



Least Bell's Vireo Surveys on the San Luis Rey River, College Boulevard in Oceanside to Interstate 15 in Fallbrook, San Diego County, California

2008 Data Summary

Prepared for:

Mission Resource Conservation District

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

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EXECUTIVE SUMMARY

We surveyed for Least Bell's Vireo (*Vireo bellii pusillus*) along the San Luis Rey River, between College Boulevard in Oceanside and Interstate 15 in Fallbrook, California in 2008. We found 102 vireo territories, at least 48 of which were occupied by pairs. Four other vireos were transients. Vireos were concentrated in three clusters within the survey area. Only one vireo territory was found in the stretch of the river where giant reed (*Arundo donax*) was recently removed. Fourteen banded vireos were detected within the survey area. All positively identified banded vireos were originally banded along the San Luis Rey River.

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 (United States Fish and Wildlife Service [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 USFWS 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). As of 2004, the statewide vireo population was estimated to be approximately 2,500 territories (United States Geological Survey [USGS], unpublished data) of which approximately 10% occur along the San Luis Rey River between Interstate 15 and Interstate 5.

In 2008, we surveyed for vireos along the San Luis Rey River from College Boulevard in Oceanside to Interstate 15 in Fallbrook, California (Figure 1). Our objectives were: 1) to document the 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

USGS biologists Rudy Badia, Suellen Lynn, and Eric Nolte conducted surveys of the study area (Figure 1). Three protocol vireo surveys (USFWS 2001) were conducted between 30 April and 25 June, 2008 and followed standard survey techniques described in the California Least Bell's Vireo Working Group and USFWS Least Bell's Vireo survey guidelines (USFWS 2001). 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. During each survey period, the entire study area was covered in five to six person-days. Survey endpoints were recorded using a Garmin 12 Global Positioning System (GPS) unit with 1-15 m positioning accuracy.

For each bird encountered, investigators recorded age (adult or juvenile), sex, breeding status (paired, single, undetermined, or transient), and whether the bird was banded. Birds were considered transients if they were not detected on one or more consecutive surveys after an initial detection. Bird locations were mapped with a GPS unit to determine geographic coordinates (WGS84). Habitat type for each territory was categorized based on dominant or co-dominant plant species. Proportion of native to exotic plant species was also estimated and prevalent exotic plant species were recorded. The presence or absence of Brown-headed Cowbirds was noted during each survey. Attempts were made to recapture banded vireos with mist nets 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.

Data at the west end of the survey area were augmented by surveys conducted by Jennifer Sexton and Jeff Wells, TW Biological Services.

RESULTS

In 2008, we detected a total of 102 vireo territories, at least 48 of which were occupied by pairs (Appendix A). An additional four transient vireos were detected in the survey area. Vireo territories were concentrated in three areas: Area 1) at the western end of the survey area between College Boulevard and a point approximately 2 km upstream (near the junction of Wilshire Road and North River Road); Area 2) a 1.5-km stretch approximately 1.5 km upstream of Area 1 (from the junction of State Route 76 with Saddleridge Road to the junction of State Route 76 with East Vista Way); and Area 3) the 7.5-km stretch at the eastern end of the survey area (from the Olive Hill Road/Camino del Rey bridge to Interstate 15; Figure 1). Only one vireo territory was found within the stretch of the San Luis Rey River between Areas 2 and 3, a stretch of riparian vegetation that cleared of giant reed in fall 2006 and 2007 (J. Giessow, Mission Resource Conservation District, pers. comm.). The remaining vegetation in this stretch consisted almost entirely of tall trees with very little understory vegetation suitable for nesting vireos. We did not survey the stretch of river between Areas 1 and 2 because of access limitations.

Territories in the survey area were mostly comprised of willow (*Salix* spp.) / cottonwood (*Populus fremontii*) vegetation (76%) and mixed willow vegetation (21%). Dominant species at most vireo territories were arroyo willow (*S. lasiolepis*) (44%), Fremont cottonwood (34%), and black willow (*Salix gooddingii*) (28%). No vireo territories were dominated by exotic plant species, although exotic plants were present at most territories. The most frequently detected exotic plant species were giant reed (50% of territories), black mustard (*Brassica nigra*) (21% of territories), and poison hemlock (*Conium maculatum*) (14% of territories). Brown-headed Cowbirds were abundant throughout the eastern end of the survey area (Areas 2 and 3) and were present, though less abundant, in the western end (Area 1).

