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

Western Pond Turtle
(*Clemmys marmorata pallida*)
Survey Report 2011

(Western Pond Turtle-Photo by Elizabeth Dionne)

2 April 2012

TABLE OF CONTENTS

LIST OF TABLES AND FIGURES

LIST OF APPENDICES

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 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.

We also 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 2011.

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 author of this report was the 2011 Herpetology 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. For further information on the MSHCP and the RCA, go to www.wrc-rca.org.

Contact Info:

Executive Director
Western Riverside County
Regional Conservation Authority
Riverside Centre Building
3403 10th Street, Suite 320
Riverside, CA 92501
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) 248-2552

INTRODUCTION

The western pond turtle (*Clemmys marmorata pallida*) is a California species of special concern and is the state's only native freshwater turtle. There are 2 subspecies of *Clemmys marmorata* that occur in California: the northwestern subspecies (*C. m. marmorata*), which ranges north of the American River, and the western subspecies (*C. m. pallida*), which is distributed from the San Francisco area south across the Western Riverside County MSHCP Plan Area and into Baja California (Seelinger 1945, USFWS 1992, Holland 1994). The genus of pond turtle has recently been changed to *Actinemys*, but we will retain the old name in this report to stay consistent with the MSHCP. The western pond turtle prefers permanent water bodies with emergent vegetation and basking areas (Lemm 2006) and occurs in the Plan Area across portions of Cole Creek, Santa Ana River, San Jacinto River, and the confluence of Temecula and Murrieta Creeks (Dudek & Associates 2003).

MSHCP species-specific conservation objectives 2 and 5 for the pond turtle call for maintaining occupancy within at least 75% of 8 listed Core Areas as measured once every 3 years (Dudek & Associates 2003). Core Areas for this species are: Cajalco Creek, San Mateo Creek, Santa Ana River, Chino Creek, Temecula Creek, Murrieta Creek, Santa Rosa Plateau, and San Jacinto River east of I-215. These Core Areas include a 2-km buffer of upland habitat surrounding each waterway.

We have surveyed for populations of pond turtle within Core Areas and other suitable areas in conservation every year since 2006. We use visual and trapping protocols developed and tested in San Diego County by the Western Ecological Research Center of the U.S. Geological Survey (USGS 2006). The protocol is widely used for trapping pond turtles in southern California.

Our 2011 survey effort focused on 2 areas where we did not previously have access: lower Murrieta Creek and the Prado Wetlands. Lower Murrieta Creek is in the Murrieta Creek Core Area and the Prado Wetlands include land in both the Santa Ana River and Chino Creek Core Areas. We also assisted trapping efforts by the MSHCP Management Program at Warm Springs Creek in Murrieta, a non-core area, where turtles in danger of losing their habitat were relocated.

Goals and Objectives

1. Locate suitable habitat in Core Areas and dispersal units not surveyed in recent years.
    a. Conduct visual habitat assessments based on USGS protocol.
2. Collect information about species distribution and demographics in the Plan Area.

   a. Determine presence and measure relative abundance at surveyed Core Areas.
   b. Mark animals with Passive Integrative Transponder (PIT) tags.

3. Work in collaboration with USGS on an ongoing population study of reptiles in southern California.
   a. Retrieve tissue samples from USGS target species for genetic analysis.

METHODS

Protocol Development

We evaluated potential trapping sites using a visual habitat assessment that was based on variables identified in Madden-Smith et al. (2005, Appendix A). The trapping protocol developed by USGS (2006) has been the basis of our protocol since surveys began in 2006. We have not appended this protocol due to its considerable length, but it is available from the USGS San Diego Field Station. The protocol details a trapping procedure that maximizes our ability to detect all turtle species present in a given area. This protocol has been amended by the current Herpetology Program Lead, Robert Packard, to include water quality data and landscape characteristics that were excluded from our visual habitat assessment protocol. In addition, we have switched to using paper datasheets instead of personal digital assistants (PDAs), we do not use temperature loggers, we record water quality data during trapping, and we take an additional side photo of all turtles to assist with identification.

