United States Department of the Interior

U.S. GEOLOGICAL SURVEY
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April 12, 2022

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Heather Dyer, M.S., M.B.A.
General Manager
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Dear Ms. Christensen and Mrs. Dyer,

This letter transmits the U.S. Geological Survey (USGS) Western Ecological Research Center's draft data summary entitled Southwestern Pond Turtle (*Actinemys pallida*) Population and Habitat Assessment, Southern California, Draft Final 2021. This information is provided to fulfill USGS obligations under the U.S. Fish and Wildlife Service Inter/Intra-Agency Agreement (IAA) 4500140068 and the San Bernardino Valley Municipal Water District Technical Assistance Agreement 20ZCTAASBVMWD00. We expect to publish these data in early 2023 and a final publication will be distributed when available.

Please note that this information is preliminary or provisional and is subject to revision. It is being provided to meet the need for timely best science. The information has not received final approval by the USGS and is provided on the condition that neither the USGS nor the U.S. Government shall be held liable for any damages resulting from the unauthorized use of this draft data for interpretation or resource decision-making.

We appreciate the opportunity to work with the U.S. Fish and Wildlife Service and the San Bernardino Valley Municipal Water District to provide scientific information relevant to resource management in southern California. Please direct any questions to Dr. Robert Fisher at (619)-206-5686.

Sincerely,

ROBERT FISHER

Digitally signed by ROBERT FISHER
Date: 2022.04.12 12:48:30 -07'00'

Principal Investigator

Southwestern Pond Turtle (*Actinemys pallida*) Population and Habitat Assessment, Southern California, Draft Final 2021

Southwestern Pond Turtle (*Actinemys pallida*) Population and Habitat Assessment, Southern California, Draft Final 2021

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U.S. GEOLOGICAL SURVEY
WESTERN ECOLOGICAL RESEARCH CENTER

Data Summary

Prepared for:
U.S. Fish and Wildlife Service
San Bernardino Valley Municipal Water District

Research authorized by:
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INTRODUCTION

Until 2014 the western pond turtle was considered one species and referred to as *Actinemys* (*Emys*) *marmorata* (Spinks et al. 2014). Recently the species has undergone taxonomic revisions with different agencies using variations of the taxonomy for the southern clade, the U.S. Fish and Wildlife Service recognizes the southern group as *Actinemys marmorata pallida* and the California Department of Fish and Wildlife recognizes it as *Emys marmorata*. Following the taxonomic revision to recognize two distinct species we will refer to it as the southwestern pond turtle (*Actinemys pallida*; pond turtle) (Turtle Taxonomy Working Group 2021).

The southwestern pond turtle is the only native freshwater turtle in coastal California. Historically the range of the pond turtle extended from the central Coast Range of California south of San Francisco, into northern Baja California, Mexico. In southern California, dramatic declines have occurred due to habitat loss, altered hydrology, and the introduction of non-native species (Thomson et al. 2016). Bury et al. (2012) estimated the pond turtle had declined in 95% to 99% of its range by 2012. In the late 1980's, work by Brattstrom and Messer (1988) suggested that only a few viable populations of pond turtles remained in southern California based on observations at only 53 of 87 known historical locations. They also found that pond turtle populations at the remaining sites were small (1–5 individuals observed). Declines prompted this species to be a covered species under the Upper Santa Ana River Habitat Conservation Plan (HCP) (ICF 2020). Currently the pond turtle is a state species of special concern (CNDDB 2022) and is under review for listing under the Endangered Species Act (U.S. Endangered Species Act [ESA 1973, as amended]) based on a 90-day finding issued in April 2015 (USFWS 2015).

The pond turtle is a habitat generalist and inhabits many types of water bodies ranging from permanent to intermittent and from freshwater to brackish environments (Holland 1991, 1994; Buskirk 2002). Specifically, pond turtles inhabit creeks, slow moving rivers, marshes, ponds, lakes, reservoirs, vernal pools, canals, and even sewage treatment plants (Ernst and Lovich 2009; Germano 2010; Stebbins and McGinnis 2012) and prefer habitats with slow flowing water with the presence of woody or rocky debris that provides emergent and underwater refugia (Reese 1996; Reese and Welsh 1998). Pond turtles are mostly aquatic but will travel to upland habitats to nest, over-winter, bask, and aestivate (Holland 1991; Reese 1996; Lovich and Meyer 2002; Rathbun et al. 2002). They have been known to travel as far as 500 m into the uplands (Reese and Welsh 1998; Hays et al. 1999) and linear home ranges have been recorded up to 4263.2 m (Goodman 1997; Goodman and Stewart 2000). It is possible that upland habitat is more important in the more arid southern portion of the pond turtle's range, where rivers and streams regularly dry as a result of drought and/or diversion or damming to support human water needs (e.g., drinking water, agriculture) (Purcell et al. 2017).

To document occupied areas in southern California, record demography of remaining pond turtle populations and assess suitable habitat, the U.S. Geological Survey (USGS) conducted pond turtle specific surveys throughout Los Angeles, Orange, western Riverside, and southwestern San Bernardino counties. These surveys included habitat suitability assessments to determine whether appropriate habitat existed at survey locations, as well as identifying threats from invasive species, especially the presence of non-native turtles. Pond turtles were also detected during surveys focused on other species, but no habitat assessment was done at those sites.

METHODS

The USGS conducted pond turtle specific surveys at 17 sites throughout southern California (Table 1, Figure 1). During the surveys a qualitative habitat assessment was conducted to rank potential pond turtle habitat suitability. Assessments included characteristics associated with the presence of pond turtles, including water feature type, estimates of water feature size and flow, presence of basking sites and upland nesting habitat, estimates of vegetation cover, general riparian species composition, upland habitat types, presence of non-native plant species, possible anthropogenic or natural disturbance of habitat, and presence of non-native aquatic species. Sites were categorized on the following general characteristics: 1) water permanency, 2) channel type, 3) presence of upland buffer, 4) water depth, 5) type of aquatic substrate, 6) presence of aquatic refugia, 7) presence of hatchling habitat, 8) presence of basking sites, 9) amount of canopy cover, 10) type and presence of terrestrial refugia, 11) availability of human access, 12) presence of invasive aquatic species, and 13) distance to the nearest paved road. Each characteristic was given a numeric value from 0 to 3 based on their contribution to habitat quality. Some characteristics were scored on presence (1) or absence (0), while some were weighted more heavily such as water depth and human access (Appendix 1). A total of 30 points were possible for each site. Based on the scoring, site quality was categorized into *high* (score of 26 or above, $\geq$ 85% of the points), *moderate* (score 24 or 25 points, 80 – 84% of the points), *marginal* (score 21 or 23 points, 68 – 83% of the points), and *poor* (score of 20 or less, $\leq$ 67 % of the points) (USGS 2011).

At sites where trapping was possible, we deployed a combination of 30” diameter hoop single fingered-mouth funnel traps, 20” diameter hoop single fingered-mouth funnel traps, 30” oval traps, and minnow traps (used to target pond turtles) baited with mackerel. The number and type of traps deployed depended on the available water and differed by site (Table 1). At seven sites, traps were deployed for four days and three nights and were checked daily. Shorter trapping sessions were used at three sites where traps were set for one to three days to determine if pond turtles were present. All animals caught in the traps and any incidental animals observed outside of the traps were recorded.

We noodled for pond turtles concurrently with trapping or as the main survey method at several sites (Table 1). Noodling surveys consist of using our hands to feel along the bottom and sides of the creek or pond. This method works well in shallow water in relatively enclosed systems where there are not good escapes for the turtles. All animals observed during these efforts were recorded.

At Aliso Canyon and Soquel Canyon we employed bacon baiting to catch turtles. Pieces of bacon were tied to a weighted string so that the bacon floated in the water column. Once a pond turtle latched on to the bacon, it was pulled to shore and a net was placed underneath it to prevent its escape, much like fishing. This method worked well for the Aliso Canyon pond turtles where State Park employees have been bacon baiting for crayfish for years. We did not catch any turtles in Soquel Canyon using this method.

All captured pond turtles were weighed (g), measured (mm), sexed, and individually marked with PIT tags or marginal scute notches for mark/recapture analysis. The PIT tags allow for identification of unique individuals and are engineered to last the lifetime of an animal (Ferner

2007). Marginal scute notches were filed with a triangular file into the marginal shield using the Holland carapace code system (Holland 1994). Measurements included: maximum carapace length from the first marginal scute to the last (twelfth in most cases); minimum carapace length from the front notch to the back notch; maximum plastron length from the highest point on the right to the longest point on the right; minimum plastron length from the front notch to the back notch in the rear scute; maximum carapace width, bridge carapace width (taken at narrowest point where the carapace and plastron meet on the side of the turtle); maximum height taken parallel to the animal's body; and minimum height taken perpendicular to the animal's body. Other markings and injuries were also recorded. Pond turtles were classified as adults if their maximum carapace length was greater than 103 mm. A maximum of 15 tissue samples were collected for phylogenetic analysis per site, consisting of a small (approximately 5 mm) section of a pond turtle's tail.

Non-native species were removed on a site-by-site basis after evaluation of the number present and discussion with landowners. At sites with large numbers of non-native species (10 or more of one species caught on the first day), landowners typically decided that removing a small number of individuals would be inconsequential for the population, and no removal was conducted except as identified below for our plastics study. At sites where animals were removed, non-native frogs were sedated with benzocaine and then pithed. Non-native sliders (*Trachemys* spp.) were either taken to a veterinary office and euthanized or euthanized on site by a trained biologist and then taken to the Natural History Museum of Los Angeles County for a study analyzing the toxicology of plastics in turtles. The common snapping turtles (*Chelydra serpentina*) were taken to a veterinary office and euthanized, then donated to a veterinary college. Demographic data were taken for non-native turtles and frogs (age, sex, weight, and length), and tissue samples were taken from up to ten non-native turtles from each site.

To prevent the transfer of pathogens and invasive species (i.e., iridovirus, chytrid fungus (*Batrachochytrium dendrobatidis*), turtle ulcerative shell disease, New Zealand mud snails (*Potamopyrgus antipodarum*), zebra mussels (*Dreissena polymorpha*), and quagga mussels (*Dreissena bugensis*)) between study areas, all equipment was cleaned to remove mud and debris, then disinfected using a 6% bleach solution, then frozen for at least eight hours to kill any pathogens and invasive snails or mussels. All equipment used for tissue collection and PIT tagging was disinfected between individuals to avoid contamination.

RESULTS

Of the 17 sites surveyed for pond turtles in 2021, only one (West Fork San Gabriel River) was categorized as *high* in the habitat assessment, nine were categorized as *marginal*, and the remaining sites were categorized as *poor* habitat (Figure 2, Appendix 1). Water, human access, and invasive species were substantial factors influencing the placement of sites into categories. Seven of the sites were dry or had intermittent water, and the water available at five of the wet sites was shallow (0.5 – 1 m depth). The presence of invasive aquatic species offset the benefit of water availability. At nine of the wet sites, we detected more than one invasive aquatic species. Only four sites had restricted or limited human access, and ten of the sites were within 274 m of a paved road.

There were 158 pond turtle observations from 10 of the sites surveyed for pond turtles and six incidental sites for a total of 122 unique pond turtles captured in 2021 (Tables 3 and 5, Appendix 2). Some populations were surprisingly large including the 42 unique pond turtles caught in upper Carbon Canyon Creek. We detected non-native turtles at six of the sites and non-native frogs at five sites. The most common aquatic invasive species, the swamp crayfish (*Procambarus clarkii*) was detected at 11 sites. See Tables 3 – 5 for a summary of species detected at each site.

Aliso Canyon

The Aliso Canyon site included an approximately 6 km section of creek in Chino Hills State Park. Most of the creek was dry at the time we surveyed the site. We noodled and bacon baited the approximately 600 m of water available (Figure 3) on June 1 and August 16, 2021. The site had good canopy cover, a large terrestrial habitat buffer, and is far from paved roads. However, the lack of water and the presence of swamp crayfish contributed to a habitat assessment score of 22 points, categorized as *marginal*. We captured 16 unique pond turtles over two bacon baiting sessions, eight juveniles, and eight adults. All the adult pond turtles were female. Arroyo chub (*Gila orcutti*) were also observed.

Big Tujunga Creek (Lower)

Big Tujunga Creek is approximately 46.3 km long from its headwaters near Highway 2 in the Angeles National Forest to its wash above the Hansen Dam. On June 2, 2021, we noodled approximately 1.8 km of the creek within the National Forest Boundary where pond turtles had been detected in 2009 (Figure 4). The site was continuously wet with water over 1 m in depth, had a large terrestrial buffer, and good canopy cover. However, the lack of access restrictions, proximity to a paved road, and more than one invasive species contributed to a habitat assessment score of 22 points, categorized as *marginal*. No pond turtles were detected during our survey, but we detected several native fish species: arroyo chub, rainbow trout (*Oncorhynchus mykiss*), and speckled dace (*Rhinichthys osculus*). Non-native swamp crayfish and bullhead catfish (*Ameiurus* sp.) were also detected.

Big Tujunga Creek (Upper)

The upper section of Big Tujunga Creek is less visited than the lower section (Figure 4). On June 2, 2021, we noodled approximately 1.2 km of the upper section of the creek where pond turtles had been found in 2009. We found little water, and the water present was shallow; this and proximity to a paved road contributed to a habitat assessment score of 18 points, categorized as *poor*. We found four pond turtles in small ponds that were approximately 25 cm deep at their deepest point. One male pond turtle was a recapture from 2009. We observed many two-striped garter snakes (*Thamnophis hammondii*), most likely taking advantage of the rainbow trout fry and Baja California treefrog (*Pseudacris hypochondriaca*) tadpoles trapped in the shallow water.

