



# **Least Bell's Vireo Surveys at Selected Drainages in San Diego County, California**

## **2008 Data Summary**

Prepared for:

**San Diego River Conservancy**

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

# Least Bell's Vireo Surveys at Selected Drainages in San Diego County, California

By Suellen Lynn and Barbara E. Kus

---

U.S. GEOLOGICAL SURVEY  
WESTERN ECOLOGICAL RESEARCH CENTER

## 2008 Data Summary

Prepared for:

San Diego River Conservancy  
1350 Front Street, Suite 3024  
San Diego, California 92101

San Diego Field Station  
USGS Western Ecological Research Center  
4165 Spruance Road, Suite 200  
San Diego, CA 92101

Sacramento, California  
2008

The use of firm, trade, or brand names in this report is for identification purposes only and does not constitute endorsement by the U.S. Geological Survey.

---

*Recommended citation:*

Lynn, S. and B. E. Kus. 2008. Least Bell's vireo surveys at selected drainages in San Diego County, California. 2008 data summary. Prepared for San Diego River Conservancy, San Diego, California.



## INTRODUCTION

The least Bell's vireo (*Vireo bellii pusillus*; hereafter "vireo") is a small, migratory songbird that breeds in southern California and northwestern Baja California, Mexico from April through July. Historically abundant within lowland riparian ecosystems, vireo populations began declining in the late 1900's as a result of multiple anthropogenic factors, including habitat loss and alteration associated with urbanization and agricultural conversion of land adjacent to rivers (Franzreb 1989, USFWS 1998, RHJV 2004), the expansion in range of the brown-headed cowbird (*Molothrus ater*), a brood parasite (USFWS 1986; Franzreb 1989; Brown 1993; Kus 1998, 1999), and the introduction of invasive exotic plant species, such as giant reed (*Arundo donax*), into riparian systems. By 1986, the vireo population in California numbered just 300 territorial males (USFWS 1986).

In response to the dramatic reduction in numbers of vireos in California, the California Fish and Game Commission listed the species as endangered in 1980, and the U.S. Fish and Wildlife Service followed suit in 1986. Since listing, the vireo population in southern California has rebounded, largely in response to cowbird control and habitat restoration and preservation (Kus and Whitfield 2005).

In 1997, biologists from San Diego State University conducted surveys in drainages throughout southern California with habitat that appeared suitable for vireos to expand knowledge of the range and distribution of this endangered subspecies beyond the well-studied, larger drainages (Kus and Beck 1998). In 2008, we repeated surveys in seven drainages in San Diego County. Our objectives were: 1) to determine changes in abundance and distribution of vireos in the study area and in response to management (habitat restoration), 2) to facilitate population trend analysis, and 3) to collect information on dispersal and site fidelity of banded vireos.

## METHODS

United States Geological Survey (USGS) biologist Rudy Badia conducted two surveys in each of the seven drainages between 14 May and 26 June, 2008 (Figure 1). A survey consisted of walking slowly through or adjacent to suitable riparian vegetation, scanning for and listening for singing or calling vireos, and periodically playing a recording of vireo songs to elicit territorial response. Surveys typically began at sunrise and were completed by 1300 or later when weather conditions and bird activity remained favorable. Survey endpoints replicated surveys conducted in 1997 and were verified using a Garmin 12 Global Positioning System (GPS) unit.

When a vireo was detected, the surveyor collected information on its breeding status (if possible), leg bands, and location using GPS. Habitat type and quality were described for the entire survey site. Habitat type was determined by dominant or co-dominant plant species. Habitat quality incorporated general impression of habitat structure and density, level of disturbance, and proportion of native to exotic plant species. Presence of brown-headed cowbird was noted at each survey site. Attempts were made to recapture banded vireos to determine their original banding location and to apply a unique color band combination so that individuals could be identified in the future without recapture.

### Survey Areas

The specific areas surveyed were as follows:

*Agua Hedionda Creek* - From Laguna Riviera Park east to El Camino Real (approximately 1.5 km; Figure 2).

*Buena Vista Creek* - From the east end of Haymar Drive (western section near El Camino Real) east to the quarry at College Boulevard (approximately 0.9 km; Figure 2).

*Encinitas Creek* – From Olivenhain Road north to La Costa Avenue (approximately 2.0 km; Figure 3).

*Escondido Creek* – From El Camino del Norte southwest to Mira Costa College Road (suitable habitat: approximately 2.5 km; Figure 3).

*Loma Alta Creek* – From the intersection of North Avenue and Seasons Road southwest to Crouch Street (approximately 11.7 km; Figure 2).

*Otay River* – From Interstate 5 near Industrial Boulevard east to Heritage Road (approximately 7.8 km; Figure 4).

*San Marcos Creek/Twin Oaks Creek (2 sections)* –

1. From the intersection of Civic Center Drive and Rancheros Drive east to Valpreda Road (approximately 0.6 km; Figure 5).
2. From the intersection of Woodward Street and Vineyard Road north to La Cienega Road (approximately 3.4 km; Figure 5).

## RESULTS

In 2008, we found a total of 34 vireo territories (Table 1), at least nine of which were occupied by pairs. Vireo territories were found in all seven drainages surveyed in 2008. Vireo pairs were observed in all drainages except Loma Alta Creek.

The total number of vireo territories in 2008 was similar to the total number found in 1997 (36), although distribution of these territories differed (Table 1; Figures 6 - 10). In 2008, fewer vireo territories occurred along Buena Vista Creek and Loma Alta Creek than occurred during 1997. However, in 2008, all of the drainages that we surveyed were occupied by vireos, including the two drainages (Encinitas Creek and Escondido Creek) that were not occupied in 1997.

