

**Western Riverside County
Multiple Species Habitat Conservation Plan (MSHCP)
Biological Monitoring Program**

**California Red-legged Frog (*Rana aurora draytonii*)
Survey Report 2008**



19 April 2009

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NOTE TO READER:

This report is an account of survey activities undertaken by the Biological Monitoring Program for the Western Riverside County Multiple Species Habitat Conservation Plan (MSHCP). The MSHCP was permitted in June 2004. The Biological Monitoring Program monitors the distribution and status of the 146 Covered Species within the Conservation Area to provide information to Permittees, land managers, the public, the California Department of Fish and Game, and the U.S. Fish and Wildlife Service. Monitoring Program activities are guided by the MSHCP species objectives for each Covered Species, the information needs identified in MSHCP Section 5.3 or elsewhere in the document, and the information needs of the Permittees.

We would like to acknowledge the land managers in the MSHCP Plan Area, who in the interest of conservation and stewardship facilitate Monitoring Program activities on the lands for which they are responsible. A list of the lands where this year's data collection activities were conducted is included in Section 7.0 of the Western Riverside County Regional Conservation Authority (RCA) Annual Report to the Wildlife Agencies.

Partnering organizations and individuals contributing data to our projects are acknowledged in the text of appropriate reports. We would especially like to acknowledge the Santa Ana Watershed Association, the Center for Natural Lands Management, and the Orange County Water District for their willingness to initiate or modify their data collection to complement our survey efforts in 2008.

While we have made every effort to accurately represent our data and results, it should be recognized that our database is still under development. Any reader who would like to make further use of the information or data provided in this report should contact the Monitoring Program to ensure that they have access to the best available or most current data. All Monitoring Program data, including original datasheets and digital datasets are stored in the Monitoring Program office in downtown Riverside, CA.

The primary authors of this report were the 2008 Herpetology Program Lead, Robert Packard and Staff Biologist, Sinlan Poo. If there are any questions about the information provided in this report, please contact the Monitoring Program Administrator. If you have questions about the MSHCP, please contact the Executive Director of the RCA. For further information on the MSHCP and the RCA, go to www.wrc-rca.org.

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INTRODUCTION

The California red-legged frog (*Rana aurora draytonii*; “RAAU”), is a California species of special concern that is federally listed as threatened. The species is typically found in lowland streams, wetlands, and deep pools surrounded by dense vegetation in small (< 300 km²) watersheds (Hayes and Jennings 1988). Historically, RAAU occupied Arroyo Seco Creek, San Juan Creek, several sewage treatment pools along the Santa Ana River near Flabob Airport, a northwest tributary of Arroyo del Toro Creek, an area immediately east of Lake Elsinore, and the recently developed upper reaches of Murrieta Creek and Santa Gertrudis Creek. The last account of a breeding population in the Plan Area occurred at Cole Creek on the Santa Rosa Plateau Ecological Reserve where 4 males and 1 female were observed in the late 1990s (Dudek and Associates 2003). The last recorded detections of RAAU at Cole Creek were in December 2001 and limited to 2 males at separate ponds (Carole Bell, The Nature Conservancy, personal communication). The species is not known to currently occur in the Conservation Plan Area despite the presence of suitable habitat. Conservation goals for RAAU call for the maintenance or restoration of occupied breeding habitat in the Santa Rosa Plateau and the Santa Ana Mountains as measured by the presence/absence of tadpoles, egg masses, or juvenile frogs once a year for the first 5 years after permit issuance (Dudek and Associates 2003).

We surveyed for breeding populations of RAAU in 2008 using a night-survey protocol developed by the Western Ecological Research Center, U.S. Geological Survey (USGS). We focused our efforts on the Santa Rosa Plateau Ecological Reserve where the species was most recently known to occur, and a parcel of land managed by the Regional Conservation Authority (RCA) in Cactus Valley that had not been previously surveyed and contained suitable RAAU habitat. Specific goals and objectives for RAAU surveys in 2008 were as follows:

Survey Goals and Objectives:

1. Document presence of breeding populations of RAAU.
 - a. Conduct visual night surveys based on USGS developed protocol using high-powered headlamps.
 - b. Target sites of known historic breeding populations and suitable habitat not previously surveyed.

METHODS

Protocol Development

We based our 2008 surveys for RAAU on the *Draft USGS Protocol for Nocturnal Aquatic Species of South Coast Ecoregion Rivers, Streams, and Creeks* (USGS 2006) (Appendix A). In general, the USGS protocol used visual encounter and dipnet survey methods for detecting all amphibian life stages, and included an assessment of habitat

characteristics. The protocol also required that targeted streams be segmented into 250-m reaches that were uniquely named in a downstream-to-upstream order.

Personnel and Training

Biological Monitoring Program personnel attended USGS training at San Francisquito Canyon, Orange County on 29 March 2006 that covered the implementation of USGS stream-survey protocol and the identification of anuran (frog and toad) species that occur in western Riverside and Orange Counties. Training sessions also included instruction on collecting data with Personal Digital Assistant (PDA) forms designed by USGS. Field crews were then trained in 2008 by Biological Monitoring Program staff that attended the USGS training in 2006. Field personnel conducted surveys after demonstrating an understanding of the USGS protocol, including use of PDA forms, and proficiency in identifying anuran species. Trainings were both office- and field-based. Field staff were trained by Natalie Marioni in 2008 and surveys were conducted by the following individuals in 2008:

- Robert Packard, Herpetology Program Lead (Regional Conservation Authority)
- Natalie Marioni, former Herpetology Program Lead (Regional Conservation Authority)
- Sinlan Poo (Regional Conservation Authority)
- Michael Zerwekh (Regional Conservation Authority)

Study Site Selection

We conducted surveys at Cole Creek in the Santa Rosa Plateau Ecological Reserve where the species was last detected in the Plan Area, and a portion of Cactus Valley east of Diamond Valley Lake (i.e., Goodhart Property) that had not been previously surveyed (Figure 1). We sectioned Cole Creek and an adjoining tributary into 250-m segments that were uniquely numbered (i.e., Reach 1, Reach 2, etc.) beginning at a downstream confluence with a higher-order waterway and working upstream. We then scouted stream segments during the day to locate suitable breeding habitat (e.g., pools \geq 0.7 m in depth), and returned at night to survey accessible pools for RAAU. We surveyed a small reservoir on the Goodhart property that contained suitable habitat and, to our knowledge, had never been surveyed for RAAU.

