

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

Mountain Yellow-Legged Frog (*Rana muscosa*)
Survey Report 2005



July 7, 2006
(Revised September 19, 2006)

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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 of 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 and the Wildlife Agencies (i.e. 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 MSHCP information needs identified in Section 5.3 or elsewhere in the document, and the information needs of the Permittees.

The primary preparer of this report was the 2005 amphibian Field Crew Leader, Shirley Bartz. 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 Western Riverside County Regional Conservation Authority. For further information on the MSHCP and the RCA, go to www.wrc-rca.org

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OVERVIEW

There are four Covered stream-dependent amphibian species with species objectives requiring the determination of successful reproduction within the MSHCP Conservation Area that can be detected by visual encounter surveys: arroyo toad (*Bufo californicus*), California red-legged frog (*Rana aurora draytonii*), mountain yellow-legged frog (*Rana muscosa*), and coast range newt (*Taricha tarosa tarosa*). In 2005, the Monitoring Program coordinated with the U.S. Geological Survey (USGS) on a stream survey protocol to assess the quality of stream habitats for the above Covered amphibian species. Stream assessment surveys were conducted in accessible waterways in the Conservation Area between May and December 2005. Surveys for Covered amphibians generally used the same protocol (with the exception of night surveys for California red-legged frog), but differed in the waterways surveyed and time of year surveys took place. This report describes methodology and survey results for mountain yellow-legged frog only. Individual survey reports have been prepared for coast range newt, California red-legged frog, and arroyo toad and are not discussed further in this report.

INTRODUCTION

The mountain yellow-legged frog (*Rana muscosa*, “MYLF”) is federally listed as endangered and is a California species of special concern. This species has narrow habitat requirements and a limited distribution within generalized Core Areas of the Plan Area. These Core Areas include riparian and adjacent upland habitat above 370 meters at the North Fork of the San Jacinto River (including Dark Canyon), Hall Canyon (a section of upper Indian Creek), Fuller Mill Creek, and other perennial waterways of the San Jacinto Mountains. Species objective 6 for MYLF states:

“within the MSHCP Conservation Area, Reserve Managers will maintain successful reproduction as measured by the presence/absence of juvenile frogs, tadpoles, or egg masses populations once a year for the first five years after permit issuance and then as determined by the Reserve Management Oversight Committee”. (Dudek and Associates 2003).

Survey Goals

The intent of surveys in 2005 was to survey known breeding locations within Core Areas and other potentially suitable habitat in accessible areas of the Conservation Area. Specifically, our surveys goals were to:

- A) Document MYLF breeding locations in Core Areas and as many other suitable habitat locations as possible within the Plan Area.
- B) Collect data to estimate occupancy in the area of inference (surveyed streams and similar habitat).
- C) Gather data on habitat characteristics preferred by MYLF and its presence in surveyed waterways to test habitat suitability and associations with the target species.
- D) Evaluate protocol and provide input on changes/additions to field methodology for future surveys.

- E) Share survey data with Reserve Managers who will evaluate the information and take steps to change or maintain management strategies.

METHODS

Protocol Development

The USGS Western Ecological Research Center, San Diego Field Station drafted the protocol, *Aquatic Species and Habitat Assessment Protocol for Southcoast Ecoregion Rivers, Streams, and Creeks* (USGS 2005), which was used by the Monitoring Program for amphibian stream surveys in 2005. Minor revisions were made to the protocol to ensure it would meet the requirements of the MSHCP species objectives for MYLF and other Covered amphibian species. Since the protocol has not been finalized by USGS, it was not included as an Appendix to this report. A copy of the protocol can be found in the Monitoring Program office or by contacting USGS directly.

