

# SAFE HARBOR AGREEMENT

**FOR THE REESTABLISHMENT  
OF THE CALIFORNIA RED-LEGGED FROG (*Rana draytonii*),  
IN THE SANTA MONICA MOUNTAINS, CALIFORNIA**

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## **SAFE HARBOR AGREEMENT SANTA MONICA MOUNTAINS NATIONAL RECREATION AREA**

### **1.0 INTRODUCTION**

This Safe Harbor Agreement (Agreement) is made and entered into as of [date] between the California Department of Parks and Recreation (CDPR) and the U.S. Department of the Interior, Fish and Wildlife Service (Service); hereafter collectively called the “Parties.” The purpose of this Agreement is to promote the conservation and recovery of the federally threatened California red-legged frog (*Rana draytonii*) through the translocation and reestablishment of the species within suitable habitat on lands owned and managed by CDPR, and to maintain habitat for the species on CDPR lands. This Agreement follows the Service’s Safe Harbor Agreement policy (64 Federal Register [FR] 32717) and regulations (50 CFR 17.22(c) and 50 CFR 17.32(c)) and implements the intent of the Parties to follow the procedural and substantive requirements of section 10(a)(1)(A) of the Endangered Species Act of 1973, as amended (Act).

For the purposes of this Agreement, we define “translocation” according to the International Union for Conservation of Nature and Natural Resources (IUCN) position statement (IUCN 1987) as “the movement of living organisms from one area with free release in another.” The goal of this Agreement is to translocate wild (non-captive) California red-legged frogs from a source population, informed by genetic analyses, to reestablish and maintain additional self-sustaining populations of California red-legged frogs within its historic range on CDPR lands.

Safe harbor agreements encourage voluntary conservation efforts by non-Federal landowners and provide them certainty that future property-use restrictions will not be imposed if those efforts attract covered species to their properties or result in increased numbers or distributions of covered species already present. In return for voluntary conservation commitments, the safe harbor agreement will extend assurances to the landowners that allow future alteration or modification of the enrolled lands back to pre-agreement conditions (Baseline). This cooperative effort provides landowners with a way to manage enrolled lands to support the conservation of listed species while conducting certain other land-use practices.

In 2010, the National Park Service (NPS) initiated planning to translocate and reestablish California red-legged frogs in the Santa Monica Mountains, which is within the southern area of the species’ range. Richmond et al. (2013) conducted genetic studies of the California red-legged frog. Information from that study was used to determine the most appropriate source population for this reestablishment effort. The NPS conducted several meetings with local aquatic resources experts to help provide information about stream conditions and site access. NPS then conducted habitat reconnaissance and site assessments and identified seven properties as potential translocation and reestablishment sites for California red-legged frogs in Santa Monica Mountains National Recreation Area (SMMNRA).

Comprising 153,075 acres, SMMNRA is the world's largest urban national park and was established in 1978. The NPS works together with partners from State and county agencies, municipalities, and universities to jointly manage many locations within SMMNRA.

Four of the seven properties identified as potential translocation and reestablishment sites for California red-legged frogs in SMMNRA are owned and managed by CDPR. Two properties are owned and managed by the NPS, and as they are federal lands, are not eligible to enroll into a safe harbor agreement. California red-legged frog reestablishment has commenced on NPS lands under a separate permit not associated with this Agreement. The remaining property is owned and managed by a non-governmental organization and is not affiliated with this Agreement, nor would any activities under this Agreement be carried out at that property.

The NPS is the project lead in the reestablishment of California red-legged frogs to SMMNRA, including conducting translocation activities on CDPR lands. The NPS and CDPR have developed a Scientific Collecting Permit, which identifies roles and responsibilities in the translocation and reestablishment of California red-legged frogs to the Enrolled Properties between the two agencies and allows NPS access to lands.

California red-legged frogs are currently found in only one location near SMMNRA. This site is within the Las Virgenes Canyon Open Space Preserve (formerly Ahmanson Ranch), which is owned by the Mountains Recreation and Conservation Authority (MRCA). The NPS has permission from MRCA to access their lands for purposes associated with translocation and reestablishment of California red-legged frogs, as identified in a letter dated February 24, 2014.

The mission of CDPR is to provide for the health, inspiration and education of the people of California by helping to preserve the state's extraordinary biological diversity, protecting its most valued natural and cultural resources, and creating opportunities for high-quality outdoor recreation. A primary purpose of the state parks is to preserve the outstanding scenic, natural, and cultural values found on lands managed by CDPR, and to enable the public to visit, see, understand, and enjoy these resources through the effective execution of programs for interpretation, recreational use, and development.

When signed, this Agreement will serve as the basis for the Service to issue CDPR an enhancement of survival permit under section 10(a)(1)(A) of the Act (Permit), for the incidental take of the California red-legged frog while conducting translocation and reestablishment activities, activities associated with the maintenance and restoration of habitat, and other covered activities, including the potential future return of any enrolled lands to the elevated Baseline condition. The Permit will authorize CDPR to take individual California red-legged frogs, and their progeny, that occur on the enrolled lands above the established elevated Baseline conditions, as a result of the activities described in this Agreement. The Parties expect that the maximum level of take authorized under this Agreement and subsequent Permit will never be realized. Permit issuance will not preclude the need for CDPR to abide by all other applicable Federal, State, and local laws and regulations that may apply.

## 2.0 SPECIES COVERED BY THIS AGREEMENT

This Agreement covers the California red-legged frog (*Rana draytonii*), which is also referred to as the “Covered Species.” This species was listed as threatened in 1996 (Service 1996).

Habitat for the California red-legged frog is described in Hayes and Jennings (1988) and the critical habitat rule for the California red-legged frog published on March 17, 2010 (75 FR 12815). Adult California red-legged frogs prefer dense, shrubby or emergent riparian vegetation closely associated with deep (greater than 2.3 feet), still or slow moving water (Hayes and Jennings 1988). However, California red-legged frogs also have been found in ephemeral creeks and drainages and in ponds that may or may not have riparian vegetation. Some California red-legged frogs have been found to remain in their breeding pond, while others disperse from their breeding habitat to forage and seek sheltering habitat. Habitat for the California red-legged frog consists of aquatic habitat, upland habitat, and/or dispersal habitat (75 FR 12815).

The California red-legged frog requires aquatic habitat for breeding, such as any standing body of freshwater, including natural and manmade (e.g., stock) ponds, slow moving streams or pools within streams, and other ephemeral or permanent water bodies that typically become inundated during winter rains and hold water for a minimum of 20 weeks in all but the driest of years. The California red-legged frog breeding season typically runs from November through April, which coincides with the general rainy season in California. Mating most commonly occurs during February or March, but can vary depending on local and seasonal climatic patterns. Non-breeding aquatic habitat includes freshwater habitats that may or may not hold water long enough for the species to hatch and complete its aquatic lifecycle but provides for shelter, foraging, predator avoidance, and aquatic dispersal habitat for juvenile and adult California red-legged frogs. This includes plunge pools within intermittent creeks, seeps, quiet water refugia during high water flows, and springs of sufficient moisture to withstand the summer dry period.

Upland habitat for the California red-legged frog includes those areas of variable distance from the edge of the riparian vegetation or drip-line surrounding aquatic habitat that provide for shelter, foraging, and predator avoidance. The upland features also maintain hydrologic, geographic, topographic, ecologic and edaphic features that support the aquatic habitat. Dispersal habitat for the California red-legged frog includes accessible upland or riparian habitat between occupied locations that allows for movement between such sites. Dispersal habitat includes various natural habitats and altered habitats, such as agricultural fields, that do not contain barriers to dispersal. Dispersal distances are typically less than 0.5 mile, with a few individuals moving up to 1 to 2 miles (Fellers 2005). Movements are typically along riparian corridors, but some individuals, especially on rainy nights, move directly from one site to another through normally inhospitable habitats, such as heavily grazed pastures or oak-grassland savannas (Fellers 2005).

Once common in southern California, there are currently only three small populations of California red-legged frogs remaining – two in Los Angeles County and one in Ventura County. The southernmost population in the United States is East Las Virgenes in Ventura County. Historical data from museum records (Table 1) and published literature (De Lisle et al. 1987)

suggest that California red-legged frogs were historically in all of the major streams throughout the Santa Monica Mountains and surrounding areas.

**Table 1. The location, year collected, and numbers collected of historical specimens of California red-legged frogs in the Santa Monica Mountains and surrounding regions. All specimens are part of L.A. County Museum of Natural History’s permanent collection.**

STREAM/LOCATION NAME	YEAR COLLECTED	INDIVIDUALS COLLECTED
TRANCAS CANYON	1964	14
SOLSTICE CANYON	1964	4
TAPIA PARK	1947	1
TOPANGA CANYON	1947	5
RUSTIC CANYON	?	2
UCLA	1937	1
UCLA	?	1
POOLS ON SANTA MONICA BLVD.	?	2
LOS FELIZ BRIDGE	1925	2

The California red-legged frog was thought to be extirpated from the Santa Monica Mountains and surrounding area until a population was discovered in Las Virgenes Creek in 1999. This site is within the Las Virgenes Canyon Open Space Preserve (formerly Ahmanson Ranch) that is owned by MRCA. The Las Virgenes population of California red-legged frogs is the only population near SMMNRA and surrounding area. In late 2003, MRCA completed the purchase of the 2,983-acre Ahmanson Ranch in the Simi Hills in Ventura County. The parkland is contiguous with and accessed from the existing 2,650-acre Upper Las Virgenes Canyon Open Space Preserve.

The Las Virgenes population is genetically distinct from all other populations of California red-legged frogs (Richmond et al. 2013). This population also represents the southernmost population of California red-legged frogs in the United States. The Las Virgenes population of California red-legged frogs is located the closest to the Santa Monica Mountains of any extant population of California red-legged frogs and is likely the California red-legged frog population that is most similar genetically to the extirpated Santa Monica Mountains population of California red-legged frogs. Therefore, the Las Virgenes population of California red-legged frogs is the most appropriate source for translocation to the Santa Monica Mountains.

The Las Virgenes population of California red-legged frogs is critically small and isolated, and the long-term persistence of this population is a concern (Delaney 2012) – it currently occurs at only one location and is at risk from small population size and stochastic events. By creating multiple locations occupied by this genetically distinct population of California red-legged frogs, we would reduce the potential of its local extinction.

A subset of individuals (eggs) from the Las Virgenes population of California red-legged frogs would serve as the source population for the reestablishment. A population would be determined appropriate for reestablishment if: 1) contributing individuals from the potential source

population would benefit the reestablishment of the California red-legged frog in SMMNRA; 2) individuals could be captured from a source site and reestablished in SMMNRA within a timely manner; 3) removing individuals from a source site would not have a detrimental effect on the viability of the source population; and 4) novel diseases would not be introduced to SMMNRA. See Appendix 1 for the protocol for translocation of California red-legged frogs.

The primary goal of this Agreement is to reestablish California red-legged frogs into suitable stream habitats within SMMNRA, creating new populations of the species, both to increase the overall population size, and to create redundant populations that would prevent the extirpation of the species from SMMNRA if a catastrophic event occurred at Las Virgenes Creek.

### **3.0 DESCRIPTION OF ENROLLED PROPERTIES**

The properties subject to this Agreement (Enrolled Properties) are owned and managed by the CDP. The four enrolled properties are: 1) Point Mugu State Park, La Jolla Canyon Watershed, Ventura County; 2) Leo Carrillo State Park, Arroyo Sequit Watershed, Los Angeles County; 3) Malibu Creek State Park, Monte Nido Watershed, Los Angeles County; and 4) Topanga State Park, Temescal Creek, Santa Monica Watershed, Los Angeles County. The area of each Enrolled Property follows: the area of La Jolla Canyon Watershed within Point Mugu State Park is 2,790 acres; the area of Arroyo Sequit Watershed within Leo Carrillo State Park is 1,803 acres; the area of Monte Nido Watershed within Malibu Creek State Park is 5,420 acres; and the area of Temescal Creek, Santa Monica Watershed within Topanga State Park is 6,917 acres. The total combined area of the Enrolled Properties is 16,930 acres.

The reestablishment of California red-legged frog populations is identified in the Recovery Plan for the California red-legged frog (Service 2002). Recovery Criterion 4 of the plan is the reestablishment of historic populations. The plan also lists augmentation of existing populations and reestablishment of extirpated populations as priority recovery actions in southern California (Recovery Tasks 1.27-1.35). The Santa Monica Mountains lie within Core Area #27 (Santa Monica Bay – Ventura Coastal Streams).

Habitat surveys conducted during 2011, 2012, 2013, and 2014 in SMMNRA identified and continue to monitor seven potential sites for the translocation and reestablishment of California red-legged frogs (Table 2, Figure 1, see Appendix 1) because suitable upland habitat and suitable aquatic breeding habitat for the California red-legged frog were identified at these seven sites. Of these seven sites: four properties are owned and managed by CDP; two are owned and managed by NPS; and one is owned and managed by another non-governmental organization.

The two sites that are owned and managed by the NPS are Solstice Creek in Solstice Canyon Park and Ramirez Creek in Zuma/Trancas Park, both located within Los Angeles County. The sites owned and managed by the NPS and the non-governmental organization are not party to this Agreement and will not be otherwise described in this Agreement.

