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

Stream Survey Report 2009

23 April 2010

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NOTE TO READER:

This report is an account of survey activities conducted by the Biological Monitoring Program for the Western Riverside County Multiple Species Habitat Conservation Plan (MSHCP). The MSHCP was permitted in June 2004. The 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 information needs identified in MSHCP Section 5.3 or elsewhere in the document, and the information needs of the Permittees.

MSHCP reserve assembly is ongoing and it is expected to take 20 or more years to assemble the final Conservation Area. The Conservation Area includes lands acquired for conservation under the terms of the MSHCP and other lands that have conservation value in the Plan Area (called public or quasi-public lands in the MSHCP). In this report, the term "Conservation Area" refers to the Conservation Area as understood by the Monitoring Program at the time the surveys were planned and conducted.

We would like to thank and 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 data collection activities were conducted in 2009 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.

While we have made every effort to accurately represent our data and results, it should be recognized that data management and analysis are ongoing activities. Any reader wishing 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.

The primary preparer of this report was the 2009, Herpetofauna Program Lead, Robert Packard. 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. Further information on the MSHCP and the RCA can be found at www.wrc-rca.org.

Contact Information:

Executive Director
Western Riverside County
Regional Conservation Authority
4080 Lemon Street, 12th Floor
P.O. Box 1667
Riverside, CA 92502-1667
Ph: (951) 955-9700

Western Riverside County MSHCP
Monitoring Program Administrator
c/o Adam Malisch
4500 Glenwood Drive, Bldg. C
Riverside, CA 92501
Ph: (951) 782-4238

INTRODUCTION

Four amphibian species covered by the Western Riverside County MSHCP inhabit stream environments in southern California, arroyo toad (*Anaxyrus californicus*), California newt (*Taricha torosa*), California red-legged frog (*Rana draytonii*), and Sierra Madre yellow-legged frog (*Rana muscosa*). The Biological Monitoring Program has been collaborating with the Western Ecological Research Center, U.S. Geological Survey (USGS) and U.S. Forest Service (USFS) in conducting amphibian-stream surveys since 2004 to reduce overlapping survey efforts and to ensure consistent data collection methods. The purpose of the stream surveys has been to assess habitat suitability and to document breeding locations for arroyo toad, red-legged frog, California newt, and yellow-legged frog within species-specific Core Areas and/or their tributaries. We have focused surveys on different species from year to year, depending on efforts of collaborating agencies and objective requirements. The target species for stream surveys in 2009 were red-legged frog and California newt.

California red-legged frog does not currently have a known distribution within the MSHCP Conservation Area, despite the presence of suitable habitat (*Biological Monitoring Program, survey results*; *Mark Jennings, Rana Resources, personal communication*). Many streams in red-legged frog Core Areas, especially the Santa Ana Mountains, have never been surveyed for breeding activity or suitable habitat by Biological Monitoring Program staff. Suitable habitat may also exist in some lowland areas outside of MSHCP Core Areas, such as Cactus Valley. The species is typically found in lowland streams, wetlands and pools where dense vegetation surrounds relatively deep water within small watersheds (e.g., < 300 km^2).

California red-legged frog has historically occupied Arroyo Seco, San Juan Creek, several sewage treatment pools along the Santa Ana River near Fla-Bob airport (1974 and 1980), a northwest tributary of Arroyo del Toro, an area immediately east of Lake Elsinore, and now-developed upper reaches of Murrieta Creek and Santa Gertrudis Creek. The MSHCP species account for red-legged frog lists Cole Creek at the Santa Rosa Plateau Ecological Reserve as the only known location recently occupied within the Conservation Area, and lists Core Areas as the Santa Rosa Plateau and the Santa Ana Mountains. Species-specific objectives require that known breeding populations be monitored once a year for the first 5 years of the permit, and then as determined by the Reserve Management Oversight Committee as described in *Section 6.6, MSHCP Volume I*, but not less frequently than every 8 years (Dudek and Associates 2003).

We included California newt as a target species for the 2009 surveys because it shares the same Core Areas as California red-legged frog, and we assumed that our surveys would encompass habitat of both species. Breeding habitat of California newt is confined to large and small streams that contain pooling and running water, and terrestrial habitat is found in woodland and riparian communities where suitable cover exists (e.g., logs, leaf litter, etc.). The species objectives for California newt state that occupancy be maintained across at least 75 percent of the occupied California newt habitat, and that successful reproduction, as measured by the presence/absence of larvae or egg masses, be documented within the MSHCP Conservation Area once a year for the first 5 years after

permit issuance, and then as determined by the Reserve Management Oversight Committee as described in *Section 6.6, MSHCP Volume I* (but not less frequently than every 8 years) (Dudek and Associates 2003).

