

Yellow-billed Cuckoo South Fork Kern River Valley 2013 Annual Report

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Executive Summary

The Western Yellow-billed Cuckoo (*Coccyzus americanus*) is a neotropical migrant that formally bred in riparian regions throughout the western United States (Hughes 1999). However, over the last 100 years wide-spread loss of their preferred cottonwood/willow habitat has resulted in the extirpation of the cuckoo from most of its historic range (Laymon and Halterman 1987, Hughes 1999). In California, cuckoos are now generally restricted to remnant habitat pockets along the Sacramento Valley, the Kern River, and the lower Colorado River with individuals occasionally reported in other areas (Laymon and Halterman 1987). Concern for the species has resulted in interest by state and federal agencies and private conservation organizations to monitor populations and have led to the Western Yellow-billed Cuckoo being listed as: (1) endangered by the California Department of Fish and Game; (2) a Species of Special Concern by the Arizona Game and Fish Department; (3) a sensitive species by the U.S. Forest Service; and (4) a proposed Threatened species for listing under the Federal Endangered Species Act (ESA) by the U.S. Fish and Wildlife Service.

The South Fork Kern River Valley (SFKRV) has been a consistent cuckoo breeding area for over 30 years (Gaines 1977, Schonholtz 1983, Laymon et al. 1997, Henneman 2009), holds one of the largest remaining contiguous cottonwood/willow forests in the state of California (Gaines 1977), and contains one of the largest populations of cuckoos in the state of CA. As such, the SFKRV provides critically important habitat for the Western Yellow-billed Cuckoo and this important breeding area should be studied, monitored, and

managed to ensure that the local cuckoo population remains stable and to expand our understanding of the relationships between cuckoos and their habitat.

Introduction

Yellow-billed Cuckoo History and Biology

Over the last 100 years, western cuckoo population declined dramatically due to 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). Once considered a common breeder in California, by 1940 the Yellow-billed Cuckoo suffered severe population reduction (Grinnell and Miller 1944) and by 1987 was estimated to occupy only 30 percent of its historical range (Laymon and Halterman 1987). 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 were concentrated mostly along the Sacramento River from Red Bluff to Colusa, along the South Fork of the Kern River, and portions of the Lower Colorado River (LCR). Population estimates on the Sacramento and Kern Rivers from the 1999 surveys were similar to those of the 1986/1987 surveys, but lower when compared to the 1977 survey. The Lower Colorado River population appeared to suffer severe declines in the 12 years from the 1986/87 to the 1999 surveys.

In 2001, the United States Fish and Wildlife Service (USFWS) determined that western Yellow-billed Cuckoos represent a Distinct Population Segment (DPS), and as such became a candidate for protective listing under the Endangered Species Act (USFWS 2001). In

2002, the listing was determined to be warranted but precluded by higher priority listing actions (due to limited resources) (USFWS 2002). In 2013 the USFWS formally proposed that the Western DPS be listed as a Threatened Species and protected under the Endangered Species Act (USFWS 2013). Yellow-billed Cuckoos are recognized as state endangered in California (CDFG 1978), a species of special concern in Arizona (AGFD 1988), and a sensitive species on US Forest Service lands within Arizona and New Mexico (USDA 1988).

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). Diet during the breeding season consists primarily of large insects such as grasshoppers, katydids, caterpillars, praying mantids, and cicadas; also 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 and continue until late September (Hughes 1999). 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). 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 and are fed mostly large insects (Laymon and Halterman 1985, Laymon et al. 1997, Halterman et al. 2009) similar to the adult diet. Young fledge after 5 to 9 days (6 days average), but 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). Their non-breeding range is believed to be the western side of the Andes (Hughes 1999), though little information exists on migration routes and non-breeding range in South America where they can be confused with the endemic pearly-breasted cuckoo (*C. euleri*), their closest relative (Payne 2005).

