Riparian Bird Nest Monitoring and Cowbird Management in the Coachella Valley

Annual Progress Report 2017

March 23, 2018

Prepared For:
Coachella Valley Conservation Commission

Prepared By:
San Diego Natural History Museum
1788 El Prado, San Diego, CA 92101
Lori Hargrove, Kevin Clark, Kim Ferree, & Philip Unitt

Least Bell's Vireo incubating, Whitewater Preserve *(Photo by K. Ferree, 2 May 2017)*

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List of Acronyms

BHCO ..... Brown-headed Cowbird

CC ..... Chino Canyon

CVMSHCP ..... Coachella Valley Multiple Species Habitat Conservation Plan

DB ..... double brood

DP ..... Dos Palmas Preserve

FL ..... fledglings

LBVI ..... Least Bell's Vireo

PR ..... pair

SDNHM ..... San Diego Natural History Museum

SM ..... singing male

SUTA ..... Summer Tanager

TLD ..... The Living Desert

USGS ..... United States Geological Society

WIFL ..... Willow Flycatcher

WWD ..... Whitewater Delta

WWP ..... Whitewater Preserve

YBCH ..... Yellow-breasted Chat

YEWA ..... Yellow Warbler

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BACKGROUND AND OBJECTIVES

The Coachella Valley Multiple Species Habitat Conservation Plan (CVMSHCP 2007) identified five species of riparian birds as targets for conservation, the Willow Flycatcher, Least Bell's Vireo, Yellow-breasted Chat, Yellow Warbler, and Summer Tanager, and one species as a potential threat with management concern, the Brown-headed Cowbird (Table 1).

From 2002 to 2004, the Center for Conservation Biology conducted baseline surveys for these six riparian bird species and established standardized monitoring survey protocols (Allen et al. 2005). The baseline surveys covered 18 riparian sites in the Coachella Valley with a total of 116 count points.

Table 1. Riparian bird species identified by the CVMSHCP for conservation monitoring.

Common name	Code	Scientific name	Status
Willow Flycatcher, incl. ssp. Southwestern Willow Flycatcher	WIFL	*Empidonax traillii (Empidonax traillii extimus)*	State Endangered (Federally Endangered)
Least Bell's Vireo	LBVI	*Vireo bellii pusillus*	State Endangered/ Federally Endangered
Yellow Warbler	YEWA	*Setophaga petechia*	State Species of Special Concern
Yellow-breasted Chat	YBCH	*Icteria virens*	State Species of Special Concern
Summer Tanager	SUTA	*Piranga rubra*	State Species of Special Concern
Brown-headed Cowbird	BHCO	*Molothrus ater*	None (potential threat)

In 2014, the San Diego Natural History Museum (SDNHM) performed resurveys at seven of these sites that were identified as higher priority on the basis of presence of target species from 2002-2004 and lack of recent surveys, specifically Chino Canyon, Dos Palmas Preserve, Mission Creek, Stubbe Canyon, Thousand Palms Oasis, Whitewater Canyon, and Whitewater Delta. There were 68 count points, each of which were surveyed three times using comparable methods. The SDNHM also mapped territories and monitored nests to confirm breeding status of target species and assess current levels of cowbird parasitism.

The 2014 resurvey found low numbers of target riparian bird species compared to historic levels and neighboring regions, and high numbers of Brown-headed Cowbirds, with 100% nest parasitism of the Least Bell's Vireo at Chino Canyon (Hargrove et al. 2014). However, successful nesting of the Least Bell's Vireo was documented at upper Whitewater Canyon, where no Brown-headed Cowbirds were observed. Three sites, Chino Canyon, Dos Palmas Preserve, and Whitewater Delta, were identified as having the most potential for riparian bird habitat where cowbirds were likely depressing riparian bird populations below a sustainable level, thereby creating a population "sink." Therefore, initiation of cowbird control was planned for 2017 at these three sites in conjunction with continued nest monitoring. At least three years of cowbird control was recommended in conjunction with nest monitoring. Broader-scale

monitoring of population trends that includes additional riparian sites was recommended at a five-year interval.

Objectives:
1. Monitor the status of these covered species within the CVMSCHP area.
2. Initiate and assess the effectiveness of cowbird control measures.
3. Identify potential management actions that would maintain or increase populations of these species and also maintain or improve the quality of their habitats over the long-term.

Tasks:
1. Complete three rounds of point counts (spring 2017).
2. Weekly nest monitoring, including removal of cowbird eggs and chicks (spring 2017).
3. Data analysis and reports, including density estimates for all riparian birds and cowbirds, nest parasitism rates, reproductive success estimates, and assessment of cowbird management effectiveness.
4. Provide cowbird traps, and maintain through spring 2017 and 2018.

METHODS

Point Counts (Task 1):

Between 16 May and 20 July, SDNHM personnel performed three rounds of point counts at five sites (Table 2, Appendix 1). The same protocol was used as in 2014 to maximize comparability, which consisted of a single-observer 10-minute point-count with distance sampling (Appendix 2). The same count point locations were targeted for surveys that were used in 2014 at Chino Canyon, Dos Palmas Preserve, Whitewater Canyon, and Whitewater Delta; however, two of the ten points could not be accessed at Chino Canyon (CC3 and CC6) and four of the points were offset by 20-30 m due to restricted access. One point could not be accessed at Dos Palmas Preserve (DP4) due to thick vegetation but was surveyed as an offset on one date. Two points with unsuitable habitat at Whitewater Canyon were surveyed only twice (WWC9 and WWC10). We added one new point at Whitewater Delta and six new points at Whitewater Preserve, each surveyed three times. Thus, the total number of points surveyed was 50, and the total number of point counts was 146.

Table 2. Targeted survey sites and number of count points.

Survey site	Code	# Count points
Chino Canyon: Aerial Tram and Cienega	AT, CC	8
Dos Palmas Preserve	DP	10
Whitewater Preserve	WWP	6
Whitewater Canyon (below Preserve)	WWC	12
Whitewater Delta	WWD	14
Total		50

All point counts were conducted during early morning hours and fair weather. As the observer approached the point, they noted any evasive movement, recording the location where the bird was first detected. We used laser rangefinders to acquire distance estimates, and noted if the detection was by call, song, visual, or some combination thereof. We classified the first detection as occurring within one of the following timed periods: 0-3 minutes, 3-5 minutes, 5-7 minutes, or 7-10 minutes. The observer shifted off the coordinates as needed to aid in confirming any identifications.

At each point surveyed we did a rapid habitat assessment once during the season, to include photos in each cardinal direction, presence/description of surface water, dominant riparian species with approximate coverage within a 50-meter radius, and various measures of disturbance graded from 0 to 3, using the same methods as in 2014 (Appendix 2).

Nest Monitoring (Task 2):

During point counts we noted all observations of nesting and cowbird activity, but we made additional visits to each of the five sites to increase these observations for target species and for other species that frequently serve as cowbird hosts. For purposes of nest monitoring, we made weekly visits to determine nest outcomes and remove any cowbirds eggs and chicks from nests, as authorized by USFWS permits TE-117947-3.4 and TE-122632.

For each site visit we documented each target species' territory locations, all cowbird activity, and for each nest, its location, height, substrate, status at each nest check, and final outcome (Appendix 3).

Survey timing was also designed to meet established guidelines for Willow Flycatcher survey protocols (Sogge et al. 2010) and we broadcast songs and calls of flycatchers after point counts to confirm absence wherever habitat appeared suitable.

After receiving incidental reports of Least Bell's Vireos at The Living Desert, we also added this site for nest-monitoring purposes, following the same protocols. Point counts, Willow Flycatcher surveys, habitat descriptions, and cowbird trapping were not performed at this site.

In conjunction with the U.S. Geological Survey (USGS), adult vireos were captured in mist nets at Whitewater Preserve and The Living Desert and banded with a unique combination of colored plastic and anodized metal federal bands. Adults previously banded as nestlings with a single numbered metal federal band (natal birds) were target netted to determine their identity, and their original band was supplemented with other bands to generate a unique color combination. These data will supplement banding data currently being gathered by USGS and other investigators.

Data Analysis (Task 3):

For estimates of density, we used the function distsamp in Package unmarked, Program R (Fiske and Chandler 2011), which allows hierarchical modeling of abundance with covariates that may affect both abundance and detection (Royle et al. 2004), based on the use of distance sampling

(Buckland et al. 2001). Because of limited sample sizes for target species, we tested only relatively simple models that allowed abundance to vary by site and year, with date as a covariate. For each species we compared models by three different detection functions without adjustments: half-normal, exponential, and hazard-rate, and used model selection to rank models (Burnham and Anderson 2002). Half-normal functions tended to fit best among species and periods, so we used that in all final models for consistency.

For territory mapping, we used the nest coordinates as the centroid or average coordinates if there were multiple nests suspected of belonging to the same pair. If no nest was found, we used the average coordinates of repeated observations of singing males, pairs, or fledglings as the territory centroid.

Cowbird Trapping (Task 4):

During the 2014 SDNHM study, three target areas were identified as benefitting most from cowbird control: Chino Canyon in the Santa Rosa and San Jacinto Mountains Conservation Area; the Dos Palmas Conservation Area (Dos Palmas Preserve); and the Coachella Valley Stormwater Channel and Delta Conservation Area on the north shore of the Salton Sea (Whitewater Delta). The approved trapping strategy included placing two standard cowbird traps at Whitewater Delta, two traps at Dos Palmas Preserve, and mist netting to capture transient cowbirds at Chino Canyon.

During 2017 the first two cowbird traps were installed and opened on 18 April, one at Dos Palmas Preserve and one at Whitewater Delta, and two additional cowbird traps were installed and opened on 15 May, one at each of these two sites (Table 3, Figures 1-4). Live decoy birds were placed into each of the four traps on 15 May, and traps were checked and maintained on a daily basis. The two traps at Dos Palmas Preserve were shut down on 13 July and the 2 at Whitewater Delta were shut down on 21 July.

As this is a multi-year study, there is an opportunity to research the movement of cowbirds both within years and between years at the various sites. By banding and releasing males, we hope to gather data on when and where they may re-enter traps in the future. Male cowbirds are not known to search for or adversely affect bird nests, and no females were released.

Restricted access prevented mist-netting in Chino Canyon during 2017, but may be considered for 2018 if access is granted.

Table 3. Locations of four cowbird traps, Coachella Valley, 2017.

Trap	Latitude	Longitude
Whitewater Delta #1 (WW1)	33.512734	-116.063309
Whitewater Delta #2 (WW2)	33.568267	-116.106378
Dos Palmas Preserve #1 (DP1)	33.510434	-115.827621
Dos Palmas Preserve #2 (DP2)	33.510434	-115.838230

Figure 1. Locations of two cowbird traps at Dos Palmas Preserve.

Figure 2. Locations of two cowbird traps at Whitewater Delta.

Figure 3. Cowbird trap at north side of Dos Palmas Preserve.

Figure 4. Cowbird trap near south end of Whitewater Delta.

PRELIMINARY RESULTS

Summary of riparian bird surveys in 2017

From April to July 2017, personnel from the San Diego Natural History Museum (Kim Ferree, Kevin Clark, Lori Hargrove, and Phil Unitt) conducted riparian bird surveys at six sites in the Coachella Valley (Table 4), completing three rounds of point counts at five sites (50 points), with additional territory mapping or nest checks as needed to confirm breeding status of the five target riparian species and assess current levels of cowbird parasitism. All data were entered into spreadsheets, which include point-count data for all bird species from a total of 146 counts (2079 point-count records), all other incidental records, habitat data for 50 points, and observations recorded during each visit to territories or nests of the target species.

Table 4. List of site visits and tasks completed by date. (Does not include daily visits to check cowbird traps.)

