



# Metropolitan Water District Inland Feeder Project: Mountain Yellow-Legged Frog (*Rana muscosa*) and California Red- Legged Frog (*Rana aurora*) Surveys

Annual Report



Prepared for:

**San Bernardino National Forest  
Steve Loe**

U.S. DEPARTMENT OF THE INTERIOR  
U.S. GEOLOGICAL SURVEY  
WESTERN ECOLOGICAL RESEARCH CENTER

# Metropolitan Water District Inland Feeder Project: Mountain Yellow-Legged Frog (*Rana muscosa*) and California Red-Legged Frog (*Rana aurora*) Surveys

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## INTRODUCTION

In southern California, the mountain yellow-legged frog (*Rana muscosa*) (MYLF) and California red-legged frog (*Rana aurora*) (RLF) occur in several isolated drainages throughout the San Gabriel and San Bernardino Mountains (Jennings 1998, 1999; Backlin et al. 2001). Currently there is one known remaining MYLF population in the San Bernardino Mountains: East Fork City Creek (Jennings 1998, 1999; Backlin et al. 2001). Both species require specific habitat characteristics: streams that contain perennial water, deep pools, and open, sunny banks lacking heavy vegetative cover. Surveys were initiated in response to a proposed Metropolitan Water District (MWD) project that has the potential to alter water flows along the numerous drainages that drain the south slope of the San Bernardino Mountains north of the city of San Bernardino. Drainages were selected based on their location relative to the MWD inland feeder project.

## METHODS

Surveys were conducted along 10 drainages in the San Bernardino National Forest between June and August 2001 (Table 1). For several drainages, surveys were conducted along different reaches along the canyon (i.e. lower and upper portions) and were conducted on multiple occasions. Because surveys were conducted after the optimal season for which to document arroyo southwestern toad (*Bufo californicus*) and western spadefoot toad (*Spea hammondi*) activity (typically March-May), we present data specific to MYLF and RLF surveys only.

MYLF and RLF surveys were conducted during the day and at night by walking slowly in or near the stream channel. The frogs usually are located basking on rocks in or near the water, and can potentially be captured by hand or with the aid of a small dip net. The captured frogs would be weighed, measured (snout to vent length), and examined to determine gender and any deformities. Water and air temperatures would be recorded for each capture. The frogs would then be photographed and the GPS location recorded. All frogs would be released after being processed. Detailed notes, identifying potential threats and general quality of the watercourse, were taken for each survey. Species lists for all amphibians and reptiles observed were also compiled. Following is a detailed site description for each drainage:

### Site 17

**Description:** Site 17 more closely resembled a seep rather than a stream. The seep was characterized by a short distance of surface flow that was completely covered by vegetation. There were no pools and there was not enough surface flow of water to support MYLF or RLF populations. See Figure 1.

### **Site 56/181**

**Description:** This site was a short stream that drains into the West Fork of City Creek. We surveyed the stream upstream of Highway 330 to the uppermost wetted area. This area has sycamore trees and is densely vegetated with shrubs in the riparian area. There was almost no surface flow and few pools. There was an insufficient amount of water available here to provide suitable habitat for either MYLF or RLF populations. See Figure 2.

### **Site 58**

**Description:** Site 58 had no surface flow, with the exception of a small pool about 1 foot in diameter and 2 inches deep. The entire wetted area is overgrown with shrubs, the majority of which is wild grape (*Vitis girdiana*). There was an insufficient amount of water available here to provide suitable habitat for either MYLF or RLF populations. See Figure 2.

### **Site 110**

**Description:** Site 110 consisted of a series of pools created by a seep along the Ben Canyon drainage. The water, however, did not reach the main stream (Ben Canyon). One pool was created by a Forest Service dirt road and contained Pacific treefrog (*Hyla regilla*) and western toad (*Bufo boreas*) larvae. However, due to its location on the road it received a high level of vehicle disturbance. The other pool was located off the road and was completely filled with cattails. Both pools were too shallow to support MYLF or RLF populations. See Figure 1.