Objectives

SSRS Yellow-billed Cuckoo research in the Kern River Valley was unfunded in 2013 and as a result minimal research was conducted. The objectives of the 2013 cuckoo research were as follows:

- 1) Mistnet and recapture three cuckoos carrying geolocators that were attached to cuckoos captured in 2012.
- 2) Conduct one round of surveys to minimally estimate the level of Yellow-billed Cuckoo occupancy within the South Fork of the Kern River Valley.
- 3) Conduct nest searching and monitoring to better understand reproductive success in the South Fork Kern River Valley.

This report details (1) surveys conducted in the SFKRV riparian areas in late-July using the latest cuckoo survey methods, (2) documentation of nesting success of breeding cuckoos, (3) re-sightings of previously banded cuckoos, and (4) attempts to recapture three cuckoos previously (2012) fitted with geolocators.

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 2013, we continued our long-term monitoring of Yellow-billed Cuckoos (cuckoo) within the SFKRV to enable an annual status assessment of the species and to identify trends in cuckoo population parameters.

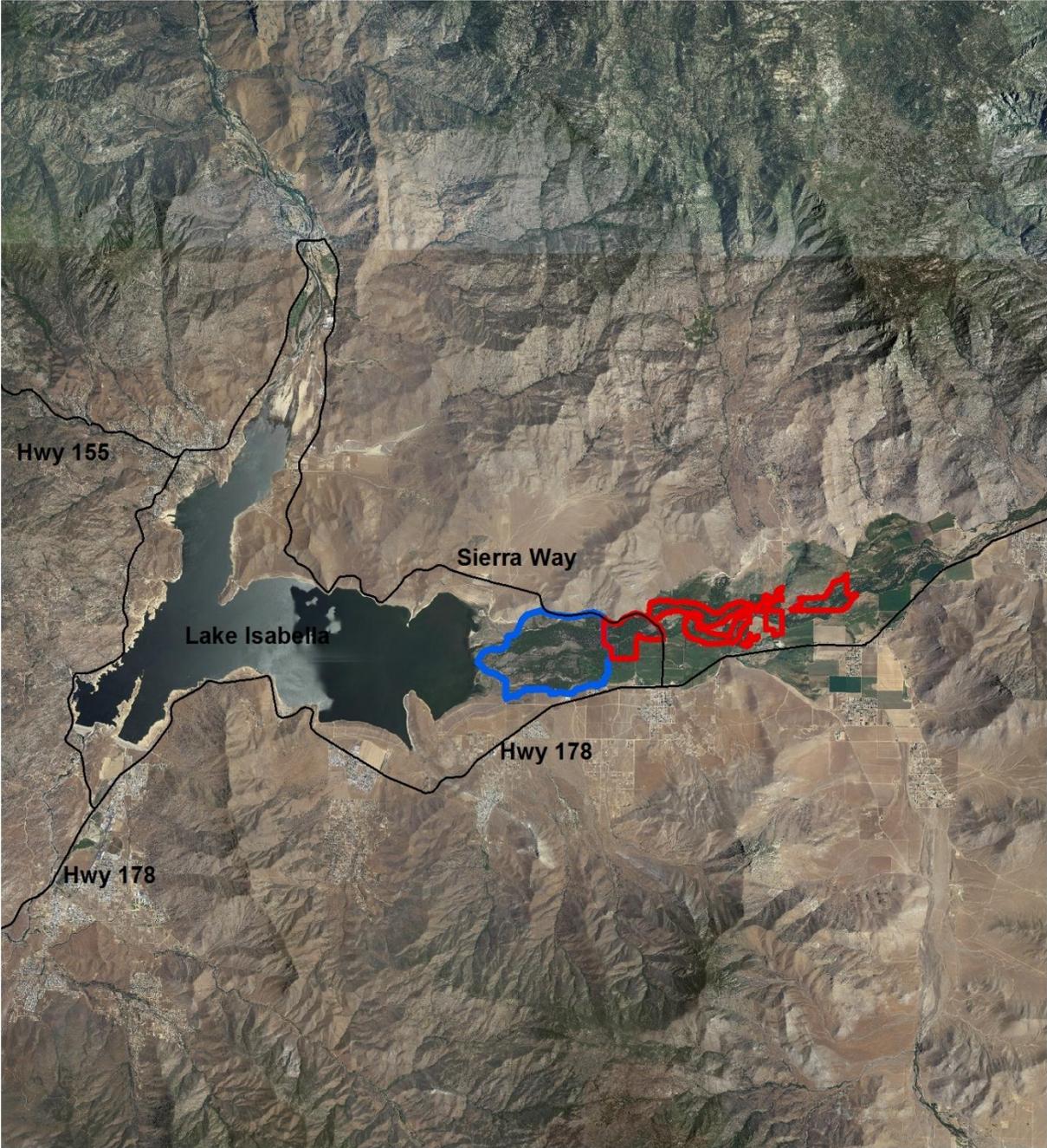
Methods

Study Area and Survey Route Selection

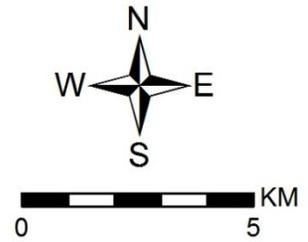
We conducted yellow-billed cuckoo surveys along a 6-river-mile stretch of the South Fork Kern River (Map a). Along this river stretch, all potentially suitable habitat was considered for inclusion. Survey routes were the same as those followed by Stanek and Stanek (2012).

Detection/Non-detection Surveys

