

Yellow-billed Cuckoo South Fork Kern River Valley 2015 Annual Report

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Photo: Yellow-billed Cuckoo decoy and speakers (not shown) used to attract birds to mistnets.

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Executive Summary

Following the dramatic loss of riparian forest habitat over the last century, significant declines in the western population of the yellow-billed cuckoo (*Coccyzus americanus*) were observed, with concurrent extirpation from the majority its historic range in the United States (Gaines and Laymon 1984, Hughes 1999, Halterman et al. 2001). In October 2014, the U.S. Fish and Wildlife Service formally recognized the western Yellow-billed Cuckoo as a threatened species under the Endangers Species Act with an estimated population of between 680 to 1,025 pair, with approximately half of the population in the U.S. and half in Mexico. This report details field work conducted in 2015 on the Yellow-billed Cuckoo population in the South Fork Kern River Valley, CA (KRV). The KRV holds the second largest, and one of the few known breeding cuckoo populations remaining in California. Due to limited available resources, 2015 KRV cuckoo research was minimal in scope and relied heavily on the efforts of volunteers. The main objective of this 2015 research was to estimate the local cuckoo occupancy and population size using cuckoo territory estimates and survey detection totals. Estimates and detection totals were derived from four rounds of standardized surveys coupled with additional non-survey cuckoo observations and compared these results to past years' estimates.

Surveys were conducted along 10 transects, four times each, in the riparian habitat of the KRV, from mid-June to early-August, covering approximately 949 ha (2344 ac) of potentially suitable breeding habitat. This included 399 ha (985 ac) of three- to five-year old Gooding's willow dominated habitat that has largely developed during the current four-year drought in the receding Lake Isabella drawdown zone. Surveyors recorded a total of 17 cuckoo detections, including 2 detections made in the new drawdown zone habitat. This is down from 43 total survey detections made in 2014 (Stanek 2014), and 89 detections made in 2012 (Stanek and Stanek 2012). Based on observed cuckoo behaviors and the spatial distribution of detections, we estimated only three cuckoo territories, two of which were confirmed. One from a cuckoo copulation observation (July 19) and the second from observations of a successful nest (July 17-22), where at least one chick fledged. Three cuckoos previously color-banded in the KRV were resighted. In an attempt to mistnet an

identified cuckoo fitted with a geocator in 2012, we instead captured and banded a previously unbanded cuckoo.

Introduction

Yellow-billed Cuckoo History and Biology

Over the last 100 years, the western Yellow-billed Cuckoo (cuckoo) population has declined dramatically following extensive loss of suitable breeding habitat, primarily riparian forests and associated bottomlands dominated by willow (*Salix* spp.), cottonwood (*Populus* spp.), or mesquite (*Prosopis* spp.) (Gaines and Laymon 1984, Laymon and Halterman 1987, Hughes 1999, Halterman et al. 2001). In the United States, extirpations and steady contraction of the cuckoo's breeding range have been documented since the 1920's (Hughes 1999). Once considered a common breeder in California with an estimated 15,000 breeding pair (Hughes 1999), in less than 100 years the Yellow-billed Cuckoo has suffered severe population reductions (Grinnell and Miller 1944) and by 1987 was estimated at 40 pair occupying less than 30 percent of its historical range (Laymon and Halterman 1987, Hughes 1999). California statewide surveys conducted in 1977 (Gaines and Laymon 1984), 1986/1987 (Laymon and Halterman 1987), and 1999 (Halterman et al. 2001) found Yellow-billed Cuckoo populations concentrated mostly along the Sacramento River, the South Fork of the Kern River, and portions of the Lower Colorado River (LCR). The Sacramento River cuckoo population has since declined from 29 cuckoo pairs detected in 1977 to 2 possible territories detected 2012 (8 detections were made in total, but only 2 sites had detections on multiple survey visits, Dettling et al. 2015). On the California side of the Lower Colorado River, in 1999, only 2 cuckoo pair were detected (Halterman 2001). However, restoration habitat planted in stages from 2006 – 2014 at the Palo Verde Ecological Reserve (north of Blythe, CA) by the Bureau of Reclamation Multi-Species Conservation Program has been increasingly successful for cuckoos and in 2014 had 250 total cuckoo detections and 49 confirmed breeding territories (McNeil et al. 2015a). The South Fork Kern River Valley (KRV) holds one of the largest remaining contiguous cottonwood/willow forests in the state of California (Gaines 1977), is part of the designated critical habitat for this species (USFWS 2014a), and has been recognized as a

consistent cuckoo breeding area for over 35 years (Gaines 1977, Schonholtz 1983, Laymon et al. 1997, Henneman 2009). The KRV cuckoo population is currently the second largest in the state, and historically has fluctuated in size between 2 to 24 pair (Laymon et al. 1997, Stanek and Stanek 2012).

In 2001, the United States Fish and Wildlife Service (USFWS) formally recognized the western Yellow-billed Cuckoo population as a separate Distinct Population Segment (DPS) from the eastern cuckoo population, and a candidate for protective listing under the Endangered Species Act (USFWS 2001). In 2002, ESA listing was determined to be warranted but precluded by higher priority listing actions (USFWS 2002). In 2014 the USFWS officially recognized the western Yellow-billed Cuckoo DPS as a threatened species under the Endangered Species Act (USFWS 2014b).