Personnel and Training

Field personnel working with the Monitoring Program's herpetology crew in 2006 attended a USGS-led training in May 2006 that covered protocol implementation and the identification of turtle species that occur in the Plan Area. Individuals that attended the USGS sessions then trained field personnel in 2009 in protocol procedures and species identification. The Herpetology Program Lead also attended a western pond turtle conference in the Santa Monica Mountains in the spring of 2009 to learn new techniques for trapping pond turtles and refining protocol methods.

Biological Monitoring Program training for pond turtle surveys included an in-office presentation of key characteristics used to distinguish local species, and examination of live specimens. Additionally, we trained crew members to safely insert PIT tags and collect tissue samples using live specimens of locally-captured non-native species or, in the field, with trapped pond turtles.

Biological Monitoring Program personnel were funded by the California Department of Fish and Game or the Regional Conservation Authority; volunteers are noted. The following personnel conducted pond turtle surveys in 2011:

- Robert Packard, Herpetology Program Lead (Biological Monitoring Program)
- Ana Hernandez (Biological Monitoring Program)
- Angela Collada (Biological Monitoring Program)
- Ashley Ragsdale (Biological Monitoring Program)
- Bonnie Johnson (Orange County Water District)
- David McMichael (Orange County Water District)
- Elizabeth Dionne (Biological Monitoring Program)
- Eric Peralta (Orange County Water District)
- Esperanza Sandoval (Biological Monitoring Program)
- John Dvorak (Biological Monitoring Program)
- Jonathan Reinig (Biological Monitoring Program)
- Joseph Sherrock (Biological Monitoring Program)
- Lynn Miller (Biological Monitoring Program)
- Maricela Paramo (Biological Monitoring Program)
- Masanori Abe (Biological Monitoring Program)
- Michele Felix (Biological Monitoring Program)
- Talula Barbee (Orange County Water District)
- Tara Graham (Biological Monitoring Program)

Survey Design

We targeted the Chino Creek, Santa Ana River, and Murrieta Creek Core Areas in 2011. We selected trap locations within targeted Core Areas and dispersal units based on presence of suitable habitat, as determined by visual assessments conducted along streams and pond shorelines (Appendix A). With the help of Orange County Water District employees, we conducted visual assessments on 5 May and 5 July 2011 in the Prado Wetlands, and after obtaining a right of entry agreement with the City of Temecula on 16 September 2011 at Murrieta Creek. We considered habitat to be suitable if there was slow moving water >0.5 m deep and the area was qualitatively assessed as marginal or better according to known habitat preferences (Lemm 2006, Appendix A).

We selectively placed traps where vegetative cover, basking sites, and appropriate water depth occurred within identified suitable habitat (Figure 1). We also attempted to prevent vandalism and theft of traps by placing them away from public access. We left traps open all night and checked them each morning. Alternatively, we opened traps in the morning, monitored them throughout the day, and removed them in the early evening if they could not be located away from public view.

The number of trap sites per Core Area or dispersal unit, and the number of trap locations per site, depended upon the extent of appropriate habitat (Table 1). Each trap location consisted of either a large or small hoop trap, depending on