We have conducted yearly stream surveys across the Santa Rosa Plateau from 2005 – 2008, and have targeted easily accessible stream segments in the Santa Ana Mountains from 2005 – 2007. Our coverage of the Santa Rosa Plateau has been fairly extensive, but we have passed over many of the drainage segments in the Santa Ana Mountains that are difficult to access in favor of maximizing survey efficiency and expanding our scope to include multiple species objectives. We believe that it is within these more remote portions of drainages in the Santa Ana Mountains that present the best probability of supporting an extant distribution of California red-legged frog in the Plan Area.

We focused our efforts in 2009 on accessing and characterizing habitat in as many stream reaches in the Santa Ana Mountains and Santa Rosa Plateau as possible, given available personnel and resources. Our intent was to document presence of water or potential pooling areas that could be used as breeding habitat by California red-legged frog, and to better delineate occupied California newt habitat in the Core. We intend to use these data to direct future search efforts for California red-legged frog, and to design more robust surveys for California newt that can address animal detectability and generate estimates of percent area occupied. We also surveyed for California red-legged frog in portions of Cactus Valley that have recently been brought into the Conservation Area. Specifically, the overall survey goals and objectives for stream surveys in 2009 were as follows:

Goals and Objectives

1. Delineate distribution of California red-legged frog and California newt across Core Areas and Cactus Valley.
    a. Model stream accessibility based on slope, distance from road, and surrounding vegetation.
    b. Survey all accessible drainages for target species.
2. Document and characterize potential breeding habitat of California red-legged frog across Core Areas and Cactus Valley.
    a. Measure water quality and vegetation (upland and riparian) where ever flowing water and/or deep pools occur.
3. Work in collaboration with USGS to collect genetic material for an on-going population study of reptiles in southern California.
    a. Retrieve tissue samples from USGS Target Species for genetic analysis.

METHODS

Protocol Development

We began conducting stream surveys in 2005 following the *USGS Aquatic Species and Habitat Assessment Protocol for Southcoast Ecoregion Rivers, Streams, and Creeks* (USGS 2005). In general, the USGS protocol describes a visual encounter and

dipnet survey method for detecting all life stages of amphibians, and includes an assessment of habitat characteristics. We also divided streams into 250-m reaches, and labeled them following the naming convention described in the USGS protocol.

We modified the USGS protocol in 2009 to better address MSHCP species-specific objectives for the target species. These modifications include using the Sawyer and Keeler-Wolf (1995) vegetation classifications for characterizing the surrounding landscape, collecting additional water chemistry data, recording weather data at the end of the survey, and the change and addition of characteristics recorded for animal records. Furthermore, we began recording animal abundance, shallow pools, medium pools, and deep pools as continuous rather than categorical values.

Tissue samples were collected from USGS Target Species following a standardized protocol developed by Biological Monitoring Program staff (Appendix A).

Personnel and Training

The Herpetofauna Program Lead trained or retrained all field crew prior to conducting formal surveys in 2009. The Program Lead was, in turn, previously instructed by a staff member that attended a USGS training (29 March 2006) that covered the use of the USGS stream-survey protocol and identifying anuran (frog and toad) and fish species in our region. Goals of the Biological Monitoring Training were to familiarize staff with species identification, field methods, and data collection techniques. Species identification training included slides addressing key distinguishing characteristics between species, in addition to observing live and preserved specimens. Three crew members and the Program Lead also examined tadpole specimens at the USGS San Diego Field Office (5 March 2009) and at the Los Angeles County Natural History Museum (17 Feb. 2009) before conducting surveys. Mock surveys were conducted on 2 stream reaches on 26 January 2009 at Bautista Creek for training purposes. Field methodology for collecting tissue samples was demonstrated using live animals and specimens at the USGS San Diego Field Office (5 March 2009). Biological Monitoring Program personnel were funded by the California Department of Fish and Game or the Regional Conservation Authority; volunteers are noted. The following staff conducted stream surveys in 2009:

- Robert Packard (Project Lead, Biological Monitoring Program)
- Ariana Malone (Biological Monitoring Program)
- Elizabeth Dionne (Biological Monitoring Program)
- Esperanza Sandoval (Biological Monitoring Program)
- Jonathan Reinig (Biological Monitoring Program)
- Liliana Santilli (Biological Monitoring Program)
- Michael Zerwekh (Biological Monitoring Program)
- Misty Gray (Biological Monitoring Program)
- Nydia Celis (Biological Monitoring Program)