Yellow-billed Cuckoos are among the latest-arriving Neotropical migrants. They arrive on their breeding grounds in Arizona and California by June (Bent 1940, Hughes 1999). During the breeding season they forage primarily on large insects such as grasshoppers, katydids, caterpillars, mantids, and cicadas; but also on tree frogs and small lizards (Bent 1940, Hamilton and Hamilton 1965, Nolan and Thompson 1975, Laymon 1980, Laymon et al. 1997). Nesting usually occurs between late June and late July, but can begin as early as late May (Hughes 1999) and continue until late September (McNeil et al. 2013). Nests consist of a loose platform of twigs, which are built by both sexes and take one to two days to build (Hughes 1999), though occasionally, the nest of another species is used (Jay 1911, Bent 1940, Payne 2005). Cuckoos are facultative brood parasites, and when food resources are plentiful females will raise their own young and may lay eggs in another yellow-billed cuckoo's nests (Nolan and Thompson 1975, Hughes et al. 1999). Clutch size is 1-5 (Payne 2005), though up to 8 eggs have been found in one nest due to more than one female laying in the nest (Bent 1940). Eggs are generally laid daily until clutch completion (Jay 1911), and incubation begins once the first egg is laid, lasting 9-11 days (Potter 1980, 1981; Hughes 1999). Young hatch asynchronously, are fed mostly large insects (Laymon and Halterman 1985, Laymon et al. 1997), and fledge after 5 to 9 days (6 days average). Fledglings may be dependent on adults for at least three weeks (Laymon and Halterman 1985).

Fall migration is thought to begin in late August, with most birds gone by mid-September (Hughes 1999); however, on the Lower Colorado River some individuals appear to begin migrating in early August (McNeil et al. 2011). Recent geolocator data from two cuckoos revealed that these birds had prolonged Fall and Spring migrations and spent the non-breeding season in the Gran Chaco Region of South America (Sechrist et al. 2012, McNeil et al. 2015b).

Chapter 1. Detection/Non-Detection Surveys

Introduction

Long-term monitoring programs focus on the status and trends of species distribution, and can effectively document a species' annual state and changes in their condition through time. Through repeated surveys, the annual status of populations can be assessed by examining within-season distribution, occupancy, and abundance patterns, both spatial and temporal, across the landscape. In 2015, we continued our long-term monitoring of western Yellow-billed Cuckoos (cuckoo) within the KRV to enable an annual status assessment of the species and to identify trends in cuckoo population parameters.

Methods

Study Area and Survey Route Selection

We conducted Yellow-billed Cuckoo surveys along ten survey routes in Kern County, CA in the South Fork Kern River riparian area from Sierra Way west to the lake shore (Map a), covering approximately 949 ha (2344 ac) of potentially suitable breeding habitat. Surveys were not conducted in the Kern River Audubon Preserve habitat upstream (East) of Sierra Way due to limited funding and near absent cuckoo activity observed in previous years (Henneman 2009, Whitfield and Stanek 2011, Stanek and Stanek 2012, Stanek 2014). In the summer of 2015, Lake Isabella was at its lowest levels since 1977, at approximately 6% of capacity (32,558 acre-feet in August 2015/ 568,075 acre-feet pool maximum), which is lower than that depicted in the 2014 aerial image in Map a and Map b. Despite the continued drought (2012 to present), stands of Gooding's Willow (*Salix goodingii*) have emerged and thrived in the historical South Fork Kern River channel as the lake edge recedes (Pictures 1-2). We conducted 2 survey routes within the young habitat (less than 5 years old) and mixed mature and young habitat found in this drawdown zone (Map a). The drawdown zone habitat was surveyed in 2014 (Stanek 2014), though cuckoos were not found to be using this habitat at that time. Note, the maximum full extent of the lake reaches the Audubon property line, but our drawdown zone nomenclature references the habitat west of Patterson Lane and the USFS South Fork Wildlife Area.

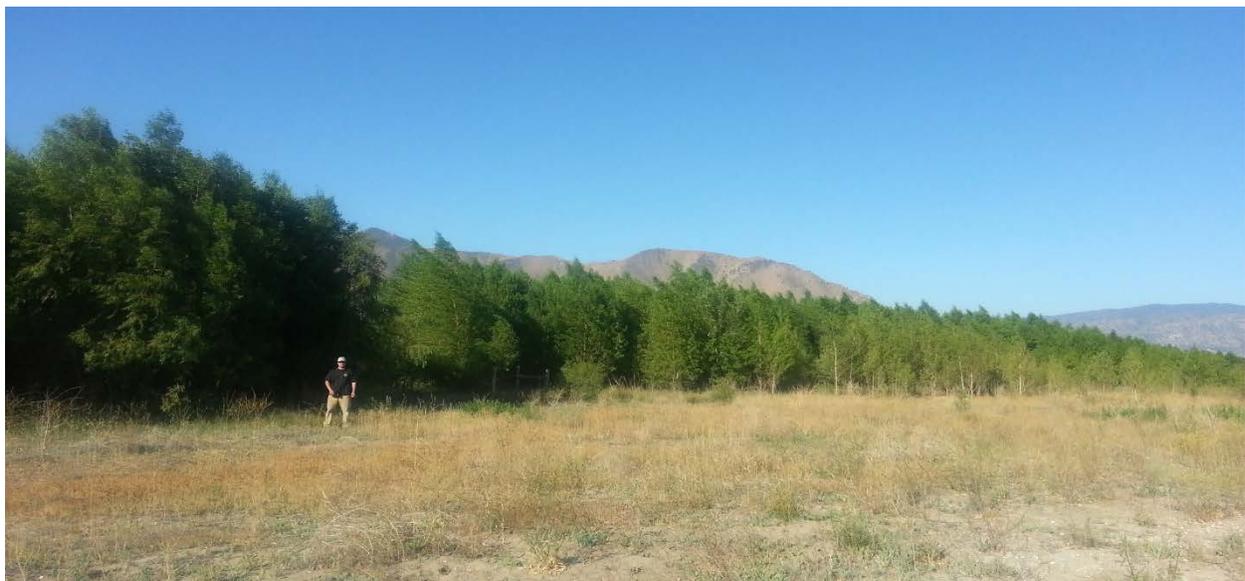
Detection/Non-detection Surveys

Occupancy and cuckoo detection totals were derived from standard detection, non-detection cuckoo surveys and are the standard metrics used to describe cuckoo survey results (Stanek and Stanek 2012, McNeil et al. 2013, Halterman et al. 2015). However, their secretive traits, variable responsiveness, and somewhat transitory behavior lead to a variable and imperfect detection of the species (McNeil et al. 2013) and render survey detection totals to be an imprecise index of abundance. Cuckoos are inherently secretive, avoid detection and call infrequently (Hamilton and Hamilton 1965, Halterman et al. 2015). Their responsiveness to call broadcast surveys appears to vary with their breeding stage (McNeil et al. 2013, SSRS unpublished data). Cuckoo behaviors such as large overlapping home-ranges, polyandry, local movement, and within-season emigration or immigration also adds uncertainty in estimating cuckoo population estimates. In sum, estimating cuckoo abundance from survey data is difficult, and it is possible to both under count or over count the number of cuckoos actually present (Halterman et al. 2015). As a result, cuckoo surveys are best used to estimate cuckoo habitat occupancy rather than cuckoo abundance.