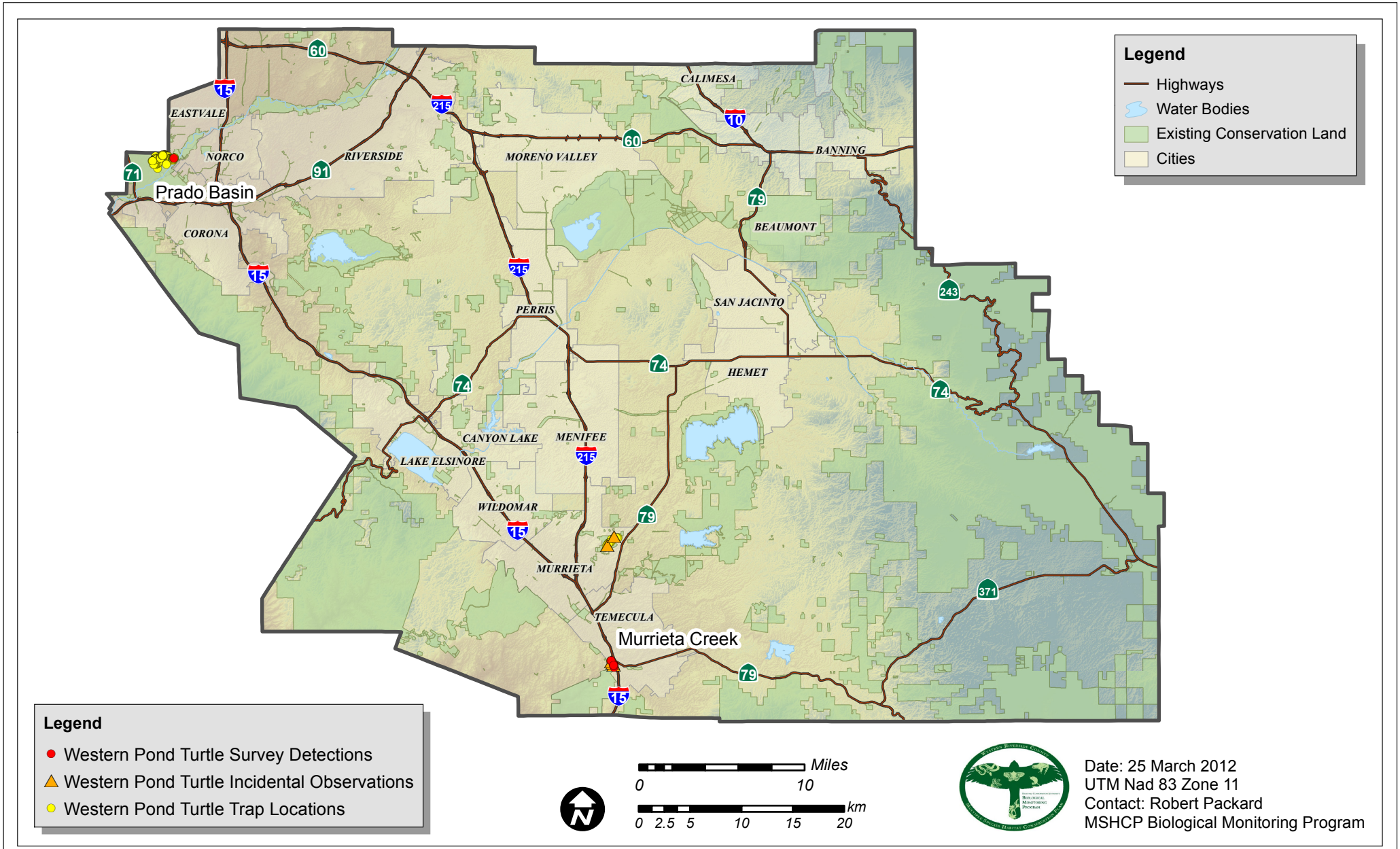

Figure 1. Western pond turtle trapping locations and detections in 2011.

Table 1. Number of trap sites per area at surveyed areas, 2011.

Site	Trapping Area	Trap Sites (*n*)	Description (# of traps per site)
Core Area			
Santa Ana River/ Chino Creek	Prado Wetlands	5	Treatment ponds and diversion channels (2–7)
Murrieta Creek	Lower Murrieta Creek	3	Creek (19–26)
Non-core Area			
Murrieta	Warm Springs Creek	8	Creek (1–5)

water depth, baited with a punctured tin of sardines. We also monitored fish and crayfish populations by placing 1 standard minnow trap for every 10 hoop traps at each site, or 1 for every trap site with <10 hoop traps.