Survey Methods

Detailed survey methodology is described in *Draft USGS Protocol for Nocturnal Aquatic Species of South Coast Ecoregion Rivers, Streams, and Creeks* (USGS 2006) (Appendix A). At least 2 surveyors simultaneously conducted visual encounter surveys between 1800 h and 2200 h between 2 April and 22 July 2008. Survey time per segment varied between 26 and 149 min depending on number of deep pools present and abundance of amphibians detected. For each surveyed stream segment we recorded water temperature, percent dissolved oxygen, water pH, and water velocity with an electronic probe (YSI Incorporated, Yellow Springs, OH) along with ambient air temperature. We also identified the major vegetation community, recorded dominant plant species, and

Figure 1. Start locations for RAAU surveys conducted in 2008.

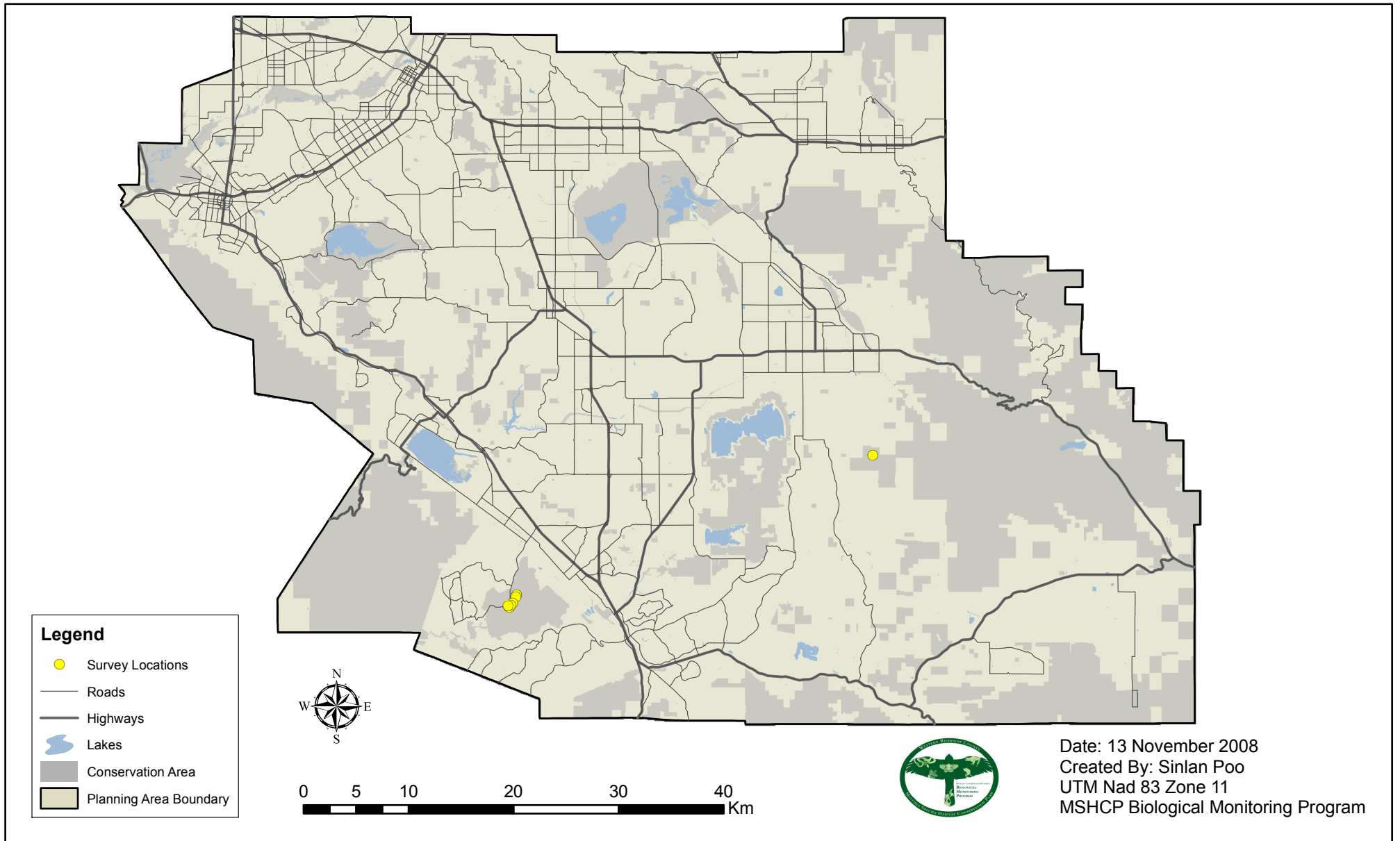


Table 1. Survey locations, dates, and amphibian species detected during stream surveys in 2008.