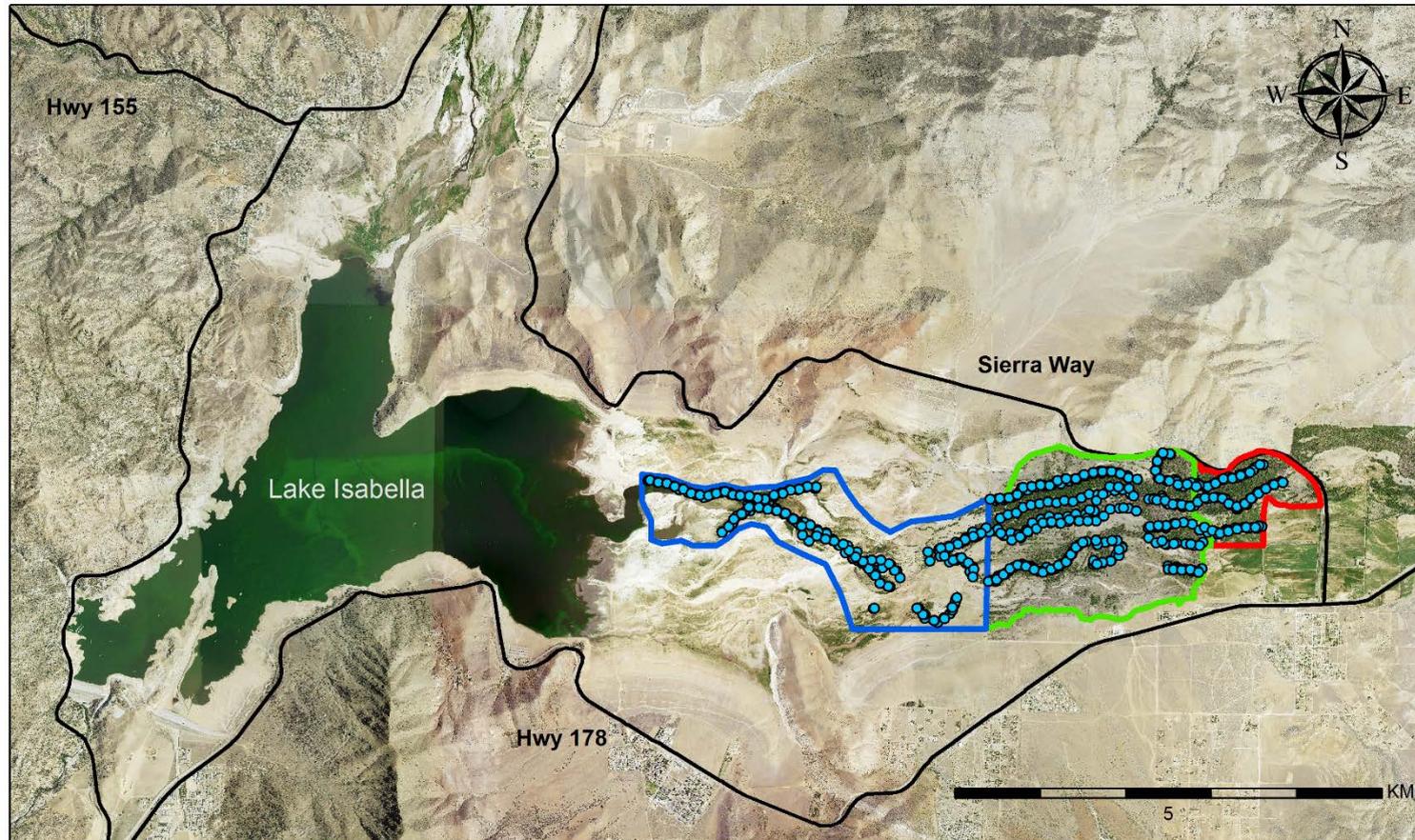
We conducted four rounds of surveys, along 10 survey routes, between June 23th and August 4th following the cuckoo survey protocol (Halterman et al. 2015). On each survey route, one survey was conducted per survey visit and surveys were conducted every 12-14 days (Table 1-1). Cuckoo detection, non-detection surveys were conducted on survey routes along point transects on foot, between sunrise and 10:30 am. Because of the close proximity of some survey routes, adjacent survey routes were surveyed by different observers concurrently, on the same day, at the time, and in the same direction, to minimize the possibility of double-counting the same cuckoo. On these occasions, surveyors used text messages to communicate with each other to avoid conducting call-broadcasts within 300m of a detected cuckoo, and double-counting detected cuckoos. Large habitat patches contained one or more survey transects with parallel transects spaced approximately 250 to 300m apart. Survey points were spaced every 100 m along transects. Half of the transects (5) traversed through the habitat patches, while with the remaining transects were conducted along riparian habitat edges to maintain a 250m buffer from adjacent transects and to take advantage of greater visual detectability from these edges.



Picture 1. New willow (*Salix goodingii*) habitat along the South Fork River channel in the receding Lake Isabella drawdown area. The majority of the habitat was approximately three to eight meters in height and encompasses over 400 ha. In 2012 the photographed area was under water. The photo was taken from the limestone dyke near Robinson Cove.