The primary survey objective was to assess the detection and non-detection of Yellow-billed Cuckoos in the suitable habitat found within the SFKRV. Cuckoos are inherently secretive, avoid detection and call infrequently (Hamilton and Hamilton, 1965). Their furtive nature coupled with their somewhat transitory behavior lead to imperfect detection of the species (McNeil et al. 2010, 2011). Also, the use of call-broadcasts can attract cuckoos from neighboring habitat into the surveyed habitat. Given these behaviors, the surveys are not designed to determine the absolute number of cuckoos within an area, to solely identify breeding status, or be used to assess small-scale habitat preferences.



- Kern River Preserve
- South Fork Wildlife Area



Map a. Yellow-billed Cuckoo survey areas in the South Fork Kern River Valley, Kern Co., California in 2013.

We conducted one round surveys, along 16 survey routes, between July 15th and July 24th. 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 on the same day by different observers to minimize the possibility of double-counting the same cuckoo. On these occasions, surveyors used radios to communicate with each other to avoid double-counting cuckoos. Each site contained one or more survey transects with parallel transects spaced approximately 250 to 300m apart. Survey points were spaced every 100 m along transects. Most transects traversed through the habitat patches. However, some transects ran along riparian habitat edges to maintain a 250m buffer from adjacent transects and to take advantage of greater visual detectability from these edges. 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. This was done to avoid additional disturbance and duplicate detection of the same bird.