Creek Name	Survey Dates	No. of Segments Surveyed	RAAU	Other Covered Species	Other Native Frog/Toad Spp.	Exotic Species
Cole Creek	2–8 Apr	4	None	<i>Taricha torosa torosa</i>	<i>Hyla regilla</i> <i>Bufo borealis</i>	None
Cole Creek tributary	2 Apr	2	None	<i>Taricha torosa torosa</i>	<i>Hyla cadaverina</i> , <i>Hyla regilla</i> , <i>Bufo borealis</i>	None
Goodhart Property	22 Jul	1	None	None	<i>Hyla regilla</i>	None

noted the aquatic substrate (e.g., sand, leaf litter) that occurred along each stream segment. We recorded species, age (i.e., tadpole, juvenile, adult), behavior (e.g., basking, foraging, calling, mating), location (e.g., pool, run, riffle, bank), and waypoint for each amphibian encountered. We recorded all data using PDA forms created by USGS, and stored the data via internet server at the USGS Pendragon database housed at the USGS San Diego Field Station. These data were later moved to the Biological Monitoring Program's database.

We ensured that chytrid fungus (*Batrachochytrium dendrobatidis*) was not transferred between sites by sterilizing equipment and boots with a 10% bleach solution after each survey. We also thoroughly dried equipment and boots under direct sunlight.

RESULTS

We surveyed 6 stream segments in the Santa Rosa Plateau Ecological Reserve (Cole Creek and tributary) and 1 pool in Cactus Valley for a total of approximately 2 km of surveyed streams (Figure 1). No surveys were conducted in the Santa Ana Mountains Core Area in 2008 due to time and personnel constraints. No RAAU or any evidence of RAAU breeding was detected by Monitoring Program biologists in 2008 (Table 1).

DISCUSSION

The focus of night stream surveys in 2008 was to locate breeding populations of RAAU where they were recently known to occur, and to survey potentially suitable breeding habitat in the Conservation Area. No RAAU were detected at any locations surveyed by Biological Monitoring Program biologists in 2008; nor were any RAAU observations reported to us by other individuals or agencies. However, we do not have enough data to conclusively demonstrate that RAAU were not located at these sites because we only surveyed a limited number of streams.

Adult bullfrogs (*Rana catesbeiana*) are known to prey upon tadpoles, metamorphs, and adults of other species, including RAAU (Kiesecker and Blaustein 1997, 1998; Lawler et al 1999; Cook and Jennings 2001; Cook, 2002). Although bullfrogs are found at the Santa Rosa Plateau, none were detected during our surveys, suggesting that the existing habitat may still be hospitable for RAAU.

Recommendations for Future Surveys

The Monitoring Program will continue to survey for RAAU in appropriate habitat within the Conservation Area, concentrating on areas with previously documented RAAU occurrence. There are some areas on the Santa Rosa Plateau that may hold populations of RAAU, but are very difficult to access at night. We will conduct surveys in 2009 during the day, and attempt to access more remote and rugged drainages that were inaccessible during night surveys. The Santa Rosa Plateau may be an appropriate area for the reintroduction of RAAU because it has remained largely free of bullfrogs and contains suitable breeding habitat. Habitat value for RAAU and other native species (e.g., arroyo toad; *Bufo californicus*) in Core Areas that are infested with bullfrogs would be greatly enhanced by their removal. No reintroduction of RAAU should be considered for areas currently infested until management actions have removed local bullfrog populations.

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USGS Protocol for Nocturnal Aquatic Species of South Coast Ecoregion Rivers, Streams, and Creeks

Survey Protocol, version 1



**U.S. DEPARTMENT OF THE INTERIOR
U.S. GEOLOGICAL SURVEY
WESTERN ECOLOGICAL RESEARCH CENTER**

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USGS Protocol for Nocturnal Aquatic Species of South Coast Ecoregion Rivers, Streams, and Creeks

U.S. GEOLOGICAL SURVEY
WESTERN ECOLOGICAL RESEARCH CENTER

Survey Protocol, version 1

Sacramento, California
2006

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Recommended Citation:

U. S. Geological Survey. 2006. USGS protocol for nocturnal aquatic species of south coast ecoregion rivers, streams, and creeks. U. S. Geological Survey protocol. San Diego, CA. 14 pp.

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1.0 INTRODUCTION

This document details a standard protocol for conducting nighttime inventory and monitoring surveys for aquatic species in river, stream, and creek systems in the south coast ecoregion of the United States (within the U. S. this extends from Santa Barbara, California to the Mexican boarder and from the sea to the tops of the mountains). The protocol was developed primarily for amphibians but may be used for other nocturnal aquatic and semi aquatic species as well. Nocturnal surveys may be prompted by and may accompany daytime surveys when daytime searches are insufficient to determine the presence of a species.

The protocol describes surveys that are to be conducted in 250 m segments of rivers, streams, and creeks. Segmentation of each survey area will provide a reasonable means of recording data that is representative of the entire site and will allow for detection probability analyses to be calculated. Surveys should be conducted at least one hour after sunset and during times of the year when the target species is most active. The precise timing will depend on the goals of the study and the biology of the target species. In southern California this will mean that surveys will generally take place between May and August, see U. S. Geological Survey (2006a).

In southern California, there are several amphibian species that may be encountered while conducting a nighttime stream survey. These include the following native anurans and caudates: California treefrog adults, larvae, and eggs (*Pseudacris cadaverina*), Pacific treefrog adults, larvae, and eggs (*P. regilla*), western toad adults, larvae, and eggs (*Bufo boreas*), red-spotted toad adults, larvae, and eggs (*B. punctatus*), arroyo toad larvae and eggs (*B. californicus*), spadefoot larvae and eggs (*Spea hammondi*), red-legged frog adults, larvae, and eggs (*Rana draytonii*), and non-natives: bullfrog adults, larvae, and eggs (*Rana catesbeiana*). In this protocol we assume that prior to conducting a survey, surveyors have familiarized themselves with background information and the biology of the target species in order to form a good search image and know where to look for that species. For information on the key characteristics, natural history, and biology of your target species we suggest referring to Stebbins, 2003, and “A Field Guide to the Reptiles and Amphibians of Coastal Southern California <http://www.werc.usgs.gov/fieldguide/>.”