**Table 2. The creek name, park name, landowner, and county of each potential translocation site.**

Type of site	Stream/Creek	Park Name	Land Owner	County
Source population	Las Virgenes Creek (east fork)	Upper Las Virgenes Open Space Preserve	Mountains Recreation and Conservation Authority (MRCA)	Los Angeles
Potential reestablishment site	Arroyo Sequit Creek	Leo Carrillo State Park	California Department of Parks and Recreation (CDPR)	Los Angeles
Potential reestablishment site	Un-named tributary of Malibu Creek (Bulldog/Fern Canyon Creek)	Malibu Creek State Park	CDPR	Los Angeles
Potential reestablishment site	La Jolla Canyon Creek (west fork)	Pt. Mugu State Park	CDPR	Ventura
Potential reestablishment site	Temescal Creek	Topanga State Park	CDPR	Los Angeles
Potential reestablishment site	Ramirez Canyon Creek	Zuma-Trancas Canyons	National Park Service	Los Angeles
Potential reestablishment site	Solstice Canyon Creek	Solstice Canyon Park	National Park Service	Los Angeles

During the Fall of 2013, water quality data were taken by the Los Angeles Regional Water Quality Board at each Enrolled Property, except for La Jolla Canyon, because of the Springs Fire (see below). The purpose was to identify water quality constraints to potential translocations at specific sites and establish baseline data. Analyses completed were: general water chemistry, microbiology, major cations (ions in water), trace elements, mercury, and pyrethroids. There were no abnormalities within the water quality data for any potential reestablishment site.

Based upon the presence of suitable habitat during the habitat surveys, and results of the water quality sampling, the Parties have determined that California red-legged frogs could be reestablished at the four Enrolled Properties. All proposed sites for reestablishment have little to no disturbance and are characterized by permanent water flowing year round with several pools occurring that are over two feet deep during the drier parts of the year. Suitable habitat conditions are present at all proposed sites (except for currently at La Jolla Canyon, because of the Springs Fire (see below)), and include thick herbaceous cover, suitable water quantity, excellent water quality, emergent vegetation, undercut banks, and exposed root masses. All proposed sites contain the appropriate biological resources for California red-legged frog breeding and foraging (except for currently at La Jolla Canyon, because of the Springs Fire (see below)), and lack non-native species that are known threats to the species (e.g., bullfrog (*Lithobates catesbeianus*), red swamp crayfish (*Procambarus clarkia*), and Centrarchid fishes; and in some cases the New Zealand mudsnail (NZMS, *Potamopyrgus antipodarum*)). Multiple surveys were conducted for the presence of California red-legged frogs in creeks from each of the Enrolled Properties and none were detected.

Upland habitat is present for the species adjacent to the creeks where we propose to reestablish California red-legged frogs. For the purposes of this Agreement, the uplands associated with a particular creek for California red-legged frog reestablishment focus on the area of upland habitat adjacent to that creek that extends 100 feet from the edge of the creek, although

California red-legged frogs, once reestablished, could occur beyond this area.

## **Santa Monica Mountains**

The Santa Monica Mountain Range is one of the transverse mountain ranges of southern California. These ranges run in an east-to-west direction perpendicular to the major mountain ranges of the state. The western portion of the Santa Monica Mountain Range is the highest with Sandstone Peak at an elevation of 3,111 feet; however, the median elevation is between 1,000 to 2,000 feet. Most of the mountain slopes are rugged and steep, while lands occurring in the interior valleys, along creek beds, and near elevated marine terraces tend to contain more of a gradual slope. The Santa Monica Mountains occur in Ventura County and Los Angeles County, California.

The Santa Monica Mountain Range is bordered by the Oxnard Plain to the west, the Los Angeles urban complex to the east, the Simi Hills to the north, and the Pacific Ocean to the south. The range is about 45 miles long, averages seven miles wide, and encompasses 220,000 acres. The range is characterized by steep mountain slopes and deep canyons with mostly intermittent streams funneling into the ocean. There are approximately 38 miles of coastline with sandy and rocky beaches and sea cliffs reaching several hundred feet in height.

Plant communities within the Santa Monica Mountains include coastal sage scrub, chaparral, foothill woodlands, oak and bay forests, non-native annual grasslands, native grasslands, riparian woodlands, and freshwater marshes. Plants common in the Santa Monica Mountains that can be found in many of the Enrolled Properties include coast live oaks (*Quercus agrifolia*), sycamore (*Platanus racemosa*), bay laurel (*Umbellularia californica*), toyon (*Heteromeles arbutiflora*), willows (*Salix spp.*) and cottonwood (*Populus balsamifera*). Beneath the canopy poison oak (*Toxicodendron diversilobum*), giant wild rye (*Elymus condensatus*), bracken fern (*Pteridium aquilinum*), California blackberry (*Rubus ursinus*), and leather root (*Hoita macrostachya*) can be encountered along the riparian areas. Within the stream channels, rushes (*Juncus spp.*), tules (*Scirpus spp.*), stream orchid (*Epipactis gigantea*), and Humboldt lily (*Lilium humboldtii*) can be found. Surrounding upland habitat is chaparral and coastal sage scrub containing more xeric species, including green-bark ceanothus (*Ceanothus spinosus*), California sagebrush (*Artemisia californica*), sugarbush (*Rhus ovata*), California buckwheat (*Eriogonum fasciculatum*), California mountain mahogany (*Cerocarpus betuloides*), scrub oak (*Quercus berberidifolia*), long leaf bush (*Lupinus longifolius*), and large areas of chamise (*Adenostoma fasciculatum*).

## **La Jolla Canyon Watershed**

The majority of the La Jolla Canyon Watershed lies within the 13,960-acre Point Mugu State Park (Point Mugu State Park General Plan: <http://www.parks.ca.gov/pages/21299/files/573.pdf>). The La Jolla Canyon Watershed, as an Enrolled Property under this Agreement, is comprised of La Jolla Valley, the unnamed creek in La Jolla Valley, and La Jolla Canyon totaling 2,790 acres.

This area has burned three times in the last 60 years. Most recently, on May 2, 2013, the Springs Fire burned large portions of Point Mugu State Park including La Jolla Canyon, resulting in complete burning of the vegetation near the stream sites. Therefore, this site is currently

unsuitable for the translocation of the California red-legged frog until adequate vegetation regrowth can occur and the site can be reassessed for suitability. Prior to the Springs Fire, the area of suitable habitat for the California red-legged frog was approximately 23.4 acres. This Enrolled Property is included in this Agreement because we anticipate that suitable habitat for the California red-legged frog will be returned to pre-fire levels during the period of this Agreement.

La Jolla Canyon is a relatively short coastal canyon that descends abruptly from La Jolla Valley into the beach areas. The uplands are a mix of chaparral, riparian woodland, oak woodland, grassland, and coastal sage scrub. Public facilities in the canyon include a 50-person group camp with restroom and a 60-car parking lot with restroom at the trailhead for hike-in access to La Jolla Valley. No other additional facilities are planned.

The unnamed creek in La Jolla Canyon contains seeps and springs that supply surface water to the creek for most of the year, and pools can be found in the mid-reaches during the late-summer through fall, except in the driest years. The creek extends from its confluence with La Jolla Creek, upstream approximately 1 mile to the upper limit at an ephemeral pond. Spring 2012 surveys found one native amphibian species breeding in the stream, the Pacific treefrog (*Pseudacris regilla*) and no non-native invasive animal species.

La Jolla Valley was established as a Natural Preserve in 1972 by CDPR due to the presence of rare native grasslands dominated by perennial bunchgrasses. Sensitive wetlands are scattered along the ephemeral and intermittent streams in the area. Passive recreation is limited here to hiking and equestrian use on existing trails, and a small hike-in campground with chemical and composting toilets.

A network of trails covers the area and includes the La Jolla Valley Fire Road and Loop Trails, Chumash Trail, Overlook Spur, and La Jolla Valley Center Trail. The Chumash Trail is limited to hiking only. All others are hiking and equestrian only except the La Jolla Valley Fire Road, which is open to biking.

### **Arroyo Sequit Watershed**

The lower Arroyo Sequit Watershed is located within Leo Carrillo State Park, a 2,487-acre park established in 1953 (Leo Carrillo State Park General Plan: <http://www.parks.ca.gov/pages/21299/files/540.pdf>). The Arroyo Sequit Watershed is relatively undeveloped, although channelization, stream disturbance, and sources of invasive plants are present on private properties along the upper terminus of the watershed outside of the Enrolled Property. The Arroyo Sequit Watershed, as an Enrolled Property under this Agreement, is comprised of 1,803 acres.

The main stem of Arroyo Sequit stream runs through the watershed from north to south emptying into the Pacific Ocean. The stream runs alongside the southern end of Mulholland Highway and crosses under the Pacific Coast Highway Bridge. The lower 1-mile section of Arroyo Sequit is intermittent, while its more upstream reaches are characterized by large pools of

year-round water shaded by large sycamores. During the dry season, large stretches of the stream dry up although some pools remain deeper than 2.3 feet, except in the driest years. The area of suitable habitat for the California red-legged frog is approximately 40 acres.

California newts (*Taricha torosa*), California treefrogs (*Pseudacris cadaverina*), and Pacific treefrogs are known to breed in Arroyo Sequit. Long term monitoring by Pepperdine University shows that the populations of newts and frogs are stable in Arroyo Sequit Creek. In addition, endangered Southern California steelhead trout (*Oncorhynchus mykiss*) breed in Arroyo Sequit in some years, depending on conditions and connectivity to the ocean. No non-native animal species have been detected at this site. The upland habitat is a mix of chaparral, riparian woodland, oak woodland, grassland, and coastal sage scrub.

Leo Carrillo State Park has 140 campsites, which are concentrated in the southern end of the park. The campground borders the lower portion of the stream for approximately 0.75 mile. There are 4.5 miles of trails within the park, but no official trails are located along Arroyo Sequit. Pedestrian access along the creek does occur, as noted by graffiti and the occurrence of infrequent trash.

Historically, grazing occurred in the flatter areas of the park. Remnant irrigation piping is present within the creek. Due to the steep canyon walls surrounding the creek itself, disturbance to onsite habitats occurs mainly in the lower 0.75 mile of the creek due to the campground development and construction of the Pacific Coast Highway and earlier roadways. All other areas of Arroyo Sequit within CDPR property are relatively undisturbed

There are ongoing projects in Arroyo Sequit to restore the stream to make it more hospitable to steelhead trout movement and breeding. Projects include steelhead barrier removal, invasive weed removal, and riparian habitat restoration. A long-term project to redesign the campground and remove the existing gabion structure along an approximately 0.5-mile section of the creek adjacent to the campground has been identified as a goal within the Leo Carrillo State Park General Plan.

### **Santa Monica Watershed**

Temescal Creek occurs within the Santa Monica Watershed. Most of Temescal Creek is located within Topanga State Park, a 11,525-acre park that was first opened to the public in 1974 (Topanga State Park General Plan: [http://www.parks.ca.gov/?page\\_id=25956](http://www.parks.ca.gov/?page_id=25956)). Topanga State Park boasts sweeping views of the Pacific Ocean and the San Fernando Valley from its 36 miles of hiking trails. Topanga State Park in general has been shaped in recent history by mining, gentleman ranching, and expansion of tourism through beach and “auto hotel” development. The portions of this watershed within the park are relatively undeveloped, however, with the exception of the Temescal Canyon, Temescal Ridge, Bienvenida and Backbone Trails, which are generally hiker only trails. Topanga State Park has limited camping, and none near Temescal Creek. The area of Temescal Creek, Santa Monica Watershed that occurs within Topanga State Park, and as an Enrolled Property under this Agreement, is 6,917 acres.

Temescal Canyon is dominated by mixed chaparral, with pockets of coastal sage scrub, coast live Oak riparian woodland, and chamise chaparral. Grasslands abound in Topanga State Park, but are not found in the vicinity of the area of suitable habitat for the California red-legged frog.

Temescal Creek is generally intermittent, with some perennial reaches, and its water is derived from natural runoff, springs, and adjacent development. A portion of the stream runs year-round, with deep pools and very large boulders characterizing the habitat. The area of suitable habitat for the California red-legged frog is approximately 52 acres. California newts are abundant in Temescal Creek and Pacific treefrogs are also found to breed there. California treefrogs have been found only rarely over 14 years of annual stream surveys by the NPS. Non-native goldfish (*Carassius auratus*) were found in Temescal Creek in 2014 near a popular bridge crossing over the creek, but no other non-native animal species have been found.

No restoration projects are currently planned for Temescal Canyon Creek beyond ongoing invasive weed removal as encountered. Restoration efforts in Topanga State Park have been focused on removal of steelhead barriers and invasive weeds and crayfish along Topanga Creek, and assessment of projects to protect water quality.

### **Monte Nido Watershed**

The Monte Nido Watershed encompasses Malibu Creek, and a large portion of the watershed lies within the 8,187-acre Malibu Creek State Park. A tributary of Malibu Creek is called Fern Canyon or “Bulldog” Creek, and is one of the sites considered for potential California red-legged frog reestablishment. The area of the Monte Nido Watershed that occurs within Malibu Creek State Park, and as an Enrolled Property under this Agreement, is 5,420 acres.

Malibu Creek State Park was established in 1976, preserving 7,881 acres of parkland. Although the park has been shaped in recent history by extensive ranching, filming, and development of recreation facilities (camping, structures, and trails) and local transportation routes, these activities have had little impact on the Fern Canyon area. Of the 40 miles of trails within the park, fire roads cross the Bulldog/Fern Canyon stream in only two places, and there are no roads or trails running parallel to the stream. The 64 campsites within the park are located in the eastern portion of the park near its entrance. The over 800 parking spots are associated with developed recreation or park management areas (Malibu Creek State Park General Plan: [http://www.parks.ca.gov/?page\\_id=25918](http://www.parks.ca.gov/?page_id=25918)).