### **Site 631**

**Description:** Site 631 was very similar to Site 58. It contained very little surface flow and an overgrown riparian area. It is unlikely that MYLF's or RLF's occur here. See Figure 2.

### **Badger Canyon**

**Description:** This site is a moderately steep canyon dominated by coastal sage scrub (in the lower reach of the canyon), which gradually gives way to a mix of slightly more dense and taller vegetative growth, including tree tobacco, mule fat, sycamore trees, and coastal sage scrub. The surveyed stretch contained only intermittent sections of water flowing at a slow trickle. The amount of water in this stretch of canyon was insufficient to provide suitable habitat for MYLF or RLF populations, however *Hyla regilla* and *Bufo boreas* were detected. See Figure 1.

### **Ben Canyon**

**Description:** This is a short stretch of canyon located at approximately 775 m in elevation. A frequently used dirt road is present at the lower reach of the canyon. The drainage contained only an intermittent trickle of water, the majority of which was observed coming from a seep in the rocks at the back wall of the canyon. Vegetation in the canyon consists of grasses, poison oak, and oak trees, the latter of which shaded the canyon floor and covered it with leaf litter. There was an insufficient amount of water available here to provide suitable habitat for either MYLF or RLF populations. See Figure 1.

### **Borea Canyon**

**Description:** Borea Canyon is a moderately steep canyon that empties out into a large catch basin. The foothills surrounding the canyon are dominated by coastal sage scrub intermixed with various nonnative trees, such as eucalyptus. Only intermittent water was observed along the surveyed reach, which consisted of small riffles containing a dense growth of mule fat and other riparian vegetation. There were no pools of significant size or depth located. This habitat would not be suitable for MYLF's or RLF's due to the lack of sufficient water and the dense vegetative growth overhanging the waterway. California treefrogs (*Hyla cadaverina*) were detected along the survey reach. See Figure 2.

### **City Creek Watershed**

**Description:** City Creek Watershed is an unnamed tributary to the West Fork City Creek drainage. The confluence with the West Fork of City Creek occurs at 680 m in elevation and the wetted part of the stream rises to approximately 800 m. This is a steep, narrow stream channel, which allows very little penetration of sunlight to the water surface. This stream had low water flow, but certain segments have retained water to create small shallow pools throughout the year. Although these pools contained *Hyla regilla*, they were inadequate to support MYLF or RLF populations. See Figure 2.

### **Little Sand Canyon**

#### *Lower Little Sand Canyon*

**Description:** This site is heavily overgrown in its lower reach. The canyon drains into a large open catch basin that is adjacent to a paved road. An infrequently used dirt road also cuts up along the east bank of the canyon. Coastal sage scrub is found growing along the banks and in the surrounding foothills and mule fat is the dominant vegetation in and adjacent to the water. The water flow was limited to a slow trickle and inundated the canyon up to the catch basin, which was dry. A lack of deep pools and an excessive overhang of brush in the waterway make this habitat unsuitable for both MYLF's and RLF's. *Hyla cadaverina* were detected during the survey. See Figure 2.

### *Upper Little Sand Canyon*

**Description:** Upper Little Sand Canyon is a short section of stream 1.4 km above the portion of stream having perennial flows. Although there was no surface flow, the ground was damp. Because both the MYLF and RLF require perennial water, it is unlikely they occur here. Both *Hyla cadaverina* and *Hyla regilla* were detected along this portion of the canyon. See Figure 2.

### **Sand Canyon**

Description: Sand Canyon was surveyed from the San Manuel Indian Reservation property, approximately 550 m in elevation, upstream to the uppermost wetted area of the stream, approximately 720 m in elevation. The dominant riparian vegetation is mule fat and sycamore, oak, and willow trees. The water flow was low; there were only a few pools large enough for MYLF's, although these pools lacked the depth and underwater structure used by MYLF's as a retreat from predators. It is unlikely that MYLF's occur in this stream. There were no locations in the stream that contained enough water to support RLF's. *Hyla cadaverina* were detected during the survey. See Figure 2.