Date	Site	Personnel	Tasks
4/13/2017	Dos Palmas Preserve	KC, LH	scouting for trap locations with Kathleen Brundige and Joel Miner, attended CVCC board meeting
4/13/2017	Whitewater Preserve	KC, LH	scouting, brief riparian bird monitoring
4/13/2017	Whitewater Canyon	LH	scouting, brief riparian bird monitoring
4/18/2017	Dos Palmas Preserve	KC, KF, ST, BG	riparian bird monitoring, cowbird trap installation
4/18/2017	Whitewater Delta	KC, KF, ST, BG	scouting and cowbird trap installation with Kathleen Brundige, Joel Miner, Brett Daniels
4/25/2017	Whitewater Preserve	KC, KF	riparian bird monitoring
4/25/2017	Whitewater Canyon	KC, KF	riparian bird monitoring
4/25/2017	Chino Canyon	KC, KF	riparian bird monitoring
4/26/2017	The Living Desert	KC, KF	scouting with Peter Siminski
5/1/2017	Whitewater Delta	KF	riparian bird monitoring
5/1/2017	Whitewater Delta	KC	initiate cowbird trapping, riparian bird monitoring
5/1/2017	Dos Palmas Preserve	KC	riparian bird monitoring, initiate cowbird trapping
5/2/2017	Chino Canyon	KF	riparian bird monitoring
5/2/2017	Whitewater Preserve	KF	riparian bird monitoring
5/2/2017	Whitewater Canyon	KF	riparian bird monitoring
5/8/2017	Whitewater Canyon	KF	riparian bird monitoring
5/8/2017	Whitewater Preserve	KF	riparian bird monitoring
5/8/2017	The Living Desert	KF	nest checks only
5/9/2017	Chino Canyon	KF	riparian bird monitoring

5/9/2017	Whitewater Delta	KC	cowbird trapping, riparian bird monitoring
5/15/2017	Dos Palmas Preserve	KC, BG	cowbird trap installation
5/15/2017	Whitewater Delta	KC, BG	cowbird trap installation
5/16/2017	Dos Palmas Preserve	LH	point counts round 1, riparian bird monitoring
5/16/2017	Whitewater Delta	KC	riparian bird monitoring, cowbird trapping
5/16/2017	Dos Palmas Preserve	KC	cowbird trapping
5/16/2017	The Living Desert	LH	nest checks only
5/17/2017	Whitewater Preserve	LH	riparian bird monitoring, established point count transect
5/17/2017	Whitewater Canyon	LH	(stopped by, too windy for surveys)
5/17/2017	Chino Canyon	LH	(stopped by, too windy for surveys)
5/23/2017	Whitewater Canyon	KF	point counts round 1, riparian bird monitoring
5/23/2017	Whitewater Preserve	KF	riparian bird monitoring
5/23/2017	The Living Desert	KF	riparian bird monitoring
5/24/2017	Whitewater Delta	KF	point counts round 1, riparian bird monitoring
5/24/2017	Dos Palmas Preserve	KF	riparian bird monitoring
5/30/2017	Chino Canyon	KC	point counts, riparian bird monitoring
5/31/2017	Whitewater Canyon	LH	point counts
5/31/2017	Whitewater Preserve	LH	point counts, riparian bird monitoring
5/31/2017	Dos Palmas Preserve	KC	point counts, riparian bird monitoring
5/31/2017	Whitewater Delta	KC	cowbird trapping, brief riparian bird survey
6/6/2017	Whitewater Delta	PU	point counts, riparian bird monitoring
6/6/2017	The Living Desert	KF	nest monitoring
6/6/2017	Whitewater Canyon	KF	nest monitoring
6/6/2017	Whitewater Preserve	KF	monitoring
6/7/2017	Dos Palmas Preserve	PU	point counts, riparian bird monitoring
6/13/2017	Chino Canyon	KF	point counts, riparian bird monitoring
6/13/2017	Whitewater Preserve	KF	riparian bird monitoring
6/13/2017	Whitewater Canyon	KF	nest monitoring
6/14/2017	The Living Desert	KF, USGS	Banding with Alex Houston and Suellen Lynn of USGS
6/14/2017	Whitewater Preserve	KF, USGS	recap banded birds; riparian bird monitoring
6/19/2017	Whitewater Delta	LH	point counts, habitat, riparian bird monitoring
6/20/2017	Dos Palmas Preserve	LH	riparian bird monitoring, habitat
6/21/2017	Whitewater Canyon	PU, KF	point counts, riparian bird monitoring
6/21/2017	Whitewater Preserve	PU, KF	nest checks, riparian bird monitoring

6/22/2017	Whitewater Preserve	PU	point counts, riparian bird monitoring
6/28/2017	Chino Canyon	KF	point counts, riparian bird monitoring, habitat
6/28/2017	Whitewater Canyon	KF	nest checks, riparian bird monitoring
6/28/2017	Whitewater Preserve	KF	nest checks, riparian bird monitoring
6/29/2017	Whitewater Delta	KF	point counts, habitat
6/29/2017	The Living Desert	KF	nest monitoring
7/6/2017	Whitewater Canyon	PU	point counts, habitat
7/7/2017	Whitewater Preserve	PU	point counts, habitat, nest checks
7/9/2017	Dos Palmas Preserve	LH	point counts, habitat
7/12/2017	Whitewater Delta	KC	point counts, habitat
7/12/2017	Whitewater Canyon	KF	point counts, habitat
7/12/2017	Whitewater Preserve	KF	nest checks
7/13/2017	Chino Canyon	KF	riparian bird monitoring, habitat
7/13/2017	The Living Desert	KF	riparian bird monitoring
7/19/2017	Whitewater Canyon	KF	riparian bird monitoring, habitat
7/19/2017	Chino Canyon	KF	point counts
7/19/2017	Whitewater Preserve	KF	habitat, final nest checks
7/20/2017	Dos Palmas Preserve	KF	point counts

During the 2017 study we observed all five target riparian bird species (Willow Flycatcher, Least Bell's Vireo, Yellow Warbler, Yellow-breasted Chat, and Summer Tanager), as well as the Brown-headed Cowbird, a potential threat. The Brown-headed Cowbird was most numerous at Whitewater Delta (up to 30 per day, and fledglings observed 6, 19, and 29 June), and less numerous at Dos Palmas Preserve (up to four per day), but was scarce to absent at all other sites. At least one target riparian species was observed at each of the six sites, with all five observed at only Whitewater Preserve (Table 5).

Four of the five target riparian species showed evidence of nesting in the Coachella Valley this year, specifically Least Bell's Vireo, Yellow Warbler, Yellow-breasted Chat, and Summer Tanager, while the Willow Flycatcher was only seen as a migrant.

Numbers of probable breeding territories of the Least Bell's Vireo were highest at Whitewater Preserve (n = 12 territories), of the Yellow Warbler at Whitewater Preserve (n = 5), of the Yellow-breasted Chat at Whitewater Delta (n = 8-10), and of the Summer Tanager at Whitewater Preserve (n = 3 or 4) and Chino Canyon (n = 3 or 4). See Figures 5-10 for approximate territory locations, summary for each species in following section, and summary by site in the discussion.

Table 5. Total number of probable breeding territories in the season (bold) and maximum number of birds observed on any one date, for six target species at six sites, Coachella Valley, 2017.

Site*	WIFL	LBVI	YEWA	YBCH	SUTA	BHCO
CC	**0**	**3**	**0**	**2-4**	**3-4**	**n/a**
	(none)	(max 4 on 6/13/17)	(max 3 on 5/9/17)	(max 5 on 6/13/17)	(max 8 on 6/13/17)	(none)
TLD	**0**	**3**	**0**	**0**	**0**	**n/a**
	(none)	(max 8 on 5/16/17)	(none)	(none)	(none)	(none)
DP	**0**	**0**	**0**	**0**	**0**	**n/a**
	(max 3 on 5/16/17)	(none)	(none)	(none)	(none)	(max 4 on 6/20/17)
WWP	**0**	**12**	**5**	**1**	**3-4**	**n/a**
	(max 2 on 5/17/17)	(max 15 on 6/22/17)	(max 9 on 6/22/17)	(max 2 on 4/24/17)	(max 5 on 6/22/17)	(none)
WWC	**0**	**3-4**	**0**	**1**	**2-3**	**n/a**
	(none)	(max 5 on 7/9/14)	(max 2 on 5/8/17)	(max 1 on 6/21/17)	(max 3 on 7/19/17)	(none)
WWD	**0**	**0**	**0**	**8-10**	**0**	**n/a**
	(max 7 on 5/16/17)	(none)	(none)	(max 9 on 6/6/17)	(none)	(max 30 on 5/1/17)
Sum	**0**	**21**	**5**	**12-16**	**8-11**	**n/a**
	(up to 7 per day)	(up to 15 per day)	(up to 9 per day)	(up to 9 per day)	(up to 8 per day)	(up to 30 per day)

*Site codes: CC = Chino Canyon, TLD = The Living Desert, DP = Dos Palmas Preserve, WWP = Whitewater Preserve, WWC = Whitewater Canyon (below Preserve), WWD = Whitewater Delta

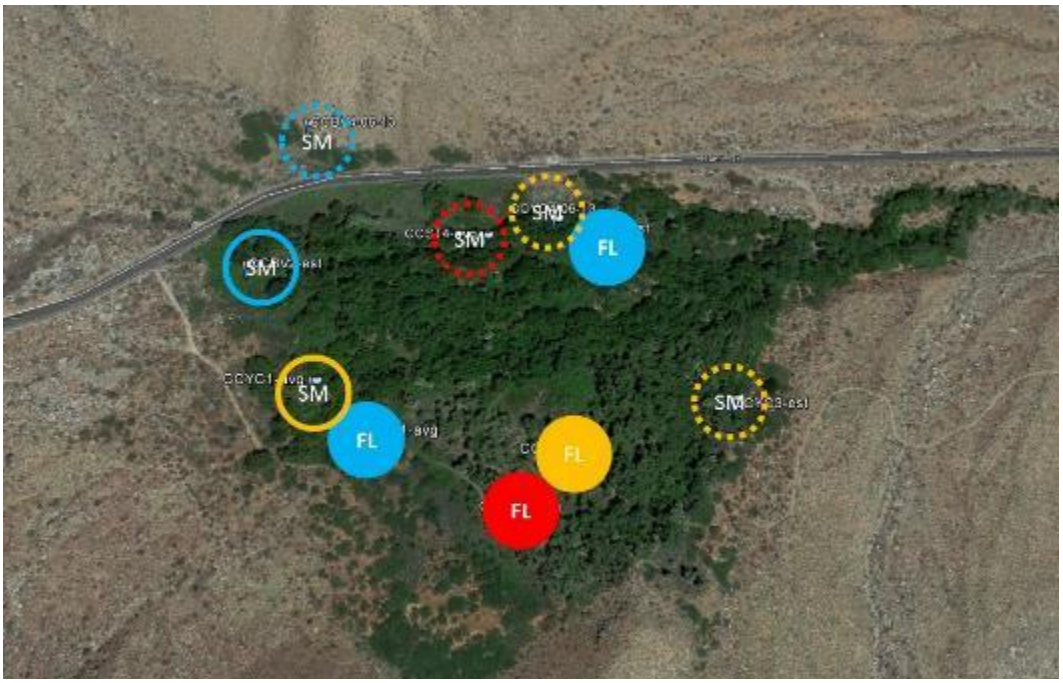

Figure 5. Territories at Chino Canyon, Cienega (blue = Least Bell's Vireo, yellow = Yellow-breasted Chat, red = Summer Tanager, SM = singing male, FL = fledglings, dashed line = floater, solid line = persistent territory).

Figure 6. Territories at Chino Canyon, Aerial Tram (blue = Least Bell's Vireo, red = Summer Tanager, SM = singing male, PR = pair, FL = fledglings, dashed line = floater, solid line = persistent territory).