Study Site Selection

Terrain and vegetation cover of the Santa Ana Mountains and Santa Rosa Plateau make access to many drainages very difficult if not impossible. Therefore, we located

access points into drainages by first constructing an accessibility model using Arc GIS v.9.2 Global Information System (GIS) software (ESRI 2006) and GIS-based vegetation (CDFG et al 2005) and slope (USGS 2006) layers. We considered a landscape inaccessible if it had a slope > 25 degrees, or consisted of chaparral with cover density > 40 % (unless within 50 m of a road or trail). We field verified our accessibility model, and used Arc GIS v.9.2 to identify drainage-access points no more than 1600 m from roads and with continuous traversable landscape leading to the stream channel. We also considered streams at the boundary of conserved land as potential access points if they passed through traversable landscapes, and if the drainage could be accessed without passing through private lands. We identified 107.2 km of potential drainage-access points out of 278.9 km of streams in the Santa Ana Mountains and Santa Rosa Plateau. We entered drainages at these modeled access points, and surveyed as many 250-m reaches as possible in an 8-hour day.

We used Arc GIS v.9.2 to segment all streams in targeted Cores that were in the Conservation Area prior to conducting field work, for a total of 1198 reaches that could potentially be accessed. We uniquely numbered reaches from downstream to upstream order according to the USGS protocol (USGS 2005). Some stream reaches (n = 74) surveyed in 2009 were also sampled during the 2006 - 2008 seasons.

We also surveyed one 250-m stream reach on lands managed by the Regional Conservation Authority (RCA) in the Cactus Valley area because a reservoir was recently brought into conservation there. To our knowledge this area had not been surveyed for red-legged frog prior to 2008.

Survey Methods

We surveyed streams for presence of water and to verify accessibility before conducting more rigorous visual-encounter and dipnet surveys based on USGS (2005) protocol. We did not survey San Mateo Canyon, San Juan Creek, Cole Creek, Adobe Creek, and the lower sections of Los Alamos and Tenaja Canyons for presence of water, because water is known to flow all year long and/or previous surveys have shown there to be deep pools. Streams were deemed not appropriate for more rigorous visual-encounter and dipnet surveys if they were completely dry or would likely be dry within a few days of scouting.

We began surveying drainages for suitable habitat on 17 March and conducted visual-encounter and dipnet surveys from 25 March to 09 July along 250-m reaches that contained water. All surveys were conducted in daylight hours (0800 h – 1700 h) from downstream to upstream areas, and along stream banks and within channels. We collected the following information onto paper datasheets at the beginning and end of each surveyed reach: time, sky condition (0 = clear or few clouds, 1 = party cloudy or variable, 2 = cloudy or overcast, 3 = fog, 4 = mist or drizzle, 5 = showers or light rain, 6 = heavy rain, 7 = sleet or hail, 8 = snow), temperature (C) in shade at 1 m above ground, average wind speed (km/h), and presence/absence of water. At the beginning of each reach we recorded the date, observer, water temperature (C), water transparency, pH, dissolved oxygen (concentration and percent), conductivity, salinity, total dissolved solids, wetted depth and width of stream channel, water velocity (m/s), and number of wetted channel braids. We also took upstream photos at the start of each reach. At the end

of each survey, we recorded presence and abundance of exotic plant species, percent wet length, percent of each pool type (shallow, medium, and deep), presence and number of plunge pools, presence and type of aquatic refugia, bank full width (m), flood prone width (m), percent of overhead canopy throughout the reach, presence and type of basking areas, percent of the 3 most dominant riparian plants, percent of 3 most common aquatic substrates, percent of 3 most common bank substrates, upland and riparian community types, and presence, type, and level of recent disturbance. Furthermore, the slope of each reach was calculated in office with a Microsoft Excel function using elevation of the start and end points. Survey time per reach varied from 24 to 93 min ($\bar{x}$ = 51 min), depending on streambed characteristics (e.g., slope, vegetation, rock barriers) and presence and abundance of amphibians detected.

Covered Species

We recorded each group of covered species encountered as a separate cluster, at the same location, by life stage. The following information was recorded for covered species: location, number, lat/long, species, abundance (e.g., cluster size), age (e.g., adult, tadpole, egg mass), detection method (visual or audio), number of photos taken, photo ID, and relevant notes.

Non-covered species

We recorded 1 animal record for each non-covered species from each age class (e.g., tadpole, juvenile, egg mass) encountered per reach, and recorded the abundance along each reach. This was done at the end of the stream survey once the entire reach had been surveyed. All information listed above for covered species was recorded for non-covered species except GPS coordinates.

RESULTS

We surveyed approximately 700 (175 km) stream reaches in the Santa Ana Mountains and Santa Rosa Plateau that were deemed accessible by our GIS model. Water was present on 38% (n = 263; 66 km) of surveyed reaches, where we conducted visual-encounter and dipnet surveys. We also recorded 102 deep pools in 60 stream reaches across 16 streams. The access model proved useful in determining accessibility, though there were a few reaches identified as accessible that occurred on slopes too steep to traverse.