Picture 2. A closer view of new willow (*Salix goodingii*) habitat along the historic South Fork River channel in the receding USFWS Lake Isabella drawdown area (Picture 1); photo taken June 2015. The riparian habitat ranges from three to eight meters in height.



- Audubon Kern River Preserve
- USFS South Fork Wildlife Area
- USFS drawdown zone

Map a. Yellow-billed Cuckoo survey areas in the South Fork Kern River Valley, Kern Co., California in 2015.

Table 1-1. Survey dates. The Survey Period (column 2) numbering follows the new format established in Halterman et al. 2015 and varies from the previous (pre-2015) Survey Period numbering format that utilized the same dates (column 3), but followed the Survey Visit numbering 1-4 (column 1). In this report, we discuss detection results relative to the Survey Visit to enable easy comparisons with pre-2015 cuckoo reports.

Survey Visit	Survey Period	Dates
1	1	June 15th to June 31
2	2	July 1 to July 15
3	2	July 16 to July 31
4	3	August 1 to August 15

Transects run in 2015 were the same as those conducted in 2014 (Stanek 2014), with two exceptions. We added an additional transect along the South Fork drawdown zone habitat and one USFWS Wildlife Area transect was surveyed only once because the area was no longer deemed suitable for cuckoos (this section of habitat experienced severe tree mortality, presumably induced by the drought). Similar to 2014, Kern River Audubon property east of Sierra Way was not surveyed this year, as it has yielded very few cuckoo detections on surveys in the recent past (Whitfield and Stanek 2011, Stanek and Stanek 2012). Survey points were located using Garmin GPS units and at each point we recorded the UTM location, date, and time.

Upon arriving at a survey point, surveyors listened and watched for cuckoos for one minute. If no cuckoos were detected, surveyors used an mp3 player and handheld speaker to broadcast a five-second yellow-billed cuckoo contact call (the 'kowlp' call) (Hughes 1999) at approximately 70 decibels once per minute for five minutes. A five-second contact call was followed by 55 seconds of active observation and listening. If a cuckoo was detected, call-playbacks were discontinued immediately and all pertinent data was recorded (see below). Following a detection, surveyors progressed along the point transect 300 m from the cuckoo's estimated location to conduct a new call-broadcast survey. This was done to avoid additional disturbance and duplicate detection of the same bird.

For each cuckoo detection, the surveyor recorded the true bearing and estimated distance from the surveyor to the cuckoo, time of detection, response type, behavior, vocalizations, presence of other cuckoos, interactions, and the presence and color combination of leg

bands. Any observed breeding evidence was also recorded, including carrying food or nesting material, copulation, the presence of a juvenile, or a nest. An individual cuckoo visually observed or heard during a survey was recorded as a survey detection. If the same individual cuckoo was detected more than once during a single survey, we recorded only the initial detection as a new survey detection. The repeat detections were also recorded and mapped, but not used in the final cuckoo survey detection summation. In general, cuckoos located >300 m apart during a single survey were counted as separate individuals (Halterman et al. 2015) and therefore separate survey detections. Cuckoos encountered any time other than during a survey were classified as non-survey or incidental detections. Information collected for an incidental detection was the same as that collected for a survey detection.

While surveys are best used to assess cuckoo occupancy, rudimentary cuckoo territory estimation methods, based off spatial and temporal cuckoo detections, have been developed. The estimation methods evolved from Breeding Bird Atlas breeding pair estimation methods (Coreman and Wise-Gervais 2005), have been refined over several years (Holmes et al. 2008, McNeil et al. 2014), and incorporated into the survey protocol (Halterman et al. 2015). Here we calculate cuckoo possible, probable and confirmed (Table 2) territory estimates using survey data coupled with additional non-survey cuckoo observations (follow-up observations) following Halterman et al. (2015).

Table 1-2. Cuckoo territory estimation methods from Halterman et al. (2015).

Term	Definition
Possible breeding territory (PO)	Two or more total detections in an area during two survey visits and at least 10 days apart. For example, within a certain area, one detection made during Survey Period 2 coupled with another cuckoo detection made 10 days later, also during Survey Period 2, warrants a PO territory designation.
Probable breeding territory (PR)	Three or more total detections in an area during at least three survey visits and at least 10 days between each detection. Or PO territory plus YBCUs observed carrying food (single observation), carrying a stick (single observation), traveling as a pair, or exchanging vocalizations.
Confirmed breeding territory (CO)	Observation of copulation, stick carry to nest, carrying food (multiple observations), distraction display, nest, or fledgling.

Results

Survey Detections

Surveys conducted from June 23 to August 4, across 10 survey routes, (Map a), yielded 17 Yellow-billed Cuckoo detections (Map b). Cuckoo detections were concentrated in the USFS South Fork Wildlife Area. In the USFS drawdown zone habitat, one detection was in the vicinity of a 2014 nest location, an area with a mix of young (less than five years old) and more mature (greater than seven years old) willow (*Salix goodingii*) habitat (Table 1-2). The second drawdown zone detection was made in young willow habitat two to three years in age. The Kern River Preserve, USFS South Fork Wildlife Area, and the USFS drawdown zone were all deemed occupied (two or more detections during two survey visits and at least 10 days apart) (Table 1-3).