2.0 PURPOSE

Currently, aquatic inventory and monitoring surveys are conducted regularly across the ecoregion by a large number of biologists from federal and state agencies, educational institutions, and non-governmental organizations throughout Los Angeles, San Bernardino, Riverside, and San Diego Counties. Survey methods and data collection differ greatly among biologists and across sites. Because of this, we are often unable to establish detection probabilities requiring standard survey techniques, to analyze what factors influence probabilities of detection for various species, or to build predictive or explanatory species models in an area or region. The purpose of this protocol is to provide a standard means of taking measurements and recording data so that changes reflected in these data are the result of natural phenomena and not because of changes in the way different individuals collect and record these data (Oakley et al., 2003). Standardizing data collection methods will also allow for data comparisons to be made across all parties and agencies using these methods (Oakley et al., 2003). The specific data collection methods described herein are intended for the purpose of quantifying information on the location and biology of amphibian species throughout the south coast ecoregion.

3.0 PROTOCOL ORGANIZATIONAL OVERVIEW

This protocol is arranged in chronological order using a step-by-step procedure of what to do before, during, and after a survey. We begin with pre-survey preparation, including making a survey map, preparing a field kit, and navigating to a site. We then describe which data are to be collected and the techniques used to collect them. We follow with post-survey procedures such as disinfecting and storing equipment, and correcting and storing data. Appendices have been added at the end of this document to provide more detailed information on data definitions (Appendix 1), an example of a paper data form (Appendix 2), and additional references and resources (Appendix 3). When performing certain procedures and measurements within this protocol, special equipment may be needed. For methods of implementing these special procedures, and care and use of required instruments we refer the reader to additional protocols found in U. S. Geological Survey, Vertebrate Sampling Protocols for Basic Procedures (2006b). This manual of basic procedures will be provided as supplementary material to this protocol for those requesting the information.

As procedures, equipment, and survey techniques improve, this protocol may be revised periodically to ensure that the most effective means of surveying and data collection are utilized

4.0 PRE-SURVEY PROCEDURES

4.1 Preparing a Survey Map

Prior to each survey, each survey site must be “pre-defined” in the USGS database before you can collect data in a standardized manner. The term “pre-defined” in this protocol means that the survey start and end points have been determined, that the linear stream area between the start and end points has been divided up into 250 m segments, and that all associated information (i.e., drainage, location name, datum, GPS, and elevation of each segment) have been linked to each segment and location name. Many sites within the south coast ecoregion have already been pre-defined. Check with the individual project lead for the status of your site and request that it be pre-defined if it has not already been done. If you are a project lead and need to pre-define a survey site, please refer to U. S. Geological Survey (2006b) Module 4. Once a site is pre-defined, you will have a map of your survey site that shows the entire survey area divided into 250 m survey segments. You will use these same start and end points and 250 m survey segments for repeated surveys, thus making it possible to standardize how our data are being collected and analyzed.

4.2 Preparing a Field Kit

Prepare or inspect the field kit. Make sure batteries are fresh and there are sufficient extras. Familiarize yourself with the GPS unit. Make sure coordinate system and datum are set. USGS recommends using the datum WGS84 (NAD83 is also acceptable). The coordinates should be recorded in decimal degrees or hddd.ddddd°.

Survey Kit:

1. Handling permit (if required)
2. Copy of protocol
3. Map with survey segments on it
4. GPS unit with accompanying list of coordinates
5. PDA (Personal Digital Assistant) with field forms (or paper data forms). *Note: bring backup paper data forms incase of PDA technical difficulties.*

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6. Light (Flash light, headlamps, etc.)
7. USGS field key for aquatic species and / or Stebbins 2003 field guide
8. Digital camera
9. Thermometer (for measuring air and water temperatures)
10. Metric ruler
11. Hand lens (USGS recommends magnification of at least 10X)
12. Alcohol-proof permanent pens (we generally use VWR[®] markers)
13. Extra batteries (AA, AAA, D) depending on equipment
14. Bleach and extra water for disinfecting equipment that has come in contact with animals or water, see U. S. Geological Survey (2006b) Module 1
15. Waders / water shoes
16. Safety and first-aid kit
17. Cell phone (optional)

If you have a handling permit bring the following (as needed for collecting specific biological information):

18. Surgical gloves
19. Dip net, electroshocker, waterscope, seine, etc., (as needed to detect target species)
20. 50 ml vials of 95% ethanol (for collecting any dead specimens and cleaning small instruments). Bring enough to accommodate more than the anticipated number of specimens you intend to collect.
21. Zip-lock baggies (1-gallon and 1-quart size). Bring enough to accommodate more than the anticipated number of animals you intend to examine.
22. Pesola[®] spring scales, see U. S. Geological Survey (2006b) Module 8
23. PIT-tags, see U. S. Geological Survey (2006b) Module 2
24. PIT-tag reader and applicator, see U. S. Geological Survey (2006b) Module 2
25. 1.5 ml tissue vials, see U. S. Geological Survey (2006b) Module 3
26. Toe snips or surgical scissors, see U. S. Geological Survey (2006b) Module 6
27. Swabs and swab vials for chytrid testing, see U. S. Geological Survey (2006b) Module 7

4.3 Navigating to a Site and to Each Segment

Use your GPS unit to navigate the vehicle(s) closest to the beginning of the site by selecting the “GO TO” button for the beginning coordinates for the segment. On foot, navigate to the start point of the site. Since the coordinates are typically figured using a topographical mapping program (TOPO![®]) you can expect there to be some positioning error and you may need to adjust your position accordingly to place yourself in or adjacent the stream channel. Whenever possible, start downstream and work your way upstream. This prevents stirred up debris from traveling ahead of you which may alert the animals to your presence before you approach and also decrease your visibility within the creek making it difficult to detect animals. At the beginning of each survey segment press the “GO TO” button and select the end point of that 250 m segment (also the start point of the next 250 m segment) and keep track of your distance walked as you survey so you do not overshoot that end point. Different habitat and site data will be recorded at the beginning and the end of each 250 m segment while animals encountered will be recorded throughout the survey segment.

