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

Diurnal Reptile Survey Report 2008

April 20, 2009

Cover photos (taken by MSHCP biologists): Clockwise from top left, San Diego horned lizard (*Phrynosoma coronatum blainvillei*), northern red-diamond rattlesnake (*Crotalus ruber ruber*), southern sagebrush lizard (*Sceloporus graciosus vandenburgianus*), Belding's orange-throated whiptail *(Cnemidophorus hyperythrus beldingi*), coastal western whiptail (*Cnemidophorus tigris multiscutatus*), and granite spiny lizard (*Sceloporus orcutti*).

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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

Diurnal reptile survey efforts in 2008 focused on 6 species of reptiles covered by the MSHCP. These consisted of Belding's orange-throated whiptail *(Cnemidophorus hyperythrus beldingi*; CNHY), coastal western whiptail (*Cnemidophorus tigris multiscutatus*; CNTI), granite spiny lizard (*Sceloporus orcutti*; SCOR), northern red-diamond rattlesnake (*Crotalus ruber ruber*; CRRU), San Diego horned lizard (*Phrynosoma coronatum blainvillei*; PHCO), and southern sagebrush lizard (*Sceloporus graciosus vandenburgianus*; SCGR). The species-specific conservation objectives for all 6 species require the Biological Monitoring Program to document the continued use of 75 percent of the Core Areas listed in the MSHCP at least once every 8 years (Dudek & Associates 2003).

Diurnal reptile surveys by Biological Monitoring Program biologists in 2008 focused on documenting species presence within species-specific Core Areas and other areas of suitable habitat in the Conservation Area. The species objectives, suitable habitat, and MSHCP-identified Core Areas for each species are described below. The following were the overall survey goals for 2008:

Survey Goals:

A) Document the presence of CNHY, CNTI, SCOR, CRRU, PHCO, and SCGR within as many species-specific Core Areas and potentially occupied areas as possible
(Table 1).

B) Train personnel in diurnal reptile survey procedures and identification, and refine protocol to optimize methods for future surveys.

C) Provide data to land managers for use in management decisions.

Belding's Orange-throated Whiptail *(Cnemidophorus hyperythrus beldingi*)

Belding's orange-throated whiptail is a California species of special concern. Appropriate vegetation communities for this species include: chaparral, non-native grassland, coastal sage scrub, juniper woodland, and oak woodland. Historic distribution information suggests that CNHY was found throughout western Riverside County; however more than 50% of historic occurrences in western Riverside County are presumed extirpated due to loss of habitat (Dudek & Associates 2003).

The species objectives for CNHY require the conservation of 9 Core Areas in the MSHCP Conservation Area: 1) Santa Rosa Plateau, 2) Lake Skinner-Diamond Valley Lake, 3) Lake Mathews-Estelle Mountain, 4) San Jacinto Wildlife Area-Lake Perris, 5) Badlands, 6) Potrero Valley, 7) Banning Bench, 8) Sage/Vail Lake, and 9) Anza Valley.

Table 1. Core Area designation by species (denoted with 'X') and whether area was surveyed in 2008. When a species was found within one of the surveyed locations, the box is shaded.

	Species						
Surveyed Areas	CNHY	CNTI	SCOR	CRRU	PHCO	SCGR	# of Plots
Core Areas							
Agua Tibia Wilderness	-	X	X	X	X	-	11
Anza Valley	X	X	X	X[a]	X	-	10
Badlands	X	X	X	X[a]	X	-	9
Banning Bench	X	X	X	X	X	-	33
Lake Matthews-Estelle Mountain	X	X	X	X[a]	X[a]	-	3
Lake Skinner-Diamond Valley Lake	X[a]	X[a]	X[b]	X[b]	X[a]	-	0
Paloma Valley/Hogbacks	-	X	-	-	X	-	33
Potrero Valley	X[a]	X[a]	X	X[a]	X[a]	-	1
Sage/Vail Lake/Aguanga/ Wilson Valley	X[a]	X[a]	X[b]	X[a]	X[a]	-	0
San Jacinto Wildlife Management Area-Lake Perris	X	X[a]	X[a]	X[a]	X	-	5
San Jacinto Mountains	-	-[a]	X[b]	X	-	X[a]	1
Santa Ana Mountains	-	X[a]	X[a]	X[a]	X[a]	-	0
Santa Ana River	-	X	-	-	X[a]	-	4
Santa Rosa Mountains	-	-	-	-	-	X	4
Santa Rosa Plateau	X	X	X	X[a]	X	-	13
Additional areas with detections							
Box Springs	-	-	-[b]	-[b]	-	-	0
Iron Springs	-	-	-[a]	-	-	-	1
Motte/Rimrock	-	-	-	-[b]	-	-	0
San Jacinto Foothills	-	-[a]	-[b]	-	-[a]	-[a]	0
% of Core Areas where species was found	78[c]	100[c]	92[c]	75[c]	85[c]	50	

