THE YELLOW-BILLED CUCKOO IN NORTHWESTERN CALIFORNIA

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ABSTRACT: Prior to 2000, the Yellow-billed Cuckoo (*Coccyzus americanus*) had been recorded in northwestern California (defined here as Humboldt, Del Norte, Trinity, northern Mendocino, and western Siskiyou counties) on six occasions, all in Humboldt County. To better understand the species' status within this region, we surveyed for it during the breeding season in 20 of the 24 years from 2000 to 2023, primarily along the lower Eel River in Humboldt County and in suitable habitat elsewhere in Humboldt and Del Norte counties. We found the species to occur more frequently than previously known, detecting 1–3 individuals in 9 of the survey's 20 years. Also, we evaluated the 23 incidental Yellow-billed Cuckoo observations during the same period; these include the first known records for Del Norte County. Most detections were within riparian scrub or riparian forest dominated by willows (*Salix* spp.) and Red Alders (*Alnus rubra*), often with scattered Black Cottonwoods (*Populus trichocarpa*). Although no nests have been confirmed to date, observations imply occasional breeding in Humboldt County.

The distribution of the Yellow-billed Cuckoo in western North America has contracted substantially over the past century, largely as a result of the loss and degradation of riparian habitats (Hughes 2015). As a result of a decline in both numbers and range, in 2014 the species' western population was classified as threatened under the United States' Endangered Species Act (U.S. Fish and Wildlife Service 2014). The state of California classified the cuckoo as threatened in 1971 and as endangered in 1988 under the California Endangered Species Act (CNDDB 2024).

The cuckoo is a neotropical migrant, breeding in North America and wintering in South America (Hughes 2015). Its breeding range formerly extended from Mexico north to western Washington and southwestern British Columbia (American Ornithologists' Union 1998, Hughes 2015) but was not known to include northwestern California (Bent 1940, Grinnell and Miller 1944, Hughes 2015). Grinnell and Miller (1944) described its distribution in California as including the larger valleys west of the Sierra Nevada, notably the Sacramento and San Joaquin valleys, and extending along the coast from San Diego County north to Sonoma County; they also listed scattered records east of the Sierra Nevada from the Colorado River north to Modoc County. In northern California, the species historically occurred at scattered locations from Sebastopol, Sonoma County, northeast to eastern Siskiyou County and Modoc County (Bent 1940, Grinnell and Miller 1944, Hughes 2015). The cuckoo was formerly common in riparian habitat along the Sacramento River (Gaines and Laymon 1984, Hughes 2015), where a small population persisted through 2000 (Gaines 1974, Halterman et al. 2001) but recent surveys, including in 2022, indicate a marked decline (Dettling et al. 2015, N. Clipperton pers. comm.).

In western North America, nesting is strongly associated with relatively large patches of lower-elevation riparian woodland dominated by willows (*Sa-*

lix spp.) and cottonwoods (*Populus* spp.) with a dense understory (Grinnell and Miller 1944, Hughes 2015, Stanek et al. 2021). Currently, cuckoos begin to arrive at western breeding areas from mid- to late May and nest primarily from mid-July to early August (Bent 1940, Gaines 1974, Hughes 2015).

No breeding has been recorded in northwestern California, and prior to 2000 there were few records there of any kind. Harris (1996, 2006) summarized the avifauna of northwestern California, which he defined as Del Norte, Humboldt, and Trinity counties, plus the northern half of Mendocino County (north of Highway 20 between Fort Bragg and Willits and north of a line from Willits east to Mount Sanhedrin and Hull Mountain) and western half of Siskiyou County (west of a line following Interstate 5 from Hornbrook to Gazelle, then southwest to the northernmost tip of Trinity County). We use the same definition here. Harris listed six records, all from Humboldt County, from 1947 to 1993 (Table 1). From 1995 to 1999, 1 February to 30 September each year, no cuckoos were detected during field work for the Humboldt County breeding bird atlas (Hunter et al. 2005). We are unaware of any pre-2000 records within the study area outside of Humboldt County (Harris 2006, Barron 2007).

STUDY SITES AND METHODS

Study Sites

Our survey focused on relatively wide riparian areas within alluvial floodplains and excluded narrow riparian areas along streams in rugged terrain. We identified potential cuckoo habitat through inspection of aerial imagery, on-the-ground reconnaissance, and knowledge of the region. Attributes identifying potential habitat included blocks or closely associated patches of riparian habitat of at least several hectares.