Brea Creek

Brea Creek has been channelized for much of its run along the 57 freeway. We surveyed an approximately 840 m section of Brea Creek that runs through an oil field north of the town of Brea (Figure 5). On September 9, 2021, we set four minnow traps at the beginning and end of the site and noodled the middle. Between September 20 and September 22, 2021, we set 25 minnow traps along the length of the survey area. The site was wet for the length of our survey with many

deep pools. However, it had a small terrestrial buffer and a paved road within 50 m of the creek. These factors as well as the presence of several non-native species contributed to a habitat assessment score of 21 points, categorized as *marginal*. We caught 11 unique pond turtles. Of the seven adults, five were male and two were female. The four juvenile pond turtles confirm that recruitment is ongoing at the site. The other species observed at the site were non-native aquatics; swamp crayfish, goldfish (*Carassius auratus*), bullhead catfish, and mosquitofish (*Gambusia affinis*).

Carbon Canyon Creek (Lower)

The lower section of Carbon Canyon Creek is an approximately 2.5 km section of creek bed that runs west from Soquel Canyon through Chino Hills State Park (Figure 6). We conducted a visual survey of the creek bed on October 21, 2021. This section of creek was completely dry which resulted in a habitat assessment score of 15, categorized as *poor*. No aquatic species were observed during this survey.

Carbon Canyon Creek (Upper)

The upper section of Carbon Canyon Creek runs north of Soquel Canyon and is bordered by a mobile home park to the west and Carbon Canyon Creek Road to the north (Figure 6). Despite the large terrestrial buffer to the south, and the presence of several deep pools, the proximity to the road, as well as the intermittent water and our detection of more than one invasive aquatic species contributed to a habitat assessment score of 19, categorized as *poor*. We noodled approximately 900 m of this site on August 19, 2021. On September 15, 2021, we set seven minnow traps in the deepest pools and checked them September 16, 2021. We captured 42 unique pond turtles in one night of trapping. Fourteen of the 21 adult turtles captured were males. The 21 juvenile pond turtles, including at least one neonate confirm that recruitment is ongoing at the site. We also detected swamp crayfish, green sunfish (*Lepomis cyanellus*), bluegill sunfish (*Lepomis macrochirus*), and mosquitofish at the site.

Chileno Canyon

Chileno Canyon contains a tributary to the West Fork San Gabriel River in the San Gabriel Mountains National Monument (Figure 7). We conducted a noodling survey on the lower section of the creek for approximately 775 m on July 2, 2021. The site received a habitat assessment of 23, categorized as *marginal*, mostly because of the lack of water at the site, and the water present being shallow. No pond turtles were detected, but Baja California treefrogs were observed.

Chino Creek

Chino Creek runs through the city of Chino parallel to Highway 71 (Figure 8). It is cemented and channelized for much of its length. We set 21, 20” traps, and 14 minnow traps along approximately 950 m of Chino Creek next to the El Prado Golf Course and under Euclid Avenue from August 23 to August 26, 2021. This site had extensive canopy cover but lacked a large terrestrial habitat buffer, was within 50 m of a paved road, and had no access restrictions. These factors as well as the detection of aquatic invasive species led to a habitat assessment score of 17, categorized as *poor*. No pond turtles were detected. Several non-native turtles were captured, including 13 sliders and three common snapping turtles (*Chelydra serpentina*). Swamp crayfish, green sunfish, common carp (*Cyprinus carpio*), bullhead catfish, and channel catfish (*Ictalurus punctatus*) were detected in the creek.

Cole Creek

Cole Creek is an intermittent stream running north from the Santa Rosa Plateau Ecological Reserve (Figure 9). This site has a large terrestrial buffer (>500 m), is not within 500 m of a paved road, and no non-native aquatic species were detected. However, only 133 m of the 1.5 km surveyed were wet. Because of the lack of water, the habitat assessment score was 23, categorized as *marginal*. We conducted a noodling survey on September 29, 2021. No turtles were detected during this survey. On October 13, 2021, we placed four minnow traps in the wet section overnight. We captured two pond turtles, one adult female and a juvenile.

Hole Creek

Hole Creek is an urban stream bisected by Jurupa Avenue before its confluence with the Santa Ana River in Riverside County (Figure 10). There was water throughout the 5 km creek bed, and a deep pond just south of Jurupa Avenue. However, there were no access restrictions at the site so we confined our trapping to a 200 m area where our traps could not be easily accessed. Because of the large number of people at the site, the lack of a terrestrial buffer, and the presence of more than one non-native aquatic species the habitat assessment score was 15, categorized as *poor*. We set six 20" traps and six minnow traps from July 19 to July 22, 2021. No pond turtles were captured. We removed one spiny softshell turtle (*Apalone spinifera*) and one African clawed frog (*Xenopus laevis*) from the site. We also detected American bullfrogs (*Lithobates catesbeianus*), swamp crayfish, green sunfish, bullhead catfish, and mosquitofish.

North of Nichols Road

This site was along Temescal Creek with pooled areas, and many partially submerged trees and aquatic vegetation throughout. Interstate 15 borders the site approximately 80 m to the east, there is a large undeveloped area to the west (Figure 11). We set 17, 20" traps, eight minnow traps, and five oval traps along an approximate 550 m of the creek from June 29 to July 2, 2021. There was no water north of the end of our survey area. The habitat assessment score of the site was 22 points, categorized as *marginal*. This score was based on the large terrestrial habitat buffer (<500 m) to the west, restricted access, and emergent and submergent vegetation. However, the proximity of the freeway, and the presence of more than one non-native aquatic species brought the score down. No pond turtles or non-native turtles were detected. Swamp crayfish, green sunfish, common carp, bullhead catfish, black crappie (*Pomoxis nigromaculatus*), and all age classes of mosquitofish were observed throughout the creek.

Prado Basin

Prado Basin is a large, created wetland made up of over 40 interconnected ponds and channels and managed by the Orange County Water District (OCWD) (Figure 12). The site was given a habitat assessment score of 21 points and categorized as *marginal* because of restricted human access, the presence of water and lack of paved roads within 400 m. However, there was an intermediate amount of canopy cover (25-74%), shallow water in the ponds (0.5-1 m in depth), and the presence of more than one non-native aquatic species, contributing to the lower score. We set 30, 20" traps, nine 30" traps, 14 minnow traps, and four oval traps throughout the site from July 12 to July 15, 2021. No pond turtles were detected during the trapping effort despite a siting by OCWD staff in July 2020. USGS captured and removed 19 sliders and two spiny softshell turtles. Bullfrogs, swamp crayfish, and inland silversides (*Menidia beryllina)* were among the non-native aquatic species detected during the trapping effort.

Rancho Jurupa Regional Park

The Rancho Jurupa Regional Park site consisted of three ponds (Figure 13). One of the ponds was surrounded by cattails, was deep (>1 m), and was not regularly visited by park goers. One pond was cement lined, deep (>1 m), and heavily visited by people fishing. The third pond was earth lined but was shallow (approximately 1 m at the deepest), and heavily visited by people fishing. Because of the heavy visitation, lack of a large terrestrial buffer, and presence of several non-native aquatic species, this site received a habitat assessment score of 15, categorized as *poor*. We set 14, 20" traps and five minnow traps throughout the three ponds from May 24 to May 27, 2021. We caught one adult male pond turtle in the earth lined pool. We also caught and removed 18 slider turtles. Bullfrogs, swamp crayfish, largemouth bass (*Micropterus salmoides*), and mosquitofish were also observed.

Soquel Canyon

Soquel Canyon creek runs west from San Bernardino County to Orange County (Figure 6). We surveyed a 2.6 km section from the confluence with Carbon Canyon Creek to the edge of Orange County Transportation Authority managed land, most of the survey was on Chino Hills State Park managed land. The creek was dry except for three small pools. The lack of water was the main factor in a habitat assessment score of 23, categorized as *marginal*. We noodled the three small pools on August 19, 2021. On September 15, 2021, we noodled and attempted bacon baiting at the three pools. We did not catch any turtles with the bacon. We did catch 20 unique pond turtles over the course of the noodling surveys. Four of the six adult turtles captured were female. We also caught four juvenile turtles that appeared to be young of this year. Mosquitofish were the only non-native aquatic species observed.

Sunnyslope Creek

Sunnyslope Creek was a meandering stream starting where a concrete channel turned into a natural stream bed; the stream ended in the Santa Ana River (Figure 14). We identified several deep (>1 m) pools along the length of the stream. The uplands surrounding the stream burned in October 2019, and the vegetation had not fully recovered. The site was given a habitat assessment score of 20 points and was categorized as *poor*. This score was based on the low water depth throughout much of the creek, the low canopy cover (between 25% and 74%), the presence of more than one non-native species, and moderate access by the public. The site did have ample aquatic vegetation and refugia. We set seven 20" traps, five minnow traps, and two oval traps from May 24 to May 27, 2021, in an approximately 1.7 km section of the creek. We noodled from the confluence with the Santa Ana River to an impassible wood fall (approximately 1.8 km) on May 26, 2021. We captured four adult pond turtles, two males and two females in the traps. We captured and removed two adult sliders, and two adult bullfrogs. Several other non-native aquatic species were detected including swamp crayfish, green sunfish, catfish, and mosquitofish.

Tequesquite Confluence Pool

This site comprised a cement lined channel that then became dirt lined and drained into the Santa Ana River (Figure 15). The site had a heavily vegetated overhead canopy, deep water, and aquatic vegetation. However, human visitation and more than one non-native aquatic species detected contributed to the habitat assessment score of 23 points; categorized as *marginal*. We set three 20" traps and two minnow traps in a 44 m section of the creek, right at the confluence

with the Santa Ana River between July 19 and July 22, 2021. We caught one adult female pond turtle. We also caught and removed two sliders, and one spiny softshell turtle. We caught another large spiny softshell turtle, but it escaped. Other non-native aquatic species caught were bullfrogs, bullhead catfish, and channel catfish.

West Fork San Gabriel River

The West Fork San Gabriel River runs east through the San Gabriel Wilderness for 31 km until its confluence with the San Gabriel River (Figure 7). The large terrestrial buffer, moderate human visitation, closure of the paved road, and lack of non-native aquatic species contributed to a habitat assessment score of 26, categorized as *high*. We noodled approximately 9.5 km of the river on July 2, 2021. We captured four pond turtles, three adult females and one adult male. We also observed Baja California treefrogs, California treefrogs (*Pseudacris cadaverina*), California newts (*Taricha torosa*), two-striped garter snakes, arroyo chub, and rainbow trout.

Incidental Observations

While conducting stream surveys focusing on other aquatic species throughout southern California, we incidentally observed pond turtles at six sites (Figures 16-19). During a day survey at Agua Blanca Creek, we caught and weighed two juvenile pond turtles. During a day survey at Castaic Creek, we caught three pond turtles, two adults and one juvenile, and collected one dead adult. During a day survey at Fish Canyon, we caught and processed one adult male pond turtle and one hatchling. During a day survey at Middle Piru Creek, we caught and processed one adult female pond turtle. During night surveys at San Francisquito Canyon, we caught one juvenile pond turtle, and observed one other. During day and night surveys at the Santa Rosa Plateau Ecological Reserve, we observed 23 juvenile and hatchling pond turtles.

CONSIDERATIONS

In 2021, pond turtles were found at 10 of the 17 sites surveyed specifically for the species. Three of those sites (Sunnyslope Creek, Rancho Jurupa Regional Park, and Tequesquite Confluence Pool) are within two kilometers of each other and could be considered one population. However, based on the USGS trapping efforts throughout the Santa Ana River watershed in 2020 and 2021, there was not a robust pond turtle population within the watershed. In 2020, we trapped 17 sites in the Santa Ana River watershed and only found pond turtles at Sunnyslope Creek (USGS unpublished data). In 2021, we re-trapped/noodled five of those sites and trapped three more. We captured pond turtles at four of those sites, but in relatively low numbers (1-16 pond turtles). The presence of non-native turtle species at six sites may have contributed to the low number of pond turtle captures. Sliders, in particular, have been found to negatively affect feeding and basking of native turtle species (Pearson et al. 2015; Lambert et al. 2019). Their presence in the traps may have discouraged any pond turtles at those sites from entering the traps. Notably, the sites with the largest number of pond turtle captures (Aliso Canyon, Carbon Canyon Creek Upper, and Soquel Canyon), had no observed non-native turtles. Lack of water may have contributed to the pond turtle capture numbers, at Aliso Canyon, Carbon Canyon Creek (Upper), Soquel Canyon, and Big Tujunga Creek (Upper) these turtles were confined to relatively small pools in an otherwise dry system. This was especially true at Soquel Canyon and Big Tujunga Creek (Upper). At Soquel Canyon, the pond turtles were only found in two small pools, one no more than 50 cm across and 10 cm deep (Figure 6). At Big Tujunga Creek (Upper), the pond turtles were found in small, shallow puddles in what was once a deep creek (Figure 4). As southern

California continues to experience severe drought (National Integrated Drought Information System, 2021), these sites may no longer be able to support pond turtles.

The urban environment throughout southern California may also play a role in the low numbers of pond turtles. Of the 17 pond turtle specific survey sites, five were within 50 m of a road, five were within 274 m of a road, and one was within 500 m. Roads and vehicles can have a detrimental effect on pond turtle populations, through road mortality, or limiting basking behavior (Nyhof and Trulio 2015; Nicholson et al. 2020).