We did not detect California red-legged frog of any life stage in 2009, but found California newt adults and egg masses in abundance at both Core Areas surveyed (Figure 1). We found few juvenile or larval California newt (n=16), but recorded 2264 adults and 1085 egg masses in 101 stream reaches across 23 streams. Other Covered Species recorded during stream surveys included southwestern pond turtle (*Actinemys marmorata pallida*; n = 20) and granite spiny lizard (*Sceloporus orcutti*; n = 3). We also detected many non-covered species such as chorus frog (*Pseudacris* sp.) and two-striped garter snake (*Thamnophis hammondi*) (Appendix B).

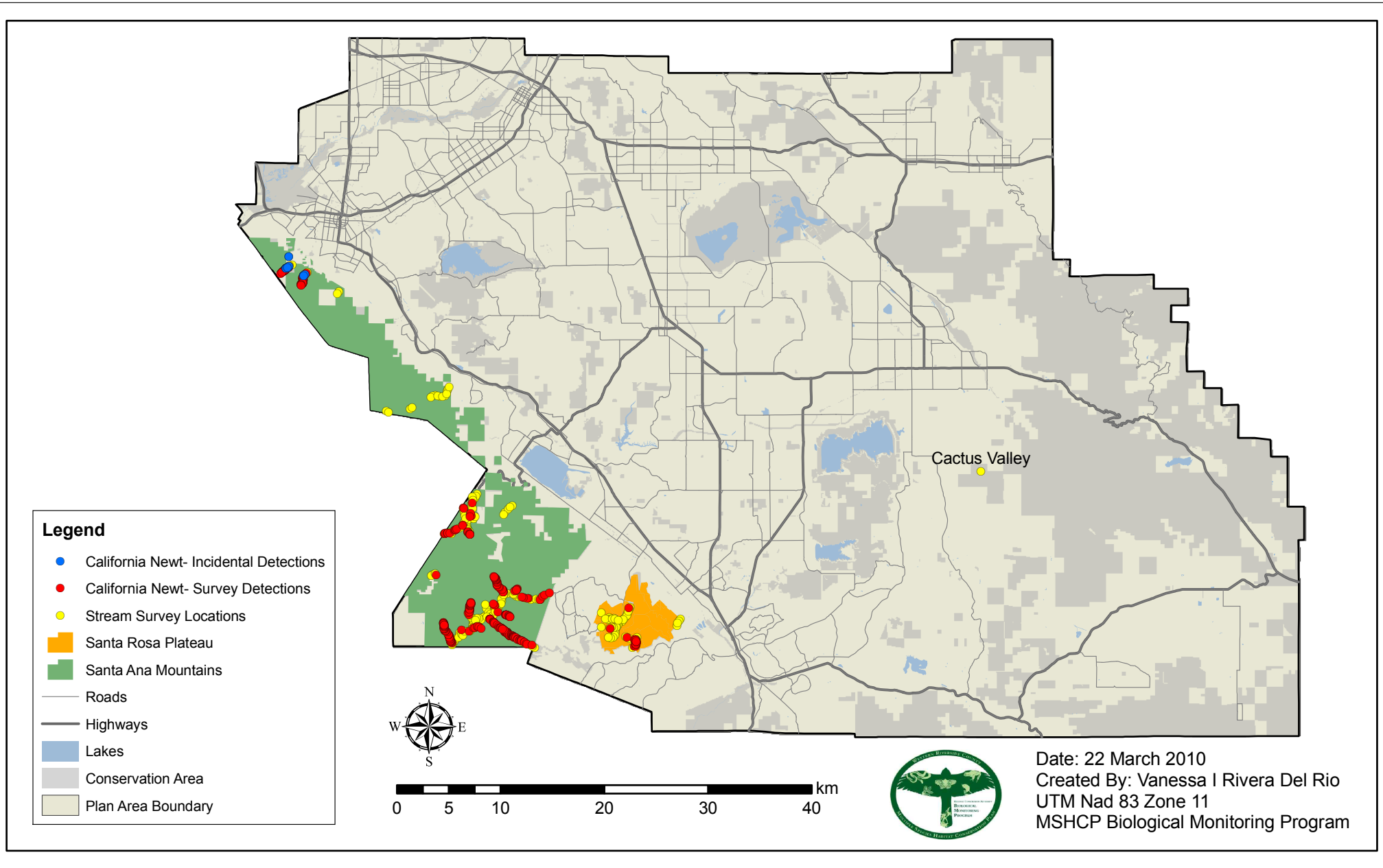

Figure 1. Stream survey locations and California newt detections in 2009.