Vegetation in survey areas was dominated by a mix of native deciduous trees and shrubs of varying proportions and age classes. The overstory, when present, was typically dominated by willows (mainly *Salix lasiandra*, *S. lasiolepis*, and *S. sitchensis*), interspersed to varying degrees with Black Cottonwood, Red Alder, and occasional Sitka Spruce (*Picea sitchensis*). In more mature riparian habitat, Pacific willow (*S. lasiandra*) and Black Cottonwood reached heights of 20 m, over a mid-story stratum between 5 and 8 m in height that was composed mostly of the aforementioned willow species. The understory was frequently dense and nearly impenetrable, often dominated by California Blackberry (*Rubus ursinus*) or Himalayan Blackberry (*R. armeniacus*) brambles, with other plants including Twinberry (*Lonicera involucrata*), Stinging Nettle (*Urtica dioica*), currants (*Ribes* spp.), and saplings of overstory species. Gravel and sand bars near active river channels often supported patches of other, less arborescent willows (including *S. scouleriana* and *S. exigua*), as well as saplings of overstory species.

We focused most of our effort on the lower Eel River downstream of Rio Dell (Figures 1 and 2), where the gradient is low and the channel has meandered over time, creating dynamic and complex habitats, with islands and past channels interspersed with recently scoured areas with new riparian vegetation. In some areas levees, berms, and rock revetment now constrain

Table 1 Yellow-billed Cuckoo Records from Northwestern California[a]

Type[b]	Date	Location	Latitude[c]	Longitude[c]	Observers	Observations and notes[d]
I	13 Jul 1947	N. spit of Humboldt Bay	40.7771	–124.2099	B. Anderson	Heard only, "calling repeatedly"
I	24 May 1958	Ferndale, Eel R.	40.5936	–124.2610	C. Crane	Single bird
I	9 Nov 1963	Arcata	40.8688	–124.0877	E. Taylor	Bird found dead
I	2 Sep 1975	Prairie Creek Redwoods State Park	41.2870	–124.0785	D. Winkler, P. Brown	Single bird seen
I	4 Jun 1992	Lanphere Dunes	40.8901	–124.1417	C. J. Ralph	Mist-netted bird with brood patch
I	27 May 1993	Rohnerville, near Eel R.	40.5566	–124.1060	W. and I. Crane	Seen and heard
S	25 Jun 2000	Cock Robin Island	40.6331	–124.2741	G. Falxa	Seen and heard (*kowlp*)
S	4 Jul 2000	Loleta Oxbow, Eel R.	40.6265	–124.2367	G. Falxa	Heard only (*coo*)
I	1 Jul 2001	Singley Bar, Eel R.	40.6162	–124.2350	S. McAllister, et al.	Seen and heard, first of multiple detections through 6 July
I	5 Jul 2002	Singley Bar, Eel R.	40.6173	–124.2221	S. McAllister	Heard only
S	23 Jul 2002	Cock Robin Island	40.6293	–124.2743	G. Falxa	Seen and heard (*coo*)
I	29 May 2003	Warswick Bar, Eel R.	40.6047	–124.1810	S. McAllister	Heard (*kowlp*)
I	24 Jun 2003	Holmes Flat, Eel R.	40.4135	–123.9318	T. McKee, G. Frankfurter	Seen and heard
I	6 Jun 2005	Sandy Prairie, Eel R.	40.5804	–124.1617	S. McAllister	Seen and heard; recorded
I	19 Jun 2005	Arcata Marsh Project	40.8604	–124.0907	E. Elias, G. Ziegler	Seen and heard; photos
S	6 Jul 2005	Sandy Prairie, Eel R.	40.5895	–124.1783	J. Tietz	Heard *kowlp* repeatedly; accounted for in the 6 June record
I	2 Jun 2006	Cock Robin Island	40.6342	–124.2815	L. Lawrence, J. Ceriani, et al.	First of multiple records Jun–Jul at this location; accounted for in the 9 Jul survey detection
I	12 Jun 2006	Arcata Marsh Project	40.8604	–124.0907	Multiple	Seen and heard
S	9 Jul 2006	Cock Robin Island	40.6353	–124.2815	E. Elias	2 adults heard at the same time, described as countersinging
I	5 Aug 2006	Cock Robin Island	40.6336	–124.2816	C. Rognan	3 birds heard, 2 observed; counted as a single incidental; 2 accounted for in the 9 July survey
S	14–15 Jul 2007	Cock Robin Island	40.6336	–124.2856	E. Elias	Adult seen and heard (*kowlp*)

