

**Tricolored Blackbird Movements and Connectivity
in the Kern River Valley, California, 2022**

Final Report



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Introduction

Tricolored Blackbirds (*Agelaius tricolor*, TRBL) are a highly colonial breeder nearly endemic to California, with less than 1% of the total population breeding outside of the state (Beedy et al. 2020). Like many colonially breeding birds, TRBL numbers have declined precipitously in the last century due to habitat loss, persecution as a pest species, and market hunting. The continuation of this downward trend resulted in the April 2018 decision by the California Fish and Wildlife Commission to list them under a temporary “emergency listing” as Threatened under the California Endangered Species Act. They are currently treated as a California Species of Conservation Concern and the species is under review for federal listing under the Endangered Species Act. While the bulk of the breeding population occurs in CA’s central valley region, particularly in the San Joaquin Valley (Meese 2017), the scattered populations that breed in the grassland foothills and valleys of the Sierra Nevada have been estimated to make up 30% of the state’s population (Ariola et al. 2015).

The objectives of our study this year were to continue to address gaps in knowledge about TRBL movements both within the breeding season and throughout the rest of their annual cycle. Growing interest in the Motus wildlife tracking system (<https://motus.org/>) in California and the western US has resulted in a major increase in the construction of towers capable of detecting tags that we deploy here in the Kern River Valley. With this in mind, we hope to continue tagging efforts of Tricolored Blackbirds in the future.

Methods

Tagging

In 2022, our efforts were primarily focused on deploying our remaining Lotek Motus tags (model NTQB 2-4-2 Lotek Wireless Inc.) on Tricolored Blackbirds in the Kern River Valley. We used modified Australian crow traps (Zanjac and Cummings 1965, Meese and Simmons 2010) and mist nets to capture birds near colony locations. For both methods we took care to minimize our time spent near the colony to reduce our impact on their nesting. Upon capture each bird was banded with an aluminum USGS band and processed quickly to obtain basic morphometric, physiological, and demographic data including wing chord, tail, length of exposed culmen, bill depth, tarsus, mass, breeding condition, age, and sex. We collected tail feather samples for the Bird Genoscape Project (<https://www.birdgenoscape.org/>). In addition, we attempted to photograph the eye color, upperwing, underwing, tail, and a macro view of the entire bird in order to begin building a photographic reference for aging and sexing. Birds that were able to carry a tag were individually fitted with a leg-loop harness (Rappole and Tipton 1991) using 0.8mm Stretch Magic (Pepperell, MA 01463), crimp beads and super glue. We then double-checked that the tags were activated and transmitting a signal before release.

Results

We successfully captured 43 birds over three trapping mornings, of these 27 were males and 16 were females. We deployed eight Motus tags on male birds that were large enough and deemed healthy enough to carry the extra 3% attachment weight. Only male Tricolored Blackbirds were large enough to carry these remaining tags while keeping the total weight below 3% of the bird's body mass.

In total, across all years, we have captured 191 TRBLs of which 185 were banded and 46 tagged. Additionally, we have collected feather samples from 182 TRBLs which were sent to collaborators at the Bird Genoscape Project (<https://www.birdgenoscape.org/>). This year, we were able to tag 8 adult males. Six of these individuals were tagged in April near a colony nesting in non-native Himalayan Blackberry (*Rubus armeniacus*) bushes along Highway 178 in Weldon, CA. The other two individuals were tagged in May near a colony nesting in native stinging nettle (*Urtica dioica*) within the Kern River Preserve in Weldon, CA. The two Motus stations in the vicinity of these sites (Red-tail Hill and Migrant Corner) detected all of the birds we tagged. Each tag was detected for a duration of 4 to 58 days. Three tagged individuals were detected for less than a week (Table 1), possibly indicating either movement outside of our study area or technological malfunction.

Table 1. Tagged Tricolored Blackbird detections by Motus stations in the Kern River Valley in 2022.

Tag ID	Deployment date	Last detection	No. of days detected
501	1-Apr	8-Apr	6
497	1-Apr	5-Apr	4
257	8-Apr	7-May	20
261*	8-Apr	11-Nov	35
254	8-Apr	12-Apr	4
255	8-Apr	18-Jun	55
496	18-May	12-Jun	24
499	18-May	15-Jul	58

*Detected at Canebrake Ecological Reserve

Tracking

Tags were monitored passively by our Motus stations in the Kern River Valley, and detected by two stations, Red-tailed Hill and Migrant Corner. In addition, we opportunistically hand-tracked when time allowed, visiting the main colonies and frequently utilized foraging fields. This resulted in a few more detections of tagged birds (Table 2, Figure 1).

