout and amphibian populations are declining in California and throughout the West. Scientists have shown a direct link between nonnative fish stocking and these declines, which are devastating such species as the golden trout, Lahontan cutthroat trout, mountain yellow-legged frog, Yosemite toad, arroyo toad, and Cascades frog. Most native trout in California — nearly all of which are threatened by fish stocking — are listed as threatened or endangered under the Endangered Species Act, and a number of amphibians are listed as threatened or endangered or are candidates for listing in part because of fish stocking. Nonnative trout stocking may be the single biggest factor in the decline of native fish species in the Sierra Nevada. as you know the listing does nothing to protect, but does effect the economics
The Department Of Fish and Game and special interest groups are responsible for this night-mare and clearly demonstrated their lack of knowledge of fish species

Listing the species will not help it recover and I support the no action alternative.
therefore i find it uncalled-for

Frank
Fmatyus@att.net

Mitch Lockhart
Dept. of Fish and Game
830 S St
Sacramento, CA. 95811

RE: Mountain Yellow-legged Frog

i protest the listing of this Mountain yellow-legged frog (MYLF) as an endangered species under the California Endangered species Act

Non-native fish in California
It is well known that many special interest groups (e.g. Bishop Fish planting Club, Sierra Club, Visalia Sportsman Club) introduced many non-native species of fish (Non-native species Brook Trout, Lake Trout, Atlantic Salmon, Kokanee Salmon, Striped Bass and Brown Trout to name a few.) to the California water ways along with California Department of Fish and Game without knowing the full knowledge or impact of said introduction all just purely hearsay no sience or facts.
This practice (fish stocking) started in the mid-1800s and still continues to this very day. It also is well known the many of these species are predacious and salmon/Frog eggs and larva is a large part of their diet.
Special interest groups and CDFG should not be allow to make this decision as there past clearly demonstrate there knowledge for wildlife, make all party's responsible for the introduction of non-natives and have them do clean up like you would any other company with a spill
It is with this I find a No-Action Alternative to be adequate
Attached is a map of non-native species density
Thank you
Fmatyus@att.net
Source
http://ice.ucdavis.edu/aquadiv/fishbio/biofish.html
http://ucce.ucdavis.edu/datastore/datastoreview/showpage.cfm?reportnumber=746http://www.biologicaldiversity.org/campaigns/fish-stocking_reform/index.html

Mitch Lockhart
Dept of Fish and Game
830 S St
Sacramento,
CA 95811

Re: Proposed listing of Mountain Yellow-legged Frog as an endangered species

The listing Of the Mountain Yellow-Legged Frogs (MYLF) as an endangered species will hurt the economy. We all know what happen to the Logging industry in California when the spotted owl was listed as endangered, 1000s lost their jobs from business closer, supply shops, restaurant, mills, even the mom and pops grocery stores.

California needs all the revenue and can get
Rather than list this MYLF as endangered reward people to help with the MYLF recovery by catching the Non-native fish that prey on the Frog and their eggs.
As we place fines on companies with oil spills so should we place fines on those that encourage CDF&G to introduce Non-natives that harm our environment.

The CDF&G, environmental groups and sportsman clubs are responsible for the decline of MYLF with the introduction of non-natives fishes.
I respectfully encourage a no action
Fmatyus@att.net
Frank
1426 Olive St
Santa Rosa Ca
95407

Please actknowledge this e-mail

03/15/2011

Mitch Lockhart

Dept of Fish and Game
830 S St
Sacramento,
CA 95811

Re: Proposed listing of Mountain Yellow-legged Frog as an endangered species under the California Endangered Species Act.

The species, Sierra mountain yellow-legged frog is already a candidate species under the U.S fish and Wildlife. They declined to list the species as endangered

After searching the net I found, "Mountain yellow-legged frogs are adapted to high elevations without aquatic predators. Widespread stocking of non -native trout in high elevation Sierra Lakes by the Dept of Fish and Game has been the Primary cause of the decline for the species." This quote is from Knapp from the Center for Biological Diversity. It places most of the blame at the feet of CA DFG. However, it also seems to lay some blame on all other predators of the frog such as otters, bears, and even trout that eat everything. If all of these were removed, then we would seem to have a rebound of the frog but at what cost to the other species?

Then you have climate change, disease (chytrid fungus) and pesticides. Why doesn't the DFG work with the National Park Service to remove the trout from the parks and get a healthy and thriving population of frogs there and then work on one lake at a time to remove the trout?

I favor the no-action alternative to this action.

Sincerely,

Frank Tafoya
Menifee, Ca

Mitch Lockhart
Dept. of Fish and Game
830 S St
Sacramento, CA 95811

Hi Mitch,

Re: Proposed listing of Mountain Yellow-legged Frog as an endangered species under the California Endangered Species Act.

The species, Rana sierrae, or the Sierra mountain yellow-legged frog is already a candidate species under the U.S. fish and Wildlife. They declined to list the species as endangered.

In the Sierra Nevada, mountain yellow-legged frogs have disappeared from nearly all known low elevation sites on the west slope (4500-9000feet), and are extremely rare east of the Sierra crest and are increasingly uncommon in the most remote alpine habitats along the west side of the Sierra Crest (10,000-12,000 feet). In addition, most remaining mountain yellow-legged frog populations are located in Sequoia, Kings Canyon, and Yosemite National Parks and are very rare in national forests and wilderness areas. (Vrendenberg et al 2007, and Knapp and Matthews 2000a).

"Mountain yellow-legged frogs are adapted to high elevations without aquatic predators. Widespread stocking of non - native trout in high elevation Sierra Lakes by the Dept. of Fish and Game has been the Primary cause of the decline for the species." This quote is from Knapp from the Center for Biological Diversity. It places most of the blame at the feet of CA DFG. However, it also seems to lay some blame on all other predators of the frog such as otters, bears, and even German browns which eat everything. If all of these are removed, then we would seem to have a rebound of the frog but at what cost to the other species?

Other reasons for the decline of the species seem to be disease and pesticides. Why doesn't the DFG work with the National Park Service to remove the trout from the parks and get a healthy and thriving population of frogs there and then work on one lake at a time to remove the trout?

Listing the species will not help it recover and I support the no action alternative.

Sincerely,

With kindest regards, its a good life.

Gary Blankenship
RE/MAX United
DRE 01254686
760-224-2700

PS: Oh, By the way I am never to busy for your Referrals.

Your REALTOR looking out for YOU! I get the job done!

Go to http://garyb.remax.com/ , to search the mls for property in Southern California. Need to be pre-approved for a loan to know how much of a home you can afford for FREE?

Go http://mortgage.bankofamerica.com/prequalification.aspx?id=28510 or call Katherine at Bank of America 800-760-7713.

MY email garyblankenship@hotmail.com. My Fax Number is 760-728-6765. Underwater? Having trouble making your payment? Go to www.hosted.cdpe.com/garyhelps for latest information that helps.

Mitch Lockhart
Dept of Fish and Game
830 S St
Sacramento,
CA 95811

Please be assured that I am always in favor of protecting our wildlife as much as possible. Great strides have been made in the past to preserve the American Bison, the California Condor, Grizzly Bears, Black and Brown Bears, as well as numerous other endangered species. However, it is necessary to evaluate and identify the "ROOT CAUSE" of the problem for the decline of a species.

The species, Rana sierrae, or the Sierra mountain yellow-legged frog is already a candidate species under the U.S fish and Wildlife. They declined to list the species as endangered. "Mountain yellow-legged frogs are adapted to high elevations without aquatic predators. Widespread stocking of non -native trout in high elevation Sierra Lakes by the Dept of Fish and Game has been the Primary cause of the decline for the species." This quote is from Knapp from the Center for Biological Diversity. It places most of the blame at the feet of CA DFG. However, it also seems to lay some blame on all other predators of the frog such as otters, bears, and even German browns which eat everything. If All of these are removed, then we would seem to have a rebound of the frog but at what cost to the other species?

In the Sierra Nevada, mountain yellow-legged frogs have disappeared from nearly all known low elevation sites on the west slope (4500-9000feet), and are extremely rare east of the Sierra crest and are increasingly uncommon in the most remote alpine habitats along the west side of the Sierra Crest (10,000-12,000 feet). In addition, most remaining mountain yelow-legged frog populations are located in Sequoia, Kings Canyon, and Yosemite National Parks and are very rare in national forests and wilderness areas. (Vrendenberg et al 2007, and Knapp and Matthews 2000a).

Other reasons for the decline of the species seem to be disease and pesticides. Why doesn't the DFG work with the National Park Service to remove the trout from the parks and get a healthy and thriving population of frogs there and then work on one lake at a time to remove the trout.

Listing the species will not help it recover and I support the no action alternative. Please make my fellings known before a decision is reached!

Sincerely,

Gary N. Goldberg
11070 Brentwood Dr.
Rancho Cucamonga, CA 91730
(909) 230-2074 (Cell)

garyngoldberg@yahoo.com

Dear DFG,

I do not believe or want the Mountain Yellow Legged Frog put on the endangered specious list.

Gary J. West
256 Douglas Lane
Pleasant Hill, CA 94523

Due to the CA DFG's practice of stocking non-native trout in the Sierra Nevada, the yellow-legged frog is rapidly approaching the endangered species list. It seems blatantly clear the CA DFG needs to realign their thinking and practices when it comes to nearly annilating a species that has such a profound impact on humans.

I strongly urge CA DFG to start removing these trout and cease from planting them in the native habitat of the yellow-legged frog.

Sincerely,

Glenn Uecker

Fisheries Branch – High Mountain Lakes Program
Department of Fish and Game
Attn: Mitch Lockhart
830 S St.
Sacramento, CA 95811

Dear Mitch Lockhart,

It is not the "stocked" trout eating these frogs that are affecting this frog population but a combination of resource mis-management/mis-guidance and excessive pollutants being allowed into the water ways that needs to be addressed.

Plain and simple. This is also stipulated in the Center for Biological Diversity report moreso than the tout spcies themselves.

Please do not stop the stocking of the trout species in California as I truely believe this is not the root cause of the frogs' dwindling population.

Sincerely,

Glenn Abuelhaj

Dear Mr. Lockhart,

I have seen data and listened to reports about this issue. The combined information shows that this Endangered Species Act should not go through. I am asking that you stop this action now before it goes any further. I have hiked and still do hike the California back country since 1964 and I can think of no more harmful thing to this country and to those of us who so enjoy it than to have the MYLF declared an endangered species.

Respectfully,

Mr. Herbert G. Rettke
2041 San Luis Road
Walnut Creek, CA 94597
cell # 408-646-6870
pawhrettke@outdrs.net

Mitch Lockhart
Dept. of Fish and Game
830 S St
Sacramento, CA 95811

RE: Mountain Yellow-legged Frog

March 16, 2011

This is in response to the proposed listing of the Mountain Yellow-legged frog as an endangered species under the California Endangered Species Act.

The scientific data points directly to the DFG as the culprit in the demise of this species. The DFG's continous stocking of fish in the habitat for the Sierra Mountain yellow-legged Frog is the primary cause of the decline of the species. Untill this practice is stopped and all of the trout are removed from the lakes, streams and waterways that the frog inhabits, then the species will continue to decline. The listing of the species as endangered will do no good.

Pesticides are also contributeing to the decline of the species by killing them outright or weakening them so they are susceptible to diseases, including a chytrid fungus that recently ravaged many yellow-legged frog populations.

The U.S. Fish and Wildlife declined to list the Rana Sierrae as an endangered species, but placed the population on the candidate list. This should be sufficient until the DFG takes the actions necessary to protect the species such as stopping trout stocking, pesticide release, and fisherman from tromping through the shallow waters that the frog lay their eggs in.

I favor the no-action alternative in this action.

Sincerely,

Jack Gunderson

45673 Clubhouse Dr.

Temecula Ca 92592

jgunderson@adelphia.net

Department of Fish and Game,

The yellow legged frog is not on the Federal Endangered Species List and California should not presume to take the lead on incomplete and speculative studies. While the population of this particular frog may vary, there is no known ideal population, is likely to fluctuate as do many species, and is does not eliminate the presents of frogs in that ecosystem. "Saving" a species - if actually possible - may in fact be counter-evolutionary as it presumes a static ideal.

The government paid out more than $4.7 billion from a fees fund between 2003 and 2007, the majority had nothing to due with improving, protecting, or sustaining the environment, but "strategic litigation" where awards are granted and attorney fees paid to the in-house legal staff of the environment group. Strategies of overwhelming agencies with filings, making adequate compliance a near impossible feat, result in judges ruling in favor of the environmental group. This results in awards and fees that are collected not to protect the environment, or public health, safety, or welfare, but are for the apparent sole purpose of enriching the organization. How much of the environment could/would have been enhanced with the $4.7 billion dollars of the U.S. citizens money instead of paid to the environmental groups that created nothing but fear and chaos?

The yellow-legged frog is a case in point. Incomplete science and speculation of extending short term observations is being used to change fish stocking programs by Fish and Game. It has be presented that " Whole lake field experiments have shown that when non-native trout are removed, both Rana sierrae and Rana muscosa populations rebound (Vredenburg, 2004; Knapp etal. 2007). While it is clear that introduced trout negatively affect R. sierrae and R. muscosa mainly through predation on tadpoles, trout also compete for resources with adult frogs. A food web study that used stable isotopes to trace energy through the Sierran lake food webs concluded that introduced trout are superior competitors and suppress the availability of large aquatic insects that make up a major portion of the diets of adult frogs (Finlay and Vredenburg 2007)." What is substantially missing is based on the flawed premise that when native fish populations return to normal levels, that the frog populations will not be reduced as well. While the assumption the "stocked fish' are superior predators may be true, it ignores that native trout likely also feed on yellow-legged frog tadpoles and suppress availability of of large aquatic insects that make up a major portion of the diets of adult frogs.

The other major predators of the yellow-legged frog (in this example the Foothill Yellow legged Frog) are diving beetles, water bugs, garter snakes, rough-skinned newts, bullfrogs, and native toads. There apparently are no/few citations as to the percent of population reductions by these predators, but then an Agency has money and the predator does not.

A lethal disease, chytridiomycosis, caused by an aquatic fungal pathogen Batrachochytriumdendrobatidis is found worldwide and is not local to the Western U.S. and is not exacerbated by human activity. No amount of relegation is going to suppress this natural phenomenon. And while many well intentioned environmental and scholastic institutions are attempting to stem this disease, this kind of self-righteous meddling often - as the historic record documents - creates disastrous unintended consequences.

