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2018 Tricolored Blackbird Monitoring Report

Tricolored Blackbird Survey and Colony Protection

San Joaquin Valley, California

By

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Nongame Wildlife Program, 2018-04

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Abstract

Between late March and mid-June 2018, we located and monitored tricolored blackbird (*Agelaius tricolor*) nesting colonies in the San Joaquin Valley in Merced, Tulare, and Kern counties, California. The work was performed under contract with the Tulare County Resource Conservation District on behalf of the California Department of Fish and Wildlife. As stipulated in the scope of work, we focused our monitoring efforts on tricolored blackbird colonies in grain crops adjacent to dairies. We located and monitored tricolored blackbird colonies at 15 colony sites. Of those, 12 colonies were in grain crops adjacent to dairies, one was in a wetland, one was in a blackberry thicket, and one was in a pasture. We documented an estimated total of 92,100 to 126,500 adult tricolored blackbirds nesting in grain crops. Tricolored blackbirds fledged young at eight of the 12 dairy-associated colony sites. None of the 12 dairy-associated colonies were adversely impacted by agricultural activities, an important conservation success for the 2018 nesting season.

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Introduction

The tricolored blackbird (*Agelaius tricolor*) is a colonially nesting songbird that is largely endemic to California, with more than 99% of its population occurring in the state (Beedy et al. 2018). It is an itinerant breeder, capable of nesting multiple times each breeding season. It nests in wetlands and agricultural fields, where it forms the largest nesting colonies of any North American passerine bird (Beedy et al. 2018).

Once abundant, with a population size in the millions, the tricolored blackbird has undergone population declines throughout its historical range, especially in the San Joaquin Valley (Kyle and Kelsey 2011) and southern California (Allen et al. 2016). Surveyors during a statewide survey for tricolored blackbirds in California in 2017 encountered an estimated 178,000 birds (Meese 2017a). Tricolored blackbird populations have declined due to habitat loss resulting from water diversions, draining of wetlands, conversion of wetlands to agriculture, conversion of row crops to orchards or other unsuitable crops, and urbanization (UC Davis 2018). Tricolored blackbirds are persecuted as agricultural pests and sometimes shot or poisoned despite their legal protection under federal and state laws. Tricolored blackbirds are also vulnerable to the destruction of large breeding colonies during the harvest of grain crops in which they often nest.

On 19 April 2018, the California Fish and Game Commission agreed to list the tricolored blackbird as threatened under the California Endangered Species Act. Tricolored blackbird is also designated a Species of Special Concern by the California Department of Fish and Wildlife (CDFW) (Shuford and Gardali 2008) and a Species of Conservation Concern by the United States Fish and Wildlife Service (USFWS 1995).

In the San Joaquin Valley, tricolored blackbirds often associate with dairies and feedlots, where they form colonies in silage fields planted with triticale or other grain crops used as cattle forage. These dairy sites provide the three critical breeding habitat elements tricolored blackbirds require: (1) suitable nesting substrate (grain crops), (2) a water source (agricultural ditches or wastewater ponds), and (3) abundant food (grain and insects) (Meese 2013). However, dairy sites also render tricolored blackbird colonies susceptible to destruction from grain harvest. Protecting colonies in agricultural fields associated with dairies is a main conservation focus of the Tricolored Blackbird Working Group. The Tricolored Blackbird Working Group is a voluntary alliance of state and federal agency biologists, non-governmental organizations, industry representatives, and academic scientists who work cooperatively to help sustain and enhance

tricolored blackbird populations and habitats. Through their efforts, several silage-buyout and silage-harvest-delay programs have been established and implemented to encourage farmers to avoid harvesting fields containing tricolored blackbird colonies.

We located and monitored tricolored blackbird nesting colonies in the San Joaquin Valley in Merced, Tulare, and Kern counties, California during the 2018 nesting season. The work was performed under contract with the Tulare County Resource Conservation District on behalf of the CDFW. As stipulated in the scope of work, we focused our monitoring efforts on tricolored blackbird colonies in grain crops adjacent to dairies.

Methods

We surveyed for tricolored blackbird nesting colonies in portions of Fresno, Kings, Madera, Merced, Tulare, and Kern counties in the San Joaquin Valley of California between late March and mid-June 2018. The surveys were performed by driving public roads in and around dairy silage fields while searching for large concentrations of tricolored blackbirds, including foraging flights indicative of colony establishment. In addition to general surveys of habitat at dairies, we also visited wetlands and agricultural fields that have historically supported large colonies of tricolored blackbirds. Historical silage colonies were identified by searching the tricolored blackbird portal (https://tricolor.ice.ucdavis.edu/) by county.

Colibri Senior Scientist Scott Frazer conducted surveys for the first two weeks with support from Colibri Staff Scientist Joe Medley, who conducted the surveys for the remainder of the survey period. Dairy-associated tricolored blackbird breeding colonies were surveyed and monitored at least weekly, beginning in late March and continuing through mid-June. In general, surveys were conducted twice per week in April and May and once per week in June. However, five days of surveys were conducted during the last week of March, as the beginning of the nesting season is a critical time for colony detection. Priority was given to sites adjacent to dairies. Wetland and pasture sites near silage colonies were visited less frequently, and surveys were brief.

Each breeding colony was viewed from various vantage points using binoculars and a spotting scope to estimate colony size, determine ratios of male to female tricolored blackbirds, evaluate and characterize nesting activity, and identify and quantify any fledglings. Access to two colony sites was limited due to private property constraints. The Cherokee Forebay site and the Poso 4 site were viewed from adjacent state-owned lands, duck clubs, or public roads at a range of 0.3–0.5 miles. Determining sex ratios and identifying fledglings was generally not achievable under these circumstances.

