U.S. Fish and Wildlife Service

Revised Guidance on Site Assessments and Field Surveys for the California Red-legged Frog

August 2005

I. Introduction

The U.S. Fish and Wildlife Service (Service) issued guidance on conducting site assessments and surveys for the California red-legged frog (*Rana aurora draytonii*) (CRF) on February 18, 1997 (1997 Guidance). Since then, the Service has reviewed numerous CRF site assessments and surveys results, accompanied wildlife biologists in the field during the preparation and performance of site assessments and CRF surveys, and consulted with species experts on the effectiveness of the 1997 Guidance. Based on our review of the information, the Service has determined that the survey portion of the 1997 Guidance is less likely to accurately detect CRF than previously thought, especially in certain portions of the species range and particularly where CRF exist in low numbers. In response to the need for new guidance, the Service has prepared this *Revised Guidance on Site Assessment and Field Surveys for the California Red-legged Frog* (Guidance).

Similar to the 1997 Guidance, two procedures are recommended in the new Guidance to accurately assess the likelihood of CRF presence in the vicinity of a project site: (1) an assessment of CRF locality records and potential CRF habitat in and around the project area and, (2) focused field surveys of breeding pools and other associated habitat to determine whether CRF are likely to be present.

Because CRF are known to use aquatic, riparian, and upland habitat, they may be present in any of these habitat types, depending on the time of year, on any given property. For sites with no suitable aquatic breeding habitat, but where suitable upland dispersal habitat exists, it is difficult to support a negative finding with the results of any survey guidance. Therefore, this Guidance focuses on site assessments and surveys conducted in and around aquatic and riparian habitat.

This Guidance was developed by the Service's Sacramento Fish and Wildlife Office in coordination with the Ventura Fish and Wildlife Office. Input by field biologists and scientists experienced in surveying for the CRF was also used in the development of this Guidance.

If the following Guidance is followed in its entirety, the results of the site assessments and surveys will be considered valid by the Service for two (2) years, unless determined otherwise on a case-by-case basis by the appropriate Service Fish and Wildlife Office. After two (2) years, new surveys conducted under the most current Service Guidance may be required, if deemed necessary by the appropriate Service Fish and Wildlife Office.

Modifications of this Guidance for specific projects or circumstances may be approved by the appropriate Fish and Wildlife Office; however, we strongly recommend that all modifications be reviewed and approved by the Service prior to implementation.

II. Permit Requirements

Unless otherwise authorized, individuals participating in site assessments and surveys for CRF may **NOT** take the California red-legged frog during the course of site assessments or survey activities. Take may only be authorized via section 7 or section 10 of the Endangered Species Act of 1973, as amended. Typically, take associated with survey activities is authorized via issuance of section 10(a)(1)(A) permits. For reference, an application for a section 10(a)(1)(A) permit is available through the appropriate Fish and Wildlife Office or online at: http://forms.fws.gov/3-200-55.pdf.

The site assessment and survey methods recommended in this Guidance do NOT require the surveyor to have a permit. As stated below, the surveyor must be otherwise qualified to conduct the surveys.

It is the responsibility of the surveyor to ensure all other applicable permits are obtained and valid (*e.g.,* state scientific collection permits), and that permission from private landowners or land managers is obtained prior to accessing a site and beginning site assessments and surveys.

III. Site Assessments

To prevent any unnecessary loss of time or use of resources, it is essential that completed site assessments be submitted to the appropriate Service Fish and Wildlife Office for review in order to obtain further guidance from the Service before conducting surveys.

Surveyors are encouraged to implement the decontamination guidelines provided in Appendix B before conducting a site assessment to prevent the spread of parasites and diseases to CRF and other amphibians.

Careful evaluation of the following information about CRF and their habitats in the vicinity of a project or other land use activities is important because this information indicates the likelihood of the presence of CRF. This information will help determine whether it is necessary to conduct field surveys.

To conduct a site assessment for CRF, complete the data sheet in Appendix D and return it with any necessary supporting documentation to the appropriate Service Fish and Wildlife Office for review prior to initiating surveys. The following information is critical to completing a proper site assessment:

1. Is the site within the current or historic range of the CRF?

Since knowledge of the distribution of the CRF is likely to change as new locality information becomes available, biologists are expected to contact the appropriate Fish and Wildlife Office (see section IV below) to determine if a project site is within the range of this species.

2. Are there known records of CRF at the site or within a 1.6-kilometer* (1-mile) radius of the site?

The biologist should consult the California Natural Diversity Data Base (CNDDB) maintained by the California Department of Fish and Game's (CDFG) Natural Heritage Division as a starting point to determine if there are reported localities of CRF within a 1.6-kilometer (1-mile) radius of the site. Information on the CNDDB is attached to the end of this document. Data entry into the CNDDB is not always current nor do all surveyors submit reports to the CNDDB, thus it is essential that other information sources on local occurrences of CRF be consulted. These sources may include, but are not limited to, biological consultants, local residents, amateur herpetologists, resource managers and biologists from municipal, State, and Federal agencies, environmental groups, and herpetologists at museums and universities. The biologist should report to the Service all known CRF records at the project site and within a 1.6-kilometer (1-mile) radius of the project boundaries. One-point-six (1.6) kilometers (1 mile) was selected as a proximity radius to a project site based on telemetry data collected by Bulger *et al.* (2003), rounded to the nearest whole mile. This distance may be subject to change when new data becomes available, or based on site-specific conditions, so it is advised that surveyors check with the appropriate Service Fish and Wildlife Office to ensure they are using the most up-to-date information.