Table 2. Detections of tagged Tricolored Blackbirds by hand-tracking in 2022

Tag ID	Date Detected	Habitat at detection site
257	12-Apr	Irrigated Pasture
255	10-May	Irrigated Pasture
255	14-Jun	Cropland
496	14-Jun*	Cropland
499	12-Jul	Irrigated Pasture

*Detected after last detection by a Motus Station.

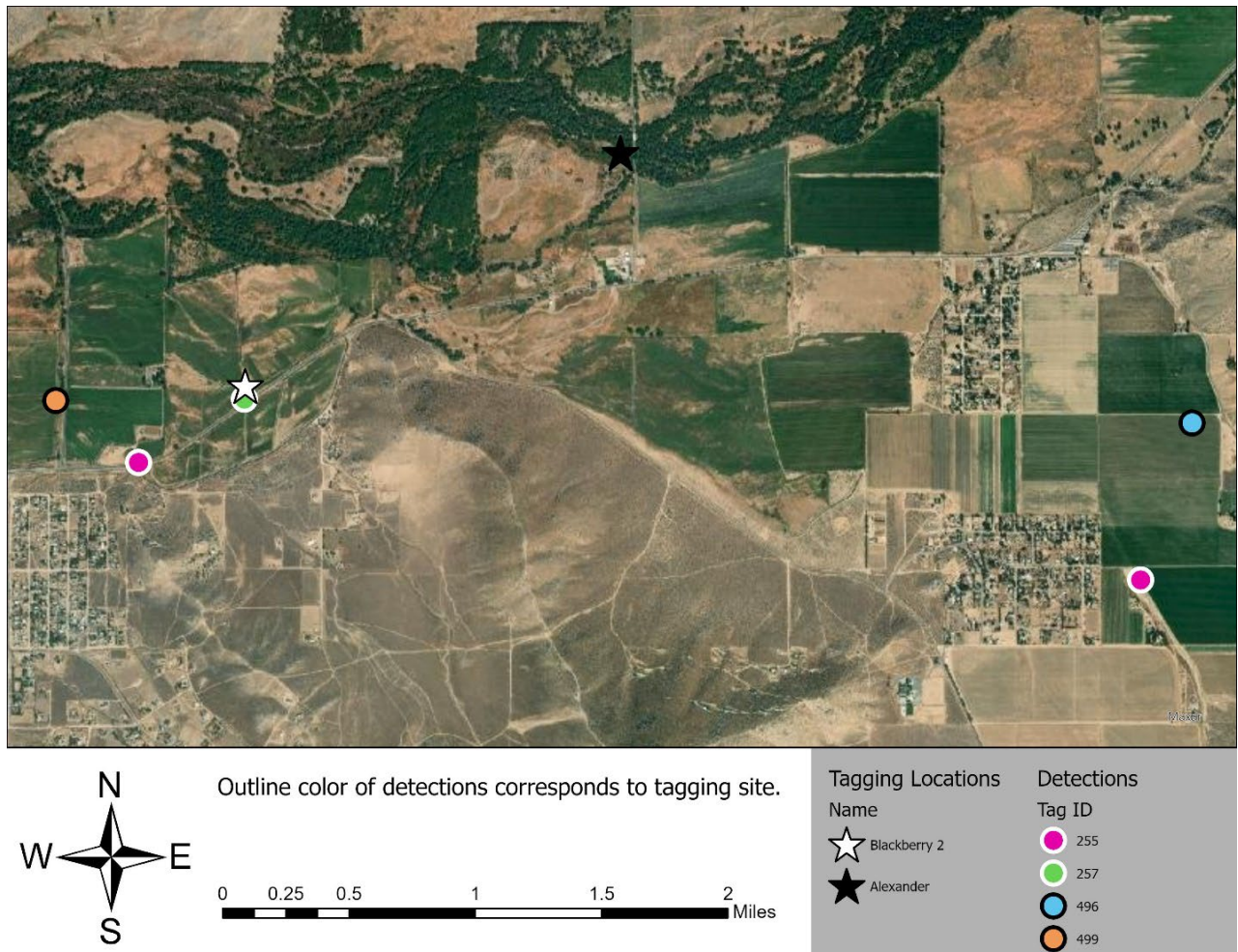


Figure 1. Hand tracking detections of Tricolored Blackbirds and their capture sites in 2022.