Table 1-3. Yellow-billed Cuckoo survey detections, 2015

Area	Cuckoos Detected Per Survey Visit				Total Survey Detections
	1	2	3	4	
Audubon Kern River Preserve	0	1	2	0	3
USFS South Fork Wildlife Area	1	2	7	2	12
USFS drawdown zone	1	1	0	0	2
Total	2	4	9	2	17

Cuckoo territory estimates were made using survey and non-survey cuckoo observations. All areas with survey detections were revisited, often repeatedly, to search for cuckoo breeding evidence. Due to lack of funding, follow-up visits were limited. We estimate just three cuckoo territories in the study area for 2015, two confirmed breeding and one probable breeding territory. An estimated confirmed territory at the Audubon Prince Restoration area, was based on a single survey detection, coupled with multiple non-survey cuckoo observations, including an observed copulation (July 19). Following the copulation observation, multiple attempts were made to locate a nest without success. During these post-copulation searches the cuckoo pair was observed foraging together on multiple visits, suggesting that they did not successfully nest. In the USFS South Fork Wildlife Area, a confirmed territory was based on survey detections and nesting observations (see Chapter 3). Lastly, an estimated probable territory was based on multiple survey and non-

survey observations. Multiple visits to this area yielded several vocal exchanges between two cuckoos, but no concrete breeding evidence.

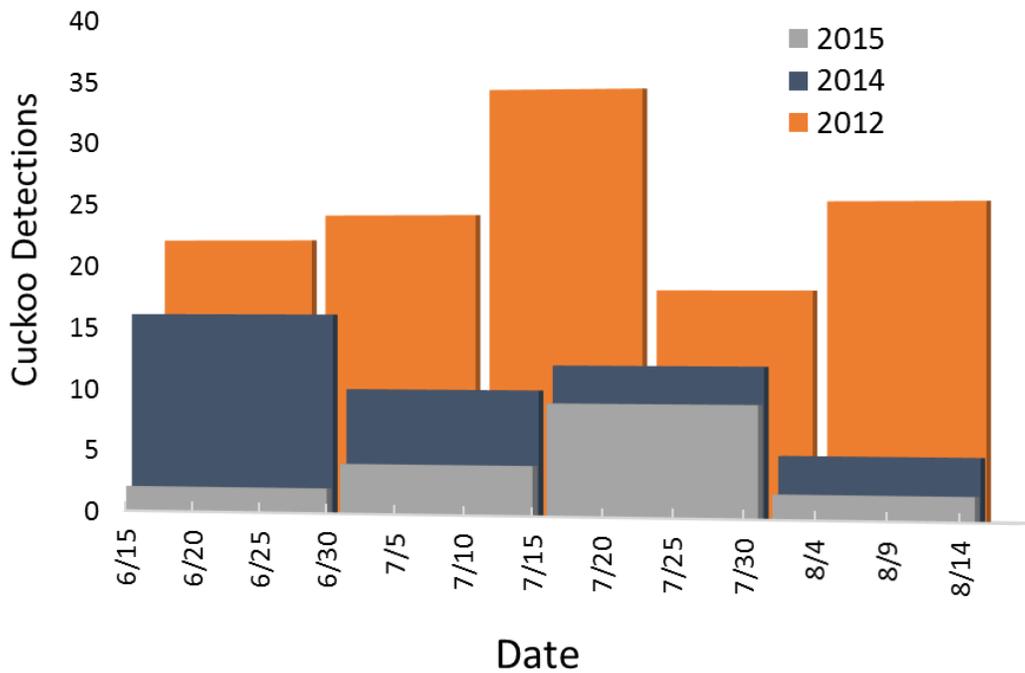
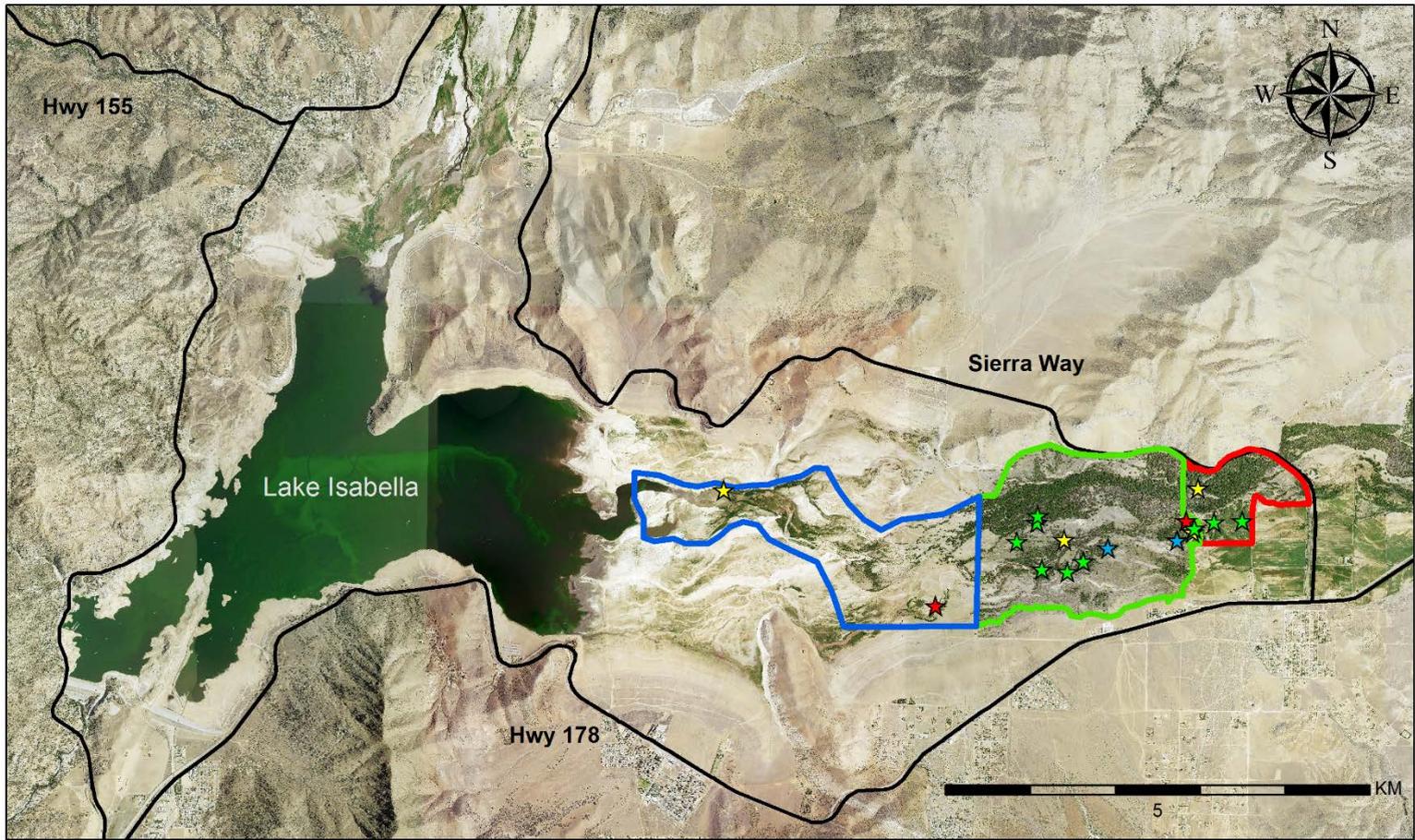