Personnel and Training

All field observers took part in discussions of and training in the use of the USGS amphibian survey protocol on 27 July 2005. Lead surveyor training included observation and capture of live adult and larval mountain yellow-legged frogs. Training took place in Dark Canyon at a field site where a known breeding population of MYLF is found. USGS amphibian biologists guided a mock survey, where identification, handling, and measurement techniques were demonstrated. Other amphibian crew members also attended the USGS training session and were accompanied by lead surveyors on all stream surveys during which time identification skills were tested and verified. Surveyors conducting MYLF surveys in 2005 included:

- Adam Malisch (Regional Conservation Authority)
- Shirley Bartz (Regional Conservation Authority)
- Debbie De La Torre (Regional Conservation Authority)
- Christine Rothenbach (Regional Conservation Authority)
- Ricky Escobar (California Department of Fish and Game)
- Annie Bustamante (California Department of Fish and Game)
- Rosina Gallego (California Department of Fish and Game)
- Karin Cleary-Rose (U.S. Fish and Wildlife Service)
- Brian Root (U.S. Fish and Wildlife Service)

Study Site Selection

Concurrent MYLF surveys by the USGS and the U.S. Forest Service (USFS) led to a collaborative survey effort, whereby MSHCP surveys occurred in Core Areas of the Conservation Area, but did not overlap or duplicate efforts of USGS and USFS. Study sites were chosen using a GIS map of historic detection locations. Surveys were divided between the Biological Monitoring Program, USGS, and USFS and were conducted within accessible lands in all three Core Areas of the Plan Area. Core Areas included perennial waterways of the San Jacinto Mountains above 370 meters. Historic and recent locations of MYLF populations were

surveyed by USGS biologists. Biological Monitoring Program biologists surveyed waterways up or downstream of historic locations in Core Areas, as well as areas of potentially suitable habitat.

In addition to surveying Core Areas in the MSHCP Plan Area, Biological Monitoring Program biologists identified and surveyed suitable habitat using habitat characteristic descriptions in the MSHCP species account for MYLF. Selection characteristics included streams with:

- waterways at moderate to high elevations
- open margins that slope gently up to depths of 5 – 8 cm
- sloping banks and rock or vegetation close to the water's edge
- large clear pools up to three feet in depth and no shallower than will allow adults to overwinter beneath ice
- rocky bottoms where adults and tadpoles can take refuge
- no floating algae, stagnant water, or predatory fishes

Survey Methods

Detailed survey methodology is described in *USGS Aquatic Species and Habitat Assessment Protocol for Southcoast Ecoregion Rivers, Streams, and Creeks* (USGS 2005). All waterways (main creeks and tributaries) to be surveyed were sectioned into 250m segments, with segment numbers (i.e., Reach 1, Reach 2, etc.) beginning at a downstream confluence with a larger order waterway. Visual encounter surveys were conducted along stream banks and within the channel from downstream to upstream areas by at least two surveyors. All surveys were conducted in daylight hours. Survey time per segment varied according to streambed characteristics and abundance of amphibians detected. MYLF surveys were conducted from 29 July to 13 September 2005, between the hours of 0900 and 1600.

All amphibians encountered, including common species, were sampled using visual encounter and dip-net techniques. At the first encounter of each life stage (tadpole, juvenile, adult) for all species detected, physical and behavioral data were collected and UTM coordinates were saved as waypoints in a GPS unit. Waypoints included a creek name code, tributary number, and reach (segment) number (Example: FM1R6 = Fuller Mill Creek, trib 1, reach 6) and were linked to a time and date.

Data on habitat characteristics were collected at the beginning and end of each surveyed segment. Data collected at the beginning of each surveyed segment included: date, observer, time, general weather description, temperature in shade at 1m above ground, average wind speed, presence/absence of water, water temperature, pH, percent dissolved oxygen, mg/L dissolved oxygen, conductivity, wetted depth and width of stream channel, water velocity and number of wetted channel braids. Data collected at the end of a survey included: presence and name of exotic plant species, percent wet length, percent shallow, medium and deep pools, presence and number of plunge pools, presence and type of aquatic refugia, type of the three most common aquatic substrates and percent coverage of each type throughout the segment, presence and type of recent disturbance.

Data Analysis

The intent of the 2005 survey effort was to locate breeding populations of MYLF in the MSHCP Core Areas to meet MSHCP species objectives. In subsequent years where there is budget and crew available, data analyses will include a calculation of Proportion of Area Occupied (PAO, see MacKenzie et al. 2002). Calculation of PAO requires multiple visits to survey locations. Because we wanted to survey as many stream segments as possible, only single visits were made to each stream segment in 2005. PAO will provide us with the detection probability of MYLF in surveyed creeks, which will in turn allow us to estimate MYLF occupancy in the area of inference (i.e., surveyed streams and similar habitat).