The upper part of Fern Canyon is dry and fairly dark with a dense riparian canopy dominated by oak, sycamore, and bay. However, the lower part of the canyon as accessed by Bulldog Motorway has perennial water and large deep pools, which appear to be spring fed. The area of suitable habitat for the California red-legged frog is approximately 19.5 acres.

NPS researchers have found Pacific and California treefrogs breeding in Fern Canyon/Bulldog Creek over 3 years of surveys initiated in 2011. Instream habitat is characterized by deep pools, large boulders and several long steep rock “slides.” Despite wide-spread invasive aquatic species in the rest of Malibu State Park’s creeks, Fern/Bulldog remains free of NZMS, red

swamp crayfish, bullfrogs, and non-native fish.

No restoration projects are currently planned for Fern Canyon beyond ongoing invasive weed removal as encountered. Restoration efforts in Malibu Creek State Park have been focused on removal of steelhead barriers along Malibu Creek and its tributaries, assessment of NZMS, and removal of invasive fish and crayfish, restoration of native grasslands and oak woodlands, and removal of invasive weeds. Maintenance of the adjacent fire roads is anticipated periodically, and would be limited to the existing road prism.

#### **4.0 BASELINE DETERMINATION**

This Agreement provides a way for the CDPR to reestablish the California red-legged frog and to enhance and manage native riparian and wetland habitat for the benefit of the species without incurring additional regulatory restrictions on the use of their property. The Agreement, however, does not release the CDPR from the responsibility to avoid take of any endangered or threatened species already occupying portions of their property. To receive the assurances regarding take of California red-legged frog specified in this Agreement, the CDPR must maintain the Baseline conditions on the Enrolled Properties.

Baseline conditions are defined in the Service's Safe Harbor Agreement policy (64 FR 32717) as population estimates and distribution and/or habitat characteristics and determined area of the enrolled property that sustain seasonal or permanent use by the covered species at the time the safe harbor agreement is executed between the Service and the property owner. The Baseline conditions must reflect the known biological and habitat characteristics of the Enrolled Property.

Although California red-legged frogs do not currently occur at the Enrolled Properties, suitable habitat for California red-legged frogs exists within each of the Enrolled Properties (except for currently at La Jolla Canyon, which we anticipate will contain suitable habitat during the period of this Agreement, as discussed previously).

This Agreement has been established to aid in promoting the recovery of the California red-legged frog. CDPR understands the valuable contribution toward recovery that the translocation and reestablishment of the California red-legged frog on its lands would provide to the species. Therefore, CDPR would like to contribute to the recovery of the California red-legged frog by creating additional populations of the species at the Enrolled Properties and by establishing an elevated Baseline for the species. The Parties have worked in partnership to establish the following Baseline conditions at the Enrolled Properties. The Baseline conditions for the California red-legged frog at the Enrolled Properties will contain two components: (1) the current area of suitable habitat for the California red-legged frog at an Enrolled Property; and (2) an elevated presence of a self-sustaining population of California red-legged frogs at an Enrolled Property. The elevated Baseline has been established with the intent to create and maintain self-sustaining populations of California red-legged frogs at the Enrolled Properties post translocation. The Parties have agreed to set the Baseline conditions for the California red-legged frog at the Enrolled Properties as follows.

1. The Baseline area for the California red-legged frog at each of the Enrolled Properties consists of:
  - 23.4 acres at La Jolla Canyon, composed of 1.5 linear miles of aquatic stream habitat by 164 feet of adjacent upland habitat (because the Parties anticipate this Enrolled Property will return to the same amount of suitable habitat that existed prior to the Springs Fire—no translocation of California red-legged frogs to this site would occur until the Parties agree that the site is again suitable for California red-legged frogs);
  - 40 acres at Arroyo Sequit, composed of 1.8 linear miles of aquatic stream habitat by 328 feet of adjacent upland habitat;
  - 52 acres at Temescal Canyon, composed of 1.83 linear miles of aquatic stream habitat by 328 feet of adjacent upland habitat;
  - 19.5 acres at Fern Canyon/Bulldog Creek, composed of 0.96 linear mile of aquatic stream habitat by 328 feet of adjacent upland habitat.

The total Baseline area for the California red-legged frog at the Enrolled Properties is 134.9 acres.

2. The elevated Baseline for the California red-legged frog at each of the Enrolled Properties can be determined independently of the others, and will be achieved when the suitable habitat at an Enrolled Property is occupied by a self-sustaining population (as defined below in this Agreement) of the species. Once the goal of a self-sustaining population of California red-legged frogs is reached at an Enrolled Property, the population of California red-legged frogs at that location will not be reduced intentionally to a condition that is not self-sustaining. The determination that the elevated Baseline has been reached at any of the Enrolled Properties would be made jointly by the Parties.

As defined by this Agreement, a self-sustaining population of the California red-legged frog is one that displays demographic characteristics consistent with a population that is reproducing and surviving. One measure of a self-sustaining population is all life stages—egg masses, tadpoles, metamorphs/juveniles, and adults—observed annually during spring season surveys for 5 or more consecutive years, and confirmed by surveys at least once every 5 years thereafter.

The translocation and reestablishment of the California red-legged frog will be considered successful at an Enrolled Property when the elevated Baseline for species presence is reached and maintained. The intent of CDPR is to maintain a viable population of California red-legged frogs at each Enrolled Property in perpetuity.

If two or fewer life stages of California red-legged frogs are observed during 1 year of annual spring surveys, the Parties will discuss appropriate next steps, including whether additional

translocations should be conducted.

CDPR will not be considered out of compliance with the Baseline conditions for presence of the California red-legged frog for circumstances or actions outside of CDPR control that may reduce the status of the species in suitable habitat at an Enrolled Property or may extirpate it from such site.

According to this Agreement, actions considered outside of CDPR's control include:

- Time periods of prolonged drought when aquatic habitat is not suitable or has dried-out.
- Natural disasters including, but not limited to, wildfires, landslides, earthquakes, and/or flood.
- The natural introduction and/or spread of disease within one or more California red-legged frog population.

If circumstances or actions outside of CDPR control that may reduce the status of the California red-legged frog in suitable habitat at an Enrolled Property occur, the Parties will convene to discuss options.

## **5.0 MANAGEMENT ACTIVITIES**

The Parties have developed this Agreement to identify activities CDPR can implement to promote the conservation and recovery of the California red-legged frog.

### **5.1 Beneficial Management Activities**

These activities and methods for the translocation and reestablishment of the California red-legged frog at SMMNRA have been designed in a cooperative and collaborative effort with multiple agencies, organizations, and private entities including: CDPR, Service, U.S. Geological Survey, NPS, MRCA, Santa Monica Bay Restoration Commission, and The Bay Foundation. See section 8.0 for specific responsibilities of the Parties.

CDPR agrees to carry out the following beneficial management activities at the Enrolled Properties:

- Activities associated with the translocation and reestablishment of California red-legged frogs at the Enrolled Properties.

The methods for reestablishment of California red-legged frogs are described in Appendix 1, which is based upon Appendix G of the Recovery Plan for the California red-legged frog (General Guidelines for Reestablishment of California red-legged frog Populations) (Service 2002), and have been adapted by experts to coincide with this specific location. Additionally, all activities associated with the reestablishment of

California red-legged frogs at the Enrolled Properties will follow the measures identified in Appendix F of the Recovery Plan for the California red-legged frog (Code of Practice to Reduce the Spread of Disease and Parasites) (Service 2002) to reduce the potential for infecting amphibians with novel pathogens at a new site.

Full implementation of the reestablishment is expected to take 5 years. Monitoring of habitat suitability will be conducted annually during the reestablishment period and at least once every 5 years thereafter (see Part 8 of this Agreement). Monitoring for the presence of California red-legged frogs will be conducted annually during the reestablishment period and at least once every 5 years thereafter (see Part 8 of this Agreement). CDPR is committed to the reestablishment of California red-legged frogs within the Enrolled Properties.

- Restoration activities, including the control and eradication of invasive non-native plant species, to conserve intact native habitats and to allow for the establishment of native plant species. Restoration also includes removing of man-made structures or the control of sources of water pollution. Active restoration efforts within the Enrolled Properties and near or within the proposed reintroduction sites include the following:

La Jolla Valley, Pt. Mugu State Park:

- Removal of Harding grass, (*Phalaris aquatic*), artichoke thistle (*Cynara cardunculus*), purple fountain grass (*Pennisetum setaceum*) and other invasive plants.
- Enhancement of native bunchgrass grassland post invasive weed treatment and/or after wildfire(s).
- Abandonment of old roads and replacement of culverts that contribute soil to waterways.
- Prescribed burns.

Arroyo Sequit, Leo Carrillo State Park:

- Removal of Cape ivy (*Delairea odorata*), blue gum eucalyptus (*Eucalyptus globulus*), terracina spurge (*Euphorbia terracina*), castor bean (*Ricinus communis*), mustard (*Hirschfeldia incana* and *Brassica* spp.), and other non-native vegetation along the riparian corridor of Arroyo Sequit.
- Removal of two steelhead barriers in the lower one-mile section of Arroyo Sequit.
- Removal of trash and graffiti along the riparian corridor and at the campground.

- Abandonment of illegal trails.

## **5.2 Other Management Activities**

Additional management activities would include recreational, educational, and research activities and the continued public use of the Enrolled Properties. Specific activities include:

- Other habitat restoration activities including trash removal, graffiti removal, invasive weed and animal removal, native plantings.
- Retiring, maintaining, improving, and creating trails and roads.
- Maintaining and improving existing facilities, or creating new facilities such as campgrounds and/or parking lots in previously developed areas, as needed to meet CDPR's mission.
- Law enforcement and emergency response including patrols, incident response, human or fish/wildlife injury, search and rescue of lost visitors, removal and restoration of marijuana grow sites, and vehicular wreckage, etc.
- Remedial erosion and flooding management.
- Limited sampling for research activities, including archaeological investigations and cultural site protection projects.
- Recreational activities on approved trails or areas that would include hiking, horseback riding, bicycling, camping, and picnicking activities.
- Fuel modification activities around existing buildings and fire roads.
- Interpretive/educational events, but not within 0.5 mile of translocation or occupied sites, unless within developed areas.
- Filming or special use events (weddings, races, etc.), but not within 0.5 mile of translocation and occupied sites, unless within defined developed area.

## **5.3 Avoidance and Minimization Measures**

CDPR agrees to implement the following avoidance and minimization measures:

- If bullfrogs or any other non-native animal species that may prey on any life stage of California red-legged frogs are detected within an Enrolled Property, CDPR will develop and implement an eradication strategy to remove/reduce the threat of predation within 0.5 mile of the translocation or occupied habitat areas within 1 month of detection, in

coordination with the Service. Bullfrog or other non-native animal species control measures will be implemented as resources and funding are available.

- CDPR will not intentionally introduce fish species into Baseline habitat areas and is not responsible for unauthorized introductions of fish.
- During any maintenance activities, CDPR, or other personnel associated with CDPR, will exercise due diligence to avoid negative effects to listed species.
- To ensure that diseases are not conveyed between work sites, the fieldwork code of practice developed by the Declining Amphibian Task Force will be followed at all times.

## **6.0 INCIDENTAL TAKE OF COVERED SPECIES**

As used in this Agreement, incidental take refers to the unintentional or unavoidable killing or injuring of individuals of the Covered Species in the course of carrying out otherwise lawful activities. Section 3(18) of the Act defines take to mean to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct. Service regulations (50 CFR 17.3) define harm to include significant habitat modification or degradation that actually kills or injures wildlife by significantly impairing essential behavioral patterns, including breeding, feeding, or sheltering. Harassment is defined by the Service as an intentional or negligent action that creates the likelihood of injury to wildlife by annoying it to such an extent as to significantly disrupt normal behavioral patterns which include, but are not limited to, breeding, feeding, or sheltering. Nothing in this Agreement authorizes CDPR or persons associated with CDPR to deliberately kill or injure any such species.

Safe Harbor Agreements are written in anticipation of take of the Covered Species and their progeny at some point in the future. Any take that occurs as a result of a reduction in the quality and/or quantity of the established Baseline on the Enrolled Properties is not authorized. Under this Agreement, incidental take could occur: (1) as a result of translocation and reestablishment activities; (2) as a result of the Management Activities, described in Part 5 of this Agreement; (3) as a result of the monitoring described in Part 8 of this Agreement; and (4) as a result of the potential return to Baseline at the end of the term of this Agreement and its associated Permit. CDPR may conduct these activities even if such use results in the incidental take of individual California red-legged frogs covered under this Agreement and as authorized in the Permit.