Habitat modification due to un-seasonal fluctuation of water levels and temperature reduction by dams - often for, and occasionally in agreement with commercial rafting companies - may (speculative) cause significant reductions of the frog populations. a dam on the major river of the frog's home. By placing it there, they have altered about 94% of the possible procreation areas for the frogs, which has greatly affected the population. One study suggests that the “data from a comparably-sized undammed river fork in the same system…demonstrated that both the number of potential sites and the total number of egg masses were…higher on this fork than in our main stem,” and so the unseasonal flooding required by the dam was negatively affecting the mating behavior of the frog. The temperature of the water is also lower than it was before the dam was put into place. The water’s temperature is kept artificially lower than normal for fish development, which consequently slows the development of R. boylii. The colder temperatures appear to make it more difficult for the

frogs to develop at a normal rate which may leave more of the young species prey to many other animals.

The fact that an Environment group(s) have determined that a species is endangered, and it is up to the governing Agency to prove them wrong, is not the proper management of natural resources or the environment.

I propose that the Yellow Legged Frog not be placed on the Endangered Species List.

James Robert Lee, Jr.
Landscape Architect R.L.A. #1528
102 Pacific Ave., Auburn, California

Dear Mr. Lockhart, et al.:

I would like to express concern about the proposed listing of the yellow-legged frogs as an endangered species.

I find it curious and suspicious that two distinct species are being listed together, for the purposes of labeling BOTH as endangered. This suggests that neither, alone, would qualify for the status but that combining the two, with their combined habitat, is strategically manipulative of the data of either species individually.

The status of this/these species is a result of their environment, and either its change or its stasis; to alter this or to initiate or encourage measures that would protect these frogs would be to further alter their habitat, or to hinder the natural progression occurring therein. For example, if declining amounts of food is a factor, then protecting the frogs will impact the food sources even more, further endangering the frogs. If predation is a factor, protecting and attempting to increase frog numbers will only lead to healthier predator numbers, and declining numbers of frogs. If, in an effort to increase the frog numbers, either additional food is introduced, whether native or non-native, that would constitute unnatural manipulation of their habitat and likely lead to other problems, like endangering the flora that the frogs' food might consume; likewise, artificially decreasing the numbers of predators will have farther-reaching consequences to their habitat.

There is no reason to endanger the entire ecosystem for the preservation of two frogs. If they were huge contributors to their habitat, then they would be thriving. If they have any cultural or historical significance, then it has been entirely understated, because I have never heard it; in other words, they are not California grizzly bears, quail, garibaldi, golden trout, et al. If they happen to be the state frog, the immediate question would be "WHY??"

If they have been overhunted (overgigged?) then I would be equally puzzled, but it would explain preserving the remainder out of a sense of guilt and obligation for reversing human interference, a la wolves, bison, moutntain lions, et al., but I have never heard that case made. In fact, if listing these frogs causes interference with current human activity in their habitat, e.g. closing it to fishing or hunting, then all of the species that have successfully adapted to that activity will be affected: Populations of the targeted species of fish or game will become unbalanced, their food source will suffer, and the entire ecosystem will be thrown out of balance, possibly endangering fish and game of greater economic and nutritional value than the frogs.

If the numbers of these frogs are declining, it must be from some natural progression and in the interest of their habitat; if their habitat were suitable and provided ample resources for them, then the frogs would be thriving. If they are not, then it means their habitat no longer supports them, and any effort to preserve them will endanger the remaining species in their ecosystem.

Sincerely,

James White

Mitch Lockhart,

I am against placeing the "Mountain Yellow Legged Frog" on the endangered species list.

I feel that the decline to these frogs is primaily due to California Dept. Of Fish & Games programs of trout planting practices of native and "non- native fish, pesticides and disease (chytrid virus). All of these causes should be addresed first.

California Dept. OF Fish & Game should be made responsable for the actions.

Please take all of this information in to careful concederation.

Best Regards

James D. Yerby Jr.
2240 Gardendale Cr.
Medford, Oregon
97504
541- 772-9634

Subject: Mountain Yellow Legged Frog
Created By: **grizzwag@charter.net**
Scheduled Date:
Creation Date: 3/16/2011 8:22 PM
From: Jim Yerby <grizzwag@charter.net>

Mr. Lockhart, I don't understand why CA DFG seems to always try, and get away with blaming different user groups for there own short comings. This was solved 2000 with Knapp and Mathews and again in 2007 with Vrendenberg studies. The non native trout you have been introducing to CA. waters is the main reason for the decline of this small creature. These non native species that DFG has introduced needs to be removed immediately from all of CA.s lakes, streams and any other water ways that this creature inhabits.

Therefore I strongly recommend the no action alternative.
Sincerely Joe Mann

Mr. Lockhart

I am writing in responce to the question of the ESL listing of the Mountain Yellow-Legged Frog.

We live in a State and Country where we promote family time and the ideology of getting outdoors with our kids and families. One of the favorite activity of many California families is to go fishing. My kids and I enjoy it as do many family friends. The questions that the Center for Biological Diversity has raised may be valid in regards to some situations but in most cases I feel they are trying to push their ideology on the State. In April 1870, the California State Legislature passed "An Act to provide for the restoration and preservation of fish in the waters". So for close to 140 years this wonderfull state we live in has viewed the stocking of fish as an act of restoring and preserving our fish. It has since evolved into a way to get the family outdoors as well as a way for families struggling with the current economic situations to put food on the table.

I understand and can appreciate the need to protect species that are endangered, threatened or on the verge. But is this frog truly endangered because of the stocking of trout?? Would it not be more reasonable to think that the reasons for the reduced numbers of this frog are caused by more obscure issues facing our state. Reduced water levels in our lakes during drought years, development or even polution. Being and Angler who fishes all over this state and in lakes and reservoirs that have many species of fish I can tell you a few facts I have observed over the years. First, in my years of fishing I have seen many things but one thing I have never seen is trout up shallow chasing tadpoles. It may occur and this I will not deny but being a clearwater angler I have seen some interesting things but never that. Next is the fact that this CBD is based out of state and is staffed mostly of attorneys not scientist or marine biologist. I know we have learned a lot since the stocking of fish began in the 1870's but is it still not a concern of this State to protect, restore and preserve the fish and the activity of fishing. We should always consider all options when making important changes to the way the state conducts business, but are we the people of the State of California going to take orders from a group of attorneys from Arizona or are we going to stand tall and proud as Californian's should and have in the past?

Make the right choice for all of California, anglers, families and attorneys alike.

Thank you,
John Rector
530-559-2809

John Wilson <acodisc@yahoo.com>

March 16, 2011

Mitch Lockhart

Dept. of Fish and Game

830 S St

Sacramento, CA 95811

Re: Proposed listing of Mountain Yellow-legged Frog as an endangered species under the California Endangered Species Act.

These comments are submitted by me as an individual, as a mineral miner non -native trout stocking. Before restricting public land use by placing them under them California Endangered Species Act. Take action that will actually have effect, by removing trout.

It is my understanding (see below).that Mountain Yellow-legged Frog is being impacted by

The species, Rana sierrae, or the Sierra mountain yellow-legged frog is already a candidate species under the U.S. fish and Wildlife. They declined to list the species as endangered.

In the Sierra Nevada, mountain yellow-legged frogs have disappeared from nearly all known low elevation sites on the west slope (4500-9000feet), and are extremely rare east of the Sierra crest and are increasingly uncommon in the most remote alpine habitats along the west side of the Sierra Crest (10,000-12,000 feet). In addition, most remaining mountain yellow-legged frog populations are located in Sequoia, Kings Canyon, and Yosemite National Parks and are very rare in national forests and wilderness areas. (Vrendenberg et al 2007, and Knapp and Matthews 2000a).

"Mountain yellow-legged frogs are adapted to high elevations without aquatic predators. Widespread stocking of non -native trout in high elevation Sierra Lakes by the Dept. of Fish and Game has been the Primary cause of the decline for the species." This quote is from Knapp from the Center for Biological Diversity. It places most of the blame at the feet of CA DFG. However, it also seems to lay some blame on all other predators of the frog such as otters, bears, and even German browns which eat everything. If all of these are removed, then we would seem to have a rebound of the frog but at what cost to the other species?

Other reasons for the decline of the species seem to be disease and pesticides. Why doesn't the DFG work with the National Park Service to remove the trout from the parks and get a healthy and thriving population of frogs there and then work on one lake at a time to remove the trout?

Mitch Lockhart
Dept. of Fish and Game
830 S St
Sacramento, CA 95811

RE: Mountain Yellow-legged Frog

March 17, 2011

My comments are in response to the proposed listing of the Mountain Yellow-legged Frog as an endangered species under the California Endangered Species Act.

After doing several hours of research on the internet I've come to the conclusion that the answer to the declining population of the Mountain Yellow-legged Frog is greatly the responsibility of the DFG. As I understand it, the decline is because the DFG has stocked non-native trout in the Sierra Mountains.
It seems to me, that the DFG should stop stocking non-native trout and start removing these trout.

I understand the the U.S. Fish and Wildlife as placed the Mountain Yellow-legged frog on candidate list. This should be sufficient until the DFG takes the necessary actions to stop planting, remove the non-native trout.

I that that no action should be taken.

Johnnie L. Cline
310 Melody Ln
Oroville CA 95966

*Public Comment – Yellow Legged Frog 2011 **California***

* *

*I strongly disagree to the following recommendations for managing the Yellow Legged Frog In **California**.*

* *

Concerned Citizen:

* *

Judy A Finley

Sonora, CA

The Petition makes the following general recommendations for managing the MYLF in California:

x Protect mountain yellow-legged frog habitat from habitat degradation related to livestock grazing, off-road vehicles, urban sprawl and other factors.

x Conduct research on the impacts of pesticides on mountain yellow-legged frogs and ban use of pesticides in the Central Valley with known negative impacts on frog populations.

x Take steps to stop the spread of chytrid fungus by limiting travel to areas where frogs have tested positive for the disease, requiring researchers to follow strict hygienic protocols, and educating the public about not handling or transporting frogs.

x Cease all stocking of trout in lakes with mountain yellow-legged frogs and in lakes in the same sub-watershed with mountain yellow-legged frogs.

x Non-native trout should be removed from many lakes to allow further recovery of mountain yellow-legged frogs. Fish removal should also be planned for whole watersheds in order to allow development of mountain

yellow-legged frog meta-populations, increasing the species resilience to individual population extinctions related to disease and other factors

From: keith mc
Sent: Thursday, March 17, 2011 9:12 AM
To: MYLF@dfg.ca.gov
Subject: Endangered Species??

After reading this, why list it as endangered if it isn't there!
Keith McRobert
Cochise, Az.

In the Sierra Nevada, mountain yellow-legged frogs have disappeared from nearly all known low elevation sites on the west slope (4500-9000feet), and are extremely rare east of the Sierra crest and are increasingly uncommon in the most remote alpine habitats along the west side of the Sierra Crest (10,000-12,000 feet). In addition, most remaining mountain yelow-legged frog populations are located in Sequoia, Kings Canyon, and Yosemite National Parks and are very rare in national forests and wilderness areas. (Vrendenberg et al 2007, and Knapp and Matthews 2000a).

"Mountain yellow-legged frogs are adapted to high elevations without aquatic predators. Widespread stocking of non - native trout in high elevation Sierra Lakes by the Dept of Fish and Game has been the Primary cause of the decline for the species." This quote is from Knapp from the Center for Biological Diversity. It places most of the blame at the feet of CA DFG. However, it also seems to lay some blame on all other predators of the frog such as otters, bears, and even German browns which eat everything. If All of these are removed, then we would seem to have a rebound of the frog but at what cost to the other species?

Mitch Lockhart

Dept. of Fish and Game

830 S St

Sacramento, CA 95811

Comments on: Mountain Yellow-legged Frog

March 16, 2011

These comments are in response to the proposed listing of the Mountain Yellow-legged frog as an

endangered species under the California Endangered Species Act.

All of the scientific data seems to point directly to the DFG as the main culprit in the demise of this species.

DFG's continued efforts to stock fish in the habitat for the Sierra Mountain yellow-legged Frog is the

primary cause of the decline of the species.

This practice of the DFG must be stopped immediately in all the lakes, streams and waterways that the frog inhabits.

Unless this is done the species will continue to decline.

Listing the species as endangered will do absolutely no good.

Pesticides greatly contribute to the decline of the species by killing them outright or weakening them so they

are susceptible to diseases, including a chytrid fungus that recently ravaged many yellow-legged frog

populations.

People responsible for management of all of these species never seem to learn from past experiences with

pesticides such as those being used.

Case in point, many years ago, (1950's), DDT was widely used and in a farming area we owned at the time, many

species such as hawks, pheasants, quail, to mention a few almost became extinct. Once it was banned it took

many years before the wildlife was able to make a comeback, over 50 years. They just do not understand it

affects the entire food chain.

Put the blame for this where it should be placed, not on the usage,access and enjoyment of the land!!!!!!

The DFG here in California is doing the same thing that DFG was doing in Colorado.

As a landowner, we even created and signed over an area as an easement for useage by the public as a

wildlife area and wildlife habitat to help preserve the wildlife.

Guess what,,, when I visited the area 2 years ago, the easment had been sold and a private home was built on it.

So much for the DFG preserving the wildlife.

The Mountain Yellow-legged frog is just another example of mis-management!!!

Recreation, Mining and Dredging is not the cause!

The U.S. Fish and Wildlife declined to list the Rana Sierrae as an endangered species, but placed the

population on the candidate list. This should be sufficient until the DFG takes the actions necessary to

protect the species such as stopping trout stocking and pesticide release.

If these are stopped it will take time but they will have a chance of making a comeback.

I favor the no-action alternative in this action.

Sincerely,

Ken Mahaney

27188 Embassy St.

Sun City, CA 92586

Dear Mr. Lockhart,

I am sending this email because I have recently become aware of the push to list the Yellow Legged Frog as endangered. I do not understand how listing the frog as endangered is going to help.

From the information I can gather (internet is a wonderful tool), the frogs demise is due in large to Department of Fish and Game practices of stocking fish. Maybe it would be more beneficial to send an inter office memo telling the DFG not to mess with Mother Nature. Quit planting fish where they don't belong.

It seems that another large contributor to the frogs demise are pesticides. Although I would love nothing more....I think you will have tough row to hoe (pun intended) telling the agricultural community to stop using pesticides!

THE DAM MUST GO!!!!!! The following is a quote from a Wikipedia article. Link provided below. I'm sure you guys already have access to this information.

According to the following quote, this dam wiped out 94% of the frogs mating grounds!!!!!

