

REQUIEM FOR THE TRICOLORED BLACKBIRD IN MEXICO?

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ABSTRACT: We summarize existing literature and document a recent steep population decline and range contraction in the Tricolored Blackbird (*Agelaius tricolor*) at the southern end of its range, in Baja California, the only state of Mexico in which the species occurs. From >1000 nesting birds using at least 14 sites south to 30° N around the turn of the 21st century, the population declined and contracted northward and upward in elevation to a single colony of ~150 nesting birds near the international border in 2019. Chronic drought, rising temperatures, and habitat losses due primarily to intensification of agriculture in Mexico are largely responsible for the decline, as in the core of the species' range in California. Because of the reduction of breeding and foraging habitat, we fear the imminent extirpation of the species in Mexico.

RESUMEN: Presentamos una síntesis de la bibliografía existente y documentamos el declive agudo y reciente de la población del tordo tricolor (*Agelaius tricolor*) en la porción sur terminal de su ámbito en Baja California, el único estado de México en el que se encuentra la especie. De >1000 aves anidantes en al menos 14 sitios rumbo al sur hasta los 30° N a principios de siglo XXI, la población disminuyó y se redujo para el norte y hacia arriba en elevación hasta quedar en 2019 una sola colonia de ~150 aves cerca la frontera internacional. La sequía prevalente, el aumento en las temperaturas y las pérdidas de hábitat debidas principalmente a la intensificación de la agricultura en México son en gran parte las causas de esta disminución, como en Alta California, en el núcleo del ámbito de distribución de la especie. Dados la reducción de los hábitats de reproducción y alimentación, tanto a nivel local como en todo su ámbito de distribución, tememos la inminente extirpación de esta especie en México.

The highly gregarious and colonial Tricolored Blackbird (*Agelaius tricolor*) is largely restricted to lowland regions of cismontane California, where it is nonmigratory but nomadic. Indeed, >99% of the global population occurs in California, the great majority in the Central Valley (Beedy et al. 2018), but the range extends from central Washington and extreme western Nevada to northwestern Baja California.

The Tricolored Blackbird is but one of many species under threat in Baja California, especially within the blackbird's range in the northwest (many others covered by Ceballos and Márquez Valdelamar 2000 and SEMAR-NAT 2010). Associated with an expanding human population are increasing threats from habitat loss due to residential, industrial, and agricultural development. The pressures of climate change are also weighing heavily on the region (Ackerly et al. 2010, Cavazos et al. 2020, Del-Toro-Guerrero and

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Kretzschmar 2020). Wetland-dependent species are especially imperiled (Contreras-Balderas et al. 2008, Peralta-García et al. 2016, Pérez Navarro et al. 2019, Harper et al. 2020), and in Mexico all known sites of Tricolored Blackbird nesting have been in wetlands, emergent marsh almost exclusively (this study). Monitoring population levels of species at risk should be an important component of continuing conservation efforts in the state. For this effort we monitored Tricolored Blackbirds in Baja California from 1991 to 2019 and reviewed all existing reports of the species in Baja California. These data lead us to conclude the species is in imminent danger of extirpation in Mexico.

METHODS

Our study of the Tricolored Blackbird in Mexico began in 1991 with research for a monograph devoted to the distribution of birds in the states of Baja California and Baja California Sur (Erickson and Howell 2001, Wurster et al. 2001). From 2000 it continued with editing the quarterly reports from the same area for the journal *North American Birds* (Erickson et al. 2008, 2013, 2020). In most years, our observations of blackbirds at colonies and elsewhere were opportunistic. During this period, we reviewed all relevant literature and specimen data pertaining to the species in Mexico.

Surveys that focused on the nesting season (March–June) were conducted by us in 2007 (Erickson et al. 2007), 2008 (Erickson and de la Cueva 2008), 2016 (Erickson et al. 2016), 2017, 2018, and 2019 and by Jonathan Feenstra in 2013 (Feenstra 2013). Travel restrictions associated with the covid-19 pandemic precluded surveys in 2020. Ground-based surveys in these years covered all known nesting sites throughout the current and historical range of the species in Baja California (Figure 1). The number of possible colony sites visited over the seven years of surveys ranged from 26 to 50 (Table 1). Multiple visits to many sites were made each year, so the total number of site visits amounted to 603. Baja California is arid, so people are where water is, and roads are where people are, so access to wetlands is generally easy. In early April 2019 we surveyed these and additional areas by aircraft, so we could evaluate known nesting locations and attempt to find additional areas potentially suitable for nesting or foraging. We followed up with ground surveys of many areas of prospective habitat previously unknown to us.