[a] Species record from incidental observation

[b] Species record from nocturnal lizard surveys

[c] Species objective met (species detected in at least 75% of Core Areas)

Coastal Western Whiptail (*Cnemidophorus tigris multiscutatus*)

The coastal western whiptail is a species of special concern in California. The species inhabits open, often rocky areas with sunny microhabitats and little vegetation within shrub or grassland associations (Benes 1969). Coastal western whiptail is commonly found on the eastern and western slopes of the San Gabriel Mountains in all vegetation types except yellow pine forest (Schoenherr 1976).

The species objectives for CNTI require the conservation of 13 Core Areas in the Conservation Area: 1) Santa Rosa Plateau, 2) Lake Skinner-Diamond Valley Lake, 3) Lake Mathews-Estelle Mountain, 4) San Jacinto Wildlife Area-Lake Perris, 5) Badlands, 6) Potrero Valley, 7) Banning Bench, 8) Sage/Vail Lake, 9) Anza Valley, 10) Agua Tibia Wilderness, 11) Santa Ana Mountain foothills, 12) Santa Ana River, and 13) Paloma Valley/Hogbacks.

Granite Spiny Lizard (*Sceloporus orcutti*)

The granite spiny lizard occurs in a wide variety of vegetation, from riparian, scrub, and chaparral, to woodland and forests. The species can be found at all but the highest elevations in the Plan Area; however, SCOR is restricted to granite outcrops and boulder fields within these areas (Mayhew 1963). The species is not state or federally listed, but the destruction of its granite outcrop habitat is illegal.

The species objectives for SCOR require the conservation of 12 Core Areas in the Conservation Area: 1) Santa Rosa Plateau, 2) Lake Skinner-Diamond Valley Lake, 3) Lake Mathews-Estelle Mountain, 4) San Jacinto Wildlife Area-Lake Perris, 5) Badlands, 6) Potrero Valley, 7) Banning Bench, 8) Sage/Vail Lake, 9) Agua Tibia Mountains, 10) San Jacinto Mountains, 11) Santa Ana Mountains, and 12) Anza Valley.

Northern Red-diamond Rattlesnake (*Crotalus ruber ruber*)

The northern red-diamond rattlesnake is a state and federal species of special concern. The species has a wide tolerance for various environments and can be found in a number of vegetation types. It is most commonly associated with heavy brush with large rocks or boulders (Klauber 1972). Moreover, CRRU populations are associated with dense chaparral in foothills, cactus or boulder in coastal sage scrub (Stebbins 1954, 1985; Fitch 1970), and desert slope scrub vegetation (Dudek & Associates 2003).

The species objectives for CRRU require the conservation of 11 Core Areas and linkages between Core Areas in the Conservation Area: 1) Lake Skinner-Diamond Valley Lake, 2) Anza Valley, 3) Lake Mathews-Estelle Mountain, 4) San Jacinto Wildlife Area-Lake Perris, 5) Badlands, 6) Potrero Valley, 7) Banning Bench, 8) Sage/Vail Lake, 9) Agua Tibia Mountains, 10) San Jacinto Mountains, and 11) Santa Ana Mountains.

San Diego Horned Lizard (*Phrynosoma coronatum blainvillei*)

The San Diego horned lizard is a California species of special concern. The species occurs primarily in scrub, chaparral, and grassland, but can also be found in oak woodland, riparian woodland, and coniferous forest (Klauber 1939). In inland areas, this species is restricted to areas with pockets of open microhabitat, often created by disturbance (e.g., floods, fire, roads, grazed areas, fire breaks) (Jennings and Hayes 1994).