Table 1. Number of least Bell's vireo territories detected in 1997 and 2008, and change between 1997 and 2008 in drainages in San Diego County, California.

Drainage	# territories		Change 1997 to 2008
	1997	2008	
Agua Hedionda Creek	3	3	0
Buena Vista Creek	8	3	-5
Encinitas Creek	0	2	+2
Escondido Creek	0	5	+5
Loma Alta Creek	7	1	-6
Otay River	14	16	+2
San Marcos Creek/Twin Oaks Creek	4	4	0
Total	36	34	-2

Source: Kus and Beck 1998

Vegetation characteristics at all survey sites consisted largely of native black willow (*Salix gooddingii*) and arroyo willow (*S. lasiolepis*) with components of Fremont cottonwood (*Populus fremontii*) and California sycamore (*Platanus racemosa*) (Table 2). Exotic herbs, such as black mustard (*Brassica nigra*), were evident in all drainages. Eucalyptus (*Eucalyptus* spp.), palm trees, giant reed, and salt cedar (*Tamarix ramosissima*) were also prevalent. Brown-headed cowbirds were detected in all drainages except Buena Vista Creek during 2008 surveys.

Table 2. Description of habitat conditions at seven drainages surveyed for least Bell's vireo in San Diego County, 2008.

Drainage	Habitat Type	Survey Area Description
Agua Hedionda Creek	Willow-Cottonwood	Largely native vegetation. Threats include encroaching urban development and road incursion.
Buena Vista Creek	Willow-Sycamore	Largely native vegetation. Threats include encroachment by surrounding recreational and rock extraction activities.
Encinitas Creek	Willow-Cottonwood	Largely native vegetation. Threats include indigent encampments.
Escondido Creek	Willow-Cottonwood	Largely native vegetation. Threats include indigent encampments and ranching in surrounding area.
Loma Alta Creek	Willow-Sycamore	Long, narrow riparian strip with abundant exotic vegetation bordered by train tracks and industrial development. Threats include garbage, noise, and invasive exotic plant species.
Otay River	Willow-Sycamore	Two areas of native vegetation at either end, separated by disturbed and arid areas. Threats include indigent encampments and invasive exotic plant species.
San Marcos Creek/Twin Oaks Creek	Willow-Cottonwood	Largely native vegetation. Threats include encroaching urban development, including a golf course.

Two vireos, one male at Agua Hedionda Creek (Figure 7) and one male at the Otay River (Figure 8), were observed with dark blue metal leg bands, indicating that they



fledged from nests on the San Luis Rey River in a previous year. These individuals were occupying territories a minimum of 9 km and 74 km (respectively) from their natal areas. Attempts to recapture and determine the specific natal territories of these individuals were not successful. One unbanded male was captured and banded at the Otay River during an attempt to recapture the banded male. This male was banded with a silver numbered federal band on the left leg and a plastic yellow band on the right leg.

## **DISCUSSION**

Since the late 1990s, vireo numbers have increased throughout their range, from approximately 2,500 territories to approximately 3,000 territories by 2005 (USFWS 2006). However, within San Diego County, the number of vireo territories has decreased during that time period, from approximately 1,900 territories to approximately 1,600 territories (USFWS 2006), mostly at Camp Pendleton where vireo territories reached a high of 1,010 in 1998 before dropping to between 700 and 800 in recent years (Griffith Wildlife Biology 2004; Rourke and Kus 2006). The number of territories that we detected was slightly less in 2008 than in 1997, although our survey methods do not promote statistical analysis. However, we observed a change in vireo distribution among our survey areas, suggesting either an increase in the number of dispersing individuals, or a relative increase in habitat quality in areas that were not occupied in 1997, or conversely, a relative decrease in habitat quality in areas that were occupied in 1997.

Broad vegetation characteristics and habitat quality did not apparently differ greatly between 1997 and 2008 (Table 3; Kus and Beck 1998), although our survey methodology was not intended to quantify habitat change. However, some territories that were detected in 1997 were in areas that have since been converted to or encroached upon by industrial development, particularly along Loma Alta Creek (Figure 6). Abundant weedy plant species in this drainage also may be contributing to reduced vireo occupancy since 1997.

Both of the banded vireos that we detected during the 2008 surveys had dispersed to territories outside of and south of their natal drainages. This agrees with results from resighted banded birds in 1997, where a high degree of genetic mixing was postulated for the San Diego County population (Kus and Beck 1998).

## LITERATURE CITED

- Brown, B. T. 1993. Bell's Vireo (*Vireo bellii*). In The Birds of North America, No. 35 (A. Poole, P. Stettenheim, and F. Gill, Eds.). Philadelphia: The Academy of Natural Sciences; Washington, DC: The American Ornithologists' Union.
- Franzreb, K. E. 1989. Ecology and conservation of the endangered least Bell's vireo. Biological Report 89(1). U.S. Fish and Wildlife Service, Department of Interior. March 1989.
- Griffith Wildlife Biology. 2004. The status of the least Bell's vireo at Marine Corps Base Camp Pendleton in 2004. Unpublished draft report for Assistant Chief of Staff, Environmental Security, Camp Pendleton, California, by Jane C. Griffith and John T. Griffith, Griffith Wildlife Biology, Calumet, Michigan.
- Kus, B. E. 1998. Use of restored riparian habitat by the endangered least Bell's vireo (*Vireo bellii pusillus*). Restoration Ecology 6:75-81.
- Kus, B. E. 1999. Impacts of brown-headed cowbird parasitism on the productivity of the endangered least Bell's vireo. Studies in Avian Biology 18:160-166.
- Kus, B. E. and P. P. Beck. 1998. Distribution and abundance of the least Bell's vireo (*Vireo bellii pusillus*) and the southwestern willow flycatcher (*Empidonax traillii extimus*) at selected southern California sites in 1997. Final Report to California Department of Fish and Game, Sacramento, California. 69 pp + append.