The Permit would authorize CDPR, and persons associated with CDPR, to incidentally take individual California red-legged frogs while conducting activities associated with the translocation and reestablishment of the species at the Enrolled Properties. Such incidental take of California red-legged frogs could occur as a result of activities associated with the capture and translocation of individuals from the source population for reestablishment into suitable habitat at the Enrolled Properties. Only California red-legged frog egg masses would be targeted for translocation. As a result of translocation activities, incidental take could occur in the form of direct mortality or injury to California red-legged frog eggs or tadpoles if any eggs happen to

hatch during translocation, through suffocation, desiccation, exposure, stranding, entrainment, or trampling by CDPR, NPS, or other persons assisting CDPR. Service biologists will also be authorized to incidentally take California red-legged frogs while conducting the above activities to assist CDPR in the implementation of the Agreement. The number of California red-legged frog egg masses removed from the source site during any single capture and translocation event would be determined by the Service and NPS and would be no more than one-half of any single egg mass and limited to no more than 10 percent of the source population estimate made visually through direct counts at the time of translocation. The time of year for any translocation and reestablishment activities would be determined by the Service and NPS in coordination with CDPR.

The Beneficial Management Activities have been developed with intent to reestablish and maintain a self-sustaining population of California red-legged frogs at each of the Enrolled Properties, while the Other Management Activities are not anticipated to impede these beneficial contributions to the status of the California red-legged frog. As the populations of California red-legged frogs increase, individuals may disperse and/or migrate outside of the areas of suitable habitat, which coincide with the Baseline areas in Part 4 of the Agreement. Provided the elevated Baseline for species presence has been met, the Permit would authorize CDPR, and persons associated with CDPR, to incidentally take individual California red-legged frogs and their progeny at the Enrolled Properties within and outside the established Baseline areas, as a result of the Beneficial Management Activities and the Other Management Activities.

The Permit would authorize CDPR, and persons associated with CDPR, to incidentally take individuals of the California red-legged frog and their progeny at the Enrolled Properties within and outside of the established Baseline areas, as a result of the Management Activities. Incidental take of individuals within the established Baseline area cannot reduce the quality and/or quantity of the established Baseline area. Such incidental take of California red-legged frogs at the Enrolled Properties could occur as a result of: activities associated with restoring habitat; recreational, education, and research activities; maintaining and improving existing facilities such as of campgrounds or trails; monitoring; and activities associated with park facility or road maintenance, fuel modification, law enforcement, or filming and special events. As a result of these activities, incidental take could occur in the form of direct mortality or injury to eggs, tadpoles, metamorphs/juveniles, and/or adults through suffocation, desiccation, exposure, stranding, entrainment, digging, planting, cutting, or trampling by CDPR or persons associated with CDPR. Service biologists will also be authorized to incidentally take California red-legged frogs while conducting the above activities to assist CDPR in the implementation of the Agreement.

The Permit would provide CDPR incidental take coverage for a certain number of California red-legged frogs that could be taken as a result of the Management Activities, as described above and in Part 5 of this Agreement, at the Enrolled Properties, on a per year basis over the 50-year permit term. The Permit would authorize the incidental take of the following number of California red-legged frogs per year in the identified life stage, over the 50-year duration. Within the Baseline areas, the Permit would authorize the incidental take of the following number of California red-legged frogs per year at each Enrolled Property (independent of the

others), in the identified life stage, over the 50-year duration: five (5) adults or metamorphs/juveniles or combination thereof; twenty five (25) tadpoles; and one (1) egg mass. Outside of the Baseline areas, the Permit would authorize the incidental take of the following number of California red-legged frogs per year at each Enrolled Property (independent of the others), in the identified life stage, over the 50-year duration: one (1) adult or metamorph/juvenile or combination thereof. Outside of the Baseline areas we anticipate that injury or mortality to California red-legged frogs would most likely occur as a result of exposure or trampling during maintenance activities.

Incidental take of California red-legged frogs could occur as a result of conducting survey and monitoring activities at the Enrolled Properties. As a result of these surveys and monitoring, incidental take of California red-legged frogs could occur in the form of harassment, injury, or mortality to all life stages through exposure, suffocation, desiccation, stranding, entrainment, or trampling by CDPR, NPS, or persons associated with CDPR. Service biologists will also be authorized to incidentally take California red-legged frogs while conducting survey and monitoring activities to assist CDPR in the implementation of the Agreement. Additionally, during these survey and monitoring activities, Service biologists may capture and handle any California red-legged frogs, in any life stage, for identification purposes.

The Permit would authorize CDPR, and persons conducting activities on behalf of CDPR, to incidentally take individuals of the Covered Species and their progeny as a result of activities associated with the return to Baseline conditions. The Baseline conditions are described in Part 4 of this Agreement and consist of (1) the Baseline area for suitable habitat and (2) the elevated Baseline for species presence. Because the Baseline area has been determined as the current area of suitable habitat for the California red-legged frog at each of the Enrolled Properties, activities that would result in a return to Baseline area could include those activities that would reduce or remove any additional suitable habitat that has been created or developed over the term of the Agreement, in addition to the areas of suitable habitat identified in Part 4 of this Agreement. Incidental take of California red-legged frogs (including adults, juveniles/metamorphs, tadpoles, and eggs) could occur, as a result of the return to the Baseline area at the Enrolled Properties, in the form of direct mortality or injury to California red-legged frogs through habitat loss, suffocation, desiccation, exposure, stranding, entrainment, digging, planting, cutting, or trampling by CDPR or persons associated with CDPR. The Permit would authorize the incidental take of all California red-legged frogs outside the Baseline areas that could result from activities associated with the return to Baseline area. Because the elevated Baseline for the California red-legged frog at an Enrolled Property consists of its suitable habitat being occupied by a self-sustaining population of the species, a return to Baseline could result in the removal of individuals from any additional habitat that has been created over the term of the Agreement. A return to the elevated Baseline could entail removing all California red-legged frogs in all life stages in any newly created habitat area at an Enrolled Property, provided that a self-sustaining population of the California red-legged frog and the Baseline habitat remains at that Enrolled Property. Incidental take of California red-legged frogs could occur, as a result of the return to the elevated Baseline at an Enrolled Property, in the form of direct mortality or injury to California red-legged frogs (including adults, juveniles/metamorphs, tadpoles, and eggs) through exposure, suffocation, desiccation, stranding, entrainment, or trampling by CDPR or persons

associated with CDPR. The Permit would authorize the incidental take of all California red-legged frogs above the elevated Baseline that could result from activities associated with the return to the elevated Baseline.

The Parties expect that the maximum level of take authorized under this Agreement and Permit will never be realized because CDPR will implement the Avoidance and Minimization Measures in Part 5 of this Agreement to reduce the likelihood that take would occur. Additionally, the maximum level of take is not expected to be realized because, as identified in Part 8 of this Agreement, CDPR is required to notify the Service of any planned activity that CDPR reasonably anticipate will result in take of the Covered Species on the Enrolled Properties, including a return of any Enrolled Property to the Baseline conditions, and provide the Service the opportunity to capture and relocate any individuals that could potentially be affected. Incidental take of California red-legged frogs could occur in the form of capture, as a result of these activities. Service biologists would be authorized to capture the Covered Species for such activities.

Certain activities by CDPR outside of the identified Baseline areas, which will not be considered a limitation on any other activity CDPR desires to engage in, that may result in incidental take of the California red-legged frog are: (1) emergency actions; (2) remedial actions to protect property from erosion and/or flooding; and (3) activities associated with fire prevention, suppression, and response. Incidental take resulting from these activities will be covered under the authorization in the Permit.

## **7.0 NET CONSERVATION BENEFIT**

In accordance with the Service's Safe Harbor Agreement Policy (64 FR 32717), "net conservation benefit" means that the management activities that are a part of the Agreement are expected to provide an increase in the Covered Species' population or distribution, and/or the enhancement, restoration, or maintenance of the Covered Species' habitat. The net conservation benefit will be sufficient to directly or indirectly contribute to recovery of the Covered Species.

This Agreement would reestablish up to four additional populations of the California red-legged frog at the southern extent of its range and would reduce the risk of losing a genetically unique California red-legged frog population. The Las Virgenes population is genetically distinct from all other populations of California red-legged frogs (Richmond et al. 2013). Translocating California red-legged frogs to the Enrolled Properties and establishing new self-sustaining populations reduces the risk of losing the unique genetic makeup of the California red-legged frog population at the Las Virgenes Canyon Open Space Preserve, the source site. The source site consists of a small population vulnerable to local extinction from stochastic events.

The reestablishment of California red-legged frog populations in Core Area 27 (where the Santa Monica Mountains are located) is identified as a recovery activity in the Recovery Plan for the California red-legged frog (Service 2002). Additional activities in the Agreement have been developed to support recovery actions for the California red-legged frog (Service 2002) by

restoring and protecting suitable habitat and by implementing management plans for habitat. The Service anticipates that implementation of these activities will produce the following net conservation benefits to the California red-legged frog:

- Reestablishing California red-legged frog populations at the southern extent of the species range.
- Increasing redundancy of a genetically unique population of California red-legged frogs and reducing the potential for its local extinction.
- Providing areas where existing suitable habitat for the California red-legged frog will be maintained, protected, and remain relatively undisturbed.

Therefore, management activities associated with this Agreement would benefit the California red-legged frog by contributing to its conservation and recovery. CDPR will manage the Enrolled Properties in a manner that is beneficial to the California red-legged frog while conducting park maintenance and other activities. The net conservation benefit to the California red-legged frog from this Agreement, and thus contribution to recovery, will remain in place for at least 50 years, as identified in Part 9 of this Agreement.

## **8.0 RESPONSIBILITIES OF THE PARTIES**

In addition to carrying out the Management Activities described in Part 5, CDPR agrees to:

1. Notify the Service 60 days in advance of any planned activity that the CDPR reasonably anticipates will result in take of the Covered Species on the Enrolled Properties, including a return of the Enrolled Properties to the Baseline conditions described in Part 4 of this Agreement, and provide the Service the opportunity to capture and relocate any individuals that could potentially be affected.
2. Conduct habitat assessment surveys at the Enrolled Properties during the spring season, with NPS assistance, in areas identified as containing suitable habitat for the California red-legged frog, focusing on translocation and reestablishment sites, as follows. Due to CDPR funding constraints, NPS has agreed to conduct these surveys on behalf of CDPR.
  - a. Surveys will be conducted during the spring season following the signing of this Agreement and conducted annually for a 5-year consecutive period, and then surveys will be conducted at least once every 5 years thereafter.
  - b. Surveys will include habitat assessment monitoring of the Baseline areas described in Part 4 of this Agreement. Photo stations of California red-legged frog habitat within the Enrolled Property will be established during the initial habitat assessment. Photos will be taken in each successive survey for

comparison.

- c. If additional suitable habitat for the California red-legged frog is established, surveys will be conducted in any such area, as described above.
  - d. The results of these surveys, including whether any California red-legged frogs were observed, will be reported to the Service in the annual report.
3. Conduct visual surveys for California red-legged frogs during the spring season, with NPS assistance, along the accessible portions of streams within the Enrolled Properties as follows. Due to CDPR funding constraints, NPS has agreed to conduct these surveys on behalf of, and in coordination with, CDPR for the initial 5 year-period.
  - a. Surveys will be conducted during the spring season following the signing of this Agreement and conducted annually for a 5-year consecutive period, and then surveys will be conducted at least once every 5 years thereafter.
  - b. Surveys will be conducted according to Service guidance and recommendations, and will include nighttime visual surveys.
  - c. During these surveys, NPS biologists may capture and handle any California red-legged frogs, in any life stage, for identification purposes.
  - d. If California red-legged frogs are observed in other areas of the Enrolled Properties, surveys will be conducted in such areas, as described above.
  - e. The results of these surveys, including whether any California red-legged frogs were observed, will be reported to the Service in the annual report.
4. Allow reasonable access by the Service, NPS, or another agreed-upon party onto the Enrolled Properties for purposes related to this Agreement, including verification of the identification of any frogs using established or enhanced aquatic habitats or the capture and relocation of California red-legged frogs for purposes described in this Agreement, with notice within 24 hours after the access to CDPR.
5. Monitor the implementation and progress of: Management Activities described in Part 5 of this Agreement; and projects and/or trail work as implemented. CDPR will provide the Service with the status of these activities in an annual report.
6. Notify the Service 60 days prior to the transfer of ownership so that the Service can attempt to contact the new owner, explain the Baseline responsibilities applicable to the Enrolled Properties, and seek to interest the new owner in signing the existing Agreement or a new one to benefit the Covered Species on the Enrolled Properties.
7. Report to the Service any dead, injured, or ill specimens of the Covered Species observed

on the Enrolled Properties. Upon the location of a dead or injured Covered Species, CDPR will notify the Ventura Fish and Wildlife Office (2493 Portola Road, Suite B, Ventura, California, 93003; (805) 644-1766) by telephone within three working days of its finding. The verbal notification must include the date, time, location, cause of injury or death if known, and any other pertinent information. An email message or written report containing the details from the verbal notification must be sent to the Ventura Fish and Wildlife Office with this information, and if possible a photograph, within 3 weeks of its finding. The person to whom the message will be sent, and corresponding email address if applicable, would be determined at the time of the phone call.

8. CDPR and NPS will provide the Service with an annual report (Attachment 1), due November 15 of each year for the prior calendar year, that describes the status of the Covered Species, including density and distribution; any substantial change in the condition of the aquatic and riparian habitats, survey results, the status of Management Activities described in Part 5 of this Agreement (see number 5 above), any predator control measures undertaken during the preceding year, any sightings of the Covered Species by CDPR (or other persons associated with CDPR) during the previous year, and any incidental take of a Covered Species that has occurred. NPS may submit this report to the Service on behalf of CDPR.

