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RECLAMATION

2024 Yellow-Billed Cuckoo Survey Results FINAL REPORT – Belen Reach

Middle Rio Grande, New Mexico



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2024 Yellow-billed Cuckoo Survey Results

Belen Reach

EXECUTIVE SUMMARY

In 2024, the Bureau of Reclamation (Reclamation) retained Tetra Tech, Inc. (Tetra Tech) to conduct presence/absence surveys and territory estimation for the Federally listed threatened Western yellow-billed cuckoo (*Coccyzus americanus occidentalis*; “cuckoo” or “YBCU”), within a 6,280-acre study area in the Belen Reach along approximately 30 river miles of the Middle Rio Grande (MRG) riparian corridor. This study was designed to inform overall management of the Belen Reach and to support compliance needs for Reclamation, the Middle Rio Grande Conservancy District, and the New Mexico Interstate Stream Commission. Additionally, survey activities within the Belen Reach contribute to the overall understanding of YBCU distribution within the MRG, population trends, and baseline population data.

In accordance with U.S. Fish and Wildlife (USFWS) protocols, YBCU surveys were conducted four times between June 15 and August 15. Tetra Tech surveys comprised a total of 192.5 observer-hours on YBCU presence/absence surveys in which 12 cuckoo detections were observed. From these detections, one possible breeding territory was delineated with one possible breeding pair.

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ACRONYMS AND ABBREVIATIONS

Acronyms/Abbreviations	Definition
ac	acre
BEMP	Bosque Ecosystem Monitoring Program
ESA	Endangered Species Act
ft	foot/feet
GIS	Geographic Information System
km	kilometer
LFCC	Low Flow Conveyance Channel
m	meter
MRG	Middle Rio Grande
Reclamation	Bureau of Reclamation
RM	River Mile
YBCU, cuckoo	Yellow-Billed Cuckoo
USFWS	U.S. Fish and Wildlife Service

1.0 Introduction

The federally threatened Western yellow-billed cuckoo (*Coccyzus americanus occidentalis*; “cuckoo” or “YBCU”) is a neotropical migratory bird found in the southwestern United States, including along the Middle Rio Grande (MRG). The cuckoo was once common across riparian habitats of the western United States up to British Columbia, Canada, but its current range within the U.S. Southwest is confined to limited areas including the Rio Grande floodplain. Cuckoos typically arrive on breeding grounds in the Southwest by late May and initiate southern migration to wintering grounds in Central and South America by mid-August (Halterman, et al., 2016). During the breeding season, YBCU establish large territories; radio telemetry studies identified core use areas between 2 and 36 hectares (ha) and home ranges as large as 216 ha in the MRG (Dillon & Moore, 2020). In 2001, USFWS determined that the Western Distinct Population Segment was distinct from the Eastern population, with the division being the continental divide from Montana to central Colorado; the eastern boundary of the Rio Grande drainage from central Colorado to Texas; and the mountain ranges that form a southeastern extension of the Rocky Mountains to the Big Bend area in West Texas. The cuckoo was listed as threatened under the Endangered Species Act (ESA) in 2014 (USFWS, 2014). The species is also listed as threatened, endangered, or sensitive by the states of California, Arizona, New Mexico (NM), Colorado, and Utah.

Designated critical habitat for the cuckoo was published in 2021 and includes Rio Grande floodplain habitat from Los Lunas, NM to Elephant Butte Reservoir, NM (USFWS, 2021). This includes the entire survey area discussed in this report. Cuckoos have been observed in the MRG since 1998, but the Bureau of Reclamation (Reclamation) has been conducting presence/absence surveys for cuckoo in the MRG since 2006. Portions of the Belen Reach have been surveyed since 2009. The entire Belen Reach, approximately 39.5 river miles (RMs), has been surveyed since 2014 (USBR, 2022). This includes the approximate 29 RMs encompassing the survey area discussed in this report (Figure 1). The entire Belen Reach was last surveyed in 2022; however, the 2024 survey area is approximately 10 RMs shorter than the survey area in 2022.

Reclamation manages water in the MRG and must maintain ESA compliance. In 2016, USFWS issued a final Biological Opinion (BiOp) to Reclamation and its partners (Bureau of Indian Affairs, State of New Mexico, and Middle Rio Grande Conservancy District) in the MRG. To maintain compliance with the BiOp, Reclamation must conduct presence/absence surveys for the cuckoo (USFWS, 2016).

Presence/absence surveys and estimation of breeding territories of YBCU were completed by using standard protocols by Tetra Tech biologists under contract with Reclamation from RM 156.5 to RM 127.5 of the Belen Reach of the MRG in 2024. Field work was completed during the breeding season for YBCU, which begins in late May with the arrival of birds as they begin establishing territories and concludes in mid-August as they finish nesting and begin their southbound migration.