- Kus, B. E. and M.J. Whitfield. 2005. Parasitism, productivity, and population growth: response of least Bell's vireos (*Vireo bellii pusillus*) and southwestern willow flycatchers (*Empidonax traillii extimus*) to cowbird (*Molothrus spp.*) control. Ornithological Monographs 57:16-27.
- RHJV (Riparian Habitat Joint Venture). 2004. Version 2.0. The riparian bird conservation plan: a strategy for reversing the decline of riparian associated birds in California. California Partners in Flight. [www.prbo.org/calpif/pdfs/riparian\\_v-2.pdf](http://www.prbo.org/calpif/pdfs/riparian_v-2.pdf).
- Rourke, J. W. and B. E. Kus. 2006. Distribution, abundance and breeding activities of the least Bell's vireo at Marine Corps Base Camp Pendleton, California. 2005 Annual Report. Prepared for Assistant Chief of Staff, Environmental Security, Marine Corps Base Camp Pendleton.
- USFWS (U.S. Fish and Wildlife Service). 1986. Final rule determining endangered status for the least Bell's vireo. Federal Register 51(85):16474-16482.
- USFWS (U.S. Fish and Wildlife Service). 1998. Draft recovery plan for the least Bell's vireo. U.S. Fish and Wildlife Service, Portland, OR.
- USFWS (U.S. Fish and Wildlife Service). 2006. Least Bell's vireo (*Vireo bellii pusillus*) 5-year review summary and evaluation. Carlsbad Fish and Wildlife Office, Carlsbad, California. 26 pp.

## FIGURES

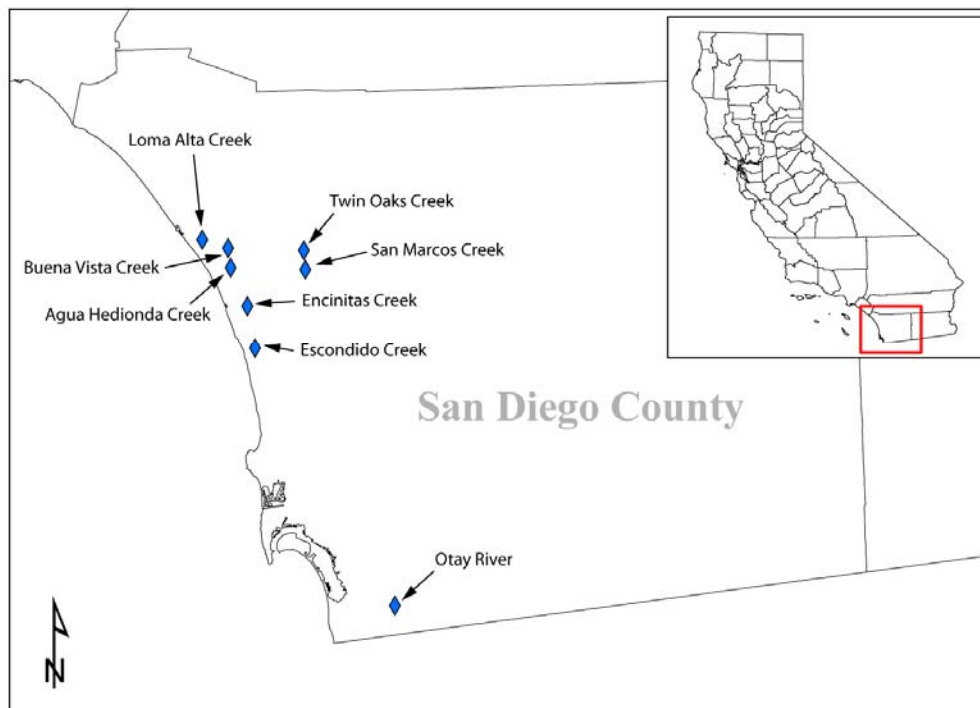


Figure 1. Location of least Bell's vireo survey areas in San Diego County, California.