Type[b]	Date	Location	Latitude[c]	Longitude[c]	Observers	Observations and notes[d]
S	25 Jul 2007	Cock Robin Island	40.6339	–124.2861	S. McAllister	Juvenile's call heard on follow-up visit
S	11–19 Jul 2008	Cock Robin Island	40.6320	–124.2869	S. McAllister, D. Coldren	2 adults observed on 19 Jul
S	19 Jul 2008	Cock Robin Island	40.6239	–124.2831	S. McAllister, K. Ross	2 adults plus apparent fledgling
S	12 Jul 2010	Cock Robin Island	40.6239	–124.2830	Kerry Ross	Adult seen and heard (*kowlp*); counted as one of 2 adults observed on 17 July
S	17 Jul 2010	Cock Robin Island	40.6321	–124.2903	K. Ross, G. Falxa, S. McAllister	Multiple detections, 2 adults seen and heard (*kowlp*)
I	23 Jul 2010	Singley Tract, Eel R.	40.6145	–124.2284	S. Peterson	Heard only
I	9 Jul 2012	Cock Robin Island	40.6381	–124.2836	T. Leskiw	Heard only
I	31 May 2013	Salt River, lower Eel R.	40.6199	–124.3167	S. McAllister	Heard only, 2 *knocker* calls; counted as one of 2 Salt River individuals in 2013
S	8 Jul 2013	Salt River, Lower Eel R.	40.6006	–124.3005	S. Scott, B. Lovelace	Survey detection of single bird; many subsequent incidental observations.
I	13 Jul 2013	Salt River, Lower Eel R.	40.5951	–124.2747	Many	2 individuals heard and seen. One of many Salt River observations in 2013, collectively counted as 2 individuals
I	3–4 Jun 2015	Smith River, downstream of Hwy. 101, Del Norte Co.	41.8927	–124.1536	T. Kurz, C. Ryan, et al.	Seen and heard; photos
I	27 Jul–4 Aug 2015	Arcata Marsh Project	40.8622	–124.0930	A. Lamb et al.	Seen and heard (*coo*)
I	4 Aug 2017	Cock Robin Island	40.6299	–124.2793	D. Barton	Multiple observers heard *kowlp*
I	24 Jun 2020	Klamath Glen boat ramp, Klamath River, Del Norte Co.	41.5159	–124.0004	L. Brug	Heard only; single *kowlp*
S	6 Jul 2023	Cock Robin Island	40.6307	–124.2826	G. Schmidt	Heard only (series of *coo* calls)

[a]Detections are from Humboldt County and represent single birds unless otherwise noted.

[b]S, detection on a survey; I, incidental detection.

[c]Coordinates estimated where not provided, as was the case for most incidental detections.

[d]Vocalization types, where noted, are as described by Hughes (2015).

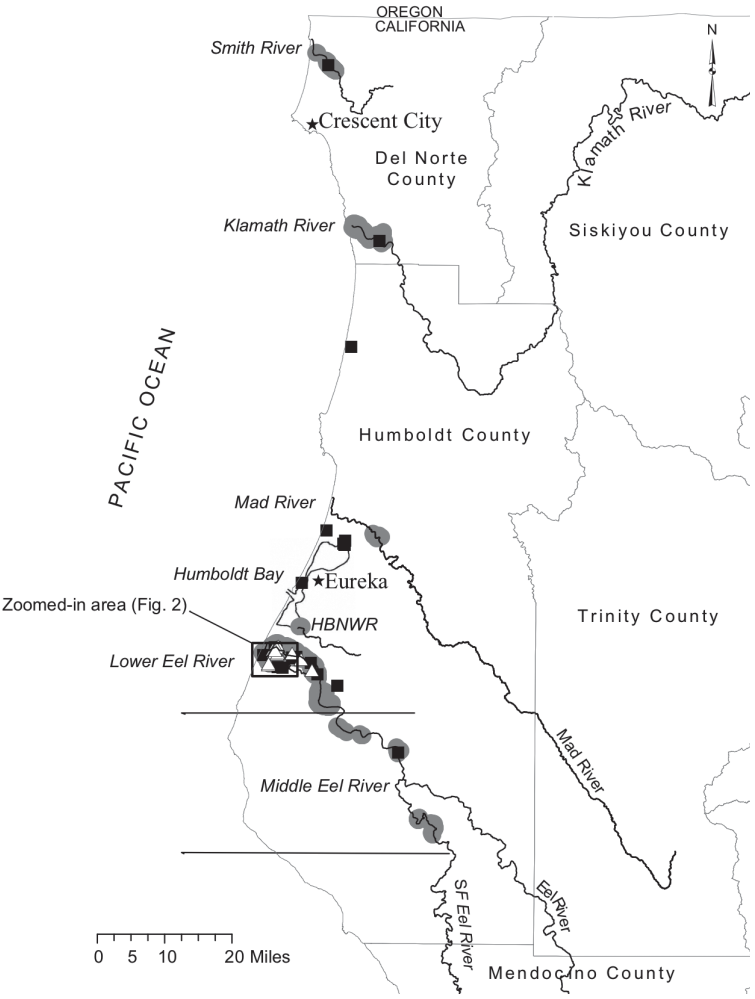

FIGURE 1. Areas surveyed (shaded gray) and records of the Yellow-billed Cuckoo northwest California, 1947–2023. (△), detections on surveys; (■), incidental observations; HBNWR, Humboldt Bay National Wildlife Refuge.

the channel, but elsewhere, as at and near Cock Robin Island, the river remains dynamic with shifting channels and corresponding habitat diversity (Figure 2).