### **Sycamore Canyon**

#### *Lower Sycamore Canyon*

**Description:** The site is a heavily overgrown area at the base of a foothill that maintains a moderate trickle of water throughout the surveyed reach. Mule fat, wild grape, and poison oak are common and completely cover the banks and hang in and over the water. Large sycamore trees are also present along the banks and further shaded the canyon. The water along the surveyed stretch contained shallow riffles and no pools of significant size or depth. The heavy overgrowth of vegetation in the stream and lack of deep open pools create a habitat that is not suitable for MYLF or RLF populations. See Figure 2.

#### *Upper Sycamore Canyon*

**Description:** Upper Sycamore Canyon is the portion of Sycamore Canyon upstream of the waterfall, which occurs at approximately 560 m in elevation, to the uppermost wetted portions of the drainage. Here, the water flowed in almost a continuous riffle interrupted by a few small pools. The stream is dominated by wild grape, which completely covers most of the flowing water. This prevents sunlight from penetrating through to the banks of the stream. Without sunny stream banks and pools, it is unlikely for that MYLF's would occur in this stream. There were no locations in the stream that contained enough water to support RLF's. *Bufo boreas* and *Hyla regilla* were detected.



## RESULTS

No MYLF's or RLF's were detected at any of the survey locations (Table 2). The drainages that were surveyed generally lacked the habitat characteristics that either MYLF's or RLF's require. Specifically, these locations had little or no surface flow and, where water was present, contained small pools that were too shallow. Many sites also contained dense vegetative cover, resulting in the lack of open, sunny stream banks. Several sites were also present along areas of human recreation, which have negative impacts on MYLF and RLF habitat.

Several other species of interest were detected during the surveys (Table 2). California treefrogs (*Hyla cadaverina*) were detected in Borea, City Creek Watershed, Little Sand, and Sand Canyons; Pacific treefrogs (*Hyla regilla*) were detected in Badger, City Creek Watershed, Little Sand, and Sycamore Canyons; western toads (*Bufo boreas*) were detected in Badger and Sycamore Canyons.

## RECOMMENDATIONS

We highlight several recommendations regarding amphibian surveys relative to the proposed MWD inland feeder project. First, we suggest expanding surveys beyond San Bernardino National Forest lands to incorporate other private or public lands that have been identified as having the potential to be affected by the project. Efforts should be made to gain access to these parcels, so that inventories of amphibians can be conducted. Second, surveys should begin earlier in the year so as to maximize the probability of detecting other sensitive amphibian species, primarily the arroyo southwestern toad (*Bufo californicus*) and western spadefoot toad (*Spea hammondi*). Both of these species typically breed in spring and can be found along streams between the months of March-May. We strongly recommend that surveys be initiated next spring in order to document the presence of these species in the drainages of interest. Such surveys may occur over different reaches of the drainages surveyed for MYLF's and RLF's in this study, as these species are common along portions of streams with lower gradients.

## LITERATURE CITED

- Backlin, A., Hirsch, R., Brown, C., and R.N. Fisher. 2001. Angeles and San Bernardino National Forest mountain yellow-legged frog (*Rana muscosa*) surveys, 2000. Final report submitted to the Angeles National Forest, Supervisor's Office, Arcadia, California. 10pp.
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**Table 1. Dates and locations of mountain yellow-legged frog (*Rana muscosa*) and California red-legged frog (*Rana aurora*) surveys.**