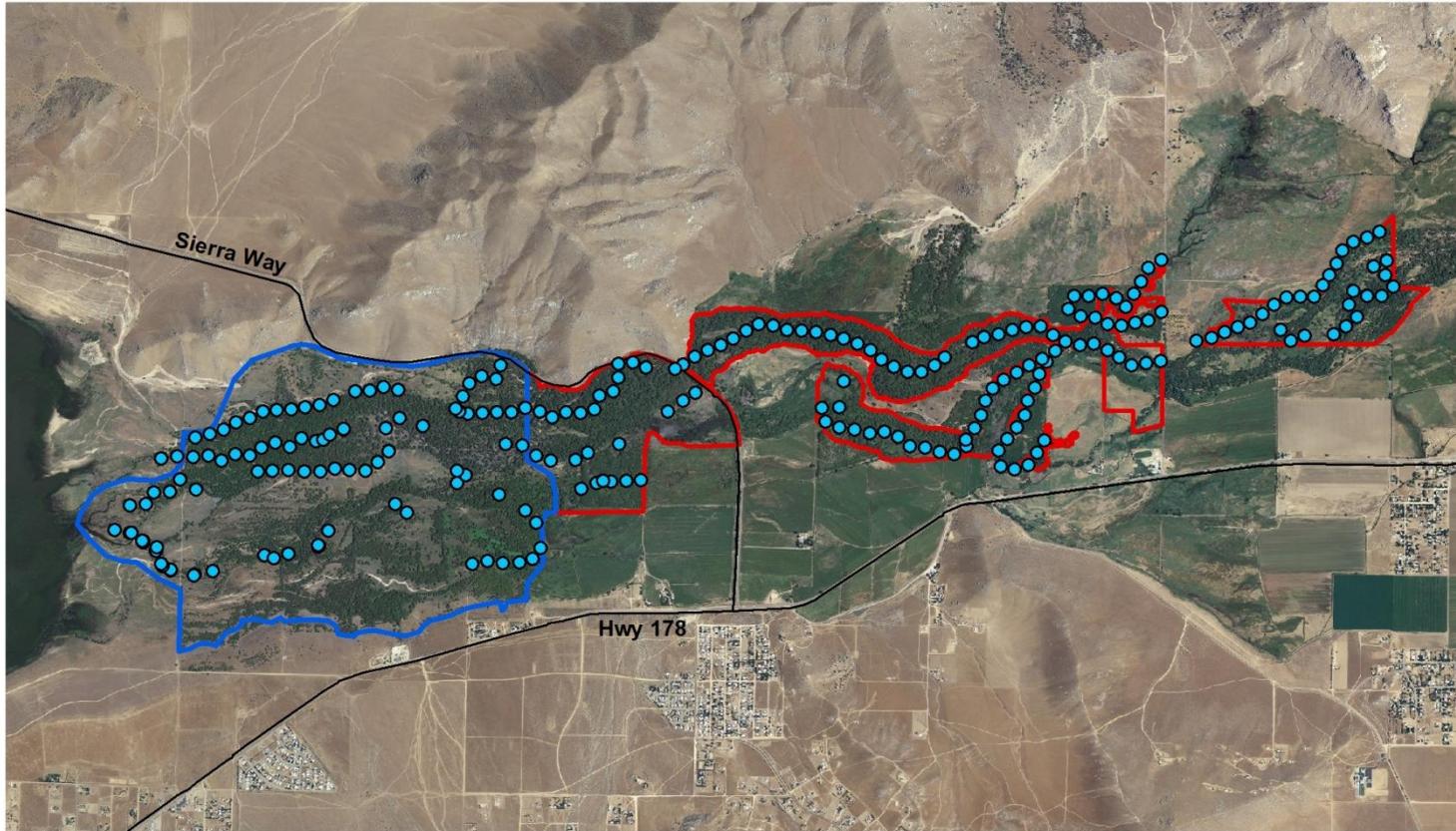
For each cuckoo detection, the surveyor recorded the true bearing and estimated distance from the surveyor to the cuckoo, time of detection, response type, behavior, vocalizations,

presence of other cuckoos, interactions, and the presence and/or 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 record only the initial detection as a new survey detection. The repeat detections are also recorded and mapped, but are not used in the final cuckoo survey detection summation. Cuckoos located >300 m apart during a single survey were counted as separate individuals 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.