As one of only two pond turtle populations found in the Santa Ana River watershed, further study could be conducted on the Sunnyslope Creek, Rancho Jurupa Regional Park, and Tequesquite Confluence Pool sites. These sites have more human visitation than the Aliso Canyon site; therefore, identifying and protecting pond turtle upland habitat and public education could limit disturbance to the pond turtle. Further trapping and noodling surveys could be conducted, at sites where pond turtles were incidentally observed to determine population viability as well as at sites that we were not able to visit this year.

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Table 1. Site list and southwestern pond turtle (*Actinemys pallida*) capture effort in southern California, 2021.

Site	Site Number	Survey Type	Start Date	End Date	Number of Traps	Total Trap Hours per Trap	Start Latitude [1]	Start Longitude [1]	End Latitude [1]	End Longitude [1]
Aliso Canyon	1	Noodling/Bacon Baiting [2]	June 1, 2021	June 1, 2021	0	0	33.89899	-117.69705	33.90993	-117.70079
Aliso Canyon	1	Bacon Baiting	August 16, 2021	August 16, 2021	0	0	33.90170	-117.69857	33.91538	-117.70165
Big Tujunga Creek (Lower)	2	Noodling	June 2, 2021	June 2, 2021	0	0	34.29908	-118.26488	34.29294	-118.23633
Big Tujunga Creek (Upper)	3	Noodling	June 2, 2021	June 2, 2021	0	0	34.31001	-118.11560	34.30754	-118.07434
Brea Creek	4	Trapping/Noodling	September 9, 2021	September 9, 2021	4	3.5	33.94081	-117.88710	33.93920	-117.87906
Brea Creek	4	Trapping	September 20, 2021	September 22, 2021	25	46	33.94081	-117.88710	33.93920	-117.87906
Carbon Canyon Creek (Lower)	5	Noodling	October 21, 2021	October 21, 2021	0	0	33.91942	-117.82325	33.92364	-117.80218
Carbon Canyon Creek (Upper)	6	Noodling	August 19, 2021	August 19, 2021	0	0	33.92313	-117.80234	33.92857	-117.79839
Carbon Canyon Creek (Upper)	6	Trapping	September 15, 2021	September 16, 2021	7	25	33.92313	-117.80234	33.93197	-117.79599
Chileno Canyon	7	Noodling	July 2, 2021	July 2, 2021	0	0	34.24248	-117.95008	34.24795	-117.95060
Chino Creek	8	Trapping	August 23, 2021	August 26, 2021	35	68	33.94373	-117.65902	33.93969	-117.65064
Cole Canyon	9	Noodling	September 29, 2021	September 29, 2021	0	0	33.56228	-117.25279	33.54884	-117.25560
Cole Canyon	9	Trapping	October 13, 2021	October 14, 2021	4	30	33.55048	-117.25566	33.54987	-117.25549
Hole Creek	10	Trapping	July 19, 2021	July 22, 2021	12	70	33.96149	-117.46750	33.95777	-117.46370
North of Nichols Road	11	Trapping	June 29, 2021	July 2, 2021	30	71	33.71888	-117.36506	33.72230	-117.36921
Prado Basin	12	Trapping	July 12, 2021	July 15, 2021	57	69	33.92289	-117.61412	33.91036	-117.64360
Rancho Jurupa Regional Park	13	Trapping	May 24, 2021	May 27, 2021	19	70	33.98467	-117.41531	33.98162	-117.42012
Soquel Canyon	14	Noodling	August 19, 2021	August 19, 2021	0	0	33.92312	-117.80212	33.93406	-117.78299
Soquel Canyon	14	Noodling/Bacon Baiting	September 15, 2021	September 15, 2021	0	0	33.92172	-117.79925	33.93289	-117.78492
Sunnyslope Creek	15	Trapping/Noodling	May 24, 2021	May 27, 2021	14	70	33.97052	-117.43205	33.97638	-117.42627
Tequesquite Confluence Pool	16	Trapping	July 19, 2021	July 22, 2021	5	70	33.97686	-117.40653	33.97665	-117.40632
West Fork San Gabriel River	17	Noodling	July 2, 2021	July 2, 2021	0	0	34.24153	-117.86971	34.24421	-117.95316

[1] Coordinate data in WGS 84, representative coordinates for the site.

[2] Bacon baiting is fishing for turtles with lines baited with bacon.

Table 2. Site list of visual surveys where southwestern pond turtles (*Actinemys pallida*) were incidentally detected in southern California, 2021.

Site	Site Number	Survey Type	Survey Date	Start Latitude [1]	Start Longitude[1]	End Latitude [1]	End Longitude[1]
Agua Blanca Creek	18	Visual	June 18, 2021	34.53990	-118.76830	34.54142	-118.77193
Castaic Creek	19	Visual	May 17, 2021	34.61191	-118.66285	34.62886	-118.66442
Fish Canyon	20	Visual	May 13, 2021	34.61871	-118.63599	34.63333	-118.63734
Middle Piru Creek	21	Visual	June 18, 2021	34.53539	-118.75872	34.53742	-118.75991
San Francisquito Canyon	22	Visual	August 3, 2021	34.54634	-118.51340	34.55033	-118.50742
San Francisquito Canyon	22	Visual	August 4, 2021	34.54634	-118.51340	34.55033	-118.50742
Santa Rosa Plateau Ecological Reserve	23	Visual	February 4, 2021	33.53986	-117.26389	33.52892	-117.28761
Santa Rosa Plateau Ecological Reserve	23	Visual	February 6, 2021	33.53986	-117.26389	33.52892	-117.28761
Santa Rosa Plateau Ecological Reserve	23	Visual	February 14, 2021	33.53986	-117.26389	33.52892	-117.28761
Santa Rosa Plateau Ecological Reserve	23	Visual	March 6, 2021	33.53986	-117.26389	33.52892	-117.28761
Santa Rosa Plateau Ecological Reserve	23	Visual	August 11, 2021	33.53986	-117.26389	33.52892	-117.28761
Santa Rosa Plateau Ecological Reserve	23	Visual	September 2, 2021	33.52943	-117.28518	33.52892	-117.28761
Santa Rosa Plateau Ecological Reserve	23	Visual	September 21, 2021	33.53986	-117.26389	33.52892	-117.28761
Santa Rosa Plateau Ecological Reserve	23	Visual	October 14, 2021	33.53986	-117.26389	33.52892	-117.28761

[1] Coordinate data in WGS 84, representative coordinates for the site.

Table 3. Native species detected during surveys for the southwestern pond turtle (*Actinemys pallida*) in southern California, 2021.

Site	Site Number	Southwestern Pond Turtle (*Actinemys pallida*) [1]	California Newt (*Taricha torosa*)	Baja California Treefrog (*Pseudacris hypochondriaca*)	California Treefrog (*Pseudacris cadaverina*)	Western Toad (*Anaxyrus boreas*)	Two-striped Garter Snake (*Thamnophis hammondii*)	Arroyo Chub (*Gila orcuttii*)	Rainbow Trout (*Oncorhynchus mykiss*)	Speckled Dace (*Rhinichthys osculus*)
Aliso Canyon	1	22	–	–	–	–	–	X	–	–
Big Tujunga Creek (Lower)	2	–	–	–	X	–	X	X	X	X
Big Tujunga Creek (Upper)	3	4	–	–	X	X	X	–	X	–
Brea Creek	4	13	–	–	–	–	–	–	–	–
Carbon Canyon Creek (Lower)	5	–	–	X	–	–	–	–	–	–
Carbon Canyon Creek (Upper)	6	44	–	X	–	–	X	–	–	–
Chileno Canyon	7	–	–	X	–	–	–	–	–	–
Chino Creek	8	–	–	–	–	–	–	–	–	–
Cole Canyon	9	2	–	X	X	–	X	–	–	–
Hole Creek	10	–	–	–	–	–	–	–	–	–
North of Nichols Road	11	–	–	–	–	–	–	–	–	–
Prado Basin	12	–	–	X	–	X	–	–	–	–
Rancho Jurupa Regional Park	13	1	–	X	–	–	–	–	–	–
Soquel Canyon	14	28	–	X	–	X	–	–	–	–
Sunnyslope Creek	15	4	–	X	–	X	–	–	–	–
Tequesquite Confluence Pool	16	1	–	–	–	–	–	–	–	–
West Fork San Gabriel River	17	4	X	X	X	–	X	X	X	–

[1] Numbers represent the total number of southwestern pond turtle captures and observations, not unique turtles.

Note: For all non-turtle species X indicates presence.

Table 4. Non-native species detected during surveys for the southwestern pond turtle (*Actinemys pallida*) in southern California, 2021.

Site	Site Number	Common Snapping Turtle (*Chelydra serpentina*)	Slider Turtle (*Trachemys scripta sp.*)	Spiny Softshell Turtle (*Apalone spinifera*)	African Clawed Frog (*Xenopus laevis*)	American Bullfrog (*Lithobates catesbeianus*)	Swamp Crayfish (*Procambarus clarkii*)	Black Crappie (*Pomoxis nigromaculatus*)	Bluegill (*Lepomis macrochirus*)	Bullhead Catfish (*Ameiurus sp.*)	Channel Catfish (*Ictalurus punctatus*)	Common Carp (*Cyprinus carpio*)	Goldfish (*Carassius auratus*)	Green Sunfish (*Lepomis cyanellus*)	Inland Silverside (*Menidia beryllina*)	Largemouth Bass (*Micropterus salmoides*)	Mosquitofish (*Gambusia affinis*)
Aliso Canyon	1	–	–	–	–	–	X	–	–	–	–	–	–	–	–	–	–
Big Tujunga Creek (Lower)	2	–	–	–	–	–	X	–	–	X	–	–	–	–	–	–	–
Big Tujunga Creek (Upper)	3	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Brea Creek	4	–	–	–	–	–	X	–	–	X	–	–	X	–	–	–	X
Carbon Canyon Creek (Lower)	5	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Carbon Canyon Creek (Upper)	6	–	–	–	–	–	X	–	–	–	–	–	–	X	–	–	X
Chileno Canyon	7	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Chino Creek	8	3	13	–	–	–	X	–	–	X	X	X	–	X	–	–	–
Cole Canyon	9	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Hole Creek	10	–	–	1	X	X	X	–	–	X	–	–	–	X	–	–	X
North of Nichols Road	11	–	–	–	–	–	X	X	–	X	–	X	–	X	–	–	X
Prado Basin	12	–	19	2	–	X	X	X	X	X	–	X	–	X	X	X	–
Rancho Jurupa Regional Park	13	–	18	–	–	X	X	–	–	–	–	–	–	–	–	X	X
Soquel Canyon	14	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	X
Sunnyslope Creek	15	–	2	–	–	X	X	–	–	X	–	–	–	X	–	–	X
Tequesquite Confluence Pool	16	–	2	2	–	X	–	–	–	X	X	–	–	–	–	–	–
West Fork San Gabriel River	17	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–

Note: For all non-turtle species X indicates presence.

Table 5. Species detected during visual surveys where southwestern pond turtles (*Actinemys pallida*) were incidentally detected in southern California, 2021.

Site	Site Number	Native															Non-Native
		Southwestern Pond Turtle (*Actinemys pallida*)	Baja California Treefrog (*Pseudacris hypochondriaca*)	California Red-legged Frog (*Rana draytonii*)	California Treefrog (*Pseudacris cadaverina*)	Western Toad (*Anaxyrus boreas*)	California Newt (*Taricha torosa*)	Arroyo Chub (*Gila orcuttii*)	Rainbow Trout (*Oncorhynchus mykiss*)	Three-spined Stickleback (*Gasterosteus aculeatus*)	California Kingsnake (*Lampropeltis californiae*)	California Striped Racer (*Coluber lateralis lateralis*)	Speckled Rattlesnake (*Crotalus mitchelli*)	Two-striped Garter Snake (*Thamnophis hammondii*)	Common Side-blotched Lizard (*Uta stansburiana*)	Western Fence Lizard (*Sceloporus occidentalis*)	Swamp Crayfish (*Procambarus clarkii*)
Agua Blanca Creek	18	2	–	–	–	–	–	X	X	–	–	–	–	X	–	–	–
Castaic Creek	19	4[1]	X	–	–	–	–	–	–	–	–	–	–	–	–	X	–
Fish Canyon[2]	20	2		–	X	–	–	–	–	–	X	–	–	X	X	X	–
Middle Piru Creek[2]	21	1	–	–	–	–	–	–	–	–	X	–	–	–	–	–	–
San Francisquito Canyon	22	3	X	X	–	X	–	X	–	X	–	X	–	–	–	–	X
Santa Rosa Plateau Ecological Reserve	23	23	X	X	–	X	X	–	–	–	–	–	X	X	–	X	–

[1] One of the Castaic Creek southwestern pond turtles was found dead.

[2] Only southwestern pond turtles from Fish Canyon and Middle Piru Creek were marked with PIT tags or marginal scute numbers.

Note: For all non-turtle species X indicates presence.