5.0 SURVEY PROTOCOL

5.1 Initial Survey Data

At the start of each 250 m survey segment, data needs to be recorded prior to walking up the creek and looking for animals. Initial survey data include site and block name, weather, and water temperature. Data fields are presented in the digital PDA forms format. If using paper data forms, you will be manually recording these data fields.

At the start of each survey site, start a new “Stream Survey Form”. The data fields at the top of the form relate to where, when, who, why, and how.

1. Survey ID: (self generating)
2. Date: (self generating)
3. Survey Type: Select from the menu that you are conducting a NIGHT survey.
4. Survey Method: Select all of the survey methods used during the survey. (The options are: visual encounter, seine, dip net, funnel / minnow trap, call survey, and other).
5. Project: Record the project code for which the data are being collected. (Obtain the correct project code from the project lead).
6. Observer: Record the names of each person on the survey. (You may choose from a drop-down list in your PDA or manually write in the name. Talk to your project lead to have your name added to the lookup list.)
7. Site Visit: Hit “add” to open to a new form to begin entering site survey data.
8. Notes: Enter any additional relevant information about the site.

The screenshot shows a PDA screen titled "StreamSurvey". It contains several data entry fields: "SurveyID" with the value "CC6-19", "Date" with "3/27/06", "SurveyType" with a downward arrow, "Survey Method" with a checkbox, "Project" with a dropdown arrow, "Observer" with a dropdown arrow and a checkbox, "SiteVisit" with a dropdown arrow and a checkbox, and "Notes" with a dotted line for input. At the bottom, there is an "End" button and four navigation arrows (left, right, double left, double right).

The next section of the Stream Survey Form includes site location information, along with several additional site descriptors. If using the PDA, some of these variables will be pre-defined for the survey site and will automatically generate when you choose your site name and segment.

1. Block: Chose the “block name” (= the name of your site) from the drop down menu.
2. Site: Select the name of the 250 m segment from the pre-defined list (scroll to the name in your PDA or write down the name that was assigned to the site when it was pre-defined).

The screenshot shows a PDA screen titled "Lookup" with a sub-header "> NewSSBlock". Below this is a list of block names: "Sycamore Canyon", "Piute Creek", "Darwin Falls", "Test1234", "TEST2345", "Cajon Wash", "Deep Creek Devil's Hole", "Deep Creek Hot Springs", and "Deep Creek Mojave Forks Dam". At the bottom, there is a "Lookup:" field and a "Cancel" button.

The screenshot shows a PDA screen titled "Lookup" with a sub-header "> NewSSSite". Below this is a list of site names: "Reach 79, Deep Creek Devil's Hole", "Reach 80, Deep Creek Devil's Hole", "Reach 81, Deep Creek Devil's Hole", "Reach 82, Deep Creek Devil's Hole", "Reach 83, Deep Creek Devil's Hole", "Reach 84, Deep Creek Devil's Hole", "Reach 85, Deep Creek Devil's Hole", "Reach 86, Deep Creek Devil's Hole", and "Reach 87, Deep Creek Devil's Hole". At the bottom, there is a "Lookup:" field and a "Cancel" button.

Note: At this point the “Block” and “Site” you entered become the “Survey Name” and the predefined latitude / longitude, elevation, datum, drainage, and site length are generated for that record. If using the paper form these fields must be entered by hand.

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3. Lats & Longs: If you have correctly pre-defined the site, the start and end coordinates of each survey and 250 m segment will be generated by the PDA. (If you do not have a PDA, enter data by hand in the fields for latitude, longitude, elevation, EPE, and datum on your paper data sheet).
4. Start Time: The time at which survey efforts began must be recorded. (Note: You will not be able to select anything within this form until you enter your “start time”).

SiteID061505124

StartLat	34.30148
StartLong	-117.12562
Start Elev, m	4205
EndLat	34.3001
EndLong	-117.12438
End Elev, m	4270
Datum	WGS84
Drainage	
Slope, degrees	
Site Length, m	250
Permanency	

End [Navigation Buttons]

Reach 83, Deep Creek Devil

SurveyName	Reach 83, Deep Cre
Lats & Longs	<input type="checkbox"/>
StartTime	- No Time -
Weather	<input type="checkbox"/>
Site Photo	<input type="checkbox"/> Y <input type="checkbox"/> N
Water	<input type="checkbox"/>
Animals	<input type="checkbox"/> <input type="checkbox"/>