Results

Survey Detections

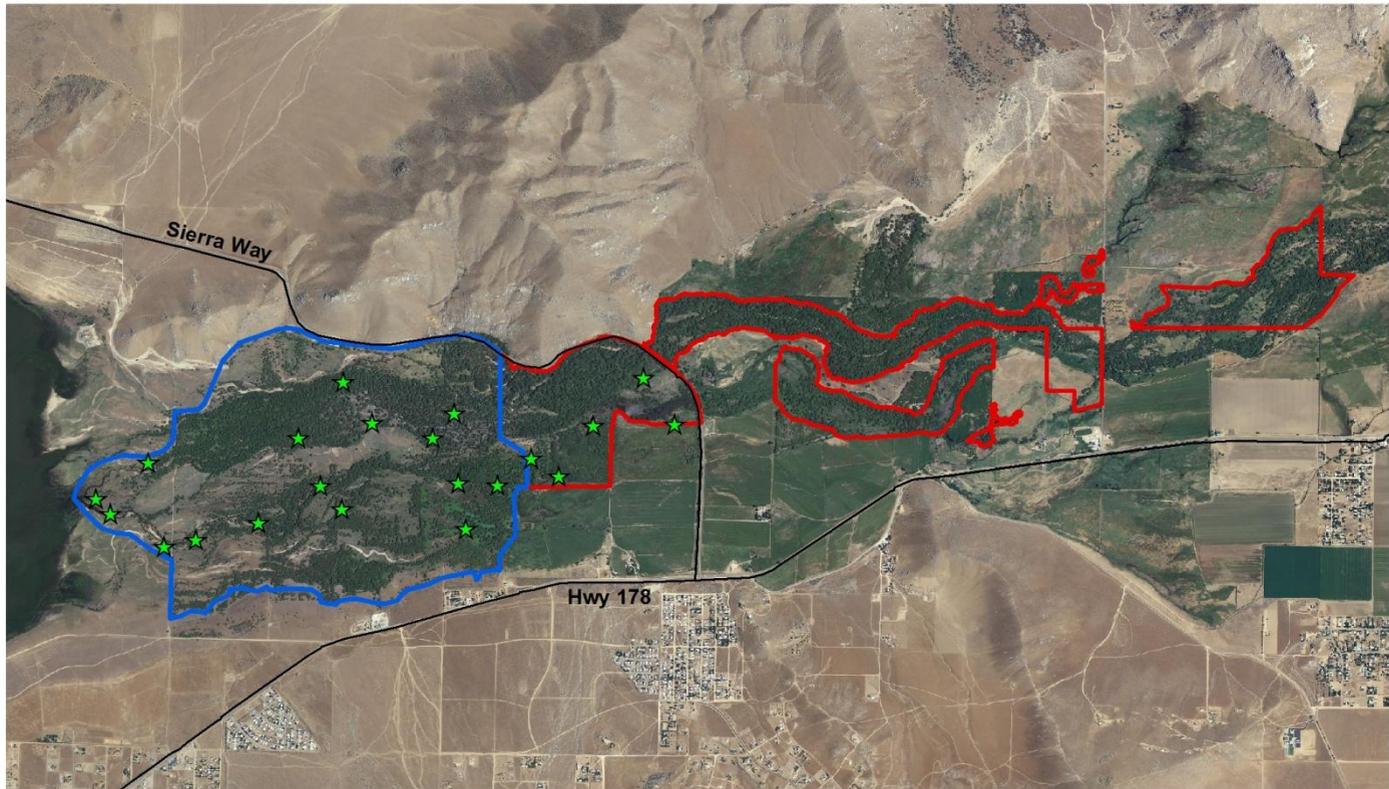
Surveys conducted from July 15 to July 24, across 16 survey routes, (Map b), yielded 21 Yellow-billed Cuckoo detections (Map c). All detections were made west of Sierra Way. Five detections were on the Audubon Kern River Preserve (KRP) and 16 in the USFS South Fork Wildlife Area.



- Survey Point
- ▭ South Fork Wildlife Area
- ▭ Kern River Audubon Preserve



Map b. Yellow-billed cuckoo survey points in the Kern River Valley, Kern Co. California, 2013.



- ★ Cuckoo Detections
- ▭ South Fork Wildlife Area
- ▭ Kern River Audubon Preserve



Map c. Yellow-billed cuckoo survey detections in the Kern River Valley, Kern Co. California, 2013.

Discussion

In 2013, cuckoos appeared to have arrived to the Kern River Valley weeks later than usual. Few cuckoo detections in the valley were reported in May and June. The first cuckoo detection for the summer was observed in the KRP Meadow Fields restoration area on May 28th. This bird was probably just an early migrant passing through. Our next detection came on June 25th during a Willow Flycatcher (*Empidonax traillii extimus*) survey in the South Fork Wildlife Area. Single cuckoo detections were made on June 28th, north of the KOA and on June 30th at the Patterson Lane parking area (Hanning Flat). Cuckoo detections increased slowly during the first two weeks in July.