Colony size was generally estimated during the settlement and nestling stages, periods when most birds in the colony are visible (Meese 2017b). Colony sizes were estimated following the guidelines included in the *Tricolored Blackbird 2017 Statewide Survey Training* (Meese 2017b). For smaller colonies, precise counts were made by counting individual tricolored blackbirds or by counting tricolored blackbirds in groups of fives or tens. For larger colonies, where precise counting is not feasible, scanning surveys were conducted. Such surveys were conducted by estimating the number of tricolored blackbirds in a defined fraction of the colony, then multiplying this estimate by the number of defined areas the colony occupies. Scanning surveys were also conducted of tricolored blackbirds in transit by estimating the number of tricolored

blackbirds flying past a point during a specified interval of time then multiplying the resulting estimate by the number of time intervals needed for the flock to pass. Estimating sizes of larger colonies typically involved using both scanning survey techniques. We estimated the number of breeding tricolored blackbirds at each colony as a range based on the uncertainty around the best estimate at a colony.

We confirmed nesting activity when female tricolored blackbirds were observed carrying nesting material into fields containing large numbers of tricolored blackbirds. Whenever a tricolored blackbird colony was detected in an agricultural field where routine crop harvest could destroy the colony, landowners were contacted by Tricolored Blackbird Working Group partner organizations (Audubon California, Western United Dairymen, National Resources Conservation Service) or CDFW contract manager Neil Clipperton to prevent colony destruction.

Reproductive success was categorized as low, moderate, or high based on observations of colony behavior, number of juvenile tricolored blackbirds, and the extent of the period during which tricolored blackbirds fledged from the colony. Nest transect surveys were not conducted this year due to private property restrictions.

Results

We surveyed for tricolored blackbirds at 67 sites in Fresno, Kings, Madera, Merced, Tulare, and Kern counties, California. Of these 67 sites, 57 consisted of silage fields near dairies, five were wetlands, three were pastures, one was a blackberry thicket along a levee, and one was a former dairy converted to an orchard. We detected tricolored blackbirds at 33 of these sites, including two in Fresno County, eight in Kern County, three in Madera County, 13 in Merced County, and seven in Tulare County (Figure 1). However, breeding activity was detected at only 15 of these sites. The 15 breeding colonies were in Merced, Tulare, and Kern counties (Figure 1, Table 1) and were monitored throughout the nesting cycle. Of these, 12 colonies were in silage fields associated with dairies, one was in a wetland, one was in a pasture, and one was in a blackberry thicket. The 12 silage colonies are the focus of this report.

We monitored eight colonies in Merced County, including one in an agricultural field planted with forage mix (Healy Road; Figure 2), one in a blackberry thicket (Hulen Levee; Figure 3), five in agricultural fields planted with triticale (Fahey Levee, Fahey South 2, Fahey South 3, Henry Miller and Cherokee, and Henry Miller and Cherokee West; Figures 4 and 5), and one in a pasture (Cherokee Forebay; Figure 4). We monitored two colonies in Tulare County, both in agricultural fields planted with triticale (Cornerstone 3 and Riverview 2; Figures 6 and 7). Five colonies were monitored in Kern County, including one in an agricultural field planted with forage mix (Pond Road; Figure 8), one in a wetland (ECLA Ponds; Figure 9), and three in agricultural fields planted with triticale (Poso 4, Sherwood Avenue 2, and Old River Road; Figures 8, 9, and 10).

Of the 12 tricolored blackbird colony sites in agricultural fields associated with dairies, two were in fields planted with forage mix (Healy Road and Pond Road) and 10 were in fields planted with triticale (Table 1). We detected a total of 92,100 (low estimate) to 126,500 (high estimate) adult tricolored blackbirds at these 12 dairy-associated colonies (Table 1). The largest colonies were at the Healy Road, Pond Road, and Fahey South 2 sites, with 20,000–25,000 adult tricolored blackbirds each. The smallest silage colony was at the Cornerstone 3 site, where only 100–500 breeding tricolored blackbirds were detected.

We confirmed tricolored blackbird nesting at 10 of the 12 dairy-associated colonies. We were unable to confirm nesting at Poso 4 and Cornerstone 3. Of the 10 confirmed breeding sites, eight successfully fledged young tricolored blackbirds. We were unable to document successful nesting at Cherokee and Henry Miller and Cherokee and Henry Miller West. Breeding almost certainly occurred at Poso 4. However, because we discovered the Poso 4 colony late in the season and could view it only from a distance, we were unable to confirm breeding activity. Nevertheless, the colony was vigorous and likely fledged many young. A total of 1200–1400 juvenile tricolored blackbirds were observed on 21 May 2018 in the Poso 5 field, just west of the Poso 4 colony. These juveniles likely fledged from Poso 4, but we were unable to confirm that due to the presence of other breeding colonies nearby that could have served as the source for the juveniles. The colony at Cornerstone 3 began small, became smaller, and was quiet and

inactive during all survey visits. Juvenile tricolored blackbirds were not detected at this colony, but a small number of young may have fledged. The colonies at Henry Miller and Cherokee and Henry Miller and Cherokee West were vigorous early in the breeding season but disbanded or decreased drastically in size throughout the season. No juveniles were detected in either of these silage colonies, although juvenile tricolored blackbirds were detected at nearby dairy pens to the southwest. However, these juveniles more likely fledged from the nearby Cherokee Forebay colony, which remained vigorous throughout much of the survey period. Seven of the eight tricolored blackbird colonies in silage fields that fledged young had high reproductive success. Those included the colonies at Healy Road, Fahey South 2, Fahey South 3, Riverview 2, Pond Road, Sherwood Avenue 2, and Old River Road. The Fahey Levee colony experienced low reproductive success, presumably due to heavy winds that damaged the silage and disrupted nesting activities.

We confirmed tricolored blackbird nesting at all three colonies that were not associated with dairies (Hulen Levee, Cherokee Forebay, and ECLA Ponds). Two of these colonies (Cherokee Forebay and Hulen Levee) successfully fledged young and had high reproductive success. We detected nest building at ECLA Ponds late in the season, but our surveys concluded before we would expect fledglings at this site.