*** IMPORTANT**: One-point-six (1.6) kilometers (1 mile) radius is a general guideline. The appropriate Service Fish and Wildlife Office will advise surveyors of the most appropriate distance for each specific project location on a case-by-case basis.

3. What are the habitats within the project site and within 1.6 kilometers* (1 mile) of the project boundary?

In order to properly characterize the habitat within 1.6 kilometers (1 mile) of the project site, individuals conducting site assessments must visit the project site and as much of the surrounding habitat within 1.6 kilometers (1 mile) of the project site as possible. Aerial photographs, maps, and other resources should be consulted as well to ensure all possible accessible habitats are considered. Based on this reconnaissance assessment, the surveyor shall describe the upland and aquatic habitats within the project site and within 1.6 kilometers (1 mile) of the project boundary. The aquatic habitats should be mapped and characterized (*e.g.*, ponds vs. creeks, pool vs. riffle, ephemeral vs. permanent (if ephemeral, give date it goes dry), vegetation (type, emergent, overhanging), water depth at the time of the site assessment, bank full depth, stream gradient (percent slope), substrate, and description of bank). The presence of

bullfrogs (*Rana catesbeiana*) and other aquatic predators such a centrarchid fishes (bass, perch, sunfish) should be documented even though their presence does not negate the presence of CRF. Upland habitats should be characterized by including a description of upland vegetation communities, land uses, and any potential barriers to CRF movement. The information provided in Appendix A serves as a guide to the features that will indicate possible CRF habitat.

4. Report the results of the site assessment

A site assessment report shall be provided to the appropriate Fish and Wildlife Office for review. Reports should include, but are not limited to, the following information:

1) Copies of the data sheet provided at Appendix D;

2) Copies of field notes and all other supporting documentation including:

   A. A list of all known CRF localities within 1.6 kilometers* (1 mile) of the project site boundaries;
   B. Photographs of the project site (photopoints shall be indicated on an accompanying map);
   C. A map of the site showing all of the habitat types and other important features as well as the location of any species detected during the site assessment within 1.6 kilometers (1 mile) of the project site boundaries. Maps shall be either copies of those portions of the U.S. Geological Service 7.5-minute quadrangle map(s) *or* geographic information system (GIS) data;
   D. A description of the project and/or land use that is being proposed at the site.

Based on the information provided in the site assessment report, the Service will provide guidance on how CRF issues should be addressed, including whether field surveys are appropriate, where the field surveys should be conducted, and whether incidental take authorization should be obtained through section 7 consultation or a section 10 permit pursuant to the Endangered Species Act.

IV. Field Surveys

Surveyors are encouraged to implement the decontamination guidelines provided in Appendix B before conducting surveys to prevent the spread of parasites and diseases to CRF and other amphibians.

To avoid and minimize the potential of harassment or harm to CRF, no additional surveys will be conducted in an area once occupancy has been established, unless the surveying effort is part of a Service-approved project to determine actual numbers of frogs at a site.

The Service should be notified in writing (*e.g.*, email) by the surveyor within three (3) working

days once a CRF is detected. The Service will provide guidance to the surveyor regarding the need to collect additional information such as population size, age class, habitat use, *etc*.

A. Qualifications of Surveyors

Surveyors must be familiar with the distinguishing physical characteristics of all life stages of the CRF, other anurans of California, and with introduced, exotic species such as the bullfrog and the African clawed frog (*Xenopus Laevis*) prior to conducting surveys according to this Guidance.

Surveyors must submit their qualifications to the Service along with their survey results.

A field guide should be consulted (*e.g.*, Wright and Wright 1949; Stebbins 2003) to confirm the identification of amphibians encountered during surveys. Surveyors also should be familiar with the vocalizations of the CRF and other amphibians found in California. Recordings of these vocalizations are available through various sources (*e.g.*, Davidson 1995). Surveyors that do not have experience with the species are required to obtain training on locating and identifying CRF adult, larval and egg stages before survey results are accepted. Training may include attendance at various workshops that have an emphasis on the biology of the California red-legged frog, accompanied by an appropriate level of field identification training; field work with individuals who possess valid 10(a)(1)(A) permits for the CRF; and experience working with ranids and similar taxa.