In consideration of the foregoing, the Service agrees to:

1. Upon execution of the Agreement and satisfaction of all other applicable legal requirements, issue a Permit to CDPR, authorizing incidental take of the Covered Species as a result of lawful activities on the Enrolled Properties in accordance with the terms of such Permit. The duration of the Agreement will be 50 years and the duration of the Permit will be 50 years. The Permit may extend for an additional 2 years beyond the 50-year duration, so long as prior to or upon expiration of the Agreement, the Service determines that the conservation actions identified in the Agreement have been implemented and CDPR need not perform additional conservation activities on the properties. If extended under the conditions above, the duration of the Permit will be 52 years.
2. As appropriate, provide CDPR with a determination that they have satisfied the conservation measures within 1 year of the expiration of the Agreement.
3. Provide CDPR with technical assistance when requested, and provide information on Federal funding programs for habitat improvement including those for threatened and endangered species.
4. Assist CDPR, and NPS, with the translocation and reestablishment, and survey and monitoring activities for California red-legged frogs; however, Service agreement to assist is limited by its authorities, workload priorities, and appropriated funds.

## **9.0 AGREEMENT AND PERMIT DURATION**

This Agreement becomes effective upon issuance of the Permit by the Service. The Agreement will be in effect for 50 years. The Permit authorizing incidental take of the California red-legged frog will also be in effect for 50 years from the effective date of the Permit (i.e., the date the Permit is signed). If the Service determines that the conservation actions identified in the Agreement have been implemented and completed, then CDPR need not perform additional conservation activities on the property and the Permit may continue in effect following termination of the Agreement for an additional 2 years. The additional duration of the Permit following termination of the Agreement will continue Permit coverage for CDPR for 2 years to allow a return of the Enrolled Properties to Baseline conditions. Both the duration of the Agreement and the Permit may be extended upon mutual agreement among the Parties.

## **10.0 ASSURANCES TO CDPR REGARDING TAKE OF COVERED SPECIES**

This Agreement will provide CDPR with assurances that efforts to promote the conservation and recovery of the California red-legged frog on the Enrolled Properties will not result in additional restrictions on the use of their property.

The Permit will authorize CDPR to take the California red-legged frog incidental to the Management Activities identified in Part 5 of this Agreement, the surveys and monitoring described in Part 8 of this Agreement, and as discussed in Part 6 of this Agreement, provided that such take is consistent with maintaining the Baseline conditions identified in Part 4 of this Agreement. Additionally, the Permit will authorize CDPR to take the California red-legged frog incidental to the return of the Enrolled Properties to Baseline conditions, as discussed in Part 6 of this Agreement.

The Permit provides incidental take authorization only to CDPR and persons conducting park-related activities, or to persons identified as a park visitor conducting approved and lawful activities per park regulations. For the purposes of this Agreement, a park visitor is any person lawfully present within the Enrolled Properties for recreational, research, educational, or other purposes not directly affiliated with landowner activities.

Any persons present within the Enrolled Properties that are not lawfully complying with posted park regulations or other State, Federal or local laws, will not be covered under the Permit nor will such persons be provided incidental take coverage.

## **11.0 MODIFICATIONS**

A. Modification of the Agreement. Either Party may propose amendments to this Agreement, as provided in 50 CFR 13.23, by providing written notice to, and obtaining the written concurrence of, the other Party. Such notice shall include a statement of the proposed modification, the reason for it, and its expected results. The Parties will use their best efforts to respond to proposed modifications within 60 days of receipt of such notice. Proposed modifications will

become effective upon the other Parties' written concurrence.

B. Termination of the Agreement. As provided for in the Service's Safe Harbor Policy (64 FR 32717), CDPR may terminate the Agreement for circumstances beyond the CDPR's control. In such circumstances, CDPR may return the Enrolled Properties to Baseline conditions even if the net conservation benefit activities have not been fully implemented, provided that CDPR gives the Service the notification required by Part 8 of this Agreement prior to carrying out any activity likely to result in the taking of the Covered Species. Upon return to Baseline under these circumstances, the Permit will terminate. If CDPR terminates the Agreement for any other reason, the Permit referenced in Part 8 of this Agreement shall immediately cease to be in effect.

C. Permit Suspension or Revocation. The Service may suspend or revoke the Permit referred to in Part 8 of this Agreement in accordance with the laws and regulations in force at the time of such suspension or revocation. The Service also, as a last resort, may revoke the Permit if continuation of permitted activities would likely result in jeopardy to the Covered Species (50 CFR 13.28(a)). In such circumstances, the Service will exercise all possible measures to avoid revoking the Permit.

D. Baseline Adjustment. The Baseline conditions set forth in Part 4 of this Agreement may, by mutual agreement of the Parties, be adjusted if, during the term of the Agreement and for reasons beyond the control of CDPR, the utilization of the Enrolled Properties by the Covered Species or the quantity or quality of habitat suitable for or occupied by the Covered Species is reduced from what was at the time the Agreement was negotiated.

## **12.0 OTHER MEASURES**

A. Remedies. Each Party shall have all remedies otherwise available to enforce the terms of the Agreement and the Permit, except that no Party shall be liable in damages for any breach of this Agreement, any performance or failure to perform an obligation under this Agreement or any other cause of action arising from this Agreement.

B. Dispute Resolution. The Parties agree to work together in good faith to resolve any disputes, using dispute resolution procedures agreed upon by all Parties.

C. Succession and Transfer. As provided in Part 11 of the Service's Safe Harbor Agreement Policy (64 FR 32717), if CDPR transfers their interest in an Enrolled Property to another non-Federal entity, the Service will regard the new owner or manager as having the same rights and responsibilities with respect to the Enrolled Property as CDPR, if the new owner or manager agrees to become a party to the Agreement in place of CDPR.

D. Availability of Funds. Implementation of this Agreement by the Service is subject to the requirements of the Anti-Deficiency Act and the availability of appropriated funds. Nothing in this Agreement will be construed by the Parties to require the obligation, appropriation, or expenditure of any funds from the U.S. Treasury. The Parties acknowledge that the Service will

not be required under this Agreement to expend any Federal agency's appropriated funds unless and until an authorized official of that agency affirmatively acts to commit to such expenditures as evidenced in writing.

E. Applicable Laws. All activities undertaken pursuant to this Agreement and its associated Permit must be in compliance with all applicable State, Federal, tribal, and local laws and regulations.

F. Relationship to the Act and other Authorities. The terms and conditions of this Agreement shall be governed by and construed in accordance with the Act and applicable Federal law. In particular, nothing in this Agreement is intended to limit the authority of the Service to seek penalties or otherwise fulfill its responsibilities under the Act. Moreover, nothing in this Agreement is intended to limit or diminish the legal obligations and responsibilities of the Service as an agency of the Federal government.

G. No Monetary Damages. No Party shall be liable in damages to any other Party or other person for any breach of this Agreement, any performance or failure to perform a mandatory or discretionary obligation imposed by this Agreement, or any other cause of action arising from this Agreement.

H. No Third-Party Beneficiaries. This Agreement does not create any new right or interest in any member of the public as a third-party beneficiary, nor shall it authorize anyone not a party to this Agreement to maintain a suit for personal injuries or damages pursuant to the provisions of this Agreement. The duties, obligations, and responsibilities of the Parties to this Agreement with respect to third parties shall remain as imposed under existing law.

I. Other Listed Species, Candidate Species, and Species of Concern. There is the possibility that other listed, proposed, or candidate species, or species of concern may occur in the future on the Enrolled Properties as a direct result of the management actions specified herein. In the event that a non-covered species that may be affected by covered activities becomes listed under the Act, CDPB and the Service will work together either to amend this Agreement, and the Permit described in Part 8 of this Agreement, to cover such other species or otherwise to confer upon CDPB similar assurances with respect to such other species as are described above for Covered Species.

J. Notices and Reports. Any notices and reports, including monitoring and annual reports, required by this Agreement shall be delivered to the person at the address listed below:

U.S. Fish and Wildlife Service  
2493 Portola Road, Suite B  
Ventura, California 93003  
Attn: Field Supervisor

K. Pursuant to Section 22, Title 41, United States Code, it is further mutually agreed that no member of or delegate to Congress or resident commissioner, after their election or appointment,

and either before or after they have qualified and during their continuance in office, shall be admitted to any share or part of the Agreement, or to any benefit to arise thereupon; but this provision shall not be construed to extend to this Agreement if made with a corporation for its general benefit.

IN WITNESS WHEREOF, THE PARTIES HERETO have executed this Safe Harbor Agreement to be in effect as of the date that the Service issues the Permit.

**U.S. Fish and Wildlife Service**

By: \_\_\_\_\_  
Stephen P. Henry  
Field Supervisor, Ventura Fish and Wildlife Office

\_\_\_\_\_  
Date

**California Department of Parks and Recreation**

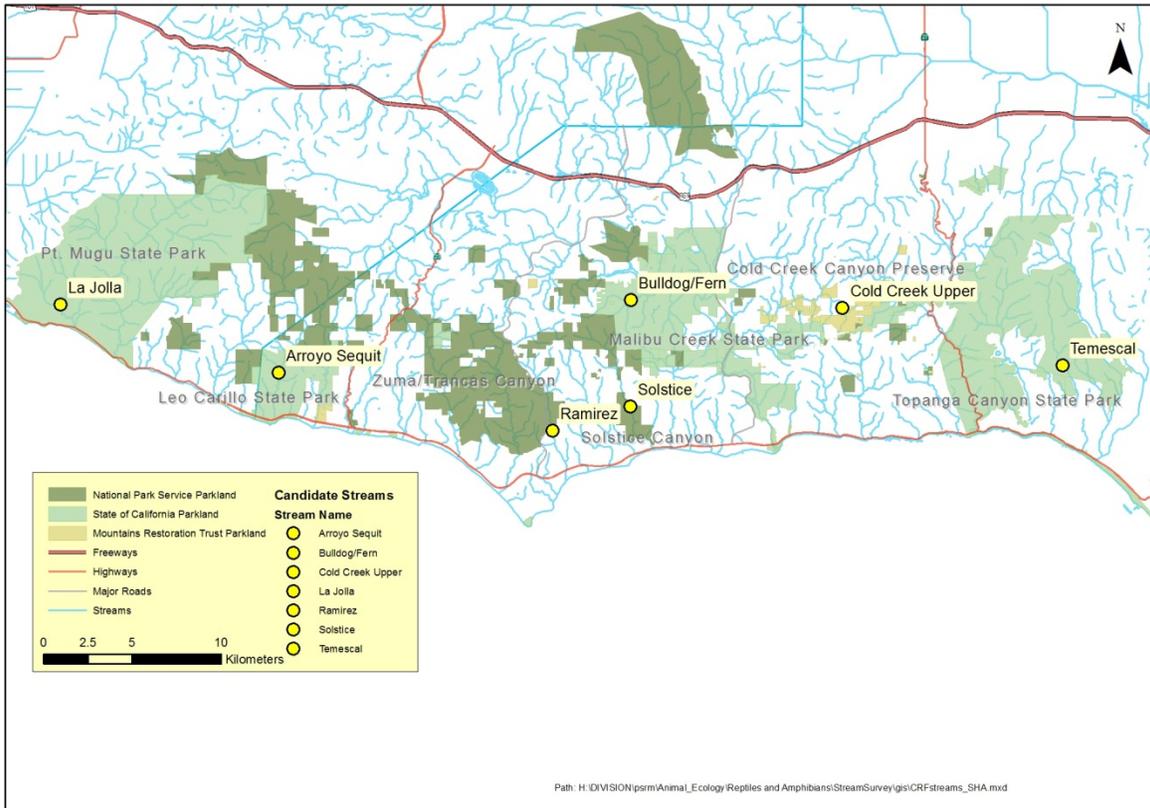
By: \_\_\_\_\_  
Craig Sap  
District Superintendent, Angeles District

\_\_\_\_\_  
Date

## LITERATURE CITED

- Bulger, J.B., N.J. Scott Jr., and R.B. Seymour. 2003. Terrestrial activity and conservation of adult California red-legged frogs *Rana aurora draytonii* in coastal forests and grasslands. *Biological Conservation* 110:85-95.
- Delaney, K. 2012. California red-legged frog Re-introduction Habitat Assessment. Final Project Report. Submitted to California Department of Parks and Recreation, Angeles District.
- De Lisle, H. G., G. Gilbert, J. Feldner, P. O'Connor, M. Peterson, and P. Brown. 1987. The distribution and present status of the Herpetofauna of the Santa Monica Mountains of Los Angeles and Ventura Counties, California. Southwest Herpetologist Society. Los Angeles, California.
- Fellers, G. 2005. *Rana draytonii* Baird and Girard, 1852b California red-legged frog. Pages 552-554 in M. Lannoo (editor). Amphibian declines the conservation status of United States species. University of California Press. Berkeley, California.
- Hayes, M.P., and M.R. Jennings. 1988. Habitat correlates of distribution of the California red-legged frog (*Rana aurora draytonii*) and the foothill yellow-legged frog (*Rana boylei*): implications for management. Pages 144-158 in R. Sarzo, K.E. Severson, and D.R. Patton (technical coordinators). Proceedings of the symposium on the management of amphibians, reptiles, and small mammals in North America. United States Department of Agriculture, Forest Service, Rocky Mountain Range and Experiment Station, Fort Collins, Colorado. General Technical Report (RM-166): 1-458.
- [IUCN] International Union for Conservation of Nature and Natural Resources. 1987. Position Statement on Translocation of Living Organisms. Introductions, Re-introductions, and Re-stocking. Prepared by the Species Survival Commission in collaboration with the Commission on Ecology, and the Commission on Environmental Policy, Law and Administration. As approved by the 22<sup>nd</sup> meeting of the IUCN Council, Gland, Switzerland. 4 September 1987.
- Richmond, J. Q., K. R. Barr, A. R. Backlin, A. G. Vandergast, and R. N. Fisher. 2013. Evolutionary dynamics of a rapidly receding southern range boundary in the threatened California Red-Legged Frog (*Rana draytonii*). *Evolutionary Applications*.
- [Service] U.S. Fish and Wildlife Service. 1996. Determination of Threatened Status for the California red-legged frog. Page 21. Federal Register 61.
- [Service] U.S. Fish and Wildlife Service. 2002. Recovery Plan for the California red-legged frog (*Rana aurora draytonii*). U.S. Fish and Wildlife Service, Portland, OR. viii + 173 pp.