Seventy-four males and 20 females were observed well enough in the study area to determine banding status in 2008. Of these, 13 males and one female vireo were

banded (Figure 2). All of these vireos were originally banded along the San Luis Rey River and at least nine were originally banded as nestlings (banded in the nest with a single numbered dark blue metal band; Table 1). Two of these vireos had complete color combinations and five others were recaptured in 2008 and given full color band combination so that we could identify them without having to recapture them in the future. Vireos banded as nestlings moved between 0.6 km and 9.2 km from their natal sites to their 2008 territories.

Table 1. Color band combinations of Least Bell's Vireos detected on the San Luis Rey River, 2008.

2008 Territory	Sex	Originally Banded ^a		Distance Moved (km)	Colorbands ^b	
		Year	Age		Left Leg	Right Leg
SLR33	Male	2005	Nestling	5.1	WHDP/pupu	Mdb
SLR45	Male	2005	Nestling	9.0	gogo	WHWH/Mdb
SLRS06	Male	2005	Nestling	4.2	-	BKLP/Mdb
SLRS17	Male	2006	Nestling	3.4	Mdb	BYST/pupu
SLR43	Male	2006	AHY ^c	12.7	LPBK/Mdb	pupu
SLR37	Male	2007	Nestling	0.6	Mdb	BWST
SLR50	Male	2007	Nestling	9.2	PUPU/gogo	Mdb
SLRS07	Male	2007	Nestling	3.9	BWST	Mdb
SLRS42	Male	2007	AHY	0	DBDP/Mdb	-
SLRS29	Male	Unk	Nestling	Unk	-	Mdb
SLRS51	Male	Unk	Nestling	Unk	Mdb	-
SLRS24	Male	Unk	Unk	Unk	?	Mdb
SLRS28	Male	Unk	Unk	Unk	Mdb	?
SLR58	Female	Unk	Unk	Unk	?	?

^a Unk = information not known.

^b Top band/bottom band. WHDP = white/dark pink split plastic band; pupu = purple metal band; Mdb = metal dark blue numbered band; gogo = gold metal band; WHWH = white plastic band; BKLP = black/light pink split plastic band; BYST = black and yellow striped plastic band; LPBK = light pink/black split plastic band; BWST = blue and white striped plastic band; PUPU = purple plastic band; DBDP = dark blue/dark pink plastic band; DPDP = dark pink plastic band; LPLP = light pink plastic band; - = leg unbanded; ? = unknown banding status.

^c AHY = after hatching year (adult bird of undeterminable age)

DISCUSSION

The number of Least Bell's Vireo territories in the survey area was lower in 2008 (102) than during the last survey of the same area, in 2002 (130; Peterson *et al.* 2002). However, the number of vireos in Area 3 increased from 2002 (66) to 2008 (69), despite fires that burned a substantial amount of vireo habitat in fall 2007. Just downstream, the number of vireos dropped from 2002 (14) to 2008 (10) in an area that has recently undergone intensive removal of giant reed. Because giant reed was the dominant understory plant species in this area, and vireos require understory vegetation for nest placement, the removal of giant reed has rendered the habitat temporarily unsuitable for vireos. It is expected that the native vegetation will recover over the next several years, allowing vireos to recolonize this area.

All of the banded vireos in the survey area were originally banded along the San Luis Rey River. We did not detect any vireos in the survey area that originated in other drainages. However, several vireos that had been banded within our survey area in past years have been detected on other drainages (Lynn and Kus, in prep.; USGS, unpublished data), and it is evident that vireos move between drainages.