In addition to PAO, analyses of habitat characteristics and association of MYLF with predicted habitat variables will be conducted as sample size allows (estimated to follow 2006 field season). Habitat characteristics noted in the MSHCP as being strongly associated with presence of MYLF will be analyzed for associations between presence (or non-presence) of the focal species.

Raw data are housed in the USGS database at the San Diego Field Station and at the Biological Monitoring Program office in Riverside.

RESULTS

Between the Biological Monitoring Program and USGS, eight waterways (three Core Areas and four areas of suitable habitat) within the MSHCP Plan Area were surveyed for MYLF in 2005, for a total of 99 segments (24.75 km). USFS also conducted surveys for MYLF in the San Jacinto Mountains, but results from those surveys are not included in this report. To reduce the pressure on current populations of MYLF, surveys of known populations were only surveyed by USGS in 2005. Details of survey results are presented below.

Results from Biological Monitoring Program Surveys

The stream segments surveyed by the Biological Monitoring Program were not known to contain populations of MYLF; they were up and downstream of known populations and other areas with suitable MYLF habitat. No MYLF adults, tadpoles or egg masses were found at any of the waterways surveyed by Biological Monitoring Program biologists (Figure 1, Table 1).

Habitat characteristic varied among waterways (Table 2). According to the MSHCP species account, MYLF prefer certain habitat characteristics. A list of the most consistently reported characteristics is provided in the Methods section. These characteristics include water transparency, large, clear pools approximately 1 meter deep with gently sloping banks and rocks or vegetation in the stream bed/bank, open stream margins (canopy cover), bank slope, bank and aquatic substrate, pool size and depth, and absence of stagnant water, floating algae, and predatory fishes. Variables measured in the field that pertain specifically to these characteristics include presence of medium/deep pools, water transparency, canopy cover, aquatic and bank substrates. Pool margin slope was not specifically measured (see discussion for recommendations for future surveys).

Of 39 segments surveyed, three had predatory fish present (Table 1). Water transparency was clear in all but two of 39 segments surveyed. Nearly half of all reaches surveyed had 51-75% canopy cover throughout the segment and about a quarter of all surveyed reaches had 76-100% canopy cover. Methods for measuring canopy cover may have varied (see suggestions for future study below). All segments surveyed had medium pools present, but less than half had deep pools present. Only 5% of reaches surveyed had deep pools throughout 76-100% of the segment. Dimensional measurements of individual pools throughout a segment were not collected (see recommendations for future surveys).

Estimates of most common bank and creek-bottom (aquatic) substrates and percent coverage of these substrates showed a trend toward a high boulder/bedrock component in both aquatic and bank substrates. Seventy-four percent (74%) of reaches surveyed had boulder/bedrock as the most common aquatic substrate. Eighty-one percent (81%) of reaches surveyed had boulder/bedrock as the most common bank substrate. The second and third most common aquatic substrates were cobble and gravel respectively. The second and third most common bank substrates were leaf litter and fallen logs respectively.

USGS Surveys

USGS biologists surveyed five waterways (three Core Areas) for a total of 50 segments (12,500 meters) within the MSHCP Plan Area. One hundred-ten (110) MYLF adults and tadpoles and 1 egg mass were detected in Fuller Mill Creek (2 segments), Dark Canyon (1 segment), and a tributary of Dark Canyon (3 segments) (Table 3).

Data on habitat characteristics were collected at four of the six creeks where MYLF was found in the MSHCP Plan Area. In all four creeks water transparency was clear, and three of the four had 51-75% canopy cover above the waterway. Only 25% of creeks with MYLF present had deep pools, and these occurred throughout 1-10% of the reach. All four creeks with MYLF present had medium depth pools present throughout > 25% of the reach and more often throughout >50% of the reach.

The most common bank and creek-bottom (aquatic) substrate was boulder/bedrock. Percent coverage of this substrate was present in greater than half the reach in all but one segment where MYLF was present. The second most common aquatic substrate was cobble, and which covered less than a quarter of the reach length. The second most common bank substrate was leaf litter, covering less than a quarter of the bank throughout most of the reaches.