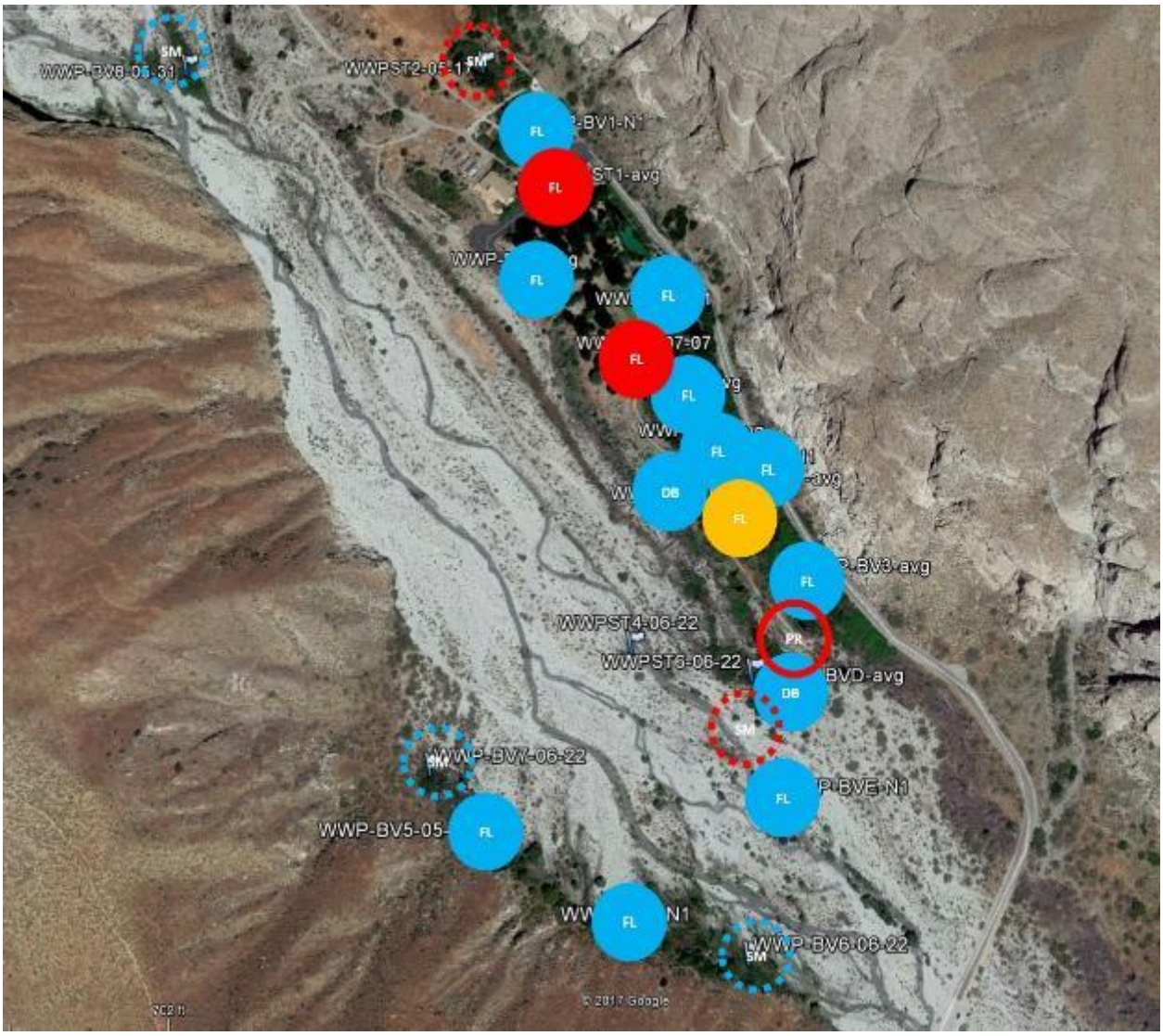

Figure 7. Territories at Whitewater Preserve (blue = Least Bell's Vireo, yellow = Yellow-breasted Chat, red = Summer Tanager, SM = singing male, PR = pair, FL = fledglings, DB = double brood, dashed line = floater, solid line = persistent territory), also see Figure 8 for Yellow Warbler territories.

Figure 8. Whitewater Preserve, approximate Yellow Warbler territories (all five fledged young).

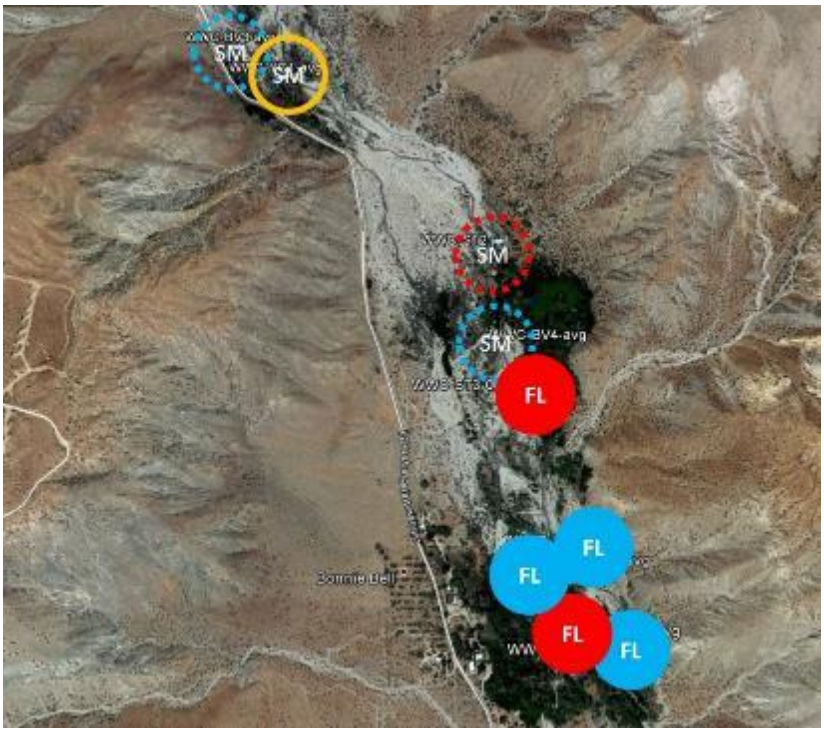

Figure 9. Territories at Whitewater Canyon, below Preserve (blue=Least Bell's Vireo, yellow=Yellow-breasted Chat, red=Summer Tanager, SM=singing male, FL=fledglings, dashed line=floater, solid line=persistent territory).

Figure 10. Whitewater Delta, approximate Yellow-breasted Chat territories (SM = singing male, PR = pair, solid line = persistent territory).

Figure 11. The Living Desert, approximate Least Bell's Vireo territories (FL = fledglings, NE = nest with eggs; pair attempted at least two nests, both of which failed).

Brown-headed Cowbird

Although Brown-headed Cowbirds were observed at only two of the six sites, they were seen regularly at Dos Palmas Preserve in low numbers and in pairs (seen on seven dates with up to four per day), and were seen regularly at Whitewater Delta in high numbers (seen on eight dates with up to 30 per day). Successful parasitism was confirmed at Whitewater Delta, with cowbird fledglings observed twice with Song Sparrow hosts, once with a Common Yellowthroat host, and a twice more with unknown hosts (Table 6).

Table 6. Observations where Brown-headed Cowbirds were suspected or confirmed of attempting or achieving nest parasitism, listed by date and site.

Date	Site	Observation
6/6/2017	WWD	Cowbird fledgling fed by Common Yellowthroat
6/19/2017	WWD	Cowbird fledgling heard, unknown host (near Yellow-breasted Chat)
6/19/2017	WWD	Cowbird fledgling seen and heard, unknown host (near Yellow-breasted Chat)
6/29/2017	WWD	Cowbird fledgling fed by Song Sparrow pair
6/29/2017	WWD	Cowbird fledgling fed by Song Sparrow

Willow Flycatcher

Migrating Willow Flycatchers were observed at only three sites in 2017, namely Whitewater Preserve, Dos Palmas Preserve, and Whitewater Delta, and only between 16-31 May, with highest count of seven at Whitewater Delta on 16 May. Based on lack of territorial behavior, all were most likely the northwestern subspecies *brewsteri*. Numbers appear similar or reduced compared to 2014: a maximum of nine at Dos Palmas Preserve on 1 June 2014 vs. a maximum of three on 16 May 2017; a maximum of three at Whitewater Canyon on 21 May 2017 vs. none in 2017; and a maximum of 19 at Whitewater Delta on 2 June 2014 vs. a maximum of seven on 16 May 2017.

Least Bell's Vireo

Least Bell's Vireos were observed at four sites in 2017, specifically Chino Canyon, The Living Desert, Whitewater Preserve, and Whitewater Canyon, with a total of 21 territories and 20 nests located (Table 7). No evidence of nest parasitism was observed. Overall, 72% (13 of 18) of completed nests were successful and fledged young in the Coachella Valley (Table 8), a high rate of reproductive success compared to that reported in the literature (Kus et al. 2010). Of the five

completed nests that failed, nest predation was suspected in each case, but the type of nest predator could not be confirmed. Of 16 nests with a full clutch of eggs, average clutch size was 3.69 (± 1.2 SE).

Table 7. Least Bell's Vireo territories, with nest outcomes and locations, listed by site. (See Appendix 1 for site location codes.)

Site	Territory Location	Observations	Map Code	Nest substrate	Coordinates (±10 m)	
					N	W
CC	CCBV1	Family group on 19 July	FL	n/a	33.84231	116.60384
CC	CCBV2	Singing male on 4 dates (3 separate singing males in area)	SM	n/a	33.84354	116.60482
CC	CCBV3	Family group on 19 July	FL	n/a	33.84392	116.60200
WWP	WWPBV1	Nest 1: nest-building 25 April; 3 eggs, fledglings present 31 May and 13 June	FL	willow	33.98943	116.65631
WWP	WWPBV2	Nest 1: pair with nest 31 May; 4 eggs, fledglings present 28 June and 12 July	FL	willow	33.98783	116.65515
WWP	WWPBV3	Fledglings on 12 July	FL	n/a	33.98582	116.65400
WWP	WWPBV4	Extra pair squeezed between A and C; fledglings observed 23 May; family group 22 June	FL	n/a	33.98678	116.65477
WWP	WWPBV5	Banded male with at least 2 fledglings observed 31 May and 13 June	FL	n/a	33.98411	116.65680
WWP	WWPBVA	Nest 1: incubating 25 April, 4 eggs, fledglings observed 23 May and 13 June	DB	willow	33.98660	116.65505
		Second brood of fledglings observed 12 July		n/a	33.98660	116.65505
WWP	WWPBVB	Nest 1: nest with 4 hatchlings on 2 May; fledglings observed 17 and 31 May, and 13 June	FL	willow	33.98657	116.65429
WWP	WWPBVC	Nest 1: nest with 4 nestlings video-taped by ranger Kyle on 5 May; probably unsuccessful	FL	willow	33.98729	116.65517
		Nest 2: Nest-building 23 May; abandoned, incomplete		willow	33.98721	116.65475
		Nest 3: Incubating 4 eggs on 6 June; fledglings observed on 28 June		willow	33.98699	116.65498
WWP	WWPBVD	Nest 1: nest with 4 hatchlings on 4 May; fledglings observed 17, 23, and 31 May, and 13 June	DB	willow	33.98499	116.65431

Site	Territory Location	Observations	Map Code	Nest substrate	Coordinates (±10 m)	
					N	W
		Nest 2: nest with 3 nestlings on 23 June; fledging event 28 June; fledglings observed 12 July		willow	33.98506	116.65436
WWP	WWPBVE	Nest 1: nest-building on 13 June; 3 eggs; fledglings observed 19 July	FL	cottonwood	33.98423	116.65428
WWP	WWPBVF	Nest 1: nest with 4 nestlings on 8 May; fledglings observed 23 May	FL	willow	33.98331	116.65559
WWP	WWPBVG	Nest 1: nest-building on 2 May; abandoned, incomplete	FL	alder	33.98796	116.65610
		Family group observed 14 June		n/a	33.98842	116.65676
WWC	WWCBV1	Nest 1: nest with 1 egg; later hatched, and 2 hatchlings on 21 June; family group 6 and 19 July	FL	alder	33.94728	116.63929
WWC	WWCBV2	Nest 1: nest with 4 eggs on 6 June; fledglings observed 21 June, 19 July	FL	alder	33.94891	116.64046
WWC	WWCBV5	Fledglings observed 6 June	FL	n/a	33.94872	116.64086
TLD	TLDBV1	Nest 1: nest with 4 nestlings on 27 April; depredated by 8 May	FL	lemonade-berry	33.70207	116.37377
		Nest 2: nest-building on 8 May, depredated by 16 May		sugar-bush	33.70208	116.37389
		Nest 3: nest-building on 23 May, fledged by 29 June		unknown shrub	33.70240	116.37314
TLD	TLDBV2	Nest 1: nest-building on 26 April, depredated by 16 May	PR	Texas ebony	33.70289	116.37164
		Nest 2: nest with 4 eggs on 23 May, depredated by 6 June		sugar-bush	33.70382	116.37127
TLD	TLDBV3	Nest 1: occupied nest on 26 April, fledged by 8 May	FL	unknown shrub	33.70177	116.37230

Table 8. Summary of Least Bell's Vireo nests monitored in Coachella Valley, California, 2017.