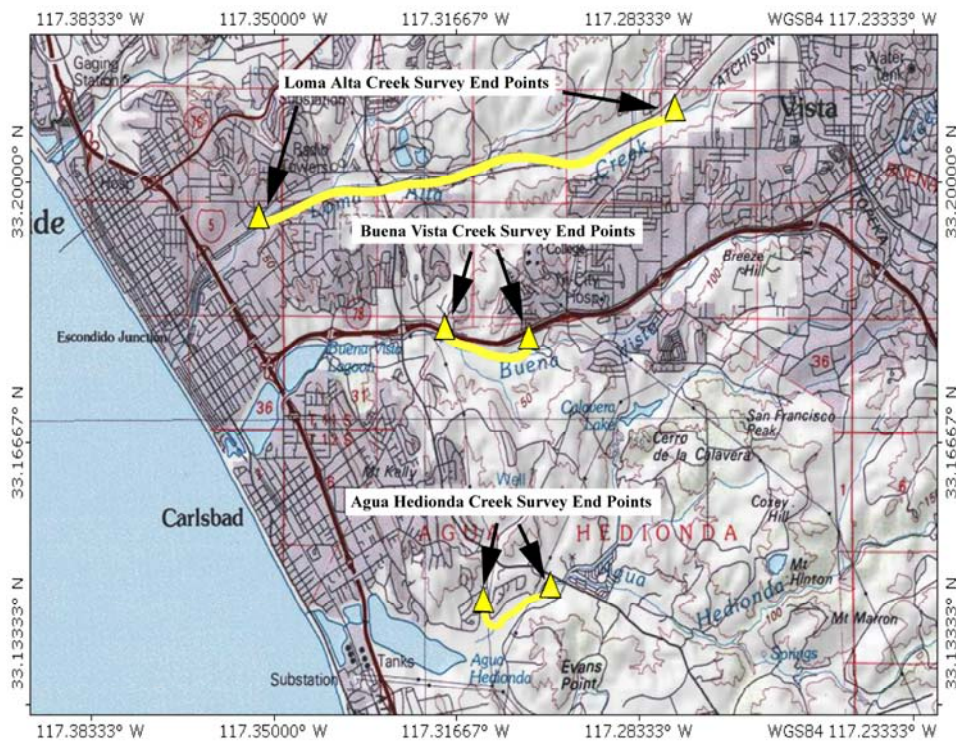


Figure 2. Locations of Agua Hedionda Creek, Buena Vista Creek, and Loma Alta Creek vireo surveys, San Diego County, California.



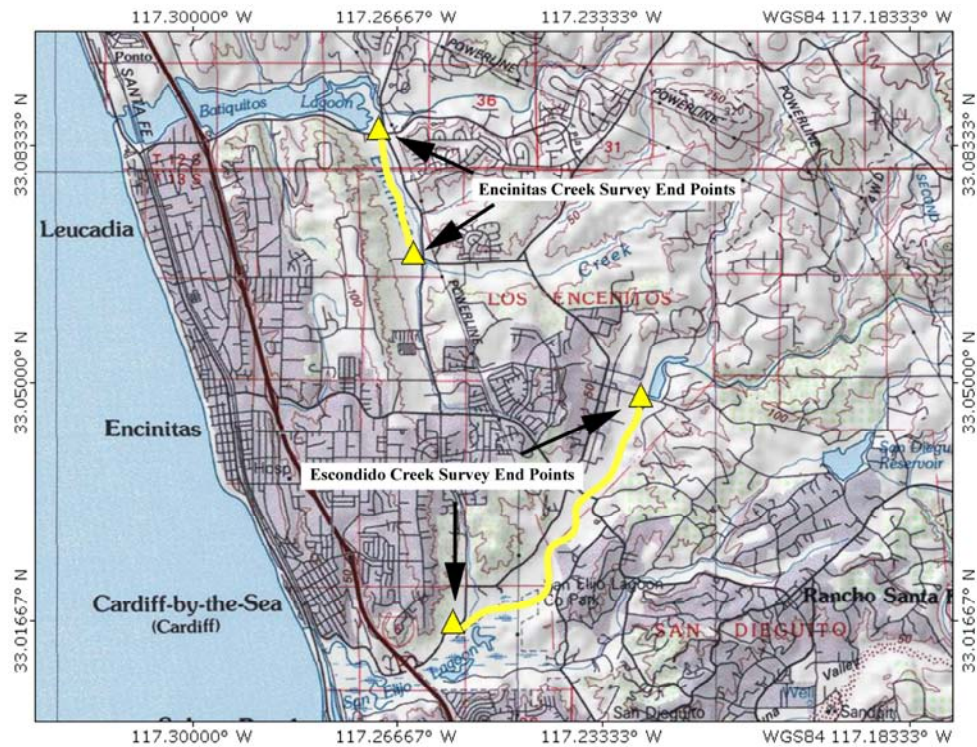


Figure 3. Location of Encinitas Creek and Escondido Creek vireo surveys, San Diego County, California.

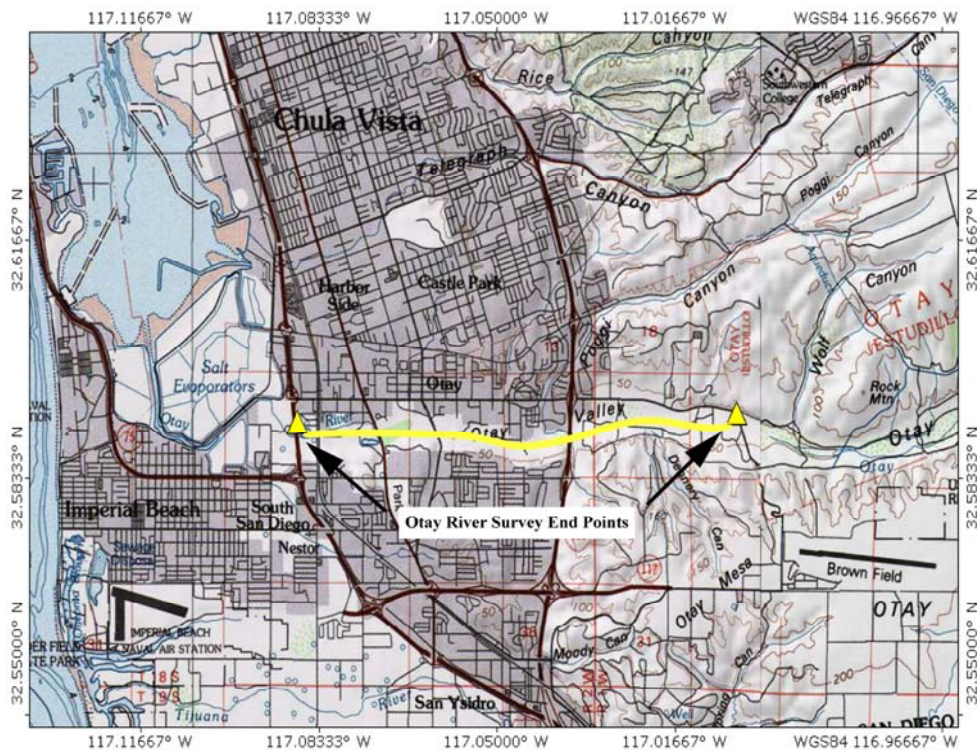


Figure 4. Location of Otay River vireo survey, San Diego County, California.