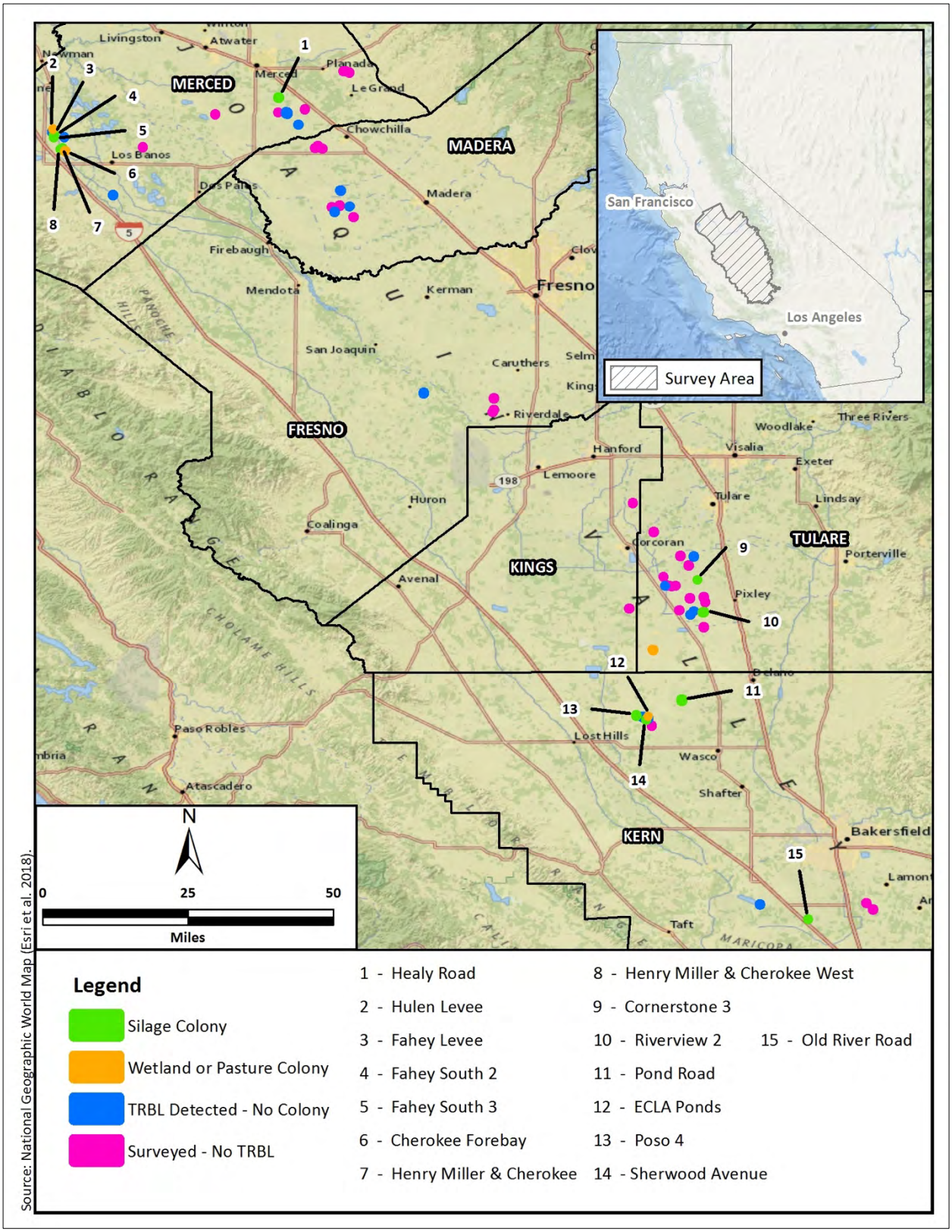

Figure 1. Survey area map.

Table 1. Tricolored blackbird sites by habitat, colony size, nesting outcome, reproductive success, and adverse impacts from agriculture.

Site # See Figure 1	Site Name	Habitat	Colony Size # of breeding adults	Nesting Outcome	Reproductive Success	Adverse Impacts from Agriculture	Comments
1	Healy Road	Ag-Forage Mix	20,000–25,000	Fledged	High	None	
2	Hulen Levee	Blackberry thicket	100–150	Fledged	High	None	Vigorous small colony.
3	Fahey Levee	Ag-Triticale	2000–3000	Fledged	Low	None	Silage was damaged by heavy winds.
4	Fahey South 2	Ag-Triticale	20,000–25,000	Fledged	High	None	
5	Fahey South 3	Ag-Triticale	5000–10,000	Fledged	High	None	
6	Cherokee Forebay	Pastureland	2500–4000	Fledged	High	None	Distant observation point made estimates difficult, but colony was vigorous.
7	Henry Miller and Cherokee	Ag-Triticale	1000–2000	Unknown	Unknown	None	Initial pre-settlement with 2500–4000 TRBLs. Established colony was small and quiet. Juveniles were detected at nearby dairy pens but may have fledged from nearby Cherokee Forebay colony.
8	Henry Miller and Cherokee West	Ag-Triticale	1000–2000	Unknown	Unknown	None	Initial pre-settlement with 2800–3800 birds. Established colony was small and quiet. Juveniles were detected at nearby dairy

Site # See Figure 1	Site Name	Habitat	Colony Size # of breeding adults	Nesting Outcome	Reproductive Success	Adverse Impacts from Agriculture	Comments
							pens but may have fledged from nearby Cherokee Forebay colony.
9	Cornerstone 3	Ag-Triticale	100–500	Unknown	Unknown	None	Small colony that shrank throughout the season.
10	Riverview 2	Ag-Triticale	6000–8000	Fledged	High	None	
11	Pond Road	Ag-Forage Mix	20,000–25,000	Fledged	High	None	
12	ECLA Ponds	Wetland-Cattail	100–400	Unknown	Unknown	None	As many as 800–1200 birds were seen in the area, but colony was much smaller.
13	Poso 4	Ag-Triticale	6000–10,000	Unknown	Unknown	None	Distant observation point and late season colony detection.
14	Sherwood Avenue 2	Ag-Triticale	5000–8000	Fledged	High	None	Intensive hazing by farmer during pre-settlement ceased following settlement.
15	Old River Road	Ag-Triticale	6000–8000	Fledged	High	None	

Figure 2. Map of the Healy Road site, an agricultural field planted with forage mix, in Merced County.