	Whitewater Preserve	Whitewater Canyon	The Living Desert	Total
Incomplete nests[a]	2	0	0	2
Completed nests	10	2	6	18
Successful	9	2	2	13 (72%)
Failed	1	0	4	5 (28%)
Total # of nests monitored	12	2	6	20

[a] Incomplete nests were partially built but not completed.

At Chino Canyon we confirmed two breeding pairs and at least one additional singing male (Figure 5), the same as in 2014. Lacking access in 2017, we could not search for nests, so were unable to determine if any nests were parasitized by Brown-headed Cowbirds, but we confirmed that both breeding pairs were eventually successful, with fledglings observed on 19 July in both territories.

At The Living Desert, we confirmed three breeding pairs (Figure 11), two of which were successful (fledglings observed 8 May and 29 June in separate territories). At least four nests failed, likely due to depredation by unknown nest predators. We observed no evidence of cowbird parasitism at The Living Desert but cannot rule out the possibility since parasitized nests are sometimes later depredated.

At Whitewater Preserve we located 12 Least Bell's Vireo territories (Figure 7), three times the number of territories in 2014. This dramatic increase is likely due to both the increase in riparian vegetation and lack of Brown-headed Cowbirds. In 2014, we confirmed only four territories, two above the Visitor Center and two below, and only one territory was successful (three nests tracked were unsuccessful). In 2017, each of the 12 territories were successful, and two successfully double-brooded. Of 12 tracked nests, nine were successful (Tables 7 and 8). Ten of the 12 nests were in willow (Table 7, Figure 12). We also documented three localities with presumed floaters, one near WWP06 on 31 May, and two in the southwestern portion of the Preserve, one north of confirmed territories on 22 June, and one south of confirmed territories on multiple occasions but possibly a male moving south from an adjacent territory for foraging.

Figure 12. Least Bell's Vireo nestlings (4) at Whitewater Preserve, 12 July 2017. Nest is in sandbar willow (*Salix exigua*).

At Whitewater Canyon downstream of the preserve we located three or four Least Bell's Vireo territories (Figure 9), which is at least one more than we located in 2014. In 2014 we found only singing males near WWC01 and near the road west of WWC7. In 2017 we confirmed three pairs near WWC01, all successful with fledglings (Table 7). We also located a singing male near the road west of WWC7 but only on 25 April and 8 May, and then another singing male near WWC3 on 23 May and 19 July, so we considered these records as representing floaters.

In total, five male vireos were color-banded on 14 June 2017 (Table 9, Figures 13-15). Three were banded at The Living Desert, representing each of the three breeding territories. At Whitewater Preserve, we recaptured two males that had been previously banded. One bird at least one year old was originally banded at Whitewater Preserve on 17 Sept 2016 by Stephen Myers during an advanced banding class offered by UC Riverside. The second bird, which had a gold-colored metal federal band was banded as a nestling in 2016 at Camp Pendleton. This demonstration of dispersal from coast to desert represents a notable advance in our understanding of Least Bell's Vireo movements within southern California.

Table 9. Banded Least Bell's Vireos at Whitewater Preserve and The Living Desert, Coachella Valley, California, 2017.

Site	Territory	Band Combination (Left leg : Right Leg)[a]	Age	Sex	Comments
TLD	TLDBV1	Msi : DPWH	≥ 1 yr	Male	Banded as an AHY in TLDBV1 on 14 June 2017.
TLD	TLDBV2	Msi: PUWH	≥ 1 yr	Male	Banded as an AHY in TLDBV2 on 14 June 2017.
TLD	TLDBV3	LPBK : Msi	≥ 1 yr	Male	Banded as an AHY in TLDBV3 on 14 June 2017.
WWP	WWPBV5	ORDG Mgo : PUPU	1 yr	Male	Banded as a nestling at Camp Pendleton in 2016. Color banded in WWPBV5 14 June 2017
WWP	WWPBVC	PUYE : Msi	≥ 2 yrs	Male	Banded as an AHY at WWP by Stephen Myers on 17 Sept 2016. Color banded in WWPBVC 14 June 2017.

[a]Band combo orientation on leg: left leg : right leg. Band colors: Msi = silver numbered federal band; Mgo = gold numbered federal band; DPWH = plastic dark pink-white split; PUWH = plastic purple-white split; LPBK = plastic light pink-black split; ORDG = plastic orange-dark green split; PUPU = plastic purple; PUYE = plastic purple-yellow split.

Figure 13. Banded Least Bell's Vireo at The Living Desert (TLDBV2), 14 June 2017.

Figure 14. Banded Least Bell's Vireo at Whitewater Preserve (WWPBVC), 14 June 2017.

Figure 15. Banded Least Bell's Vireo at Whitewater Preserve (WWPBV5), 14 June 2017.

Yellow Warbler

Yellow Warblers have been historically common in the Coachella Valley as migrants, with spring records extending at least from 3 April to 9 June, and fall migration beginning as early as 11 July (Patten et al. 2003). During 2017 we observed Yellow Warblers at only three sites, Chino Canyon, Whitewater Preserve, and Whitewater Canyon, and confirmed nesting at only Whitewater Preserve where at least five pairs successfully fledged young (Figure 8), observed 22 June and 12 July. Compared to 2014, this appears to represent a decline at Dos Palmas Preserve and Whitewater Delta, and an increase at Whitewater Preserve. No evidence of nest parasitism was observed.

Yellow-breasted Chat

We found Yellow-breasted Chats at each site except The Living Desert and Dos Palmas Preserve. Every site where we found chats had at least one persistent territory, but highest numbers were at Whitewater Delta with 8-10 territories (Figure 10). We documented successful nesting at Chino Canyon (Figure 5) and Whitewater Preserve (Figure 7), observing a pair with fledglings on 28 June at Chino Canyon and on 13 June at Whitewater Preserve. However, at Whitewater Delta we did not find any chat nests, or see any evidence of nest-building, carrying food, or fledglings, but from the high number of persistent territories and suggestion of pairing, we strongly suspect that nesting was attempted. Given the high number of Brown-headed Cowbirds at Whitewater Delta, it is possible that most or all nesting attempts failed due to nest parasitism. Yellow-breasted Chats appear to be extirpated from Dos Palmas Preserve, where they were common from 2002-04.

Summer Tanager

We found Summer Tanagers at three sites, and at each of these they were persistently territorial. Chino Canyon had three or four territories (Figures 5 and 6), Whitewater Preserve had three or four territories (Figure 7), and Whitewater Canyon had two or three territories (Figure 9). Nesting success was confirmed at all three sites. A pair with fledglings was observed in Chino Canyon on 13 July; two different pairs were observed with fledglings at Whitewater Preserve, one on 7 July and most likely a different family group on 12 July; and two different pairs were observed with fledglings at Whitewater Canyon, one on 6 July and most likely a different family group on 19 July. No evidence of nest parasitism was observed.

At Whitewater Preserve on 6 June, ranger Kyle reported that some birders had seen a Summer Tanager foraging in sycamores and then fall into the pond below. He retrieved the dead bird from the pond and later gave the specimen to museum staff. Phil Unitt prepared the specimen as museum voucher #55130 (Figure 16), and confirmed that it is the western subspecies *cooperi*. He noted that it had a broken right humerus and missing feathers near the break, inferring that the injury arose from collision, possibly with a wire. Tissue sample has been sent to SDSU for long-term storage.

Other species:

We recorded a total of 2079 point-count detections and documented a total of 137 bird species and 13 other incidental vertebrate species during our surveys (Appendix 5), including nesting confirmations of 31 non-target bird species. Notable observations included: one Crissal Thrasher was heard at Dos Palmas Preserve near 33.50828 / 115.82631 (9 July) and one bighorn sheep was observed crossing the road at Whitewater Canyon near 33.95785 / 116.64419 (12 July). Also notable was the absence of Brown-crested Flycatchers at Whitewater Preserve/Canyon in 2017, which had been documented at this site regularly up until 2016 (www.ebird.org).

On 13 July Kevin Clark received a dead Yellow-billed Cuckoo from the Dos Palmas Preserve site manager who had found it on his porch on 12 July. We prepared the cuckoo as a museum specimen (Figure 16). There was no sign of trauma or broken bones, so it was not a window strike. The bird was extremely emaciated, with significant muscle loss to the breast muscles and no fat deposits. No internal parasites or other signs of disease were obvious. It was an adult female, in pre-breeding condition, so had not yet bred this year. We preserved the skin and skeleton as museum voucher #55185, and tissue sample has been sent to SDSU for long-term storage and all internal organs have been saved frozen for possible future studies.

Figure 16. Specimens of the Summer Tanager (top) and Yellow-billed Cuckoo (bottom).

Density Estimates:

Territory mapping allows for precise density estimates of focal species in terms of number of territories per site covered (Table 5). Point-count surveys allow for density estimates across species and can control for differences in detection probability, but require sufficient sample sizes that are often not possible for rare species. However, point-count surveys are also useful for monitoring the riparian bird community based on common indicator species such as the Song Sparrow and Common Yellowthroat, and are also useful for non-territorial species such as Brown-headed Cowbirds.

Across the six target species, the Yellow-breasted Chat had the highest probability of detection (effective radius 108 m), while Willow Flycatcher and Yellow Warbler were the lowest (Figure 17). Distance sampling controls for these differences to yield more robust estimates of density. We estimated density of the six target species at the five sites surveyed in 2017, compared to 2004 and 2014 (Figure 18). Brown-headed Cowbirds were most abundant at Whitewater Delta (highest estimate 2.07 birds/ha in 2004) followed by Dos Palmas Preserve, and rare to absent or irregular at Chino Canyon and Whitewater Canyon. They showed a sharp decrease at both Whitewater Delta and Dos Palmas Preserve in 2014 relative to 2004, and this decline continued at Dos Palmas Preserve in 2017, but they rebounded somewhat at Whitewater Delta in 2017. The five target riparian bird species were relatively scarce to absent across all sites and years, except at Whitewater Preserve where there were high numbers of Least Bell's Vireo in 2017 (0.82 birds/ha). Highest density observed for the Willow Flycatcher was 0.32 birds/ha at Dos Palmas Preserve in 2014, 0.35 birds/ha for the Yellow-breasted Chat at Dos Palmas Preserve in 2004, 0.36 birds/ha for the Yellow Warbler at Whitewater Preserve in 2017, and 0.35 birds/ha for the Summer Tanager at Chino Canyon in 2017.

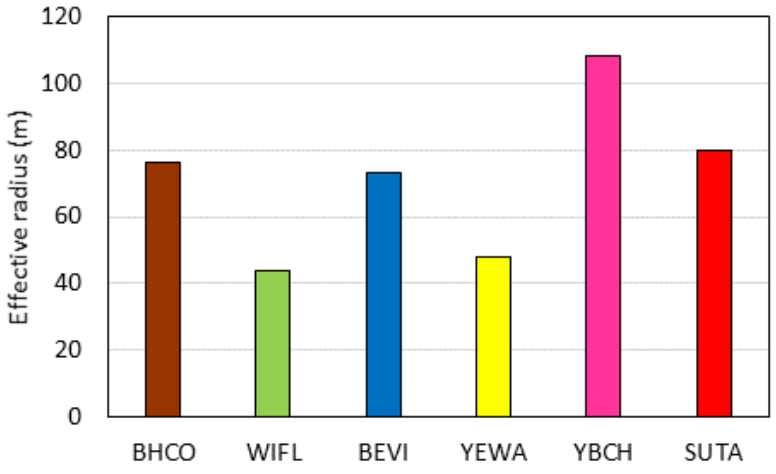

Figure 17. Difference in probability of detection across the six target species, expressed as the effective radius (m), or the distance for which as many individuals are detected beyond as are missed within (Buckland et al. 2001). Point count data pooled across sites and years. (See Table 1 for species' code definitions.)