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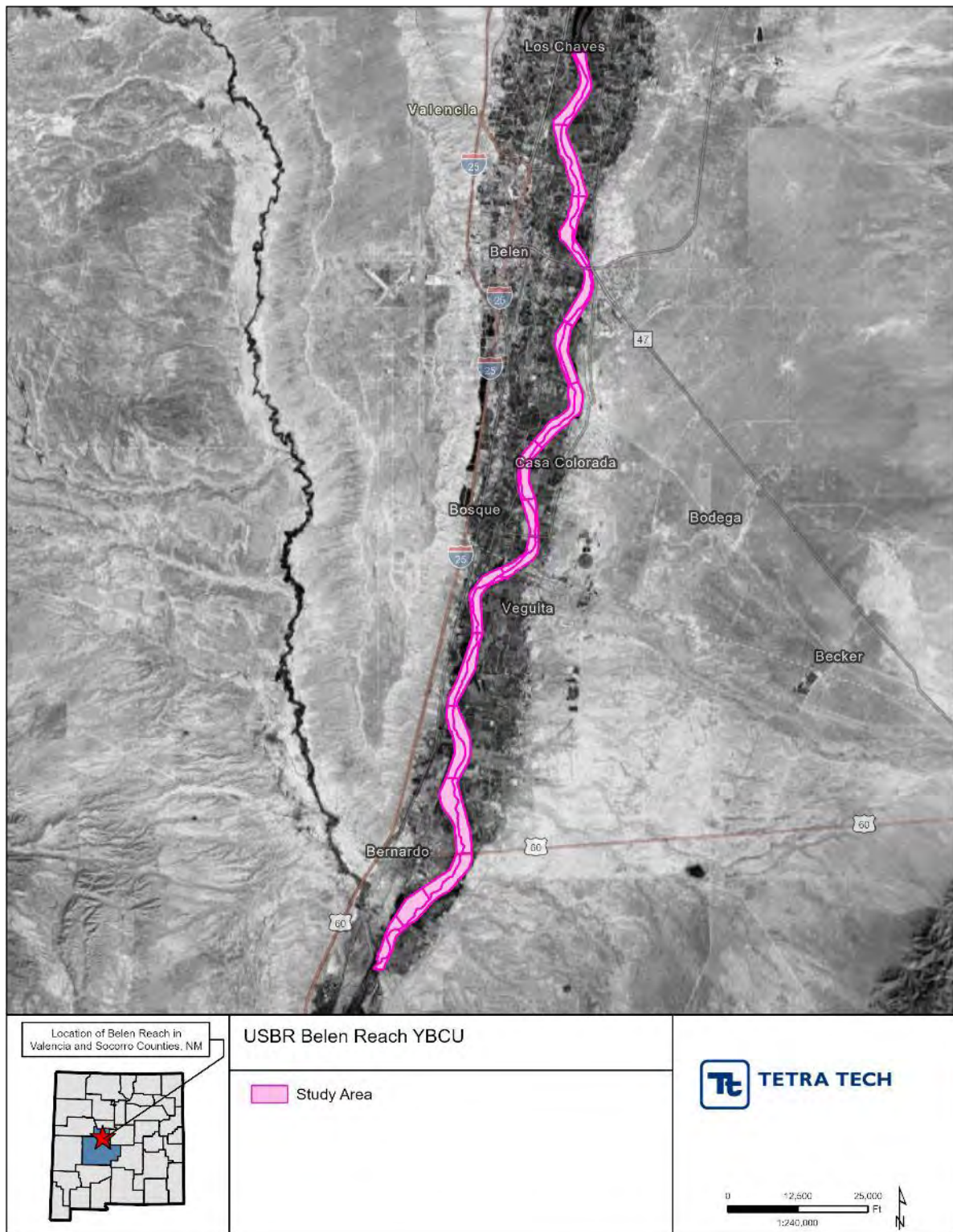


Figure 1. Location of Study Area

1.1 GOALS AND OBJECTIVES

The scope of the 2024 YBCU monitoring field season included conducting and completing the following:

1. YBCU presence/absence surveys at specified sites during the breeding season in accordance with specified protocols;
2. Estimation of the number of breeding YBCU territories, in accordance with specified protocols;
3. Identification of key habitat parameters.

1.2 RELATED STUDIES

Numerous studies on the MRG and across the U.S. southwest have been completed since formal YBCU monitoring began in 2006, including baseline data collection and analysis on YBCU habitat preferences, hydrology, reproduction, and the development of habitat suitability models. The following is a summary of studies referenced in this document:

- Vegetation mapping completed by Reclamation using field-based and geographic information system (GIS) inventories to develop YBCU habitat suitability models began in 2016 and have been updated with the most recent model completed in 2021. Recommendations from this work were to conduct vegetation mapping every 5 years, as stands of YBCU habitat are subject to active change, and to focus on locations with dynamic changes in habitat conditions (Siegle & Moore, 2022).
- The 2022 MRG YBCU Study provided a synopsis of baseline population data and trends along select sites of the MRG within the Belen, Sevilleta/La Joya, San Acacia, Escondida, Bosque del Apache, Tiffany, and San Marcial Reaches as well as the Elephant Butte Reservoir. This larger dataset provided an overview of presence/absence, territory estimations, nest monitoring trends, hydrology, and habitat associations (USBR, 2022).
- The 2019 radio telemetry study assessed breeding habitat size and vegetation composition requirements within the MRG, specifically between RM 116 and RM 87. The dataset provided insight into preferred habitat composition and how that influences breeding range (Dillon & Moore, 2020).
- The Bosque Ecosystem Monitoring Program (BEMP) is a community science program that monitors the health of the Rio Grande bosque annually. Select sites that are monitored fall within the Belen Reach, including BL-17 and BL-20. This is a long-term dataset that includes abiotic factors (depth to groundwater, water levels, precipitation, temperature above and below-ground, and water quality), and biotic factors (litterfall, vegetation cover, and surface-active arthropod richness and abundance) (BEMP, 2024).