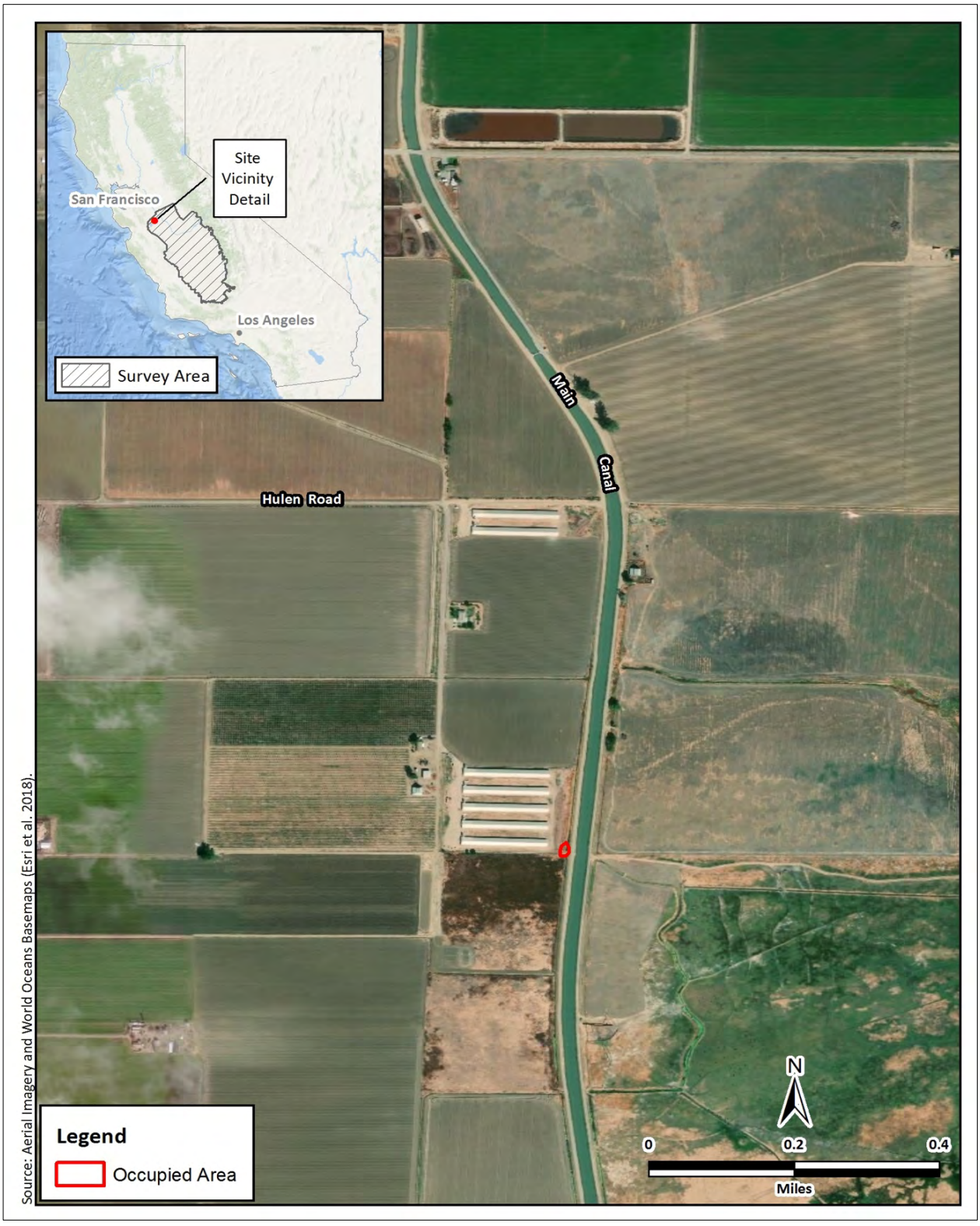

Figure 3. Map of the Hulen Levee site, a blackberry thicket, in Merced County.