In some localities more intensive surveys (*e.g*., dip-netting larvae and adults) may be desirable to document the presence of CRF. In order to conduct such focused surveys a valid section 10(a)(1)(A) permit is required (refer to introduction section for information on how to apply for a section 10(a)(1)(A) permit). Applicants will be considered qualified for a section 10(a)(1)(A) permit if they meet the Service's most current qualification requirements. At a minimum, prospective applicants must:

1) Possess a Baccalaureate degree in biology, ecology, a resource management-related field, or have equivalent relevant experience;
2) Have completed course work in herpetology and study-design/survey-methodology or have equivalent relevant experience;
3) Have verifiable experience in the design and implementation of amphibian surveys or research or have equivalent relevant experience;
4) Have verifiable experience handling and identifying a minimum of 10 CRF, or similar ranid species, comprised of a minimum of 5 adults and a combination of larva and juveniles;
5) Obtain a minimum of 40 hours of field experience through assisting in surveys for the CRF during which positive identification is made;
6) Have familiarity with suitable habitats for the species and be able to identify the major vegetative components of communities in which California red-legged frog surveys or

research may be conducted.

7) Have familiarity with and be able to identify native and non-native amphibians that may co-occur with the listed species.

B. Survey Periods

Surveys may begin anytime during January and should be completed by the end of September. Multiple survey visits conducted throughout the survey-year (January through September) increases the likelihood of detecting the various life stages of the CRF. For example, adult frogs are most likely to be detected at night between January 1 and June 30, somewhere in the vicinity of a breeding location, whereas, sub-adults are most easily detected during the day from July 1 through September 30.

Due to the geographic and yearly variation in egg laying dates, it is not possible to specify a range of dates that is appropriate for egg surveys throughout the range of the CRF. The following table summarizes the best approximated times to survey for CRF egg masses.

Geographic Area	Best Survey Period*
Northern California along the coast and interior to the Coast Range (north of Santa Cruz County)	January 1 and February 28
Southern California along the coast and interior through the Coast Range (south of, and including Santa Cruz County)	February 25 and April 30
Sierra Nevada Mountains and other high-elevation locations	Should not begin before April 15

Site specific conditions may warrant modifications to the timing of survey periods, modifications must be made with the Service's approval prior to conducting the surveys.

Survey Methodology

This Guidance recommends a total of **up to** eight (8) surveys to determine the presence of CRF at or near a project site. Two (2) day surveys and four (4) night surveys are recommended during the breeding season; one (1) day and one (1) night survey is recommended during the non-breeding season. Each survey must take place at least seven (7) days apart. At least one survey must be conducted prior to August 15th. The survey period must be over a minimum period of 6 weeks (*i.e.*, the time between the first and last survey must be at least 6 weeks). Throughout the species' range, the non-breeding season is defined as between July 1 and September 30.

If CRF are identified at any time during the course of surveys, no additional surveys will be conducted in the area, unless the surveying effort is part of a Service-approved project to determine actual numbers of frogs at a site.

The following methodology shall be followed unless otherwise specified, or approved by the

appropriate Service Fish and Wildlife Office:

1) Upon arrival at the survey site, surveyors should listen for a few minutes for frogs calling, prior to disturbing the survey site by walking or looking for eye shine using bright lights. If CRF calls are identified, the surveyor should note this information on the survey data sheet and note the approximate location of the call. Once the survey begins, the surveyor should pay special attention to the area where the call originated in an attempt to visually identify the frog.

2) The most common method of surveying for CRF is the visual-encounter survey. This survey is conducted either during daylight hours or at night by walking entirely around the pond or marsh or along the entire length of a creek or stream while repeatedly scanning for frogs. This procedure allows one to scan each section of shore from at least two different angles. Surveyors should begin by first working along the entire shoreline, then by entering the water (if necessary and no egg masses would be crushed or disturbed), and visually scanning all shoreline areas and all aquatic habitats identified in the site assessment. Generally, surveyors shall focus on all open water to at least 2 meters (6.5 feet) up the bank. When wading, surveyors must take maximum care to avoid disturbing sediments, vegetation, or larvae. When walking on the bank, surveyors shall take care to not crush rootballs, overhanging banks, and stream-side vegetation that might provide shelter for frogs. Surveys must cover the entire area, otherwise the remaining survey area must be surveyed the next day/night that weather conditions allow (both visits would constitute one day/night survey).

3) Day surveys may be conducted on the same day as a night survey.

   The main purpose of day surveys during the breeding season is to look for larvae, metamorphs, and egg masses; the main purpose of day surveys during the non-breeding season is to look for metamorphosing sub-adults, and non-breeding adults. Daytime surveys shall be conducted between one hour after sunrise and one hour before sunset.

4) Night surveys

   The main purpose of night surveys is to identify and locate adult and metamorphosed frogs. Conditions and requirements for conducting night surveys are as follows:

   A. Night surveys must commence no earlier than one (1) hour after sunset.
   B. Due to diminished visibility, surveys should not be conducted during heavy rains, fog, or other conditions that impair the surveyor's ability to accurately locate and identify frogs.
   C. Nighttime surveys shall be conducted with a Service-approved light such as a Wheat Lamp, Nite Light, or sealed-beam light that produces less than 100,000 candle watt. Lights that the Service does not accept for surveys are lights that are either too dim or too bright. For example, Mag-Light-type lights and other

types of flashlights that rely on 2 or 4 AA's/AAA's, 2 C's or 2 D batteries. Lights with 100,000 candle watt or greater are too bright and also would not meet Service requirements.