Arroyo toad was not a target species, but we did survey some historic locations at the Cleveland National Forest (e.g., Los Alamos Canyon) and Santa Rosa Plateau. We did not record any life stage of this species during these surveys. Rainfall may have been a factor in lack of detections, as it was 50% to 70% of normal in winter of 2008/2009 (NOAA 2009). Invasive plants and animals were found in a few of the larger drainages, such as San Mateo Canyon, but smaller drainages had few invasive species. Invasive species found include bullfrog (*Lithobates catesbeiana*), red swamp crayfish (*Procambarus clarkii*), and tamarisk (*Tamarix* sp.).

DISCUSSION

Our survey goals focused on delineating the distributions of California red-legged frog and California newt across Core Areas, and documenting locations of potential breeding habitat. Presence of California red-legged frog remains undocumented in western Riverside County since a single male was recorded on 19 September 2003 in Cole Creek at the Santa Rosa Plateau (*Carole Bell, The Nature Conservancy, personal communication*). We did identify a number of deep pools during our surveys, some of which were previously unrecorded, that should be revisited during future searches for the species. Stream reaches not surveyed in 2009 should also be investigated for presence of California red-legged frog and suitable habitat.

We recorded California newt adults and egg masses in many stream reaches in the Santa Ana Mountains and Santa Rosa Plateau, often in abundance. We suspect that the species will continue to thrive in protected watersheds within Core Areas, given sufficient rain and no major change to hydrology that would result in fewer medium and deep pools. We found few juvenile and larval newts, but these life stages are typically difficult to detect. Newt larvae tend to remain hidden to avoid being consumed by adults, and the juvenile stage occurs in upland terrestrial areas not specifically targeted by this survey (Petranka 1998).

We surveyed approximately 626 stream reaches in the Santa Ana Mountains and Santa Rosa Plateau that have not been previously inspected, an almost 4-fold increase in the number of reaches that have been visited in these 2 Core Areas prior to 2009 (n = 159). To date, we have surveyed approximately 65% (n = 785) of available stream reaches in Core Areas for California red-legged frog and California newt. Not all remaining stream reaches can be safely accessed, but future efforts should target areas not yet surveyed to delineate distribution of suitable habitat and locate any California red-legged frog population that may remain in the Plan Area.

Recommendations for Future Surveys

Stream reaches should continue to be visually assessed for suitable habitat of California red-legged frog and California newt. Visual assessments should then be followed by detailed stream surveys where suitable habitat exists (e.g., presence of water, or potential pooling). Reaches not surveyed in detail can be addressed at a later date, but initial efforts should be focused on describing habitat in the Plan Area most likely suitable for targeted Covered Species. More robust surveys that address detectability and percent area occupied can then be possible on reaches with relevant species-specific habitat values, especially for California newt (Dudek & Associates 2003).

Remote and inaccessible areas will continue to present obstacles to future surveys. We should consider utilizing different strategies for accessing these areas, such as extended hiking or camping trips. We should also continue to refine our accessibility model by attempting to access areas identified as inaccessible, given available field personnel.

Species Objective 5 for California newt requires that occupancy be maintained on at least 75 percent of occupied newt habitat. We interpret this to mean that some baseline estimate of occupancy be measured across suitable habitat in Core Areas, and that species presence be maintained across 75% of that area. Distribution of California newt likely fluctuates with yearly precipitation and the availability of pooled water in drainages. It is therefore difficult to asses when a meaningful baseline measure of occupancy should be recorded. Moreover, much of the suitable newt habitat in the Santa Ana Mountains can not be realistically surveyed given issues of safe access. Future surveys should address Species Objective 5 by drawing inferences of occupancy from accessible newt habitat, based on the accessibility model and documented habitat. Extrapolating estimates to areas that can not be surveyed is inappropriate, and can lead to unknown bias in the estimate.

Refuge managers should consider the removal of invasive aquatic species from the watersheds in their respective areas of management, such as bullfrog, red swamp crayfish, and invasive fish species, in anticipation of possible future reintroductions of red-legged frog, and to prevent the loss of other native species. Invasive plants could also alter the habitats for native species, and should be controlled in these watersheds.

Our 2010 work plan will include surveys for California red-legged frog, California newt, and arroyo toad. We will also continue our collaboration with USGS to monitor the San Jacinto Mountains populations of yellow-legged frog in 2010.The Sierra Madre yellow-legged frog is currently being monitored in the San Jacinto Mountains by the USGS Western Ecological Research Center. Arroyo toads have mostly different Core Areas and habitat preferences than red-legged frog or California newt, and will be surveyed in the near future with a different study design.