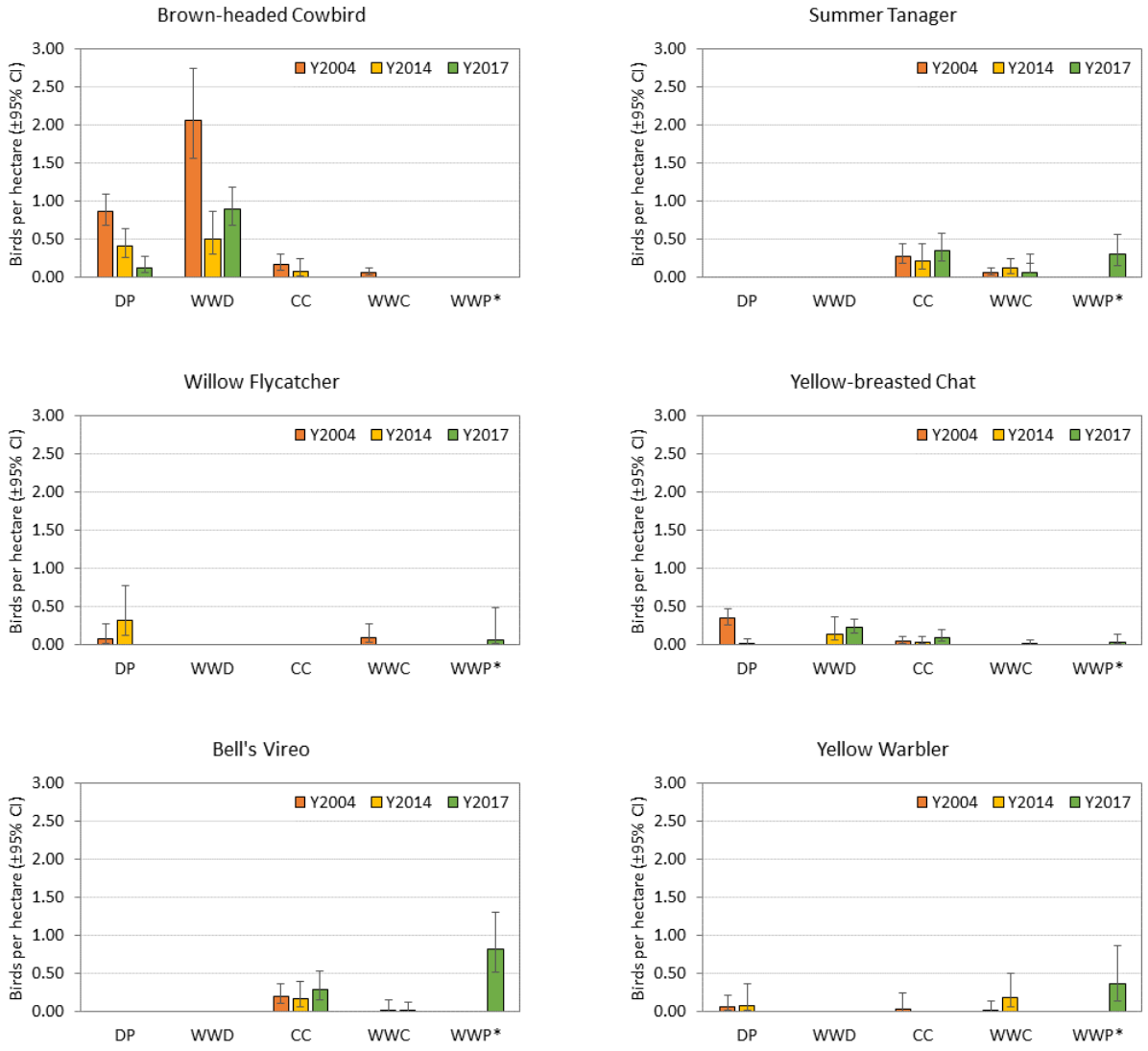

Figure 18. Density estimates based on point counts with distance sampling, comparing five sites (DP = Dos Palmas Preserve, WWD = Whitewater Delta, CC = Chino Canyon, WWC = Whitewater Canyon, and WWP = Whitewater Preserve), three years (2004, 2014, and 2017), and six target species, Coachella Valley. (*Note that WWP was only surveyed in 2017.)

Cowbird Trapping:

A total of 84 Brown-headed Cowbirds were trapped during 2017, 75 at Whitewater Delta Storm Channel and nine at Dos Palmas Preserve (Table 10, Figures 19-22). Of the 84 total trapped, 23 males were banded and released, to determine recapture rate, and 60 were collected. Totals do not include banded birds that were recaptured.

Table 10. Summary of cowbird trapping data, Coachella Valley, 2017. Numbers do not include recaptures.

Dos Palmas

Totals	Males	Females	Juveniles	Totals	Bycatch	Dates
Trap 1						
collected	1	1	1	3		
banded	2	0	0	2		
Trap Totals	3	1	1	5	4 HOFI; 2 LOSH; 1 LBWO; 1 ABTO	18 April-13 July
Trap 2						
collected	0	0	2	2		
banded	2	0	0	2		
Trap Totals	2	0	2	4	1 LOSH; 1 ABTO	15 May -13 July
TOTAL COWBIRDS TRAPPED AT DP				9		

Whitewater Delta

Totals	Males	Females	Juveniles	Totals	Bycatch	Dates
Trap 1						
collected	4	2	18	24		
banded	10	0	0	10		
Trap Totals	14	2	18	34	3 ABTO; 1 LOSH; 2 NOMO	18 April - 21 July
Trap 2						
collected	1	3	27	31		
dead	1	0	0	1		
banded	1	0	8	9		
Trap Totals	3	3	35	41	1 LOSH; 2 ABTO	15 May -21 July
TOTAL COWBIRDS TRAPPED AT WWD				75		
GRAND TOTAL COWBIRDS TRAPPED IN 2017				**84**		

Figure 19. Female cowbirds inside trap at Dos Palmas Preserve.

Figure 20. Adult male cowbird inside trap at Dos Palmas Preserve.

Figure 21. Banded cowbird at Dos Palmas Preserve.

Figure 22. Banded cowbird at Whitewater Delta.

A high number of juvenile cowbirds (n = 53) were captured at Whitewater Delta, especially during late June and July (Table 10). These high numbers combined with our observations of fledgling cowbirds suggests that the Whitewater Delta is a productive breeding area for cowbirds, and that the local riparian bird community is likely strongly suppressed.

Several species of non-target birds were also captured and released, including Abert's Towhee, Northern Mockingbird, House Finch, Loggerhead Shrike, and Ladder-backed Woodpecker (Table 10). Most of these species were captured and released a single time; however, the same individual Abert's Towhees were consistently recaptured and released throughout the trapping period.

DISCUSSION AND RECOMMENDATIONS

During 2017, we found all five target riparian species in the Coachella Valley, but at the southern end where Brown-headed Cowbirds are numerous, only the Yellow-breasted Chat persists at the Whitewater Delta, and no target species persist at Dos Palmas Preserve. At the north end in the Whitewater Preserve/Canyon, however, populations of the Least Bell's Vireo, Yellow-breasted Chat, Summer Tanager, and Yellow Warbler are increasing. With high reproductive success, these populations may be self-sustaining, especially that of the Least Bell's Vireo. In 2017 as in 2014, we found no cowbirds in this area, and in 2017 we noted strong increases in extent of riparian habitat where the river channel had previously been flood-scoured.

In 2017 as in 2014 (and in 2002-2004), no Willow Flycatchers were found to be nesting in the Coachella Valley, and all observations were consistent with the northern subspecies (*brewsteri*) passing through in migration. Least Bell's Vireos continued to nest at three sites, increasing in Whitewater Preserve/Canyon but still with only three territories in Chino Canyon, where each of five nests found during 2014 had been parasitized by cowbirds. Although our access was limited, we confirmed that two of three territories in the cienega were successful in 2017. Yellow Warblers were first documented as nesting in the Coachella Valley at Mission Creek and Stubbe Canyon in 2014, and now have been documented successfully nesting at Whitewater Preserve, with at least five successful territories in 2017. Yellow-breasted Chats persisted and nested successfully in low numbers at Chino Canyon and Whitewater Preserve/Canyon, but appear to be extirpated from Dos Palmas Preserve, and persist in high numbers at Whitewater Delta but without any apparent nest success. Summer Tanagers continue to thrive in Chino Canyon and appear to have increased in Whitewater Preserve/Canyon. Least Bell's Vireos, Yellow Warblers, and Summer Tanagers are still absent at Dos Palmas Preserve and Whitewater Delta.

Assessment by Site:

Chino Canyon—Chino Canyon is the site of the Palm Springs Aerial Tramway, which extends to 2600 m in elevation from its base at elevation 800 m. A year-round stream flows down the steep canyon from the San Jacinto Mountains, becoming intermittent where the canyon widens to the east, but supporting a narrow strip of riparian vegetation within a boulder-strewn desert landscape. Just over 1 km below the tram is a spring-fed cienaga supporting a broader patch of

riparian vegetation approximately 400 m wide. The riparian habitat of both the stream and cienaga are dominated by sycamore, cottonwood, willow, alder, palms, and baccharis, with grapevine draping many areas, and bordered by mesquite, catclaw, and brittlebush. Large parking lots and a road with heavy traffic are immediately adjacent to the riparian habitat. Several small trails go through and around the cienaga, and there was evidence of tamarisk removal at one edge. Adjacent to the stream are several clumps of fountain grass, a few Russian thistles, and other invasive exotic plants.

Our access to the cienega was restricted in 2017, but we detected little to no change in habitat between 2014 and 2017. There was also little change in riparian bird composition between 2014 and 2017 and number of target species' territories, except for the addition of at least one Yellow-breasted Chat territory.

We observed no Brown-headed Cowbirds at Chino Canyon during our 2017 surveys and two of the three Least Bell's Vireo territories successfully fledged young. During the 2014 surveys we had few detections of Brown-headed Cowbirds but documented that all five nests tracked were parasitized by the cowbird. Without access to the cienega in 2017 we were unable to determine current levels of cowbird parasitism, and cowbirds may still be suppressing riparian bird populations at this site.

Figure 23. Chino Canyon, 2017.

***Whitewater Preserve*—**The Whitewater River is the main drainage of the Coachella Valley. At its upper reaches it drains from the San Bernardino Mountains into the north-south Whitewater Canyon. Here, many stretches are flood-scoured, but some stretches support mature cottonwood forest, with patches of willow and alder in wetter areas, and baccharis and mesquite in drier areas. The Whitewater Preserve includes a set of trout ponds around which the habitat has been partly restored. A paved road extends along the river channel up to the trout ponds, where there is a picnic area and visitor center.

We did not perform point counts or habitat assessments at this area in 2014, but in 2017 noted increases in riparian vegetation at the trout ponds and below the trout ponds where vegetation is recovering from past flood-scouring. There was intermittent surface water in 2014, with several full trout ponds and flowing water along approximately half of the survey area, a situation similar to that in 2017. The increasing extent of riparian habitat and lack of cowbirds has led to a strong increase in the Least Bell's Vireo population at this site, with high reproductive success for the vireos and for Yellow Warblers. We recommend continued trail maintenance to discourage hikers from entering riparian habitat off the trails, but avoidance of vegetation clipping during the nesting season.

Figure 24. Whitewater Preserve at WWP3, site of successful nesting by Least Bell's Vireo, Yellow Warbler, Yellow-breasted Chat, and Summer Tanager.

Whitewater Canyon (below Preserve)—Our main survey area in 2014, which we resurveyed in 2017, was a 2-km stretch of the river beginning just over 2.5 km below the trout ponds and extending down to the small community of Bonnie Bell. The surrounding hills are dry and barren with some creosote desert scrub and windmills on higher ridges. Disturbance is due primarily to natural flood-scouring and wind, but there is also old trash and graffiti, cut vegetation, and a few trails behind the small community. There is evidence of old tamarisk removal, with some fresh tamarisk regrowth and numerous other invasive species sparsely scattered through the canyon including oleander, date palm, tree tobacco, mustards, fountain grass, and Bermuda grass.

During 2017 there was more water flowing than in 2014, with modest increases in riparian vegetation. The number of territories of both the Least Bell's Vireo and Summer Tanager at this site increased by at least one over the number in 2014.

Figure 25. Whitewater Canyon (below Preserve), looking south toward San Jacinto Peak.

The Living Desert—We opportunistically monitored three Least Bell's Vireo territories in 2017, two of which were successful, and we banded all three territorial males. This represents an interesting colonization of a landscaped habitat. Park staff are encouraged to record the return of any banded birds and numbers and locations of territories.