The species objectives for PHCO require the conservation of 13 Core Areas in the Conservation Area: 1) Santa Rosa Plateau, 2) Lake Skinner-Diamond Valley Lake, 3) Lake Mathews-Estelle Mountain, 4) San Jacinto Wildlife Area-Lake Perris, 5) Badlands,

6) Potrero Valley, 7) Banning Bench, 8) Sage/Vail Lake, 9) Anza Valley, 10) Agua Tibia Wilderness, 11) Paloma Valley/Hogbacks, 12) Santa Ana Mountain foothills, and 13) Santa Ana River.

Southern Sagebrush Lizard (*Sceloporus graciosus vandenburgianus*)

The southern sagebrush lizard is a California species of special concern. It occurs primarily in open montane areas with good light and scattered low bushes. Vegetation types in which it is found include: montane chaparral, sagebrush, hardwood and conifer forests, woodlands, and juniper woodlands, usually above 1500 m (Dudek and Associates 2003).

The species objectives for SCGR require the conservation of 2 Core Areas within the Conservation Area: the San Jacinto and Santa Rosa Mountains.

METHODS

Protocol Development

The Biological Monitoring Program protocol developed for diurnal reptile surveys in 2008 was modified from visual encounter survey methods detailed in Crump and Scott (1994) (Appendix A). The protocol focuses on documenting the presence of Covered Species in their respective Core Areas. A summary of survey methods is provided below.

Personnel and Training

Crew members were trained by the Herpetology Program Lead on survey techniques as well as species identification. The following Monitoring Program biologists and Santa Ana Watershed Association volunteers conducted diurnal reptile surveys in 2008:

- Robert Packard, Herpetology Program Lead (Regional Conservation Authority)
- Masanori Abe (Regional Conservation Authority)
- Amanda Breon (Regional Conservation Authority)
- Rosina Gallego (Regional Conservation Authority)
- Mary Grady (California Department of Fish and Game)
- Ryann Loomis (Regional Conservation Authority)
- Ariana Malone (Regional Conservation Authority)
- Sinlan Poo (Regional Conservation Authority)
- Esperanza Sandoval (Regional Conservation Authority)
- Rika Setsuda (California Department of Fish and Game)
- Jonathan Reinig (California Department of Fish and Game)
- Carol Thompson (Regional Conservation Authority)
- Nathan Zalik (Regional Conservation Authority)
- Michael Zerwekh (Regional Conservation Authority)
- Melody Aimar (Santa Ana Watershed Association Volunteer)
- Allyson Beckman (Santa Ana Watershed Association Volunteer)

- Jill Coumoutso (Santa Ana Watershed Association Volunteer)
- Nicole Peltier (Santa Ana Watershed Association Volunteer)
- Terry Reeser (Santa Ana Watershed Association Volunteer)

Survey Methods

We divided the Conservation Area into 250 m x 250 m plots and conducted surveys within these plots in designated Core Areas and a small number of other areas with potentially suitable habitat (Figures 1-2). At least 2 surveyors simultaneously conducted visual encounter surveys for terrestrial reptiles (Crump and Scott 1994) in survey plots between approximately 0800 h and 1500 h. All appropriate habitats were searched for target species within these plots. Plots were not surveyed systematically or in a time-constrained manner. Survey time per plot ranged from 10 to 122 min (mean = 38 min), depending on habitat conditions and the presence and abundance of Covered Species. A small number (n = 27) of cells located at the boundaries of our access area (i.e., the Conservation Area at the time) were smaller than 250 m x 250 m.

For each plot surveyed, the date, observers, location, cell number, and general weather description were documented. In addition, at the start and end of each survey, the ambient air temperature and average wind speed were noted. We attempted to identify all reptile species observed and recorded observations for each individual of any Covered Species encountered. For non-covered species, we recorded observations at the first encounter of each life stage (i.e., juvenile, adult) and noted the number of individuals seen within each plot. We conducted surveys between 4 August and 13 November 2008. Detailed survey methods can be found in *Western Riverside County MSHCP Biological Monitoring Program Protocol for Diurnal Reptile Surveys 2008* (Appendix A).