"Along with the problems associated with pesticides being washed up in the Foothill Yellow-Legged Frog's habitat, in Trinity County, California there is a dam on the major river of the frog's home. By placing it there, they have altered about 94% of the possible procreation areas for the frogs, which has greatly affected the population.[3] One study suggests that the "data from a comparably-sized undammed river fork in the same system...demonstrated that both the number of potential sites and the total number of egg masses were...higher on this fork than in our main stem," and so the unseasonal flooding required by the dam was negatively affecting the mating behavior of the frog.[9] The temperature of the water in Trinity County is also lower than it was before the dam was put into place. To keep up with demands of fisheries, the water's temperature is kept artificially lower than normal, which consequently slows the development of R. boylii.[9] Therefore, the colder temperatures are making it more difficult for the frogs to grow quickly, which sometimes leaves the species prey to many other animals that dine on their young. The problems occurring between the Foothill Yellow-Legged Frog and the dam are being handled by several herpetological organizations, along with the Forest Service, to find ways to alter the effects in a beneficial way for the frog.

Here is the link to the article....
http://en.wikipedia.org/wiki/Foothill_Yellow-legged_Frog We are really in trouble now. The USFS is getting in the game too.

Lastly, it appears that a fungus is a big player as well. Now tell me how listing the frog as endangered is going to stop a fungus? Do you think the fungi will be afraid and have a meeting where the frog will be declared off limits?

So I guess if the frog is listed as endangered we must immediately take action. Rotenone all lakes to kill the fish (or will this kill the frogs too?) By the way here is a link to the effects of Rotenone and it's adverse side effects on humans. http://en.wikipedia.org/wiki/Rotenone Are you familiar with Lake Davis, the drinking water supply for Portola? I believe this tactic was applied there by the DFG to eradicate some fish. It also says in there that the effects can last up to 6 months in water....hmmmmmm?

Then after we kill all of the fish, we rip out the dam on the Trinity river. This simply must go! Shut down the power generators and rip it out!

After taking care of the dam, we will stop all use of pesticides. I actually wish we could accomplish this one!

Then for the grand finale we call a meeting and invite all of the fungi.

Once inside we seal the door and burn the place to the ground!!!

Whew....We have our work cut out for us. If you haven't come to this conclusion yet...I am against listing the frog as endangered.

Thanks for taking the time to read this.

Kenny Bowman

--
The greatest problem in communication is the illusion that it has been accomplished....Ambrose Bierce

Kenny B <6xnbugs@gmail.com

Mitch Lockhart
Dept. of Fish and Game
830 S St
Sacramento, CA. 95811

Please know I am commenting on the proposed listing of the Mountain Yellow-legged frog as an endangered species under the California Endangered Species Act. I favor the no-action alternative in this action.

Pesticides are a major contributor to the decline of the species by killing them outright or weakening them so they are susceptible to diseases, including a chytrid fungus that recently ravaged many yellow-legged frog populations.

The Scientific data points directly to the DFG as the main culprit in the demise of this species. The DFG's continued efforts to stock fish in the habitat for the Sierra Mountain yellow-legged Frog is the primary cause of the decline of the species. Unless this practice is stopped immediately and the all of the trout are removed from the lakes, streams and waterways that the frog inhabits, then the species will continue to decline. Listing the species as endangered will do no good.

The U.S Fish and Wildlife declined to list the Rana Sierrae as an endangered species, but placed the population on the candidate list. This should be sufficient until the DFG takes the actions necessary to protect the species such as stopping trout stocking, pesticide release, and fisherman from tromping through the shallow waters that the frog lay their eggs in.

Thank you,

Laurie Wetzel

1250 Castle Creek Ranch Rd

Newcastle, CA 95658

March 17, 2011

Mitch Lockhart
Department of Fish and Game
830 S St
Sacramento, CA 95811

Re: Proposed listing of Mountain Yellow-legged Frog as an endangered species under the California Endangered Species Act.

Mr. Lockhart

This letter is in response to the proposed listing of the Sierra Mountain Yellow-legged Frog as an endangered species under the California Endangered Species Act. The species, Rana sierrae, is already a candidate species under the U.S. Department of Fish and Wildlife. They declined to list the species as endangered.

Quote: “In the Sierra Nevada, mountain yellow-legged frogs have disappeared from nearly all known low elevation sites on the west slope (4500-9000feet), and are extremely rare east of the Sierra crest and are increasingly uncommon in the most remote alpine habitats along the west side of the Sierra Crest (10,000-12,000 feet). In addition, most remaining mountain yellow-legged frog populations are located in Sequoia, Kings Canyon, and Yosemite National Parks and are very rare in national forests and wilderness areas.”(Vrendenberg et al 2007, and Knapp and Matthews 2000a).

"Mountain yellow-legged frogs are adapted to high elevations without aquatic predators. Widespread stocking of non -native trout in high elevation Sierra Lakes by the Department of Fish and Game has been the Primary cause of the decline for the species." This quote is from Knapp from the Center for Biological Diversity and places most of the blame at the feet of California Department of Fish and Game. However, it also lays some blame on all other predators of the frog. If all of these are removed, then we would seem to have a rebound of the frog. But, at what cost to the other species?

Other reasons for the decline of the species are disease and pesticides. Why doesn't the DFG work with the National Park Service to remove the trout from the parks and get a healthy and thriving population of frogs there? Then, they could work on one lake at a time to remove the trout.

Listing this species as endangered will not help it recover and I support the no action alternative.

Sincerely,

Lorrie Young

Dear Folks at DFG,
I read that the DFG may be contemplating a cessation of trout plants in the belief that such action may help protect the yellow legged frog. I would disagree with such action. I believe the biggest threat to all of our state amphibians, other than fungus (no-one knows the vectors, and it even gets into remote amazon and andean waterways where we do not plant trout), habitat destruction, pollution and acid rain, is the white egret. Their numbers are increasing noticeably, and they are voracious. Are they not an invasive species? Please do not stop trout planting until reasonable and significant cause and effect can be clearly proven. Further, if white egrets are decimating our amphibian population, action must be taken to remove them or eliminate them first. Thank-you for your consideration.
Sincerely,
M. Gibson

mgibson@infosite.com

Mr. Mitch Lockhart:

As a lake and stream fisherman here in Northern California, I was alarmed that the CA DFG wants to put the Mountain Yellow Legged Frog on the CA Endangered Species List. Along with many other fishermen, I fish for trout in these lakes and streams. Putting this particular species of frog on the endangered list and not stocking the lakes with trout will eliminate a food source for now and the future of our children. As the economy continues to decline, fishing for trout and other types of fish puts food on our table.

Please consider the food source that the trout provides and continue planting trout in the lakes and streams of Northern California.

Yours truly,

Manuel Castro

1852 Sukh Drive

Yuba City, CA 95993

I write this letter to ask that you refrain from adding the two species of frogs named above to the endangered list as pushed by the Center of Biological Diversity.

These high elevation montane riparian natives have experienced reduced population numbers due to various natural and unnatural occurrences, primarily the introduction of nonnative trout and the pathogen *B. dedrobatidis*. Studies and practices have already proven to increase the population numbers, as follows:

Their population numbers increased remarkably after the removal of the nonnative trout.

The amphibian chytrid fungus, B. dendrobatidis, which first appeared in South Africa in 1938, has appeared all over the world. It first appeared in the U.S. in Sequoia National Park in 1975. Lab and field studies are ongoing to determine if bacterial augmentation strategies will effectively control *B. dendrobatdis*. Even in the absence of such strategies, some populations of the Sierra Nevada mountain yellow-legged frogs persist while others are susceptible. Possibly this falls under the survival of the fittest syndrome.

Stocking of nonnative fish began in 1850. The trout have been observed and documented eating yellow-legged frogs since 1938. Likewise the pathogen has been observed worldwide since 1938. Therefore the primary causes for the decline in population numbers has been ongoing for over 70 years in the case of the pathogen and over 160 years in the matter of the nonnative trout. Yet the *Rana sierrae and Rana muscosa* do continue to persist to this day.* *
*
*
Placing these frogs on the endangered species list is neither warranted nor necessary and should not be done merely to placate the Center for Biological Diversity. As a resident of El Dorado county, living in the montane zone of the Sierras, I am fully aware of the impact and injustice that this proposed listing, were it to be done, would perpetrate on the people whose livelihoods depend on logging, mining, grazing, farming, public land use and private land zoning. Recreation and thus tourism would also be impacted.

Residents here love and respect the environment and myriad of creatures great and small here in the Sierras. Unfortunately, it appears that in the quest to save the environment by some groups today, they are literally throwing the baby out with the bath water, and often doing greater harm than good.

Respectfully,

Marie Peaker

March 18, 2011

Mitch Lockhart
Dept of Fish and Game
830 S St
Sacramento,
CA95811

Re: Proposed listing of Mountain Yellow-legged Frog as an endangered species under the California Endangered Species Act.

These comments are submitted by me as an individual.

The species, the Sierra mountain yellow-legged frog is already a candidate species under the U.S fish and Wildlife. They declined to list the species as endangered.

All of the scientific data seems to point directly to the DFG as the main culprit in the demise of this species.
Mountain yellow-legged frogs are adapted to high elevations without aquatic predators. Widespread stocking of non -native trout in high elevation SierraLakesby the Dept of Fish and Game has been the Primary cause of the decline for the species.

Other reasons for the decline of the species seem to be disease and pesticides.

Why doesn't the DFG work to remove the trout from the parks and lakes to get a thriving population of frogs there.
However, it also seems to lay some blame on all other predators of the frog such as otters, bears, and even German browns.

Listing the species will not help it recover and I support the no action alternative.

Sincerely,
Mark Hepfner
6833 Capital CircleSacramentoCa 95828

Hi
While I like to give respect to all critters and their place on our earth I also think about how I came to have that caring. As a valley kid my introduction to the wonders of the Sierra first came on a trout fishing trip with my neighbor buddy and his fisherman Dad.
Trout plants help draw people to experience mountain lakes and streams and I feel this leads to better appreciation of our natural world and understanding that frogs ought to have a place.
From what I've learned of endangered frogs is that planted trout are just one factor that affects them negatively and removing trout from the water doesn't always mean the frogs will flourish.
Give frogs a chance by giving valley people better opportunity to experience and learn about their habitat. Give the frogs some remote water on their own, but continue to plant trout in recreation areas.
My daughter Martha's first mountain camping trip was as an infant and she slept in a cardboard box. Did her early mountain experiences make a difference on how she feels about frogs and trout? I dunno. You might ask her ... she works for CA DFG as a fishery biologist.
I've recently been digitizing my color slide collection and I've attached a couple I thought might interest you. One is of Martha after she outgrew the cardboard box. The other contains a critter that might also be a factor in how the frogs are doing.
Mark Volkoffretired photographer

To Whom It May Concern,

I would like to submit a comment in support of the no-action alternative for the proposed listing of the Mountain Yellow Legged Frog (hereafter referred to as MYLF). As an avid Sierra Nevada backpacker and fisherman who has also worked as part of a field crew conducting surveys of MYLF populations in Kings Canyon National Park, I am a proponent of both maintaining Sierra backcountry fisheries as cultural and recreational resources and conserving the MYLF as an integral part of a healthy Sierra ecosystem. I believe that both ends can be achieved, but only if the MYLF is not listed as an endangered species.

Listing the MYLF as an endangered species will likely restrict research access to existing populations. This is a concern that has been voiced by many researchers working with the MYLF in the Sierra Nevada, who argue that this access is crucial to the continued understanding of the species and the factors which have contributed to its decline. Introduced trout are indeed a significant factor in the demise of native populations of MYLF, but they are not the only factor, nor are they the most pressing. Chytridiomycosis (otherwise known as chytrid fungus) has been found to infect the skin of the MYLF and to cause the death of individual animals once levels of the fungus grow to a certain height. Although it has been established that chytrid fungus is present in many parts of the Sierra, and that it infects and can kill MYLF, we do not know where it originated and we do not know how the spread of chytrid can be prevented. There is also a concern that listing the MYLF as an endangered species will possibly shift the oversight and control of management decisions from a local level to a state and/or federal level, a shift which may usher in decisions and legislation that are not necessarily informed by the research that is being conducted on location by localized agencies. Without allowing for access to and further study of the MYLF and its relationship with chytrid fungus on the scale of both the individual lake basin and the entire Sierra Nevada range, listing the MYLF as an endangered species could very possibly do more to damage the species' chance for survival than to preserve it.

Additionally, listing the MYLF as an endangered species may result in the elimination of many quality Sierra fisheries in order to reintroduce the MYLF into several parts of its historic range. It is impossible from both a logistical and practical standpoint to completely eradicate all nonnative trout from each of the thousands of fish-bearing lakes of the Sierra Nevada, so the process of fish removal will rely upon selecting individual basins and/or lakes based upon their specific attributes. These attributes will include factors such as accessibility, lake size, and depth, which all affect both the ease of fish removal and the capacity of the lake or basin to successfully retain a reintroduced MYLF population. However, I believe that these attributes should also include factors such as the recreational value of the lake, including the relative quality of its fishery. If two

lakes or lake basins are equally attractive candidates for fish removal and MYLF repopulation, then why not take the recreational and aesthetic value of the lake or basin's fishery into consideration during this process?

Although trout may have been introduced into the Sierra relatively recently, the past hundred years during which trout have existed in the high mountain lakes and streams of the Sierra Nevada have been long enough to establish a substantial cultural value for Sierra fisheries. Fishing for trout in the Sierra has become a significant chapter in the book of the Californian and American wilderness experience. The golden trout is designated as California's state fish, and many fishermen including myself caught their first golden trout (and continue to fish for them today) in a stream or lake in which the species did not originally exist. Trout may have been introduced to those lakes by way of a coffee can and mule, or via an aerial plant by a CDFG airplane, but their origins do not lessen the cultural, historical, and personal significance of their presence today – and their continued presence in the future – to thousands of Californians and Americans who visit the Sierra Nevada each year. Therefore, I support a plan for the conservation of the MYLF which includes comments and input from Sierran anglers, many of whom can share recent personal observations from several lakes that can prove valuable to the process of evaluating new MYLF habitat and fish removal targets.

Because of these reasons, I support the no-action alternative in the proposed listing of the Mountain Yellow Legged Frog.

Thank you,

Matt Young

Mitch Lockhart
Dept. of Fish and Game
830 S St
Sacramento, CA. 95811

March 15, 2011

This comment is in response to the proposed listing of the Mountain Yellow-legged frog as an endangered species under the California Endangered Species Act.