Location	Date(s) Surveyed	Start Coordinates (Lat/Long) <sup>1</sup>	End Coordinates (Lat/Long)	Figure #
Site 17	June 4, 2001	34.18741N / 117.28445W	34.18911N / 117.28368W	1
Site 56/181	June 6, 2001	34.15214N / 117.18857W	34.1557N/ 117.19145W	2
	June 13, 2001	34.15214N / 117.18857W	34.1557N/ 117.19145W	
Site 58	June 6, 2001	34.15505N/ 117.18767W <sup>2</sup>		2
	June 13, 2001	34.15505N/ 117.18767W <sup>2</sup>		
Site 631	June 6, 2001	34.15888N/ 117.18472W <sup>2</sup>		2
	June 13, 2001	34.15888N/ 117.18472W <sup>2</sup>		
	June 27, 2001	34.15931N / 117.18458W		
Badger Canyon	June 7, 2001	34.19903N / 117.30769W	34.20463N / 117.30694W	1
	June 21, 2001	34.20032N / 117.30789W	34.20507N / 117.30679W	
	July 10, 2001	34.19903N / 117.30769W	34.20463N / 117.30694W	
Ben Canyon	June 7, 2001	34.20425N / 117.32041W	34.20549N / 117.31975W	1
	June 21, 2001	34.2043N / 117.32041W	34.20546N / 117.31971W	
	July 10, 2001	34.20425N / 117.32041W	34.20549N / 117.31975W	
Borea Canyon	June 14, 2001	34.16985N / 117.24425W	34.17396N / 117.24357W	2
	August 1, 2001	34.16516N / 117.24581W	34.18037N / 117.24225W	
City Creek Watershed	June 6, 2001	34.17582N/ 117.18614W	34.17626N/ 117.19571W	2
	June 13, 2001	34.17582N/ 117.18614W	34.17626N/ 117.19571W	
	June 27, 2001	34.1757N / 117.18626W	34.17615N / 117.1957W	
Little Sand Canyon	June 14, 2001	34.15726N / 117.23803W	34.17576N / 117.22785W	2
	June 20, 2001	34.15809N / 117.23622W	34.164N / 117.23008W	
Sand Canyon	August 7, 2001	34.17891N/ 117.21333W	34.26655N/ 117.21861	2
	August 29, 2001	34.164617N / 117.2196W	34.18011N / 117.20877W	
Sycamore Canyon	June 4, 2001	34.19016N / 117.2987W	34.19608N / 117.29666W	1
	June 7, 2001	34.18447N/ 117.30095W	34.19N/ 117.29849W	
	June 21, 2001	34.18511N / 117.30057W	34.18614N / 117.30040W	
	June 25, 2001	34.18997N / 117.29852W	34.19686N / 117.297W	
	July 10, 2001	34.18447N/ 117.30095W	34.19N/ 117.29849W	

<sup>1</sup> coordinates marked in WGS84 Datum

<sup>2</sup> survey was conducted at a specific site rather than a stream reach

**Table 2. Results of mountain yellow-legged frog (*Rana muscosa*) and California red-legged frog (*Rana aurora*) surveys.**

Location	Date	Results	Other Species Detected	Comments
Site 17	June 4, 2001	None detected		
Site 56/181	June 6, 2001	None detected	<i>Uta stansburiana</i>	
	June 13, 2001	None detected		
Site 58	June 6, 2001	None detected		
	June 13, 2001	None detected		
Site 631	June 6, 2001	None detected		
	June 13, 2001	None detected		
	June 27, 2001	None detected		
Badger Canyon	June 7, 2001	None detected		
	June 21, 2001	None detected		
	July 10, 2001	None detected		
Ben Canyon	June 7, 2001	None detected		
	June 21, 2001	None detected		
	July 10, 2001	None detected		
Borea Canyon	June 14, 2001	None detected		fish barrier; ephemeral pond
	August 1, 2001	None detected		
City Creek Watershed	June 6, 2001	None detected	<i>Crotalus viridis; Hyla cadaverina</i> <i>Hyla cadaverina; Hyla regilla</i> <i>Elgaria multicarinatus; Hyla regilla</i>	
	June 13, 2001	None detected		
	June 27, 2001	None detected		
Little Sand Canyon	June 14, 2001	None detected	<i>Hyla cadaverina</i> <i>Crotalus viridis; Hyla cadaverina; Hyla regilla</i>	waterfall
	June 20, 2001	None detected		
Sand Canyon	August 7, 2001	None detected	<i>Eumeces skiltonianus; Hyla cadaverina</i> <i>Thamnophis hammondi; Uta stansburiana</i> <i>Crotalus viridis; Hyla cadaverina</i>	waterfall
	August 29, 2001	None detected		
Sycamore Canyon	June 4, 2001	None detected	<i>Bufo boreas; Crotalus mitchellii; Hyla regilla</i> <i>Bufo boreas</i>	
	June 7, 2001	None detected		
	June 21, 2001	None detected		
	June 25, 2001	None detected		
	July 10, 2001	None detected		