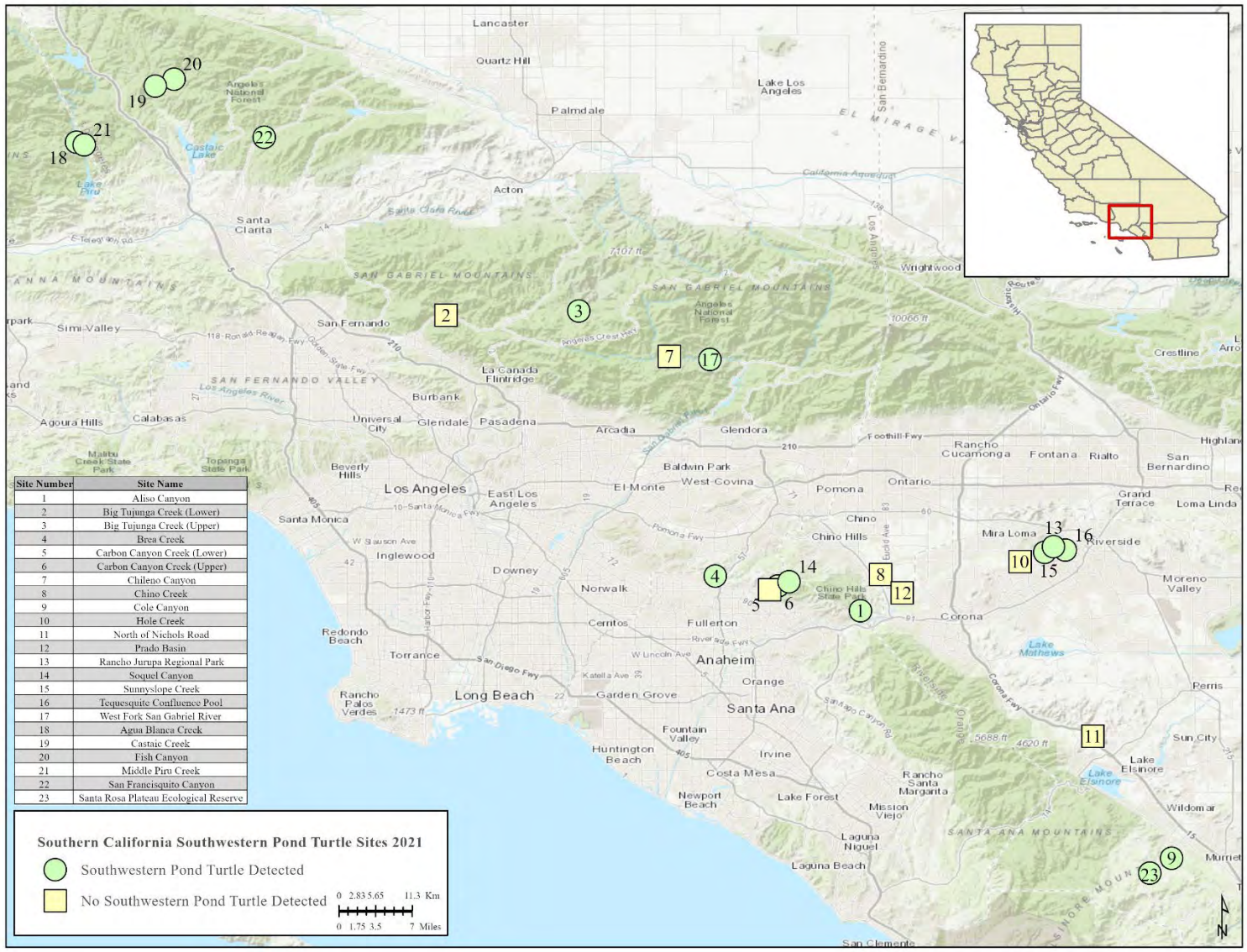

Figure 1. Overview of southwestern pond turtle (*Actinemys pallida*) trapping, noodling, bacon baiting and incidental sites in southern California, 2021.

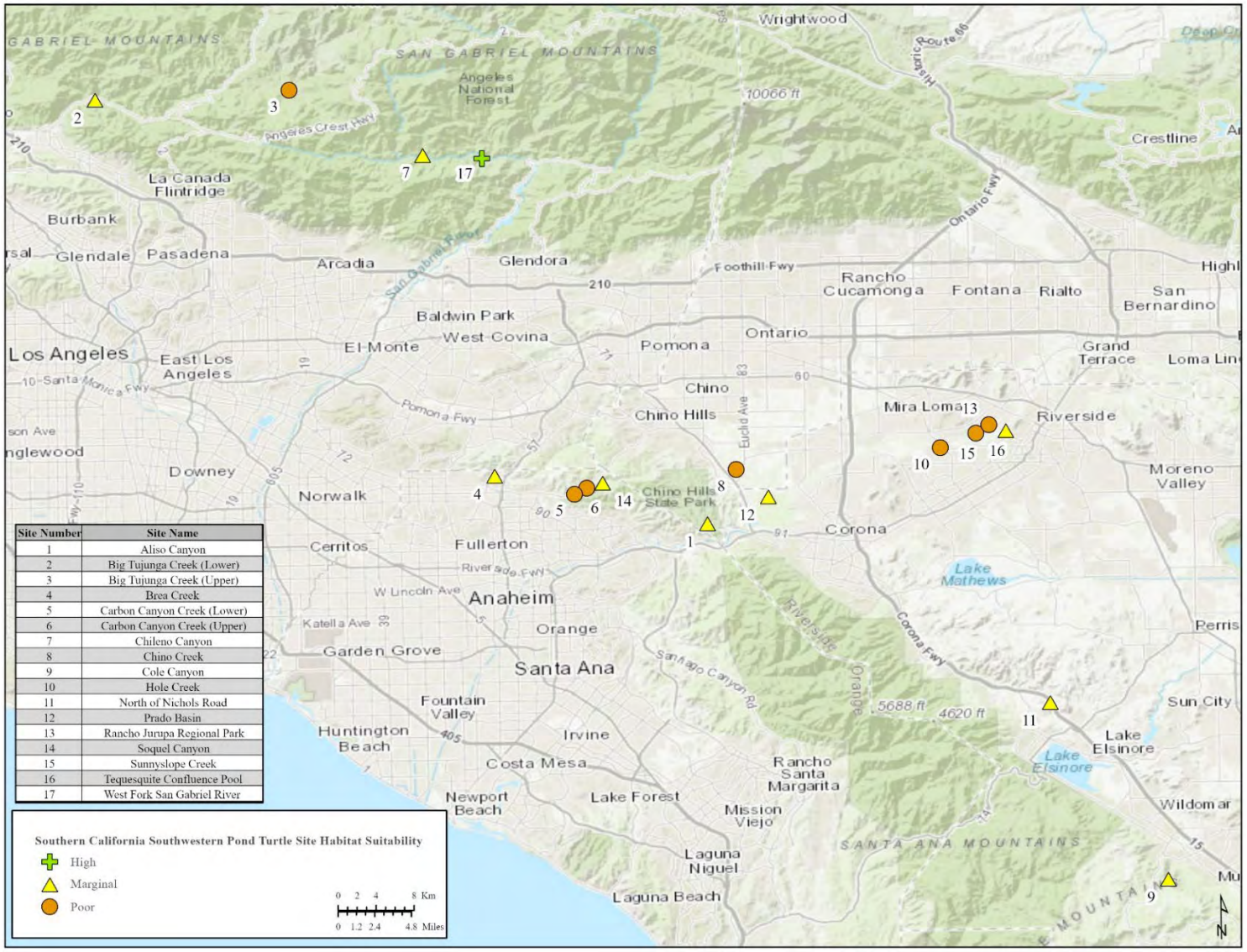

Figure 2. Habitat suitability assessment categories for southwestern pond turtle (*Actinemys pallida*) sites in southern California, 2021.

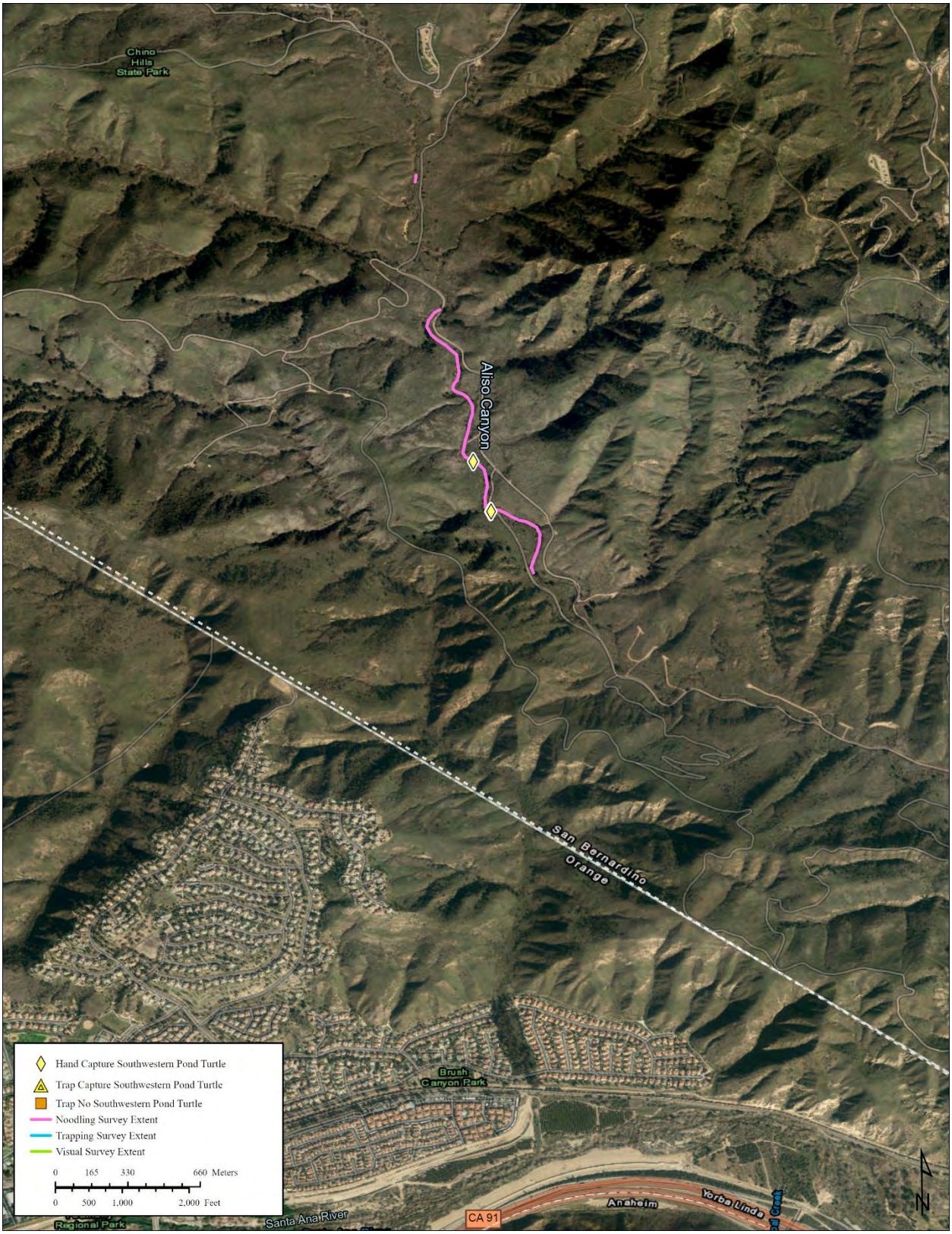

Figure 3. Aliso Canyon survey for the southwestern pond turtle (*Actinemys pallida*) in southern California, 2021.

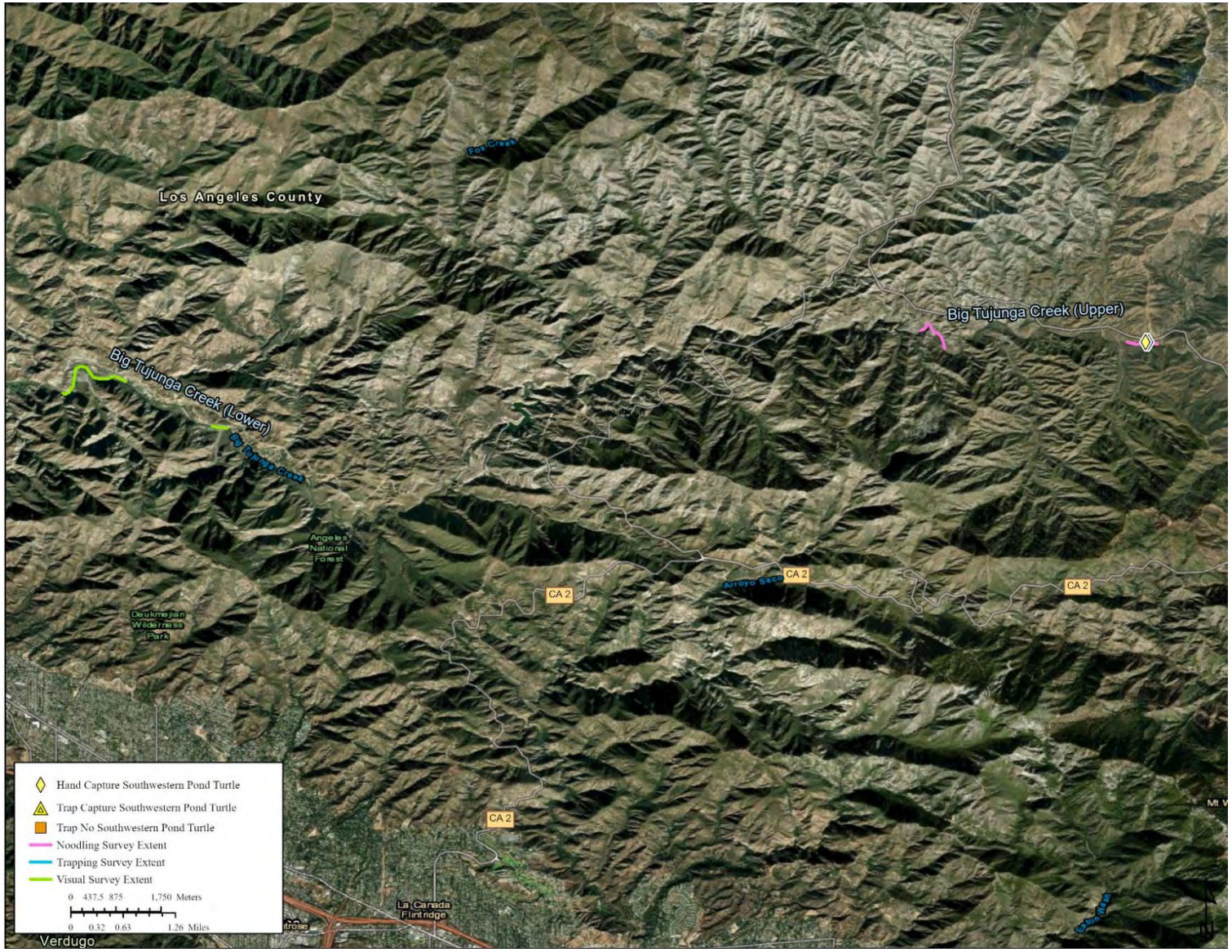

Figure 4. Big Tujunga Creek survey for the southwestern pond turtle (*Actinemys pallida*) in southern California, 2021.