2.0 METHODS

2.1 STUDY AREA

The study area is located within MRG sites designated by Reclamation, entitled “Belen Reach” sites, which comprises approximately 29 RMs from RM 156.5 to RM 127.5. For the 2024 field effort, surveys were conducted on 29 designated Belen Reach survey sites (BL-01 through BL-24, and SV-11 through SV-15; referred to as the “study area”) and are entirely within designated 2021 YBCU Critical Habitat (USFWS, 2021). According to a habitat assessment completed in 2022, only 14 percent of the total reach is considered suitable YBCU breeding habitat

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(Siegle & Moore, 2022). It should be noted that this survey effort (RM 156.5 to RM 127.5) did not cover all existing Belen Reach sites, but the entire reach (RM 166 to RM 126.5) was surveyed in 2022.

The sites cross the city of Belen and are within Valencia and Socorro Counties in central New Mexico. In the north, they start at the community of Los Chaves and extend south to the communities of San Francisco and Contreras along the riparian corridor of the Rio Grande, covering approximately 29 river miles. Habitat within the study area is a mixture of burned and unburned sections with typical riparian plant species consisting of Rio Grande cottonwoods (*Populus deltoides* ssp. *wislizenii*), tree willow (*Salix gooddingii*), salt cedar (*Tamarix chinensis*), Russian olive (*Eleagnus angustifolia*) and coyote willow (*Salix exigua*). Survey sites contain the Rio Grande on one side and a levee system on the other with some supporting additional channels during high flows.

2.2 PRESENCE/ABSENCE SURVEYS

Cuckoo presence/absence surveys were conducted using the repeated call-playback method, in accordance with standard protocols outlined in *A Natural History Summary and Survey Protocol for the Western Distinct Population Segment of the Yellow-billed Cuckoo* (Halterman et al., 2016). The prerecorded “kowlp” was projected, using a wireless speaker, into suitable habitat at 100-meter (m) intervals to elicit responses from cuckoos. The recording was played at each call point for 20 to 30 seconds, after which surveyors pause for 1 minute to look and listen for YBCU responses. This sequence was repeated 5 times, or until a YBCU response was observed. If a detection occurred, surveyors ceased playback and recorded observations, including surveyor location and estimated distance and compass bearing of the cuckoo detection. The observer then resumed playback 300m from the point of detection to reduce the potential for duplicate counting of individuals. Excessive use of broadcast calls can attract the attention of cuckoo predators. If a predator was observed (e.g. Cooper’s Hawk), the broadcast was stopped, and the surveyor waited for the predator to leave before resuming callbacks or moved on to the next call point.

Survey sites that contained suitable or moderately suitable habitat were surveyed for YBCU a total of four times between June 15 and August 15 (Table 1). A minimum of 12 days between surveys and a maximum of 15 days between surveys was observed. All surveys were conducted between 5:30am and 11:00am, by trained and permitted personnel. Multiple surveys were conducted to increase the likelihood of detections, the probability of positively identifying occupied locations during the breeding season, and to aid in the determination of breeding status.

Table 1. YBCU Survey Periods

Survey Period	Survey Period Dates	Number of Surveys
1	June 15 – June 30	1
2	July 1 – July 31	2
3	August 1 – August 15	1

All survey data and spatial detection information were recorded for each survey using ESRI ArcGIS software: Survey 123 for detection data and comments, Field Maps to mark detection locations and call points, and ArcGIS Online to host a geospatial database. Data were then transferred to USFWS electronic survey forms, which are presented in Appendix A.

2.3 TERRITORY ESTIMATION

Territory estimation was conducted using detection data after completion of all survey periods. According to telemetry data, cuckoos can travel more than 500m per day and more than 3km during the breeding season (Dillon & Moore, 2020). Due to their broad range and the lack of distinction between calls of males and females, it can be difficult to accurately estimate breeding territories. Actual or projected YBCU locations are calculated from surveyor UTM coordinates, distance, and compass bearing, all of which have inherent estimation errors, particularly with aural detections.

The following rules are used to estimate breeding YBCU territories based on projected YBCU survey detections (Halterman et al., 2016):

1. A YBCU territory must have a minimum of 2 detections less than 500m apart during at least 2 surveys of the 4 total surveys (Figure 2, Example 1). If these conditions are not met, the detections are not considered to be part of a breeding territory, but rather to be floater detections.
2. No more than 3 detections within 300 m during the same survey period can be included within a single YBCU territory. More than 2 YBCU detections during the same survey period in an area less than 300 m apart suggests multiple breeding territories (Figure 2, Example 2).
3. YBCU clumping patterns should be evaluated based on the number and proximity of detections during individual survey periods. Ideally, multiple discrete detections within 300 m of each other over multiple surveys are needed to confirm a breeding territory (Figure 2, Example 3).
4. Although YBCU territories can overlap, “natural breaks” between detection clumps, regardless of distance, should be considered when delineating territories (Figure 2, Example 4).
5. “Best biological judgment” should prevail when delineating and estimating YBCU territories. Habitat suitability and abundance, as well as the distribution of YBCU detections over the entire breeding season should be considered when delineating breeding territories.

Territories are categorized as Possible breeding territories (PO) for two or more distinct YBCU detections over two survey visits or periods (which are at least 10 days apart), Probable breeding territories (PR) for three or more detections over three survey visits or periods, or Confirmed breeding territories (CO) for finding a nest or observing nest building, copulation, or fledglings (Halterman et al., 2016). Using ESRI ArcGIS Pro, breeding territories were developed following these rules and a buffered center point created for each territory to show the general location on maps.