To ensure that the decline in Tricolored Blackbirds we document is independent of search effort we quantify the observed number of nesting birds per year, and the number of nesting birds per visit (sighting effort) (Table 1).

Beginning in 2018, we investigated ownership and other land-use issues at occupied sites and additional areas that may be important for the species.

RESULTS

Literature Review and Pre-survey Efforts

Table 2 lists all reports of the Tricolored Blackbird in Mexico through 1989. Grinnell (1928) summarized all that was known of the Tricolored Blackbird in Mexico at that time, roughly outlining the breeding range and considering the species a “fairly common resident.” That assessment was based in part on

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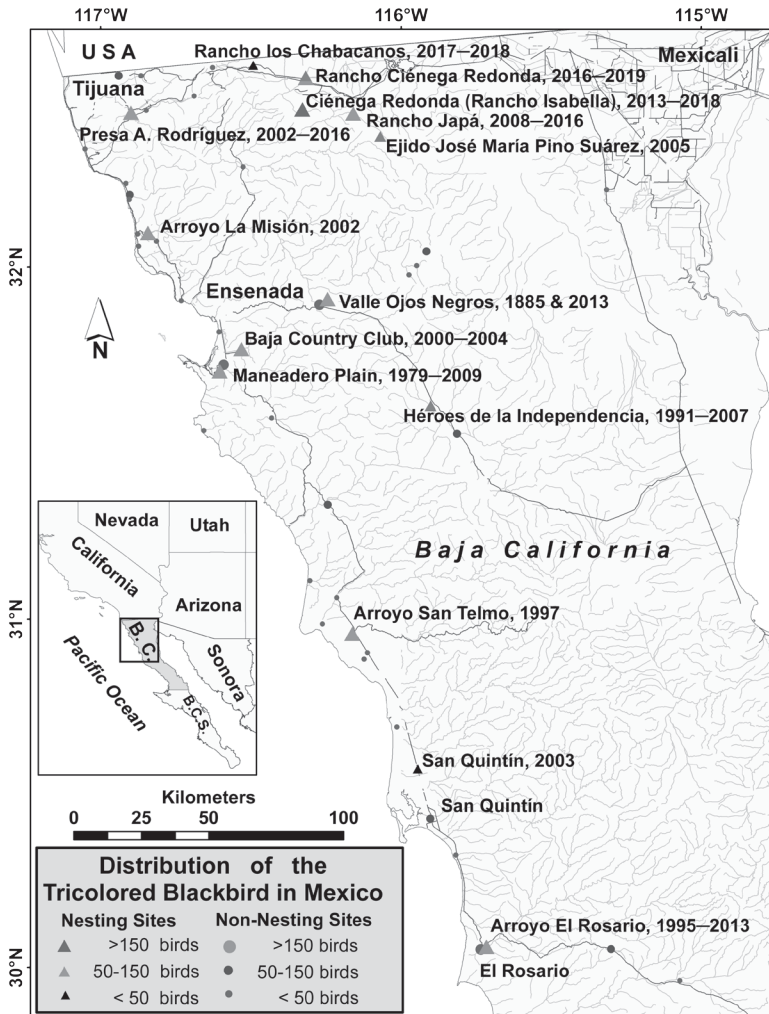


FIGURE 1. Historical and recent distribution of the Tricolored Blackbird in Mexico.

A. W. Anthony's report of the species as "rather common along the northwest coast, breeding in all freshwater marshes; and in San Rafael Valley [= Valle de Ojos Negros]. Mr. L. Belding found a large colony nesting in tules, May, 1885" (quoted by Bryant 1889 and Bendire 1895). Specific information on nesting sites was not provided. Laurence M. Huey (field notes at San Diego Natural History Museum) saw approximately 500 birds on the Maneadero Plain on 31 January 1928. No more information was provided by Neff (1937), AOU (1957), or Miller et al. (1957).

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TABLE 1 Numbers of Surveys for the Nesting of the Tricolored Blackbird in Northwestern Baja California by Year, 2007–2019^a

Location	2007	2008	2013	2016	2017	2018	2019
Presa Rodríguez	2	1	2	5	1	4	5
Arroyo La Misión	5	1	3	1	2	2	2
Baja Country Club	4	2	1	1		1	1
Maneadero Plain	6	2	3	3	4	2	5
Arroyo San Telmo	1	1	1	1	1	2	4
San Quintín	3	1	1	1	3		2
Arroyo El Rosario	2	1	1	3	1	1	4
Rancho Los Chabacanos					4	2	2
Rancho Ciénega Redonda	1			3	2	4	6
Ciénega Redonda			1	3	2	4	6
Rancho Japá	2	1	2	3	3	3	4
Ejido José María Pino Suárez	1	1					2
Valle de Ojos Negros (multiple sites)	6	1	2	3	3	6	6
Héroes de la Independencia	4	2	1	1	1	2	3
Total visits to known nesting sites	37	14	18	28	27	33	52
Number of known nesting birds	80	440	280	875	300	250	150
Nesting birds per visit (search effort)	2.16	31.43	15.56	31.25	11.11	7.58	3.00
Visits to additional sites/ number of sites	71/33	25/17	35/21	39/14	49/15	75/21	100/36
Nesting birds per all visits	0.74	11.28	5.28	13.06	3.95	2.31	0.99