DISCUSSION

All three Core Areas listed in the MYLF species account were surveyed in 2005, as well as an additional four areas of suitable habitat, for a total of 175 km of surveyed habitat. Species objective 6 requires the MSHCP to document and maintain evidence of MYLF breeding activity within the MSHCP Conservation Area. Because evidence of breeding MYLF was detected at Fuller Mill Creek and Dark Canyon, the species objective for MYLF was met in 2005. The

Monitoring Program will continue to conduct annual MYLF surveys for the first five years after permit issuance, as required by the MSHCP.

Habitat Characteristics

Of 10 habitat characteristics selected to indicate suitable MYLF habitat, those that tend to exclude MYLF (predatory fishes, crayfish) were largely absent from surveyed waterways in the MSHCP. Although canopy cover estimates were generally greater than 50%, estimation techniques need to be standardized and perhaps re-defined to describe cover at a smaller scale (i.e., inclusive of creek, mid, and upper-level canopy structure). Aquatic and bank refugia represented by boulders, cobble, and related rock crevices were readily available in all surveyed reaches. It has been suggested that MYLF populations in southern California may occur in streams and small pools where, in the fall, flow is reduced to a trickle and pools reduced to less than half a meter in depth and .75m in width (Zeiner et al. 1988, Mullay 1959). These conditions may sustain populations only if winter conditions are such that shallow pools do not freeze solid.

Overall, 2005 MYLF survey data reflect a presence of medium and deep pools, aquatic substrates that provide refugia for adults and larval MYLF, few stagnant or non-flowing waterways, and low numbers of exotic aquatic predators (i.e., fish, crayfish). Given the presence of these habitat characteristics, the data generally support the conclusion that many of the waterways in Core Areas within the MSHCP Conservation Area could support breeding populations of MYLF.

Recommendations for Future Surveys

Below is a list of recommendations for future surveys for MYLF in western Riverside County.

- 1.** Begin hiring crew earlier in season. Hiring and time constraints resulted in a reduction in the number of waterways surveyed. Amphibian surveys conducted in 2005 included four species with overlapping activity schedules such that the start date for MYLF surveys was delayed until the bulk of arroyo toad surveys were completed. If arroyo toad surveys had begun earlier, MYLF surveys would also have begun in a more timely fashion.
- 2.** Hire more field crew members. An increase in the number of crew available for teams of surveyors would improve survey timing described above.
- 3.** Collect data on microhabitat characteristics of pools including slope of bank/shorelines and whether rock or vegetation exists in proximity to the water's edge. Bank slope and bank refugia have been noted as important to adults, larvae, and post-metamorphs. Depth and size of pools available in a waterway has also been noted as important in terms of providing overwintering habitat for frogs. Fields for these variables need to be added to the datasheet.
- 4.** Incorporate landscape/vegetation communities that apply specifically to the MSHCP.

Many of the upland and riparian vegetation communities available for selection on the datasheet were not found in the Plan Area (e.g., San Diegan Sage Scrub). Amphibian surveyors would benefit from several pre-survey visits (accompanied by a botanist) with the express purpose of identifying and categorizing communities common to MYLF habitat.

5. Estimate canopy cover consistently. Since “open streams and lake margins” have been identified as a key habitat characteristic preferred by MYLF, it is important to estimate canopy cover above waterways in a manner that is both consistent among all surveyors and relevant to the species in question. Canopy/openness may affect water temperature, refuge for/from predators, water pH, and other elements of MYLF habitat. In all cases, canopy cover should be collected at a level that impacts frogs in the waterway. We suggest that cover estimates include any vegetative or fallen log material that obscures the line of sight from the top of the bank to the highest tree top. In this way, estimates of cover include the area inhabited by most terrestrial predators, as well as shrubs and small trees that may contribute to shade and organic material decomposing in the creek bed.

Data Sharing with Reserve Managers

Extreme winter precipitation in 2004-05 led to higher than average water levels in rivers and creeks of western Riverside County in 2005. It is highly probable that MYLF populations were effected by these high water levels. Increased water levels from March to July may have provided extended time for breeding and larval development, as well as greater food and cover availability for adult and juvenile MYLF. It is also possible that high water levels resulted in increased flow and scouring in channels where MYLF had previously bred or developed into adult life stages.

The results of our surveys for MYLF in 2005 indicate that MYLF populations are breeding at levels high enough and within specified areas to the degree to satisfy the species goals of the MSHCP. The preparation of this report is the first step in a process by which survey data and management recommendations will be made available by the Biological Monitoring Program to Reserve Managers. Depending on climatic and other variables in this year and the next, comparisons of breeding activity to be reported in 2006 may provide Reserve Managers with some indication of population trends.