The U.S Fish and Wildlife placed the population on the candidate list, but declined to list the Rana Sierrae as an endangered species. According to Knapp from the Center for Biological Diversity: "Mountain yellow-legged frogs are adapted to high elevations without aquatic predators. Widespread stocking of non-native trout in high elevation Sierra Lakes by the Dept of Fish and Game has been the Primary cause of the decline for the species." It places most of the blame at the feet of CA DFG. However, it also seems to lay some blame on all other predators of the frog such as otters, bears, and even German browns which eat everything. If All of these are removed, then we would seem to have a rebound of the frog but at what cost to the other species?

It would seem to me that placing the Mountain yellow-legged frog on the Calif. endangered species list will have absolutely no effect until and unless the DFG:
1. stops stocking all lakes and rivers with non-native trout species.
2. traps, kills or removes all otters from any waterway or body of water that the frog inhabits.
3. traps, kills or removes all bears from any waterway or body of water, or prevents them gaining any access to the waterway or body of water that the frog inhabits.
4. traps, kills or removes any other mammal, bird or amphibian that might eat the frog.
5. removes all german brown trout from all waterways or bodies of water that the frog inhabits.
6. prohibits and prevents any sport or commercial fisherman from tromping through the shallow waters that the frog lay their eggs in.
7. prohibits any person, thing or activity from disturbing the riparian habitat that the frog inhabits.
8. preventing any and all pesticide releases which kills the frog outright or weakens the frog so they are susceptible to diseases, including a chytrid fungus that recently ravaged
many yellow-legged frog populations.

Until the DFG is willing to take these actions necessary to protect the species and promote a rebound of the population of the species, leaving the species on the candidate list as the U.S Fish and Wildlife has done should be sufficient.

I favor the no-action alternative in this action.

Sincerely,
Michael Henry
20877 Caylor Drive
Soulsbyville, CA 95372

It is my belief that your own practice of stocking trout is the main reason for there decline along with pesticides and disease. I also feel that they should not be added to the ESL... list until these matters have been addressed first. thank you Michael Laier 9759 broadmoor way Kelseyville Ca. 95451

Mitch Lockhart
Dept. of Fish and Game
830 S St
Sacramento, CA. 95811

SUBJECT: Should the Mountain Yellow-Legged Frog be listed as an Endangered ?

The short version? NO!

For the following reasons.

The Mountain Yellow Leg Frog (MYLF) has populations all across this state and others. So how could they be endangered? Has every potential habit in every water system been inspected ? Where is the current and undeniable evidence to show they are endangered in 2011?

The MYLF Life Cycle

The female MYLF lays 40-300 eggs each spring, which hatch into tadpoles in 2-3 weeks. To be more than fair, lets say only half of 40 eggs hatched. So 20 eggs, turning to tadpoles in 3 weeks. It could be up to 3 years before the tadpoles become frogs due to the extreme cold and ice conditions at high mountain lakes. Shorter in warmer areas. So 1 adult female MYLF creates 20 thriving tadpoles that become frogs in 3 years, and are sexually mature and reproduce in 3 more years. So. Worst case scenario, 20 more mature frogs in 6 years. Six years later 20x20=400 more mature frogs. 12 years and 1 female produces 400 mature frogs. So if you had only 100 tadpoles in any habitat, you would have in 6 years you would have 40,000 mature reproducing frogs.

Then reduce some of the predators (who like to eat frog legs) where-ever possible, and with reasonable weather and rainfall, the MYLF populations should zoom back.

Does a female frog lay eggs only once a year? Well, multiply that number of times into the above scenario and one female could easily produce 3-4 times my conservative yearly estimates.

So who has done current frog counts? And where? If it was done at the last place they counted, who is to say the population there at the last count has not moved a mile up or downstream to a more remote spot with more favorable habitat. Do surveyors walk every foot of a habit stream or lake looking for evidence of a colony?

Putting a species on the California ESL, in spite of the USFWS's reluctance to do so, seems premature, especially if you are only relying on past survey counts, which were done when again?

No! I recommend the DFG not place the MYLF on California's ESL list.

However, I have a recommendation - Why not farm raise MYLFs and plant them in their known habits to increase the populations? How hard could it be to raise frogs? Hasn't science progressed a few steps beyond raising frogs in a laboratory, by now?

Sincerely,
Michael Rafferty
36743 Hillview Rd
Hinkley, CA

Mitch Lockhart
Ca. Dept. of Fish and Game
830 S St
Sacramento, CA. 95811

RE: ESL listing of the Mountain Yellow-legged Frog

March 15, 2011

Mr. Lockhart, the following comment are in response to the CDFG placing the Mountain Yellow-legged frog on the endangered species list by authority of the California Endangered Species Act.

Do to the potential impact on all people and activities throughout the range, both current and historic I feel there are better actions than listing this species as endangered.

Among these action are: Instruct the Department of Fish and Game to discontinue the practice of releasing hatchery raised fish in the ranges of the Mountain Yellow Legged Frog. Removal of these non-native fishes from waters of the state within the range of said frog. Close scrutiny of pesticide and disease caused declines in the frog populations. Taking proactive measures along these lines will greatly improve the populations of this species of frog.

I urge you to take the "No Action Alternative" pertaining to this possible listing.

Thank you for your consideration to this matter,

Mike O'Connell
2555 Morehead Rd.
Crescent City, Ca. 95531
mikeoc4@charter.net

joescabinrental.com

These comments are in response to the proposed listing of the Mountain Yellow-legged frog as an endangered species under the California Endangered Species Act.

All of the scientific data seems to point directly to the DFG as the main culprit in the demise of this species. The DFG's continued efforts to stock fish in the habitat for the Sierra Mountian yellow-legged Frog is the primary cause of the decline of the species. Unless this practice is stopped immediately and the all of the trout are removed from the lakes, streams and waterways that the frog inhabits, then the species will continue to decline. Listing the species as endangered will do no good.

Pesticides also contribute to the decline of the species by killing them outright or weakening them so they are susceptible to diseases, including a chytrid fungus that recently ravaged many yellow-legged frog populations.

The U.S Fish and Wildlife declined to list the Rana Sierrae as an endangered species, but placed the population on the candidate list. This should be sufficient until the DFG takes the actions necessary to protect the species such as stopping trout stocking, pesticide release, and fisherman from tromping through the shallow waters that the frog lay their eggs in.

I favor the No-Action Alternative in this matter.

Sincerely,
Paul Lambert

Paul Lambert <goldgitters@hotmail.com

Paul Roberts <Paulr123@comcast.net>

I did some reading and from a layman's point of view. Maybe instead of listing it as another endangered species, take a look at what is killing it off.
Looks to me like non native trout, German browns, fires, pesticides, and excessive flooding are among the primary reasons for its decline.

Maybe Have DFG stop stocking non native fish in its habitat areas. Start systematically removing the non-native fish from their areas.
Make the Forest Service and Park Services knock it off with their "controlled burns" that always go out of control. That may give the little guys a fighting chance to re-populate.

And how about those illegal pot growers, could be a source of the pesticides.

I am against the listing, listing it will not help.
I support no action.

Paul Roberts

3-16-2011
Mitch Lockhart
DFG

re: Pproposal to list the Mountain Yellow-Legged Frog as endangered

I don't think it should be listed because listing won't help the poor frog at all, the stocked fish don't read and will continue to eat them:

http://www.biologicaldiversity.org/news/press_releases/2010/mountain-yellow-legged-frog-01-25-2010.html

I am sure have seen this article and have had the reasons pointed out to you including:

“2006 the Center for Biological Diversity filed suit against Fish and Game for failing to complete an environmental review of the impacts of fish stocking on sensitive aquatic species”

“2007 a court ordered the state agency to conduct a public review of the stocking program’s impacts”

“In 2008 Fish and Game agreed to interim restrictions prohibiting stocking trout in water bodies with species sensitive to nonnative fish. Although the state has taken steps to reduce trout stocking in areas with yellow-legged frogs, stocked trout continue to harm frog populations and limit recovery”

“Permanent protection and management decisions to stop stocking and remove trout in key frog habitats are necessary to reduce trout predation of mountain yellow-legged frogs”

“(Jan 2010, added) California Department of Fish and Game released a final environmental impact report on the impacts of stocking of hatchery fish on mountain yellow-legged frogs and other imperiled species, which unfortunately failed to adopt sufficient mitigation to protect the species from the impacts of past and ongoing fish stocking.”

So….the DFG’s EIR on Trout Stocking was finalized in Jan 2010 but they failed to propose enough mitigation measures for decreasing the stocked trout threat, to satisfy the CDB.
Thank you for your time and for looking out for our wild life

Sincerely,

Randy Duncan
1527 19th ST., Ste 410
Bakersfield, CA 93301

March 16, 2011

Mitch Lockhart
Dept. of Fish and Game
830 S St
Sacramento, CA 95811

Re: Proposed listing of Mountain Yellow-legged Frog as an endangered species under the California Endangered Species Act.

Mr Lockhart,

I understand the species, Rana sierrae, or the Sierra mountain yellow-legged frog is already a candidate species under the U.S. fish and Wildlife but it also has declined to list the species as endangered.

Since in the Sierra Nevada, mountain yellow-legged frogs have disappeared from nearly all known low elevation sites on the west slope (4500-9000feet), They are extremely rare east of the Sierra crest and are increasingly uncommon in the most remote alpine habitats along the west side of the Sierra Crest (10,000-12,000 feet). Also, most remaining mountain yellow-legged frog populations are located in Sequoia, Kings Canyon, and Yosemite National Parks and are very rare in national forests and wilderness areas. (Vrendenberg et al 2007)

Sounds like Mountain yellow-legged frogs are effected by aquatic predators. Knapp from the Center has quoted "Widespread stocking of non -native trout in high elevation Sierra Lakes by the Dept. of Fish and Game has been the Primary cause of the decline for the species." Some blame is on other predators of the frog such as otters, bears.

The DFG should work with the National Park Service to promote healthy and thriving population of frogs in already protected areas such as Parks and concentrate on reducing the predation by non-native brown trout planting in protective lakes. We need a balance of use of our National Forest and Parks.

I support the no action alternative.

Sincerely,

Reginald Jonker

Subject: Mountain yellow-legged frogs
Created By: **rejlclr@verizon.net**
Scheduled Date:
Creation Date: 3/16/2011 7:40 PM
From: <rejlclr@verizon.net>

Please continue to plant trout. Please do not forget that for 150 yrs trout have been planted. I am tired of a small contingent of Eco people wrecking the recreational pleasures of the high country. Not to mention the positive effect of reducing the bug population.

Richard Betti
914 Kilkenny Way
Pinole,CA 94564

Mitch Lockhart
Dept of Fish and Game
830 S St
Sacramento,
CA 95811

Re: Proposed listing of Mountain Yellow-legged Frog as an endangered species under the California Endangered Species Act.

These comments are submitted by me as an individual, as a mineral Estate owner, and as a Board member of Public Lands for the People. INC.

The species, Rana sierrae, or the Sierra mountain yellow-legged frog is already a candidate species under the U.S fish and Wildlife. They declined to list the species as endangered.

In the Sierra Nevada, mountain yellow-legged frogs have disappeared from nearly all known low elevation sites on the west slope (4500-9000feet), and are extremely rare east of the Sierra crest and are increasingly uncommon in the most remote alpine habitats along the west side of the Sierra Crest (10,000-12,000 feet). In addition, most remaining mountain yelow-legged frog populations are located in Sequoia, Kings Canyon, and Yosemite National Parks and are very rare in national forests and wilderness areas. (Vrendenberg et al 2007, and Knapp and Matthews 2000a).

“Mountain yellow-legged frogs are adapted to high elevations without aquatic predators. Widespread stocking of non -native trout in high elevation Sierra Lakes by the Dept of Fish and Game has been the Primary cause of the decline for the species.“ This quote is from Knapp from the Center for Biological Diversity. It places most of the blame at the feet of CA DFG. However, it also seems to lay some blame on all other predators of the frog such as otters, bears, and even German browns which eat everything. If All of these are removed, then we would seem to have a rebound of the frog but at what cost to the other species?

Other reasons for the decline of the species seem to be disease and pesticides. Why doesn’t the DFG work with the National Park Service to remove the trout from the parks and get a healthy and thriving population of frogs there and then work on one lake at a time to remove the trout.

Listing the species will not help it recover and I support the no action alternative.

Sincerely,

Mitch Lockart

Department of Fish and Game

830 S street

Sacramento, CA 95811

Regarding the listing of the Mountain Yellow-legged frog for the California Endangered Species List, it is clear from the available studies that the decline of this frog is due to trout eating the eggs and pesticide use. Unless the DFG has a scheme to remove all of the trout from the lakes and rivers, this species will continue to decline. The proposed listing will not do anything but stop human activities near the lakes and rivers where this creature resides and that will not stop the decline.

Given these facts, I favor the no listing alternative until and unless an exhaustive and total removal of trout from the rivers and streams and lakes can take place. This is literally the only way this frog can continue to reproduce and thrive once again. Also, fisherman must not be allowed to trample the eggs of this frog which lie on the sides of these waterways. This will also help the species survive.

Sincerely,

Richard Wetzel

>>> <reddy2ctsp@aol.com> 3/16/2011 8:24 PM >>>

To director at dfg: Please do not add the yellow legged frog to the endangered species list. All we have to do is remove all the brown trout from the high mountain lakes, and the frog will come back. Thank you Rick Eddy 5477 russell hollow road pilot hill ca 95664.

Re:
http://cdfgnews.wordpress.com/2011/02/16/dfg-seeking-public-comment-regarding-proposed-listing-of-mountain-yellow-legged-frogs/

I'm writing to give public comment on the listing of Mountain Yellow-Legged Frogs.

There are two aspects to this listing:

1. Whether or not the Mountain Yellow-Legged Frog is indeed endangered as defined by the relevant government regulations.

2. If the Mountain Yellow-Legged Frog is listed as endangered, what mitigating actions the CA DFG will take

Not being a scientist or one who studies frogs, I'm not qualified to speak to #1. However, when reading the Center for Biological Diversities' public statements regarding this listing, it is apparent that they are most interested #2 and are already stacking the "public relations deck" with the notion that stocked trout are the primary cause of frog population decline.

I sincerely hope that if the frog is listed that the Department will rely on peer reviewed scientific data when establishing the true causes for declines in Mountain Yellow-Legged Frog populations and planning subsequent mitigations. While any 5th grader can do a science experiment to prove that rainbow trout will eat something small and wriggly like a frog tadpole, it will take far more analysis to determine if stocked trout are a primary causal factor for frog population decline in all locations of historic abundance or just a small contributing factor.