From July 15th to July 31st (survey period 3), we conducted a round of surveys across Audubon and USFS lands. We had 21 survey detections, which would suggest that the Kern River Valley had (at least) 21 individual cuckoos during this time period. 71% (15/21) of those survey detections were of cooing cuckoos. To compare, in 2012, during survey period 3, we had 34 survey detections (Stanek and Stanek 2012). Of these birds, 64% (22/34) were cooing cuckoos. Between 2012 and 2013 the number of survey period 3 cuckoo detections declined 39%.

Overall the cuckoos appeared to have arrived late this year. Cuckoo activity appeared to have peaked during our surveys and following our surveys fewer cuckoos were reported by field biologists in the area. Cuckoo detectability typically decreases in August (McNeil et al. 2013), but with the drought this year, food resources may have been low and many cuckoos may have departed early from the area.

Chapter 2. Mist Netting, Color Banding, and Re-sights

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 2013, we banded and re-sighted cuckoos, to increase our ability to make behavioral observations, track cuckoo movements, and identify individual's nests. We aimed to recapture 3 geolocators attached to cuckoos banded in 2012. The reclamation of a geocator would have provide us with an invaluable data set cataloging the cuckoos' movements for a full year, from July 2012 to July 2013 which could be used to address questions on cuckoo dispersal and population connectivity.

Methods

Mist Netting

We attempted to capture adult cuckoos during the breeding season from mid-June to late-August. First we located a responsive cuckoo by broadcasting recorded conspecific vocalizations. Responsive cuckoos were often found while conducting presence absence surveys. We then found 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) ranging from 9 to 18 m in length between two canopy poles placed in a vegetation gap of similar canopy height. This type of mist-net set-up is typically used to band bats, but we have found it useful in catching cuckoos because they rarely fly close enough to the ground to use a conventional two meter high mist net set-up. With the nets in place, we then broadcast various recorded cuckoo vocalizations from speakers placed on either side of the net to lure in cuckoos. During each mist netting attempt we recorded number of cuckoos in the area 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

We banded all captured cuckoos with a federal aluminum band on one leg and a pin-striped color aluminum band on the other leg with a unique color combination. Non-target captured birds were immediately released without banding. We used a stopped wing rule to measure wing and tail, calipers to measure tarsus and bill length, and 100 g Pesola® scales or 400 g Acculab digital scales to weigh all birds. We recorded 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. We extracted a small amount of blood from each bird from the brachial artery, and placed the blood sample on PermaCode™ cards and/or in EDTA-treated buffer. To identify the cuckoo's sex, genomic DNA was extracted from the buffered blood or cards using standard Qiagen protocols. Birds were sexed using a PCR-based method following Han, Wang et al. (2009) to amplify sex-specific DNA fragments of the CHD gene located on the avian sex chromosomes (W and Z). Accuracy of the sexing results were verified by using another

molecular sexing method (Fridolfsson and Ellegren, 1999) on 10% of the samples and on six known-sex birds as recommended (Casey et al., 2009; Robertson and Gemmell, 2006).

Results and Discussion

Mist Netting

We made nine mist netting attempts between July 13 and August 15 in 2013, resulting in the capture of three adults. DNA sex results for these three cuckoos are pending.

Color Banding

Of the three mistnetted cuckoos, we color-banded two and one was a recapture of a previously color banded bird (Table 2-1). The recaptured cuckoo, Two Fish, was originally banded by the Point Reyes Bird Observatory (now Point Blue) on the Sacramento River (Dettling 2011, cover photo) on July 29th, 2011! Upon the initial 2011 capture, a radio telemetry transmitter was attached to this cuckoo. The bird was tracked on July 30th, but was not found on July 31st or thereafter and presumably had departed from the Sacramento study site (Dettling.

Table 2-1. Yellow-billed Cuckoos banded in the SFKRV, 2013.