REFERENCES

- Dudek & Associates. 2003. Western Riverside County Multiple Species Habitat Conservation Plan (MSHCP). Final MSHCP, Volumes I and II. Prepared for County of Riverside Transportation and Lands Management Agency. Prepared by Dudek & Associates, Inc. Approved June 17, 2003.
- Jennings, M.R. and M.P. Hayes. 1994. Amphibian and reptile Species of Special Concern in California. Final Report submitted to California Department of Fish & Game, Inland Fisheries Division, Rancho Cordova, California, under Contract 8023.
- MacKenzie, D.I., J. D. Nichols, B.L. Gideon , S. Droege, A. Royle, and C.A. Langtimm. 2002. Estimating site occupancy rates when detection probabilities are less than one. *Ecology*, 83: 2248 – 2255.
- University of California, Riverside, Center for Conservation Biology. 2005. Final Report: Western Riverside County Multiple Species Habitat Conservation Program. Prepared for California Department of Fish and Game, under contracts titled: Inland Ecosystems of California: Resource Assessment Project and Western Riverside County and Sierra Nevada Wildlife Assessment Project. May 4, 2005.

Table 1. Results of mountain yellow-legged frog surveys in 2005. Non target species encountered during surveys included western skink (*Eumeces skiltonianus*), California kingsnake (*Lampropeltis zonata*), California treefrog (*Hyla cadaverina*), steelhead (*Oncorhynchus mykiss*), trout (*O. mykiss*), granite spiny lizard (*Sceloporus orcutti*), mule deer (*Odocoileus hemionus*), and an unknown trout species (*O. spp.*).

| Creek Name | MSHCP Status | Survey Date | Observers ¹ | #Segs | MYLF | Other Spp |
|------------------------------------|-------------------|-----------------|------------------------|-------|------|---------------------------|
| Fuller Mill Creek ^{2,3} | Core Area | 28 Jul - 1 Sept | 1, 2, 3, 5 | 27 | Yes | H. cadaverina, L. zonata |
| Indian Creek ^{2,3} | Core Area | 2 - 24 Aug | 1, 2, 3, 4, 5, 7, 9 | 15 | No | H. regila |
| N. Fork San Jacinto ^{2,3} | Core Area | 27 Jul - 1 Sept | 3, 5 | 21 | Yes | H. cadaverina, S. orcutti |
| Black Mountain Creek ² | Potential Habitat | 3-Aug-05 | 1, 2, 3, 5 | 8 | No | None |
| Logan Creek ³ | Potential Habitat | 9 - 23 Aug | - | 5 | No | H. cadaverina |
| Stone Creek ^{2,3} | Potential Habitat | 5 - 10 Aug | 1, 3, 5, 6 | 13 | No | O. mykiss, (O. spp) |
| Strawberry Creek ² | Potential Habitat | 9 - 27 Aug | 1, 2, 3 | 7 | No | None |
| Marion Creek ² | Potential Habitat | 7-13 Sept | 2, 5 | 3 | No | None |
| Total Segments Surveyed | | | | 99 | | |

¹ RCA Biologists: 1: S. Bartz, 2: R. Escobar, 3: A Malisch, 4: A. Bustamante, 5: R. Gallego, 6: K. Cleary-Rose, 7: D. DeLa Torre, 8: B. Root, 9: C. Rothenbach

² Also surveyed by RCA Biologists

³ Also surveyed by USGS Biologists

Table 2. Habitat Characteristics at mountain yellow-legged frog locations. MYLF have been noted to prefer large, clear, pools > 90 cm in depth, with rocky bottoms where adults and tadpoles can take refuge, no floating algae, stagnant water, or predatory fishes.