Focused Surveys

Surveys took place from 2000 to 2010, in 2012, 2013, 2016, and 2017, and from 2019 to 2023 (Figure 1, Table 2). They were exploratory, designed to

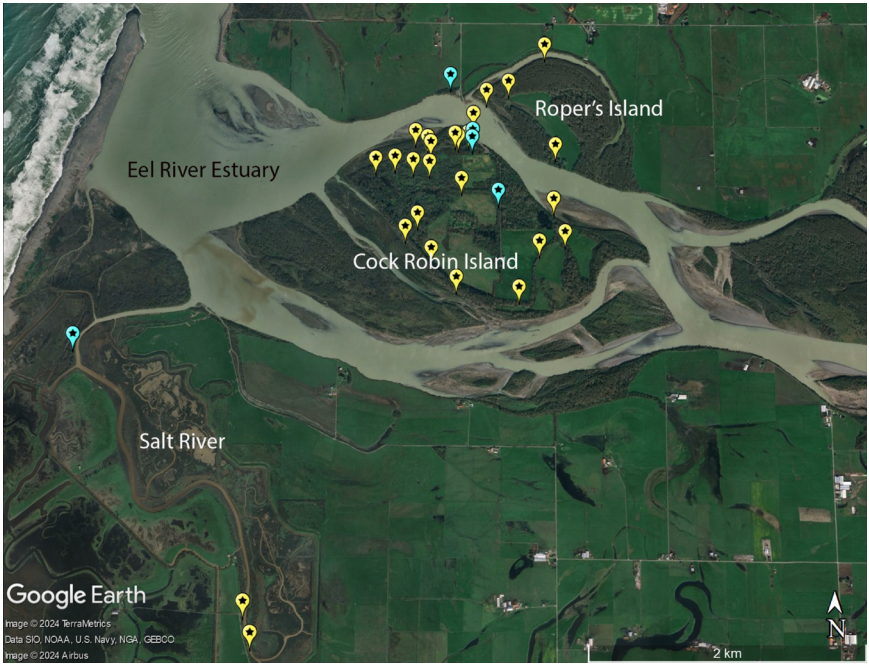

FIGURE 2. Cock Robin Island and vicinity on the lower Eel River, showing Yellow-billed Cuckoo detections from 2000 to 2023. Yellow symbols, detections on surveys; blue symbols, incidental observations.

cover more habitat with the available resources rather than to assess presence or absence rigorously, such as a regulatory agency might require before activities that could affect an endangered species—for which the protocol of Halterman et al. (2016) is designed. Nevertheless, our methods were similar to those of Halterman et al. (2016) except that the surveys involved visiting an area only once, occasionally twice, per year, in the peak breeding season, rather than the four times prescribed by Halterman et al. (2016). Exceptions are noted below.

Surveys used broadcast recordings of the "kowlp" call (Hughes 2015), following earlier protocols used in California and elsewhere in the West (Hamilton and Hamilton 1965, Gaines and Laymon 1984, Dettling et al. 2015). Broadcast points were located along edges of potential habitat, approximately 100 m apart, or occasionally within the interior of larger habitat patches where such habitat extended more than 100 m from an edge. Surveyors broadcast recorded calls five times at each point at one-minute intervals, then visually searched and listened for cuckoos before, during, and for at least one minute after the last broadcast at a point. Surveys generally took place between sunrise and noon. We refer to a single survey visit to a broadcast point as a "point survey." Survey effort varied by location (Table 2) and year, and the number of surveyors ranged from one (2000–2002) to up to 20 in years with intensive

Table 2 Distribution of Survey Effort and Detections of the Yellow-billed Cuckoo in Northwestern California, 2000–2023

Area and years	No. of point surveys	No. of detections on surveys
Smith River	197	0
2012, 2016		
Klamath River	226	0
2001, 2016		
Salmon Creek	12	0
2016		
Mad River	34	0
2002, 2016		
Lower Eel River[a]		
2000–2004	251	3
2005–2010	1758	8
2013, 2016, 2017	244	1
2019–2023	1112	1
Middle Eel River		
2006, 2016, 2017	152	0

[a]Includes Salt River.

effort. Across the study, the number of points surveyed in a day ranged from 1 to 329 (median 20; mean 37.9, SD 56.1; $n = 104$). In areas surveyed multiple years, the exact locations of points varied.

Survey dates ranged from 17 May to 14 August, with effort greatest in July, considered the best time to detect cuckoos in California (Hughes 2015, Halterman et al. 2016). Of 3986 total point surveys, six were in May, 9.4% were in June, 79.2% were in July, and 11.2% were in August. Surveys prior to 2005 were done primarily by Falxa. With the exception of those along the Salt River in 2013, surveys from 2005 through 2016 were coordinated by McAllister and involved a team of individuals covering multiple areas on the same day or few consecutive days, to minimize multiple detections of an individual that might be on the move.