ID	Capture Code	Capture Date	Name	Federal Band #	Color Band Combination¹
1	New	7/20/2013	The Grinch	1202-68084	AS/IB-R-IB
2	New	7/21/2013	One Fish	1202-68085	R-G-R/AS
3	Recapture	7/13/2013	Two Fish	0742-44824	Y, AS/G, Y

¹Band color codes (top to bottom, left/right): AS = Aluminum Silver, IB=light blue, R=red, G=green and Y=yellow. ‘-’ between colors indicates a split band. ‘,’ between colors indicates separate bands.

Re-sights

In 2013 we re-sighted three color-banded cuckoos. Two re-sighted cuckoos were originally banded in the Kern River Valley in 2012 (Stanek and Stanek 2012). Of these, one was banded as a nestling in 2012 (Sloth, Band # 1202-68084). In 2013, this bird was observed nesting in the USFS South Fork wildlife area and successfully fledged one chick (see chapter 3). The other re-sighted SFKRV banded cuckoo, Wrath (Band # 1202-68085), was banded as an adult in 2012. Wrath was initially observed (7/5) in its former 2012 territory at the east end of the USFS South Fork Wildlife Area. She was later observed (7/31) with another adult cuckoo at the far west end of the Wildlife Area approximately 2.2 km away from the initial 7/5 observation. The third re-sighted banded cuckoo was caught in a mistnet in the western portion of the USFS South Fork wildlife area and was a recapture of a cuckoo originally banded in 2011 by the Point Reyes Bird Observatory (now Point Blue) on the Sacramento River (Dettling 2011, cover photo)! This is the first SSRS capture or re-sight of a cuckoo not originally banded by SSRS. This Sacramento cuckoo (Two Fish, Band # 0742-44824) was observed with another adult cuckoo on July 24th and July 30th.

Table 2-2. Yellow-billed Cuckoos re-sighted in the SFKRV, 2013.

Name	Federal Band #	Color Band Combination¹	Sex	Dates of Observation
Sloth	1713-67916	G-R-G/AS	Female ²	7/29, 8/02, 8/05, 8/13
Wrath	1202-68077	AS/G-mB-G	Female ³	7/5, 7/31
Two Fish	0742-44824	Y, AS/G, Y	Female ⁴	7/13, 7/24, 7/30

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

²Sex estimated to be female based on brooding behavior. Cuckoo was not observed brooding overnight on nest, which is a male behavior.

³Sex determined by DNA analysis.

⁴Sex unknown, but estimated to be female based on large size and mass.

Chapter 3. Nest Searching and Monitoring

Introduction

Population assessments are best defined in terms of the survival and reproductive success (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 comprehensive nest searching in an effort monitor cuckoo breeding status in the Kern River.

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, Halterman et al. 2009) 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. If possible, we used a video camera attached to a telescoping pole to monitor nests every 2-5 days. Nestlings were banded at 3-6 days when accessible (Chapter 24 of this report). 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

Between July 15 and August 15, 2013, we found one Yellow-billed Cuckoo nest (Table 3-1). The located nest was found in the eastern portion of the SFWA, near the Audubon KRP boundary. This same territory was also active in 2012, but was occupied by a different female (Wrath) in 2012 (Stanek and Stanek 2012).

Table 3-1. Yellow-billed Cuckoo nests found in the SFKRV, 2013.

Nest	Date Found	Adult 1	Adult 2	Tree Species	# Eggs	1st Egg ²	Nest Fate ³	Fledge Date
PF-N1-13	7/24	Sloth	Unbanded	Goodding's willow ¹	?	7/19	F1	8/03

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 known fledglings).

The 2013 nest was found in close proximity, within 50m, of a successful 2012 nest. It was located in a dense mistletoe growth, 16 meters up a 23 meter Gooddings Willow (*Salix gooddingii*) tree. Based on a 10 day incubation period and a 6 day brooding period, we estimate that the first egg was laid on July 19th. On August 5th a single juvenile cuckoo (estimated to be 8 days old) was heard and seen calling frequently 15 meters from the nest. No other juveniles were seen or heard.

Acknowledgements

We thank Reed Tollefson and Sean Rowe of Audubon California's Kern River Preserve for logistical support and assistance in coordinating research efforts. We also thank our 2013 SSRS field crew, staff and volunteers for committing their time to collect this data.

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