Figure 1-1. 2012 (orange), 2014 (blue), and 2015 (gray) cuckoo detections per survey period displayed. Bar widths indicate the dates of each survey period. In 2012 transects were surveyed five times across five survey periods between June 17th and August 15th. In 2014 and 2015 transects were surveyed four times across four survey visits between June 15th and August 15th. For comparison, 2012 detections made in survey visits 1, 2, 4, & 5, (n=89 detections) were twice those made in the four 2014 survey periods (n=43 detections), and were five times greater than those made during the four surveys in 2015 (n =17 detections).

Discussion

In 2015, cuckoos appeared to have arrived to the Kern River Valley later than usual, similar to that observed in 2013 and 2014 (Stanek 2013, Stanek 2014). No cuckoos were detected in the valley in May and few were detected in June (3 total). The first cuckoo detection for the summer was observed during a Willow Flycatcher (*Empidonax traillii extimus*) survey in the USFS drawdown zone Area on June 16th. Cuckoo survey detections were alarmingly low across all of the surveys, with an unexpected increase during survey visit 3 (Figure 1-1).



Survey Detections

Survey Visit

- ★ 1
- ★ 2
- ★ 3
- ★ 4

- Audubon Kern River Preserve
- USFS South Fork Wildlife Area
- USFS drawdown zone

Map b. Yellow-billed cuckoo survey detections in the Kern River Valley, Kern Co. California, 2015.

In the USFS Lake Isabella drawdown area, along the historic South Fork Kern River channel, surveys were conducted in young, two to four year old, Gooding's Willow stands (Map b, Picture 1, Picture 2). In general, the habitat consisted of tree stands between three and eight meters tall, and varied between five and 100 meters wide. Two cuckoos were detected in this habitat during surveys. Along the Lower Colorado River cuckoos readily use and favor two-year old habitat planted at restoration sites, in particular at the Palo Verde Ecological Reserve (PVER) (McNeil et al. 2013, McNeil et al. 2015). The restoration habitat at PVER is actively irrigated and two year old trees are often between eight to ten meters tall. It is suspected that prey availability is a primary driving forces to cuckoo breeding habitat selection (McNeil et al. 2013) and has been positively correlated with increased cuckoo clutch sizes (Nolan and Thompson 1975). Food resources at PVER are largely unknown, but appear to be abundant because clutch sizes are large, the breeding season is long (May to September), and cuckoos have been documented to double and triple clutch (McNeil et al. 2013) at this location. The prey composition and availability in the new habitat in the KRV Lake drawdown area remains unknown. While the drawdown habitat along the forks of the Kern river are similar in age as that at found at PVER, the similarities end there and the two sites are vastly different in area, height, understory, water, and most likely food availability. Future monitoring of this young KRV habitat will be important to better understand what constitutes suitable cuckoo habitat established under natural conditions.

Overall the cuckoos appear to have arrived late and the extremely low survey detection totals indicate that we had few breeding resident cuckoos this year compared to that observed in 2012 (Stanek and Stanek 2012) (Figure 1-1). With the record-breaking California drought continuing into its fourth year, tree mortality in the study area is high, food resources may have been low, and cuckoos may have stayed in the valley only briefly or did not migrate to the valley at all. The KRV contains the only known, large population of cuckoos in California outside of the growing cuckoo population found at recently restored habitat on the Lower Colorado River (McNeil et al. 2013). Only 25 years ago, the Sacramento Valley cuckoo population was the largest in the state (Laymon and Halterman 1989), but recent monitoring efforts have revealed the population may be on the brink of

local extinction as evident by recent survey results (Dettling et al. 2015). KRV surveys (2012-2015) have documented an estimated local population decline from 13 estimated territories in 2012 (Stanek and Stanek 2012) to 2 in 2015. The current KRV population decline could be a natural fluctuation, possibly caused by the ongoing drought, and not unprecedented (Laymon et al. 1997). However, in context of the century-long range contraction, and apparent recent extirpation from the Sacramento River Valley, the KRV population decline may also be a symptom of the regional western DPS decline.

Chapter 2. Mist Netting, Color Banding, and Resights

Introduction

Yellow-billed Cuckoo breeding populations in the Western United States are restricted to small and isolated riparian habitat fragments comprising less than 1% of the western landscape (Rich 2002). Dispersal of individuals among breeding sites is vital for gene flow and population persistence, but can be significantly impacted by habitat fragmentation and isolation even in birds capable of long-distance flight (Martin et al. 2006; Martín et al. 2008; Ortego et al. 2008). Long-term color banding can provide information on natal and breeding dispersal patterns, as well as other poorly understood key traits such as survivorship, mate and site fidelity, breeding behavior and morphology, and population demography and genetic structure. In 2015, we attempted to re-sight color-banded cuckoos to make behavioral observations, track cuckoo movements, and identify individual's nests. Unfortunately, due to limited resources, mistnetting and banding cuckoos were not research priorities this field season. However, the resighting of a banded KRV cuckoo last observed in 2012 when it was fitted with a geolocator prompted us to open our nets with the remote hope that the bird still carried the geolocator. Attempts to recapture this bird failed, but a previously unbanded cuckoo was captured and banded instead.