D. The Service approved light must be held at the surveyor's eye level so that the frog's eye shine is visible to the surveyor.
E. The use of binoculars is a must in order to effectively see the eye shine of the frogs. Surveys conducted without the use of binoculars may call in to question the validity of the survey.

5) Weather conditions.

Weather and visibility conditions must be consistent throughout the duration of the survey; if weather conditions become unsuitable, the survey must be completed at another time when conditions are better suited to positively locating and identifying frogs. Suitable conditions are as follows:

A. Air temperature at the survey site must be at least 10 degrees Celsius (50 degrees Fahrenheit). Frogs are less likely to be active when temperatures are below 10 degrees Celsius (50 degrees Fahrenheit).
B. Wind speed must not exceed 8 kilometers/hour (5 miles/hour) at the survey site. High wind speeds affect temperatures and the surveyor's ability to hear frogs calling.
C. Surveys must be conducted under clear to partly cloudy skies (high clouds are okay) but not under dense fog or during heavy rain, as stated above. Surveys may be conducted during light rains.

Surveyors should carefully consider weather conditions prior to initiating a survey. Ask yourself, "Can I collect accurate, reliable data under the existing weather conditions" prior to proceeding with the survey. Weather conditions will be taken into account when the data is reviewed by the appropriate Service Fish and Wildlife Service Office.

6) Decontamination of equipment

In an effort to minimize the spread of terrestrial and aquatic pathogens, all aquatic survey equipment including chest waders, wet suits, float tubes, kayaks, shall be decontaminated before entering potential CRF habitat using the guidelines in Appendix B. Careful attention shall be taken to remove all dirt from boots, chest waders, wetsuits, float tubes, kayaks, and other equipment before placing equipment into the water.

7) Unidentified larvae, sub-adults, and adults

If the larval life stage is the only life stage detected and the larvae are not identified to species (or similarly, if sub-adult or adult frogs are observed but not identified to

species), the surveyor must either return to the habitat to identify the frog in another life stage or obtain the appropriate permit (*e.g.*, section 10(a)(1)(A) permit) authorization allowing the surveyor to handle CRF and larvae. In order for the Service to consider a survey to be complete, all frogs encountered must be accurately identified.

8) Reporting results of the surveys

A species survey report shall be provided to the appropriate Fish and Wildlife Office for review. Reports should include, but are not limited to, the following information:

1. Copies of the data sheets provided at Appendix E;

2. Copies of field notes and all other supporting documentation including:

    A. Photographs of all CRF observed during the survey and of the habitat where each individual was located, if possible without harming or harassing the individual;
    B. A map of the site showing the location of any species detected during the survey. Maps shall be either copies of those portions of the U.S. Geological Service 7.5-minute quadrangle map(s) *or* geographic information system (GIS) data;

Based on the information provided in the site assessment report and the survey results, the Service will provide guidance on how CRF issues should be addressed through the section 7 or section 10 processes.

All information on CRF distribution resulting from field surveys shall be sent to the California Natural Diversity Database (CNDDB). CNDDB forms shall be completed, as appropriate, for each listed species identified during the survey(s) and submitted to the California Department of Fish and Game, Wildlife Habitat Data Analysis Branch, 1807 13th Street, Suite 202, Sacramento, California 95814, with copies submitted to the appropriate Service Fish and Wildlife Office. Each form sent to the CDFG shall have an accompanying 1:24,000 scale USGS map (or an exact scale photocopy of the appropriate portion(s) of the map) -or- Global Information System (GIS) data coverage of the site. Copies of the form can be obtained from the CDFG at the above address (telephone: 916-324-3812) or online at: http://www.dfg.ca.gov/whdab/html/animals.html. Additional information about the CNDDB is available in Appendix C.

The Service may not accept the results of field surveys conducted under this Guidance for any of the following reasons:

A. if the appropriate Service Fish and Wildlife Office was not contacted to review the results of the site assessment prior to field surveys being conducted;
B. if field surveys were conducted in a manner inconsistent with this Guidance or with

survey methods not previously approved by the Service;

C. if field surveys were incomplete;
D. if surveyors were not adequately qualified to conduct the surveys;
E. if the reporting requirements, including submission of CNDDB forms, were not fulfilled.

IV. Service Contacts

There are three Service Fish and Wildlife Offices within the range of the CRF (see Map 1). The appropriate office to contact regarding site assessments or survey authorization depends on the location where the surveys are to be conducted.