It seems apparent that the Center for Biological Diversity has made the correct observation that stocked trout form the cornerstone of recreation in the state of California. It seems apparentthat they have begun a campaign to reduce or eliminate the stocking of trout in the state. It seems apparent that they know that in a multi-decade time frame, if they can eliminate trout stocking in the state, they can reduce the number of anglers in the state. They know this because they know where fishermen get their start in this state. They get their start fishing for stocked trout. The CBD has a long history of using specific regulatory nuances to force regulating entities to make decisions that support an unrelated or tangentially related end-game on the part of the CBD. Everything about this issue reeks of this same strategy.

While the Department may be forced to list the Mountain Yellow-Legged frog as endangered and while that may be the correct decision, the Department should not base subsequent mitigating actions on speculation or Center for Biological Diversity press releases. Those decisions should be based on unbiased science.

Sincerely,

-Rob Belloni
Owner: www.calfishing.com
swimbait@gmail.com
510-673-0176

7893 Jade Circle
Dublin, CA 94568

Mitch Lockhart 3/18/11
Dept of Fish and Game
830 S St
Sacramento,
CA 95811

Re: Proposed listing of Mountain Yellow-legged Frog as an endangered species under the California Endangered Species Act.

These comments are submitted by me as an individual, and a member of the GPAA. and two other prospecting organizations who enjoys using the streams as much as the yellow-legged frog.

The species, Rana sierrae, or the Sierra mountain yellow-legged frog is already a candidate species under the U.S fish and Wildlife. They declined to list the species as endangered.

In the Sierra Nevada, mountain yellow-legged frogs have disappeared from nearly all known low elevation sites on the west slope (4500-9000feet), and are extremely rare east of the Sierra crest and are increasingly uncommon in the most remote alpine habitats along the west side of the Sierra Crest (10,000-12,000 feet). In addition, most remaining mountain yelow-legged frog populations are located in Sequoia, Kings Canyon, and Yosemite National Parks and are very rare in national forests and wilderness areas. (Vrendenberg et al 2007, and Knapp and Matthews 2000a).

"Mountain yellow-legged frogs are adapted to high elevations without aquatic predators. Widespread stocking of non - native trout in high elevation Sierra Lakes by the Dept of Fish and Game has been the Primary cause of the decline for the species." This quote is from Knapp from the Center for Biological Diversity. It places most of the blame at the feet of CA DFG. However, it also seems to lay some blame on all other predators of the frog such as otters, bears, and even German browns which eat everything. If All of these are removed, then we might, have a rebound of the frog but at what cost to the other species or local economies that depend on the fishermen/women and others that recreate and make or supplement their incomes from the streams and pay taxes both local and state and Federal?

Other reasons for the decline of the species seem to be disease, construction of dams that have changed their habitat and pesticides. Why doesn't the DFG work with the National Park Service to promote healthy and thriving population of frogs there by raising and stocking frogs one lake at a time and remove or limit the trout in some locations.

Just listing the species will not help it recover and I support the no action alternative supported by the U.S. Fish and Wildlife Service.

Sincerely,

Robert F. Cutting

A.S. Water & Wastewater Technology

Ca. Community College

Credentialed Instructor Water & Related Subjects

Benicia,Ca.

Dear Sirs,
Thank you for the opportunity to give input on the possible listing of the MYLF. After discussing the proposal with a DFG fisheries biologist, it appears that everything that can be done to help support MYLF populations is already being done by the DFG. I greatly applaud and support your efforts. Since everything is currently being done, my suggestion would be to not place the MYLF on the endangered list as this would be one more costly expense at a time that we simply should not be spending money on unnecessary endeavors.
Thank you
Sincerely,
Robert Leih
P.O. Box 154
Idylliwild, CA 92549

How are the trout that are planted in these lakes that hav these so called endagerd frogs going to help by not planting the trout? if any of there studies show that trout live on frogs in these lakes is a toatally differnt issue. I have never caught a trout that i had gutted that had a single frog in its stomach or any where else. there also is the factor of snow, ice and rodents birds of prey etc. that can or are contributing to the frogs decline in numbers not TROUT , I have been fishing in northern california lakes since i was 10 years old so that would make it a total of 43 years yes, 43 years. In all my days of fishing at the places i hav been not once have I hav ever heard of frogs being eatin by trout. I do not what these people gain by saying that the trout are eating these frogs any moe info you can call me at 916 812 7545

robert Last Namesteele <robertsteele1@yahoo.com

It is my opinion that the Mountain Yellow Legged Frog should not be added to the endangered species list for two reasons. The first is that nature seems to want them gone. Nature can take care of itself and who are we to decide nature is wrong? The second reason is because every time an animal is added to the endangered species list, all of man kind who live or work around that species become unreasonably inconvenienced.

Robert Smeja

RE: Mountain Yellow-legged Frog

March 16, 2011

I favor the no-action alternative in this action.

These comments are in response to the proposed listing of the Mountain Yellow-legged frog as an endangered species under the California Endangered Species Act.

All of the scientific data seems to point directly to the DFG as the main culprit in the demise of this species. The DFG's continued efforts to stock fish in the habitat for the Sierra Mountian yellow-legged Frog is the primary cause of the decline of the species. Unless this practice is stopped immediately and the all of the trout are removed from the lakes, streams and waterways that the frog inhabits, then the species will continue to decline. Listing the species as endangered will do no good.

Pesticides also contribute to the decline of the species by killing them outright or weakening them so they are susceptible to diseases, including a chytrid fungus that recently ravaged many yellow-legged frog populations.

The U.S Fish and Wildlife declined to list the Rana Sierrae as an endangered species, but placed the population on the candidate list. This should be sufficient until the DFG takes the actions necessary to protect the species such as stopping trout stocking, pesticide release, and fisherman from tromping through the shallow waters that the frog lay their eggs in.

I favor the no-action alternative in this action.

Sincerely,
Robert Swift
Oakhurst, Ca.

CA DFG is proposing to put the yellow-legged frog on the endangered species list because of its blatant disregard for a species that has existed on the earth longer than mankind has. This disregard is demonstrated by the planting of a non-native fish, the trout, in the natural habitat of this a predator frog. The trout is a natural predator of the frog.

What is in the thinking of the CA DFG to stock these trout, a known predator of this species of frog, in the same waterways? DFG must be aware of how detrimental this action would be.

It never ceases to amaze me how government entities take the existence of other living entities so lightly.

Please do not deprive future generations of the yellow-legged frog. Putting them on the endangered species list will not improve their plight. Not stocking a known predator of this amphibian in the same waterways, will.

I urge the CA DFG to reconsider their thoughtless proposed action.

Sincerely,

Robin Uecker

to who it may concern:

We strongly disagree with the idea of putting the Yellow Legged Frog on the endangered species list.

Rod Knudtson

Michele Knudtson
3-18-11

Could you please forward this to Mitch Lockhart his email address does not seem to work. Thanks

RE: Mountain Yellow-legged Frog

March 16, 2011

These comments are in response to the proposed listing of the Mountain Yellow-legged frog as an endangered species under the California Endangered Species Act.

On some of the research I have done on the proposed listing of this frog on the California endangered species act it appears the decline in the population of this frog is directly related to the stocking of nonnative fish, pesticides, fungus and other non-natural causes. Unless the practice of stocking these fish and stopping the use of pesticides is stopped and the all of the trout are removed from the lakes, streams and waterways that the frog inhabits, then the species will continue to decline.

The state of California and small communities cannot afford any of these alternatives as they would lose a tremendous amount of money with no fishing, no pesticides and so on. I sincerely hope the DFG will consider all alternative plans prior to listing this frog on the endangered species list. Enough is enough.

I favor the no-action alternative in this action.

Sincerely,

Rod Maynick

Southland Mechanical Services

870 E Greg St.

Sparks Nv. 89431

Phone 775-329-3991

Fax 775-329-6507

Email <mailto:rmaynick@southlandms.com> rmaynick@southlandms.com

March 18, 2011

Mitch Lockhart
Dept of Fish and Game
830 S St
Sacramento,
CA 95811

Re: Proposed listing of Mountain Yellow-legged Frog as an endangered species under the California Endangered Species Act.

These comments are submitted by me as an individual.

The decline of the Mountain Yellow legged frog is the result of fish planting initiated almost a century ago, as well as disease and introduced predators (primarily the bull frog). These causes cannot be undone by adding yet another layer of restrictive regulation on the states inhabitants.

Listing the species will not help it recover and I support the no action alternative.

Sincerely,

Ron Peterson
6950 Ridgewood Road
Willits, CA 95490

Scott Coykendall
2948 Conata St
Duarte, CA. 91010-1448

Mitch Lockhart
Dept. of Fish and Game
830 S St
Sacramento, CA. 95811

RE: Mountain Yellow-legged Frog proposed endangered species listing

March 15, 2011

I am opposed to the listing of the the Mountain Yellow-legged frog and favor the no-action alternative in this action.

These comments are in response to the proposed listing of the Mountain Yellow-legged frog as an endangered species under the California Endangered Species Act.

The U.S Fish and Wildlife declined to list the Rana Sierrae as an endangered species, but placed the population on the candidate list. This should be sufficient until the DFG takes the actions necessary to protect the species such as stopping trout stocking, pesticide release, and fisherman disturbing the redds.

I favor the no-action alternative in this action.

Sincerely,

Scott Coykendall

This letter is in regards to the proposed listing of the Mt. Yellow Legged Frog as an endangered species under the CA endangered species act.
From all of the information I have gathered off the internet the leading cause to the depletion of the yellow legged frog population can be directly placed on the CA Dept. of Fish & Game. The reasoning is the stocking of preditory fish in the habitate of these frogs. Also some other factors are pestisides, other preditors such as snakes and birds and weather conditions,as we have been in drought conditions for many years now. Although the populations of the yellow legged frogs have dropped significantly, I don't believe they should be placed on the CA Endangered Species Act. The U.S. Dept. of Fish & Wildlife and wildlife declined to place the yellow legged frog on the endangered species list ofter their investigation. If the Dept. of Fish & Game will correct the problem they created by introducing preditors into the habitat and work to control the spread of pesticides along with weather conditions returning to normal the yellow legged frog population will recover.

I support no action on listing the yellow legged frog on the Endangered Species Act.

Thank You,

Shirley Barber

Dear Department of Fish and Game,
My name is Simon Caplan from the sixth grade class of Sequoyah School in Pasadena, CA. I have decided to oppose my classmates opinion on the question of whether the Mountain Yellow Legged Frog should be put on the endangered species list. The expense of removing the trout from the lakes and ponds would be too great and there are also many other ways that the money could be spent in this time of recession. If the Yellow-legged frog died out of the Yosemite area then the chytrid fungus would not be able to flourish and spread. Finally, the local fishermen's lively hood would be compromised if the trout were to be removed.
Siman Caplan

Teacher:
Art

aphiffer@ca.rr.com<mailto:aphiffer@ca.rr.com>
aphiffer@sequoyahschool.org
Cell phone: 818-389-9385
11023 Cardamine Drive
Tujunga, CA. 91042

Mitch Lockhart
At 6:30 last thurs. evening, I turned off my wood splitter, and all I could hear was an almost deafening symphony of frogs next to my seasonal creek. Apparently they were competing with the sound of the wood splitter and nearly succeeding. I own 20 acres on Big Canyon Creek just due south of the Town of El Dorado near Hwy 49 in El Dorado County. It seems that the lack of stocked predatory trout, the absence of agricultural pesticides and the absence of fishermen has enabled the local frog population to thrive in my canyon. I would suggest that listing the YLF at higher altitudes on the ESL would do absolutely no good to help restore the YLF population until the previously mentioned activities are curtailed. These activities seem to be the most obvious reasons for the demise of the populations of these frogs. Thankyou for your consideration.
Steve Tyler
5601 Bumper Rd
El Dorado, Ca. 95623

ATTN:Mitch Lockhart
Department of Fish and Game

After reading the news release from January 25th 2010 and also investigating research done on the subject, I felt the need to comment on the potential solution of eliminating non-native trout species. While I can understand arguments made against introducing non-native species to any environment, I feel as though this course of action is not the right one. Reducing the predadation by the trout will not show significant results in maintaining and increasing frog populations. It is a ridiculous proposed solution and the fact that decision makers are that ignorant is truly frightening, in fact its almost criminal.

The studies I have seen indicate the problem is not the trout, while the trout do prey on the frogs the population reduction seems to hinge on two other major factors, both of which are far more severe. As you can easily deduce from the findings, pollution is the number one cause of our declining ecosystems and is offered to be the main cause in the decline of the frog population. That said, how can we as a state, and more importantly you as a public figure and public servant, ignore these findings. Regulation of farming methods and waste management are two far more significant problems than nonnative species eating the frogs, which I might add is already occurring and has been by the native species of the trout already in the mountain waters. The non-native trout species is simply the scapegoat for this twisted course of action. How can we allow water pollution to have such harmful effects, but write the damage off to our way of life. Their needs to be accountability. We need to take action to reduce the pollution of our water and air first, then if we can no longer attribute the ecological decline of the frogs to that pollution, other actions may need to be taken.

We can also deduce that unsustainable water levels are another major cause of the decline in the frog population. I have read that a possible solution to that would be transport of these frogs, if that does occur, there should be public outrage on money spent so irresponsibly. Its become apparent that there is an effort to reduce public recreational opportunities throughout the state. Instead of putting together legitimate scientific studies with actual scientific results, the leaders of our state choose to support studies by departments that push an agenda. This matter is eerily similar in that regard. None of the studies I have read suggest that non-native fish are the CAUSE of the decline in the population, only offer it as the easiest solution. The continued use of correlative studies as scientific backing for these decisions is criminal, but criminal and immoral activities seem to follow the current philosophy of California and the appointed officials we have. I guess I just can't understand why the correct scientific protocols are not followed in these studies. There needs to be peer review, additional sources, and controlled variables.

The CBD may be correct to list the yellow-legged frogs as and endangered species but they are only providing one point of view on cause of the problem. If this is truly an issue that endangers our ecosystem why not take some time and get several opinions from different sources, including wildlife and fisheries management officials, instead of blindly accepting the suggestions on one single organization that has continually pushed their anti-fishing agenda. We need to start basing decisions on unbiased science, not press releases from one sided organizations. I know that the suggested consequences of the decline in the amphibian population is eutrophication of our waters. This is alarming, but it should be known that the number one cause of eutrophication is pollution. Now I'm no scientist, just an average outdoorsman with concerns, but if the cause of the decline in the frog population can be linked to pollution and the cause of eutrophication is pollution maybe we should first look into measures that reduce evident causal factors to both problems.