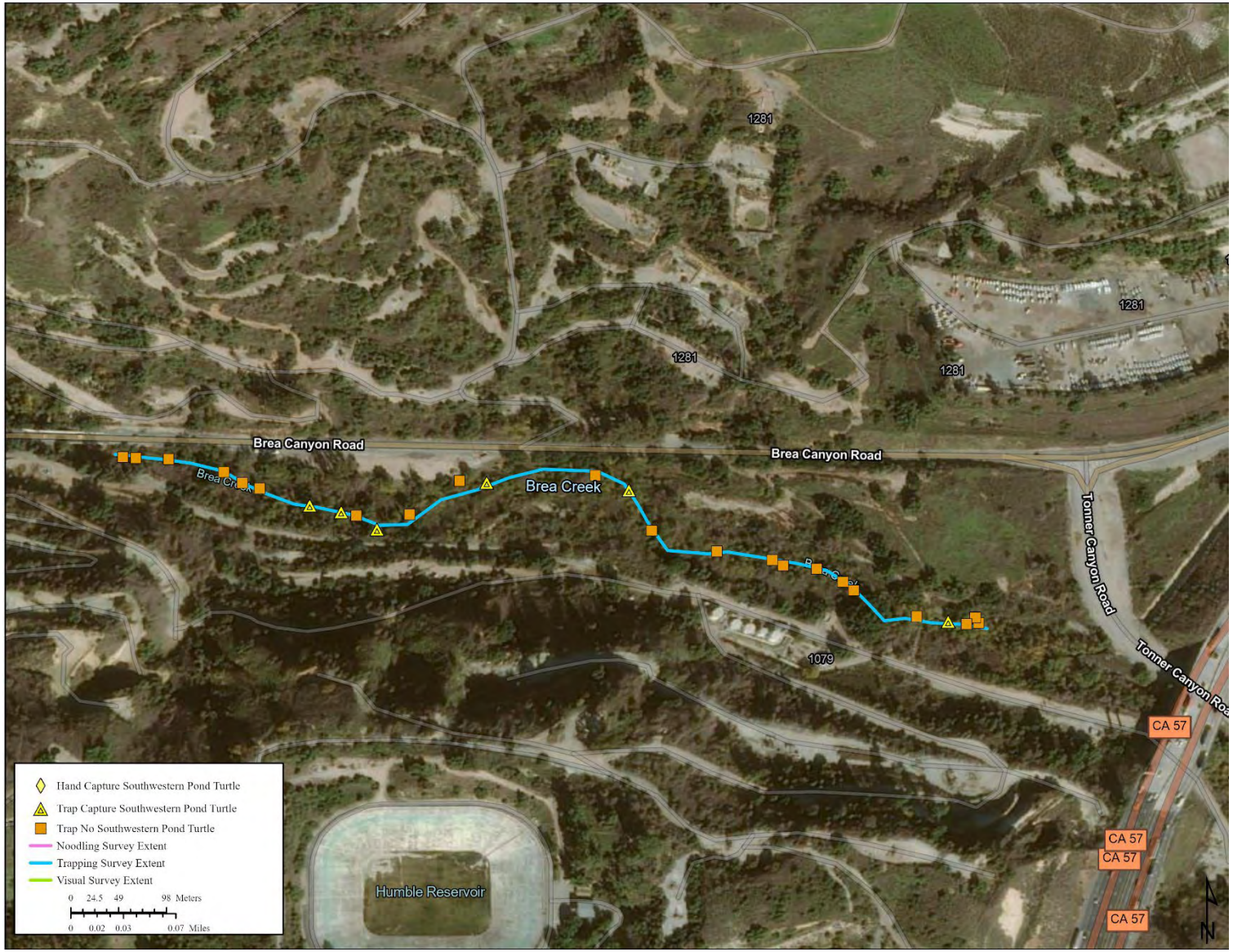

Figure 5. Brea Creek survey for the southwestern pond turtle (*Actinemys pallida*) in southern California, 2021.

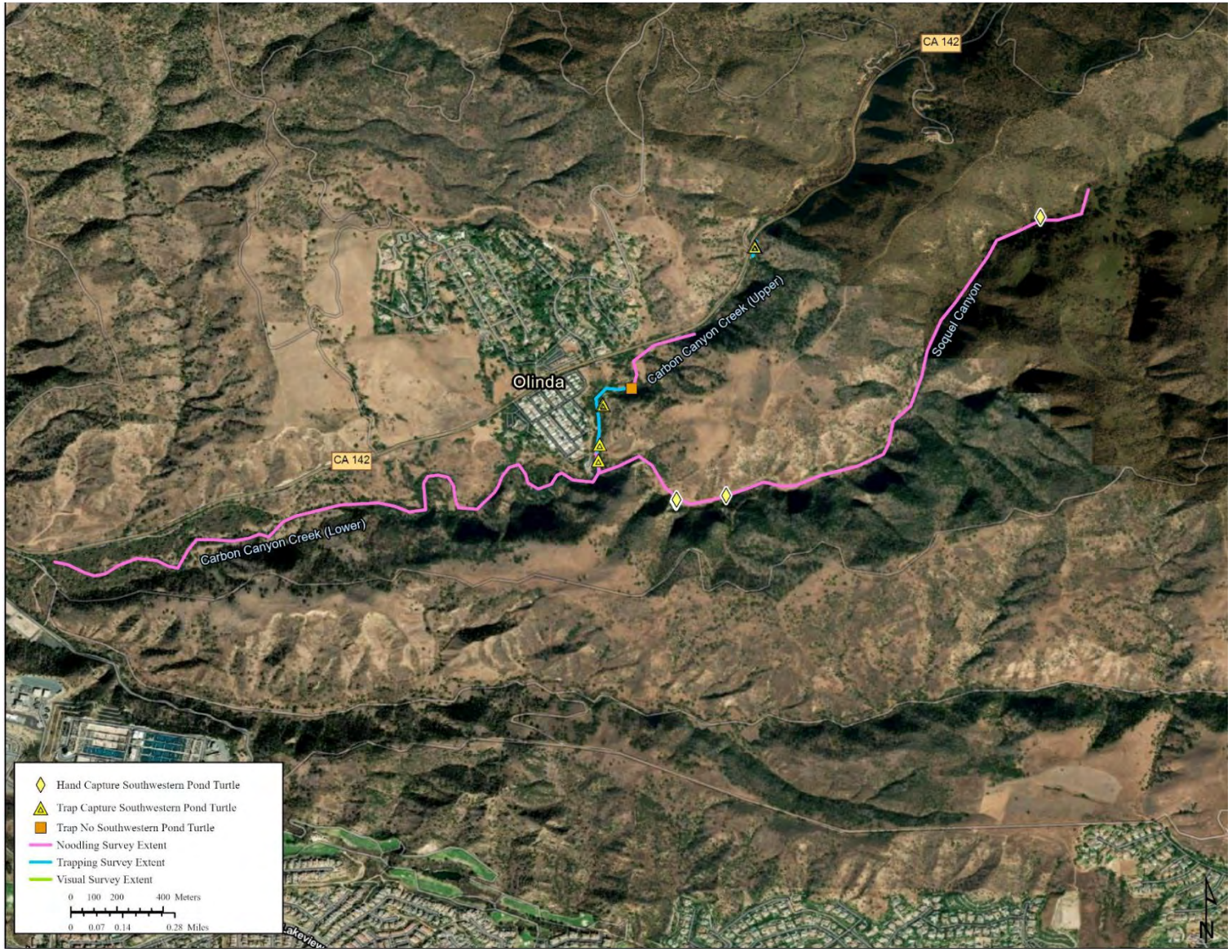

Figure 6. Carbon Canyon Creek and Soquel Canyon surveys for the southwestern pond turtle (*Actinemys pallida*) in southern California, 2021.

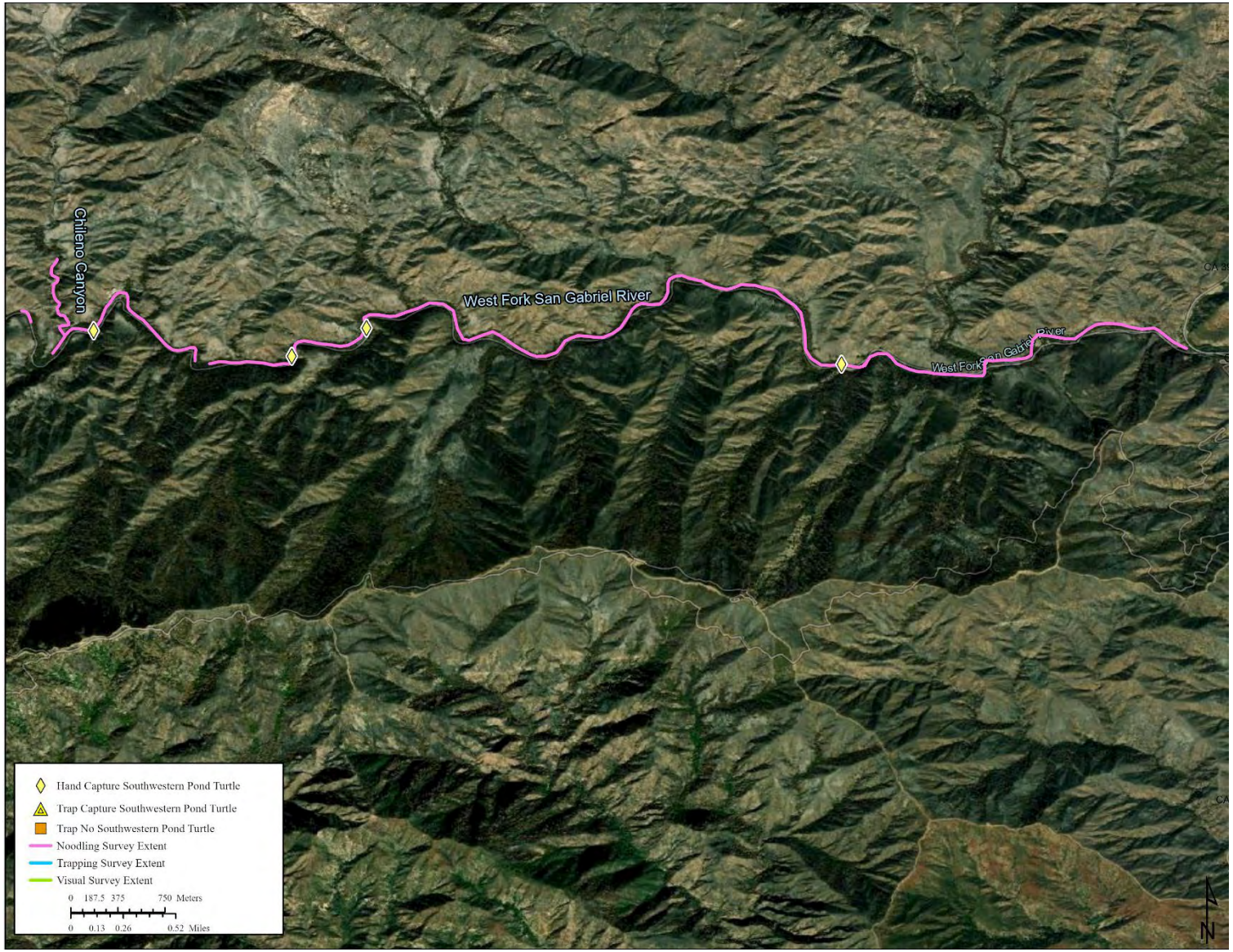

Figure 7. Chileno Canyon and West Fork San Gabriel River surveys for the southwestern pond turtle (*Actinemys pallida*) in southern California, 2021.