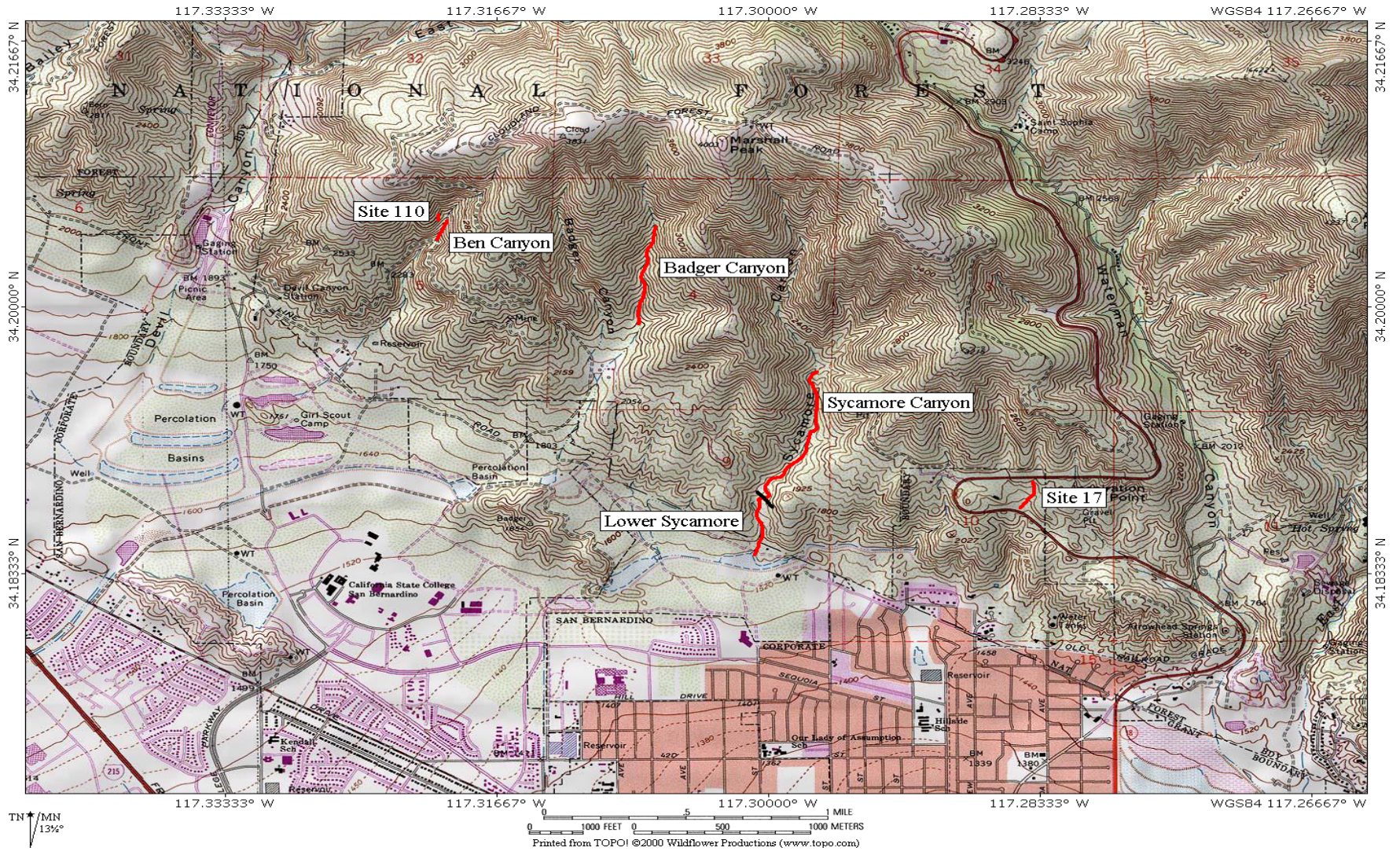



Figure 1. Location of amphibian surveys in western portion of study area.