Methods

Mistnetting

In general, we attempt to capture adult cuckoos during the breeding season from early July to early-August, and have the greatest success in July when cuckoos are more responsive to call playbacks. To capture a cuckoo, we first we locate responsive cuckoos by broadcasting conspecific vocalizations. Responsive cuckoos were often found while conducting surveys. We then locate a suitable net lane and used a target mist net technique modified from Sogge et al. (2001): we attached three or four stacked mist nets (totaling 7.8 to 10.4 m high) 9m to 18m in length between two canopy poles placed in a vegetation gap with the

immediate canopy of similar height to the net set-up. This type of mistnet set-up is typically used to band bats, but we have found it useful in catching cuckoos because they rarely fly low enough to the ground to use a conventional two meter high mistnet set-up. We secured a live-mounted cuckoos on either side of the nets (new for 2015, cover photo) and placed speakers next to the cuckoo decoys. We then broadcast various recorded cuckoo vocalizations to lure in responsive cuckoos. During each mistnetting attempt we record the number of cuckoos present and which vocalizations elicited a response. If no cuckoos displayed interest in our playbacks after approximately one hour, we took down the nets and moved the set-up to another location.

Color Banding

Captured cuckoos are banded with a federal aluminum band on one leg and on the other leg we secured an aluminum band with a unique pin-striped color combination. Adult cuckoos and nestlings in nests that we can reach are banded in this manner. Non-target captured birds were immediately released without banding. We used a stopped wing rule to measure wing and tail, calipers to measure bill length, and 100 g Pesola® scale to weigh all birds. On adult birds we record additional morphological data such as molt, feather wear, orbital ring color, cloacal protuberance (CP) score (0-3), and brood patch (BP) score (0-5) following MAPS protocols.

Results and Discussion

Mistnetting and Color Banding

We made three mistnetting attempts, July 22, July 23, and July 30 in 2015; one adult cuckoo was captured and color-banded (Table 2-1).

Table 2-1. Yellow-billed Cuckoos banded in the KRV, 2015.

Name	Capture Code	Capture Date	Federal Band #	Color Band Combination¹
Thor	New	7/30/2015	1713-67917	AS/O-Lv-O

¹Band color codes (left/right, top to bottom): AS = Aluminum Silver, O=orange, Lv=lavender. ‘-’ between colors indicates a split band.

Resights

In 2015, in addition to observations of unbanded cuckoos, we observed three previously banded color-banded cuckoos (Table 2-2). All three resighted color-banded cuckoos were detected within 300m of the located 2015 nest (see chapter 3) and elsewhere.

Table 2-2. Yellow-billed Cuckoos re-sighted in the KRV, 2015. All three cuckoos were originally banded in the Kern River Valley.

Name	Federal Band #	Color Band Combination¹	Sex	Year Banded	2015 Dates of Observation
One-fish	1202-68085	R-G-R/AS	Male ²	2013	7/19, 7/23, 7/27
Envy	1202-68082	AS/mB-W-mB	Female ³	2012	7/14, 7/23
Wrath	1202-68077	AS/G-mB-G	Female ³	2012	7/25

¹Band color codes (top to bottom, left/right): AS = Aluminum Silver, G=green, mB=medium blue, R=Red, and W=White. '-' between colors indicates a split band

²Sex assumed based on size and weight when originally banded

³Sex determined by DNA analysis

At the 2015 nest, a male cuckoo named One-fish (Table 2-2), was observed on several occasions feeding caterpillars to the nestlings, and shared brooding duties with a female cuckoo tending to the nest; the banding status of the female parent is unknown.

Wrath, a female, was observed once, approximately 200m from the nest, carrying food while flying in the direction of the 2015 nest. Wrath's relationship to the nest is unknown, but the food carry leaves open the possibility that she may have been the female parent of the nest. Wrath has been observed in the KRV annually since her initial capture in 2012. In that year, she double clutched and had two nests within 150m of the 2015 nest location.

Envy, a female, was observed once at the 2015 nest tree, within three feet of the nest, but was not observed to provide food or tend to the nestlings. After the nestlings hatched, and prior to fledging, Envy was observed approximately 1 km to the west with an unbanded male. The two birds were often observed together, exchanging vocalizations, and the unbanded male was observed flying to Envy with a caterpillar in an apparent (failed) attempt to solicit a copulation (July 23). A geolocator was attached to Envy in 2012 and we made several (failed) attempts to capture her this year. A cuckoo was captured in these mistnetting attempts, Thor; a cuckoo we believe to be Envy's unbanded male suitor.

Envy's relationship to the 2015 nest and nestlings remains unknown. She may have been the female parent of the nest that left to start a second nest once the nestlings had hatched. This is a common strategy of western yellow-billed cuckoo, but no concrete evidence was observed to indicate that she was the nesting female. Conspecific brood parasitism is also a known breeding strategy for cuckoos and SSRS researchers have observed (through telemetry observations and incidental observations) cooing females making visits to known and suspected cuckoo nesting locations (personal observations by SSRS staff John Stanek, Jenna Stanek, and Shannon McNeil). An unpublished Lower Colorado River study examining DNA parentage results of sibling nestlings showed nearly all nestlings shared the same male parent; however, the percent of nestlings related to the brooding female was variable (SSRS Shannon McNeil unpublished data). It is possible that Envy engaged in or tried to engage in intraspecific brood parasitism.

Chapter 3. Nest Searching and Monitoring

Introduction

Population assessments are best defined in terms of the survival and reproductive success of species over other common measurements such as species density (Van Horne 1983). For any species to maintain a healthy population, reproduction needs to be successful. Though our resources were limited, we monitored cuckoo breeding effort through limited nest searching to assess cuckoo breeding activity in the Kern River Valley.