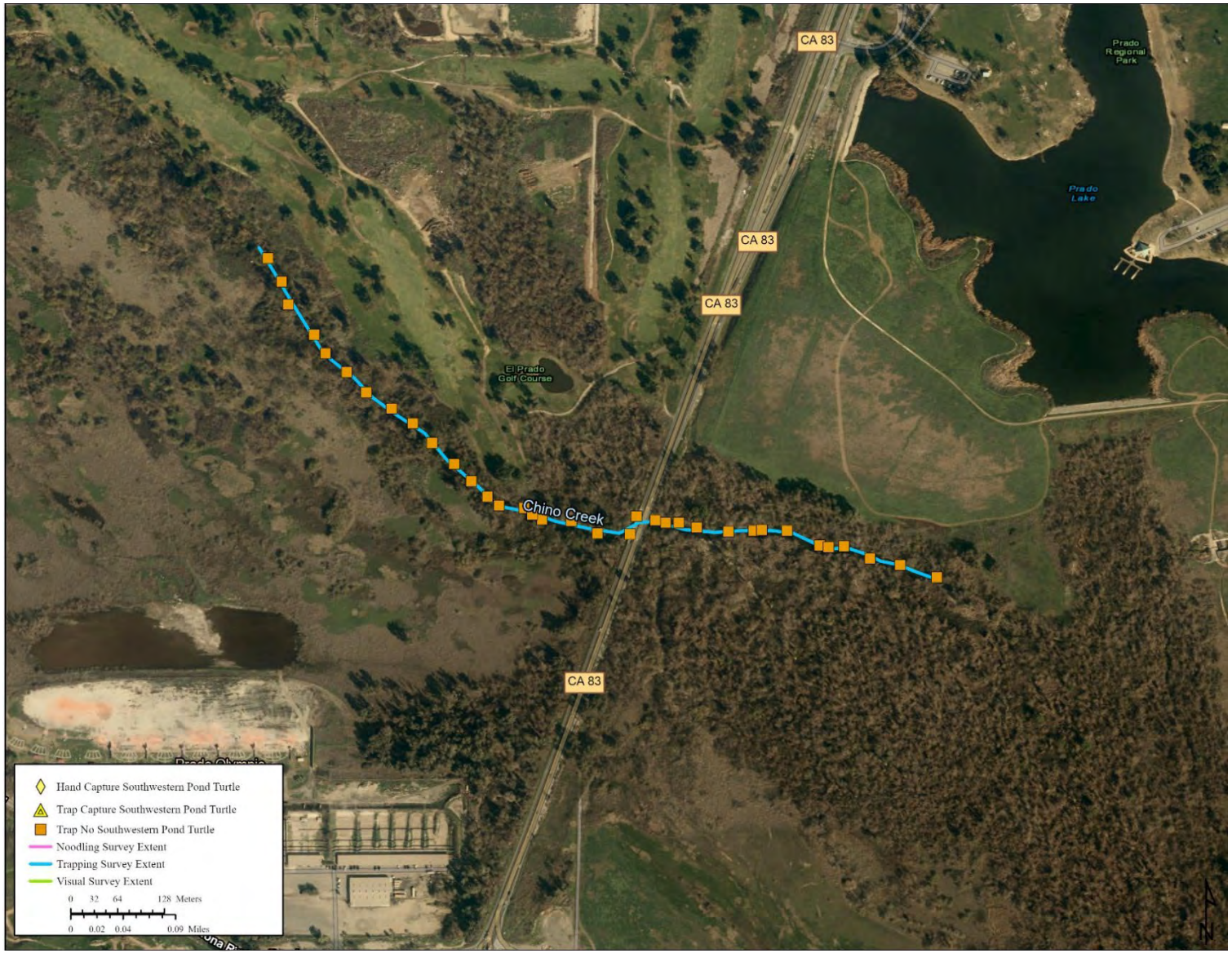

Figure 8. Chino Creek survey for the southwestern pond turtle (*Actinemys pallida*) in southern California, 2021.

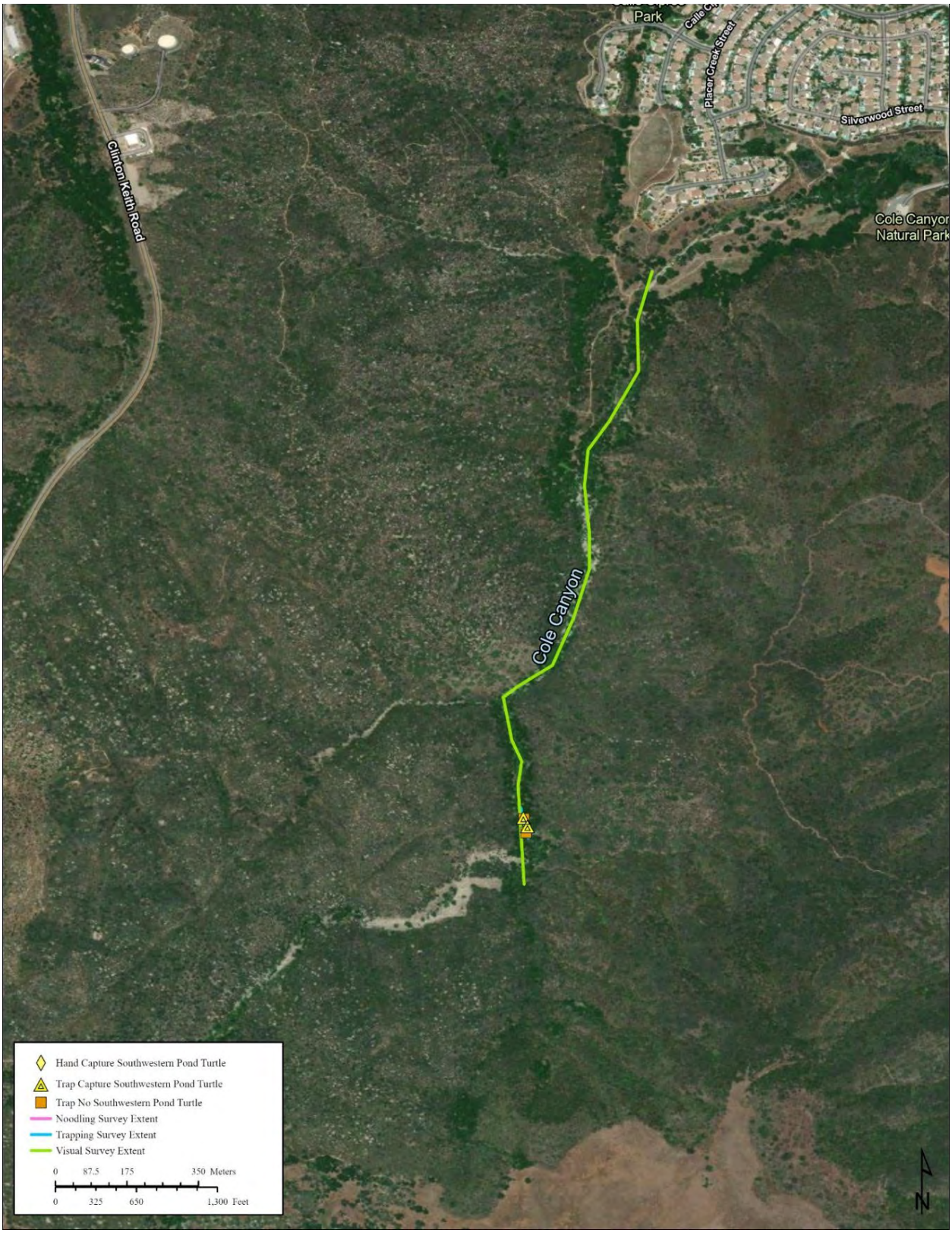

Figure 9. Cole Canyon survey for the southwestern pond turtle (*Actinemys pallida*) in southern California, 2021.

Figure 10. Hole Creek survey for the southwestern pond turtle (*Actinemys pallida*) in southern California, 2021.

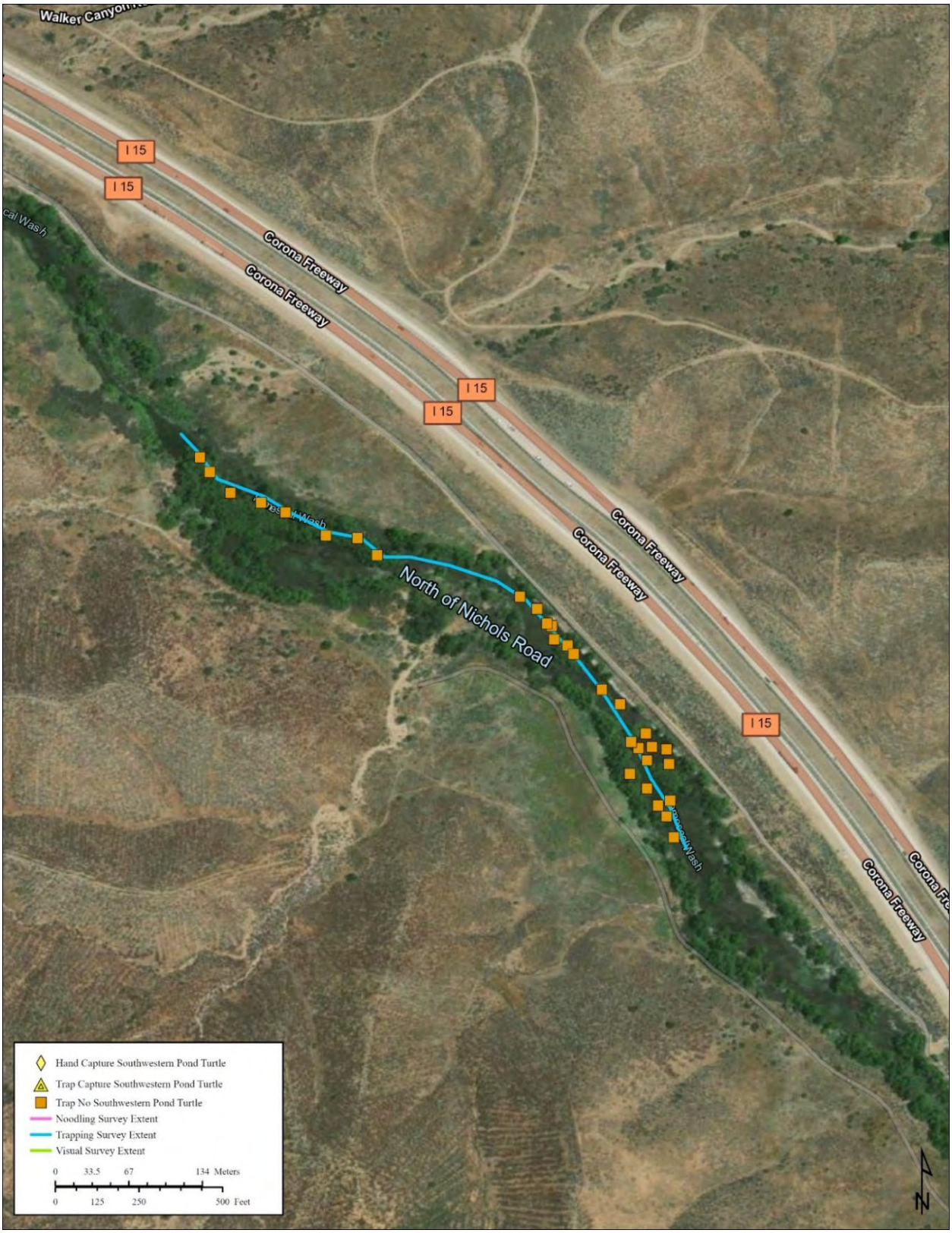

Figure 11. North of Nichols Road survey for the southwestern pond turtle (*Actinemys pallida*) in southern California, 2021.

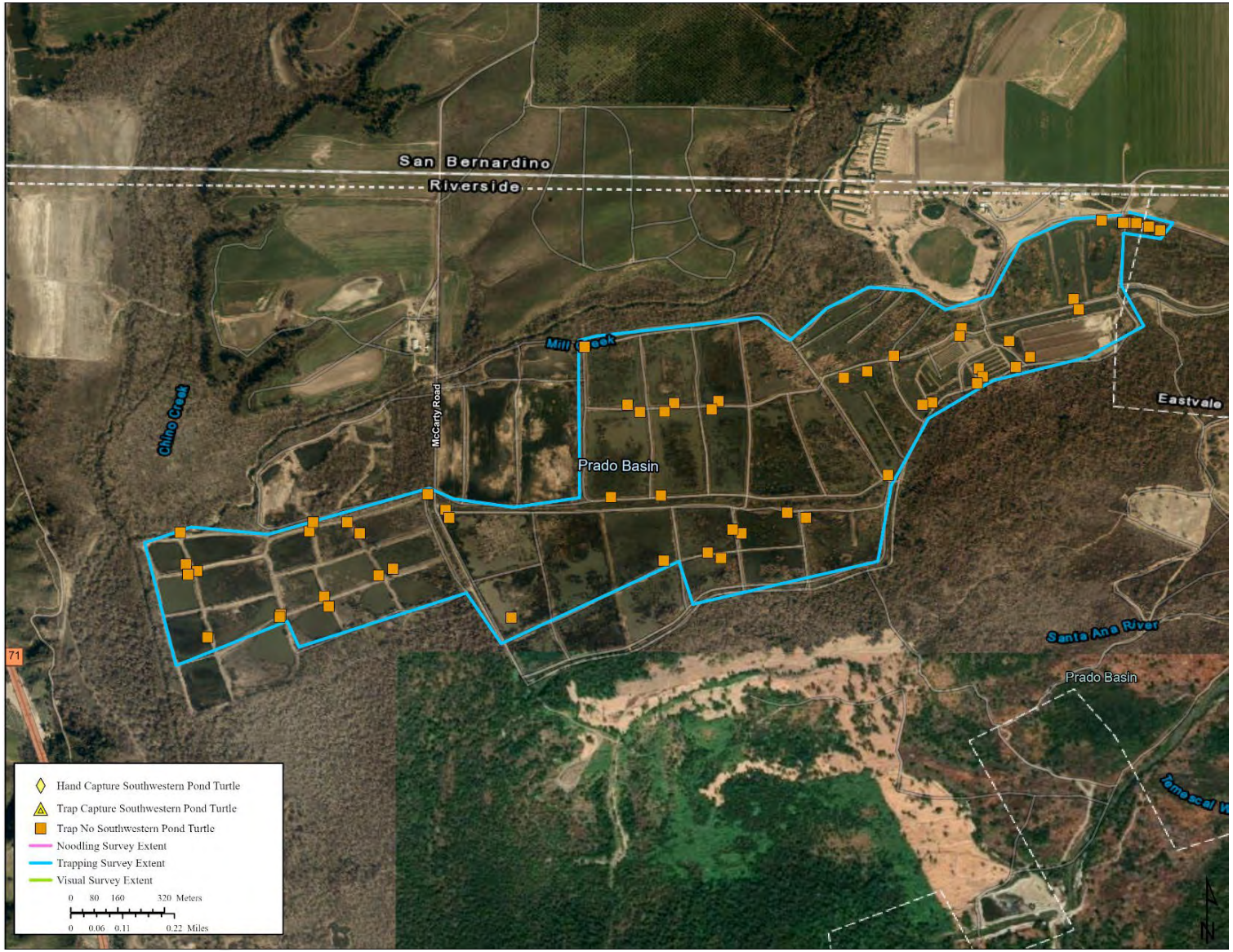

Figure 12. Prado Basin survey for the southwestern pond turtle (*Actinemys pallida*) in southern California, 2021.