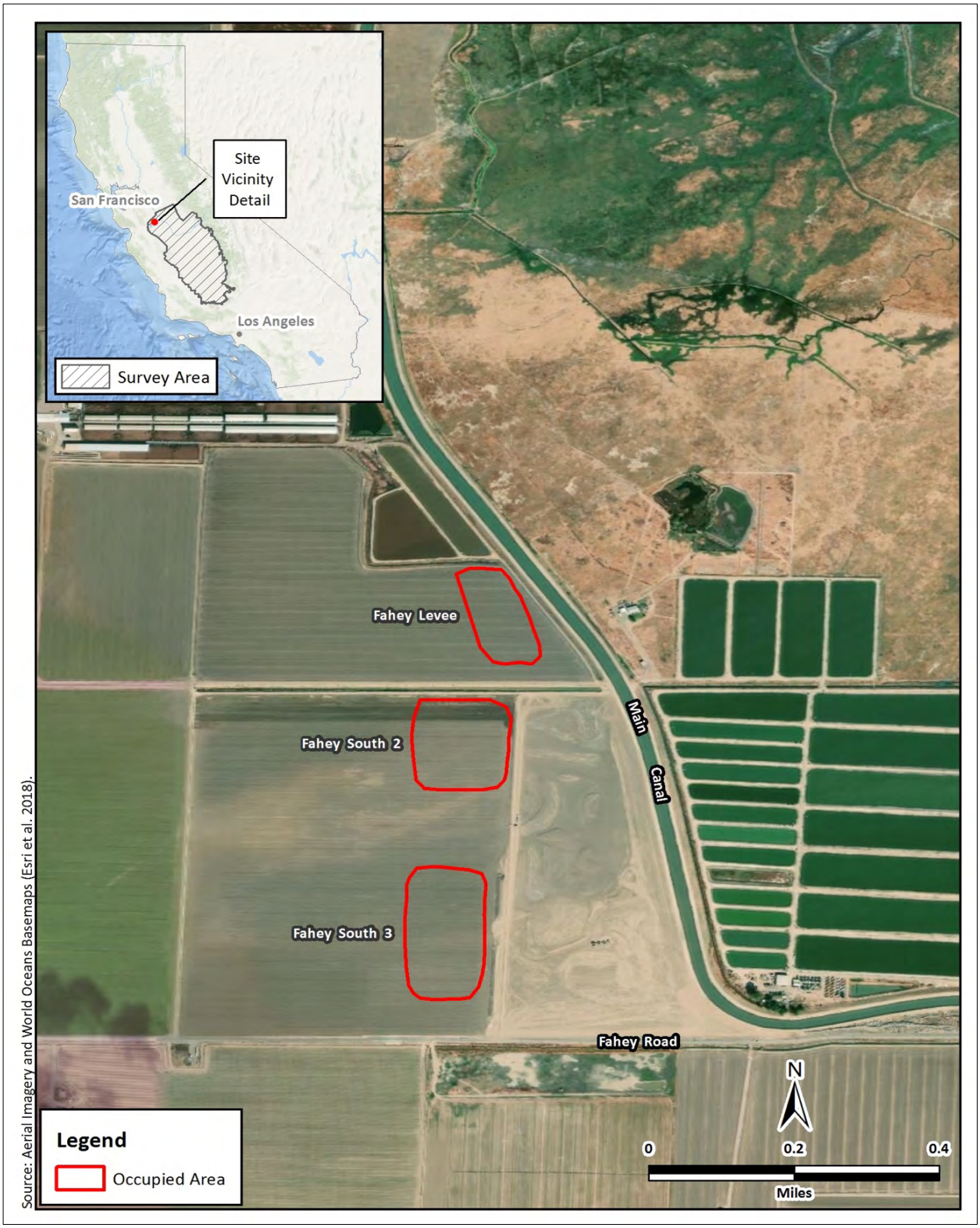

Figure 4. Map of the Fahey Levee, Fahey South 2, and Fahey South 3 sites, agricultural fields planted with triticale, in Merced County.