Surveys from 2000 to 2010 focused on the lower Eel River valley (Figures 1 and 2; Table 2). This focus was based on the valley's extensive riparian habitats and multiple detections early during this period (Table 1). The 275 point surveys from 2000 to 2004 comprised 251 along the lower Eel River, 19 on the lower Klamath River, and five on the Mad River (Table 2, Figure 2). From 2005 to 2010, our survey effort along the lower Eel River intensified (McAllister 2010), resulting in 1781 point surveys, including 1758 on the lower Eel and 23 on the middle Eel River, from Rio Dell upstream to Myers Flat.

In 2012, California Department of Transportation (CalTrans) staff covered the Smith River near the Highway 101 crossing, making 4 visits to each of 20 points. In 2013, J. B. Lovelace (pers. comm.) completed 35 point surveys along the Salt River (a tributary to the Eel River) on 8 and 9 July.

In 2016, our efforts expanded spatially so the cuckoo's distribution beyond the lower Eel River valley could be better understood (McAllister 2016). From 9 to 25 July we surveyed the lower sections of the Klamath River (207 point

surveys), Smith River (40), Mad River (29), and Salmon Creek (south end of Humboldt Bay; 12), plus the Eel River upstream of Rio Dell, near Miranda and at the mouth of Larabee Creek (73; Figure 1). The 2016 effort also included 150 point surveys along the lower Eel River (McAllister 2016).

In 2017, following the 2016 protocol (Halterman et al. 2016), McAllister completed 115 point surveys for two CalTrans bridge projects on the middle Eel River near Rio Dell and farther upstream at Myers Flat, making four visits to each site.

From 2019 to 2023, staff of the U.S. Fish and Wildlife Service (USFWS) surveyed the Cock Robin Island area of the lower Eel River. Each year, surveyors made four visits to each broadcast point, resulting in 149–187 point surveys per year (G. Schmidt pers. comm.).

Finally, from 23 June to 1 August 2022, as part of a multi-state study throughout the western United States, J. B. Lovelace (pers. comm.) completed 166 point surveys along the lower Eel River in the Salt River and Loleta Oxbow areas. This study involved three visits to each broadcast point.

Incidental Observations

We also compiled incidental records from the study area. A primary source was the records amassed by the late Stanley Harris of Humboldt State University (now Cal Poly Humboldt). Harris maintained a comprehensive database of bird observations for northwestern California from the scientific literature, museum specimens, field notebooks of bird collectors and others, and unpublished records by scientists and birdwatchers whom he judged to be reliable. While Harris (1996) had only six records of the cuckoo for northwestern California, a later edition of his book (Harris 2006) included 14 records through March 2006, all from Humboldt County. All but two records were from the May to August period, and eight were from the lower Eel River valley. While the 2006 edition did not include details for records added since the 1996 edition, we obtained details from Harris' database.

We also include incidental records from (1) eBird (https://ebird.org/), (2) the NWCALBIRD listserve (https://groups.io/g/NWCALBIRD), (3) a telephone hotline for northwestern California birds that was in operation from October 1995 through August 2019, (4) our own observations, and (5) observations provided directly to us that we judge to be reliable.

Record Evaluation

We considered both visual and auditory detections; the Yellow-billed Cuckoo has distinct vocalizations (Hughes 2015, Halterman et al. 2016) that trained observers are unlikely to confuse with other species. We accepted records Harris (1996, 2006) evaluated and included in his books and those available through eBird, whose regional reviewers assess the documentation required for observations of rare species. Other reports not supported by a photo or audio recording could be supported by multiple observers seeing or hearing a cuckoo. On multiple occasions, birders who had been alerted to the presence of a cuckoo by others made repeated incidental observations at one location over a period of days. For example, many reported a single cuckoo on Singley Bar of the lower Eel River from 1 to 6 July 2001, the first well-publicized cuckoo observation in Humboldt County.

For both incidental reports and detections during our surveys, we treated multiple observations at the same location on the same day or over a period of days as a single record of one bird, unless there was strong evidence for multiple cuckoos, such as simultaneous detections of multiple birds. We excluded a few incidental reports of an observer hearing distant calls that may have represented vocalizations of species other than the Yellow-billed Cuckoo.

We considered observations of juveniles, adults carrying prey, and/or multiple cuckoos near a single broadcast point simultaneously as representing a high likelihood of breeding.

RESULTS

Detections on Surveys

Thirty cuckoo detections were recorded during the surveys, all along the lower Eel River (Table 2, Figure 1). After adjusting for repeated detections that were close in time and space and likely represented multiple detections of the same birds, we concluded that these 30 detections represented at least 13 occurrences, including two of two cuckoos and one of two adults plus an apparent fledgling (Table 1). All but three of these detections were in a complex of dynamic river channels and adjacent riparian habitat on and near Cock Robin Island, encompassing about 400 ha located in the river's estuary, about 2 to 4 km inland from the Pacific Ocean (Figure 2).