Figure 13. Rancho Jurupa Regional Park survey for the southwestern pond turtle (*Actinemys pallida*) in southern California, 2021.

Figure 14. Sunnyslope Creek survey for the southwestern pond turtle (*Actinemys pallida*) in southern California, 2021.

Figure 15. Tequesquite Confluence Pool survey for the southwestern pond turtle (*Actinemys pallida*) in southern California, 2021.

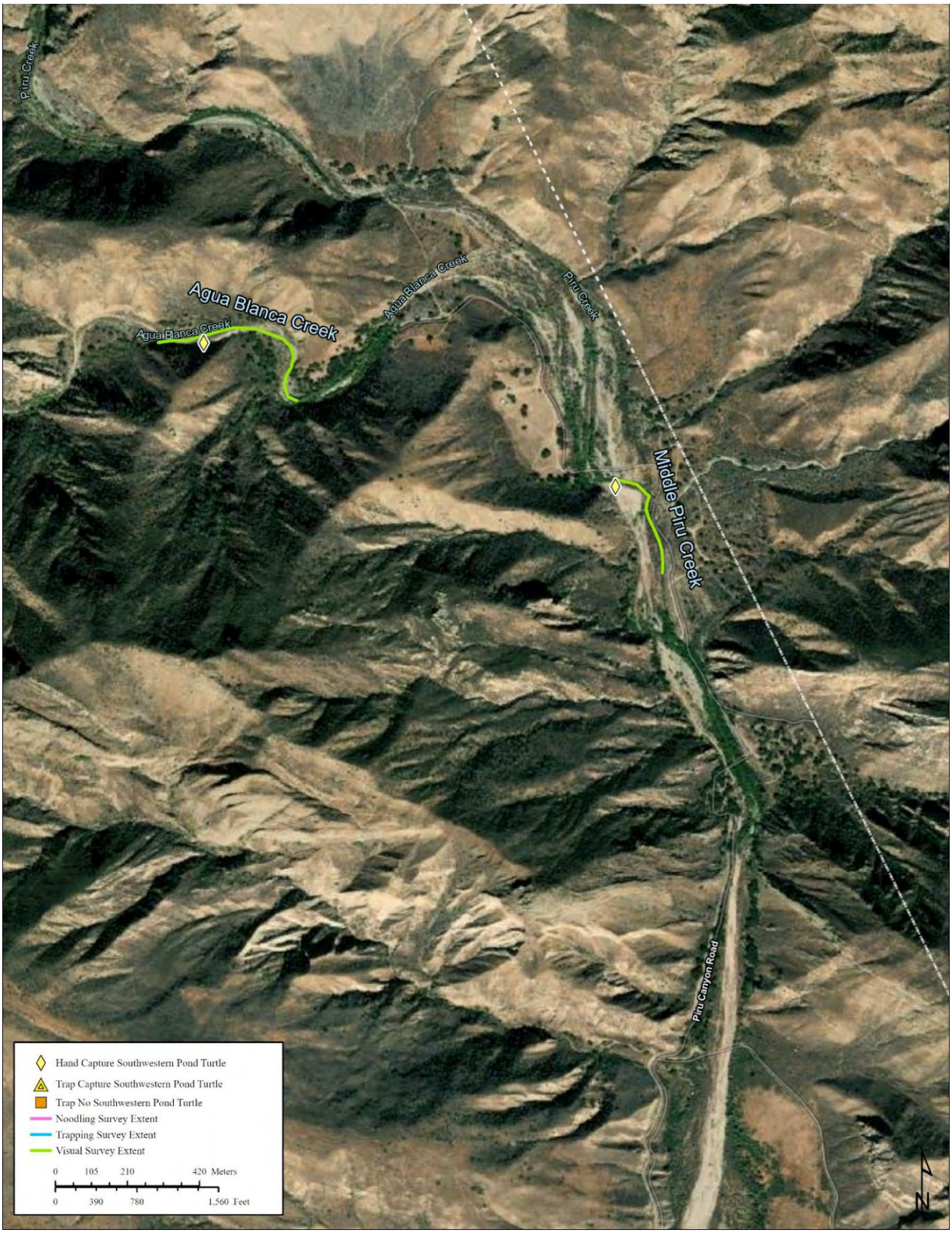

Figure 16. Agua Blanca Creek and Middle Piru Creek visual survey with incidental observations of the southwestern pond turtle (*Actinemys pallida*) in southern California, 2021.

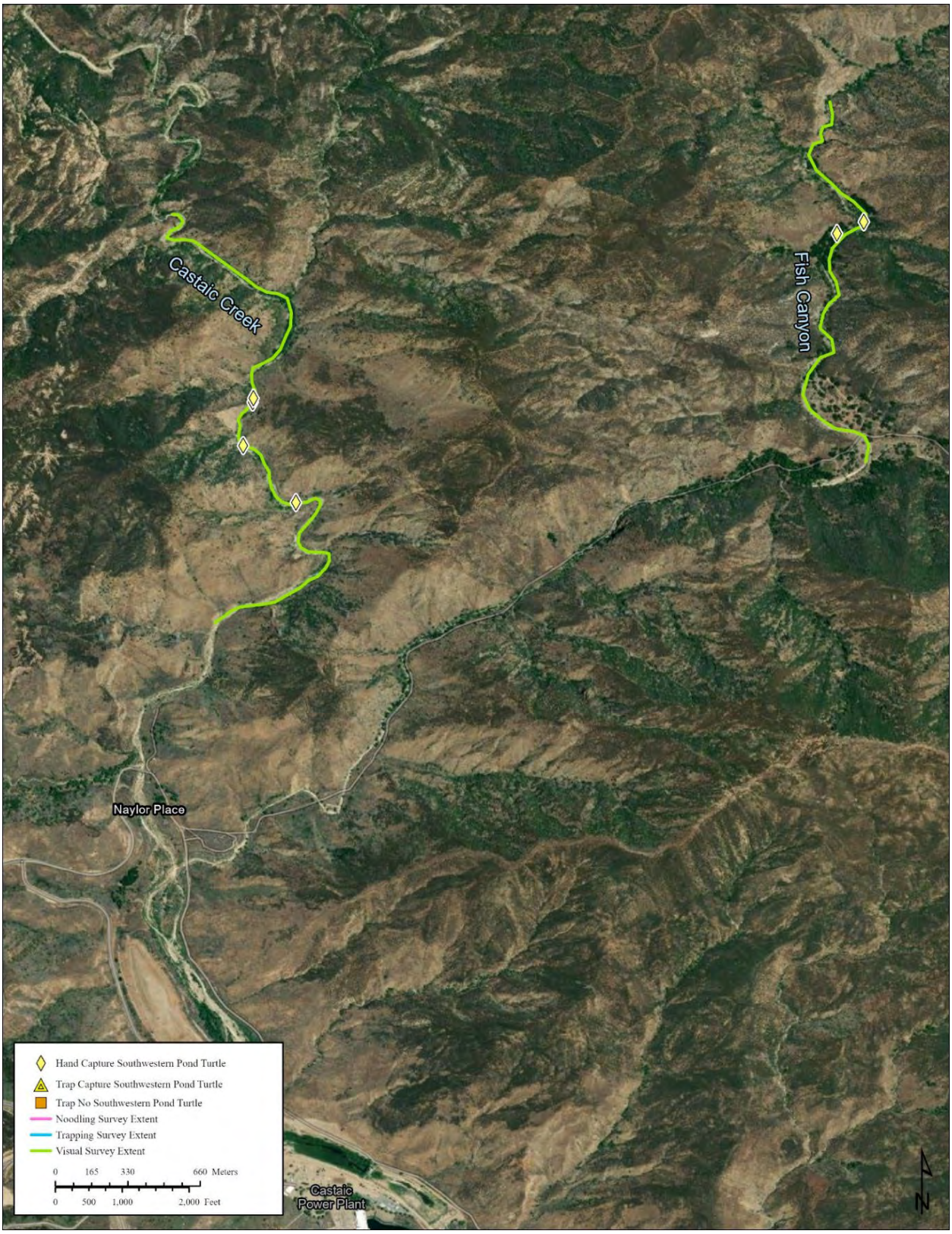

Figure 17. Castaic Creek and Fish Canyon visual survey with incidental observations of the southwestern pond turtle (*Actinemys pallida*) in southern California, 2021.

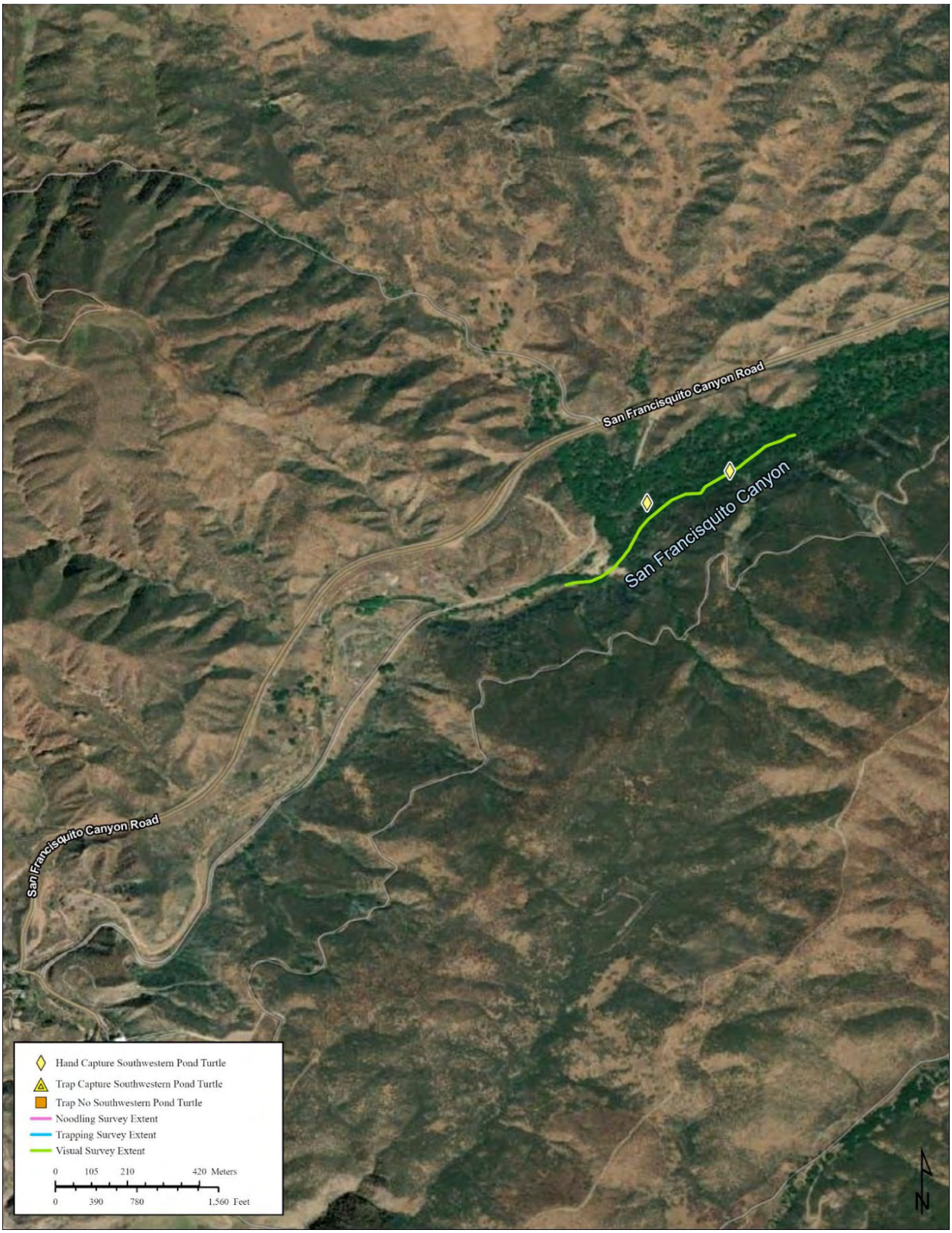

Figure 18. San Francisquito Canyon visual survey with incidental observations of the southwestern pond turtle (*Actinemys pallida*) in southern California, 2021.