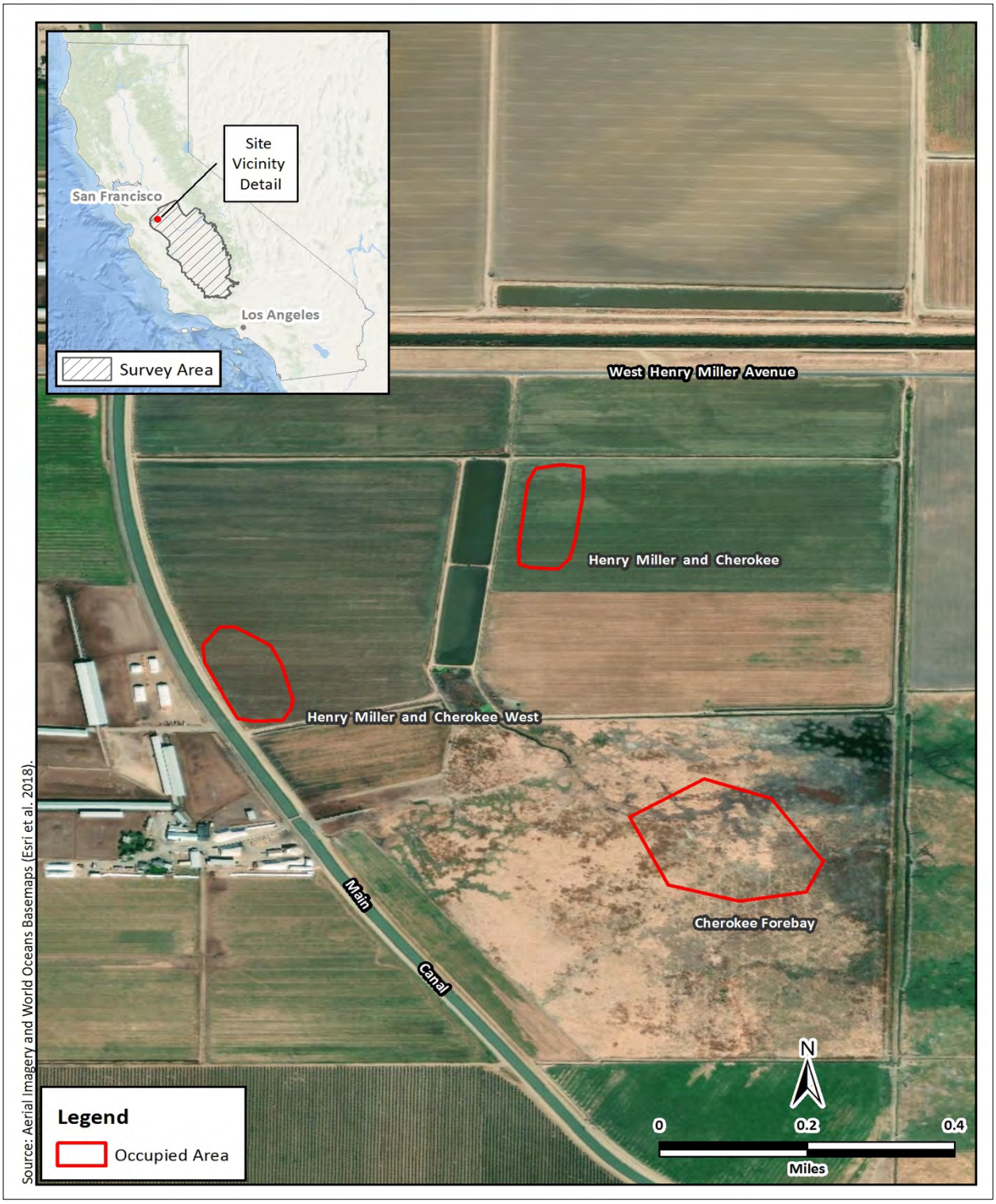

Figure 5. Map of the Henry Miller and Cherokee and Henry Miller and Cherokee West sites, agricultural fields planted with triticale, and the Cherokee Forebay site, a pasture, in Merced County.

Figure 6. Map of the Cornerstone 3 site, an agricultural field planted with triticale, in Tulare County.

Figure 7. Map of the Riverview 2 site, an agricultural field planted with triticale, in Tulare County.

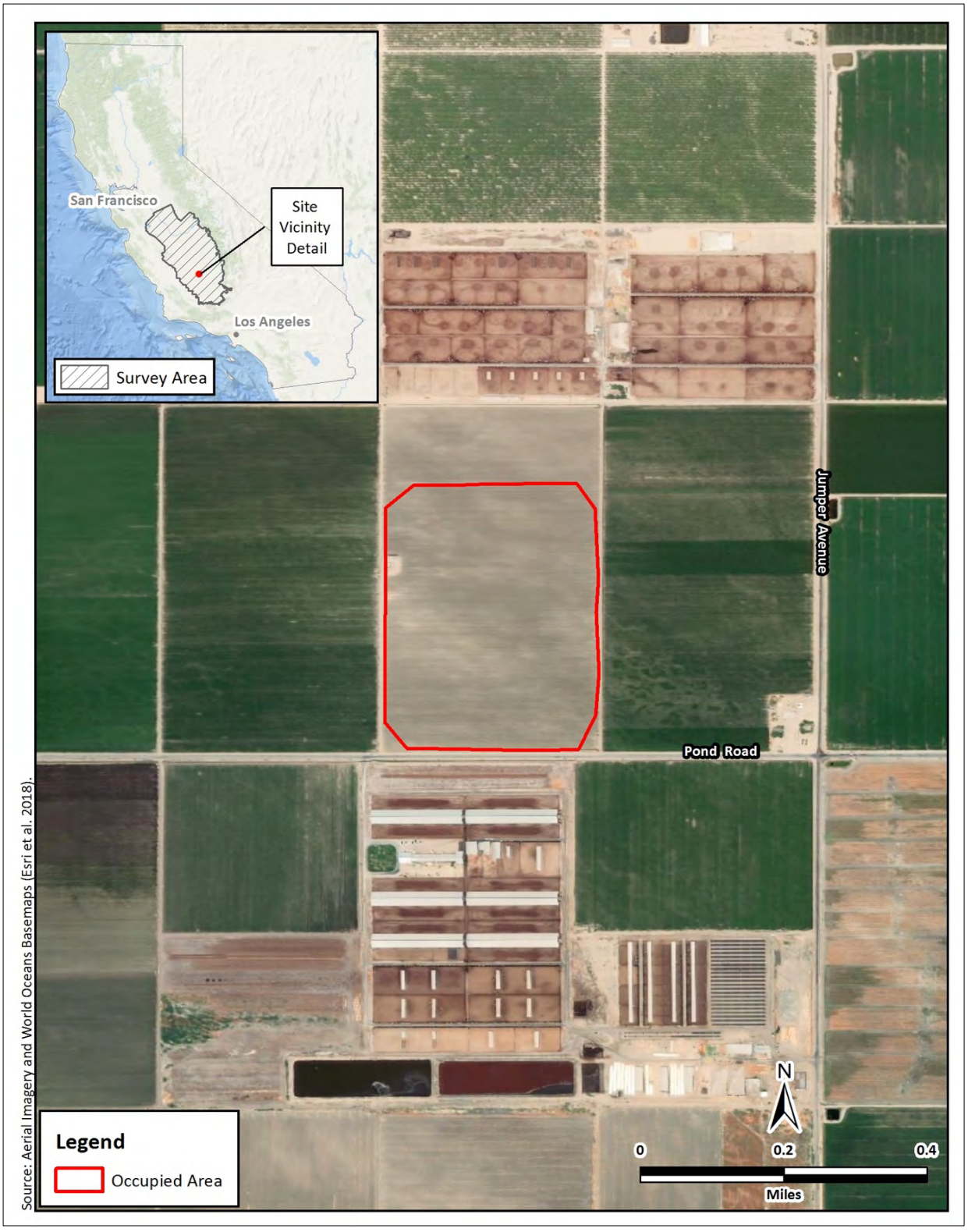

Figure 8. Map of the Pond Road site, an agricultural field planted with forage mix, in Kern County.

Figure 9. Map of the ECLA Ponds site, a wetland, in Kern County.

Figure 10. Map of the Poso 4 site, an agricultural field planted with triticale, in Kern County.