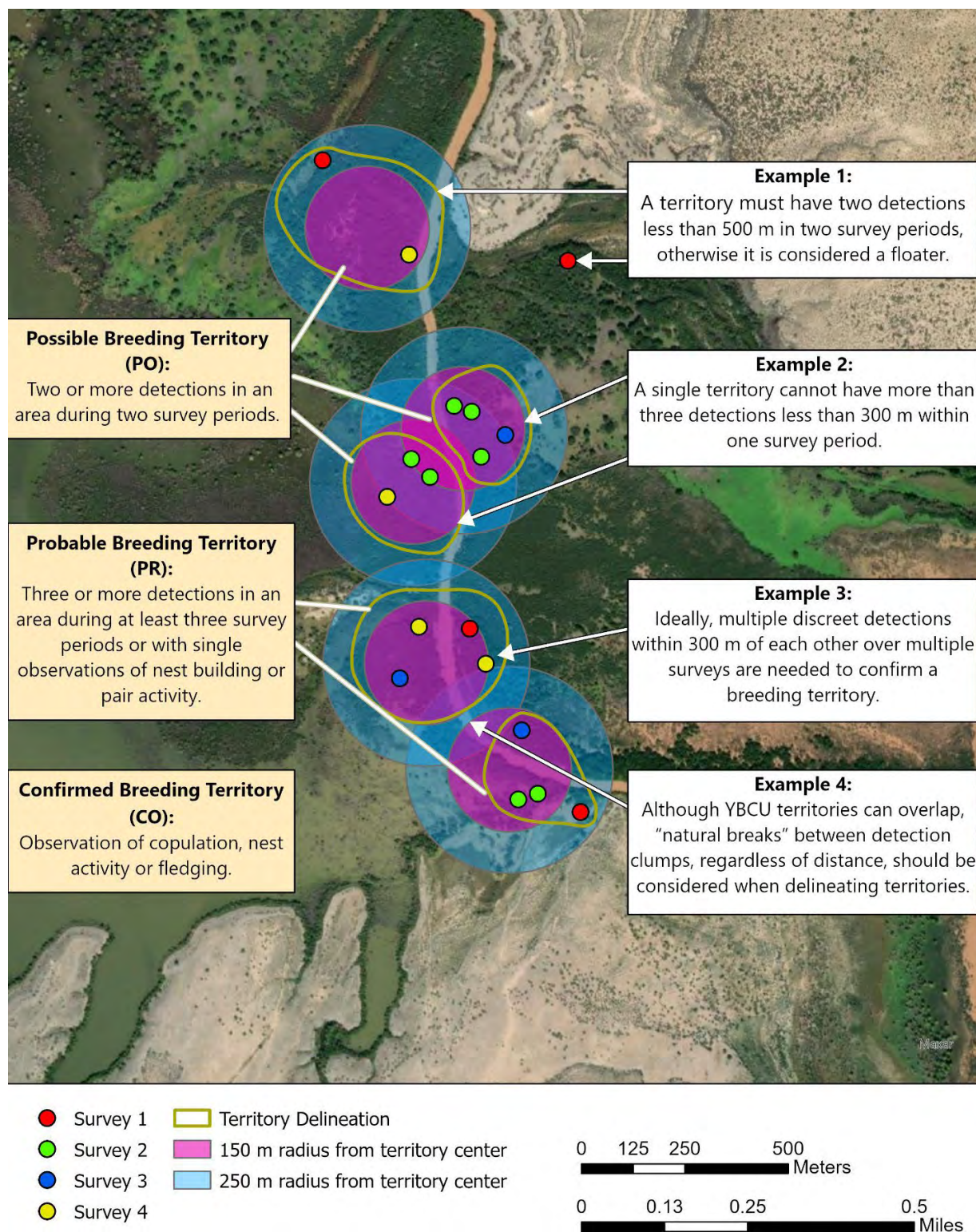


Figure 2. Examples of YBCU Territory Estimations (USBR, 2022)

3.0 RESULTS

3.1 PRESENCE/ABSENCE SURVEYS

YBCU presence/absence surveys were conducted during the cuckoo breeding season between June 15 and August 15. During the 2024 breeding season, 12 YBCU detections were recorded within the Belen Reach study area. These detections were delineated into one possible breeding territory (PO), with one possible breeding pair (Table 2). Spatial distribution and abundance of cuckoos are presented within five maps showing detections within the study area (Figures 3-7). Compared to historical results (USBR, 2022) for the Belen Reach, the number of detections decreased by 70% (40 detections in 2022 to 12 detections in 2024) throughout the survey area for the 2024 season. The USFWS presence/absence survey forms are presented in Appendix A.

Table 2. 2024 Yellow-billed Cuckoo Survey Detections Within the Belen Reach of the Middle Rio Grande*

Site Name	YBCU Observed ⁽¹⁾	Est. Number of Pairs	Est. Number of Territories	Comments
BL-02	2	0	0	1 migrant
BL-04	1	0	0	1 migrant
BL-07	1	0	0	1 migrant
BL-08	1	0	0	1 migrant
BL-22	1	0	0	1 migrant
BL-24	1	0	0	1 migrant
SV-11	1	0	0	1 migrant
SV-13	1	0	0	1 migrant
SV-15	3	1	1	1 pair, 1 migrant
Belen Reach Summary	12	1	1	10 migrants; 1 pair

*29 sites were surveyed, only sites with detections are listed in the table. All non-listed sites had zero detections observed.