**Figure 1.** Enrolled Properties and Candidate Streams for California red-legged frog reestablishment in the Santa Monica Mountains National Recreation Area.



**Attachment 1.**

**Annual Monitoring Report for Safe Harbor Agreement  
between the U.S. Fish and Wildlife Service  
and the California Department of Parks and Recreation**

**Permittee's Name:** California Department of Parks and Recreation, Angeles District

**Permit Tracking Number:** [TBD]

**Location:** Santa Monica Mountains National Recreation Area, Los Angeles and Ventura Counties, CA

**Agreement Approved by:** Ventura Fish and Wildlife Office

**Covered Species:** California red-legged frog

**Monitoring Program:** Describe in general terms the monitoring program for the current year pursuant to Part 8 of the Safe Harbor Agreement. Annual reports are designed to provide information to the Service concerning the effects and effectiveness of the Agreement's conservation actions on the Covered Species, as well as to determine if the conservation actions the Permittee undertakes meet the Service's Safe Harbor Policy "standard." The monitoring report will document any changes in the condition of individuals of the Covered Species or the habitat associated with that species over time and will denote whether the data provided is from the Permittee, professional scientist, or other specific individual or entity. Photographs are helpful but may not be required.

**Date Annual Report is Due:** On or before November 15, for the prior calendar year

**Date Annual Report was Received:** \_\_\_\_\_

**Date Annual Report was Reviewed:** \_\_\_\_\_

**Signature of Reviewer:** \_\_\_\_\_

**Printed Name and Phone # of Reviewer:** \_\_\_\_\_

**Management and Conservation Actions:** Please write a summary of the actions taken to date and the results of the actions taken on each of the management and conservation actions (attach additional pages if necessary).

## **APPENDIX 1.**

### **Short Protocol**

*Reestablishment of threatened California red-legged frogs (*Rana draytonii*) to historical locations in the Santa Monica Mountains.*

**Contact:** Katy Semple Delaney, [katy\\_delaney@nps.gov](mailto:katy_delaney@nps.gov), 805-370-2386

### **Abstract**

The California red-legged frog (*Rana draytonii*) was designated as Federally Threatened by the U. S. Fish and Wildlife Service (FWS) in 1996. A species recovery plan was adopted in 2002 which defined actions needed to recover the species to sufficient numbers throughout all or part of their range, with the eventual goal of de-listing. Historical data suggest that red-legged frogs were in all of the major streams throughout Santa Monica Mountains National Recreation Area (SMMNRA). Currently, there is only one population of red-legged frogs within the immediate area of SMMNRA, in Upper Las Virgenes Canyon Open Space Preserve (LV), Ventura County, CA. In fact, the LV population is the southernmost population of red-legged frogs in the United States. Consistent successful reproduction has been documented at LV; however, the majority of the egg masses are lost to predation, probably by over-wintering red-legged frog tadpoles.

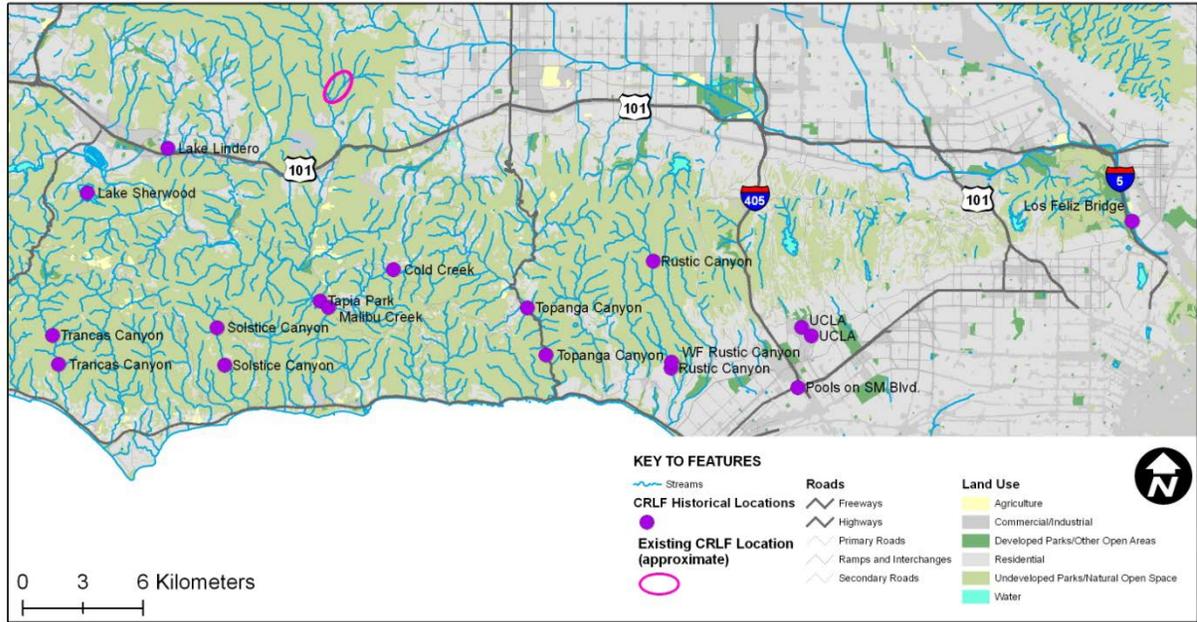
We propose to reestablish red-legged frogs into suitable stream reaches throughout SMMNRA, both to increase the overall population size and to create redundant populations, which would prevent the extirpation of the species from the area if a catastrophic event occurred at LV. Red-legged frogs in LV are genetically distinct from other populations in Ventura and Los Angeles Counties (Richmond et al. 2013), therefore it is important to populate streams with local individuals to maintain genetic uniqueness. We have developed habitat suitability protocols that are specific to southern California red-legged frogs, and have conducted focused site surveys in SMMNRA to assess several sites' potential as reintroduction locations. We will remove red-legged frog half-egg masses, taking no more than 10% of the total eggs produced in a year, which will be translocated to suitable streams. Translocation will involve keeping eggs and tadpoles in predator-proof enclosures until tadpoles are large enough to be released, and then frequently monitoring reestablished populations to determine survival and translocation success.

We anticipate that our translocation actions will successfully reestablish red-legged frogs into historical sites within SMMNRA. Successful translocation of tadpoles should result in an adult population of red-legged frogs that we will continue to monitor for evidence of breeding. A population of successfully breeding adults in streams other than LV will instantly result in a population size increase for SMMNRA region's red-legged frogs.

## Introduction/Problem Statement

The California red-legged frog (*Rana draytonii*) is a medium-sized true frog (Ranid) that ranges from northern California to upper Baja California in Mexico, and was once widespread and abundant throughout its range (Jennings & Hayes 1985). California red-legged frogs have declined because of habitat destruction (De Lisle et al. 1987; Jennings & Hayes 1988, 1994), the amount of agricultural land upwind (Davidson 2004), the introduction of non-native species, particularly bullfrogs (*Lithobates catesbeianus*) (Jennings & Hayes 1988; Lawler et al. 1999; Cook & Jennings 2007; D'Amore et al. 2009, 2010), and possible disease (Padgett-Flohr 2008; James et al. 2009). Populations of California red-legged frogs were once exploited as food (Jennings & Hayes 1985). Bullfrogs, native to the eastern United States, were possibly introduced in response to California red-legged frog scarcity and documented harvest decline in the late 1800s. The California red-legged frog was designated as Federally Threatened by U. S. Fish and Wildlife Service (FWS) in 1996. A species recovery plan was adopted in 2002, which defined actions needed to recover the species to sufficient numbers throughout all or part of their range with the goal of de-listing (U.S. Fish and Wildlife Service 2002). SMMNRA is part of Recovery Unit 8, and Core Area 27, identified in the 2002 FWS recovery plan.

Once common in southern California, there are currently only two small populations of red-legged frogs in Los Angeles County, and a third small population (LV), which is in Ventura County. Historical data suggest that red-legged frogs were in all of the major streams throughout Santa Monica Mountains and surrounding areas (Figure 1; De Lisle et al. 1987). Currently, there is only one population of red-legged frogs close to SMMNRA, in LV stream. This population is the southernmost population in the United States. The LV population consists of about 100 adults (USGS/NPS unpublished data 2013), and there is consistent evidence of successful reproduction (egg masses and tadpoles). In addition, we have found adults and egg masses in the main stem of Las Virgenes Creek, approximately 1 km away from LV. This suggests that there is dispersal and breeding (2012 and 2013 egg masses) in this population. However, the majority of the egg masses in LV are lost to predation, probably by over-wintering red-legged frog tadpoles. This population of red-legged frogs is critically small and isolated, and there is great concern about the long-term persistence of the LV population.



**Figure 1.** Documented historic locations and current location for California red-legged frogs in the Santa Monica Mountains and surrounding regions. Note that historical locations are approximate based on points taken from paper maps.

Red-legged frogs in LV are genetically distinct from other populations in Ventura and Los Angeles Counties, therefore it is important to populate SMMNRA streams with local individuals to maintain genetic uniqueness (Richmond et al. 2013). For one population of distinct California red-legged frogs, it is too late. The Santa Rosa Plateau population was genetically distinct, and was most closely related to populations found in northern Baja California, Mexico (Shaffer et al. 2004). However, the Santa Rosa Plateau lost its breeding population of California red-legged frogs in the late 1990s, and it has never recovered.

The Natural History Museum of Los Angeles collected California red-legged frogs in 1964 from Trancas and Solstice (Table 1). There are no official records of red-legged frogs from those locations after that year. The last sighting, an unofficial/non-vouchered record, in Cold Creek was in 1975 (De Lisle et al. 1987). Ten years later, Cold Creek and all of the other streams in the Santa Monica Mountains were surveyed, but no California red-legged frogs or tadpoles were found anywhere (De Lisle et al. 1987). The authors stated at the time that red-legged frogs were “formerly found in all the larger streams from Rustic Canyon to Trancas Canyon” of the Santa Monica Mountains. It has been suggested that habitat degradation, the introduction of non-native fish, and the spread of bullfrogs are possible reasons for the decline in the Santa Monica Mountains and in sites throughout their range (De Lisle et al. 1987; Jennings & Hayes 1988, 1994).

**Table 1.** The location, year collected, and numbers collected of historical specimens of California red-legged frogs in the Santa Monica Mountains and surrounding regions. All specimens are part of the L.A. County Museum of Natural History’s permanent collection.

<b>Stream/Location Name</b>	<b>Year Collected</b>	<b>Individuals Collected</b>
<b>Trancas Canyon</b>	1964	14
<b>Solstice Canyon</b>	1964	4
<b>Tapia Park</b>	1947	1
<b>Topanga Canyon</b>	1947	5
<b>Rustic Canyon</b>	?	2
<b>UCLA</b>	1937	1
<b>UCLA</b>	?	1
<b>Pools on Santa Monica Blvd.</b>	?	2
<b>Los Feliz Bridge</b>	1925	2

## **Objectives**

To reestablish red-legged frogs into suitable stream habitats throughout the Santa Monica Mountains. Our goal is to establish new populations of red-legged frogs, specifically to increase the number of individuals, and to create redundant populations. Reestablishment of new populations would prevent extirpation from the SMMNRA region, in the case of a catastrophic event in the LV population.

Our specific goals are to:

- Find potential suitable sites for translocation of California red-legged frogs.
- Translocate California red-legged frogs to those sites.
- Intensively monitor translocation efforts.
- Results will be evaluated at each step and adjustments will be made to methodology as needed.

Our efforts will be successful if:

- Two or more new sites are identified for reestablishment.
- Tadpoles, juveniles, and adults are present at translocation sites in the years following the initial translocation.
- Consistent evidence of successful breeding is seen at translocation sites in the years following the initial translocation.
- The populations are stable over the long-term and continue to show evidence of successful breeding.

California red-legged frogs are an extremely important resource to SMMNRA because of their rarity and extreme threat level. We anticipate that our translocation actions will successfully reestablish California red-legged frogs, which will result in an adult population of red-legged frogs, that we will monitor for evidence of breeding. A

population of successfully breeding adults in streams other than LV will instantly result in a population size increase for SMMNRA region California red-legged frogs. Alleviating a small population size will be the most important conservation action that can be taken for red-legged frogs in the Santa Monica Mountains and Simi Hills.