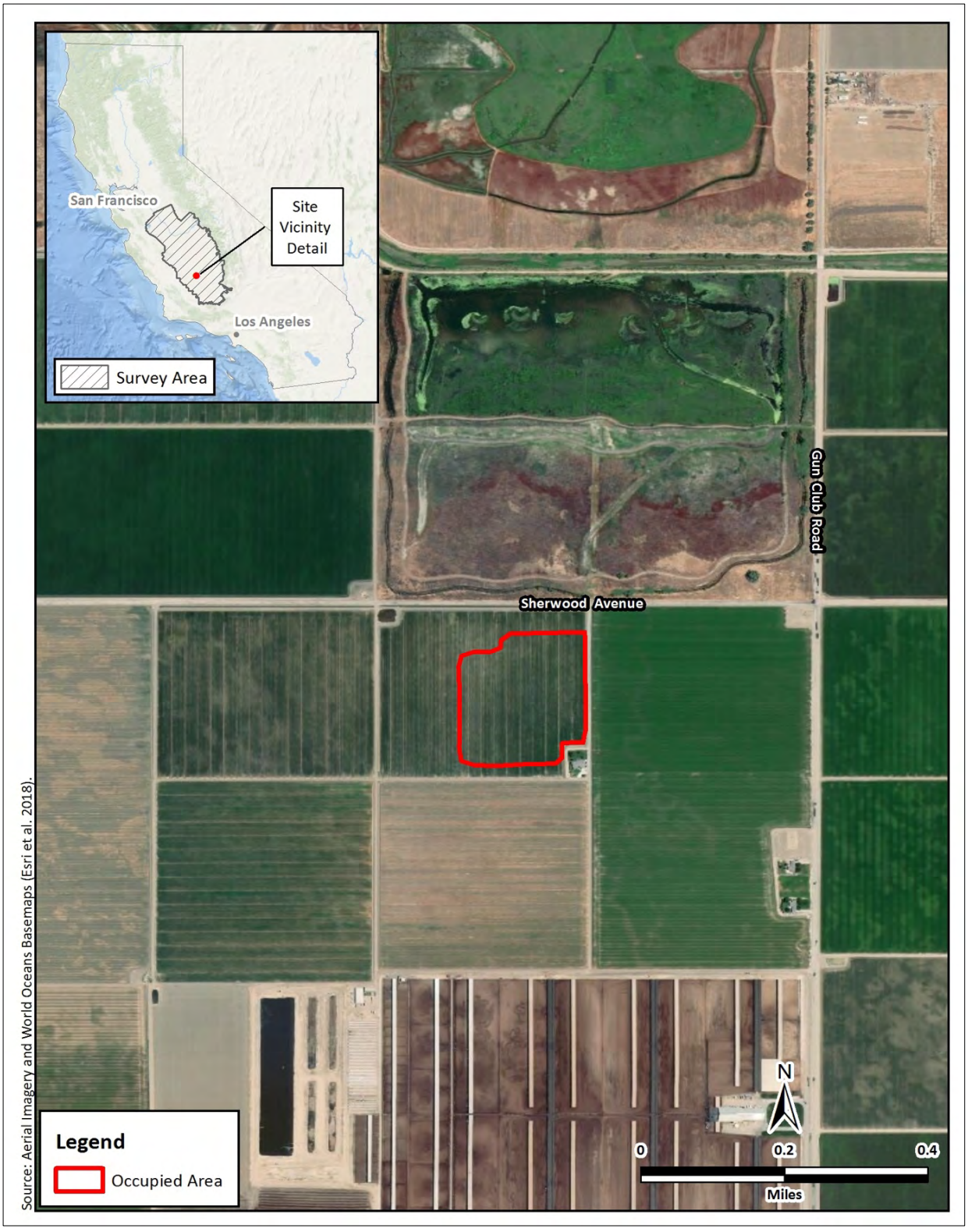

Figure 11. Map of the Sherwood Avenue 2 site, an agricultural field planted with triticale, in Kern County.

Figure 12. Map of the Old River Road site, an agricultural field planted with triticale, in Kern County.

Discussion

Agricultural Impacts

None of the 12 dairy-associated tricolored blackbird colonies we monitored were substantially impacted by harvesting activities. However, other agricultural activities may have impacted tricolored blackbirds at one site in Merced County and two sites in Kern County:

North of Fahey (Merced County)

A total of 800–1000 adult tricolored blackbirds displayed settlement behavior, and five females carried nesting material in a silage field on 20 April 2018. This colony was staked and protected by the Natural Resource Conservation Service (NRCS), and silage harvest of the unoccupied portion of the field followed immediately thereafter. The colony disbanded shortly after the silage in the unoccupied portion of the field was harvested. These birds likely joined one of the nearby active nesting colonies after the colony disbanded.

Jumper Road and Elmo Highway (Kern County)

On 06 April 2018, Scott Frazer received a tip that a field containing 700–1000 tricolored blackbirds was being disked on the northeast corner of the intersection of Jumper Road and Elmo Highway. He called CDFW and Audubon California to apprise them of this activity, but responders were too far from this location to stop the activity. A CDFW law enforcement officer visited the area shortly after disking and did not detect any sign of tricolored blackbirds. Whether a colony was established in this field prior to the disking is unknown.

Sherwood Avenue 2 (Kern County)

On 30 March 2018, Scott Frazer observed intense hazing activities directed at tricolored blackbirds, including the use of carbide canons. Despite the hazing, tricolored blackbirds continued to display settlement behavior in a silage field planted with triticale. On 03 April 2018, Joe Medley accompanied a CDFW law enforcement officer to the silage field where tricolored settlement was expected. Joe conducted four 150-foot-long nest transects in this field and didn't detect any nests or tricolored blackbirds. Therefore, the hazing activities may have prevented the colony from becoming established in this field. Tricolored blackbirds persisted in the area, however, and on 16 April 2018, a total of 5000–8000 displayed settlement behavior in silage just north of the original settlement

location. Settlement behavior observed on this date included 12 females carrying nesting material. Hazing activities continued, however, including firing a propane canon in the field where nest building was observed. CDFW was contacted regarding the hazing, and no hazing was documented on any subsequent visits to the colony. Stopping hazing at this colony represents a conservation success, as the colony was vigorous and had high reproductive output, fledging young for a period of at least one month.