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FIGURES

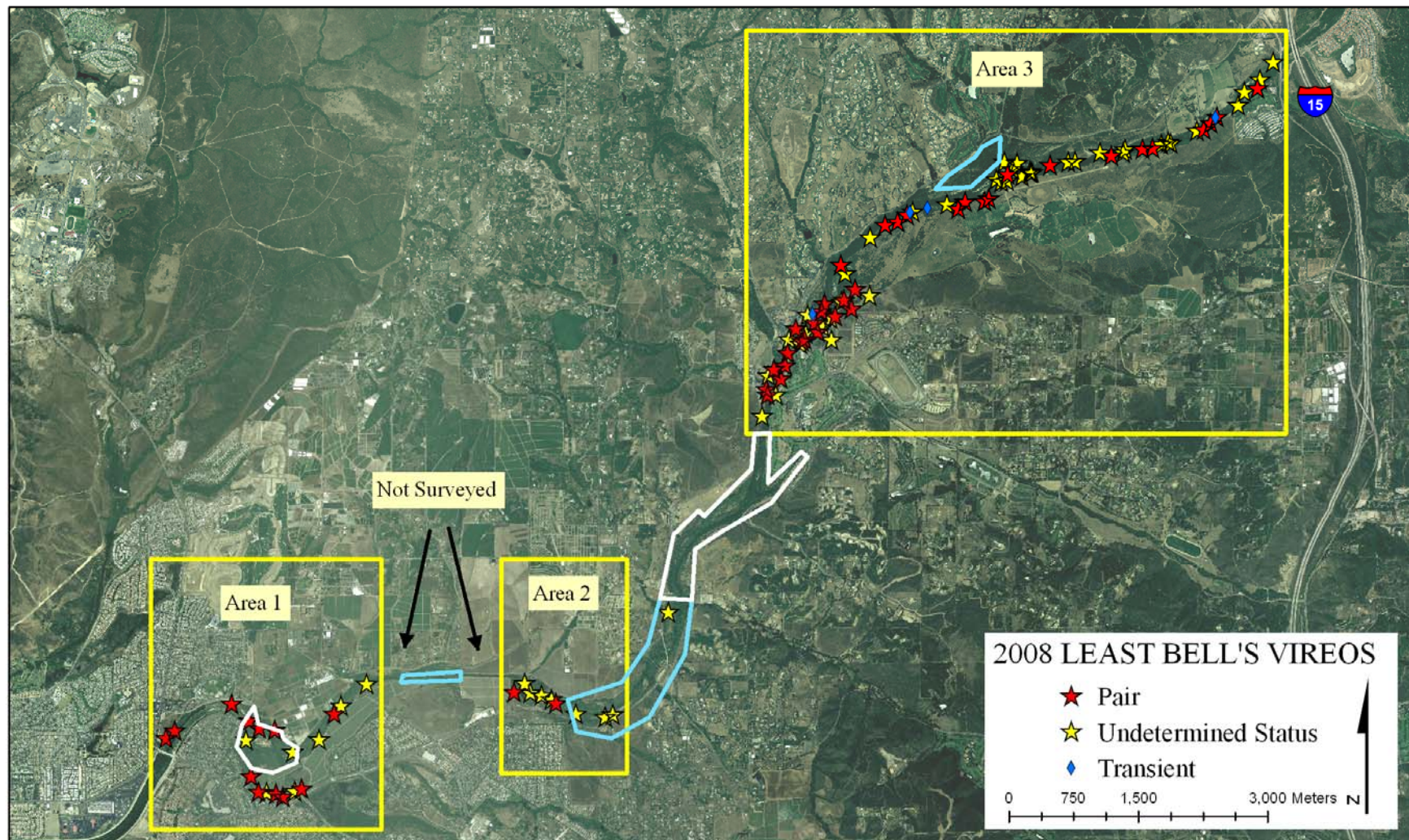


Figure 1. Least Bell's Vireo detections along the San Luis Rey River, 2008. Yellow boxes highlight areas of vireo concentration. Blue (2007) and white (2006) polygons roughly delineate areas of giant reed removal.