 = Survey Reach

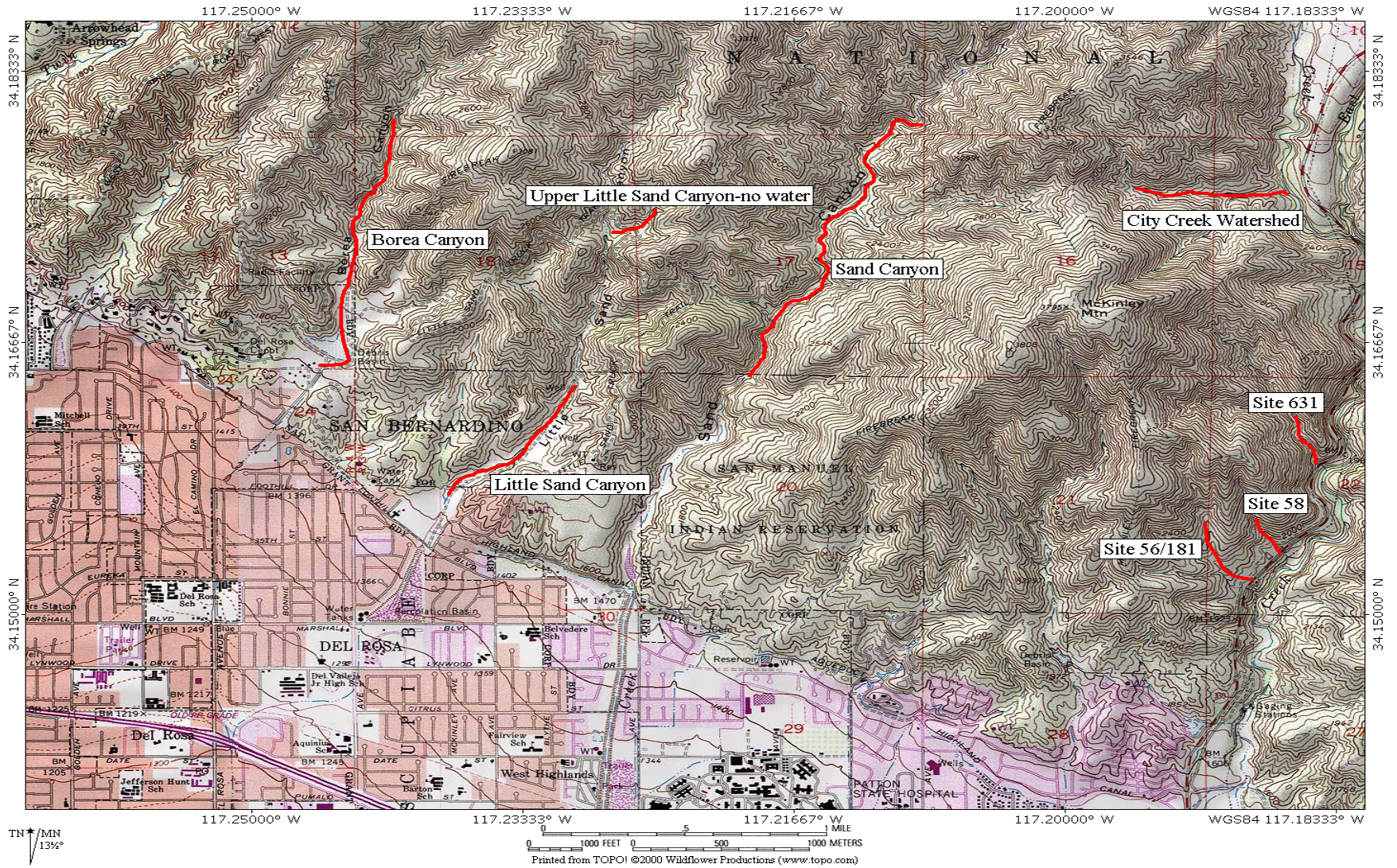



Figure 2. Location of amphibian surveys in eastern portion of study area.

 = Survey Reach