RESULTS

We conducted diurnal reptile surveys in 127 plots within 12 Core Areas and 1 additional area, representing 8 km^2 of surveyed land (Table 1). We detected 715 reptiles of 15 different species during diurnal reptile surveys in 2008 (Table 2). In addition, we recorded 122 incidental observations in Core Areas where no formal diurnal surveys were done.

We detected a total of 12 CNHY across 8 plots during diurnal surveys. This total included detections within 7 of 9 Core Areas (78%). We also detected CNHY in 2 non-core areas (the Agua Tibia Wilderness and Paloma Valley/Hogbacks) (Figure 1).

We detected CNTI in all of its 13 Core Areas and in 3 non-core areas (San Jacinto Mountains, Iron Springs, and San Jacinto Foothills) with a total of 28 observations over 13 plots (Figure 1).

We detected SCOR in 10 of its 11 Core Areas (92%) and 5 non-core areas (Paloma Valley/Hogbacks, Santa Rose Mountains, Box Springs, Iron Springs, and San Jacinto Foothills), with 42 total detections across 17 plots (Figure 2).

Figure 1. Species detection of Belding's orange-throated whiptail (CNHY), coastal western whiptail (CNTI), and northern red-diamond rattlesnake (CRRU).

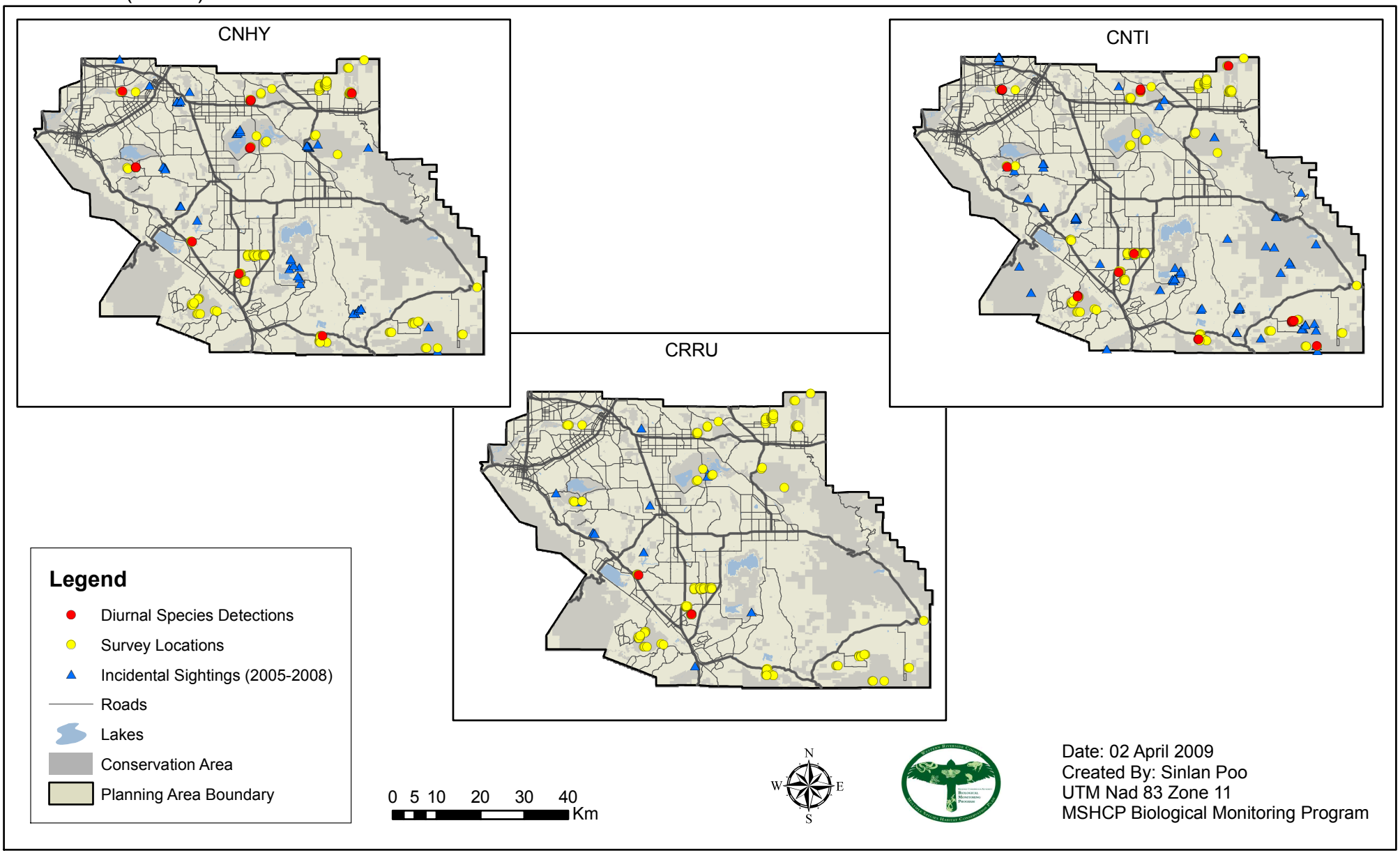

Figure 2. Species detection of San Diego horned lizard (PHCO), southern sagebrush lizard (SCGR), and granite spiny lizard (SCOR).