Incidental Cuckoo Observations

After accounting for likely multiple observations of the same bird or birds, including individuals also detected during surveys, we inferred that the incidental observations represent 23 occurrences (Figure 3, Table 1). These include the six records prior to 2000 listed by Harris (1996, 2006) and 17 records since 2000. Two incidental records involved more than one bird noted simultaneously; one of these was of three birds at Cock Robin Island on 5 August 2006 (Table 1).

Taken together, the incidental observations and detections on surveys represented at least 35 individuals, if we ignore the possibility of an individual being observed in more than one year.

Temporal and Spatial Distribution of Records

Cuckoos were observed, either incidentally or during surveys, in 14 of the 24 years from 2000 to 2023, as compared to six of 53 years between 1947 and 1999 (Table 1). Detections were concentrated from 2000 to 2009, coinciding with the period of most intensive survey effort (Figure 4). There were only five detections in the 10 years from 2014 to 2023 (Table 1).

Records were concentrated in the months of June and July (Figure 4), with the earliest record on 24 May and only one after early September—of a bird found dead in Arcata on 9 November 1963 (Harris 2006; Table 1). Twenty of the 23 incidental records were concentrated from 1 July to 7 August (Table 1), which approximates the cuckoo's peak breeding period in the western United States (Hughes 2015). Outside of the Eel River valley, the only two detections during this peak period were of a "cooing" bird observed at the

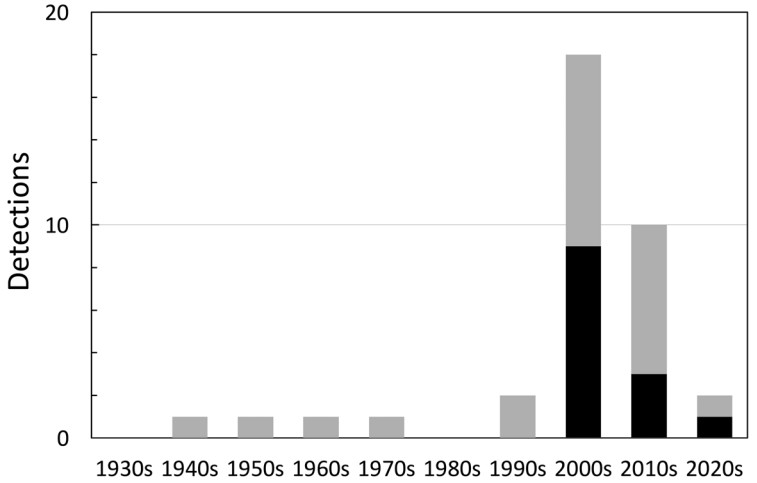

FIGURE 3. Temporal distribution of Yellow-billed Cuckoo detections in northwest California. Black bars, detections on surveys; gray bars, incidental observations. The "2020s" bar includes records through 2023.

Arcata Marsh near the north end of Humboldt Bay from 27 July to 5 August 2015 and a cuckoo "calling repeatedly" from the north spit of Humboldt Bay on 13 July 1947 (Harris 2006, Table 1).

Away from the lower Eel River, the only other geographic cluster of records

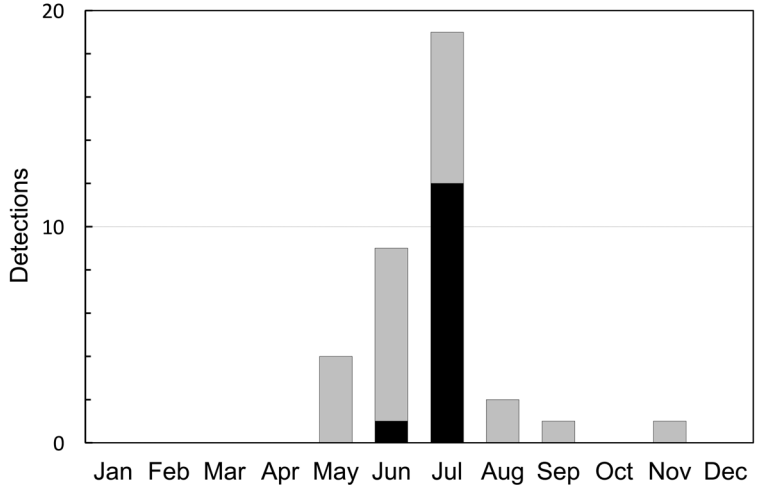

FIGURE 4. Seasonal distribution of Yellow-billed Cuckoo detections in northwest California, 1947–2023. Black bars, detections on surveys; gray bars, incidental observations.

is of six incidental observations around Humboldt Bay (Figure 1, Table 1). The three records from outside the Eel River and Humboldt Bay areas are one from Prairie Creek Redwoods State Park (Humboldt County) and two from Del Norte County (Table 1).