3.2 TERRITORY ESTIMATION

Territory estimations were conducted following the established federal protocols outlined in section 2.3 (Halterman et al., 2016). Based on the timing, location, and persistence of all detected cuckoos, one possible breeding territory (PO) was estimated within the survey area (Table 2). At the southern end of survey site SV-15, there were 3 total detections less than 500m apart during surveys 1 and 3. There were not more than 3 detections within 300m during the same survey period, so there is no indication that multiple territories are present. As there were two or more distinct YBCU detections over two survey periods, but not two or more detections over three survey periods, the territory is classified as a PO (Halterman et al., 2016). Compared to historical results (USBR, 2022), the number of territories in the Belen Reach decreased by 90.9% (from 11 territories to 1 territory) since 2022. Figure 7 shows the estimated possible breeding territory at the southern end of survey site SV-15.

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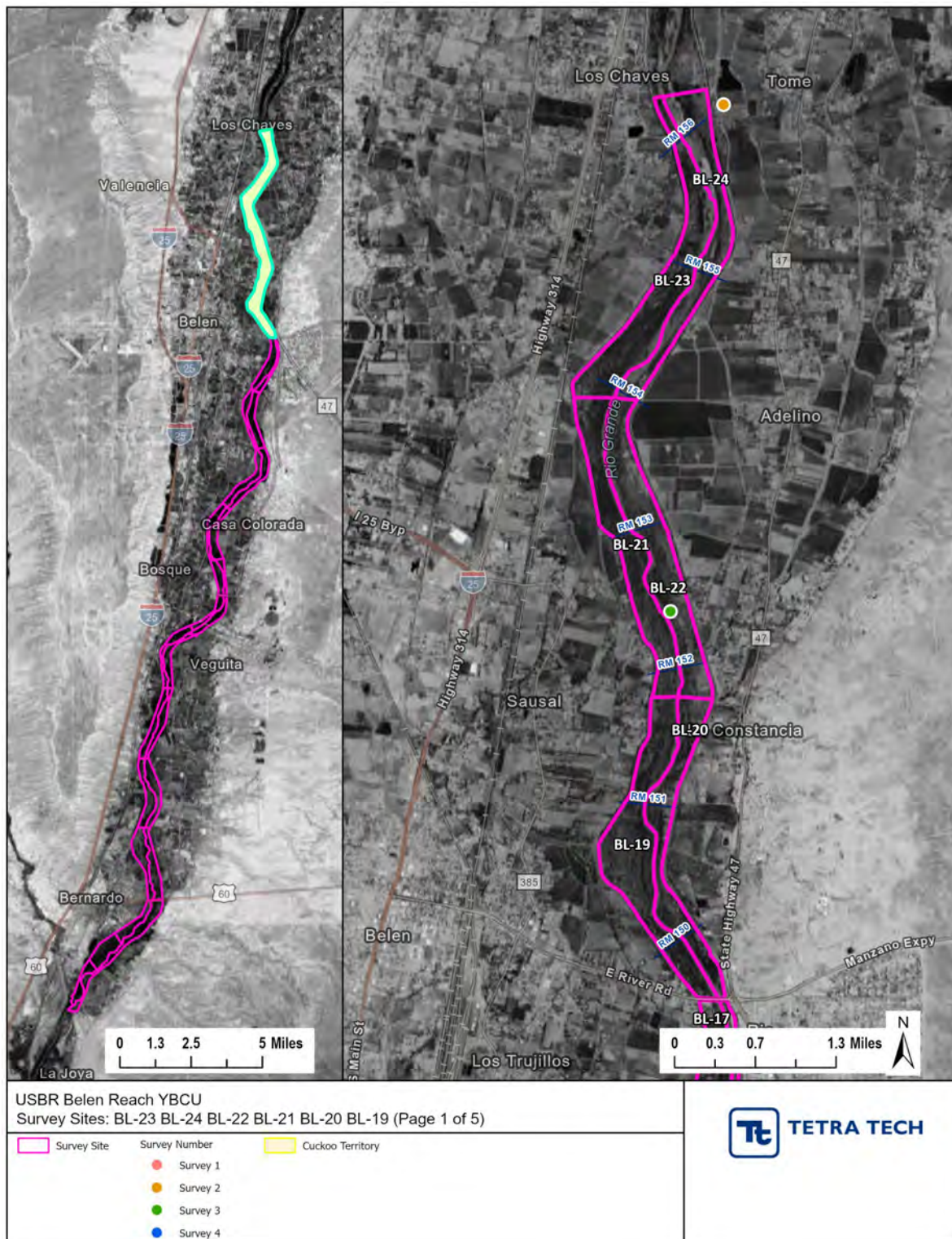


Figure 3. 2024 YBCU Detections and Territories: BL-23, BL-24, BL-22, BL-21, BL-20, BL-19