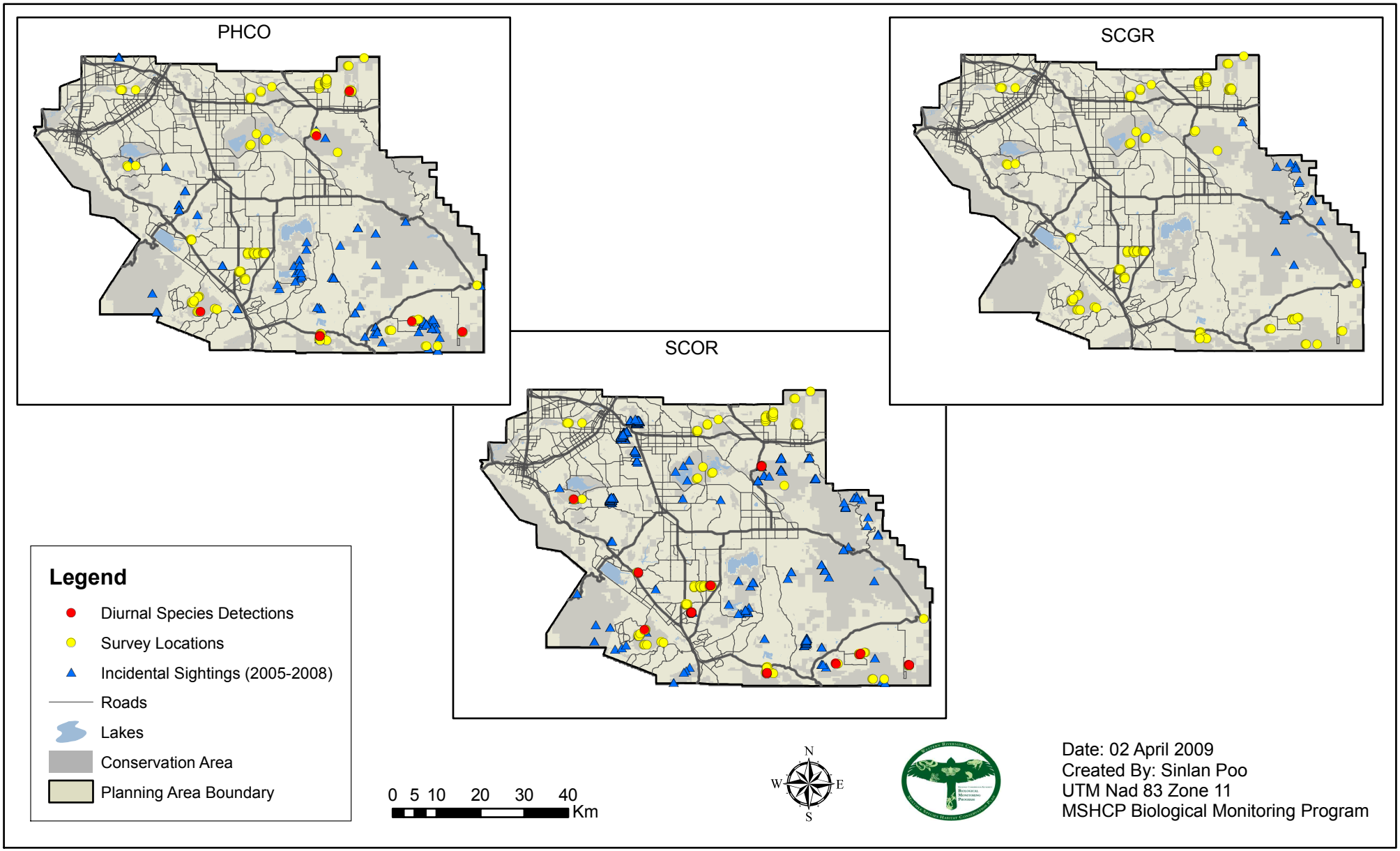

Table 2. Reptile species observed during diurnal surveys in 2008.

Species	Number Observed
Cnemidophorus hyperythrus beldingi	12
Cnemidophorus tigris stejnegeri	27
Coleonyx variegatus abbottii	2
Crotalus mitchellii pyrrhus	2
Crotalus ruber ruber	4
Crotalus viridis helleri	2
Eumeces skiltonianus	1
Gambelia wislizenii	1
Masticophis flagellum piceus	4
Masticophis lateralis lateralis	3
Phrynosoma coronatum blainvillei	10
Sceloporus occidentalis	225
Sceloporus orcutti	41
Uta stansburiana	380
Xantusia henshawi henshawi	1
Total reptiles detected	**715**

We detected CRRU in 9 of its 12 Core Areas (75%) and 3 non-core areas (Paloma Valley/Hogbacks, and the Box Springs and Motte/Rimrock Reserves) (Figure 1). Most CRRU observations were either during nocturnal lizard surveys (n = 3) or were made incidentally during other survey efforts (n = 6), with just 1 observation of a living individual made during a diurnal survey in the Hogbacks.

We detected PHCO in 11 of its 13 Core Areas (85%) and 2 non-core areas (the Santa Rosa Mountains and San Jacinto Foothills) with a total of 9 observations across 6 plots (Figure 2). Juveniles comprised the majority of detections and often more than 1 juvenile was detected in a single plot.

We did not detect SCGR during targeted surveys. However incidental observations of SCGR were fairly common in the San Jacinto Mountains, which is 1 of its 2 Core Areas (Figure 2). In addition, we also detected SCGR in the San Jacinto Foothills which is not a Core Area for this species.

DISCUSSION

Visual encounter surveys are a simple technique for searching for animals that spend the majority of their time on the surface of the ground. Because the species

objectives only require documentation of the presence of a species in a Core Area, these initial surveys did not employ more complex designs such as time-constrained sampling (Crump and Scott 1994) or repeat visits to the same sites in an occupancy framework (MacKenzie et al 2006).