Breeding Status

No cuckoo nests have been found in northwest California to date, but evidence implying breeding included detections during the breeding season in nine of the survey's 20 years (Figure 5). In July of four of these years (2006, 2008, 2010, and 2013), two to three birds were detected simultaneously; three of these observations were around Cock Robin Island, and the fourth was nearby along the Salt River.

On 25 July 2007, when following up a preceding cuckoo detection, McAllister heard a soft knocking or purring sound where an adult cuckoo had been observed repeatedly disappearing in dense vegetation. He saw a raccoon departing and assumed it was likely the source of the sound but later learned that the call very much resembled that of a begging juvenile cuckoo.

On 19 July 2008, on Cock Robin Island, K. Ross (pers. comm.) observed an apparent fledgling near two adults, one of which carried prey. He described the apparent fledgling as having a tuft of downy feathers on the crown, relatively dingy plumage, and only a small amount of yellow on the lower mandible (McAllister 2008). The lower mandible of a juvenile cuckoo is mostly light gray, while that of an adult is mostly yellow with a black tip, and the juvenile plumage is "generally duller" than that of adults (Hughes 2015). Finally, C. J. Ralph mist-netted a cuckoo with a brood patch at Lanphere Dunes, north of Humboldt Bay, on 4 June 1992 (Bailey et al. 1992, Harris 1996).

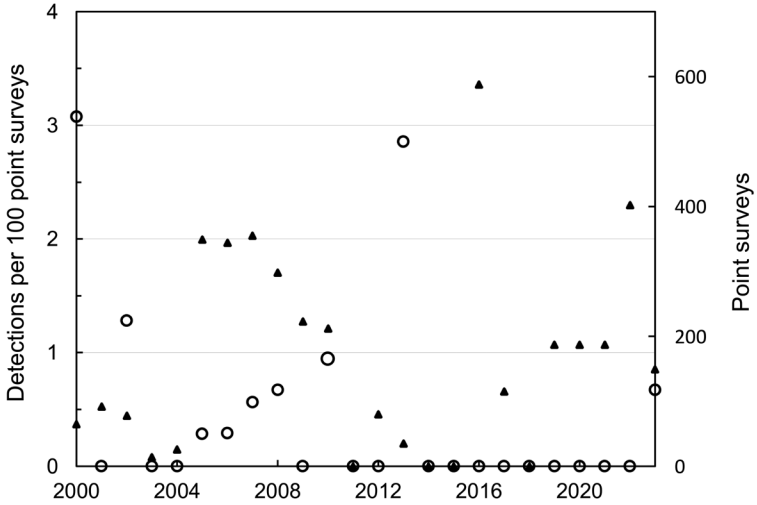

FIGURE 5. Numbers of points surveyed (triangles) and detections per 100 point surveys (circles) for the Yellow-billed Cuckoo by year, Humboldt and Del Norte counties, California, 2000–2023.

Number of Birds Represented by Detections

During surveys, two surveyors occasionally heard the same bird from different broadcast points, or a surveyor detected cuckoos from adjacent broadcast points on the same day (cuckoos sometimes follow a surveyor from one broadcast point to another). Taking into account the timing and location of the various detections and of the survey effort, we estimate that as few as one to two adults could account for all the detections in any single year, with three exceptions: (1) in 2005, three separate records of distinct individuals, including two on the lower Eel (Figure 6) and one at the Arcata Marsh; (2) in 2006 three cuckoos were observed simultaneously on Cock Robin Island; and (3) in 2008 an observation of two adults with a juvenile (Table 1). Apart from that fledgling and the begging of a suspected juvenile heard in 2007, we concluded from behavior and other observed characteristics that the other detections were likely of adult birds, even though not all birds could be definitively identified as adults. If our method of estimating cuckoo numbers errs, it is on the conservative side. Given the cuckoo's often cryptic behavior, more birds could easily have been present regionally.

Habitat

With few exceptions, cuckoos were detected in riparian habitats near major watercourses. Most were along current and former channels of the lower Eel River. The area where cuckoos were observed remains dynamic and includes portions of the Eel River estuary influenced by the tide, though the waters are sufficiently fresh to support diverse riparian forest and shrubs.

FIGURE 6. Yellow-billed Cuckoo, Eel River near Fortuna, Humboldt County, California, 6 June 2005.

Photo by Sean McAllister

While we do not have habitat information for the pre-2000 records, all post-2000 occurrences were in riparian habitats. At least some of the cuckoos recorded incidentally around Humboldt Bay were not near watercourses but were in riparian habitat such as around the ponds and wetlands of the Arcata Marsh Project and along the eastern edge of Lanphere Dunes.