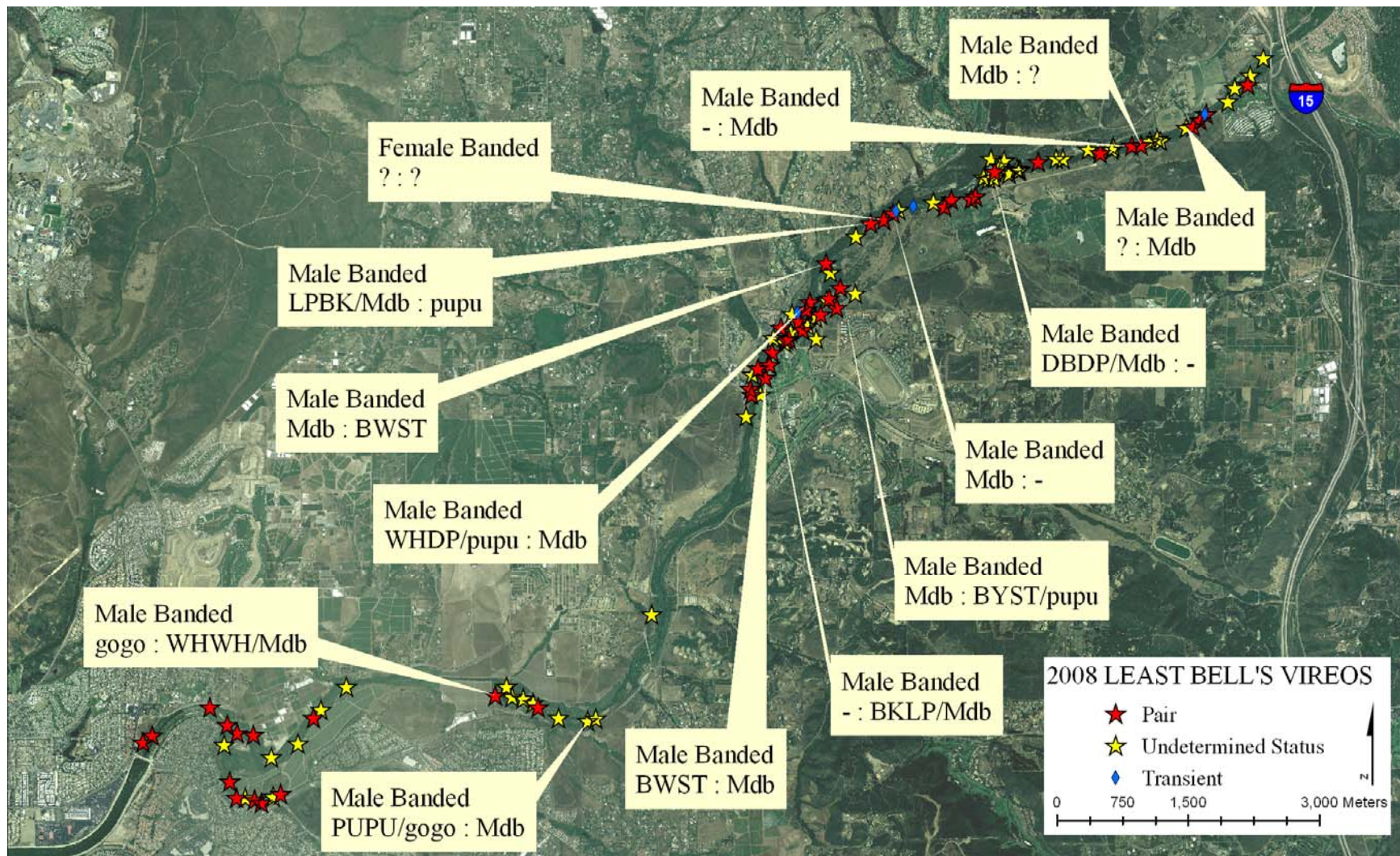


Figure 2. Locations of banded Least Bell's Vireos on the San Luis Rey River, 2008. Unlabelled points represent vireos without bands or with unknown banding status. See Table 2 footnote b for description of band combinations.

Appendix A. Least Bell's Vireo territory locations, breeding status, and banding status for the San Luis Rey River between College Boulevard in Oceanside and Interstate 15 in Fallbrook, 2008.