StartTime

03 : 55 [Up] [Down] AM PM

OK Cancel

5. Weather: Enter weather condition, and wind speed using the drop down menus. Also write in the air temperature.
 - a) Weather Conditions: Select the general sky conditions. The options are: clear or few clouds, partly cloudy or variable, cloudy or overcast, fog, mist or drizzle, showers or light rain, heavy rain, sleet or hail, snow, and no data.
 - b) Air Temperature: Measure air temperature (in degrees Celsius). Record temperature 1 m off the ground in the shade.
 - c) Wind Speed: Report the general wind speed based on the Beauford scale. The options are: ≤ 1 mph = calm, smoke rises vertically; 2 - 3 mph = light air movement, smoke drifts; 4 - 7 mph = light breeze; 8 - 12 mph = gentle breeze leaves / small twigs in constant motion, raises dust; 13 - 18 mph = moderate breeze, small branches move; 19 - 24 mph = fresh breeze, small trees begin to sway; 25 - 31 mph = strong breeze, large branches move; 32 - 38 mph = near gale, large trees begin to sway, noticeably difficult to walk; ≥ 39 mph = gale and above; and no data.
 - d) Weather Notes: Enter any additional relevant weather information here (i.e., if there were any changes in the weather patterns such as rain during the middle of the survey).
 - e) Show All: The show all button brings up additional fields that are not required for the general stream survey protocol. Ask your project lead if you need to record any additional data for your specific project.

NewSSWeather

WthrCond

- Clear or few clouds
- Partly cloudy or variable
- Cloudy or overcast
- Fog
- Mist or drizzle
- Showers or light rain
- Heavy rain
- Sleet or Hail
- Snow

Cancel

NewSSWeather

0

WthrCond	0
Air Temp	15
Wind	0
Weather Notes	

Show All (Show All)

End [Navigation Buttons]

NewSSWeather

Wind

- <1 MPH, CALM
- 2-3 MPH, LIGHT AIR MOVEMENT
- 4-7 MPH, LIGHT BREEZE
- 8-12 MPH, GENTLE BREEZE
- 13-18 MPH, MODERATE BREEZE
- 19-24 MPH, FRESH BREEZE
- 25-31 MPH, STRONG BREEZE
- 32-38 MPH, NEAR GALE
- >39 MPH, GALE AND ABOVE

Cancel

5.2 Water Data

When water is encountered, usually at the start of the survey site, you will record a water temperature and the coordinates of where the water is. Before taking water temperature, look for any aquatic species within or next to the water. Document the species before recording water temperature (see section 5.3). The following fields appear when you select “Water” in the “Stream Survey Form.”

1. Water Present: Yes / No, is water present along the study site? If you encounter water, then record the water temperature and GPS location of the water.
2. Water Temperature: Place your thermometer 10 cm below the surface of the water (if possible) in an area that is representative of the creek, (i.e., not in a backwater pool or side channel where temperatures would be expected to be warmer). Leave the thermometer under water for a minute or so and record the temperature once the thermometer reading has stabilized.
3. Lat / Long: Select Lat / Long field and hit “GPS Grab” in the form that pops up. This will generate your GPS location, elevation, estimated positioning error (EPE) and datum for where you are recording water quality data. (Make sure your GPS is connected to your PDA. If you do not have a GPS cable to connect to your PDA you may enter data by hand in the fields for latitude, longitude, elevation, EPE, and datum).
4. Remarks: Record any relevant or unusual notes pertaining to water, equipment readings or conditions.
5. Show All: The show all button brings up additional fields that are not required for the general stream survey protocol. Ask your project lead if you need to record any additional data for your specific project.

5.3 Search Methods and Survey Techniques

Start slowly walking up the stream channel, either in the water or immediately adjacent to the water. In addition to looking for your target species you need to make sure to document any other native or non-native aquatic species observed. For example, include all life stages of other amphibians and / or larvae, turtles, snakes, newts, fish, crayfish, Asian clams, beavers and beaver sign. (See expected species list in PDA or paper data form for common species, and field guides for proper identification).

1. Visual encounter: Carefully search the water, especially in pools, along shoreline, and near aquatic refugia for eggs, tadpoles, fish and adult amphibians. Identifying eye shine is an effective technique to detect nocturnal amphibians. This can be used by placing the light source near the observer’s eyes and scanning the banks, especially vegetated areas. Floating material can be gently moved back with finger or stick to look underneath. Look ahead often to spot frogs resting on the banks that may leap into water when they hear or see you coming.
2. Dip Netting: Dip netting is most effective during the day but can be used at night as well to determine if species are present. Some fish, tadpoles, and other animals can be found at the edge or in the bottom mud of pooled water, in aquatic vegetation and under ledges along the perimeter of pools. When encountering deep pools and aquatic refugia, first visually check for any aquatic animals or egg masses. If no eggs are seen, you may take long sweeps with the dip net through these areas. Gently sweep the net along the bottom and sides of the pool or refugia, then check the net for aquatic species by carefully sifting

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through any mud and debris brought up from the bottom. We recommend using two sizes of nets, a large fish net with a long handle for sweeping deep pools and a small aquarium size net for small fish and tadpoles. Do not disturb any egg masses with dip nets. Capturing tadpoles and fish with a dip net is also a useful method to observe animals more carefully, take voucher photos, and make positive identifications. Special state and federal permits may be required for capturing and handling any listed species.

3. Call Surveys: Many amphibians are most often heard calling at night. Always be listening for calls (Davidson, 1995) and for the sound of animals jumping into the water.

5.4 Animal Records

For this protocol we do not require that every single animal encountered be entered in the animal records, but that you enter an animal record the first time you encounter any species or life stage of that species within the 250 m segment. If you have specific questions pertaining to a particular species you may want to record it more than once per segment depending on your research goals. The first time you encounter any life stage of any species within the 250 m segment record the species and its age class in the animal form as follows: (Several additional data fields are included, not all of which are required).