We surveyed each trap site over a single effort that consisted of 4 consecutive trap nights. We installed traps on Mondays, checked them each morning of the next 4 days (i.e., Tuesday–Friday), and removed them on Friday. We removed turtle traps at Murrieta Creek each night at approximately 1800 h because of the threat of human disturbance, and reset them each morning between 0700 and 0900 h. We conducted trap surveys 11–15 July and 1–26 August 2011 at the Prado Wetlands, and 3–7 October and 24–28 October 2011 at Murrieta Creek. We did not trap during consecutive weeks at either site due to conflicts with other Monitoring Program surveys at those times.

We also assisted Elizabeth Dionne of the MSHCP Management Program with turtle trapping at the non-core area of Warm Springs Creek in Murrieta from 14–18 November 2011. Five turtles trapped from Tucalota Creek in May 2010 were relocated here on 19 April 2011, due to habitat alteration along Tucalota Creek, and 2 pond turtles native to Warm Springs Creek, but found in inappropriate habitat, were caught in traps on 9 September 2011, and moved to this location.

Field Methods

We conducted visual habitat assessments with at least 2 surveyors walking along lake or stream banks and within stream channels in an upstream direction. We qualitatively ranked the suitability of each pool or 250-m stream segment according to presence or absence of slow moving water, water depth, quantity of basking sites, aquatic and streamside substrate, and upland habitat. We also recorded the ease of human access, naturalness, and identified all reptiles and amphibians that we encountered at each potential trapping location (Madden-Smith et al. 2005, Appendix A).

We trapped sites that contained appropriate habitat according to the USGS (2006) protocol. We recorded UTM coordinates of each trap on the day it was set,

and uniquely numbered trap locations in the order in which they were selected. We collected the following data before setting traps at each pool or stream segment: date, observer, time, general weather conditions, temperature in shade at 1 m above ground, average wind speed, water temperature, pH, dissolved oxygen, conductivity, water width, water velocity, and area of water. We also took upstream photos at the start of each segment and noted the presence and abundance of exotic plant species. For non-covered animal species, we recorded a species observation at the first encounter of each life stage (i.e., tadpole, juvenile, or adult) within a pool or stream segment for animals outside of traps. For all Covered Species, we made an incidental record for each individual and recorded its location as a waypoint on handheld GPS units.

We baited each trap with a punctured can of sardines and checked traps daily between 0730 h and 1600 h to retrieve trapped turtles and other aquatic species (e.g., fish, frogs, invertebrates). We first recorded general weather information at each pool before checking traps. We then recorded trap site, sex, carapace length, carapace width, plastron length, and weight for each captured turtle. We also notched the right femoral scute of the plastron of all turtles except softshells, and collected tissue samples from each turtle by clipping the last 3 mm of the tail, or a small strip of skin from the feet of softshells. We did not notch softshell turtle scutes due to the delicate nature of their soft shell and the fact that they are non-target species. We preserved tissue samples in alcohol and stored them in a freezer at the Biological Monitoring Program office before delivering them to the USGS office in San Diego. USGS uses the tissue samples in a larger genetic study to assess population structure and movement of turtles between sites. We took at least 4 photos of each turtle (face-on, carapace, side of carapace, and plastron orientations) and noted shell damage. After scanning individuals with a PIT tag reader to determine whether they had already been PIT-tagged, we marked all adult pond turtles with a subcutaneous PIT tag (American Veterinary Identification Devices, Inc., Norco, CA) inserted at the medial ventral fold of the right rear leg (Figure 2). Processing times lasted 5–10 min per animal depending on whether the turtle had already been PIT-tagged. We then returned all western pond turtles to the pool from which they came. We donated all exotic turtles we collected to the California Turtle and Tortoise Club (Orange County, California), which were then put up for adoption. We either released on-site or destroyed all other exotic animals we collected, according to each surveyor's personal preference. We then re-set traps after each check and removed the traps on the fourth trapping day. All other exotic species were either released or destroyed, depending on each crew member's personal preference.

Figure 2. PIT tag being inserted into the medial ventral fold of the right rear leg of a western pond turtle. Notch mark used for identifying a recaptured animal is also visible on the right femoral scute.