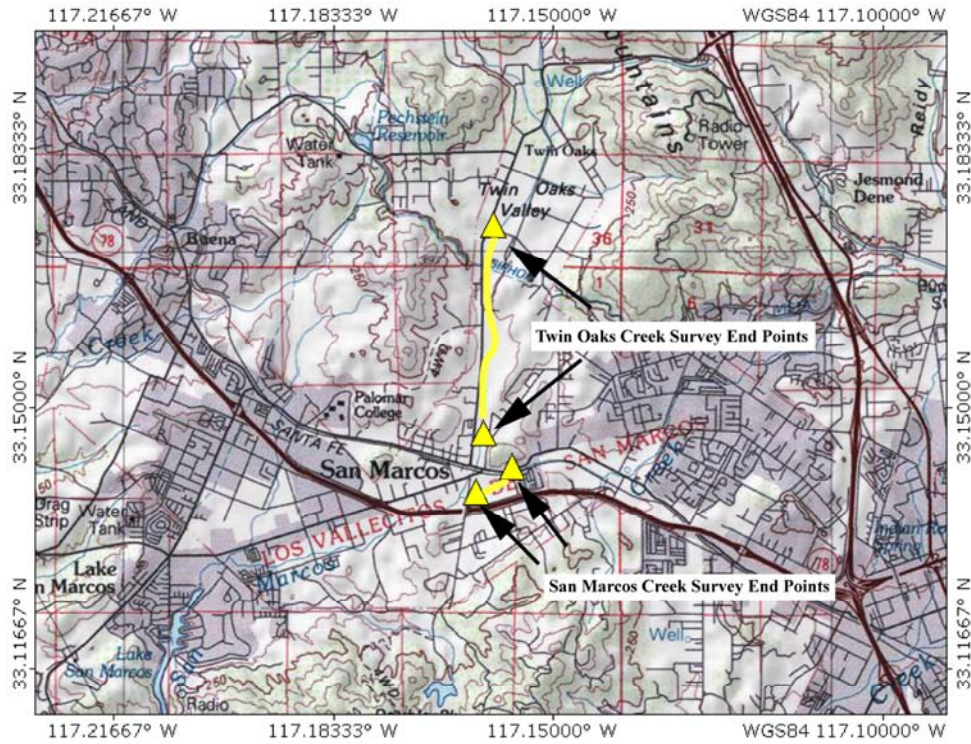


Figure 5. Location of San Marcos Creek and Twin Oak Creek vireo survey, San Diego County, California.