***Dos Palmas Preserve*—**The Dos Palmas Preserve is on the northeast side of the Salton Sea, just below the Orocopia Mountains and the Coachella Canal. There are numerous springs and seeps that feed into a series of levees and ponds, supporting a large patchwork of riparian vegetation 2 km across, interspersed with the surrounding salt flats. Some degree of artificially increased water at this site compensates for the loss of natural springs elsewhere. Palm trees are the dominant feature, with large patches of common reed (*Phragmites* spp.), cattail, and mesquite. There are a few structures, and although the main road is gated, the entire area is crossed by numerous dirt roads. Tamarisk had been fairly recently and extensively cleared before our surveys in 2014, and we noted that this disturbance and lack of shrub cover had an apparent correlation with the drop in Yellow-breasted Chat density at this site from 2002-04 to 2014. In 2017, we found no chats at this site, and no other target riparian species nesting. Even common riparian species such as the Song Sparrow and Common Yellowthroat are scarcer than expected from the large extent of the area and plentiful water. If patches of mesquite and riparian shrubs and trees are allowed to recover, the site would likely support much larger populations of riparian birds and could potentially be colonized by any of the target riparian bird species. Brown-headed Cowbirds are not as numerous at this site as at Whitewater Delta, but remain common relative to the number of riparian birds that the site now supports, and are likely suppressing riparian bird populations. Thus, cowbird control will likely have a positive effect on riparian bird populations at this site.

Figure 26. Large pond at Dos Palmas Preserve, with few scattered young cottonwood trees.

***Whitewater Delta*—**Below the communities of Palm Springs and Palm Desert, the Whitewater River becomes the Coachella Valley Stormwater Channel, gathering agricultural drainage and wastewater. The channel feeds into the Salton Sea at the Whitewater Delta, where riparian vegetation has historically been removed for flood control, but variably supports riparian habitat that is now dominated by tamarisk, but with substantial willow and common reed. Surrounding habitats are salt flats with variable densities of shrubs including saltbush, iodine bush, and arrowweed. Adjacent to the drainage are some constructed duck ponds containing limited cattails and other emergent aquatic plants.

In 2014, the channel had strong flow and there was recent bulldozing immediately adjacent to the narrow strip of riparian habitat. The situation was similar in 2017 but with even more extensive bulldozing along the northeast side of the river, and removal of riparian vegetation from sections of the river. This work was associated with emergency repairs following winter storms and ensuing flood damage and sedimentation. However, despite the bulldozing, shrub and tree cover within undisturbed patches has increased strongly since 2004. Extensive clearing in 2004 appeared to be correlated with the disappearance of Least Bell's Vireos. The increase in shrub and tree cover by 2014 had an apparent correlation with the increase in Yellow-breasted Chat density, although the Least Bell's Vireo has not recolonized. The status was little changed in 2017, and this site continues to have a high abundance of cowbirds. We saw evidence that common species such as the Song Sparrow and Common Yellowthroat were serving as cowbird hosts but at least in some cases successfully fledged their own young.

Figure 27. Whitewater Delta with extensive recent bulldozing and removal of emergent vegetation. An undisturbed patch is on the right.

Assessment of effectiveness of cowbird management and recommendations:

Because of the low numbers of cowbirds captured at Dos Palmas, as well as the relatively high ratio of non-target birds captured, we recommend altering the cowbird control program at Dos Palmas Preserve in 2018. Cowbirds observed at Dos Palmas tended to occur south of the traps, near the ponds and in the riparian vegetation to the south of the ponds. This would be the best location to target cowbirds in 2018.

Rather than trapping, alternative methods to capture cowbirds are recommended for Dos Palmas Preserve. Given low numbers of cowbirds over a large area, the preferred option is to capture cowbirds in mist-nets with the aid of captive decoy cowbirds and broadcast of recorded vocalizations. This method is highly mobile and can be targeted for areas where cowbirds were recently observed. This method would also allow for the immediate release of any non-target birds captured, and would eliminate the daily visits required to maintain the food and water in the traps.

In contrast to Dos Palmas, the traps at Whitewater Delta were highly successful. We recommend continuing these traps at the same two locations in 2018. The cowbird population in this area is large and will require a sustained trapping effort to reduce the numbers.

If we switch from cowbird trapping to mist-netting at Dos Palmas Preserve, this will allow for cost-savings and flexibility to consider additional options: (A) Use the cost-savings to perform limited riparian bird monitoring and point counts at Whitewater Delta and Dos Palmas Preserve to monitor abundance of cowbirds and target riparian species, and to better assess the effectiveness of cowbird trapping. (B) If access to Chino Canyon is permitted, split the mist-netting effort between Dos Palmas Preserve and Chino Canyon. (C) Placement of additional cowbird traps at Whitewater Delta. However, we suspect that the number of suitable shaded sites at Whitewater Delta may be too restrictive for additional traps.

During 2018 we will perform: (1) a second year of cowbird management, based on discussion of the above recommendations and options, and (2) submit a final report with summary of results and assessment of cowbird management effectiveness. We recommend continued riparian bird surveys to better assess effectiveness and development of a long-term monitoring strategy.

ACKNOWLEDGMENTS

Fieldwork in 2017 was conducted by Kim Ferree, Kevin Clark, Lori Hargrove, and Philip Unitt. Cowbird trap checking and maintenance was conducted by Tracy Thomas and Marco Combs. Joel Miner and Bill Pope facilitated access to Dos Palmas Preserve. Brett Daniels of the Coachella Valley Water District and Alberto Ramirez from the Torres-Martinez tribe facilitated access to the Whitewater Delta. Jack Thompson of the Whitewater Preserve facilitated access to that site. Steve Nichols and the Palm Springs Tramway allowed our access outside Desert Water Agency property. Peter Siminski allowed access to the Living Desert to monitor Least Bell's Vireos. Funding was provided through contract with the Coachella Valley Conservation Commission, and supported in part through the Natural Community Conservation Planning Local Assistance Grant Agreement P1582109. Kathleen Brundige facilitated site access and overall contract management.

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Appendix 1. List of bird-count points, bold indicating that it was surveyed three times in 2017.

Site (Code)	Point	N	W
Chino Canyon: Aerial Tram (AT)	**AT1**	**33.83957**	**-116.61346**
	AT2	**33.84107**	**-116.61228**
	AT3	**33.84223**	**-116.61058**
	AT4	**33.84311**	**-116.60847**
Chino Canyon: Cienaga (CC)	**CC1**	**33.84253**	**-116.60375**
	CC2	**33.84176**	**-116.60179**
	CC3	33.84307	-116.60041
	CC4	**33.84418**	**-116.60235**
	CC5	**33.84380**	**-116.60492**
	CC6	33.84401	-116.59756
Whitewater Preserve (WWP)	**WWP1**	**33.98331**	**-116.65436**
	WWP2	**33.98471**	**-116.65647**
	WWP3	**33.98561**	**-116.65414**
	WWP4	**33.98748**	**-116.65526**
	WWP5	**33.98963**	**-116.65664**
	WWP6	**33.98996**	**-116.65927**
Dos Palmas Spring (DP)	**DP1**	**33.50736**	**-115.82591**
	DP2	**33.50199**	**-115.83004**
	DP3	**33.49635**	**-115.83034**
	DP4	33.49595	-115.82824
	DP5	**33.50146**	**-115.82729**
	DP6	**33.49958**	**-115.82594**
	DP7	**33.50417**	**-115.82586**
	DP8	**33.50904**	**-115.82768**
	DP9	**33.50527**	**-115.83030**
	DP10	**33.50008**	**-115.82995**
Whitewater Canyon (WWC)	**WWC01**	**33.94775**	**-116.64057**
	WWC02	**33.94946**	**-116.64122**
	WWC1	**33.95158**	**-116.64170**
	WWC2	**33.95314**	**-116.64107**
	WWC3	**33.95385**	**-116.64313**
	WWC4	**33.95527**	**-116.64180**
	WWC5	**33.95680**	**-116.64291**
	WWC6	**33.95785**	**-116.64419**
	WWC7	**33.95932**	**-116.64573**
	WWC8	**33.96072**	**-116.64666**
	WWC9	33.96240	-116.64758
	WWC10	33.96397	-116.64849

Site (Code)	Point	N	W
Whitewater Delta (WWD)	**WWD1**	**33.50779**	**-116.05729**
	WWD2	**33.51069**	**-116.06094**
	WWD3	**33.51325**	**-116.06414**
	WWD4	**33.51598**	**-116.06737**
	WWD5	**33.51848**	**-116.07052**
	WWD6	**33.52100**	**-116.07355**
	WWD7	**33.50643**	**-116.05523**
	WWD8	**33.50925**	**-116.05914**
	WWD9	**33.51197**	**-116.06256**
	WWD10	**33.51463**	**-116.06577**
	WWD11	**33.51724**	**-116.06894**
	WWD12	**33.51975**	**-116.07202**
	WWD13	**33.52222**	**-116.07520**
	WWD14	33.52346	-116.07682
The Living Desert (TLD)	n/a	33.70251	-116.37230

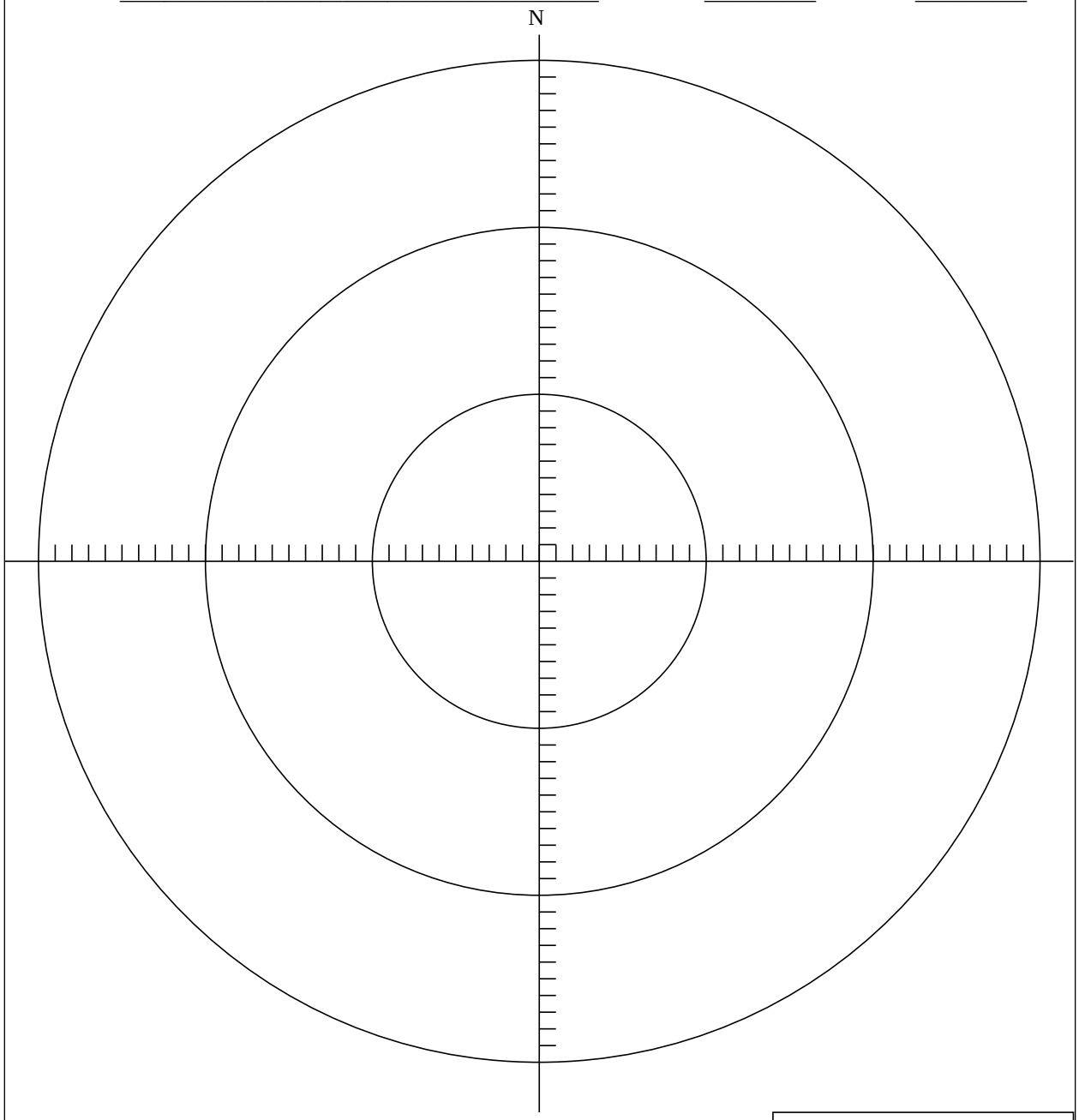
Appendix 2. Point count form used during the 2017 surveys.