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Appendix A. Western Riverside County MSHCP Biological Monitoring Program Protocol for Reptile Tissue Sampling March 2009

Tissue sampling has been shown to be a valuable component of scientific and genetic studies. Many genetic studies have revealed important results about local populations (Richmond, Jockusch 2007; Wood, Fisher, Reeder 2007), and tissue sampling allows for analyses of population genetics to be conducted without killing individuals in the population. Reptiles generally recover quickly from injuries sustained during acquisition of a small tissue sample, and the resulting scars can be used to aid in recapture identification analysis. Scale clipping and taking tail tips rarely draws blood, and the application of a tissue adhesive (e.g., New Skin) will speed the healing process and stem any blood loss. The tissue adhesive should also help minimize the risk of bacterial infection, although this is a possible deleterious side-effect. Some species of lizards also readily shed their tails as a defense mechanism and although care will be taken to process all animals as quickly and carefully as possible it is likely that a small number of individuals will lose their tails during handling. Although there are some risks associated with tissue sampling, this method should have less impact on target populations than taking specimens for vouchering and still provide valuable monitoring data.

The protocol outlined below will be followed by Monitoring Program staff processing reptiles in the field. All current herpetological personnel were trained in taking tissue samples by a USGS biologist at the USGS office in San Diego on March 5, 2009, or trained by those who attended said training. Tissue samples were taken by all crew from dead specimens; however a live specimen was used for demonstrating handling techniques while taking tissue samples. Future personnel will be trained by our crew on live specimens in the field. All tissue samples will be temporarily stored in refrigeration at the MSHCP's Biological Monitoring Office at 4500 Glenwood Drive, Riverside, CA, and then transported to the USGS Western Ecological Research Center's San Diego Field Office at 4165 Spruance Road, San Diego, CA for genetic analysis.

USGS TARGET SPECIES Processing Methods

Target Species include: Gilbert's skink (*Plestiodon gilberti*), western skink (*P. skiltonianus*), rosy boa (*Lichanura trivirgata*), southern rubber boa (*Charina umbratica*), glossy snake (*Arizona occidentalis*), shovel-nosed snake (*Chionactis occipitalis*), San Diego mt. kingsnake (*Lampropeltis zonata pulchra*), San Bernardino mt. kingsnake (*L. z. parvirubra*), red coachwhip (*Masticophis flagellum*), striped whipsnake (*M. lateralis*), red-sided garter snake (*Thamnophis sirtalis infernalis*), two-striped garter snake (*T. hammondii*), southwestern blind snake (*Leptotyphlops humilis humilis*) San Diego banded gecko (*Coleonyx variegatus abbotti*), western banded gecko (*C. v. variegatus*), granite night lizard (*Xantusia henshawi henshawi*), and sagebrush lizard (*Sceloporus vandenburgianus*).

1. Gender/Age
    - Male, female or unknown
2. Measurements
    - Using metric ruler

i. Snout-Vent length (mm)
ii. Tail length (mm)

- Using pesola scale
  i. Weight (g): tare scale first with sampling bag, then place animal in bag.
     1. Use the smallest scale possible for the most accuracy.

3. Take tissue sample (y/n) (Do not take a sample if the animal is too small to safely do so)
   i. Label micro-centrifuge tubes with sample # [date, full board name(site#-board#), 4-letter species code, and individual sequential # (ex. 20091125_MS12-02_EUSK_1)]
   - Sterilize scissors with alcohol.
   - For larger snakes: Take three ventral scale clips from the largest midbody scales, the three samples not from adjoining scales. The clip should be ~1 mm x ~3 mm, but try to clip all the way across each scale, and try to get some of the pigmentation of each scale.
   - For small snakes and lizards: Snip ~3 mm of the tail tip with scissors into centrifuge tube.

     Place drop of tissue adhesive (New Skin) on cut, allow to air dry. Place micro-centrifuge tube in designated container in specimen freezer at the office.
4. Take photos (Optional except for Mt. Kingsnakes and Rubber Boa)
   - Minimum of 3 (1 dorsal, 1 ventral, 1 close-up of dorsal portion of head).
     i. Place, in each photo, ruler and tape with date and specimen # (corresponding to order entered on datasheet).
     ii. Label the photos with photo #s [date, photographer initials, and photo file number (ex. 20091125_SLP_362)].
5. Notes - Record unusual morphology
   - Take notes on any unusual characteristics of the animal (e.g. coloration, injuries, regrown tail, etc.).
6. Return animal to exact location where found.

Non-Target Species Processing Methods (DO NOT PROCESS ANY VENOMOUS REPTILES!)

1. Gender/Age

   Male, female or unknown
2. Measurements
   a. Using metric ruler
      i. Snout-Vent length (mm)
      ii. Tail length (mm)
   b. Using Pesola scale
      i. Weight (g): tare scale first with bag, then place animal in bag.
         1. Use the smallest scale possible for the most accuracy.
3. Take photos (optional)
   i. Record photo #s on datasheet.

ii. Label the photos with photo #s [date, photographer initials, and photo file number (ex. 20091125_SLP_362)].