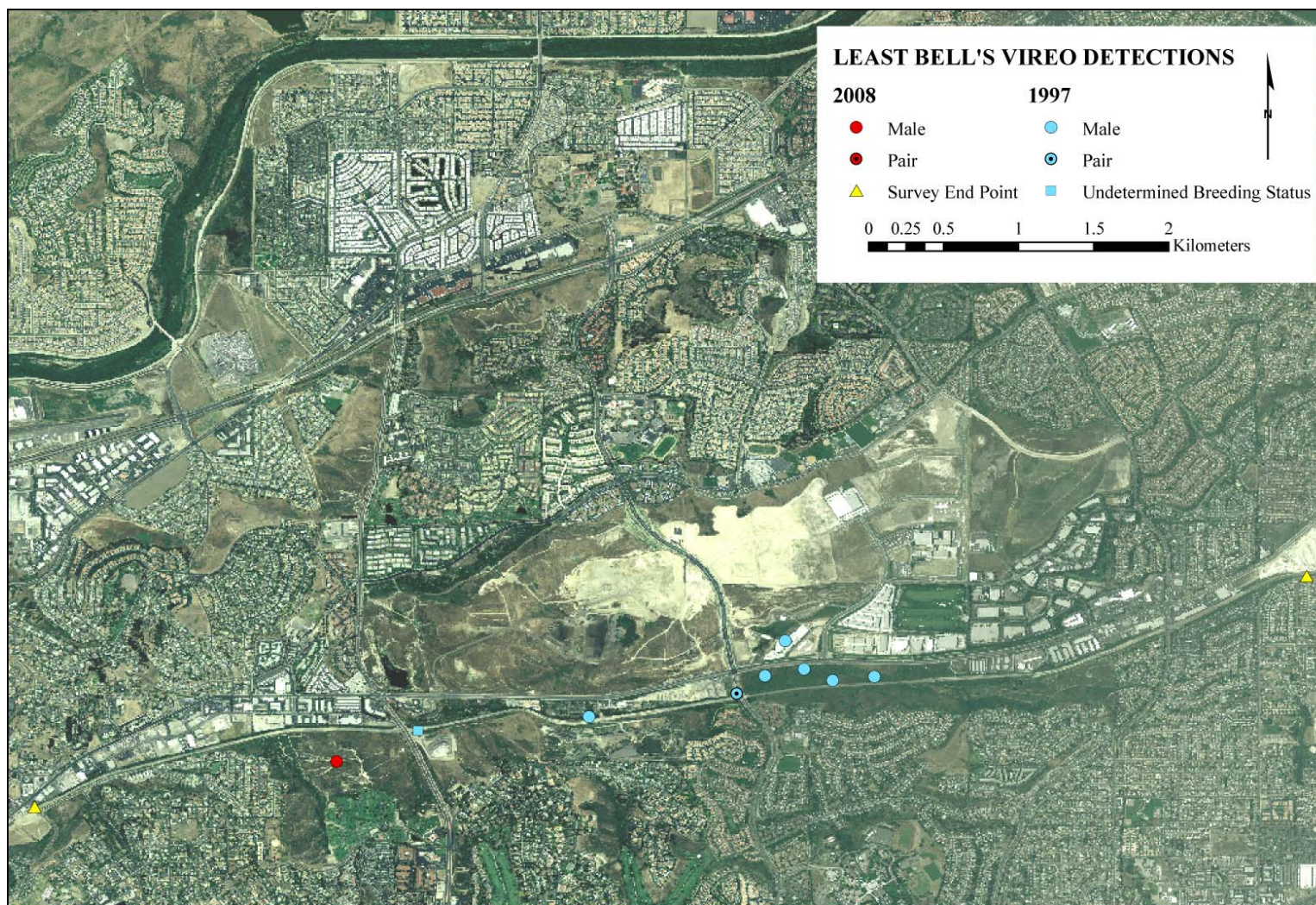


Figure 6. Loma Alta Creek vireo locations, 1997 and 2008, San Diego County, California.



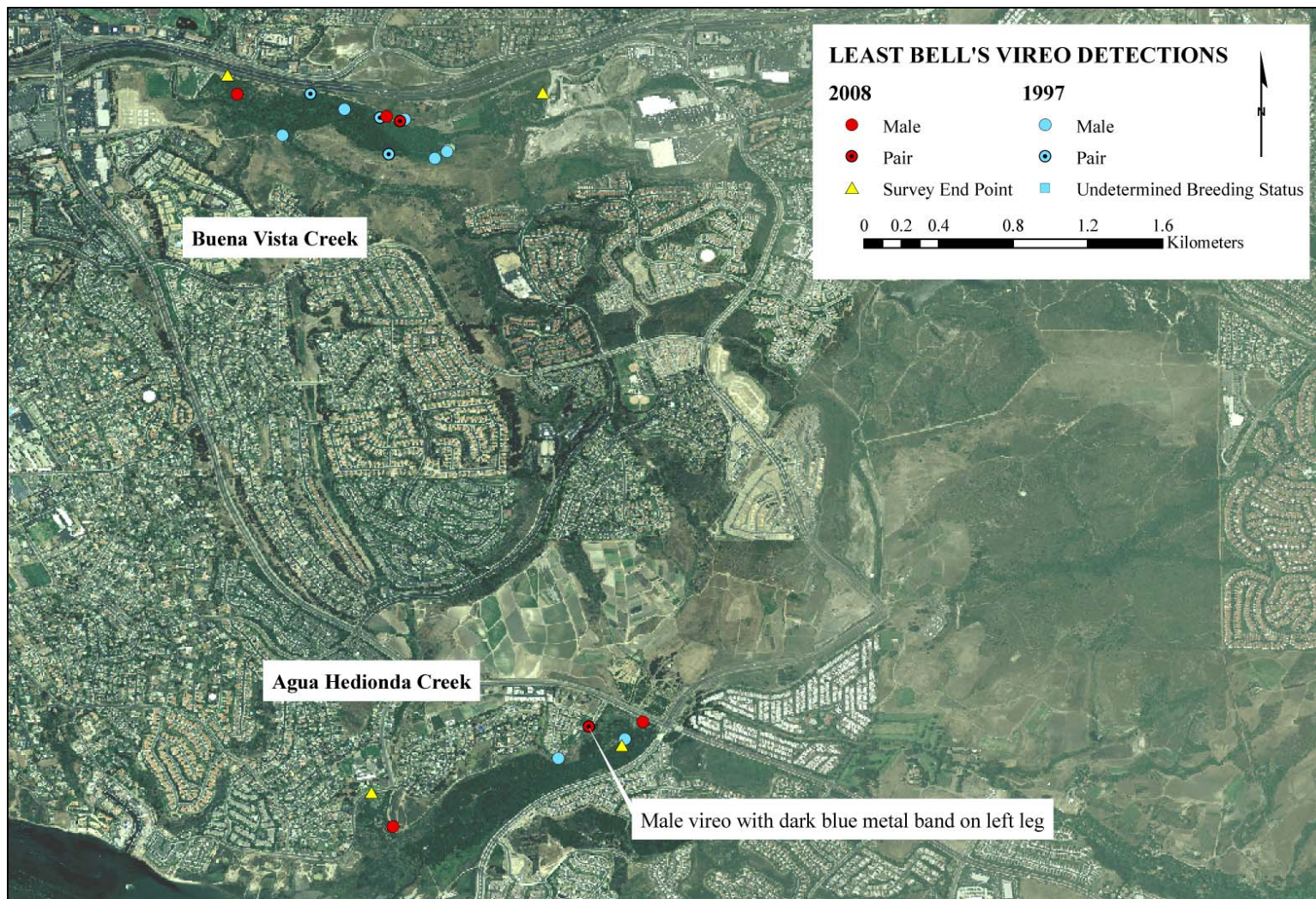


Figure 7. Agua Hedionda Creek and Buena Vista Creek vireo locations, 1997 and 2008, San Diego County, California.