Data Analysis

We were unable to conduct quantitative analysis of data collected in 2011 due to small sample sizes. We present here summary information for 2011 and for the entire survey period beginning in 2006. We have transferred all data collected prior to 2009 from the USGS database in San Diego, CA to the MSHCP database in Riverside, CA.

RESULTS

We captured a total of 14 live pond turtles in 2011. We captured 1 pond turtle in the Santa Ana River diversion in the Prado Wetlands, which is in the Santa Ana River Core Area. We also captured 12 pond turtles in lower Murrieta Creek (Figure 1). Finally, we caught 1 turtle by hand at lower Murrieta Creek, and also found 1 dead pond turtle there with a fish hook in its neck. We did not capture any pond turtles at Warm Springs Creek while working with the MSHCP Management Program.

We found several non-native species at our trapping sites (Table 2). We detected 2 species of invasive turtle in the Prado Wetlands, spiny softshell (*Apalone spinifera*) and red-eared slider (*Trachemys scripta*). We also found 1 African clawed frog (*Xenopus laevis*) in this drainage.

Table 2. Summary of species and numbers trapped, by site, during 2011 pond turtle surveys.

Site	Common Name	Scientific Name	Number
Prado Wetlands	Red swamp crayfish	*Procambarus clarkii*	1000s
	Common carp	*Cyprinus carpio*	6
	Black bullhead	*Ameiurus melas*	2
	Yellow bullhead	*Ameiurus natalis*	1
	Mosquitofish	*Gambusia affinis*	100s
	Bluegill	*Lepomis macrochirus*	10s
	Green sunfish	*Lepomis cyanellus*	100s
	White crappie	*Pomoxis annularis*	10s
	Largemouth bass	*Micropterus salmoides*	10s
	Bullfrog	*Lithobates catesbeiana*	100s
	African clawed frog	*Xenopus laevis*	1
	Western pond turtle	*Actinemys marmorata*	1
	Spiny softshell	*Apalone spinifera*	8
	Red-eared slider	*Trachemys scripta*	5
Murrieta Creek	Red swamp crayfish	*Procambarus clarkii*	1000s
	Fathead minnow	*Pimephales promelas*	1
	Black bullhead	*Ameiurus melas*	100s
	Mosquitofish	*Gambusia affinis*	1000s
	Bluegill	*Lepomis macrochirus*	10s
	Green sunfish	*Lepomis cyanellus*	100s
	Bullfrog	*Lithobates catesbeiana*	10s
	Western pond turtle	*Actinemys marmorata*	12
Warm Springs Creek	Red swamp crayfish	*Procambarus clarkii*	10s
	Mosquitofish	*Gambusia affinis*	10s
	Green sunfish	*Lepomis cyanellus*	10s

All drainages trapped had a variety of non-native fish, including mosquitofish (*Gambusia affinis*), black bullhead (*Ameiurus melas*) and green sunfish (*Lepomis cyanellus*). We found the invasive red swamp crayfish (*Procambarus clarkii*) in all drainages we trapped. We did not find any native fish in any drainage we trapped.

Including all turtles trapped, caught by hand, or recovered deceased we collected tissue samples from 31 individuals, representing 3 turtle species during turtle surveys in 2011. We delivered all samples to USGS in support of their ongoing population genetics study of reptiles in southern California.

DISCUSSION

We focused 2011 survey efforts on documenting the presence of pond turtles in Core Areas for which we did not have previous access. We detected pond turtles in the Santa Ana River and Murrieta Creek Core Areas, but not in the Chino Creek Core Area.

We visually surveyed all 8 pond turtle Core Areas for appropriate habitat from 2006–2011, and performed trapping surveys in 5 Core Areas. We have detected the species in 5 of 8 (63%) Core Areas, as well as in 1 dispersal area, the Santa Margarita River (Table 3). We need to document pond turtle at 1 additional Core Area to meet species objective 5, which requires occupancy of at least 75% (6 of 8) of Core Areas. Temecula Creek has little if any appropriate habitat currently included in the Conservation Area, and Chino Creek and the San Jacinto River Core Areas have been highly impacted by human activities. A robust population is known to occur along Chino Creek itself just north of the Plan Area in San Bernardino County, and suitable habitat exists within 2 km of the San Jacinto River as it passes through the San Jacinto Wildlife Area (SJWA). Pond turtles could occur in these Core Areas and trapping efforts should continue there.