## **Methods**

### *Historical Locations*

An online search (<http://www.herpnet.org/portal.html>, accessed September 29, 2010) of museum specimens has revealed historical locations for California red-legged frogs in streams of the Santa Monica Mountains: Trancas Canyon, Solstice Canyon, Malibu Creek, Topanga Canyon, and Rustic Canyon (Figure 1, Table 1). In addition, anecdotal information from local naturalists suggests that California red-legged frogs were once found in all of the major coastal watersheds in the Santa Monica Mountains (De Lisle 1986).

### *Site surveys for potential reestablishment*

### Habitat Requirements

Red-legged frogs have adapted to southern California's Mediterranean climate and associated temporal and spatial changes in water flow and habitat quality. Potential translocation streams must have the following characteristics, which are important for successful reproduction (U.S. Fish and Wildlife Service 2002, Hayes & Jennings 1989): 1) hiding places for escape cover (e.g. emergent vegetation, bank overhangs, etc.), 2) deep (0.7 m or greater), still or slow moving water maintained this way during the entire tadpole rearing season (January to August), 3) dense, shrubby vegetation, and 4) cool year-round temperatures in pools (<70°F) ( U.S. Fish and Wildlife Service 2002 and references therein). Additionally, habitat requirements for juveniles or over-wintering larvae during the non-breeding (dry season) include perennial water at least 0.5 m deep. If habitat dries, adults will use damp leaf litter or small mammal burrows (Jennings & Hayes 1994). If habitat between streams is urbanized, it is unlikely that there can be dispersal of adult frogs; therefore potential dispersal should be taken into consideration when choosing relocation sites. For example, the number of roads near a site and the isolation from other nearby freshwater sites were negatively correlated with red-legged frog reproduction in the Elkhorn Slough area of Monterey County (D'Amore et al. 2010).

### Threats at Potential Sites

The exact cause of the red-legged frog's extirpation from the Santa Monica Mountains is unknown, but the loss seems to have coincided with an increase in urban development and human population density during the mid-20<sup>th</sup> century. An increased human population in SMMNRA region translated to threats to red-legged frog populations from habitat destruction, elevated pesticide use, and invasive species, and those impacts continue to present day. Non-native, invasive species that represent a threat to a successful translocation of red-legged frogs are non-native fish, bullfrogs, red swamp crayfish (*Procambarus clarkii*), and New Zealand mudsnails (*Potamopyrgus antipodarum*). Non-native fish, bullfrogs, and crayfish are all known to depredate eggs and larvae of red-legged frogs in other areas (Hayes & Jennings 1986; Lawler et al. 1999;

Kiesecker et al. 2001; Davidson 2004; D'Amore et al. 2010). Habitat destruction continues to threaten potential sites for re-location of red-legged frogs, where suitable upland stream habitat is important to provide cover for local and dispersing adults (Bulger et al. 2003; Fellers & Kleeman 2007). Diseases, pesticides, and declining water quality also remain a threat to red-legged frogs (Berger et al. 1998; Davidson 2004; Padgett-Flohr 2008).

#### Selection of Sites

We developed habitat suitability protocols that are specific to southern California red-legged frogs, and have conducted site surveys to assess habitat (Appendix A, B, and C). In general, our site assessments have followed the guidelines outlined by U. S. Fish and Wildlife Service ( U. S. Fish and Wildlife Service 2005). Surveyors carried two data sheets: one habitat assessment sheet created by us and a sheet with habitat requirements and threats observed, based on a checklist created by N. J. Scott and G. B. Rathbun (Accessed October 7, 2010, [http://www.elkhornsloughctp.org/training/show\\_train\\_detail.php?TRAIN\\_ID=Ca2GEJY](http://www.elkhornsloughctp.org/training/show_train_detail.php?TRAIN_ID=Ca2GEJY)) (Scott & Rathbun 2009, pp 11-12). The latter sheet had each of the habitat requirements and threats listed above. Each criterion was given a score, and the scores for each stream were tallied at the end of each survey. In addition to a site's score, we will assess future activities surrounding a site that may make a site more or less suitable (i.e., private land surrounding a site that is not protected from future development). We have narrowed down our potential sites to seven streams within SMMNRA. These sites have suitable habitat with few or no current or perceived future threats, and are on public land.

#### *Population Size Estimation of LV Population*

During the Fall of 2013, we conducted a three-night mark-recapture survey to estimate the size of the adult and juvenile (metamorphs) population in LV stream. These surveys were done with NPS and USGS (USFWS Recovery permit, Adam Backlin). Mark-recapture analysis revealed that there were approximately 98 adult frogs (95% CI 58.5 – 219.7, USGS unpublished data) in LV during Fall 2013 (USGS unpublished data).

#### *Experimental translocation*

Once suitable sites were selected, we followed established protocols similar to those followed for reestablishment of California red-legged frogs in Pinnacles National Park (Paul Johnson, personal communication) as well as reestablishment in the Golden Gate National Recreation Area (Darren Fong, personal communication), mountain yellow-legged frogs in southern California (Hitchcock et al. 2006), and relict leopard frogs in Nevada and Arizona (Relict Leopard Frog Conservation Team 2005).

We will translocate eggs, not adult red-legged frogs. A strong homing instinct has been shown with adult red-legged frogs after translocation (Rathbun & Schneider 2001), and translocating tadpoles can be logistically challenging (e.g., difficult to capture hundreds of individuals). Translocating eggs will allow us to introduce a larger number of individuals, which has been shown to increase translocation success (Germano & Bishop 2008). Also, eggs and tadpoles will be protected in mesh tadpole-rearing pens during the period of highest predation risk (see below).

The LV site will be surveyed for California red-legged frog egg masses in February and March. The locations of egg masses will be mapped, flagged, and monitored as necessary to allow for accurate estimation of hatching date. Each year, we expect to find 8-30 egg masses (e.g. Backlin et al. 2012). In Spring of 2014, we found 27 egg masses in LV.

In early February, mesh tadpole-rearing pens will be constructed using PVC pipe formed into a cube. Pet-resistant mesh window screen will be zip-tied to the PVC frame creating a secure mesh cube. A rectangular opening approximately 15 x 15 cm will be cut into one side of the pen where a mesh door will be sewn on using fishing line, with strips of a hook and loop fastener (e.g., Velcro) added for opening and closing the door. The door will allow us easy yet secure access to the inside of the pen. Each pen will be placed into chosen translocation streams several weeks prior to moving egg masses to allow for algae to grow on the pen surfaces. Pens will be secured in the stream using plastic coated wire or string. Air-filled plastic bottles, serving as floats, will be placed inside the pens so that the top of the pen will be flush with the water's surface. Bushnell remote trail cameras will be installed so that any human or animal activity near pens can be recorded. Finally, pens and the area surrounding will be signed with an "ongoing research, please do not disturb" message and a contact phone number on them.

To maximize genetic diversity, we will take samples from several egg masses in LV, which will be selected according to their developmental stage, i.e., estimated date of hatching. We will collect half egg masses, so that the entire reproduction effort of any individual will not be affected. In order to minimize impact on the LV population, we will not take more than 10% of the total eggs from LV in any one year. We will take extreme care and closely follow detailed methods, developed after much research, preparation and consultation with other experts who have successfully translocated ranids, during the translocations. Half-masses will be carefully extracted at a time that we will attempt to approximate to one to five days before hatching, leaving the rest of the mass attached to substrate in LV. Each half-mass will be placed in a Tupperware container with stream water, and fit into in a small cooler with bubble wrap to prevent sloshing, and ice-packs and plastic/paper layering to regulate temperature. We will estimate the number of eggs extracted. Extra Tupperware containers with stream water will be carried in case any container leaks. Once at the translocation site, a Tupperware container will be placed, still closed but partially submerged, near the tadpole-rearing pen to equilibrate temperature for at least 30 minutes. After equilibration, eggs will then be placed in a course mesh bag tied to the inside top of the tadpole-rearing pen. Course mesh bags will be tied at the approximate position that natural egg masses are laid, and tadpoles will be allowed to hatch normally. Egg masses and tadpoles will be placed in areas with sufficient shading, because of the potential negative effect of UV-B radiation that has been shown to inhibit growth of larvae in a closely related congener, *R. aurora* (Belden & Blaustein 2002). Care will be taken every time that a pen door is open to prevent aquatic invertebrates or other potential predators from entering the pen.

Newly hatched tadpoles can move through the course mesh bag if they wish; they often

stay close to the egg mass to feed on the nutrient-rich gelatinous material within and around the eggs. Once tadpoles are larger, at approximately two to three weeks after translocation, any left in the mesh bag will be released into the larger tadpole pen. We will monitor the tadpole-rearing pens two to three times per week, taking photographs of the pool, pen and selected tadpoles each visit. Approximately once every two weeks, we will place tadpoles in a clear bin or baggy to measure the length (body length, and total length including tail) and Gosner Stage of one to five tadpoles per pen. Tadpoles will be fed one or more of the following: bruised organic lettuce, algae wafers/rounds (fish food), and aquatic frog/tadpole food pellets as needed. Once tadpoles are large enough that predation risk is reduced (June or July), they will be released from the pens into their translocation pools.

Weekly monitoring, including visual surveys and dip-netting, will continue after tadpole release until late summer. We will also conduct approximate counts during every visit to monitor survivorship. However, due to tadpoles often hiding and poor visibility in certain pools at times, the counts may be simply the number seen within a number of minutes. We will use dipnets, and potentially aquascopes, to incidentally count tadpoles as we encounter them. During the Fall and Winter, we will conduct several site visits per month to survey for tadpoles and metamorphs. Night visual and auditory surveys for metamorph and adult frogs will be conducted during these and subsequent months, and years after translocation; we will also conduct daytime visual surveys. Photos will be taken for documentation of frog status and site condition at every visit.

## Project Time Line

Habitat site assessments will be done the first year, and the process of relocating egg masses and monitoring will continue for the following two years. Surveys to examine population growth and translocation success will continue monthly for at least three years.

### Year 1

Action	Months	Description
Habitat assessments at potential translocation sites.	February - June	Surveys done by wildlife technician and project coordinator (Ecologist).
Surveys at LV creek for egg masses.	February - March	Surveys done by wildlife technician and ecologist, cooperation with USGS biologists, and permission by the landowners.

### Years 2 through 5

Action	Months	Description
Build/set up rearing pens.	February	In preparation for translocation of half egg masses.
Surveys at LV creek for egg masses. Transport half-masses to pens.	February - March	Surveys done by NPS staff, egg masses identified and aged, half egg masses collected and transported.
Monitor tadpoles in pens.	March – June/July	Surveys done by NPS staff, vegetation/food added to pens, tadpoles measured and counted.
Release tadpoles.	June/July	Released by NPS staff, after large enough to avoid predation by aquatic insects, newts, etc.
Surveys for tadpoles.	August	Monitoring by NPS staff, tadpoles counted.
Surveys for juveniles, adults, and over-wintering tadpoles.	August - February	Monitoring by NPS staff, individuals counted.

## References Cited

- Backlin, A. R., E. A. Gallegos, S. L. Schuster, M. S. Canfield, K. L. Baumberger, and R. N. Fisher. 2012. California red-legged frog (*Rana draytonii*) egg mass surveys in southern California, 2011. Page 7. U.S. Geological Survey data summary.
- Belden, L. K., and A. R. Blaustein. 2002. Exposure of red-legged frog embryos to ambient UV-B radiation in the field negatively affects larval growth and development. *Oecologia* **130**:551–554.
- Berger, L. et al. 1998. Chytridiomycosis causes amphibian mortality associated with population declines in the rain forests of Australia and Central America. *Proceedings of the National Academy of Sciences U.S.A.* **95**:9031–9036.
- Bulger, J. B., N. J. Scott Jr., and R. B. Seymour. 2003. Terrestrial activity and conservation of adult California red-legged frogs *Rana aurora draytonii* in coastal forests and grasslands. *Biological Conservation* **110**:85–95.
- Cook, D. G., and M. R. Jennings. 2007. Microhabitat use of the California red-legged frog and introduced bullfrog in a seasonal marsh. *Herpetologica* **63**:430–440.
- D'Amore, A., V. Hemingway, and K. Wasson. 2010. Do a threatened native amphibian and its invasive congener differ in response to human alteration of the landscape? *Biological Invasions* **12**:145–154.
- D'Amore, A., E. Kirby, and M. McNicholas. 2009. Invasive species shifts ontogenetic resource partitioning and microhabitat use of a threatened native amphibian. *Aquatic Conservation: Marine and Freshwater Ecosystems* **19**:534–541.
- Davidson, C. 2004. Declining downwind: Amphibian population declines in California and historical pesticide use. *Ecological Applications* **14**:1892–1902.
- De Lisle, H. G., G. Gilbert, J. Feldner, P. O'Connor, M. Peterson, and P. Brown. 1987. The distribution and present status of the Herpetofauna of the Santa Monica Mountains of Los Angeles and Ventura Counties, California. Southwest Herpetologist Society., Los Angeles, California.
- Fellers, G. M., and P. M. Kleeman. 2007. California red-legged frog (*Rana draytonii*) movement and habitat use: Implications for conservation. *Journal of Herpetology* **41**:276–286.
- Germano, J. M., and P. J. Bishop. 2008. Suitability of amphibians and reptiles for translocation. *Conservation Biology* **23**:7–15.
- Hayes, M. P., and M. R. Jennings. 1986. Decline of ranid frog species in western North America: are bullfrogs (*Rana catesbeiana*) responsible? *Journal of Herpetology*

20:490–509.