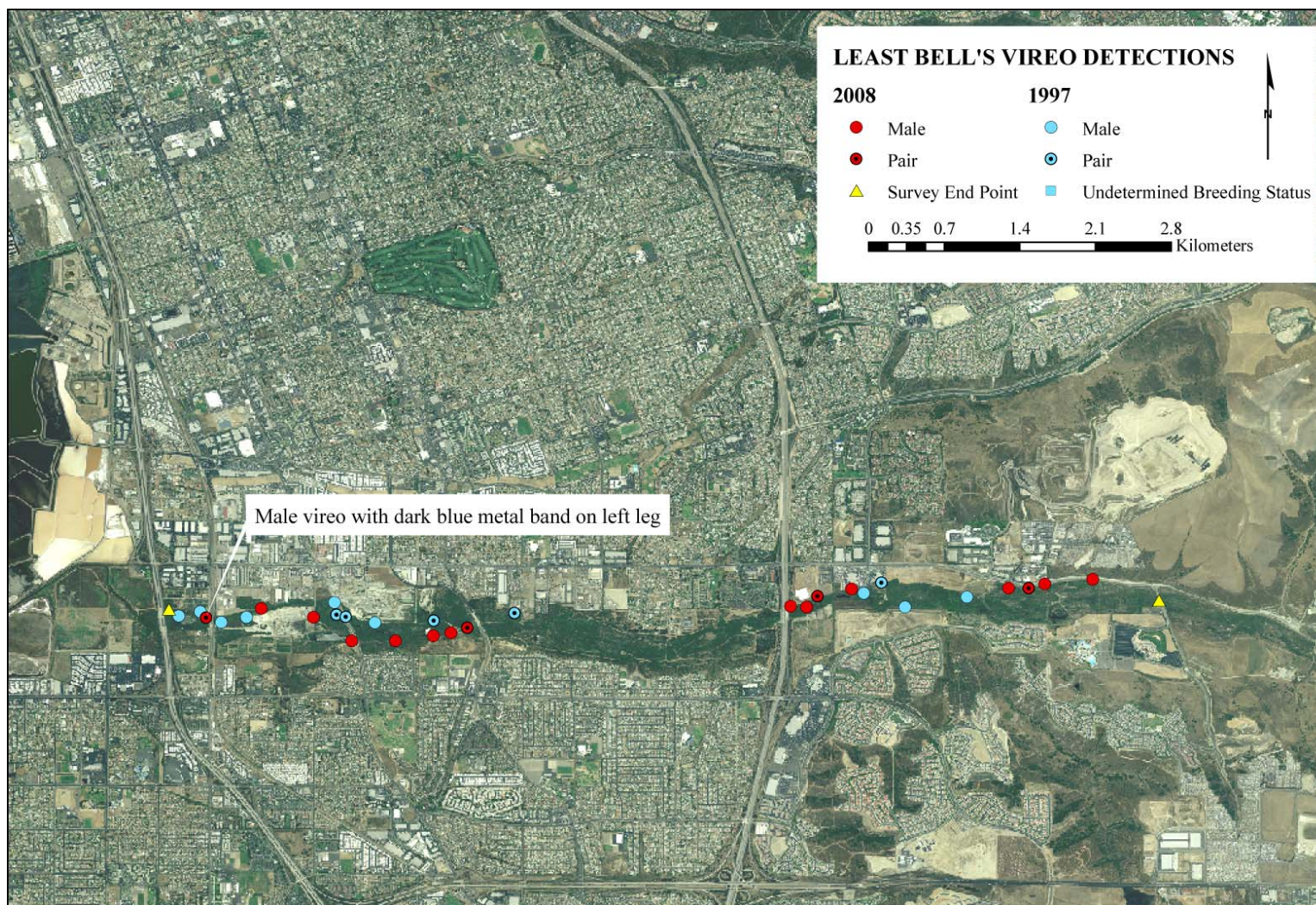


Figure 8. Otay River vireo locations, 1997 and 2008, San Diego County, California.