It's only right to protect endangered species from extinction and with this letter that's simply what I'm trying to do. I'm trying to protect myself and my fellow fishermen from extinction. Fishermen have been unfairly singled out for too long and hopefully our leaders start to fight for our rights.

Sincerely,
Steven Reed

--
Steve Reed

March 17, 2011

Mitch Lockhart
Department of Fish and Game
830 S St
Sacramento, CA 95811

RE: Mountain Yellow-legged Frog

Mr. Lockhart

This letter is in response to the proposed listing of the Sierra Mountain Yellow-legged Frog as an endangered species under the California Endangered Species Act.

All of the scientific data points directly to the Department of Fish and Game as the main culprit in the demise of this species. The DFG's efforts to stock fish in the habitat of the Sierra Mountain yellow-legged Frog is the primary cause of the decline of the species. Unless this practice is stopped immediately and the all of the trout are removed from the lakes, streams and waterways that the frog inhabits, then the species will continue to decline.

Listing the species as endangered will do no good. The following quote is from Knapp at the Center for Biological Diversity. "Mountain yellow-legged frogs are adapted to high elevations without aquatic predators. Widespread stocking of non-native trout in high elevation Sierra Lakes by the Department of Fish and Game has been the Primary cause of the decline for the species."

Pesticides also contribute to the decline of the species by killing them outright or weakening them so they are susceptible to diseases, including a chytrid fungus that has recently ravaged many yellow-legged frog populations.

The species is already a candidate species under the U.S. Department of Fish and Wildlife. They declined to list the species as endangered. This should be sufficient until the Department of Fish and Game takes the actions necessary to protect the species such as stopping trout stocking, pesticide release, and fisherman from tromping through the shallow waters that the frogs lay their eggs in.

Listing the species will not help it recover. I favor the no-action alternative in this action.

Sincerely,

Terri Young

Hi

I have attached a document containing comments I hope will be helpful in the assessment of the status of the mountain yellow-legged frogs. Thank you for your time.

Thomas C. Smith

--

Thomas C. Smith
Ph.D. candidate
Department of Ecology, Evolution, and Marine Biology
University of California, Santa Barbara
thomas.smith@lifesci.ucsb.edu
805-893-2888

March 29, 2011

Fisheries Branch - High Mountain Lakes Program
Department of Fish and Game
Attn: Mitch Lockhart
830 S St.
Sacramento, CA 95811

I write to offer comments on the current status of the mountain yellow-legged frogs (*Rana muscosa* and *R. sierrae*) in the Sierra Nevada and the proposal to add these species to the California's endangered species list.

Significantly reduced from their former abundance, first by introduced predators (1, 2), with remaining populations threatened by the emergence of the disease *chytridiomycosis* (3), few large mountain yellow-legged populations remain. I have collaborated for the past eight years with the researchers who have described the effects of chytridiomycosis on populations throughout the southern Sierra Nevada, and spent years counting frogs and collecting and processing the skin swab samples used to diagnosis individuals with chytridiomycosis. I cannot add unpublished data or perspectives that describe threats to the frogs, but I collected significant amounts of the data that has been presented by Dr. Roland Knapp of the Sierra Nevada Aquatic Research Laboratory. I hope I can add a perspective that has been revealed by my own recent Ph.D. dissertation research. While this work is unpublished (nor will it be prior to the decision regarding MYLF listing), it has been evaluated by peers and faculty at the University of California Santa Barbara, and presented at scientific meetings (4-7).

As members of the freshwater communities in Sierra Nevada alpine lakes, mountain yellow-legged frogs play many ecological roles. They consume primary production (algae), recycle nutrients from the food they consume, serve as prey, act as predators, and link the aquatic and terrestrial habitats. Others have shown the importance of the links between aquatic and terrestrial habitats as demonstrated by the flux of insects from the lake that become food for terrestrial organisms (including adult frogs) (8, 9). We can suppose that for the terrestrial mammals and birds that feed on mountain yellow-legged frog adults and tadpoles, the resource of aquatic amphibians can be significant. My work however, focuses on A) the bottom-up and B) top-down influences that tadpoles exert on

benthic producers, and on C) the correlations between aquatic invertebrate community properties and the presence of mountain yellow legged frogs.

A) Effects of tadpole abundance and behavior on distribution of nutrients required by benthic producers.
    a. In large *Rana muscosa* and *R. sierrae* populations, tadpoles form aggregations of several thousand individuals in the same spot(s) in a lake each day of the summer season (personal observation and personal communication, Dr. Roland Knapp). Throughout the day, increasing numbers of tadpoles gather in these spots, reaching maximum density in mid-afternoon.
    b. Tadpoles excrete liquid ammonia (10) (analogous to urea in human urine).
    c. In 2010, I found that ammonia concentrations within these afternoon tadpole aggregations can be several orders of magnitude higher than the same location in the morning and in the rest of the lake any time of day. Thus, tadpole aggregations become ammonia 'hotspots' which fluctuate on a daily basis.
    d. Benthic algae consume dissolved nitrogen, and absorb ammonia preferentially.
    e. Ecological principles suggest that more species may coexist using a single resource when that resource fluctuates in time and/or space than when that resource is held constant (11). One species will be most successful when a resource is at low concentration, and another will be most successful when the resource is abundant. If the resource were always supplied in low concentration, only the former species can thrive. When the resource fluctuates, conditions favor each species in turn, and both species are able to coexist.
    f. It stands to reason that the nutrient fluctuations and heterogeneity that tadpoles can create will enhance the species diversity of benthic algae.

B) Top-down effects of tadpoles as grazers on benthic algae
    a. Tadpoles are generalist grazers on the bottom of lakes.
    b. In 2009 and 2010, I performed field and mesocosm experiments to assess the ability of tadpoles to control the standing stock of benthic algae in alpine lakes.
    c. My results suggest that tadpoles can control algae growth under experimental conditions, but in lakes, the abiotic processes in the lake – temperature, nutrient availability –have influences on the growth of the algae in a lake that prevent detection of effects of tadpoles.
    d. No evidence of competition with mayfly nymphs, also grazers, was observed. Tadpoles and mayflies likely have partitioned resources in a lake so that they do not compete.

C) Benthic macroinvertebrate community composition in fishless lakes with and without frogs.

a. Preliminary analysis I performed on data previously collected by a collaborator suggests that lakes without frogs have fewer macroinvertebrate species living in them. The dataset includes presence/absence and counts of 30+ benthic macroinvertebrate taxa in over 100 alpine lakes throughout the southern Sierra.

My observations and hypotheses suggest that declines and extinctions of mountain yellow-legged frogs will alter, and possibly reduce the biodiversity of alpine lakes in the Sierra Nevada. Diversity benefits an ecosystem because it can enhance that system's ability to withstand dramatic changes due to disturbances (12).
I propose that extinctions of mountain yellow legged frogs will have cascading effects that will change the character of lake and terrestrial food-webs. I realize this is not an immediate consideration in the decision to list the species, but I do hope that it motivates awareness that these frogs are highly connected to other species. Efforts to conserve frogs may preserve alpine lake communities in their current status. However, loss of biodiversity in these lakes may make them more susceptible to change in response to stresses such as future species invasion, air pollution, and climate change.
I hope my comments offer perspective on potential consequences of mountain yellow-legged frog declines, and that this information assists the Fish and Game Commission in their consideration of the status of *Rana muscosa* and *Rana sierrae*.

Thank you for your time,

Thomas C. Smith
Ph.D. candidate
Dept. of Ecology, Evolution, and Marine Biology
University of California, Santa Barbara
Santa Barbara, CA 93106
thomas.smith@lifesci.ucsb.edu

1. Knapp RA, Matthews KR (2000) Non-native fish introductions and the decline of the mountain yellow-legged frog from within protected areas. *Conservation Biology* 14:428-438.

2. Vredenburg VT et al. (2007) Concordant molecular and phenotypic data delineate new taxonomy and conservation priorities for the endangered mountain yellow-legged frog. *Journal of Zoology* 271:361-374.

3. Vredenburg VT, Knapp RA, Tunstall TS, Briggs CJ (2010) Dynamics of an emerging disease drive large-scale amphibian population extinctions. *Proceedings of the National Academy of Sciences* Early Addition.

4. Smith, T.C. (2011) Interactions between alpine lake producers and consumer (January 7). Presentation at California/Nevada Amphibian Population Task Force 2011 Meeting, Yosemite National Park, CA.

5. Smith, T.C. (2010) Interactions between tadpoles, mayflies, and epiphyton in alpine lakes of the Sierra Nevada (February 27). Presentation at UC Natural Reserve System Mildred E. Mathias Graduate Student Research Symposium, Bodega Bay, CA.

6. Smith, T.C. (2010) Interactions between tadpoles, mayflies, and epiphyton in alpine lakes of the Sierra Nevada (February 20). Presentation at UC Santa Barbara Dept. of Ecology, Evolution, and Marine Biology Graduate Student Symposium, Santa Barbara, CA.

7. Smith, T.C. (2009) Amphibian declines, species interactoins, and ecological stability (November 14). Presentation at 2009 IRCEB Amphibian Disease Meeting, Tempe, AZ.

8. Finlay JC, Vredenburg VT (2007) Introduced trout sever trophic connections in watersheds: Consequences for a declining amphibian. *Ecology* 88:2187-2198.

9. Epanchin P, Knapp R, Lawler S (2009) Nonnative trout impact an alpine-nesting bird by altering aquatic insect subsidies. *Ecology*.

10. McDiarmid RW, Altig R (1999) *Tadpoles: the biology of anuran larvae* (University of Chicago Press).

11. Chesson P (2000) Mechanisms of maintenance of species diversity. *Annual Review of Ecology and Systematics*:343-366.

12. Ives AR, Carpenter SR (2007) Stability and Diversity of Ecosystems. *Science* 317:58-62.

Mr Lockhart,

I will first introduce myself as an avid outdoorsman and one who absolutely cares about the environment and the threats posed to indiginous species. I am also an avid fly fisherman and spent every moment possible trout fishing in the high lakes, streams, and rivers of the Sierra last summer. I am eagerly awaiting the spring thaw so I can get back out there and will continue to do so as long as I am able.

My personal experiences with the MYLF are very limited. I have seen them in abundance at Summit Lake below Piute Pass and in various other locations in varying amounts. I had not paid much attention to them until I began reading up on the issues. My reading material consists of a High Sierra Fishing Forum that is populated by some very knowledgable folks, Roland Knapp's Frog Blog, and basically any article that has come up in any Google Search. I suppose that I am trying to educate myself on these issues to be able to make an informed opinion, at least as informed as I can be.

I had intended to make this a much longer email, but felt a shorter answer would be much more effective. It is my opinion that all efforts to preserve the MYLF frog should be focused on dealing with the Bd pathogen. Trout and Frogs seemed to have coexisted for a long time before the Bd hit. Obviously the frogs have a better chance to adapt if there is less pressure on them from fish, but I still firmly believe it is the Bd that has destroyed the frog population. I understand that there needs to be some preserved habitat where the major focus can be on a sustainable population for the frogs. I hope that there will be a balance acheived and the angles of the High Sierra be educated as to where these preserves will be. I think it unwise to make large preserves without first knowing how to beat the Bd pathogen. I do hope that a good solution is found and I know that many of us anglers would like to see the frogs proliferate again.

Thank You,

Tim Carraher
38962 Palm Tree Way
Palmdale, CA. 93551

Fisheries Branch – High Mountain Lakes Program March 16, 2011
Department of Fish and Game
Attn: Mitch Lockhart
830 S St.
Sacramento, CA 95811

RE: Mountain Yellow-legged Frog

These comments are in opposition to the proposal to list the Mountain Yellow-legged Frog on the endangered species list.

According to the Center for Biological Diversity (CBD) the Department of Fish and Game (DF&G) kills off millions of yellow-legged frogs with poor management practices by stocking non-native trout (that predate on the frog eggs & tadpoles) to appease the million plus fishermen who buy fish kill licenses every year. Obviously the DF&G considers the CBD "opinion" as scientific fact as they are considering having the frog listed under the California Endangered Species Act. Or does the fact that the CBD sued the DF&G in 2006 have anything to do with this proposed action? Having the MYLF listed under the Ca. ESA without mitigating the REAL reason for the frog's decline is arbitrary and capricious and will unnecessarily restrict public land access to citizens who have had no part in the cause of the frog's decline.
I see no reason to list the Rana sierrae or Rana muscosa under the Ca. ESA when the U.S Fish and Wildlife declined to do so but placed them on the Candidate list.

The best thing for the DF&G to do for the frog would be to stop stocking non-native fish and prevent fisherman from stomping around where the frog's eggs are.

I am opposed to this proposal and am in favor of the NO-ACTION ALTERNATIVE.

Sincerely,

Tom Chambers
2126 Franklin Way
Hanford, Ca. 93230

Message Id: 4D817939.DB0 : 81 : 32176
Subject: ESA listing
Created By: **tcplace2go@sbcglobal.net**
Scheduled Date:
Creation Date: 3/16/2011 7:59 PM
From: Tom Chambers <tcplace2go@sbcglobal.net>

Mitch Lockhart,

I am writing you regarding the issue of the Yellow Legged Frog going on CA Endangered Species List (ESL). I am greatly concerned, as it is my understanding that should this frog be placed on the ESL this in turn will stop trout planting at our public lakes and water ways that have received trout plants regularly. Trout are California's most sought after game fish according to http://www.gameandfishmag.com. Since 2008 the DFG trout planting in the lakes within 100 miles from Sacramento has greatly diminished and or has periodically stopped all together (i.e. Lake Amador, Shadow Cliffs Reservoir, San Pablo Reservoir, Ice House Reservoir, Lafayette Reservoir, American River, Indian Valley Reservoir, Jenkinson Lake and Scotts Flatt Reservoir). It is extremely disheartening, as my family and I are avid sportsmen, who camp and boat at these various lakes throughout the year to target trout stocked by DFG. Should these lakes not receive trout plants from DFG I will not be attending them in the future. I know I am not alone in this belief. Since the ceasing of trout plants in 2008 at these lakes mention above, both my friends and family have significantly deceased their allocation of disposable income to visit the above mention bodies of water. Statewide the tone of fisherman and outdoorsmen has been disgruntled to say the least. With a decrease of sales in the fishing and boating industry, the removal of trout stocking programs will only further exacerbate the volatile climate of the purchasing of goods and services associated with trout planting on our local waterways. This intern will have an adverse impact on those revenues attained by DFG for licenses and park usage by the public. Which will result in the amount of money from general funds to sustain DFG Game Warden, and Fisheries associated positions as well as impact Parks & Recreation Department. Please reconsider and reevaluate the decision of placing the Yellow Legged Frog on the CA Endangered Species List. It will hurt California's fisheries as well as the funding justification for DFG and Park & Recreations related positions.