Diurnal reptile surveys in 2008 were very successful. We located all target species except SCGR in at least 75% of their respective Core Areas, meeting the species objectives for 5 of 6 focal Covered Species.

Belding's orange-throated whiptail, even though found in the required number of Core Areas, was recorded only 12 times. This could indicate CNHY is not a common species in these areas, or that the probability of detecting CNHY using our survey methods is small. Juvenile CNHY were found on 8 occasions, indicating recent successful breeding in some areas. In comparison to other lizard species, surveys in most areas did not return an abundance of CNHY observations, and they appear to be one of the harder species to detect visually, possibly due to their speed, wariness, and smaller size. It is also likely that their populations are more localized, and thus less likely to be encountered by our surveying methods (Malisch 2005). Results of funnel and pitfall-trap herp array surveys conducted within the Plan Area by the Santa Ana Watershed Association (SAWA; http://www.sawatershed.org/) suggest that CNHY can be locally abundant (unpubl. data). Arrays may need to be utilized to increase sample size or to make meaningful inferences about the status of CNHY populations, if information beyond the minimal objective of documenting at least 1 individual in a Core Area is desired.

The 2 Core Areas where CNHY was not found were the Santa Rosa Plateau and the Anza Valley. Fourteen plots were surveyed on the Santa Rosa Plateau, but there is little available habitat there for this species. The 11 surveys conducted in Anza Valley indicated large areas with potentially suitable habitat for CNHY and they have been found in similar habitat nearby in Wilson Valley and Agua Tibia. Additional surveys should be done in the Anza Valley to determine if CNHY occupies any locations there.