Table 3. Summary of pond turtle survey efforts and detections by year and site, 2006-2011. Survey type (V=visual, T=trapping, I=incidental) is also indicated.

Site	Trapping Site	2006	2007	2008	2009	2010	2011	Detected
Core Areas								
Chino Creek	Chino Creek	V, T	V	-	V, T	-	-	-
	Mill Creek	-	-	-	V, T	-	-	-
	Prado Wetlands	-	-	-	V, T	-	T	-
	Goldberry Ponds	-	-	-	V, T	-	-	-
Murrieta Creek	Murrieta Creek	V	-	V	V	-	V, T	2011
Cajalco Creek	Cajalco Creek	-	-	T	V	T	I	2008, 2009, 2010, 2011
San Jacinto River	San Jacinto River	-	-	V, T	-	-	-	-
	SJWA	-	-	V, T	-	-	-	-
San Mateo Creek	San Mateo Canyon	V	V	I	I	-	-	2007, 2008, 2009
Santa Ana River	Norco Pools, Prado Wetlands	-	-	-	V, T	-	T	2009, 2011
Santa Rosa Plateau	Santa Rosa Plateau	V	V	-	I	I	-	2006, 2007, 2008, 2009, 2010
Temecula Creek	Temecula Creek	V	-	T	-	-	-	-
Dispersal Sites								
Railroad Canyon Lake	Canyon Lake	-	-	-	V, T	-	-	-
Santa Margarita River	Santa Margarita River	-	V, T	-	I	I	-	2007, 2009, 2010
Non-core Areas								
Chino Hills State Park[a]	Lower Aliso Canyon	-	T	-	-	-	-	2007
Murrieta	Warm Springs Creek	-	-	-	-	-	T	2011

[a] Not a Core Area for pond turtle; we tested the trapping protocol at this site.

The absence of pond turtles in the Chino Creek Core Area may be due to the presence of red-eared sliders and spiny softshell turtles. These exotic species may pose a threat to native species through competition for food and basking and nesting sites, along with the introduction of exotic diseases (Spinks et al. 2003).

Recommendations for Future Surveys

We will continue surveying all accessible Core Areas and attempt to identify other potential turtle habitat outside of listed cores. We plan to trap the San Jacinto River and Santa Ana River Core Areas in 2012, pending access permissions. We will also search for more areas along the San Jacinto River that may be suitable for trapping.

A more comprehensive assessment of upland habitat use would help facilitate management of pond turtles. This would involve a more thorough evaluation of landscape composition, such as collecting parameters of upland slope and distance to suitable nesting locations. Pond turtles are known to travel extensive distances in search of suitable nesting habitat and it has been reported that pond turtles in particular have traveled as far as 1.9 km streamside and 100 m into upland habitat (Rathbun et al. 1992). We support the ongoing telemetry studies conducted by the MSHCP Management Program to determine specific upland habitat use by nesting female turtles at RCA-owned properties within the Conservation Area. Because pond turtles do not nest in the aquatic system itself, it is important to assess all of their habitat requirements.

We also urge local land managers to focus attention on controlling invasive non-native species present in these waterways. In particular, the spiny softshell and red-eared slider are competing for the same resources the pond turtle uses, and can transmit disease to pond turtles (Spinks et al. 2003). Invasive fish and frogs can also compete with pond turtles for food, and prey on turtle hatchlings (Dudek & Associates 2003).

Finally, we highly recommend that the Santa Margarita Ecological Reserve be considered as a replacement Core Area for cores where pond turtles have not been detected during monitoring efforts to date. The amount of conserved pond turtle habitat is very limited and/or heavily disturbed in some existing Core Areas. Based on previous efforts, we know that a pond turtle population occurs within the reserve along the Santa Margarita River. Therefore, it seems appropriate to replace a more highly disturbed or unsuitable area on the Core Area list with the Santa Margarita Ecological Reserve.