1. Type: Select from the drop down menu whether the animal is a fish, frog, turtle, bird, invertebrate, etc.
2. Species: Record each life stage of each species the first time it is encountered within the 250 m segment by selecting that species from the drop down list.
3. Lat / Long: Perform a GPS grab (if using a PDA and have a GPS attached) at the first observation of the target species within the segment, or write in the GPS location including elevation, EPE and datum in the PDA fields provided or on your paper data sheet.
4. Age: Record the age category of the animals detected. Each age category should be recorded as a separate record. The options are Adult, Juvenile, Metamorph, Tadpole, 2nd Year Tadpole, Hatchling, Egg Mass, and Unknown.
5. Swab: (This field will show up only if you are recording an amphibian). Select yes or no (Y / N) if you swabbed the individual for chytrid fungus or a DNA sample, see USGS (2006b) Module 8.
 - a. Swab ID: Enter the swab identification number of your individual, see USGS (2006b), Module 8.
6. Disposition: Select the checkbox indicating if your animal was released (R), dead (D), or escaped (E).
7. Photo: Select yes (Y) if you took a photo of your animal or no (N) if you did not.
 - a. # of photos: Write in how many photos of that individual were taken.
8. Location Within Habitat: Select from the drop down menu the location within the habitat in which the animal was found. The options are pool, run, riffle, bank, upland, splashzone, and other. If you choose “other” please indicate what that is.
9. Animal Behavior: Select from the drop down menu any behaviors you observed the individual doing. The options are calling, basking, foraging, mating, hiding, and other. If you choose “other” please indicate what that is.
10. Notes: Record any pertinent information that does not fit into one of the other data fields.

The image shows a screenshot of a PDA application titled "NewSSpeciesData". The form contains the following fields and controls:

- Animal Record ID: A text input field with a small icon to its right.
- Type: A dropdown menu.
- Species: A dropdown menu.
- Lat/Long: A text input field with a small icon to its right.
- Age: A dropdown menu.
- Disposition: A row of three checkboxes labeled R, D, and E.
- Photo: A row of two checkboxes labeled Y and N.
- Location within hab: A dropdown menu.
- Animal Behavior: A dropdown menu.
- Notes: A text input field.
- Show all: A button with the text "click".
- End: A button.
- Navigation: Three arrow buttons (back, forward, and a double arrow button).

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11. Show All: The show all button brings up additional fields that are not required for the general stream survey protocol. Ask your project lead if you need to record any additional data for your specific project.

5.5 Ending a 250 m Segment

In the section labeled Site Closeout Fields, record information on the wetted portion of the site and any disturbances found at the site.

1. End Time: Enter the time that you finished surveying the segment.
2. Percent Wet Length of Survey: Record the percentage of the length of the 250 m segment that was wetted by selecting a range from the dropdown menu.
3. Disturbance Type: Document any disturbance seen and record the nature of the disturbance that was at the study site. Check all that apply (e.g., heavy foot traffic, trash, road / vehicle crossings, fire, etc.)
 - a. Intensity of Disturbance: Estimate the level of the disturbance across the 250 m segment as a whole. The options are light, moderate, and heavy.
4. Notes: Add any relevant information on the stream properties that have not yet been recorded.

Field 19 of 21	
Disturbance type(s)	
<input checked="" type="checkbox"/>	Hiking
<input checked="" type="checkbox"/>	Fishing
<input type="checkbox"/>	Trash
<input checked="" type="checkbox"/>	ORV use
<input type="checkbox"/>	Wading/bathing
<input type="checkbox"/>	Construction

In the section labeled Species List, use the check boxes to enter all of the species seen, all of the species expected to be seen, and which of the species were not expected to be seen in that particular habitat.

5. Species List: This keeps track of which species were expected and which were actually observed during the survey. Check appropriate boxes for species detected, surveyed, and not detected, and / or not surveyed or not detected. (See Appendix 3 for choices).
6. Notes: Enter any other relevant information to the survey that you have not yet recorded.
7. Show All: The show all button brings up additional fields that are not required for the general stream survey protocol. Ask your project lead if you need to record any additional data for your specific project.

3226305233			
Pacific Chorus Frog	D	N	X
Western Toad	D	N	X
California Newt	D	N	X
Southwestern Toa	D	N	X
Mosquitofish	D	N	X
Crayfish	D	N	X
California TreeFro	D	N	X
Bullfrog	D	N	X
African clawed frog	D	N	X
Notes		

6.0 POST-SURVEY PROCEDURES

When you are finished with your field survey there are several post survey procedures that must be completed to 1) prevent the spread of biological pathogens, and 2) to ensure that your data are correct and can be read by anyone requesting it.

1. Immediately after returning from the field, all equipment coming in contact with water or mud (i.e., boots, dip nets, seine nets, plastic specimen containers) must be thoroughly disinfected in a 16:1 water / bleach mixture to prevent moving pathogens between study sites.
2. Review and check the quality assurance / quality control (QA / QC) of the data from your surveys. Correct any mistakes.
3. Enter data into the USGS database. (This entails HotSyncing from your PDA or hand entering data from your paper form).

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4. Label photographs and send to project lead.
5. Get positive species identifications from experts if needed.

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LITERATURE CITED

- Davidson, C. 1995. Frog and toad calls of the Pacific Coast. Library of Natural Sounds, Cornell Laboratory of Ornithology, Ithaca, New York.
- Oakley, K. L., L. P. Thomas, and S. G. Fancy. 2003. Guidelines for long-term monitoring protocols. *The Wildlife Society Bulletin* 31(4):1000-1003.
- Stebbins, R. C. 2003. A field guide to western reptiles and amphibians, Third edition. Houghton Mifflin Company, Boston, Massachusetts. 533 pp.
- U. S. Geological Survey. 2006a. USGS Aquatic species and habitat assessment protocol for south coast ecoregion rivers, streams, and creeks. U. S. Geological Survey protocol. San Diego, CA. 48 pp.
- U. S. Geological Survey. 2006b. USGS vertebrate sampling protocols for basic procedures and equipment use. U. S. Geological Survey protocol. San Diego, CA. 30 pp.