Wes Roberson, M.S. QRP, Training Officer
Staff Development Section
California Department of Rehabilitation
916-552-9415

March 17, 2011

Mitch Lockhart
Dept of Fish and Game
830 S St
Sacramento,
CA 95811

Re: Proposed listing of Mountain Yellow-legged Frog as an endangered species under the California Endangered Species Act.

The Sierra mountain yellow-legged frog is already a candidate species under the U.S fish and Wildlife. They declined to list the species as endangered, this action should be supported by the State of California.

The predominate Mountain yellow-legged frog populations are already protected and are located in Sequoia, Kings Canyon, and Yosemite National Parks.

Widespread stocking of non -native trout by the Dept of Fish and Game has been the Primary cause of the decline for the species." This quote is from the Center for Biological Diversity. It places most of the blame at the feet of CA DFG. Why doesn't the DFG work to remove the trout and get a healthy and thriving population of frogs

Listing the species will put an undue burdon on landowners & as a user of public lands where land use activities will be affected and in addition will not help the Frogs recover. I support the no action be taken to list the Mountain yellow legged frog as Endangered under the CESA.

Sincerely,

William Levier
5545 Straight Creek Rd
Waverly, Oh 45690

My name in William JMcCracken I live in NYS but I do have 4 climes in CA and I do use them in the Merced River and Halls gulch area. While down there 2 years ago the BLM sent 2 persons into the mountians to fine the yellow legged frogs. They did not fine any not a one. To many snakes that like the color. So there is no need for any restrictions do to these frogs!!!

William
McCracken 2031 Quaker RD, Barker NY 14012

quakerrd39@yahoo.com 716 795 3655

Dear DFG,

As a young backpacker decades ago, I encountered my first yellow-leg frogs at Ranger Lake, in King's Canyon National Park, and I remember vividly the characteristic garlic aroma that allowed me to identify them positively in my copy of Storer and Usinger's "Sierra Nevada Natural History." Now as a professional ecologist who lives and works thousands of miles from the Sierra, I am fascinated, saddened, and occasionally encouraged as I watch the saga of their decline, recovery, and now critical status as they respond to the same kinds of threats that face wild creatures throughout the world: pollution, habitat reduction, climate change, and invasive exotics.

I wish I could submit some data from my expertise as an ecologist, but alas, I only get out to the Sierra every few years, and amphibian biology isn't my specialty anyway. But it's hard for me to imagine what harm could come from listing the species. I do have many friends who fish the Sierra -- I am not a fisherman myself -- and they recognize, with varying degrees of reluctance, how important it is to keep the frogs from being extinguished by fish, even if it means removing the fish from some lakes. Although I can't speak for them, I believe their major concern is to be kept informed of steps taken to help the frogs recover. For example, no one wants to hike for hours to fish a cherished favorite lake only to find that the fish have been removed from it without public notice.

I wish the yellow-legged frogs luck. They will need it.

Kind regards,

William E. Williams <mailto:WEWilliams@smcm.edu>
Professor of Biology
Saint Mary's College of Maryland
18952 E Fisher Rd, Saint Marys City, MD 20686
(240)895-4365

To the Department of Fish & Game:

Justin Vital, 12

I've recently found out that the DFG has been commencing an input on wether or not to put the Yellow-Legged Mountain Frog species on the endangered species list. I am contacting you to let you know my opinion on this issue. I believe that if anything living requests our undivided attention and help, we should be willing to provide assistance to the best of our ability in the appropriatte situation. Myself and others are convinced that with the wisdom & abilities of humans, we can nurse this creature to an abundant state once again.

I also understand that human pollution has killed a number of these frogs. I'm also convinced that by reducing the amount of pollution we produce by taking necessary actions, we would be contributing to a big part of helping to save this brilliant species. My point is that I am in full support of putting this amphibian on the endangered species list. Someone needs to help them, and offer my assistance in any way needed. I personally think that if these frogs were on the endangered species list, their need for help would attract more attention, perhaps providing them with assistance.

Thank you, DFG, for giving these frogs a second chance. Once again, I am in full support of these frogs and if for any reason you must contact me on this issue, call me at (530) 249-8396. I pledge to give all needed attention to this species, and attempt to make life as they know it better.

Justin Vital

State of California – Natural Resources Agency
DEPARTMENT OF FISH AND GAME
Fisheries Branch
830 S Street
Sacramento, CA 95811

EDMUND G. BROWN, Jr., Governor
CHARLTON H. BONHAM, Director

October 6, 2011

David Pilliod
Forest & Rangeland Ecosystem Science Center
970 Lusk Street
Boise, ID 83706

Dear Dr. Pilliod:

The Fish and Game (Commission) received a petition to list mountain yellow-legged frog, *Rana muscosa* and *R. sierrae*, as threatened or endangered under the California Endangered Species Act (CESA) on January 27, 2010. (Cal. Reg. Notice Register 2010, No. 9-Z, p. 333.) On September 15, 2010, the Commission found that the petition provided sufficient information to indicate that listing mountain yellow-legged frog as a threatened or endangered species may be warranted under CESA. (See generally Fish & G. Code, § 2074.2; Cal. Reg. Notice Register 2010, No. 40-Z, p. 1601 (October 1, 2010).) Subsequently, the Commission referred the petition to the Department of Fish and Game (Department) to complete a Status Review of the mountain yellow-legged frog *R. muscosa* and *R. sierrae*. In order to provide sufficient time for peer review, the Department intends to submit its final status report to the Commission in late November.

Recognizing your expertise on the subject of mountain yellow-legged frog, the Department is pleased to invite you to be a peer reviewer for the Draft Status Review of the mountain yellow-legged frog *R. muscosa* and *R. sierrae* in California. A confidential draft of this report is attached. We request that you focus your comments on the scientific soundness and clarity of the document. The recommendation is based upon the Department's review of the information contained in the report. Peer review and other public processes may further inform the recommendation. Please do not utilize track changes for comments; a list of comments and page numbers is preferable so that comments may be correctly referenced to a specific part of the document.

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Comments may be submitted by mail or email to the address below. If you have any questions about the confidential draft status review, or about how to submit your comments, please contact Mr. Mitch Lockhart, Environmental Scientist, at (916) 323-3422 or mlockhart@dfg.ca.gov.

Address: Mountain yellow-legged frog Status Review Comments
c/o Mitch Lockhart
Department of Fish and Game
830 S Street
Sacramento, CA 95811

or by email to: mlockhart@dfg.ca.gov, using "Mountain yellow-legged frog Status Review Comments" in the subject line.

The Department appreciates your participation in this status review.

Sincerely,

Stafford Lehr
Chief, Fisheries Branch

From: David Pilliod; dpilliod@usgs.gov
To: Mitch Lockhart; MLockhart@dfg.ca.gov
CC: David Pilliod; dpilliod@usgs.gov
Date: 11/21/2011 10:49 AM
Subject: Re: MYLF Status Evaluation

Mitch:
I have reviewed the scientific content of the State of California's Report to the Fish and Game Commission "A Status Review of the Mountain
Yellow-legged Frog" dated 9/30/2011 draft. The report is a sobering account of the status and threats of mountain yellow-legged frogs in California (both Rana sierrae and Rana muscosa, combined). Overall the report is very well written. The analyses of historic and current distributions are thorough and well executed, drawing inference from large data sets 2,842 historic localities. The use of MaxEnt analytical software to create a predictive distribution map was appropriate. The use of occupancy modeling to determine changes in the catchment-level distribution of these two species was appropriate, although there was no presentation of detection probabilities at the catchment or water body level. The interpretations and conclusions from these analyses are reasonable and not overstated.

If you need any clarification, please contact me.

Sincerely,

David Pilliod

David Pilliod, Research Ecologist
USGS Forest and Rangeland Ecosystem Science Center
Snake River Field Station, 970 Lusk St., Boise, ID 83706
dpilliod@usgs.gov

Page	Para	Reviewer Comment	Department Response
18	1	Fig 9B is confusing. The dark blue lines are difficult to differentiate from the streams. I suggest using a different color and making all connectivity lines larger. Also, I suggest making the green dots appear in both Figures 9A and 9B and make them larger in size.	accepted
19	5	Provide more specifics about fire fighting. Under increasing temperatures and drought cycles associated with climate change, the range of these species may experience more fire. Fire fighting uses fire retardants and water pumping. I recommend a more complete description of these threats (see Pilliod et al. 2003. Forest Ecology and Management).	rejected – wildfires are not likely a priniciple driver of the observed decline and therefore receive brief treatment in this document.
26	2	I believe Dr. Vredenberg is at a CSU campus, not a UC campus. San Francisco State University, I think.	accepted

State of California – Natural Resources Agency
DEPARTMENT OF FISH AND GAME
Fisheries Branch
830 S Street
Sacramento, CA 95811

EDMUND G. BROWN, Jr., Governor
CHARLTON H. BONHAM, Director

October 6, 2011

Gary Fellers
Pt. Reyes Field Station
Pt. Reyes National Seashore
Pt. Reyes, CA 94956-9799

Dear Dr. Fellers:

The Fish and Game (Commission) received a petition to list mountain yellow-legged frog, *Rana muscosa* and *R. sierrae*, as threatened or endangered under the California Endangered Species Act (CESA) on January 27, 2010. (Cal. Reg. Notice Register 2010, No. 9-Z, p. 333.) On September 15, 2010, the Commission found that the petition provided sufficient information to indicate that listing mountain yellow-legged frog as a threatened or endangered species may be warranted under CESA. (See generally Fish & G. Code, § 2074.2; Cal. Reg. Notice Register 2010, No. 40-Z, p. 1601 (October 1, 2010).) Subsequently, the Commission referred the petition to the Department of Fish and Game (Department) to complete a Status Review of the mountain yellow-legged frog *R. muscosa* and *R. sierrae*. In order to provide sufficient time for peer review, the Department intends to submit its final status report to the Commission in late November.

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Sacramento, CA 95811

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The Department appreciates your participation in this status review.

Sincerely,

Stafford Lehr
Chief, Fisheries Branch

From: Gary Fellers; gary_fellers@usgs.gov
To: Mitch Lockhart; mlockhart@dfg.ca.gov
Date: 11/4/2011 1:30 PM
Subject: MYLF status review
Attachments: MYLF status review - Fellers comments.xls

Mitch - I have read the MYLF status document that Stafford Lehr sent to me. Overall it is a thorough and accurate review of the species and the potential threats. I have attached a file that outlines a number of specific concerns.

Please let me know if you have any questions.

Gary

Gary M. Fellers
Research Biologist

U.S. Geological Survey
Western Ecological Research Center
1 Bear Valley Rd.
Point Reyes National Seashore
Point Reyes, CA 94956

gary_fellers@usgs.gov

Page	Para	Reviewer Comment	Department Response
2	2	At lower elevations where the summers are longer, tadpoles are thought to be able to grow to metamorphosis in a single season (Storer, 1925).	accepted
2	5	The word extinct should be reserved for the loss of the entire species. The appropriate word is extirpated. This is an issue in many places thorughout the document, though extipation is corrected used in a number of places.	accepted
8	1	See first comment above regarding time to metamorphosis.	accepted
9	4	Long 1970 should be included in literature cited section.	accepted
10	1	Columbiana should be lower case	accepted
10	3	Aguabonita should be lower case	accepted
10	5	The paranthetic use of lentic is wrong. It would be best to delete both lotic and lentic in this section.	accepted
11	4	I would not refer to 1995 data as current.	accepted
17	2	Reference 69 should reference a person, not just a park.	rejected - citation refers to multiple datasets collected by various persons and entities for the NPS
18	1	"vitually impossible" is an overstatement.	accepted
22	2	The last sentence is completely out of place and should be deleted.	accepted
23	2	It is an overstatement that trout presence excludes MYLF.	accepted
26	1	Delete USGS from this list, or include a discussion of USGS efforts.	rejected - USGS are included as collaborators in the Little Rock Creek fish eradication project listed under The Department's activities.
27	1	What is a mtn garter snake? Use proper name and give scientif name.	accepted
27	5	This section lacks any references. It is imporant to cite publications when available, and note unpublished when not.	rejected - citations are listed throughout section 7.4
27	6	It should be noted that this work was done before Bd was discovered.	accepted
27	6	The word apparently should be changed to possibly. No frogs were ever swabbed and no specimens were ever preserved.	accepted
27	6	It should be made clear that it is assumed, based on subsequent work, that the frogs from Sixty Lakes Basin were Bd-negative. The could not and was not tested at the time, though I agree it is a reasonable conclusion. We just don't know and should not state otherwise.	accepted

Page	Para	Reviewer Comment	Department Response
27	7 and following	It is very important to specifically state when Bd was tested for and when it is assumed that Bd was not present. While I agree with the presumed lack of Bd, not all readers will know what has been done.	accepted
28	4	The statement that MYLF were extirpated due to chytirdiomycosis is particularly egregious since Bd was discovered after the event and there are no specimens to test.	accepted
28	last	Were a total of 40-50 frogs moved, or 40-50 per site?	accepted
29	4	If there has been any loss of adult MYLF in captivity, this should be noted.	accepted
32	1	Earlier, it was stated that stocking ended in 2000, not 2001.	accepted
32	3	It is important to mention risk of introducing diseases and the potential loss of frogs (of any life stage) in the lab.	accepted

State of California – Natural Resources Agency
DEPARTMENT OF FISH AND GAME
Fisheries Branch
830 S Street
Sacramento, CA 95811

EDMUND G. BROWN, Jr., Governor
CHARLTON H. BONHAM, Director

October 6, 2011

Vance Vredenburg
Department of Biology
1600 Holloway Avenue, HH 227
San Francisco, CA 94132

Dear Dr. Vredenburg:

The Fish and Game (Commission) received a petition to list mountain yellow-legged frog, *Rana muscosa* and *R. sierrae*, as threatened or endangered under the California Endangered Species Act (CESA) on January 27, 2010. (Cal. Reg. Notice Register 2010, No. 9-Z, p. 333.) On September 15, 2010, the Commission found that the petition provided sufficient information to indicate that listing mountain yellow-legged frog as a threatened or endangered species may be warranted under CESA. (See generally Fish & G. Code, § 2074.2; Cal. Reg. Notice Register 2010, No. 40-Z, p. 1601 (October 1, 2010).) Subsequently, the Commission referred the petition to the Department of Fish and Game (Department) to complete a Status Review of the mountain yellow-legged frog *R. muscosa* and *R. sierrae*. In order to provide sufficient time for peer review, the Department intends to submit its final status report to the Commission in late November.