Territory	Year	Breeding Status	Longitude(Y)	Latitude(X)	Datum	Male Banded	Female Banded
JS03	2008	Undetermined	33.24639	-117.28612	WGS84	U	
JS09	2008	Pair	33.25280	-117.29759	WGS84	U	U
JS11	2008	Pair	33.25390	-117.28835	WGS84	N	N
SLR01	2008	Pair	33.25205	-117.29870	WGS84	U	U
SLR03	2008	Pair	33.25565	-117.29048	WGS84	N	U
SLR05	2008	Undetermined	33.25187	-117.28873	WGS84	N	
SLR07	2008	Pair	33.24807	-117.28806	WGS84	N	N
SLR08	2008	Pair	33.28868	-117.22408	WGS84	U	U
SLR09	2008	Pair	33.24641	-117.28717	WGS84	N	U
SLR10	2008	Undetermined	33.29014	-117.22383	WGS84	U	
SLR11	2008	Pair	33.24592	-117.28412	WGS84	N	U
SLR13	2008	Pair	33.24681	-117.28177	WGS84	N	U
SLR14	2008	Undetermined	33.29855	-117.21123	WGS84	N	
SLR15	2008	Undetermined	33.25197	-117.27962	WGS84	U	
SLR17	2008	Pair	33.25290	-117.28516	WGS84	N	N
SLR19	2008	Pair	33.25308	-117.28711	WGS84	U	U
SLR20	2008	Undetermined	33.29783	-117.21472	WGS84	N	
SLR23	2008	Undetermined	33.28588	-117.22461	WGS84	U	
SLR24	2008	Undetermined	33.29607	-117.21607	WGS84	N	
SLR25	2008	Undetermined	33.29647	-117.21896	WGS84	N	
SLR27	2008	Undetermined	33.29393	-117.22128	WGS84	U	
SLR28	2008	Pair	33.29475	-117.21768	WGS84	N	U
SLR29	2008	Transient	33.29657	-117.21831	WGS84	U	
SLR31	2008	Pair	33.29689	-117.21724	WGS84	U	N
SLR33	2008	Pair	33.29769	-117.21681	WGS84	Y	N
SLR34	2008	Undetermined	33.29386	-117.21600	WGS84	N	
SLR35	2008	Pair	33.29565	-117.21812	WGS84	U	U
SLR36	2008	Pair	33.29711	-117.21353	WGS84	N	N
SLR37	2008	Pair	33.30174	-117.21481	WGS84	Y	N
SLR39	2008	Undetermined	33.30080	-117.21428	WGS84	U	
SLR40	2008	Undetermined	33.30808	-117.20162	WGS84	N	
SLR41	2008	Undetermined	33.30456	-117.21116	WGS84	U	
SLR43	2008	Pair	33.30589	-117.20934	WGS84	Y	N
SLR44	2008	Pair	33.30866	-117.19645	WGS84	N	U
SLR45	2008	Pair	33.25698	-117.25541	WGS84	Y	U
SLR47	2008	Undetermined	33.25790	-117.25404	WGS84	N	

Territory	Year	Breeding Status	Longitude(Y)	Latitude(X)	Datum	Male Banded	Female Banded
SLR48	2008	Undetermined	33.25463	-117.24308	WGS84	N	
SLR49	2008	Undetermined	33.25780	-117.27376	WGS84	N	
SLR50	2008	Undetermined	33.25436	-117.24404	WGS84	Y	
SLR51	2008	Pair	33.24623	-117.28497	WGS84	N	U
SLR53	2008	Undetermined	33.25060	-117.28290	WGS84	U	
SLR54	2008	Pair	33.28809	-117.22393	WGS84	N	N
SLR55	2008	Undetermined	33.25547	-117.27688	WGS84	N	
SLR56	2008	Undetermined	33.25466	-117.24767	WGS84	U	
SLR57	2008	Pair	33.25462	-117.27778	WGS84	N	U
SLR58	2008	Pair	33.30626	-117.20775	WGS84	N	Y
SLR59	2008	Undetermined	33.24652	-117.28265	WGS84	U	
SLR60	2008	Undetermined	33.32302	-117.16107	WGS84	U	
SLR61	2008	Undetermined	33.25665	-117.25199	WGS84	U	
SLR62	2008	Undetermined	33.32117	-117.16268	WGS84	N	
SLR63	2008	Pair	33.29501	-117.22039	WGS84	U	U
SLRS01	2008	Undetermined	33.26534	-117.23622	WGS84	N	
SLRS02	2008	Pair	33.25578	-117.25016	WGS84	N	N
SLRS03	2008	Undetermined	33.25621	-117.25073	WGS84	U	
SLRS04	2008	Undetermined	33.25688	-117.25334	WGS84	U	
SLRS05	2008	Pair	33.29248	-117.22139	WGS84	N	U
SLRS06	2008	Pair	33.29119	-117.22172	WGS84	Y	N
SLRS07	2008	Pair	33.28983	-117.22225	WGS84	Y	N
SLRS08	2008	Undetermined	33.28812	-117.22289	WGS84	N	
SLRS09	2008	Pair	33.29077	-117.22314	WGS84	N	N
SLRS10	2008	Undetermined	33.29347	-117.21988	WGS84	N	
SLRS11	2008	Pair	33.29372	-117.21964	WGS84	N	N
SLRS12	2008	Pair	33.29391	-117.21934	WGS84	N	N
SLRS13	2008	Undetermined	33.29458	-117.21915	WGS84	N	
SLRS14	2008	Undetermined	33.29524	-117.21706	WGS84	N	
SLRS15	2008	Pair	33.29638	-117.21548	WGS84	N	N
SLRS16	2008	Pair	33.29808	-117.21445	WGS84	N	N
SLRS17	2008	Pair	33.29919	-117.21307	WGS84	Y	N
SLRS18	2008	Pair	33.32025	-117.16300	WGS84	N	U
SLRS19	2008	Undetermined	33.31853	-117.16543	WGS84	U	
SLRS20	2008	Pair	33.31724	-117.16804	WGS84	N	N
SLRS21	2008	Transient	33.31720	-117.16820	WGS84	N	
SLRS22	2008	Pair	33.31659	-117.16882	WGS84	N	U
SLRS23	2008	Pair	33.31594	-117.16969	WGS84	N	N
SLRS24	2008	Undetermined	33.31583	-117.17051	WGS84	Y	