Methods

We used a number of techniques to search for nests during the breeding season. During surveys, we located all detected cuckoos visually if possible, and searched vegetation in the vicinity for nests (following Martin and Geupel 1993). Cuckoos may respond from the nest to broadcast survey calls, and if they are close enough to the surveyor, the nest can be located. We also relied on the fact that nesting pairs share incubation duties (Potter 1980, Hughes 1999) and soon after sunrise, the female replaces the male on the nest, with one or both often vocalizing during the exchange. To observe a nest exchange, before dawn, one or more researchers would wait in the area of a suspected nest; and if a call was given, attempts were made to triangulate the location of the calling bird. Cuckoos may also call prior to arriving at the nest to feed young and a third technique followed localized activity or behavioral clues (e.g. food and stick carries, alarm calls) and directed efforts into these areas until a nest was located. We also performed systematic searches, concentrating on edge and structural transition habitats. Additionally, we used radio telemetry to locate nests (Chapter 4 of this report). We distinguished used cuckoo nests from similar stick nests of other species (such as doves) by the presence of bluish egg fragments remaining in or directly below the nest.

After locating a nest, we recorded the GPS location approximately 10 m from the nest; a more accurate reading was taken after nesting activity ceased. We recorded nest site characteristics such as nest tree species, tree height and nest height, stage, and the banded

status of adults if known. Nests were judged successful if at least one young fledged, which we determined by detecting an adult or fledgling in the vicinity of the nest within two days of the estimated fledge date. Young cuckoos leave the nest before they can fly, thus they climb or hop onto nearby branches where they may remain in close proximity to the nest for several days. Nests were considered failed if they were found damaged or destroyed, with large egg shell fragments or remains, or empty before the earliest possible fledge date with no further activity detected nearby. Nests were considered deserted if intact eggs or chicks were present and no further parental activity was observed.

Results and Discussion

From June 15 to August 1, 2015, we found one nest in the USFS South Fork Wildlife Area (Table 3-1). Nests have been found near this location (within 200 meters) annually since 2012 (Stanek and Stanek 2012, Stanek 2013, Stanek 2014) even though the habitat at this location has changed dramatically during this time frame, becoming increasingly xeric, due to the ongoing drought. Two nestlings were observed in the nest, and one cuckoo fledgling was observed above the nest on July 22. Two cuckoos were observed tending to the nest, with one positively identified as One Fish (Table 2-2), a cuckoo originally banded, as an after-hatch year adult, in the KRV in 2013.

In 2015, we suspect there were very few nesting cuckoos in the study area, and the found nest may have been the only one. We followed-up on the few cuckoo detections made during surveys (Table 1-2); most of which yielded no further cuckoo detections, and in the two areas that did, behavioral observations suggested that the cuckoos were likely not nesting. A single copulation was observed. However, subsequent follow-up visits to this and the surrounding area yielded no indication of nesting and observations of the pair foraging together, indicated that they were not nesting.

Table 3-1. Yellow-billed Cuckoo nests found in the KRV, 2015.

Date Found	Adult 1	Adult 2	Tree Species	# Eggs	1st Egg²	Nest Fate³	Fledge Date
7/11	One Fish	Unknown	Goodding's willow ¹	2	7/05	F1	7/21

¹Tree species: Goodding's willow = *Salix gooddingii*

²Estimated date first egg laid (based on 10 day incubation period and 6 day brooding period).

³Fate: F=fledged (number of observed fledglings).

Overall Conclusions and Recommendations

In California, over the last century the cuckoo population plummeted from 15,000 to approximately 50 pair (Hughes 1999). This decline has progressed despite receiving protective status in 1971 (CA Threatened), 1988 (CA Endangered) and 2014 (Federally Threatened). The species' slow, century-long range contraction appears to have now retracted beyond the Sacramento River Valley, leaving the KRV at the new edge of the species' distribution. Survey results and territory estimates from 2014 and 2015 suggest that the KRV cuckoo population has declined significantly since 2012. While this decline could be a natural population fluctuation similar to that observed in the KRV in the 1980's and 1990's (Laymon 1997), these observations taken in context with the regional breeding range contraction cause concern for the long-term viability of the KRV population. It is imperative that the KRV breeding area be monitored and managed to ensure the local cuckoo population remains stable.

While habitat loss is attributed as a major factor in the species decline, it may not be the primary factor impeding its recovery. In California researchers have noted that apparently suitable habitat is often unoccupied by cuckoos ((Laymon and Halterman 1987, Dettling 2015). In the Sacramento Valley, over the last 30 years, habitat restoration has increased the amount of riparian habitat available while the local population declined (Dettling 2015). Reasons for the cuckoo decline on the Sacramento River and tributaries are unclear, but appear to be unrelated to habitat availability (Dettling 2015). It's likely that factors greater than those acting at the local scale are impacting yellow-billed cuckoos.

At this time the migration routes and wintering locations used by KRV cuckoos are unknown. Western yellow-billed cuckoos spend only 2-3 months on their breeding grounds with the rest of the year spent in a prolonged migration (approximately 2-3 months in the fall, and 2 months in the Spring), and on their wintering grounds in South America (approximately 5 months) (Sechrist et al. 2012, McNeil et al. 2015b). Identifying and protecting migratory stop over habitat is critical for the conservation management of this species, and has been recognized as an area of research need in the federal listing decision (USFWS 2014b).

Reasons for the western yellow-billed cuckoos continued decline are unclear. We strongly recommend that management actions directed to the conservation of the western yellow-billed cuckoo, in the KRV and throughout their U.S. distribution, should prioritize identifying the locations of, and impacts to migratory and winter habitat. Additionally, with apparently suitable habitat remaining unoccupied, we also recommend an examination of the habitat prey base and potential pesticide impacts. Food resource abundance and availability are vital habitat characteristics (for any bird) and has rarely been monitored for cuckoos.

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