While most cuckoos were detected where riparian habitat was relatively extensive, from 31 May to 18 July 2013 at least two occurred in narrow strips or "stringers" (approximately 30–90 m wide at the time of detections, as measured from aerial imagery on Google Earth Pro (https://earth.google.com/web/). These were along the channel of the Salt River, a tributary in the Eel River estuary. These riparian stringers were remnants of a wider riparian forest that had been partly cleared for grazing. The initial detection, made during cuckoo surveys for a habitat-restoration project, was followed by incidental sightings by multiple observers (Table 1). The site lies about 2 to 3 km from the large patch of riparian habitat around Cock Robin Island.

DISCUSSION

Our results show that the Yellow-billed Cuckoo has occurred, at least intermittently, in low numbers in northwest California during the breeding season, with detections in nine of 20 survey years between 2000 and 2023. These include detections during seven breeding seasons around Cock Robin Island in the lower Eel River. While most of the detections and survey effort were along the lower Eel River and in Humboldt County, incidental observations at two locations in Del Norte County, including photo documentation at one location, represent that county's first known records of the cuckoo. During surveys, cuckoos were detected almost exclusively in July, likely reflecting, at least in part, the timing of survey efforts.

Incidental observations increased concurrently with initiation of focused surveys in 2000. We lack pre-2000 survey data to evaluate population trends over time, but believe that the increase in incidental observations was, at least in part, a result of the initiation of surveys and ensuing detections. These increased the local birdwatching community's awareness of the species and its habits and sparked effort to observe the species. By comparison, eBird records from nearby areas without a comparable survey do not show an increase for this period. Nearby in southwest Oregon, we know of three records between 1980 and 1993, and two records since 2000; these include four from Jackson County and one from Klamath County (https://ebird.org/). Similarly, we are aware of only one record (eBird) from Mendocino County, of a single bird on 5 and 6 August 1997 along the Navarro River estuary, south of our study area.

While cuckoo records from northwest California increased with the inception of our survey in 2000, both incidental and survey detections appear to have decreased after about 2015 (Figure 3). The detection rate on surveys since 2015 (0.06 per 100 point surveys) was very low compared to the rate for the 2000–2013 period (0.55; Figure 5). After 2013, only one cuckoo was detected in 1815 point surveys, of which 75 percent were along the lower Eel River.

The reasons for the more recent decline in detections are unclear, but the decline mirrors a similar decline in cuckoo detections in California's Sacramento Valley (Dettling et al. 2015). As in the Sacramento Valley (Dettling et al.

2015), the habitat in our study area does not appear to have changed markedly. One notable change since the early 2000s elsewhere within the species' range is the Lower Colorado River Multi-Species Conservation Program, initiated in 2005 to maintain and create wildlife habitat within the historical floodplain of the lower Colorado River for federally endangered and threatened species, including the Yellow-billed Cuckoo (U.S. Bureau of Reclamation 2004, Stanek et al. 2021, Tracy and Squibb 2022). This program has restored large areas of habitat where cuckoos have nested in increasing numbers since 2008 (Stanek et al. 2021), with 56 confirmed and 18 probable nesting territories in 2016 (Parametrix, Inc., and Southern Sierra Research Station 2016). One potential explanation for the decrease in cuckoo detections in northwest California and the Sacramento Valley could be that cuckoos are stopping to breed in the increased habitat along the lower Colorado River rather than continuing north into northern California. Such a long-distance distributional shift to newly created habitat has been observed for waterbirds in central California (Stenzel and Page 2018).

The role of fluctuations of prey populations in determining when and where cuckoos nest in California may warrant attention. Elsewhere in its range, during outbreaks of caterpillars, the cuckoo consumes them in large numbers (Hamilton and Hamilton 1965, Hughes 2015). While we did not document prey abundance, on occasion we noted large numbers of the Western Tent Caterpillar (*Malacosoma californicum*) in survey areas; others have noted the cuckoo consuming caterpillars of this genus during outbreaks (Bent 1940, Hughes 2015). Notably, during the expanded survey effort in 2016, when no cuckoos were detected despite 511 point surveys, observers were asked to note tent caterpillars; none were reported.

MANAGEMENT CONSIDERATIONS

We suggest that the cuckoo's regularity and occasional breeding along the lower Eel River warrant annual monitoring of this area, especially the riparian woodland on and near Cock Robin Island (Figure 2). This could be accomplished with the current survey protocol modified for a more rigorous statistical evaluation. The use of autonomous recording units might also be explored as a potentially cost-effective alternative.

Our findings suggest that focused surveys may be warranted in other areas with potentially suitable habitat away from known cuckoo populations. In view of the cuckoo's status under both the California and federal endangered species acts, we recommend that any proposed disruption of the cuckoo's habitat in northwest California be preceded by surveys for the species, according to the current protocol.

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