For project sites and land use activities in Santa Cruz, Monterey, San Benito, San Luis Obispo, Santa Barbara, and Ventura Counties, portions of Los Angeles and San Bernardino Counties outside of the Los Angeles Basin, and portions of Kern, Inyo and Mono Counties east of the Sierra Crest and south of Conway Summit, contact:

Ventura Fish and Wildlife Office,
2493 Portola Road, Suite B
Ventura, California, 93003
(805/644-1766).

For project sites and land use activities in all other areas of the State south of the Transverse Ranges, contact:

Carlsbad Fish and Wildlife Office
Attn: Recovery Permit Coordinator
6010 Hidden Valley Road
Carlsbad, California, 92009
(760/431-9440).

For project sites and land use activities in all other areas of the State, contact:

Sacramento Fish and Wildlife Office
2800 Cottage Way, Suite W-2605
Sacramento, California 95825
(916/414-6600).
(916/414-6713, fax)

For information on section 10(a)(1)(A) recovery permits, contact:

Regional Office,
Eastside Federal Complex
911 N.E., 11th Avenue
Portland, Oregon 97232-4181
(503/231-6241)

* These are independent offices overlapping with the Sacramento Fish and Wildlife Office. Their work primarily focuses on salmonid restoration, fishery monitoring and Forest Plan Implementation.

Map 1. Map of California showing jurisdictional boundaries of Service Fish and Wildlife Offices.

References

Davidson, C. 1995. Frog and toad calls of the Pacific Coast: Vanishing Voices. Library of Natural Sounds, Cornell Laboratory of Ornithology, Ithaca, New York. 27 pp. +1 cassette.

Stebbins, R.C. 2003. A field guide to western reptiles and amphibians. Third edition. Houghton Mifflin Company, New York, New York. 533 pp.

Wright, A.H. and A.A. Wright. 1949. Handbook of frogs and toads of the United States and Canada. Third Edition. Comstock Publishing Company, Ithaca, New York. xii+640 pp.

Appendix A.
California red-legged frog identification and ecology.

1. Identification

The following information may aid surveyors in the identification of California red-legged frogs and similar species. However, all surveyors are expected to consult field guides (Wright and Wright 1949; Davidson 1995; Stebbins 2003) for further information.

General Description
The California red-legged frog (*Rana aurora draytonii*), is a relatively large aquatic frog ranging from 4 to 13 centimeters (1.5 to 5 inches) from the tip of the snout to the vent. From above, the California red-legged frog can appear brown, gray, olive, red or orange, often with a pattern of dark flecks or spots. The skin usually does not look rough or warty. The back of the California red-legged frog is bordered on either side by an often prominent dorsolateral fold of skin running from the eye to the hip. The hindlegs are well-developed with large webbed feet. A cream, white, or orange stripe usually extends along the upper lip from beneath the eye to the rear of the jaw. The undersides of adult California red-legged frogs are white, usually with patches of bright red or orange on the abdomen and hindlegs. The groin area can show a bold black mottling with a white or yellow background.

Adults
Positive diagnostic marks should be used to accurately distinguish California red-legged frogs from other species of frogs that may be observed. A positive diagnostic mark is an attribute of the animal that will not be found on any other animal likely to be encountered at the same locality. The following features are positive diagnostic marks that, if observed, will distinguish California red-legged frogs from foothill yellow-legged frogs (*Rana boylii)* and bullfrogs *(Rana catesbeiana)*:

a. Prominent dorsolateral folds (thick upraised fold of skin running from eye to hip) on any frog greater than 5 centimeters (2 inches) long from snout to vent. Young yellow-legged frogs can show reddish folds; these usually fade as the frogs mature.

b. Bright red dorsum.

c. Well defined stripe as described above running along upper lip.

Since California red-legged frogs are often confused with bullfrogs, surveyors should note those features that might be found on bullfrogs that will rarely be observed on California red-legged frogs. These features are:

a. Absence of the dorsolateral fold.
b. Bright yellow on throat.
c. Uniform bright green snout.
d. Tympanum (ear disc) distinct and much larger than eye.

Please note that some frogs may lack all of the above characteristics given for both California red-legged frogs and bullfrogs. Surveyors should regard such frogs as unidentified, unless it is clearly identified as another species.

California red-legged frogs are cryptic because their coloration tends to help them blend in with their surroundings, and they can remain immobile for great lengths of time. When an individual California red-legged frog is disturbed, it may jump into the water with a distinct "plop." The California red-legged frog may do this either when the surveyor is still distant or when a surveyor is very near. Bullfrogs exhibit similar behavior but will often emit a "squawk" as they dive into the water. Because a California red-legged frog is unlikely to make such a sound, a "squawk" from a fleeing frog will be considered sufficient to positively identify the frog as a bullfrog.