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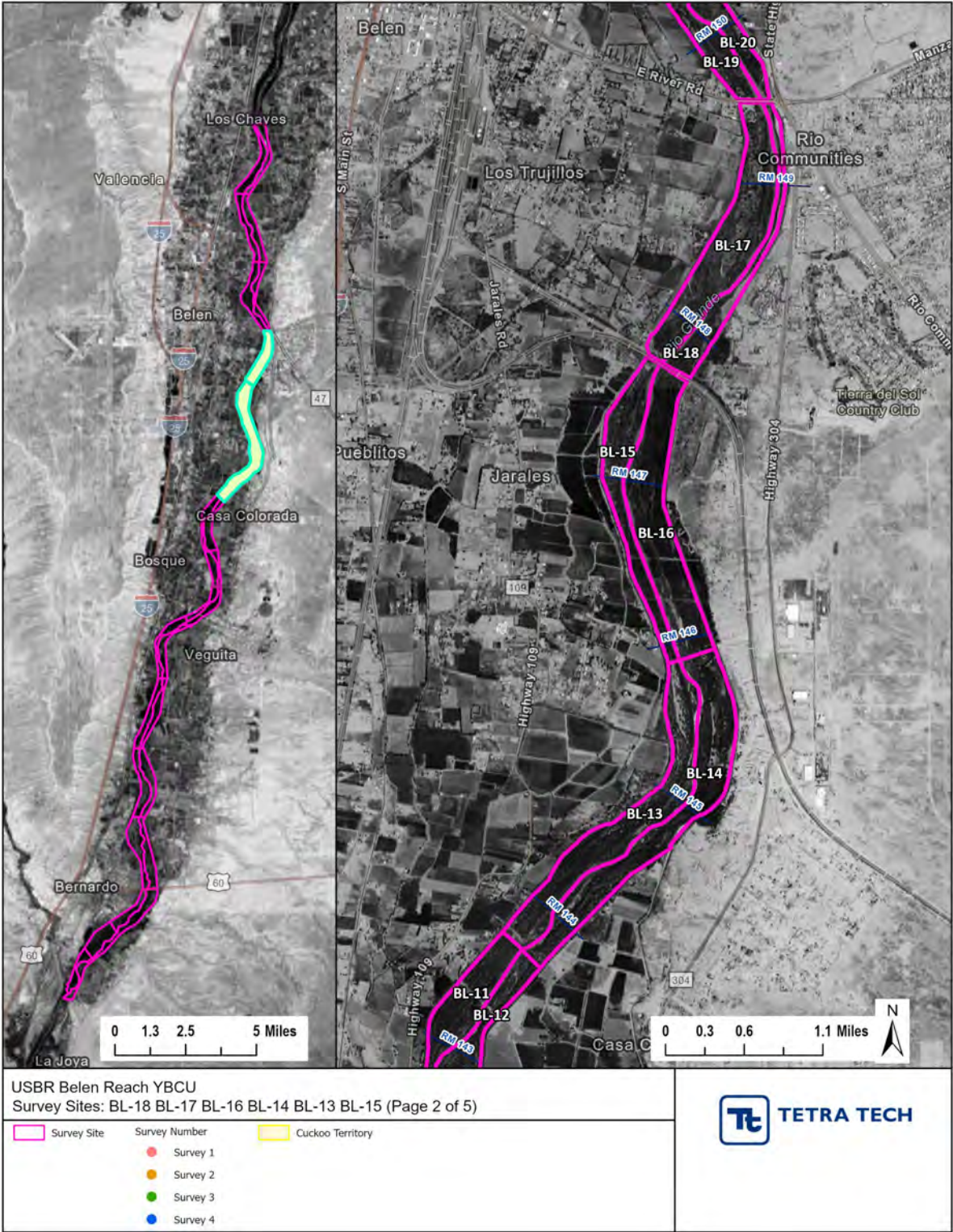


Figure 4. 2024 YBCU Detections and Territories: BL-18, BL-17, BL-16, BL-14, BL-13, BL-15

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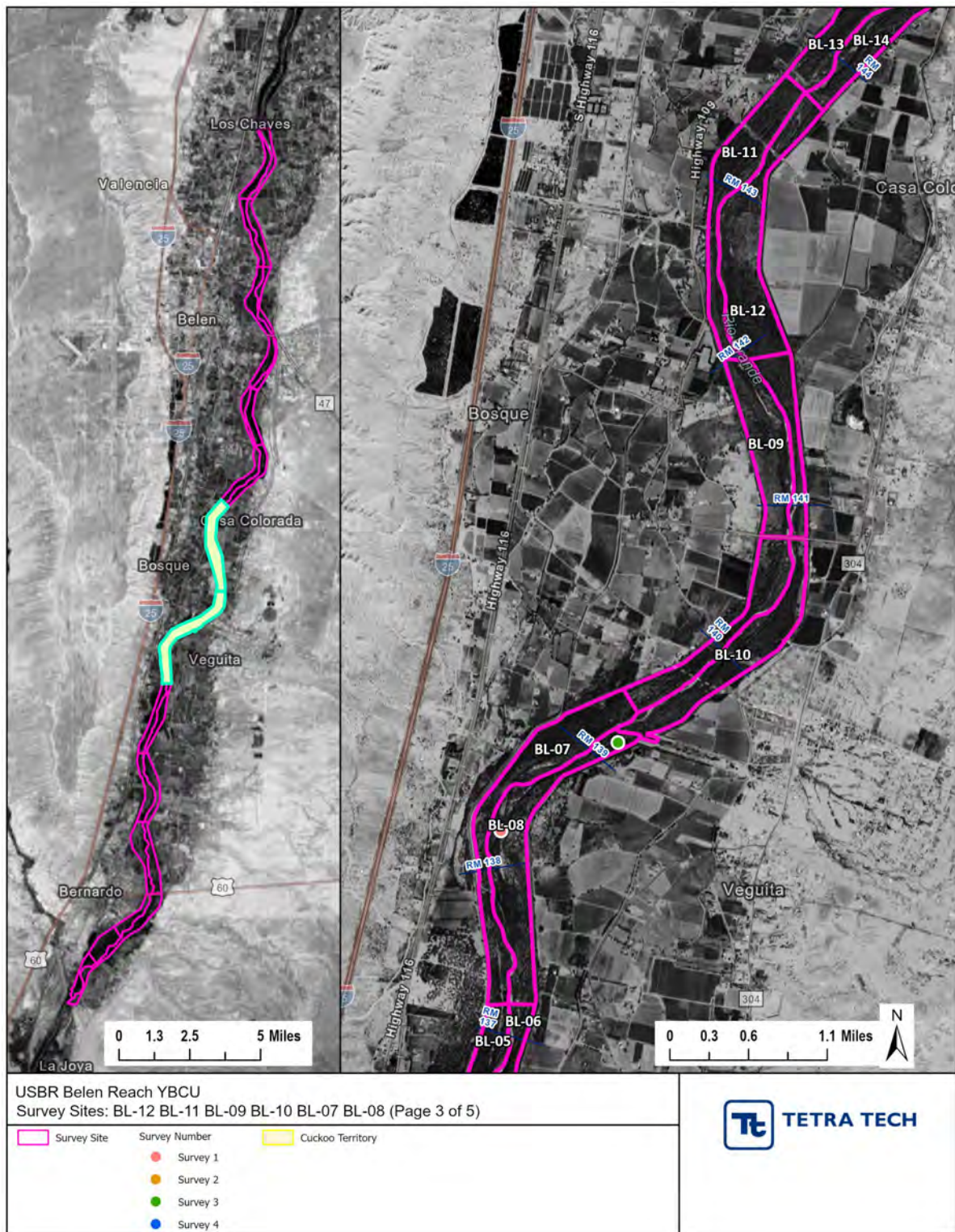