- Hayes, M. P., and M. R. Jennings. 1989. Habitat correlates of distribution of the California red-legged frog (*Rana aurora draytonii*) and the foothill yellow-legged frog (*Rana boylei*): Implications for management. U.S. Department of Agriculture, Forest Service General Technical Report RM-166.
- Hitchcock, C. J., A. R. Backlin, and R. N. Fisher. 2006. Using experimental translocation as a last resort for the recovery of the mountain yellow-legged frog (*Rana mucosa*) in Southern California.
- James, T. Y., A. P. Litvintseva, R. Vilgalyls, J. A. T. Morgan, J. W. Taylor, M. C. Fisher, L. Berger, C. Weldon, L. du Preez, and J. E. Longcore. 2009. Rapid global expansion of the fungal disease chytridiomycosis into declining and healthy amphibian populations. PLoS Pathogens 5:e1000458.doi:10.1371/journal.ppat.1000458.
- Jennings, M. R., and M. P. Hayes. 1985. Pre-1900 overharvest of California red-legged frogs (*Rana aurora draytonii*): The inducement for bullfrog (*Rana catesbeiana*) introduction. Herpetologica 41:94–103.
- Jennings, M. R., and M. P. Hayes. 1988. Natural history and decline of native ranids in California. Pages 1–143 Proceedings of the Conference on California Herpetology.
- Jennings, M. R., and M. P. Hayes. 1994. Amphibian and reptile species of special concern in California.
- Kiesecker, J. M., A. R. Blaustein, and C. L. Miller. 2001. Potential mechanisms underlying the displacement of native red-legged frogs by introduced bullfrogs. Ecology 82:1964–1970.
- Lawler, S. P., D. Dritz, T. Strange, and M. Holyoak. 1999. Effects of introduced mosquitofish and bullfrogs on the threatened California red-legged frog. Conservation Biology 13:613–622.
- Padgett-Flohr, G. E. 2008. Pathogenicity of *Batrachochytrium dendrobatidis* in two threatened California amphibians: *Rana draytonii* and *Ambystoma californiense*. Herpetological Conservation and Biology 3:182–191.
- Rathbun, G. B., and J. Schneider. 2001. Translocation of California red-legged frogs (*Rana aurora draytonii*). Wildlife Society Bulletin 29:1300–1303.
- Relict Leopard Frog Conservation Team. 2005. Conservation agreement and rangewide conservation assessment and strategy for the relict leopard frog (*Rana onca*) - Final.

- Richmond, J. Q., K. R. Barr, A. R. Backlin, A. G. Vandergast, and R. N. Fisher. 2013. Evolutionary dynamics of a rapidly receding southern range boundary in the threatened California Red-Legged Frog (*Rana draytonii*). *Evolutionary Applications*:n/a–n/a.
- Scott, N. J., and G. B. Rathbun. 2009. Management guidelines for the California red-legged frog.
- Shaffer, H. B., G. M. Fellers, S. R. Voss, J. C. Olivier, and G. B. Pauly. 2004. Species boundaries, phylogeography and conservation genetics of the red-legged frog (*Rana aurora/draytonii*) complex. *Molecular Ecology* **13**:2667–2677.
- U. S. Fish and Wildlife Service. 2002. Recovery plan for the California red-legged frog (*Rana aurora draytonii*). U. S. Fish and Wildlife Service, Portland, OR.
- U. S. Fish and Wildlife Service. 2005. Revised guidance on site assessments and field surveys for the California red-legged frog.

## Appendix A

The stream scoring data sheet scores streams for potential breeding habitat for California red-legged frogs (*Rana draytonii*) in Santa Monica Mountains NRA and Simi Hills. This form and its contents are based on N. J. Scott and G. B. Rathbun's "Management guidelines for the California red-legged frog", Elkhorn Slough Training Program, February 2009.

[http://www.elkhornsloughctp.org/reference/subissue\\_detail.php?SUBISSUE\\_ID=37](http://www.elkhornsloughctp.org/reference/subissue_detail.php?SUBISSUE_ID=37)

The scoring system is based on experience of N. J. Scott, G. B. Rathbun, and others, our literature reviews, and the biology and ecology of California red-legged frogs currently in our area. Although this is a number-based scoring system, it is highly subjective. Note that all staff conducting surveys will coordinate at the beginning of each season to ensure consistent scoring between surveyors. At each initial survey a "stream scoring" data sheet should be filled out by the surveyor(s). This form should be attached to the "habitat assessment" data sheet described in Appendix B. Observations during the stream survey will be noted and a numeric score should be given to each criteria. At the end of the survey a total score for that stream site will be summed.

Date:	Site Name:		
Surveyors:			
Stream Scoring Data Sheet			
		Points	Score
Pool duration (through July or August)*	Pools with tadpole habitat present through August	5	
	Pools do not hold water through July most years	0	
Pool depth	Pools >0.5 m	3	
	Pools <0.5 m	0	
Egg and tadpole rearing area	Greater than 10% of surveyed stream reach	5	
	Less than 10% of surveyed stream reach	0	
Summer/juvenile refuges * <sup>1</sup>	Summer/juvenile refuges at site or within 200 m	2	
	Summer/juvenile refuges >2 km away	0	
Metamorph habitat*	Aquatic micro-habitat with good cover <sup>1</sup> and few adult	3	
	No cover and abundant adults or other predators	0	
Aquatic vegetation	Mosaic of open and vegetated water (a rocky cobble substrate can substitute for vegetation in a stream)	5	
	Choked with vegetation	2	
	No vegetation	0	
Exotic fish and/or crayfish present*	No fish	5	
	Mosquitofish or crayfish	3	
	Fish present, little cover for tadpoles	0	
Bullfrogs	No bullfrogs	3	
	Bullfrogs abundant and reproducing	0	
New Zealand mudsnails	NZMS absent	1	
	NZMS present	0	
Urban proximity	Urban development further than 1 km	2	
	Urban development closer than 200 m	0	
Agriculture proximity (pesticide exposure)	Agriculture or winery not upstream within 2 km	3	
	Agriculture or winery upstream/near watershed within 2 km	0	
		Total	
*If any of these criteria are consistently scored 0, frogs will probably not breed in these habitats.			
<sup>1</sup> Refuges will include emergent bank vegetation, undercut banks, semi-submerged rootballs, nearby small mammal burrows, and grassland seeps or springs.			
Notes:			

### Instructions for completing form

1. Pool duration: Surveys will be done in late summer/early fall to determine water persistence. Pools with breeding habitat (deep pools) will be given the highest score, whereas dry, shallow, or damp streams will be given the lowest.
2. Pool depth: Measure or estimate depth of the deepest pool or pools.
3. Egg and tadpole rearing area: Measure or estimate amount of adequate breeding area over the entire stream reach surveyed during that period.
4. Summer/juvenile refuge: Adults and juveniles need perennial water at least 0.5m deep.
5. They will disperse if breeding habitat dries up, will use spaces under debris, rocks, damp leaf litter, small mammal burrows. Look for these sites nearby, especially perennial water sources.
6. Metamorph habitat: Metamorph habitat should include places to escape from potential predators (adult CRLF and bullfrogs) such as emergent bank vegetation, undercut banks, emergent tree root balls, nearby small mammal burrows near moist soil, grassland seeps or springs.
7. Aquatic vegetation: Aquatic vegetation should be present along with open areas with no vegetation. If the stream is choked with vegetation or there is no vegetation then the stream will not be suitable for reproduction.
8. Exotic fish present: Any exotic fish species will be predators of eggs, larvae, and juveniles.
9. Bullfrogs: Will be predators of eggs, larvae, and juveniles.
10. New Zealand mudsnails: New Zealand mudsnails can lower the available food in a stream.
11. Urban proximity: Nearby urban development can inhibit upland movement of dispersing frogs.
12. Agriculture proximity: Nearby agriculture can introduce pesticides, stream silting, and fertilizers that can create aquatic vegetation blooms which choke the streams.

## Appendix B

At each initial survey a “habitat assessment” data sheet should be filled out by the surveyor(s). This form should be attached to the “stream scoring” data sheet described in Appendix A.

Habitat Assessment Data Sheet						page 1
Date					Surveyors	
Creek name					Site name	
Start Time						
Coordinates					What datum?	
Start						
End						
Are there known current or historical records of CRLFs within 2 km of the site?						yes / no
Weather Notes:						
Photos:						
Number of photos						
Storage Location						
Landscape/vegetation:						
Percent overhead canopy	0%	1-10%	11-25%	26-50%	51-75%	76-100%
Upland community						
Dominant riparian plants						
Invasive plants						
Basking areas present	yes / no					
Choose all that apply: sunny rocks, open banks, fallen logs, other						
Bank substrate						
clay/dirt	0%	1-10%	11-50%	51-100%		
sand	0%	1-10%	11-50%	51-100%		
gravel/cobble	0%	1-10%	11-50%	51-100%		
boulder	0%	1-10%	11-50%	51-100%		
leaf litter	0%	1-10%	11-50%	51-100%		
fallen log/stick	0%	1-10%	11-50%	51-100%		



## Instructions for completing form

### General Information

- Date: Date of the survey
- Surveyors: First and last names of all surveyors present
- Creek name: Name of the entire water body
- Site name: Name of the actual site where the survey is conducted.
- Start time: Time that the survey starts in military time format.
- Coordinates: Coordinates of the start and end point taken in datum NAD27.
- Known CRLF populations: The map of historical and current locations should be consulted and “yes” or “no” can be circled.

### Weather

- Take general notes about approximate temperature, cloud cover, and precipitation.

### Photos

- A digital waterproof camera with GPS function should be taken on each survey. Photos should be taken at the start and end site of the survey. During the survey, noteworthy pools or habitat should be documented. Note the number of pictures and where they have been stored on the NPS computer network (G drive).

### Landscape/vegetation

- Percent overhead canopy: Estimate the percent overhead vegetation of the entire length of the survey segment.
- Upland community: Record the dominant vegetative community outside the immediate stream channel.
- Dominant riparian plants: Record the top three dominant riparian plants seen during the survey.
- Invasive plants: Note the presence of invasive plant species (especially tamarisk) in the entire stream reach.
- Basking areas: Were basking areas present? If yes, record the type by circling any that apply or make notes.
- Bank substrate: Record the percentage of the top three dominant types of substrate along the banks of the entire stream survey region. Note that many substrate types are defined by the diameter of the particles that make it up. Sand is <2 mm, gravel/pebble/cobble is 2-256 mm, and boulder is >256 mm.

### Aquatic habitat

- Percent wet length of survey: Estimate the amount of wet areas relative to the entire length of the survey.
- Percent reach with deep pooling water: Estimate the amount of deep pools relative to the entire length of the survey.
- Deep pools present: Were there pools that were deeper than 0.5m in the survey site?
- Number of deep pools: The number of pools >0.5m deep along the entire reach of the survey.
- Key pools: Record the depth of each key pool in cm, estimate the length and width of each key pool. This is meant to be a fairly quick description of key pool attributes found in the stream reach during the survey.

- Aquatic substrate: Record the percentage of the top three dominant types of substrate in the stream over the entire stream survey region. Note that many substrate types are defined by the diameter of the particles that make it up. Sand is <2 mm, gravel/pebble/cobble is 2-256 mm, and boulder is >256 mm.
- Aquatic refugia: Was there aquatic refugia present? If yes, circle all types of refugia that was found in the entire stream reach.
- % Algae cover: Estimate the % of the entire survey reach that was covered with aquatic algae. This should give an idea of how choked with vegetation the stream is, as well as provide information about detectability of native and invasive species at the survey site.
- Submerged aquatic vegetation: Estimate the % of the entire survey reach that had submerged aquatic vegetation. This should give an idea of how choked with vegetation the stream is, as well as provide information about detectability of native and invasive species at the survey site.

#### Species

- HYRE – Pacific tree frog
- HYCA – California tree frog
- TATO – California newt
- BUBO – Western toad
- CRAY – Red swamp crayfish
- FISH – Any species of non-native fish
- NZMS – New Zealand mudsnails
- RACA – bullfrog
- TOEB – toe biter
- Other – any other notable species observed (e.g. red-legged frog, pond turtle, garter snake, etc.)
- Notes: Make observations about abundance and life stages of all species observed during the survey.

Survey length: Note that surveys will have different lengths and the total should be roughly estimated and recorded here.

A map of the site with start and end points should be attached.



## Instructions for completing form

### General Information

- Date: Date of the survey
- Surveyors: First and last names of all surveyors present
- Creek name: Name of the entire water body
- Site name: Name of the actual site where the survey is conducted.
- Start time: Time that the survey starts in military time format.
- Coordinates: Coordinates of the start and end point taken in datum NAD27.
- Deepest pool depth: Depth of the deepest pool found during that survey.

### Weather

- Take general notes about approximate temperature, cloud cover, and precipitation.

### Species detected

Make notes about the species detected during the survey. Commonly encountered species in our area are listed below.

- HYRE – Pacific tree frog
- HYCA – California tree frog
- TATO – California newt
- BUBO – Western toad
- CRAY – Red swamp crayfish
- FISH – Any species of non-native fish
- NZMS – New Zealand mudsnails
- RACA – bullfrog

### Detailed pool information

- Each stop should be numbered as encountered when traveling upstream.
- Length should be measured in meters, depth of the deepest point in centimeters, and width at the widest point in meters.
- Species/age class observed: Any species and its age class observed in the pool should be noted.

Notes on each pool stop can be made. For example, abundances of species detected in the pool could be noted here.