Larvae
Tadpoles may be trapped and handled only by those with a valid 10(a)1(A) permit. California red-legged frog larvae range from 14 to 80 millimeters (0.5 to 3.25 inches) in length. They are greenish to generally brownish color with darker marbling and lack distinct black or white spotting or speckling. Large California red-legged frog larvae often have a wash of red coloration on their undersides and a very small single row of evenly spaced whitish or gold flecks along the side where the dorsolateral fold will develop. Other features to look for to identify California red-legged frog larvae include: eyes set well in from the outline of the head (contrasts with treefrogs (*Hyla* spp.)), oral papillae on both the sides of the mouth and the bottom of the mouth (contrasts with *Bufo* spp.), well developed oral papillae on the sides of the mouth (contrasts with other subspecies of red-legged frogs (*Rana aurora* spp.) and spadefoot toads (*Scaphiopus* spp.)), generally mottled body and tail with few or no distinct black spots on tail fins (contrasts with bullfrogs), and two to three tooth rows on the top and bottom (contrasts with foothill yellow-legged frogs).

Eggs
California red-legged frogs breed during the winter and early spring from as early as late November through April and May. Adults engage in courtship behaviors that result in the female depositing from 2,000 to 6,000 eggs, each measuring between 2 and 3 millimeter (0.1 inches). California red-legged frog eggs are typically laid in a mass attached to emergent vegetation near the surface of the water, where they can be easily dislodged. However, egg masses have been detected lying on the bottom of ponds. The egg mass is well defined and

about the size of a softball. Eggs hatch within 6 to 14 days after deposition at which time the newly hatched larvae are delicate and easily injured or killed. California red-legged frog larvae transform into juvenile frogs in 3.5 to 7 months.

During the time that red-legged frog egg surveys are conducted, other amphibian eggs may be found including those of Pacific treefrogs, spadefoot toads, California tiger salamanders, and newts. Bullfrogs and foothill yellow-legged frogs lay their eggs later in the season. Field guides should be consulted for additional information on egg identification.

2. Habitat

California red-legged frogs occur in different habitats depending on their life stage, the season, and weather conditions. Rangewide, and even within local populations, there is much variation in how frogs use their environment; in some cases, they may complete their entire life cycle in a particular habitat (*i.e.,* a pond is suitable for all life stages), and in other cases, they may seek multiple habitat types (U.S. Fish and Wildlife Service 2002).

Breeding habitat
All life history stages are most likely to be encountered in and around breeding sites, which are known to include coastal lagoons, marshes, springs, permanent and semi-permanent natural ponds, ponded and backwater portions of streams, as well as artificial impoundments such as stock ponds, irrigation ponds, and siltation ponds. California red-legged frog eggs are usually found in ponds or in backwater pools in creeks attached to emergent vegetation such as *Typha* and *Scirpus*. However, they have been found in areas completely denuded of vegetation. Creeks and ponds where California red-legged frogs are found most often have dense growths of woody riparian vegetation, especially willows (*Salix* spp.) (Hayes and Jennings 1988). The absence of *Typha, Scirpus,* and *Salix* at an aquatic site does not rule out the possibility that the site provides habitat for California red-legged frogs, for example stock ponds often are lacking emergent vegetation yet they provide suitable breeding habitat. California red-legged frog larvae remain in these habitats until metamorphosis in the summer months (Storer 1925; Wright and Wright 1949). Young California red-legged frogs can occur in slow moving, shallow riffle zones in creeks or along the margins of ponds.

Summer habitat
California red-legged frogs often disperse from their breeding habitat to forage and seek summer habitat if water is not available. In the summer, California red-legged frogs are often found close to a pond or a deep pool in a creek where emergent vegetation, undercut banks, or semi-submerged rootballs afford shelter from predators. California red-legged frogs may also take shelter in small mammal burrows and other refugia on the banks up to 100 meters from the water any time of the year and can be encountered in smaller, even ephemeral bodies of water in a variety of upland settings (Jennings and Hayes 1994; U.S. Fish and Wildlife Service 2002).

Upland habitat
California red-legged frogs are frequently encountered in open grasslands occupying seeps and

springs. Such bodies may not be suitable for breeding but may function as foraging habitat or refugia for dispersing frogs. During periods of wet weather, starting with the first rains of fall, some individuals make overland excursions through upland habitats (U.S. Fish and Wildlife Service 2002).

3. Movement

California red-legged frogs may move up to 3 kilometers (1.88 miles) up or down drainages and are known to wander throughout riparian woodlands up to several dozen meters from the water (Rathbun *et al.* 1993). Dispersing frogs have been recorded to cover distances from 0.40 kilometer (0.25 mile) to more than 3.2 kilometers (2 miles) without apparent regard to topography, vegetation type, or riparian corridors (Bulger 1998). California red-legged frogs have been observed to make long-distance movements that are straight-line, point to point migrations rather than using corridors for moving in between habitats. Dispersal distances are considered to be dependent on habitat availability and environmental conditions. On rainy nights California red-legged frogs may roam away from aquatic sites as much as 1.6 kilometers (1 mile). California red-legged frogs will often move away from the water after the first winter rains, causing sites where California red-legged frogs were easily observed in the summer months to appear devoid of this species. Additionally, California red-legged frogs will sometimes disperse in response to receding water which often occurs during the driest time of the year.