Coastal western whiptail was the only species found in every one of its Core Areas. This species seems to be quite common and general in its habitat preferences. Its fairly large size and generally conspicuous behavior makes it an easy species to detect. It was also found in 2 large non-core areas, the San Jacinto Foothills and the Iron Springs area.

We found granite spiny lizards in almost every area where there were expansive granite rock outcrops. These sites ranged in elevation from 152 m to 2126 m. We also found SCOR in some non-granite habitats, including the volcanic black rocks south of Lake Mathews and stone-masonry buildings at the Dripping Springs Campground in the Cleveland National Forest. The only Core Area where SCOR was not detected was the Banning Bench where there are limited areas of marginal habitat and presence of the species is doubtful here. A few other locations (e.g., Motte Rimrock and Box Springs

Reserves) have adequate habitat and could potentially replace Banning Bench as a Core Area. The Badlands, despite the presence of a few SCOR, has little suitable habitat, and likewise could be replaced by other areas in the Conservation Area with abundant rock outcrops.

Northern red-diamond rattlesnakes were detected in 9 Core Areas listed in the MSHCP. However this species was difficult to find, and the records are a combination of incidental observations, snake skins, and nocturnal survey findings. This result shows the importance of having well-trained crew members that remain vigilant about looking for and documenting non-target Covered Species during any field effort. Only 1 living animal was found during diurnal reptile surveys, while 3 were detected during nocturnal surveys. Skins were used to confirm CRRU presence in a few cases, as we assume that the skins do not persist long enough in the field to confirm presence when they are in fact extirpated. Only 6 snakes of any kind were found during these surveys, indicating that other survey methods should be used for monitoring CRRU and other snakes if meaningful inference about species status is desired beyond the minimal objective of documenting at least 1 individual in a Core Area.

San Diego horned lizards were found in a variety of areas and habitats. However, PHCO was not found in 2 of its Core Areas, the Paloma Valley/Hogbacks and the Lake Perris/San Jacinto Wildlife Area (Davis Unit). The Paloma Valley/Hogbacks is a patchwork of small parcels; however suitable habitat exists in this area and there is a possibility that PHCO were present and not detected. The Lake Perris/San Jacinto Wildlife Area is a large area with suitable habitat and there is a high possibility PHCO inhabits this area. The fact that all observations made during diurnal surveys were of juveniles indicates that PHCO populations are successfully reproducing in these areas.

We detected SCGR in the San Jacinto Mountains Core, but not the Santa Rosa Mountains Core. Southern sagebrush lizards were quite common in the San Jacinto Mountains at higher elevations, from 946 m to 2068 m. In contrast, portions of the Santa Rosa Mountains that occur within the Plan Area (i.e., Existing Core L) consist of desert transition habitats that mostly lie below the stated elevation range of >1524 m for SCGR (Dudek & Associates 2003). We surveyed 4 plots over 3 days in the Beauty Mountain and Tule Creek areas of Existing Core L, but did not observe SCGR or suitable habitat. Lemm (2006) states that SCGR is found from 150 m to 3200 m, but we have no records of SCGR below 3100 ft (944 m). Furthermore, U.S. Geological Survey reptile sampling data in the Plan Area includes no record of SCGR below 1524 m (Fisher and Case 1999), and MSHCP historical records are all in the San Bernardino National Forest above 1676 m. The historical locations reported in the MSHCP Species Account for SCGR are also all at least 12 km from Existing Core L, and include Santa Rosa Peak which is on the eastern end of Existing Core K (San Jacinto Mountains) and at the western end of the Santa Rosa Mountains. We searched 1 plot near Santa Rosa Peak that contained appropriate habitat, but did not detect SCGR. If future surveys fail to detect SCGR in Existing Core L, then efforts should be conducted in the higher elevations of the Banning

Bench area where suitable habitat exists. If SCGR is detected at the Banning Bench, then this location should replace Existing Core L as a Core Area for this species.

Southern sagebrush lizards are not listed as occurring in the Santa Ana Mountains in the MSHCP species account. Its presence there is undetermined, but there is suitable habitat in the area. Surveys should be conducted in the higher elevations to determine if SCGR is present there.