Territory	Year	Breeding Status	Longitude(Y)	Latitude(X)	Datum	Male Banded	Female Banded
SLRS25	2008	Undetermined	33.31448	-117.17375	WGS84	U	
SLRS26	2008	Undetermined	33.31462	-117.17408	WGS84	N	
SLRS27	2008	Undetermined	33.31441	-117.17498	WGS84	N	
SLRS28	2008	Pair	33.31400	-117.17607	WGS84	Y	N
SLRS29	2008	Pair	33.31392	-117.17726	WGS84	Y	U
SLRS30	2008	Undetermined	33.31382	-117.17950	WGS84	U	
SLRS31	2008	Undetermined	33.31355	-117.17969	WGS84	N	
SLRS32	2008	Pair	33.31318	-117.18114	WGS84	U	N
SLRS33	2008	Undetermined	33.31352	-117.18255	WGS84	N	
SLRS34	2008	Undetermined	33.31257	-117.18569	WGS84	N	
SLRS35	2008	Undetermined	33.31255	-117.18656	WGS84	N	
SLRS36	2008	Pair	33.31223	-117.18878	WGS84	U	U
SLRS37	2008	Undetermined	33.31240	-117.19291	WGS84	U	
SLRS38	2008	Undetermined	33.31177	-117.19346	WGS84	U	
SLRS39	2008	Pair	33.31122	-117.19406	WGS84	N	N
SLRS40	2008	Undetermined	33.31066	-117.19545	WGS84	N	
SLRS41	2008	Undetermined	33.31046	-117.19483	WGS84	U	
SLRS42	2008	Undetermined	33.31058	-117.19419	WGS84	Y	
SLRS43	2008	Undetermined	33.31102	-117.19230	WGS84	N	
SLRS44	2008	Undetermined	33.31136	-117.19118	WGS84	N	
SLRS45	2008	Undetermined	33.31143	-117.19104	WGS84	N	
SLRS46	2008	Pair	33.30839	-117.19699	WGS84	N	N
SLRS47	2008	Pair	33.30764	-117.20023	WGS84	N	N
SLRS48	2008	Transient	33.30769	-117.20407	WGS84	N	
SLRS49	2008	Undetermined	33.30730	-117.20591	WGS84	N	
SLRS50	2008	Transient	33.30719	-117.20621	WGS84	N	
SLRS51	2008	Pair	33.30693	-117.20662	WGS84	Y	N
SLRS52	2008	Pair	33.30832	-117.19939	WGS84	N	N
SLRS53	2008	Undetermined	33.31254	-117.19451	WGS84	U	
SLRS54	2008	Undetermined	33.31988	-117.16458	WGS84	U	
SLRS55	2008	Undetermined	33.31156	-117.19132	WGS84	U	