References for Appendix A

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Appendix B.
Recommended Equipment Decontamination Procedures

In an effort to minimize the spread of pathogens that may be transferred as result of activities, surveyors should follow the guidance outlined below for disinfecting equipment and clothing after entering a pond and before entering a new pond, unless the wetlands are hydrologically connected to one another:

i. All organic matter should be removed from nets, traps, boots, vehicle tires and all other surfaces that have come into contact with water or potentially contaminated sediments. Cleaned items should be rinsed with clean water before leaving each study site.

ii. Boots, nets, traps, hands, *etc*. should be scrubbed with either a 75% ethanol solution, a bleach solution (0.5 to 1.0 cup per 1.0 gallon of water), Quat-128™ (1:60), or a 6% sodium hypochlorite 3 solution. Equipment should be rinsed clean with water between study sites. Cleaning equipment in the immediate vicinity of a pond or wetland should be avoided (*e.g.*, clean in an area at least 100 feet from aquatic features). Care should be taken so that all traces of the disinfectant are removed before entering the next aquatic habitat.

iii. Used cleaning materials (liquids, *etc.*) should be disposed of safely, and if necessary, taken back to the lab for proper disposal. Used disposable gloves should be retained for safe disposal in sealed bags.

iv. Additionally, the surveyors shall implement the following when working at sites with known or suspected disease problems: disposable gloves should be worn and changed between handling each animal. Gloves should be wetted with water from the site or distilled water prior to handling any amphibians. Gloves should be removed by turning inside out to minimize cross-contamination.

Appendix C.
General instructions for filling out CNDDB field survey forms

The Natural Diversity Data Base (NDDB) is the largest, most comprehensive database of its type in the world. It presently contains more than 33,000 site specific records on California's rarest plants, animals, and natural communities. The majority of the data collection effort for this has been provided by an exceptional assemblage of biologists throughout the state and the west. The backbone of this effort is the field survey form. We are enclosing copies of Natural Diversity Data Base (NDDB) field survey forms for species and natural communities. We would greatly appreciate you recording your field observations of rare, threatened, endangered, or sensitive species and natural communities
(elements) and sending them to us on these forms.

We are interested in receiving forms on elements of concern to us; refer to our free publications: *Special Plants Lis*t, *Special Animals List*, and *Natural Communities List* for lists of which elements these include. Reports on multiple visits to sites that already exist in the NDDB are as important as new site information as it helps us track trends in population/stand size and condition. Naturally, we also want information on new sites. We have enclosed an example of a field survey form that includes the information we like to see. It is especially important to include a xeroxed portion of a USGS topographic quad with the population/stand outlined or marked (see back of enclosed example).

Without the map, your information will be mapped less accurately, as written descriptions of locations are frequently hard to interpret. Do not worry about filling in every box on the form; only fill out what seems most relevant to your site visit. Remember that your name and telephone number are very important in case we have any questions about the form.

If you are concerned about the sensitivity of the site, remember that the NDDB can label your element occurrence "Sensitive" in the computer, thus restricting access to that information. The NDDB is only as good as the information in it, and we depend on people like you as the source of that information. Thank you for your help in improving the NDDB.

Copies of the NDDB form can be obtained from the CDFG at the above address (telephone: 916-324-3812) *or* online at: http://www.dfg.ca.gov/whdab/html/animals.html.

Appendix D.
California Red-legged Frog Habitat Site Assessment Data Sheet

This data sheet is to assist in the data collection of California red-legged frog habitat in the vicinity of projects or other land use activities, following the August 2005, *Revised Guidance on Site Assessment and Field Surveys for California Red-legged Frogs* (Guidance), issued by the U.S. Fish and Wildlife Service. Prior to collecting the data requested on this form, the biologist should be familiar with and understand the Guidance.

The "Site Assessments" section of the Guidance details the data needed to complete a site assessment. When submitting a complete site assessment to the Service (one that has been done following the Guidance), one data sheet should be included for each aquatic habitat identified. If multiple aquatic habitats are identified within the project site, then multiple data sheets should be completed. A narrative description of the aquatic, riparian, and upland habitats should be provided to characterize the breeding habitat within the project site and the breeding and dispersal habitat within 1.6 kilometers (1 mile) of the project site. In addition to completing this data sheet, field notes, photographs, and maps should be provided to the appropriate Fish and Wildlife Service Office, as requested in the "Site Assessments" section of the Guidance.

Appendix D.
California Red-legged Frog Habitat Site Assessment Data Sheet

Site Assessment reviewed by_____ _____ _____
(FWS Field Office) (date) (biologist)

Date of Site Assessment: _____
(mm/dd/yyyy)

Site Assessment Biologists: _____ _____
(Last name) (first name) (Last name) (first name)

_____ _____
(Last name) (first name) (Last name) (first name)

Site Location: _____
(County, General location name, UTM Coordinates or Lat./Long. or T-R-S).