Figure 5. 2024 YBCU Detections and Territories: BL-12, BL-11, BL-09, BL-10, BL-07, BL-08

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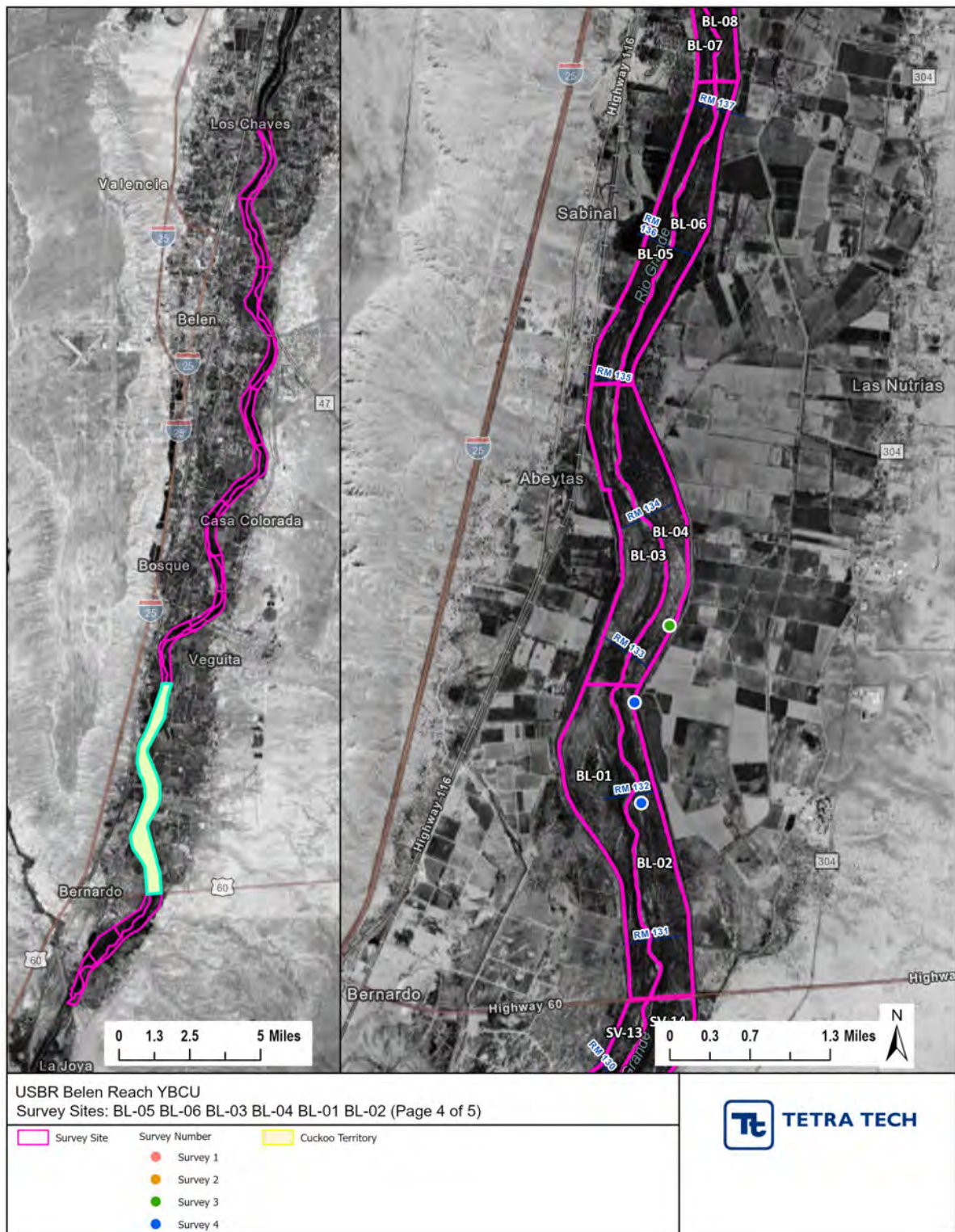