Figure 19. Santa Rosa Plateau Ecological Reserve visual survey with incidental observations of the southwestern pond turtle (*Actinemys pallida*) in southern California, 2021.

Appendix 1A. Habitat suitability assessment results for southwestern pond turtle (*Actinemys pallida*) sites in southern California, 2021. (See descriptions for numerical scores in Appendix 1B).

Site Number	Site	Date Surveyed	Water Depth Score	Aquatic Substrate Score	Aquatic Refugia Score	Hatchling Habitat Score	Basking Sites Score	Terrestrial Habitat Buffer Score	Canopy Cover Score	Terrestrial Refugia Score	Human Access Score	Aquatic Vegetation Score	Invasive Species Score	Roads Score	Water Present Score	Total	Score	Habitat Category
1	Aliso Canyon	June 1, 2021	1	3	1	2	1	3	2	1	1	2	1	3	1	22	0.7333	Marginal
2	Big Tujunga Creek (Lower)	June 2, 2021	3	3	1	2	1	3	2	1	0	2	0	1	3	22	0.7333	Marginal
3	Big Tujunga Creek (Upper)	June 2, 2021	0	3	1	2	1	3	2	1	1	2	1	0	1	18	0.6	Poor
4	Brea Creek	September 9, 2021	3	3	1	1	1	3	2	1	1	2	0	0	3	21	0.7	Marginal
5	Carbon Canyon Creek (Lower)	October 27, 2021	0	3	0	1	1	3	1	1	1	0	3	1	0	15	0.5	Poor
6	Carbon Canyon Creek (Upper)	September 15, 2021	1	3	1	2	1	3	1	1	1	2	0	0	3	19	0.6333	Poor
7	Chileno Canyon	July 2, 2021	0	3	1	2	1	3	1	1	3	1	3	3	1	23	0.7667	Marginal
8	Chino Creek	August 23, 2021	3	3	1	0	1	1	2	1	0	2	0	0	3	17	0.5667	Poor
9	Cole Creek	October 13, 2021	1	3	1	2	1	3	1	1	1	2	3	3	1	23	0.7667	Marginal
10	Hole Creek	July 19, 2021	1	3	1	2	1	0	1	1	0	2	0	0	3	15	0.5	Poor
11	North of Nichols Road	June 29, 2021	1	3	1	2	1	3	1	1	3	2	0	1	3	22	0.7333	Marginal
12	Prado Basin	July 12, 2021	1	1	1	2	1	3	1	1	3	2	0	2	3	21	0.7	Marginal
13	Rancho Jurupa Regional Park	May 24, 2021	3	1	1	2	1	0	0	1	0	2	0	1	3	15	0.5	Poor
14	Soquel Canyon	August 19, 2021	1	3	1	2	1	3	1	1	3	2	1	3	1	23	0.7667	Marginal
15	Sunnyslope Creek	May 24, 2021	1	3	1	2	1	3	1	1	1	2	0	1	3	20	0.6667	Poor
16	Tequesquite Confluence Pool	July 19, 2021	3	3	1	1	1	3	2	1	0	2	0	3	3	23	0.7667	Marginal
17	West Fork San Gabriel River	July 2, 2021	1	3	1	2	1	3	2	1	1	2	3	3	3	26	0.8667	High

Appendix 1B. Southwestern pond turtle (*Actinemys pallida*) habitat suitability assessment descriptions for the numerical scores in Appendix 1A.

Description	Score
Water Depth	
> 1 m depth	3
0.5 - 1 m depth	1
< 0.5 m depth	0
Aquatic Substrate	
Natural watercourse	3
Earthen Channel	1
Concrete lined	0
Aquatic Refugia	
Present	1
Absent	0
Hatchling Habitat	
Gentle gradient with shallow water and refugia	2
Gentle gradient with shallow water or refugia	1
No gentle gradient	0
Basking Sites	
Present	1
Absent	0
Terrestrial Habitat Buffer	
> 500 m buffer	3
499-275 m buffer	2
274-51 m buffer	1
<50 m buffer	0
Canopy Cover	
>75%	2
<74% x >25%	1
<24%	0
Terrestrial Refugia	
Present	1
Absent	0
Human Access	
Remote, restricted or limited access	3
Moderate visitation	1
No access restrictions	0
Aquatic Vegetation	
Emergent and submergent aquatic vegetation is present	2
Emergent or submergent aquatic vegetation is present	1
No aquatic vegetation present	0
Invasive Species	
No invasives seen	3
One invasive species seen	1
More than one invasive species detected	0
Roads	
> 500 m buffer	3
499-275 m buffer	2
274-51 m buffer	1
<50 m buffer	0
Water Present	
100% wet	3
Sections of wet	1
Dry	0

Site Categories		
Points	Score	Habitat Category
>26	>85%	High
24-25	80-84%	Moderate
21-23	68-83%	Marginal
<20	<67%	Poor

Appendix 2. Southwestern pond turtle (*Actinemys pallida*) demography for southern California, 2021. Note: For the incidental capture sites, only pond turtles from Fish Canyon and Middle Piru Creek were marked with PIT tags or marginal scutes.

Site	PIT Tag/Marginal Scute Number	Age	Sex	Maximum Carapace Length (mm)	Maximum Weight (g)
Aliso Canyon	845295873	Juvenile	Unknown	67.7	51.0
Aliso Canyon	845296122	Juvenile	Female	86.2	111.0
Aliso Canyon	845296257	Adult	Female	124.3	314.0
Aliso Canyon	845296367	Juvenile	Unknown	72.2	58.0
Aliso Canyon	845296525	Juvenile	Unknown	52.9	24.0
Aliso Canyon	845296565	Juvenile	Unknown	72.9	62.0
Aliso Canyon	845296599	Adult	Female	122.1	287.0
Aliso Canyon	845296783	Adult	Female	150.0	490.0
Aliso Canyon	845528377	Juvenile	Female	91.0	118.0
Aliso Canyon	845530291	Adult	Female	141.2	529.0
Aliso Canyon	845531124	Adult	Female	133.0	443.0
Aliso Canyon	845531311	Juvenile	Male	91.0	103.0
Aliso Canyon	845531540	Juvenile	Unknown	84.5	105.0
Aliso Canyon	845532077	Adult	Female	106.0	197.0
Aliso Canyon	845533807	Adult	Female	107.4	182.0
Aliso Canyon	845534090	Adult	Male	129.0	327.0
Big Tujunga Creek	043273084	Adult	Male	125.3	246.0
Big Tujunga Creek	845527799	Adult	Female	121.8	252.0
Big Tujunga Creek	845532058	Adult	Male	107.9	158.0
Big Tujunga Creek	845534573	Adult	Female	121.6	246.0
Brea Creek	9	Juvenile	Unknown	60.5	75.0
Brea Creek	845296322	Adult	Male	146.1	504.0
Brea Creek	845526825	Adult	Male	152.0	527.1
Brea Creek	845528270	Adult	Female	147.5	463.9
Brea Creek	845529772	Juvenile	Unknown	68.2	50.0
Brea Creek	845530126	Adult	Male	150.0	500.3
Brea Creek	845530382	Adult	Female	118.0	233.5
Brea Creek	845533547	Adult	Male	121.3	231.0
Brea Creek	845533771	Adult	Male	139.0	332.9
Brea Creek	845535096	Juvenile	Unknown	71.9	62.9
Brea Creek	845535598	Juvenile	Unknown	83.9	80.6
Carbon Canyon Creek	101	Juvenile	Female	81.3	82.0
Carbon Canyon Creek	102	Adult	Male	111.8	182.0
Carbon Canyon Creek	103	Juvenile	Unknown	74.7	60.0
Carbon Canyon Creek	104	Juvenile	Unknown	58.0	20.0
Carbon Canyon Creek	105	Juvenile	Unknown	64.8	52.0
Carbon Canyon Creek	106	Juvenile	Unknown	86.6	96.0
Carbon Canyon Creek	107	Adult	Female	111.8	260.0
Carbon Canyon Creek	108	Juvenile	Female	101.5	146.0
Carbon Canyon Creek	109	Juvenile	Female	95.3	123.0
Carbon Canyon Creek	110	Juvenile	Female	79.0	72.0

Appendix 2. Southwestern pond turtle (*Actinemys pallida*) demography for southern California, 2021, *Continued*.

Site	PIT Tag/Marginal Scute Number	Age	Sex	Maximum Carapace Length (mm)	Maximum Weight (g)
Carbon Canyon Creek	120	Juvenile	Unknown	80.9	74.0
Carbon Canyon Creek	120	Juvenile	Unknown	71.5	55.0
Carbon Canyon Creek	130	Juvenile	Female	92.1	102.0
Carbon Canyon Creek	206	Juvenile	Unknown	66.5	51.0
Carbon Canyon Creek	845296006	Adult	Female	118.5	269.0
Carbon Canyon Creek	845296009	Adult	Male	118.0	256.0
Carbon Canyon Creek	845296301	Adult	Female	144.2	456.0
Carbon Canyon Creek	845527003	Juvenile	Male	97.5	143.0
Carbon Canyon Creek	845527112	Adult	Male	131.2	283.0
Carbon Canyon Creek	845527567	Adult	Male	120.0	243.0
Carbon Canyon Creek	845528005	Adult	Male	117.5	239.0
Carbon Canyon Creek	845528291	Juvenile	Female	92.0	113.0
Carbon Canyon Creek	845528297	Adult	Female	111.0	208.0
Carbon Canyon Creek	845528355	Juvenile	Female	89.3	106.0
Carbon Canyon Creek	845528383	Adult	Male	121.5	134.0
Carbon Canyon Creek	845528589	Adult	Male	122.7	268.0
Carbon Canyon Creek	845529314	Adult	Male	103.2	148.0
Carbon Canyon Creek	845529375	Adult	Male	120.2	244.0
Carbon Canyon Creek	845529591	Juvenile	Female	91.2	107.0
Carbon Canyon Creek	845529823	Adult	Male	125.7	245.0
Carbon Canyon Creek	845530604	Juvenile	Female	102.3	160.0
Carbon Canyon Creek	845530816	Juvenile	Unknown	95.9	132.0
Carbon Canyon Creek	845531072	Juvenile	Male	102.0	137.0
Carbon Canyon Creek	845532515	Adult	Female	123.4	290.0
Carbon Canyon Creek	845532547	Adult	Male	131.4	291.0
Carbon Canyon Creek	845532809	Juvenile	Unknown	86.9	96.0
Carbon Canyon Creek	845532894	Adult	Male	120.1	231.0
Carbon Canyon Creek	845533329	Adult	Female	134.8	399.0
Carbon Canyon Creek	845533368	Adult	Male	110.6	183.0
Carbon Canyon Creek	845534355	Adult	Male	117.4	234.0
Carbon Canyon Creek	845534537	Juvenile	Female	98.0	141.0
Carbon Canyon Creek	845535269	Adult	Female	121.4	263.0
Cole Canyon	845862304	Juvenile	Unknown	85.9	103.3
Cole Canyon	845863792	Adult	Female	122.0	261.1
Fish Canyon	1	Adult	Male	200.0	109.5
Fish Canyon	2	Hatchling	Unknown	31.6	6.8
Middle Piru Creek	605370520	Adult	Female	129.3	320.0
Rancho Jurupa Regional Park	845532093	Adult	Male	148.0	516.0
Soquel Canyon	1	Hatchling	Unknown	43.7	14.5
Soquel Canyon	7	Juvenile	Unknown	43.9	17.0
Soquel Canyon	8	Juvenile	Unknown	49.7	20.0

Appendix 2. Southwestern pond turtle (*Actinemys pallida*) demography for southern California, 2021, *Continued*.

Site	PIT Tag/Marginal Scute Number	Age	Sex	Maximum Carapace Length (mm)	Maximum Weight (g)
Soquel Canyon	9	Juvenile	Unknown	55.4	29.0
Soquel Canyon	10	Juvenile	Unknown	52.9	23.0
Soquel Canyon	20	Juvenile	Unknown	56.8	28.0
Soquel Canyon	30	Juvenile	Unknown	58.4	31.0
Soquel Canyon	40	Juvenile	Unknown	49.5	18.0
Soquel Canyon	50	Juvenile	Unknown	58.3	36.0
Soquel Canyon	841560630	Adult	Female	108.9	187.0
Soquel Canyon	842806854	Juvenile	Unknown	51.0	25.0
Soquel Canyon	845295876	Adult	Female	111.8	210.0
Soquel Canyon	845296278	Adult	Male	111.4	199.0
Soquel Canyon	845296540	Juvenile	Unknown	68.9	48.0
Soquel Canyon	845296574	Adult	Female	133.4	395.0
Soquel Canyon	845296575	Juvenile	Female	96.0	146.0
Soquel Canyon	845296581	Adult	Female	126.1	335.0
Soquel Canyon	845296592	Juvenile	Female	80.8	69.0
Soquel Canyon	845296616	Juvenile	Unknown	71.3	58.0
Soquel Canyon	845296786	Adult	Male	114.5	177.0
Sunnyslope Creek	845295895	Adult	Male	136.5	341.0
Sunnyslope Creek	845296125	Adult	Female	141.0	282.0
Sunnyslope Creek	845296841	Adult	Female	114.0	153.0
Sunnyslope Creek	845528006	Adult	Male	140.0	188.0
Tequesquite Confluence Pool	845527272	Adult	Female	176.0	777.0
West Fork San Gabriel River	605369878	Adult	Female	114.0	225.0
West Fork San Gabriel River	605527379	Adult	Female	146.0	480.0
West Fork San Gabriel River	605529567	Adult	Male	137.0	370.0
West Fork San Gabriel River	605532844	Adult	Female	144.0	–