Acknowledgements

We thank the Orange County Water District (OCWD) for their invaluable assistance in allowing us access and guiding us around the OCWD retention ponds,

canals, and backwaters, and their hard work in helping us set the traps and check them every day.

We also thank the City of Temecula for allowing us access to Murrieta Creek, and the City of Murrieta for allowing us access to Cole Creek, and Laurie Dobson-Correa and Brian Beck of the RCA for their assistance in obtaining this access.

Lastly, we thank the California Turtle and Tortoise Club of Orange County for accepting all of the exotic turtles we captured.

LITERATURE CITED

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.

Holland DC. 1994. The western pond turtle: habitat and history. Final Report. DOD/BP-62137-1. Bonneville Power Administration and Oregon Dept. of Fish and Wildlife, Wildlife Diversity Program, Portland, OR.

Lemm JM. 2006. Field Guide to amphibians and reptiles of the San Diego region. Berkeley (CA): University of California Press.

Madden-Smith MC, Ervin EL, Meyer KP, Hathaway SA, Fisher RN. 2005. Distribution and status of the arroyo toad (*Bufo californicus*) and western pond turtle (*Emys marmorata*) in the San Diego MSCP and surrounding areas. U. S. Geological Survey final report prepared for County of San Diego and California Department of Fish and Game. San Diego, CA. 183 pp.

Rathbun GB, Siepel N, Holland D. 1992. Nesting behavior and movements of western pond turtles, *Actinemys marmorata*. Southwest Nat. 37:319–324.

Seelinger LM. 1945. Variation in the Pacific mud turtle. Copeia 1945:150–159.

Spinks Q, Pauly GB, Crayon JJ, Shaffer HB. 2003. Survival of the western pond turtle (*Emys marmorata*) in an urban California environment. Biol Conserv. 113:257–267.

[USFWS] U.S. Fish and Wildlife Service. 1992. Endangered and threatened wildlife and plants: 90-day finding and commencement of status reviews for a petition to list the western pond turtle and California red-legged frog. Fed. Reg. 57:45761–45762.

[USGS] U.S. Geological Survey. 2006. USGS western pond turtle (*Emys marmorata*) trapping survey protocol for the southcoast ecoregion. U.S. Geological Survey. San Diego, CA.

Appendix A. Pond turtle habitat assessment datasheet.

Block (stream/ pond): _____ **DATE**: _____
Site (reach/ pool #): _____

Observer(s) Initials: _____

Habitat Quality

slow moving water circle one: no yes___

≥ 0.50 m of pooling water circle one: no yes___

basking sites circle one: 0 ("none") 1 ("few") 2 ("many")

aquatic refugia circle one: 0 ("none") 1 ("few") 2 ("many")

streamside refugia* circle one: 0 ("none") 1 ("few") 2 ("many")

upland nesting habitat* circle one: 0 ("none") 1 ("few") 2 ("many")

Total: _____

High=7-8 **Good**=5-6 **Marginal**=3-4 or water more than 0.5 m deep **Poor**=0-2 or water less than 0.5 m deep

Level of Human Access (circle one)

Low (remote sites or sites with restricted or limited access)

Medium (sites with restricted or limited access, but with a moderate frequency of trespassing (e.g., private reservoirs), or sites with only limited restrictions on access & have only moderate use (e.g., parks imbedded in low density housing, parks in a developing area with only moderate use at this time))

High (sites with few access restrictions, usually designated recreational areas (e.g., fishing/boating areas)

Level of Naturalness (circle one) – If not able to assess in the field, please leave for Program Lead.

Natural: (Sites with 10% or less modification of the natural habitat (e.g., mostly natural river or stream channel)

Modified Natural: (sites with greater than 10% artificial modification of the natural habitat (e.g., dammed or channelized river or stream))

Artificial: (sites that were completely artificial and occur outside of a natural channel or wetland [e.g., artificial ponds in a park setting, agricultural ponds])

NOTES:_____
_____
_____