Point Count Mapping Form

Site _____ Date _____ Observer _____

Weather _____

Point ID _____ Time Start _____ Time End _____



Super: V=visual, S=song, C=call
Sub: B=before, 1=0-3 min, 2=3-5 min, 3=5-7 min, 4=7-10 min, A=after.
Tick=5m. Rings=50,100,150m.

Notes: _____

_____

Appendix 3. Rapid habitat assessment form used during the 2017 surveys.

RIPARIAN HABITAT RAPID ASSESSMENT FORM

Point ID:_____ Date:_____ Observer: _____

SURFACE WATER	grade (0-3)	Description (distance from point; amount; flowing/standing/surface moisture)

	N	S	E	W
DENSIOMETER READINGS AT POINT (record points NOT occupied by veg); OR PHOTO				

DOMINANT RIPARIAN SPECIES (trees, shrubs >20%)	% total coverage in riparian habitat	Avg. height (m)	Notes/other species:
1)			
2)			
3)			
4)			

DESCRIPTION OF RIPARIAN HABITAT	Apx. total width	Apx. total length	% of 50m circle

HUMAN ACTIVITY	grade (0-3)	Description (recent/old activity; extent; in/near habitat)
trash/litter		
damaged/removed vegetation		
vehicle tracks/presence		
paved roads/structures		
human footprints/presence		
other (describe)		

OTHER DISTURBANCES	grade (0-3)	Description (recent/old damage; extent; in/near habitat)
cattle tracks/presence		
flood damage		
fire damage		
other (describe)		

INVASIVE NON-NATIVES	grade (0-3)	Description (species; extent; in/near habitat)
tamarisk		
arundo		
fountain grass		
other shrubs and trees		
other grasses and herbs		

LANDSCAPE (other habitat types <50m; known habitat types and disturbances 50m-1km; description):

OTHER NOTES:

(grades: 0=absent, 1=low significance or small amount, 2=moderate significance or amount, 3=large significance or amount)

Appendix 4. Nest monitoring form used during the 2017 surveys.

NEST MONITORING FORM

NEST ID | DATE | SITE

SPECIES | METHOD

SUBSTR | APX NEST HEIGHT | APX SUBST HEIGHT

DIRECTIONS/NOTES

SKETCH

Rem to note: apx distance and direction of nest from flagging, flagging height and substrate, coordinates of flagging, nest visibility, how flagging should be approached, draw arrow to nest in sketch, only note contents if know n, alw ays note if adult on nest, flushed, etc.

DATE	TIME	INITS	TTL EGGS	CB	TTL NESTL	CB	ACTIONS, OBSERVATIONS, and NOTES (OK to use multiple lines)

Especially note all evidence of possible depredation or fledging: nest damage, fragments below nest, tracks, distance of FL to nest, #, age of and adult behavior. Also note description/age of nestlings. CB=# cow bird eggs or nestlings out of total. Note if photographs taken.

Appendix 5. Summary of all vertebrate species observed during riparian bird surveys, Coachella Valley, 2017. Species are listed by site and include the 6 target species and incidental observations. Max # is the maximum number observed by one observer in one day.

Species	Common Name	Max #	Notes
CHINO CANYON			
Cathartes aura	Turkey Vulture	1	
Accipiter cooperii	Cooper's Hawk	1	
Buteo jamaicensis	Red-tailed Hawk	1	
Falco peregrinus	Peregrine Falcon	1	
Callipepla californica	California Quail	6	
Zenaida macroura	Mourning Dove	9	
Aeronautes saxatalis	White-throated Swift	1	
Archilochus alexandri	Black-chinned Hummingbird	2	
Calypte anna	Anna's Hummingbird	1	
Calypte costae	Costa's Hummingbird	2	
Picoides nuttallii	Nuttall's Woodpecker	2	nestlings 5/9
Empidonax difficilis	Pacific-slope Flycatcher	1	
Sayornis nigricans	Black Phoebe	1	family group 6/28
Myiarchus cinerascens	Ash-throated Flycatcher	2	
Lanius ludovicianus	Loggerhead Shrike	1	
Vireo bellii	Bell's Vireo	4	fledglings 7/19
Aphelocoma californica	Western Scrub-Jay	1	
Corvus corax	Common Raven	1	
Phainopepla nitens	Phainopepla	2	
Salpinctes obsoletus	Rock Wren	1	
Catherpes mexicanus	Canyon Wren	1	
Thryomanes bewickii	Bewick's Wren	2	
Troglodytes aedon	House Wren	1	
Auriparus flaviceps	Verdin	4	fledglings 6/13
Polioptila caerulea	Blue-gray Gnatcatcher	4	fledglings 5/2, 5/30, 6/13
Polioptila melanura	Black-tailed Gnatcatcher	1	fledglings 6/13
Psaltriparus minimus	Bushtit	20	family group 6/28
Chamaea fasciata	Wrentit	2	fledglings 7/13
Spinus psaltria	Lesser Goldfinch	3	fledglings 5/9, 6/13, 6/13, nest 6/13
Haemorhous mexicanus	House Finch	23	fledglings 5/2, 7/13, 7/19
Melospiza melodia	Song Sparrow	1	
Spizella atrogularis	Black-chinned Sparrow	1	
Chondestes grammacus	Lark Sparrow	1	
Amphispiza bilineata	Black-throated Sparrow	2	fledglings 6/13
Aimophila ruficeps	Rufous-crowned Sparrow	1	

Species	Common Name	Max #	Notes
Pipilo maculatus	Spotted Towhee	1	
Melozone crissalis	California Towhee	4	fledglings 5/30, 6/3, 6/13, 7/13
Setophaga petechia	Yellow Warbler	3	
Cardellina pusilla	Wilson's Warbler	1	
Icteria virens	Yellow-breasted Chat	5	fledglings 6/28
Piranga rubra	Summer Tanager	8	fledglings 7/13
Piranga ludoviciana	Western Tanager	1	
Pheucticus melanocephalus	Black-headed Grosbeak	1	
Passerina amoena	Lazuli Bunting	1	
Icterus cucullatus	Hooded Oriole	6	fledglings 7/13
Canis latrans	coyote	1	
Odocoileus hemionus	mule deer	1	
THE LIVING DESERT			
Ardea alba	Great Egret	1	
Cathartes aura	Turkey Vulture	1	
Zenaida macroura	Mourning Dove	10	
Zenaida asiatica	White-winged Dove	1	
Bubo virginianus	Great Horned Owl	2	
Chordeiles acutipennis	Lesser Nighthawk	2	
Calypte costae	Costa's Hummingbird	6	
Picoides scalaris	Ladder-backed Woodpecker	1	
Vireo bellii	Bell's Vireo	8	fledglings 5/8, 6/29
Corvus corax	Common Raven	10	
Phainopepla nitens	Phainopepla	1	fledglings 5/16
Mimus polyglottos	Northern Mockingbird	1	
Thryomanes bewickii	Bewick's Wren	4	
Auriparus flaviceps	Verdin	6	fledglings 5/16
Passer domesticus	House Sparrow	4	
Spinus psaltria	Lesser Goldfinch	4	
Haemorhous mexicanus	House Finch	10	
Melospiza melodia	Song Sparrow	1	
Geothlypis tolmiei	Macgillivray's Warbler	1	
Piranga ludoviciana	Western Tanager	1	
Pheucticus melanocephalus	Black-headed Grosbeak	1	
Icterus cucullatus	Hooded Oriole	2	
Quiscalus mexicanus	Great-tailed Grackle	2	

Species	Common Name	Max #	Notes
Sceloporus magister	desert spiny lizard	1	
Aspidoscelis tigris	Western whiptail	1	
Sylvilagus audubonii	desert cottontail	1	
WHITEWATER PRESERVE			
Butorides virescens	Green Heron	1	
Buteo lineatus	Red-shouldered Hawk	1	
Buteo jamaicensis	Red-tailed Hawk	1	
Falco sparverius	American Kestrel	1	
Falco peregrinus	Peregrine Falcon	2	nesting on cliff 5/17
Callipepla californica	California Quail	3	
Actitis macularius	Spotted Sandpiper	1	
Zenaida macroura	Mourning Dove	1	
Zenaida asiatica	White-winged Dove	1	
Aeronautes saxatalis	White-throated Swift	4	
Calypte costae	Costa's Hummingbird	6	
Melanerpes formicivorus	Acorn Woodpecker	1	
Picoides nuttallii	Nuttall's Woodpecker	3	
Contopus sordidulus	Western Wood-Pewee	1	
Empidonax traillii	Willow Flycatcher	2	
Empidonax difficilis	Pacific-slope Flycatcher	1	
Sayornis nigricans	Black Phoebe	5	fledglings 7/12
Pyrocephalus rubinus	Vermilion Flycatcher	1	
Myiarchus cinerascens	Ash-throated Flycatcher	4	
Lanius ludovicianus	Loggerhead Shrike	9	fledglings 7/7
Vireo bellii	Bell's Vireo	15	12 territories with fledglings (5/17-7/19), including 2 with double brood
Vireo huttoni	Hutton's Vireo	1	
Corvus corax	Common Raven	8	family group 6/22
Phainopepla nitens	Phainopepla	1	
Sialia mexicana	Western Bluebird	1	
Catharus ustulatus	Swainson's Thrush	1	
Mimus polyglottos	Northern Mockingbird	1	
Toxostoma redivivum	California Thrasher	7	family group 6/22
Salpinctes obsoletus	Rock Wren	2	
Catherpes mexicanus	Canyon Wren	1	
Thryomanes bewickii	Bewick's Wren	8	carrying food 4/13
Troglodytes aedon	House Wren	1	
Polioptila melanura	Black-tailed Gnatcatcher	1	

Species	Common Name	Max #	Notes
Psaltriparus minimus	Bushtit	12	fledglings 5/31, 6/13, 7/12
Stelgidopteryx serripennis	Northern Rough-winged Swallow	1	
Spinus psaltria	Lesser Goldfinch	5	fledglings 5/31, 6/13
Spinus lawrencei	Lawrence's Goldfinch	1	
Haemorhous mexicanus	House Finch	45	fledglings 6/13
Melospiza melodia	Song Sparrow	15	fledglings 5/31, 6/13, 6/21
Chondestes grammacus	Lark Sparrow	2	fledglings 5/31
Amphispiza bilineata	Black-throated Sparrow	1	
Aimophila ruficeps	Rufous-crowned Sparrow	1	
Pipilo maculatus	Spotted Towhee	3	
Melozone crissalis	California Towhee	11	
Setophaga petechia	Yellow Warbler	9	fledglings 6/22, 7/12
Setophaga townsendi	Townsend's Warbler	1	
Geothlypis trichas	Common Yellowthroat	8	fledglings 5/31, 6/13
Cardellina pusilla	Wilson's Warbler	1	
Icteria virens	Yellow-breasted Chat	2	fledglings 7/12
Piranga rubra	Summer Tanager	5	fledglings 7/7, 7/12
Pheucticus melanocephalus	Black-headed Grosbeak	1	
Passerina caerulea	Blue Grosbeak	8	fledglings 5/31, 6/13
Passerina amoena	Lazuli Bunting	1	
Icterus cucullatus	Hooded Oriole	4	
Icterus bullockii	Bullock's Oriole	2	
Pseudacris regilla	Pacific treefrog	1	
Aspidoscelis tigris	Western whiptail	1	
Thamnophis hammondii	Two-striped Gartersnake	1	
Spermophilus beecheyi	California ground squirrel	1	
Sylvilagus audubonii	desert cottontail	1	
WHITEWATER CANYON (BELOW PRESERVE)			
Accipiter cooperii	Cooper's Hawk	1	
Buteo jamaicensis	Red-tailed Hawk	1	
Falco sparverius	American Kestrel	1	
Callipepla californica	California Quail	2	
Zenaida macroura	Mourning Dove	10	
Geococcyx californianus	Greater Roadrunner	1	