Canebrake Ecological Reserve

Interestingly, one tagged bird (261) was also detected by our Motus station at Canebrake Ecological Reserve, about 10 miles east of its presumed nesting colony and original tagging location (Figure 2). This bird initially remained near its capture location and was detected by Red-tail Hill and Migrant Corner towers from April 8th-May 20th, after which there are no detection records until September 9th at Canebrake Ecological Reserve. Unfortunately, the Motus station at Canebrake Ecological Reserve had a software related malfunction which rendered any data collected between October 8th, 2021, and August 22nd, 2022 unusable, so we are unable to say if '261' was in the Canebrake area between May 20th and August 22nd. For the period that we do have data, it appears that '261' was using the Canebrake area sporadically, with multiple days of absence between detection periods. One notable absence was more than 40 days, between September 27th and November 9th. We also detected evidence of night-roosting (tower detections after 8pm PST) on at least 5 nights. This pattern of detections suggests nomadic behavior within the Kern River Valley during post-breeding and fall.

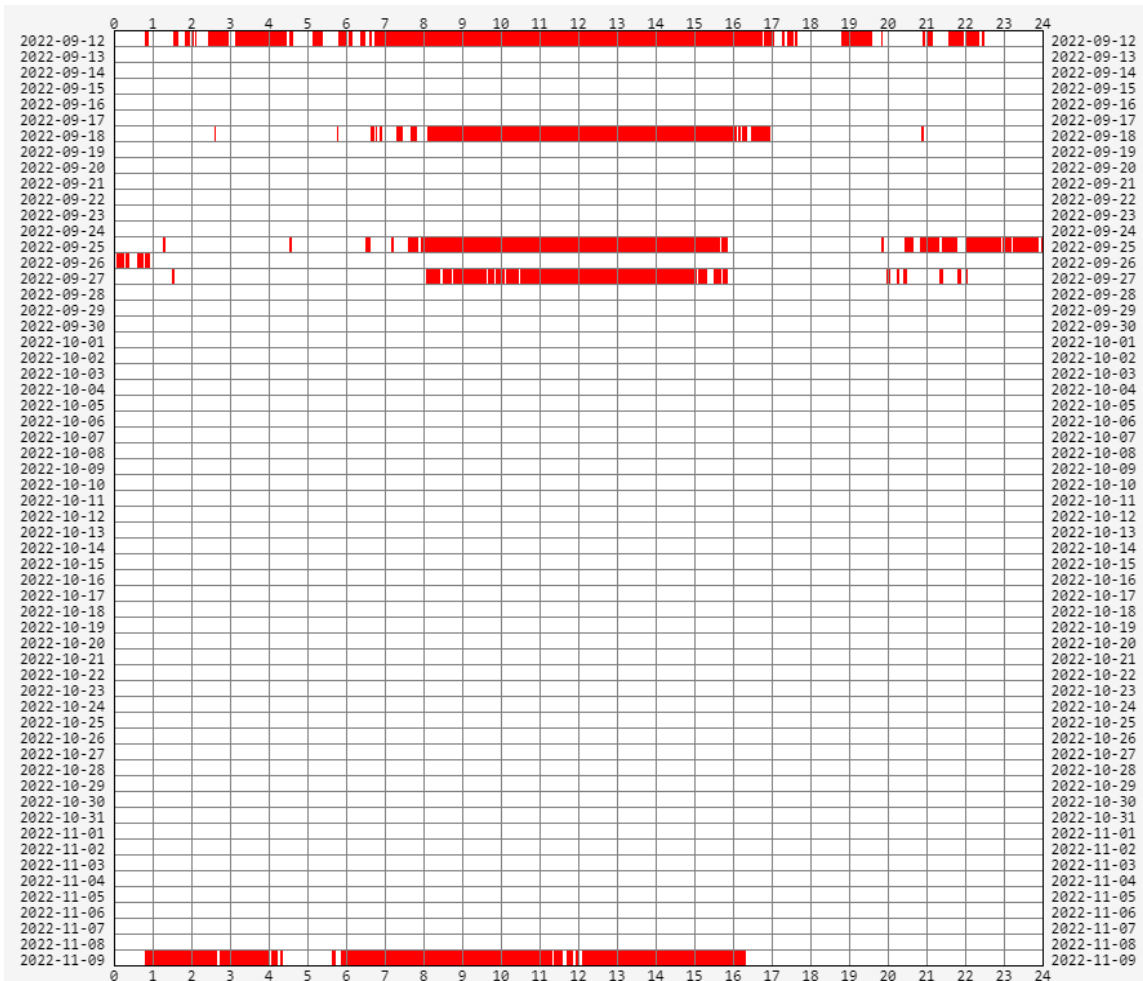


Figure 2. Detections of male TRBL '261' by the Canebrake Ecological Reserve Motus station in 2022. Time is displayed on the x-axis in UTC, dates are displayed on the y-axis.