Figure 6. 2024 YBCU Detections and Territories: BL-05, BL-06, BL-03, BL-04, BL-01, BL-02

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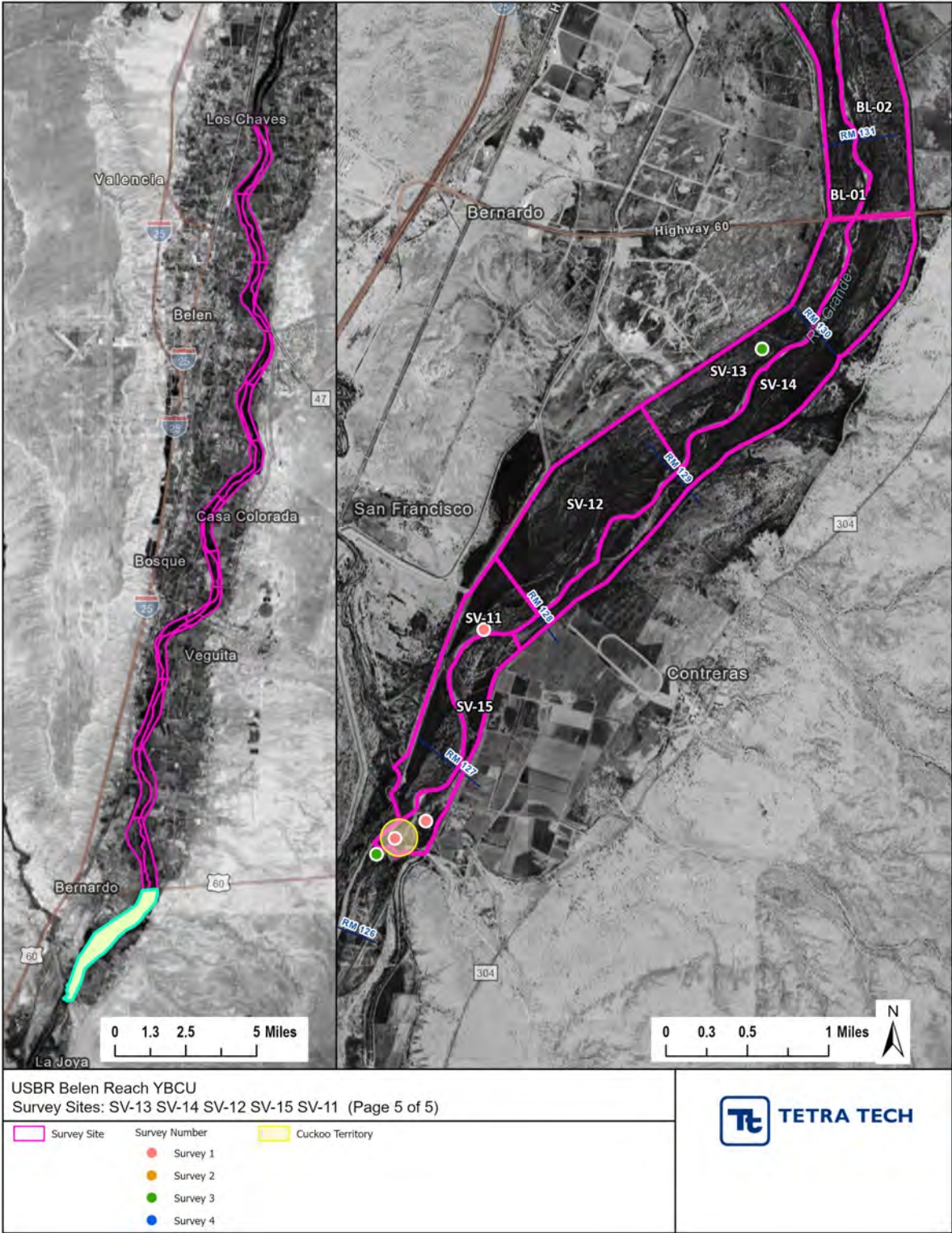


Figure 7. 2024 YBCU Detections and Territories: SV-13, SV-14, SV-12, SV-15, SV-11

4.0 CONCLUSIONS

The 2024 presence/absence surveys and territory estimation of YBCU conducted within the Belen Reach of the MRG yielded a count of one territory, with one possible breeding pair, and 10 migrant cuckoos (12 total detections). The territory and detection counts are lower than the 2022 documentation of 11 territories and 40 detections within the Belen Reach; however, the 2024 survey area is approximately 10 RMs shorter than the survey area in 2022 (USBR, 2022). Since the entire reach was not surveyed in 2024, a direct population comparison cannot be made. The drying of the river and dynamic water elevation changes documented over the season indicate the need for continued monitoring of hydrological conditions given the cuckoo's habitat requirements for breeding that are intricately linked to vegetation and hydrology. Continued presence/absence surveys are recommended to maintain ESA compliance and support the understanding of the status of the YBCU as ecosystem conditions change.

5.0 LITERATURE CITED

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APPENDIX A: 2024 YBCU PRESENCE/ABSENCE SURVEY FORMS