Recommendations for Future Surveys

Surveys should continue in Core Areas and non-core areas for covered reptile species. If time and personnel allow, intensive and repeated surveys should be done to estimate range occupancies and detection probabilities of target species using methods described in MacKenzie et al (2006). Surveys should also be done in suitable habitat in non-core areas to determine if any of these areas would be more suitable as Core Areas for target species than some of the more marginal existing Cores.

Artificial cover surveys focusing on documenting the presence of 4 covered reptiles in the Plan Area were initiated in late summer 2008. Target species include the southern sagebrush lizard (*Sceloporus graciosus vandenburgianus*), southern rubber boa (*Charina bottae umbratica*), and 2 subspecies of the mountain kingsnake, San Diego mountain kingsnake (*Lampropeltis zonata pulchra*) and San Bernardino mountain kingsnake (*Lampropeltis zonata parvirubra*). Survey efforts began in August, 2008 by installing artificial cover material in the San Jacinto Mountains, Banning Bench, Iron Springs, and the Santa Margarita Ecological Reserve. Checking these cover materials started in November, 2008 and will continue into the spring of 2009 if weather conditions are suitable. Generally it takes considerable time before snakes find and utilize artificial cover objects for thermoregulation sites.

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Appendix A. Western Riverside County MSHCP Biological Monitoring Program Protocol for Diurnal Reptile Surveys 2008

Goals: To document the presence of CNHY, CNTI, SCOR, CRRU, PHCO, and SCGR within as many species-specific Core Areas and potential habitats as possible in the MSHCP Conservation Area.

Determine the grids that are inside both the access and Core Areas you wish to survey, and find or print a map. Download all corner points to your GPS unit.

Surveys will be conducted when the temperature is at least 25 degrees Centigrade starting at least one hour after sunrise, with no precipitation. Surveys should be done by two people for every complete 250m x 250m grid. Incomplete grids, or those with little appropriate habitat, may be done by one person.

When at the location, navigate to the corner point of the grid you wish to survey. Determine the best way to navigate through the grid, staying in appropriate habitat. Fill out the datasheet, including sky code, wind avg. and max.(km/hr), and temperature (C°). Also record date, location, grid number, start time, and observers.

To start the survey, walk slowly and carefully through appropriate habitat, scanning all basking sites, including trees and large bushes, with binoculars. Look into any dark cracks or crevices using a flashlight or mirror to reflect light into these openings. Rock crevices especially should be checked thoroughly. Be careful not to expose yourself to any rattlesnakes that might be lurking inside. Try to leave all natural cover undisturbed, but any unnatural cover or trash should be flipped over to find animals. Be very careful not to leave any part of your body exposed as you are looking under cover to protect yourself from rattlesnakes, scorpions, spiders, etc. Snake gaiters are also highly recommended while conducting these surveys. Any reptile skins found should be carefully removed and put into a plastic sampling bag to be brought back to the office for identification. Take a GPS waypoint for every Covered Species location or unknown skin.

All reptiles, amphibians, fish and crayfish should be recorded, even if not positively identified. For reptiles and amphibians, also record the number observed, behavior, habitat, location, identification cues, sex, and age for every age class. For non-covered species, record the number seen in the grid for every age class, but for all of the other information, record only that which pertains to the FIRST individual seen in the grid square. For Covered Species enter each individual as a separate record and record the GPS coordinates. If more than one Covered Species is in the same small area you can use the same coordinates for all, but a separate entry must be made for each animal.

Take a photograph of any unusual specimens and put them at Projects\Herps\Terrestrial Herps\THerpPhotos. Label the photos with the four letter code, the grid number, the date and the observer. For example a Coast Horned Lizard at GB2177NE on June 15, 2008 seen by Sheila would be PHCO_GB2177NE_6-15-2008_SLP.jpg. Don't forget the jpg. If there is more than one photo of the same species in the same grid just add a number to the species code, e.g. PHCO1_ etc.

When the grid survey is complete, record the end time, temperature, and wind speed again.

Equipment: Close-focus binoculars, Kestrel, GPS unit, camera, extra batteries, snakestick, flashlight, handheld mirror, datasheets, species code sheet, field guides, sampling bags, snake gaiters (optional), and all personal gear, including food and water.

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