4. Return animal to exact location where found.

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Appendix B. Species Detected During Stream Surveys On Reaches Containing Habitat for California Red-legged Frog and California Newt.

Area Name	Common Name	Scientific Name	Covered
Adobe Creek	California newt	*Taricha torosa torosa*	Yes
Bluewater Canyon	California chorus frog	*Pseudacris cadaverina*	No
	Pacific chorus frog	*Pseudacris regilla*	No
	California newt	*Taricha torosa torosa*	Yes
	western pond turtle	*Clemmys marmorata pallida*	Yes
	speckled rattlesnake	*Crotalus mitchellii pyrrhus*	No
	two-striped garter snake	*Thamnophis hammondii*	No
Cactus Valley Stream	Pacific chorus frog	*Pseudacris regilla*	No
Cole Creek	California chorus frog	*Pseudacris cadaverina*	No
	Pacific chorus frog	*Pseudacris regilla*	No
	California newt	*Taricha torosa torosa*	Yes
	western pond turtle	*Clemmys marmorata pallida*	Yes
	western fence lizard	*Sceloporus occidentalis*	No
	two-striped garter snake	*Thamnophis hammondii*	No
Cole Creek Trib 5	Pacific chorus frog	*Pseudacris regilla*	No
	unidentified lizard species		
Cole Creek Trib 5a	Pacific chorus frog	*Pseudacris regilla*	No
	bullfrog	*Lithobates catesbeianus*	No
	western pond turtle	*Clemmys marmorata pallida*	Yes
	southern Pacific rattlesnake	*Crotalus viridis helleri*	No
	two-striped garter snake	*Thamnophis hammondii*	No
Cole Creek Trib 6	Pacific chorus frog	*Pseudacris regilla*	No
	California newt	*Taricha torosa torosa*	Yes
	western pond turtle	*Clemmys marmorata pallida*	Yes
	two-striped garter snake	*Thamnophis hammondii*	No
De Luz Creek	California chorus frog	*Pseudacris cadaverina*	No
	Pacific chorus frog	*Pseudacris regilla*	No
	California newt	*Taricha torosa torosa*	Yes
	western pond turtle	*Clemmys marmorata pallida*	Yes
	two-striped garter snake	*Thamnophis hammondii*	No
Decker Canyon	Pacific chorus frog	*Pseudacris regilla*	No
	western fence lizard	*Sceloporus occidentalis*	No
Eagle Canyon	California chorus frog	*Pseudacris cadaverina*	No
	Pacific chorus frog	*Pseudacris regilla*	No
Guava Creek	California chorus frog	*Pseudacris cadaverina*	No
	Pacific chorus frog	*Pseudacris regilla*	No
	gopher snake	*Pituophis catenifer annectens*	No

Appendix B. Continued

Area Name	Common Name	Scientific Name	Covered
Hagador Canyon	California chorus frog	*Pseudacris cadaverina*	No
	California newt	*Taricha torosa torosa*	Yes
	western fence lizard	*Sceloporus occidentalis*	No
Indian Canyon	California chorus frog	*Pseudacris cadaverina*	No
	Pacific chorus frog	*Pseudacris regilla*	No
	western fence lizard	*Sceloporus occidentalis*	No
Long Canyon	California chorus frog	*Pseudacris cadaverina*	No
	Pacific chorus frog	*Pseudacris regilla*	No
	California newt	*Taricha torosa torosa*	Yes
	western fence lizard	*Sceloporus occidentalis*	No
	granite spiny lizard	*Sceloporus orcutti*	Yes
Long Canyon Trib 1	Pacific chorus frog	*Pseudacris regilla*	No
	gopher snake	*Pituophis catenifer annectens*	No
Los Alamos Canyon	Common Carp	*Cyprinus carpio*	No
	channel catfish	*Ictalurus punctatus*	No
	western mosquitofish	*Gambusia affinis*	No
	green sunfish	*Lepomis cyanellus*	No
	California chorus frog	*Pseudacris cadaverina*	No
	Pacific chorus frog	*Pseudacris regilla*	No
	bullfrog	*Lithobates catesbeianus*	No
	California newt	*Taricha torosa torosa*	Yes
	western fence lizard	*Sceloporus occidentalis*	No
	granite spiny lizard	*Sceloporus orcutti*	Yes
	western pond turtle	*Clemmys marmorata pallida*	Yes
	two-striped garter snake	*Thamnophis hammondii*	No
Lucas Creek	California newt	*Taricha torosa torosa*	Yes
Morrell Canyon	California chorus frog	*Pseudacris cadaverina*	No
	Pacific chorus frog	*Pseudacris regilla*	No
	western fence lizard	*Sceloporus occidentalis*	No
	two-striped garter snake	*Thamnophis hammondii*	No
Nickel Canyon	California chorus frog	*Pseudacris cadaverina*	No
	Pacific chorus frog	*Pseudacris regilla*	No
	California newt	*Taricha torosa torosa*	Yes
	two-striped garter snake	*Thamnophis hammondii*	No
San Juan Creek	California chorus frog	*Pseudacris cadaverina*	No
	Pacific chorus frog	*Pseudacris regilla*	No
	bullfrog	*Lithobates catesbeianus*	No
	California newt	*Taricha torosa torosa*	Yes
	western fence lizard	*Sceloporus occidentalis*	No
	two-striped garter snake	*Thamnophis hammondii*	No