| Block | General Preferred Habitat Characteristics | Dark Canyon | Dark Canyon Trib 1 | Dark Canyon Trib 1 | Fuller Mill Creek TRIB 3 |
|-----------------------------|--|------------------------------------|------------------------------------|------------------------------------|------------------------------------|
| Survey Date | - | 27-Jul-05 | 27-Jul-05 | 27-Jul-05 | 28-Jul-05 |
| Reach | - | 3 | 2 | 1 | 1 |
| Water Transparency | Clear | Clear | Clear | Clear | Clear |
| Canopy | Open | 26-50% | 51-75% | 51-75% | 51-75% |
| Riparian Community | Montane hardwood conifer and riparian habitat | Mixed Riparian Forest and Woodland | Mixed Riparian Forest and Woodland | Mixed Riparian Forest and Woodland | Mixed Riparian Forest and Woodland |
| Riparian Spp 1 | Provides overhanging refugia | Oak | Oak | Incense Cedar | Currant |
| Riparian Spp 2 | | Incense Cedar | Incense Cedar | Oak | Incense Cedar |
| Riparian Spp 3 | | Pine | | Pine | |
| Shallow Pools: | | 1-10% | 11-25% | 26-50% | 11-25% |
| Medium Pools: | Abundant | 51-75% | 26-50% | 26-50% | 51-75% |
| Deep Pools: | Abundant | 1-10% | 0% | 0% | 0% |
| Aquatic Substrate 1: | Provides crevice refugia | Cobble | Boulder/bedrock | Boulder/bedrock | Boulder/bedrock |
| Percent % | | 26-50% | 76-100% | 51-75% | 51-75% |
| Aquatic Substrate 2: | | Boulder/bedrock | Cobble | Cobble | Sand |
| Percent % | | 26-50% | 11-25% | 11-25% | 11-25% |
| Aquatic Substrate 3: | | Sand | Leaf litter | Leaf litter | Fallen logs |
| Percent % | | 26-50% | 1-10% | 1-10% | 1-10% |
| Bank Substrate 1: | Provides overhanging refugia | Boulder/bedrock | Boulder/bedrock | Boulder/bedrock | Boulder/bedrock |
| Percent % | | 51-75% | 76-100% | 76-100% | 51-75% |
| Bank Substrate 2: | | Silt | Leaf litter | Leaf litter | Sand |
| Percent % | | 11-25% | 11-25% | 11-25% | 11-25% |
| Bank Substrate 3: | | Sand | --- | --- | Fallen logs |
| Percent % | | 1-10% | --- | --- | 1-10% |

Table 3. Mountain yellow-legged frog detections in the San Jacinto Mountains, Riverside County, CA. RCA Biologists did not detect MYLF in 2005. All detections below were made by USGS Biologists. Abundance represents counts of each individual detected. *Note that specific location information has been suppressed to protect the species.*

| Waterway | Segment | Location | Survey Date | Easting | Northing | Lifestage | Abundance |
|-------------------|---------|----------|-------------|---------|----------|------------------|-----------|
| Dark Canyon | | | 27-Jul-05 | | | Adult | 1 |
| Dark Canyon | | | 27-Jul-05 | | | Adult | 14 |
| Dark Canyon | | | 27-Jul-05 | | | Metamorph | 7 |
| Dark Canyon | | | 27-Jul-05 | | | 2nd Year Tadpole | 9 |
| Dark Canyon | | | 27-Jul-05 | | | 1st Year Tadpole | 2 |
| Dark Canyon | | | 27-Jul-05 | | | Eggmass | 1 |
| Dark Canyon | | | 01-Sep-05 | | | Adult | 4 |
| Dark Canyon | | | 01-Sep-05 | | | Metamorph | 6 |
| Dark Canyon | | | 01-Sep-05 | | | 2nd Year Tadpole | 16 |
| Dark Canyon | | | 01-Sep-05 | | | 1st Year Tadpole | 16 |
| Fuller Mill Creek | | | 01-Sep-05 | | | Metamorph | 2 |
| Fuller Mill Creek | | | 01-Sep-05 | | | 2nd Year Tadpole | 1 |
| Fuller Mill Creek | | | 28-Jul-05 | | | Adult | 4 |
| Fuller Mill Creek | | | 28-Jul-05 | | | Metamorph | 4 |
| Fuller Mill Creek | | | 28-Jul-05 | | | 2nd Year Tadpole | 4 |
| Fuller Mill Creek | | | 28-Jul-05 | | | 1st Year Tadpole | 20 |

Figure 1. Locations of all stream surveys conducted in 2005 and detections of mountain yellow-legged frog, arroyo toad, and coast range newt. California red-legged frog was not detected in 2005.