Species	Common Name	Max #	Notes
Bubo virginianus	Great Horned Owl	1	
Aeronautes saxatalis	White-throated Swift	1	
Calypte anna	Anna's Hummingbird	1	
Calypte costae	Costa's Hummingbird	8	
Picoides nuttallii	Nuttall's Woodpecker	6	
Contopus sordidulus	Western Wood-Pewee	1	
Empidonax oberholseri	Dusky Flycatcher	1	
Empidonax difficilis	Pacific-slope Flycatcher	1	
Sayornis saya	Say's Phoebe	1	
Sayornis nigricans	Black Phoebe	3	
Myiarchus cinerascens	Ash-throated Flycatcher	7	
Tyrannus verticalis	Western Kingbird	1	
Lanius ludovicianus	Loggerhead Shrike	2	
Vireo bellii	Bell's Vireo	3	fledglings 6/6, 6/21, 7/6
Vireo huttoni	Hutton's Vireo	2	
Vireo gilvus	Warbling Vireo	1	
Aphelocoma californica	Western Scrub-Jay	2	
Corvus corax	Common Raven	2	
Phainopepla nitens	Phainopepla	6	
Mimus polyglottos	Northern Mockingbird	2	
Toxostoma redivivum	California Thrasher	1	
Salpinctes obsoletus	Rock Wren	1	
Thryomanes bewickii	Bewick's Wren	10	
Troglodytes aedon	House Wren	1	
Auriparus flaviceps	Verdin	4	
Polioptila caerulea	Blue-gray Gnatcatcher	1	
Polioptila melanura	Black-tailed Gnatcatcher	2	
Psaltriparus minimus	Bushtit	8	
Stelgidopteryx serripennis	Northern Rough-winged Swallow	1	
Petrochelidon pyrrhonota	Cliff Swallow	1	
Spinus psaltria	Lesser Goldfinch	1	
Haemorhous mexicanus	House Finch	30	
Melospiza melodia	Song Sparrow	3	
Chondestes grammacus	Lark Sparrow	2	
Amphispiza bilineata	Black-throated Sparrow	1	family group 7/12
Aimophila ruficeps	Rufous-crowned Sparrow	1	
Pipilo maculatus	Spotted Towhee	1	
Melozone crissalis	California Towhee	10	
Oreothlypis celata	Orange-crowned Warbler	1	

Species	Common Name	Max #	Notes
Setophaga petechia	Yellow Warbler	2	
Geothlypis trichas	Common Yellowthroat	1	
Cardellina pusilla	Wilson's Warbler	1	
Icteria virens	Yellow-breasted Chat	1	
Piranga rubra	Summer Tanager	3	fledglings 7/6, 7/19
Piranga ludoviciana	Western Tanager	1	
Pheucticus melanocephalus	Black-headed Grosbeak	4	
Passerina caerulea	Blue Grosbeak	6	
Passerina amoena	Lazuli Bunting	1	
Icterus cucullatus	Hooded Oriole	6	
Pseudacris regilla	Pacific treefrog	1	
Odocoileus hemionus	mule deer	1	
Ovis canadensis	bighorn sheep	1	crossed road 7/12
WHITEWATER DELTA			
Podiceps nigricollis	Eared Grebe	30	
Aechmophorus occidentalis	Western Grebe	16	
Phalacrocorax auritus	Double-crested Cormorant	3	
Pelecanus erythrorhynchos	American White Pelican	120	
Pelecanus occidentalis	Brown Pelican	14	
Egretta thula	Snowy egret	6	
Ardea herodias	Great Blue Heron	8	
Ardea alba	Great Egret	5	
Butorides virescens	Green Heron	1	
Nycticorax nycticorax	Black-crowned Night-Heron	5	
Ixobrychus exilis	Least Bittern	1	
Plegadis chihi	White-faced Ibis	1	
Cathartes aura	Turkey Vulture	1	
Oxyura jamaicensis	Ruddy Duck	20	
Anser caerulescens	Snow Goose	1	
Branta bernicla	Brant	1	
Anas strepera	Gadwall	5	
Anas crecca	Green-winged Teal	3	
Anas platyrhynchos	Mallard	10	
Anas clypeata	Northern Shoveler	1	
Pandion haliaetus	Osprey	1	
Accipiter cooperii	Cooper's Hawk	1	
Falco sparverius	American Kestrel	1	

Species	Common Name	Max #	Notes
Falco mexicanus	Prairie Falcon	1	
Callipepla gambelii	Gambel's Quail	50	fledglings 5/1, 6/6, 6/19, 7/12
Gallinula chloropus	Common Moorhen	1	
Fulica americana	American Coot	25	
Numenius phaeopus	Whimbrel	1	
Charadrius vociferus	Killdeer	5	
Charadrius nivosus	Snowy Plover	6	
Himantopus mexicanus	Black-necked Stilt	2	
Recurvirostra americana	American Avocet	1	
Larus californicus	California Gull	10	
Hydroprogne caspia	Caspian Tern	30	
Sterna forsteri	Forster's Tern	15	
Rynchops niger	Black Skimmer	1	
Columba livia	Rock Pigeon	1	
Zenaida macroura	Mourning Dove	30	nest 6/19
Zenaida asiatica	White-winged Dove	8	
Geococcyx californianus	Greater Roadrunner	1	
Chordeiles acutipennis	Lesser Nighthawk	5	
Picoides scalaris	Ladder-backed Woodpecker	1	
Empidonax traillii	Willow Flycatcher	7	
Empidonax difficilis	Pacific-slope Flycatcher	1	
Sayornis saya	Say's Phoebe	1	
Sayornis nigricans	Black Phoebe	8	fledglings 5/1
Myiarchus cinerascens	Ash-throated Flycatcher	1	
Tyrannus verticalis	Western Kingbird	3	
Lanius ludovicianus	Loggerhead Shrike	5	
Vireo cassinii	Cassin's Vireo	1	
Vireo gilvus	Warbling Vireo	1	
Corvus corax	Common Raven	1	
Mimus polyglottos	Northern Mockingbird	1	
Cistothorus palustris	Marsh Wren	1	
Thryomanes bewickii	Bewick's Wren	12	fledglings 5/1
Auriparus flaviceps	Verdin	30	fledglings 6/29, family groups 7/12
Polioptila melanura	Black-tailed Gnatcatcher	12	fledglings 5/1, 6/6, 6/29
Stelgidopteryx serripennis	Northern Rough-winged Swallow	15	nesting in drainage pipe 5/16
Hirundo rustica	Barn Swallow	2	
Petrochelidon pyrrhonota	Cliff Swallow	3	

Species	Common Name	Max #	Notes
Haemorhous mexicanus	House Finch	2	fledglings 5/1
Melospiza melodia	Song Sparrow	45	fledglings 5/1, 6/6, 7/12
Melozone aberti	Abert's Towhee	18	fledglings 5/1, 6/6
Geothlypis trichas	Common Yellowthroat	35	fledglings 5/1, 6/6, feeding cowbird fledgling 6/6
Cardellina pusilla	Wilson's Warbler	1	
Icteria virens	Yellow-breasted Chat	9	8-10 territories including at least 4 pairs, but no evidence of successful nesting
Passerina caerulea	Blue Grosbeak	3	
Passerina amoena	Lazuli Bunting	1	
Icterus cucullatus	Hooded Oriole	1	
Icterus bullockii	Bullock's Oriole	1	
Agelaius phoeniceus	Red-winged Blackbird	1	
Quiscalus mexicanus	Great-tailed Grackle	1	
Molothrus ater	Brown-headed Cowbird	30	fledglings 6/6, 6/19, 6/29
Rana catesbiana	American bullfrog	1	
Apalone sp.	softshell turtle	1	
Sylvilagus audubonii	desert cottontail	1	
DOS PALMAS PRESERVE			
Podilymbus podiceps	Pied-billed Grebe	3	fledglings 5/24
Podiceps nigricollis	Eared Grebe	4	
Phalacrocorax auritus	Double-crested Cormorant	1	
Ardea herodias	Great Blue Heron	2	
Egretta thula	Snowy egret	4	
Ardea alba	Great Egret	1	
Butorides virescens	Green Heron	1	
Nycticorax nycticorax	Black-crowned Night-Heron	1	
Botaurus lentiginosus	American Bittern	1	
Ixobrychus exilis	Least Bittern	1	
Cathartes aura	Turkey Vulture	16	
Oxyura jamaicensis	Ruddy Duck	1	
Pandion haliaetus	Osprey	1	
Falco sparverius	American Kestrel	3	
Rallus crepitans	Clapper Rail	4	
Callipepla gambelii	Gambel's Quail	10	
Rallus limicola	Virginia Rail	1	
Porzana carolina	Sora	1	

Species	Common Name	Max #	Notes
Gallinula chloropus	Common Moorhen	5	fledglings 5/16
Fulica americana	American Coot	1	fledglings 5/24
Tringa melanoleuca	Greater Yellowlegs	1	
Actitis macularius	Spotted Sandpiper	1	
Charadrius vociferus	Killdeer	4	
Himantopus mexicanus	Black-necked Stilt	2	
Columba livia	Rock Pigeon	8	
Streptopelia decaocto	Eurasian Collared-Dove	1	
Zenaida macroura	Mourning Dove	15	nest 7/9
Zenaida asiatica	White-winged Dove	30	
Coccyzus americanus	Yellow-billed Cuckoo	1	dead bird received from caretaker
Megascops kennicottii	Western Screech-Owl	1	
Chordeiles acutipennis	Lesser Nighthawk	24	
Aeronautes saxatalis	White-throated Swift	2	
Calypte anna	Anna's Hummingbird	1	
Calypte costae	Costa's Hummingbird	2	
Megaceryle alcyon	Belted Kingfisher	1	
Picoides scalaris	Ladder-backed Woodpecker	2	feeding young 5/24
Contopus cooperi	Olive-sided Flycatcher	1	
Contopus sordidulus	Western Wood-Pewee	3	
Empidonax traillii	Willow Flycatcher	3	
Empidonax wrightii	Gray Flycatcher	1	
Empidonax difficilis	Pacific-slope Flycatcher	1	
Sayornis saya	Say's Phoebe	1	
Sayornis nigricans	Black Phoebe	3	
Myiarchus cinerascens	Ash-throated Flycatcher	2	
Tyrannus verticalis	Western Kingbird	2	
Lanius ludovicianus	Loggerhead Shrike	6	
Corvus corax	Common Raven	4	
Phainopepla nitens	Phainopepla	8	
Catharus ustulatus	Swainson's Thrush	1	
Sturnus vulgaris	European Starling	1	
Mimus polyglottos	Northern Mockingbird	2	
Toxostoma crissale	Crissal Thrasher	1	
Campylorhynchus brunneicapillus	Cactus Wren	8	feeding young 5/24
Cistothorus palustris	Marsh Wren	6	
Thryomanes bewickii	Bewick's Wren	1	
Auriparus flaviceps	Verdin	12	

Species	Common Name	Max #	Notes
Polioptila melanura	Black-tailed Gnatcatcher	7	
Tachycineta thalassina	Violet-green Swallow	1	
Stelgidopteryx serripennis	Northern Rough-winged Swallow	6	
Petrochelidon pyrrhonota	Cliff Swallow	100	
Spinus psaltria	Lesser Goldfinch	1	
Haemorhous mexicanus	House Finch	8	
Melospiza melodia	Song Sparrow	17	fledglings 5/16, 5/24
Zonotrichia leucophrys	White-crowned Sparrow	1	
Amphispiza bilineata	Black-throated Sparrow	1	
Melozone aberti	Abert's Towhee	7	
Oreothlypis celata	Orange-crowned Warbler	1	
Setophaga coronata	Yellow-rumped Warbler	1	
Setophaga occidentalis	Hermit Warbler	1	
Geothlypis tolmiei	Macgillivray's Warbler	1	
Geothlypis trichas	Common Yellowthroat	40	feeding young 5/24
Cardellina pusilla	Wilson's Warbler	34	
Piranga ludoviciana	Western Tanager	1	
Pheucticus melanocephalus	Black-headed Grosbeak	2	
Passerina caerulea	Blue Grosbeak	1	
Icterus cucullatus	Hooded Oriole	4	
Icterus bullockii	Bullock's Oriole	1	
Xanthocephalus xanthocephalus	Yellow-headed Blackbird	1	
Agelaius phoeniceus	Red-winged Blackbird	1	
Quiscalus mexicanus	Great-tailed Grackle	2	
Molothrus ater	Brown-headed Cowbird	4	
Rana catesbiana	American bullfrog	4	
Uta stansburiana	side-blotched lizard	1	
Canis latrans	coyote	1	
Odocoileus hemionus	mule deer	8	
Procyon lotor	raccoon	1	