Appendix B. Continued

Area Name	Common Name	Scientific Name	Covered
San Juan Ck Trib 2	California chorus frog	*Pseudacris cadaverina*	No
	Pacific chorus frog	*Pseudacris regilla*	No
	California newt	*Taricha torosa torosa*	Yes
San Juan Ck Trib 3	California chorus frog	*Pseudacris cadaverina*	No
	Pacific chorus frog	*Pseudacris regilla*	No
	California newt	*Taricha torosa torosa*	Yes
	western fence lizard	*Sceloporus occidentalis*	No
	two-striped garter snake	*Thamnophis hammondii*	No
San Mateo Canyon	common carp	*Cyprinus carpio*	No
	black bullhead	*Ameiurus melas*	No
	yellow bullhead	*Ameiurus natalis*	No
	channel catfish	*Ictalurus punctatus*	No
	western mosquitofish	*Gambusia affinis*	No
	bluegill sunfish	*Lepomis macrochirus*	No
	green sunfish	*Lepomis cyanellus*	No
	California chorus frog	*Pseudacris cadaverina*	No
	Pacific chorus frog	*Pseudacris regilla*	No
	bullfrog	*Lithobates catesbeianus*	No
	California newt	*Taricha torosa torosa*	Yes
	western pond turtle	*Clemmys marmorata pallida*	Yes
	western fence lizard	*Sceloporus occidentalis*	No
	granite spiny lizard	*Sceloporus orcutti*	Yes
	two-striped garter snake	*Thamnophis hammondii*	No
San Mateo Canyon Trib 10	California chorus frog	*Pseudacris cadaverina*	No
	Pacific chorus frog	*Pseudacris regilla*	No
	bullfrog	*Lithobates catesbeianus*	No
	California newt	*Taricha torosa torosa*	Yes
	western fence lizard	*Sceloporus occidentalis*	No
	two-striped garter snake	*Thamnophis hammondii*	No
San Mateo Canyon Trib 11	fish species		
	California chorus frog	*Pseudacris cadaverina*	No
	Pacific chorus frog	*Pseudacris regilla*	No
San Mateo Canyon Trib 3	Pacific chorus frog	*Pseudacris regilla*	No
	California newt	*Taricha torosa torosa*	Yes
San Mateo Canyon Trib 4	Pacific chorus frog	*Pseudacris regilla*	No
	California newt	*Taricha torosa torosa*	Yes
San Mateo Canyon Trib 7	Pacific chorus frog	*Pseudacris regilla*	No
San Mateo Canyon Trib 8	California chorus frog	*Pseudacris cadaverina*	No
	Pacific chorus frog	*Pseudacris regilla*	No
	California newt	*Taricha torosa torosa*	Yes

Appendix B. Continued

Area Name	Common Name	Scientific Name	Covered
San Mateo Canyon Trib 9	California chorus frog	*Pseudacris cadaverina*	No
	Pacific chorus frog	*Pseudacris regilla*	No
	California newt	*Taricha torosa torosa*	Yes
Tenaja Canyon	California chorus frog	*Pseudacris cadaverina*	No
	Pacific chorus frog	*Pseudacris regilla*	No
	California newt	*Taricha torosa torosa*	Yes
	western fence lizard	*Sceloporus occidentalis*	No
	two-striped garter snake	*Thamnophis hammondii*	No
Tin Mine Canyon	California chorus frog	*Pseudacris cadaverina*	No
	Pacific chorus frog	*Pseudacris regilla*	No
	garden slender salamander	*Batrachoseps major*	No
	California newt	*Taricha torosa torosa*	Yes
Wildhorse Canyon	California chorus frog	*Pseudacris cadaverina*	No
	Pacific chorus frog	*Pseudacris regilla*	No
	California newt	*Taricha torosa torosa*	Yes
	western fence lizard	*Sceloporus occidentalis*	No
	two-striped garter snake	*Thamnophis hammondii*	No