Previous detections of TRBL at Canebrake Ecological Reserve Motus station were in August, 2021. They show two birds using Canebrake at two different times, likely for roosting or nearby roosting. The first bird detected (female 256) was picked up on two evenings (6-8 pm PST) and once in the early morning a (~5:15 am PST), suggesting travel between roosting and foraging locations. The next bird (male 494) shows a very similar pattern later in the month, in addition to four nights (two nights each separated by a night of absence) of roosting within range of the Motus station.

Canebrake Ecological Reserve is owned by the California Department of Fish and Wildlife, located at the base of the Sierra Nevada where the South Fork of the Kern River enters the Kern River Valley. The riparian area adjacent to pastureland consists of around 530 acres and includes a cattail and bullrush wetland.

Discussion

At the outset of this project in 2019, no Motus stations existed in the range of Tricolored Blackbirds. At the time of this report there are at least 44 Motus stations in the TRBL breeding range, including 38 stations in the species' non-breeding range, as a result of efforts by SSRS and other entities (e.g. Partners in Flight Western Working Group, California Department of Fish and Wildlife, MPG Ranch, TNC California, [Birds Canada 2022]). With growing interest in the Motus network in California, more stations will continue to be erected throughout the range of Tricolored Blackbirds, and the California Department of Fish and Wildlife is planning to add 40 more stations in 2023-2024. Because Motus research will continue to expand in the foreseeable future, we suggest that subsequent studies should deploy tags that are designed to last the life of the bird such as the CTT LifeTag, CTT HybridTag, and Lotek NanoTag Solar.

One recent development in Motus technology is CTT Nodes (www.celltracktech.com/), which act as a local receiver and can detect tags within 200-300 meters. Since Tricolored Blackbirds are colonial nesters and can be expected to return to discrete patches of habitat, they are a uniquely suited species for the use of nodes to study local movements during the breeding season. Due to the species' sensitivity to human disturbance around nesting colonies, we strongly recommend the use of nodes in future TRBL research to refine our understanding of local habitat use.

During this project, we have yet to receive a foreign detection of our tagged birds. However, until the winter season of 2021-2022 almost no stations existed in the winter distribution of Tricolored Blackbirds. With the very recent development of the Motus network in the west, we now have a much higher likelihood than in previous years of detecting the eight birds tagged in 2022 on their wintering grounds. The tags we deployed this year have an estimated battery life of 13 months; battery life may have depleted some amount as these tags remained inactivated for a year. We expect to detect any tagged birds that return to the Kern River Valley during the spring of 2023.

An interesting observation from our 2022 research was the presence of scaly leg mites (*Knemidocoptes mutans*) on many of the Tricolored Blackbirds that we captured. The mites

burrow under bird leg and foot scales, causing significant swelling and crusted lesions. Mites can be spread between adults on shared surfaces and from adults to offspring in the nest; left untreated, scaly leg mites have the potential to cause deformities in some cases (Martin 2021). We suspect that Tricolored Blackbirds were exposed to scaly leg mites while feeding at nearby rural residences with chicken coops, because this affliction is common in domestic fowl populations. Eight of the 43 (18.6%) TRBL we captured in 2022 had detectable scaly leg mites (Table 3). It is interesting to note that significantly more males were afflicted: 25.9% of males captured had mites (n=7/27), whereas we only detected mites in 6.1% of females (n=1/16) (Table 3). There was also a significant difference in mite prevalence between colony locations, although time may have been a confounding variable, as we captured TRBL at the blackberry bush colony over a month earlier in the spring than those at the nettle colony. Given that TRBLs are colonial breeders and birds live in extremely close quarters, often using the same perches, this condition is likely to continue to spread throughout the population. The detection of this condition in the population of Tricolored Blackbirds in the Kern River Valley warrants further research to determine the effect of this affliction on the population.

Table 3. Incidence of Scaly Leg Mites (*Knemidocoptes mutans*) in Tricolored Blackbirds captured in the Kern River Valley, California in 2022.

Sex	Total Number of Captures	Number of Individuals with Scaly Leg Mites	Percent of Individuals with Scaly Leg Mites
Male	27	7	25.9%
Female	16	1	6.1%
Blackberry (both sexes)	37	4	10.8%
Nettle (both sexes)	6	4	66.7%
Total	43	8	18.6%

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