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Appendix 1: Data definitions.

Block (also, Site Name): The name of the survey area given to that area when the site was pre-defined. Block or site names should remain consistent from visit to visit, (ask the project lead if you are uncertain of the names).

Drainage: The area of land that drains water, sediment, and dissolved materials to a common outlet at some point along a stream channel (www.environmentalencyclopedia.com). The name of the watershed in which the survey area lies.

Expected Species: Species that are known to be in the area and whose presence can be reasonably expected based on the presence of basic habitat (e.g., water).

Project Code: A unique alpha-numeric code assigned by USGS BRD, San Diego to each of our projects for the purpose of organizing projects, billing project accounts and retrieving data.

Segment: A stretch of creek 250 m in length that had been pre-defined by the project lead. Each survey area has been divided into 250 m segments. Each segment should have been given a unique name so that the surveyor always knows which section of the survey area they are in.

Survey Type: For the stream survey protocol, survey type refers to whether a day survey or a night survey was conducted.

Survey Method: The methods you will be using to collect data (e.g., visual encounter, seine, dip net, funnel/minnow trap, call survey).

Appendix 2. Paper data form (continued).

Landscape/Vegetation:																																																													
Channel width / bankfull (m) _____ Flood prone width _____ Entrenchment Ratio _____ (flood plain width / bankfull width) Basking areas present: <u>Y / N</u> Choose all that apply: (sunny rocks, open banks, fallen logs, other) % overhead canopy <u>0%, 1-10%, 11-25%, 26-50%, 51-75%, 76-100%</u>	Upland Community _____ Riparian Community _____ Dominant Riparian Plants (top 3) Species 1: _____ Species 2: _____ Species 3: _____																																																												
Bank Substrate (Record top 3): clay <u>0%, 1-10%, 11-25%, 26-50%, 51-75%, 76-100%</u> dirt <u>0%, 1-10%, 11-25%, 26-50%, 51-75%, 76-100%</u> sand <u>0%, 1-10%, 11-25%, 26-50%, 51-75%, 76-100%</u> gravel <u>0%, 1-10%, 11-25%, 26-50%, 51-75%, 76-100%</u>	pebbles <u>0%, 1-10%, 11-25%, 26-50%, 51-75%, 76-100%</u> cobble <u>0%, 1-10%, 11-25%, 26-50%, 51-75%, 76-100%</u> boulder/bedrock <u>0%, 1-10%, 11-25%, 26-50%, 51-75%, 76-100%</u> leaf litter <u>0%, 1-10%, 11-25%, 26-50%, 51-75%, 76-100%</u> fallen logs/sticks <u>0%, 1-10%, 11-25%, 26-50%, 51-75%, 76-100%</u>																																																												
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% wet length of survey <u>0%, 1-10%, 11-25%, 26-50%, 51-75%, 76-100%</u> % reach with shallow pooling water <u>0%, 1-10%, 11-25%, 26-50%, 51-75%, 76-100%</u> % reach with medium pooling water <u>0%, 1-10%, 11-25%, 26-50%, 51-75%, 76-100%</u> % reach with deep pooling water <u>0%, 1-10%, 11-25%, 26-50%, 51-75%, 76-100%</u>																																																													
Plunge pools present <u>Y / N</u> # of plunge pool _____ Aquatic refugia present <u>Y / N</u> Choose all that apply: Undercuts, tree roots, woody debris, rock crevices, aquatic submerged vegetation, emergent veg, floating material																																																													
Aquatic Substrate (Record top 3): clay <u>0%, 1-10%, 11-25%, 26-50%, 51-75%, 76-100%</u> silt <u>0%, 1-10%, 11-25%, 26-50%, 51-75%, 76-100%</u> sand <u>0%, 1-10%, 11-25%, 26-50%, 51-75%, 76-100%</u> gravel <u>0%, 1-10%, 11-25%, 26-50%, 51-75%, 76-100%</u>	pebbles <u>0%, 1-10%, 11-25%, 26-50%, 51-75%, 76-100%</u> cobble <u>0%, 1-10%, 11-25%, 26-50%, 51-75%, 76-100%</u> boulder/bedrock <u>0%, 1-10%, 11-25%, 26-50%, 51-75%, 76-100%</u> leaf litter <u>0%, 1-10%, 11-25%, 26-50%, 51-75%, 76-100%</u> fallen logs/sticks <u>0%, 1-10%, 11-25%, 26-50%, 51-75%, 76-100%</u>																																																												
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Appendix 3. Additional references and resources.

Contact Information:

For questions and comments on this protocol (including additional information, modular protocols, and supplementary materials): chitchcock@usgs.gov, abacklin@usgs.gov

Additional Reference Material:

Lannoo, M., Ed. 2005. Amphibian declines: The conservation status of the United States species. Berkeley, CA, University of California Press. 1094 pp.

Stebbins, R. C. 2003. A field guide to western reptiles and amphibians. Boston, Massachusetts, Houghton Mifflin Company. 533 pp.

Wright, A. H. and A. A. Wright. 1995. Handbook of frogs and toads of the United States and Canada. Ithaca, New York, Comstock Publishing. 640 pp.

Internet Resources:

A field guide to the reptiles and amphibians of coastal southern California:

<http://www.werc.usgs.gov/fieldguide>

California's plants and animals: <http://www.dfg.ca.gov/hcpb/species/species.shtml>

eNature wildlife field guide: <http://www.enature.com/home/>