Nest Transects

Nest transects were not conducted during the 2018 field season due to a lack of access to private land. Jesse Bahm of NRCS, assisted by Joe Medley, did conduct a nest survey at Riverview 2. However, the survey did not involve using standardized nest transects, and the results therefore provided only anecdotal information on the reproductive success at this site.

Field Types

Two of the largest tricolored blackbird colonies (at the Healy Road and Pond Road sites) were in agricultural fields planted with forage mix. Both colonies were successful and had high reproductive success. Early breeding season reconnaissance surveys for tricolored blackbird colonies tend to focus on fields planted with triticale, which have historically held the largest colonies in agricultural fields. However, this year's results, like last year's, suggest fields planted with forage mix should not be overlooked.

Conservation Successes

Healy Road, Fahey South 2, Fahey South 3, Riverview 2, Pond Road, Sherwood Avenue 2, and Old River Road represent substantial conservation successes. Large colonies became established at all these sites, including at Sherwood Avenue 2, despite intensive hazing there early in the season. Farming operations ultimately did not hinder breeding activities, and multiple cycles of breeding occurred, resulting in high reproductive success. These cases illustrate how communication and cooperation between CDFW, NRCS, Audubon California, and landowners can result in positive conservation outcomes for tricolored blackbirds.

Importance of Silage Colonies

We detected an estimated 92,100–126,500 tricolored blackbirds nesting in silage fields. This count is 52–71% of the estimated 178,000 tricolored blackbirds encountered in California during

the 2017 statewide survey. Ideally, tricolored blackbirds would nest largely at wetland sites on public lands, where they could be readily protected and managed. However, the limited number of wetland sites on public lands and the unreliability of seasonally appropriate water deliveries at those sites means that a large proportion of the tricolored blackbird population will continue to nest in silage fields. Detecting and monitoring these silage colonies, therefore, especially to prevent their destruction during routine harvest operations, is vital to the conservation of the species. Funding to ensure these efforts and supplement dairy operators with large tricolored blackbird colonies on their properties is necessary for the survival of the species.

Conclusion

Monitoring San Joaquin Valley tricolored blackbird colonies throughout the breeding season and communication between Tricolored Blackbird Working Group partners and landowners of silage fields resulted in conservation successes at all 12 of the dairy-associated colonies. The 2018 season highlighted the importance of detecting and monitoring silage colonies to ensure species protection, as a large percentage of the tricolored blackbird population relied on silage fields for nesting.

Recommendations for Conservation

Early Colony Detection

To maximize the potential for detecting large tricolored blackbird colonies that initiate early, colony detection and monitoring efforts should begin by early March. Based on nest records, nesting colonies from 2000 to the present have initiated earlier in the season than they did historically (Frazer 2016). And even large colonies can be overlooked in the incubation phase (Hamilton 2004). Early colony detection is key to tricolored blackbird conservation.

Alternative Measure of Reproductive Success

We recommend that an alternative quantitative measure of reproductive success be developed. The current method involves using transect surveys, during which the number of 7-9-day-old tricolored blackbird chicks is documented along a specified transect. The number of 7-9-day-old tricolored blackbird chicks detected is assumed to represent the number of tricolored blackbirds that will successfully fledge from a given area in the colony (Beedy et al. 2018). However, fragile or patchy nest substrate, asynchronous colonies, and limited access to colonies on private lands can render nest transect surveys inadequate or infeasible. Transects in dense, intertwined nesting substrate can be difficult to walk and may cause inadvertent damage to nest structures. Transects in patchy nest substrate, where waking is less impeded, may not be representative of the entire colony. Asynchronous tricolored blackbird colonies may contain large numbers of 10-12-day-old tricolored blackbird chicks, which tend to jump from nests when approached by human observers. These “jumper” chicks may not survive once outside the immediate protection of the nest.

We propose exploring the use of an unmanned aerial vehicle (UAV) and a thermal infrared sensor to capture aerial imagery of tricolored blackbird nesting colonies during the 2019 field season. Analyzing the thermal imagery may be a means of more accurately assessing the number of nests in a less invasive manner than the traditional nest transect method. We suggest conducting same-day walking nest transects in addition to aerial image analysis to ground truth the potential usefulness of UAV technology in determining the number of nests. Similar methods are currently used with great success for colonial nesting seabirds (e.g., Hodgson et al. 2016), songbirds (Wilson et al. 2017), and lapwings (Israel and Reinhard 2017). We recommend that the Tricolored

Blackbird Working Group discuss this strategy and alternative strategies for quantitatively measuring reproductive success. Accurate and reproducible measures of reproductive success across the range of colony types are critical for informing conservation-based management decisions for the tricolored blackbird.

Landowner Incentive Program

Throughout the 2018 field season, we had many interactions with landowners during which we discussed issues associated with tricolored blackbird colonies next to dairies. Almost invariably, these landowners voiced that their negative opinion of tricolored blackbirds stems from economic hardships resulting from birds colonizing their silage fields. Silage-harvest-delay and silage-buyout programs have been a great conservation tool for protecting tricolored blackbirds—and the protection of all 12 dairy-associated colonies during the 2018 season is a great example of the value of these programs. However, many landowners commented that even with these buyout programs, they often still take an economic loss when large colonies of tricolored blackbirds take residence in their grain, are inconvenienced by delaying harvest, and that tricolored blackbirds consume and foul grain feed in the dairy pens. We specifically asked several landowners if they would change their opinion of tricolored blackbirds colonizing their land if a program were in place that made hosting tricolored blackbirds a financial benefit, rather than a loss, wash, or inconvenience. Consistently, these landowners answered that they would be more tolerant and willing to deal with tricolored blackbirds if a financial incentive were in place.

We propose that the Tricolored Blackbird Working Group explore this kind of landowner incentive program. Raising sufficient funds for such a program could be challenging. However, we think that creating an environment in which having tricolored blackbirds colonize a silage field is seen by landowners as an economic benefit would be a means of conserving the species while improving relations between agencies, researchers, and landowners.

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