****ATTACH A MAP** (include habitat types, important features, and species locations)**

Proposed project name: _____
Brief description of proposed action:

1) Is this site within the current or historic range of the CRF (circle one)? YES NO

2) Are there known records of CRF within 1.6 km (1 mi) of the site (circle one)? YES NO
If yes, attach a list of all known CRF records with a map showing all locations.

GENERAL AQUATIC HABITAT CHARACTERIZATION

(if multiple ponds or streams are within the proposed action area, fill out one data sheet for each)

POND:

Size: _____ Maximum depth: _____

Vegetation: emergent, overhanging, dominant species: _____
_____
_____

Substrate: _____
_____

Perennial or Ephemeral *(circle one).* If ephemeral, date it goes dry: _____

Appendix D.
California Red-legged Frog Habitat Site Assessment Data Sheet

STREAM:

Bank full width: _____
Depth at bank full: _____
Stream gradient: _____

Are there pools (circle one)? YES NO

If yes,

Size of stream pools: _____
Maximum depth of stream pools: _____

Characterize non-pool habitat: run, riffle, glide, other: _____
_____
_____

Vegetation: emergent, overhanging, dominant species: _____
_____
_____

Substrate: _____
_____

Bank description: _____
_____
_____

Perennial or Ephemeral *(circle one).* If ephemeral, date it goes dry: _____

Other aquatic habitat characteristics, species observations, drawings, or comments:

Necessary Attachments:

1. All field notes and other supporting documents
2. Site photographs
3. Maps with important habitat features and species location

Appendix E.
California Red-legged Frog Survey Data Sheet

This data sheet is to assist in the data collection during surveys for California red-legged frogs in areas with potential habitat. This data sheet is intended to assist in the preparation of a final report on the field surveys as detailed in the August 2005, *Revised Guidance on Site Assessment and Field Surveys for California Red-legged Frogs* (Guidance) issued by the U.S. Fish and Wildlife Service (Service). Before completing this data sheet, a site assessment should have been conducted using the Guidance and the Service should have been contacted to determine whether surveys are required. Prior to collecting the data requested on this form, the biologist should be familiar with and understand the Guidance. To avoid and minimize the potential of harassment to California red-legged frogs, all survey activities shall cease once an individual California red-legged frog has been identified in the survey area, unless prior approval has been received from the appropriate Service Fish and Wildlife Office. The Service shall be notified within three (3) working days by the surveyor once a California red-legged frog is detected, at which point the Service will provide further guidance. Surveys should take place in consecutive breeding/non-breeding seasons (*i.e.*, the entire survey period, including breeding and non-breeding surveys should not exceed 9 months). It is important that both the breeding and non-breeding survey be conducted during the time period specified in the Guidance. Site specific conditions may warrant modifications to the timing of survey periods, modifications must be made with the Service's approval. The survey consists of two (2) day and four (4) night surveys during the breeding season and one (1) day and one (1) night surveys during the non-breeding season.

All California red-legged frog life stages should be surveyed for. Surveyors may detect larvae but not be able to identify this life stage to species as handling any life stage of the California red-legged frog necessitates a valid 10(a)(1)(A) permit. If the larval life stage is the only life stage detected and the larvae are not identified to species, the surveyor must either return to the habitat to identify the frog in another life stage or have a valid 10(a)(1)(A) permit allowing the surveyor to handle California red-legged frogs and larvae. In order for the Service to consider a survey to be complete, all frogs encountered must be accurately identified.

Appendix E.
California Red-legged Frog Survey Data Sheet

Survey results reviewed by_____ _____ _____
(FWS Field Office) (date) (biologist)

Date of Survey: _____ **Survey Biologist:** _____
(mm/dd/yyyy) (Last name) (first name)

Survey Biologist: _____
(Last name) (first name)

Site Location: _____
(County, General location name, UTM Coordinates or Lat./Long. or T-R-S).

****ATTACH A MAP** (include habitat types, important features, and species locations)**

Proposed project name: _____
Brief description of proposed action:

Type of Survey (circle one): **DAY NIGHT BREEDING NON-BREEDING**

Survey number (circle one): **1 2 3 4 5 6 7 8**

Begin Time: _____ **End Time:** _____

Cloud cover: _____ **Precipitation:** _____

Air Temperature: _____ **Water Temperature:** _____

Wind Speed: _____ **Visibility Conditions:** _____

Moon phase: _____ **Humidity:** _____

Description of weather conditions: _____
_____

Brand name and model of light used to conduct surveys: _____

Were binoculars used for the surveys (circle one)**? YES NO**
Brand, model, and power of binoculars: _____

Appendix E.
California Red-legged Frog Survey Data Sheet

AMPHIBIAN OBSERVATIONS

Species	# of indiv.	Observed (O) Heard (H)	Life Stages	Size Class	Certainty of Identification

Describe potential threats to California red-legged frogs observed, including non-native and native predators such as fish, bullfrogs, and raccoons: _____

_____

_____

_____

_____

Other notes, observations, comments, *etc.*

Necessary Attachments:

4. All field notes and other supporting documents
5. Site photographs
6. Maps with important habitat features and species locations