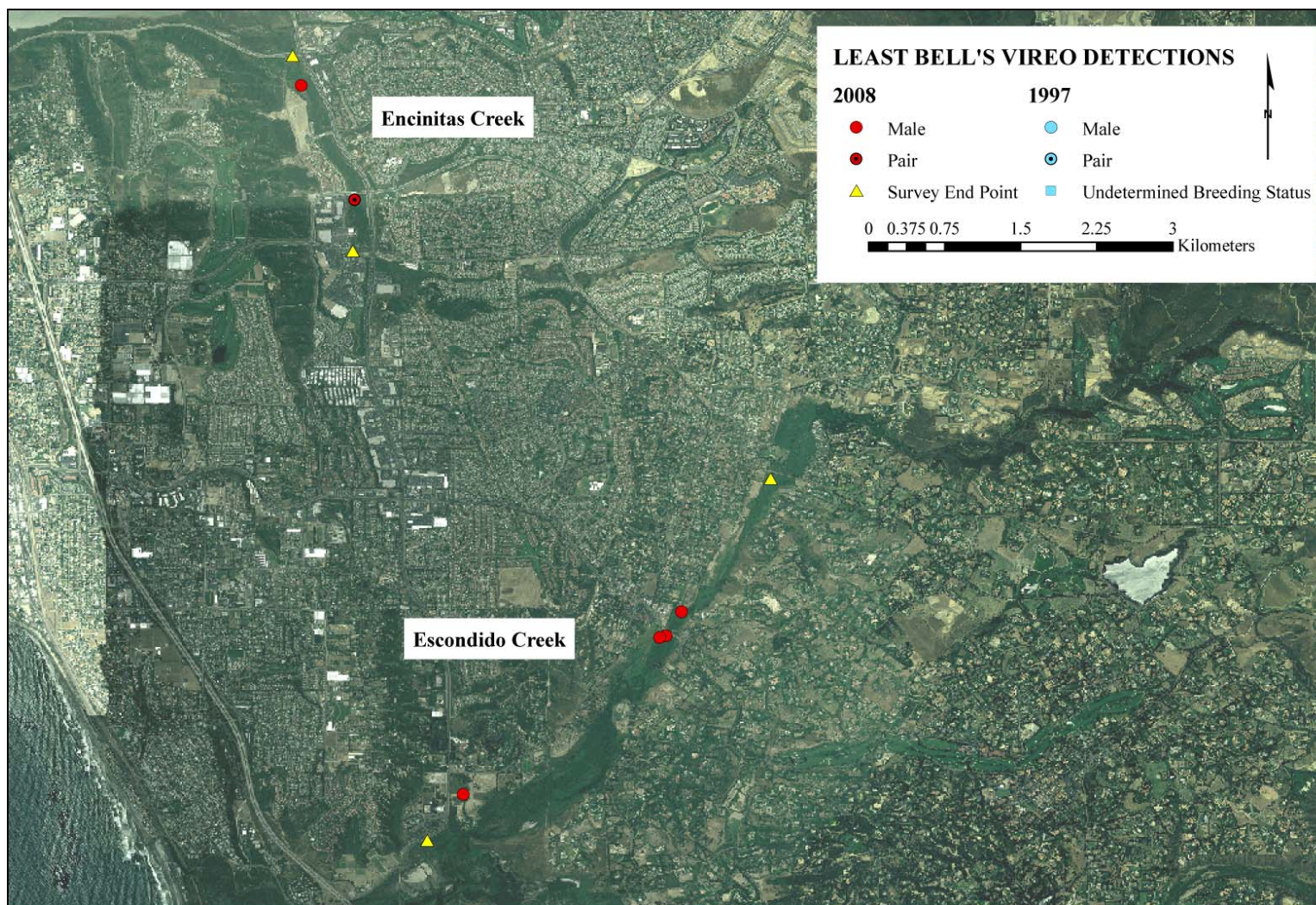


Figure 9. Encinitas Creek and Escondido Creek vireo locations, 1997 and 2008, San Diego County, California.



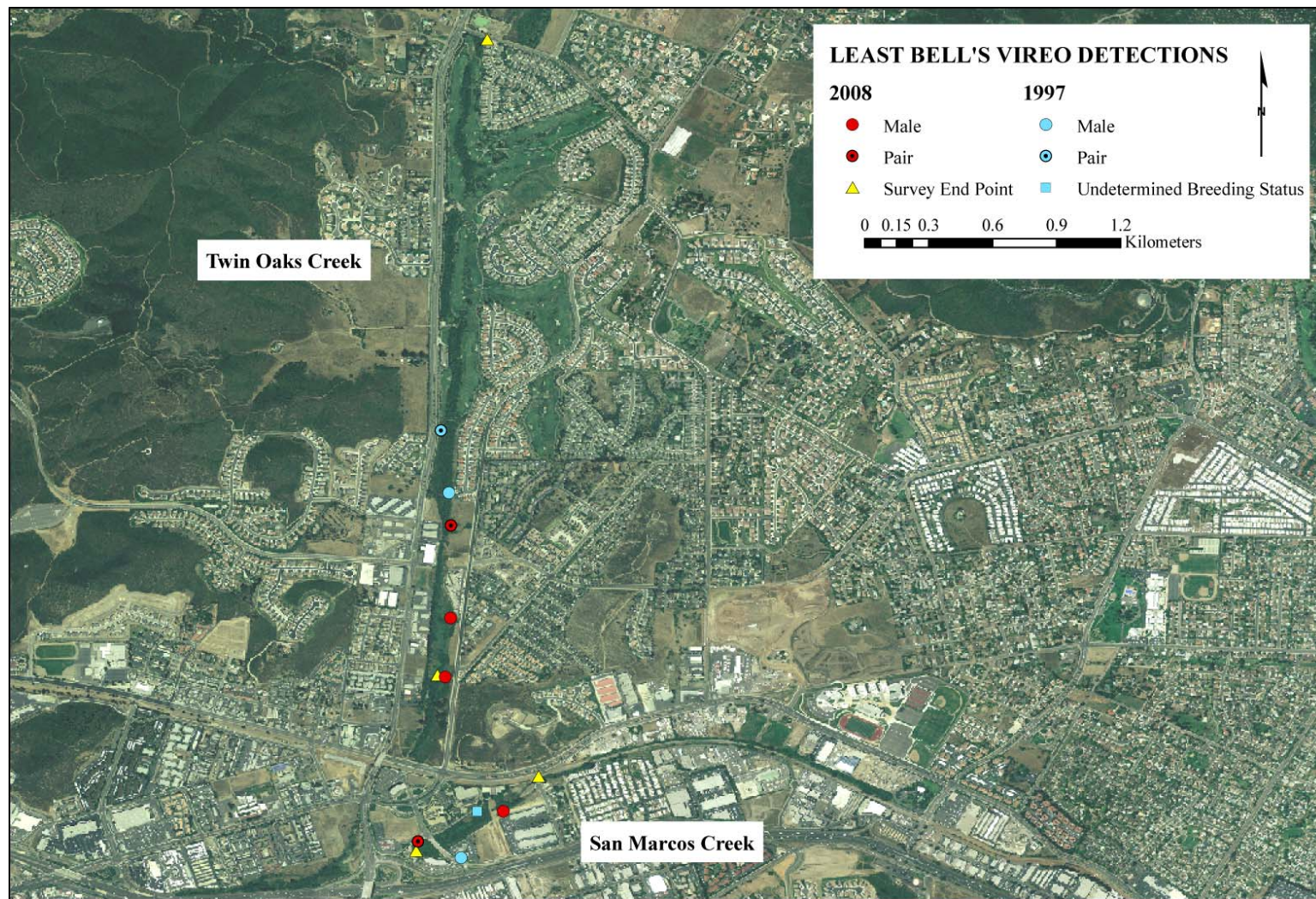


Figure 10. San Marcos Creek and Twin Oaks Creek vireo locations, 1997 and 2008, San Diego County, California.