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The Department appreciates your participation in this status review.

Sincerely,

Stafford Lehr
Chief, Fisheries Branch

State of California – Natural Resources Agency
DEPARTMENT OF FISH AND GAME
Fisheries Branch
830 S Street
Sacramento, CA 95811

EDMUND G. BROWN, Jr., Governor
CHARLTON H. BONHAM, Director

October 6, 2011

Karen Pope
USDA Forest Service
Pacific Southwest Research Station
1700 Bayview Drive
Arcata, CA 95521-6013

Dear Dr. Pope:

The Fish and Game (Commission) received a petition to list mountain yellow-legged frog, *Rana muscosa* and *R. sierrae*, as threatened or endangered under the California Endangered Species Act (CESA) on January 27, 2010. (Cal. Reg. Notice Register 2010, No. 9-Z, p. 333.) On September 15, 2010, the Commission found that the petition provided sufficient information to indicate that listing mountain yellow-legged frog as a threatened or endangered species may be warranted under CESA. (See generally Fish & G. Code, § 2074.2; Cal. Reg. Notice Register 2010, No. 40-Z, p. 1601 (October 1, 2010).) Subsequently, the Commission referred the petition to the Department of Fish and Game (Department) to complete a Status Review of the mountain yellow-legged frog *R. muscosa* and *R. sierrae*. In order to provide sufficient time for peer review, the Department intends to submit its final status report to the Commission in late November.

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Sacramento, CA 95811

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The Department appreciates your participation in this status review.

Sincerely,

Stafford Lehr
Chief, Fisheries Branch

From: Pope, Karen kpope@fs.fed.us
To: mlockhart@dfg.ca.gov
Date: 10/31/2011 4:25 PM
Subject: Peer review of the draft MYLF status review
Attachments: MYLF StatusEval_Reviewer Comment Sheet_KPope.xlsx

Hello Mitch,

I have reviewed the DFG draft Status Review of the Mountain Yellow-legged Frog and have a few minor suggestions attached. I found the document concise, informative, up-to-date, and extremely well researched. It was easy to read and understand, and conclusions are logical and based on the best available science. The review does not linger on irrelevant details and only focuses on information germane to the status evaluation. When finalized, this should be a model document for the Conservation documents for the MYLF species complex. Thank you for your hard work.

Sincerely,
Karen Pope

Page	Para	Reviewer Comment	Department Response
11	4	Replace with "Therefore, we estimate that 84% of historical MYLF are now extinct." Given that detection probabilities were likely <1 (albeit likely close to 1), this is a high (or maximum) estimate of extinction according to the dataset used.	accepted
13	2	Instead of just calculating the total change in abundance for all resurveyed sites combined, it would be valuable to assess the change per site (# t1 - # t2) in relation to julian date of first and second survey, year, and spatial coordinates of the site. It would be interesting to note if the decrease in abundance is similar across sites or driven by a subset of the sites with major decreases in abundance.	rejected - conducting additional analyses is beyond the scope of this iteration of reviews.
13	3	After "…MYLF were not edtected at 569 sites, indicating a" add "maximum of" before "54% decline in the number of sites occupied by MYLF."	accepted

State of California – Natural Resources Agency
DEPARTMENT OF FISH AND GAME
Fisheries Branch
830 S Street
Sacramento, CA 95811

EDMUND G. BROWN, Jr., Governor
CHARLTON H. BONHAM, Director

October 6, 2011

Kathleen Matthews
USDA Forest Service
Pacific Southwest Research Station
800 Buchanan Street
West Annex Building
Albany, CA 94710-0011

Dear Dr. Matthews:

The Fish and Game (Commission) received a petition to list mountain yellow-legged frog, *Rana muscosa* and *R. sierrae*, as threatened or endangered under the California Endangered Species Act (CESA) on January 27, 2010. (Cal. Reg. Notice Register 2010, No. 9-Z, p. 333.) On September 15, 2010, the Commission found that the petition provided sufficient information to indicate that listing mountain yellow-legged frog as a threatened or endangered species may be warranted under CESA. (See generally Fish & G. Code, § 2074.2; Cal. Reg. Notice Register 2010, No. 40-Z, p. 1601 (October 1, 2010).) Subsequently, the Commission referred the petition to the Department of Fish and Game (Department) to complete a Status Review of the mountain yellow-legged frog *R. muscosa* and *R. sierrae*. In order to provide sufficient time for peer review, the Department intends to submit its final status report to the Commission in late November.

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The Department appreciates your participation in this status review.

Sincerely,

Stafford Lehr
Chief, Fisheries Branch

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DEPARTMENT OF FISH AND GAME
Fisheries Branch
830 S Street
Sacramento, CA 95811

EDMUND G. BROWN, Jr., Governor
CHARLTON H. BONHAM, Director

October 6, 2011

David Bradford, PhD
Research Ecologist
US Environmental Protection Agency
Environmental Sciences Division
PO Box 93478
Las Vegas, NV 89193-3478

Dear Dr. Bradford:

The Fish and Game (Commission) received a petition to list mountain yellow-legged frog, *Rana muscosa* and *R. sierrae*, as threatened or endangered under the California Endangered Species Act (CESA) on January 27, 2010. (Cal. Reg. Notice Register 2010, No. 9-Z, p. 333.) On September 15, 2010, the Commission found that the petition provided sufficient information to indicate that listing mountain yellow-legged frog as a threatened or endangered species may be warranted under CESA. (See generally Fish & G. Code, § 2074.2; Cal. Reg. Notice Register 2010, No. 40-Z, p. 1601 (October 1, 2010).) Subsequently, the Commission referred the petition to the Department of Fish and Game (Department) to complete a Status Review of the mountain yellow-legged frog *R. muscosa* and *R. sierrae*. In order to provide sufficient time for peer review, the Department intends to submit its final status report to the Commission in late November.

Recognizing your expertise on the subject of mountain yellow-legged frog, the Department is pleased to invite you to be a peer reviewer for the Draft Status Review of the mountain yellow-legged frog *R. muscosa* and *R. sierrae* in California. A confidential draft of this report is attached. We request that you focus your comments on the scientific soundness and clarity of the document. The recommendation is based upon the Department's review of the information contained in the report. Peer review and other public processes may further inform the recommendation. Please do not utilize track changes for comments; a list of comments and page numbers is preferable so that comments may be correctly referenced to a specific part of the document.

In accordance with Title 14, California Code of Regulations section 670.1(f)(2), any comments provided to the Department pursuant to this peer review process, will be submitted to the Commission along with the status report. Therefore, the Department requests that your comments be received on or before November 16th, 2011, so that the comments can be annotated and referenced in the final status report, which will be available for receipt at the December Commission meeting. If this time line does not fit your schedule, please let the Department know as soon as possible so that it may propose a suitable alternate.

Comments may be submitted by mail or email to the address below. If you have any questions about the confidential draft status review, or about how to submit your

comments, please contact Mr. Mitch Lockhart, Environmental Scientist, at (916) 323-3422 or mlockhart@dfg.ca.gov.

Address: Mountain yellow-legged frog Status Review Comments
c/o Mitch Lockhart
Department of Fish and Game
830 S Street
Sacramento, CA 95811

or by email to: mlockhart@dfg.ca.gov, using "Mountain yellow-legged frog Status Review Comments" in the subject line.

The Department appreciates your participation in this status review.

Sincerely,

Stafford Lehr
Chief, Fisheries Branch

From: Bradford.David@epamail.epa.gov
To: mlockhart@dfg.ca.gov
Date: 11/8/2011 5:06 PM
Subject: Mountain Yellow-legged Frog Status Review Comments

Mitch:

Below are my comments on “A status review of the mountain yellow-legged frog (Rana sierrae and Rana muscosa)” Draft: September 30th, 2011.

General Comment

I find this document a thorough treatment of information on the subject, and it is well written. The information and conclusions made about the biology and status of these taxa are based on numerous extensive studies. Indeed, the MYLF is one of the most extensively studied amphibians in the world outside the laboratory. Some of the datasets represented are truly massive, such as those representing historical and current population distribution and abundance, fish distribution relative to frog distribution, and Bd distribution and relations.

Please contact me if I can be of further assistance.

Sincerely,

Dave Bradford

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Page	Para	Reviewer Comment	Department Response
5	4	Regarding endemic status, is the Dry Creek/Crooked Creek location for R. sierrae SE of Mono Lake technically outside the Sierra Nevada?	rejected - as an overview of status of 2 species across a broad geographic range, it is a minor nuance.
5	4	Is 1000 m minimum elevation in Sierra correct? Zweifel (1955) reported about 1400 m.	accepted
7	1	It is not evident how “probability of occurrence” is represented in Fig. 3.	rejected - “Probability of occurrence” is displayed in Figure A1 not in Figure 3.
8	2	What is the reference for 80% mortality of juveniles?	accepted
9	4	References to Long and Mullaly need to be numbered.	accepted
11	4	and elsewhere in document. It grates on me that “current” refers to 1995 -2010 given the huge declines since 1995. How about “recent locality data” and “recent status”?	accepted
12	Fig 4	Where does the “historical range of MYLF” come from? Is this the same as the MaxEnt generated distribution in Fig. 3?	accepted
12	Fig 4	“polygon” should be “polygons.”	accepted
12	Fig 4	Number of HU12s (historical and currently occupied) should be provided to obviate the confusion I raise below.	accepted
12	1	The analysis is confusing. If 224 HU12’s were occupied, but only 191 were surveyed since 1995, it is not clear what is shown in the figure. Are the white polygons in panel A the 224 HUs? Where are the HU12s in panel B that were not resurveyed? I would expect these to be a different color. Also, something should be said about the 33 HU12s that were not resurveyed; otherwise, one wonders about a bias in the data for the 191. Were they evenly scattered across the range; were they only partially surveyed; were they on the margin of the distribution?	accepted
12	1	For the statements like “R. sierrae now absent from 51% of historically occupied watersheds”, is this based on the 191 or the 224?	accepted
12	1	Were there any HU12s sampled that did not have historic records but MYLF was found? I know this would be rare in this case, but this is a vital statistic for 2-point comparisons. That is, if frogs disappeared from 121 of historic HU12s, but they were found in 100 new ones, then it would be difficult to claim there has been a decline.	accepted
12	1	Something is screwy with the number of watersheds occupied. If 121 (63%) of the 191 watersheds surveyed had frogs absent, this means 70 watersheds had frogs present. But I count about 90 green HU12s for both species in Fig. 4. Moreover, the data in Figure 5 yield a third number. The frequencies in Fig. 3 total to about 111 (~90 for sierrae and ~21 for muscosa).	accepted

Page	Para	Reviewer Comment	Department Response
13	Fig 5	State somewhere that these are 1995-2010 data.	accepted
13	Fig 5	Give sample size for total number of HU12s occupied for each species.	accepted
13	Fig 5	Since data are presented by species, it should be noted that no HU12s contained both species. (I presume this is the case).	accepted
13	1	Replace “last 16 years” with the specific years. “last” is a relative term.	accepted
13	2	Define “site”. Do places have to be a certain distance apart to be deemed a separate site?	accepted
13	3	Why not just say “number of sites” rather than “distribution”? “Distribution” often connotes the range of the species, which has probably changed less than the number of sites. Moreover, “number of sites” was used in paragraph 1 this page.	accepted
13	3	The argument that these data indicate “decline in the number of sites occupied” is misleading because no data are presented for sites where MYLF was not found the first time but was found the second time.	rejected - edited language to address the issue, however the data cannot support the analysis suggested by this comment
13	4	Is this using data with surveys separated by >=5 years as in the previous paragraph?	accepted
14	1	I suggest giving sample size along with “87%”.	accepted
14	Fig 6	What is the source(s) for this map?	accepted
15	Fig 7	Insert “(right axis)” after “fish” in last line.	accepted
15	Fig 7	Where do lake area data come from? Where do the fish occupancy data come from?	accepted
15	2	I don’t see the basis to conclude “trout introductions have been the prime cause of local extinctions of MYLF,” because no comparison has been made to the other causes of local extinctions. I suggest changing “the prime cause” to “a prime cause”.	accepted
17	1	What is the reference or rationale to support the assertion that Bd “will likely spread ….next ten years”?	accepted
17	3	Is this section really the place to be making recommendations?	accepted
17	6	Insert “representative” before “drainages” in line 3 and remove from line 5.	accepted
18	1	I suggest replacing “most” with 92%.	accepted
18	1	With no scale on the map, and no distances provided between sites, there is little support for the “virtually impossible” assertion. I suggest adding some sort of distance value between sites you are referring to, either straight-line or via stream distance.	rejected due to time constraints

Page	Para	Reviewer Comment	Department Response
19	2	Replace "'P. sierra" with more information to identify the species, e.g., "Pacific Chorus Frog (Pseudacris sierra)." Otherwise, it is easy for a reader to misread this as R. sierrae.	accepted
19	3	You could add after "[81]": "However, mercury concentrations in Pseudacris sierra tadpoles in the southern Sierra within the range of MYLF were low and below levels thought to be toxic to the tadpoles or harmful to predaceous wildlife (Bradford et al. 2011)." Reference for this is: Bradford, D.F., J. L. Kramer, S.L. Gerstenberger, N.G. Tallent-Halsell, and M.S. Nash. 2011. Mercury in tadpoles collected from remote alpine sites in the southern Sierra Nevada Mountains, California, USA. Archives of Environmental Contamination and Toxicology, DOI 10.1007/s00244-011-9674-y. (paginated version not available yet)	accepted
20	Last	Does the 65% value apply only to lands within the range of MYLF? If so, this should be clarified. If not, then is this value relevant?	accepted
21	3	Again, is this the appropriate section to make recommendations?	accepted
27	6	"Fellers and Bradford" should be "Fellers et al."	accepted
27	6	What is the Bd-negative status in 60-lakes based on? Analysis of preserved specimens from this time? Vredenburg's later studies showing Bd was not found in 60-lakes until mid 2000s?	accepted
27	6	There is no basis presented for the claim that extirpation was caused by Bd. This should be deleted or a reference or rationale provided.	accepted
28	4	What is the basis to assert that "these populations were extirpated by chytridiomycose 1-20 years prior…."?	accepted
A-1	2	Define "SDM"	accepted
A-2	3	"Knapp, 2003" is not formatted.	accepted
A-4	Fig A1	Need to explicitly state that the range boundaries are the "proposed historical range" determined from MaxEnt (P>0.4) as described in text.	accepted