^aBoldface highlights years when Tricolored Blackbirds actually nested at the site. The slopes calculated for year vs. number of nesting birds and year vs. search effort (nesting birds/visits to known colony sites) were not correlated, indicating that the reduction in the Baja California population is independent of sampling effort.

TABLE 2 Timeline of Reports of the Tricolored Blackbird in Mexico

Years of observation	Locations	Sources
1885	northwest coast, Ojos Negros Valley	Bryant (1889), Bendire (1895)
1894	Carrizo Valley	Grinnell (1928)
1906	El Rosario	Thayer and Bangs (1907)
1910	San Quintín	Howell (1911)
1925	San Antonio del Mar	Huey (1926)
1928	Maneadero Plain	L. M. Huey field notes
1929–1972 ^a		
1973, 1979, 1980	Maneadero Plain	Anderson and Kelly (1980), Wurster et al. (2001)
1981	Colonet	Wilbur (1987)
1984	Ojos Negros, San Vicente	Wurster et al. (2001)
1986, 1989	Arroyo San Telmo	eBird, Howell and Pyle (1990)
1988	Maneadero Plain	Wurster et al. (2001)
1989	El Descanso	Wurster et al. (2001)
1990s–2010s	throughout range	Erickson et al. (2008, 2016); this study

^a45-year gap in reports of the Tricolored Blackbird in Mexico.

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TABLE 3 Summary of Numbers of the Tricolored Blackbird Known Nesting in Mexico by Year, 1995–2019

Year	Nesting adults	Colony sites known occupied	Potential colony sites visited	Southernmost colony (°N)	References
1995	700	1		30.0	Anderson et al. (1997)
1997	1350	2		30.0	Anderson et al. (1997)
2000	20	1		31.8	Wurster et al. (2001)
2001	350	2		31.6	N. Am. Birds 55:360
2002	1100	2		32.1	N. Am. Birds 56:490
2003	40	2		30.6	N. Am. Birds 57:407, eBird, NAB database
2004	100	1		31.8	eBird, NAB database
2005	50	1		32.4	N. Am. Birds 59:658
2006	—	—		—	N/A
2007	80	1	44	31.6	Erickson et al. (2007), N. Am. Birds 61:646
2008	440	4	26	30.0	Erickson and de la Cueva (2008), N. Am. Birds 62:622
2009	175	1		31.7	N. Am. Birds 63:659
2010	—	—		—	N/A
2011	—	—		—	N/A
2012	—	—		—	N/A
2013	280	3	20	30.0	Feenstra (2013), N. Am. Birds 67:654
2014	—	—		—	N/A
2015	—	—		—	N/A
2016	875	4	21	32.4	Erickson et al. (2016), N. Am. Birds 70:392
2017	300	3	17	32.5	pers. obs., eBird
2018	250	3	16	32.5	pers. obs., eBird
2019	150	1	49	32.5	pers. obs., eBird

Wilbur (1987) considered the Tricolored Blackbird a “local resident” and noted only two reports since Grinnell’s (1928). Additional information from the 1970s and 1980s has since come to light but still leaves a 45-year gap in records from 1928 to 1973 (Table 2). Howell and Webb (1995) cited earlier literature but considered the species “now apparently local”

With recognition of the blackbird’s increasingly imperiled status, more attention was paid to the species. Table 3 includes what is known of nesting from 1995 to 2006. Seven nesting sites along the coast extended south to El Rosario, and two inland sites were the first to be found at elevations >1000 m. A detailed map of the blackbird’s Mexican range prepared by Erickson et al. (2008) was based primarily on data from these years. The largest numbers reported were at nesting colonies along the Arroyo El Rosario (700 in 1995 and 1997) and Arroyo San Telmo (650 in 1997) (all per Anderson et al. 1997). All specific reports of the species in Mexico are summarized in

Appendices 1 and 2 (see https://archive.westernfieldornithologists/archive/V52/Erickson_Appendices).

Surveys (2007–2019) and Other Recent Efforts

Results of focused surveys during the nesting season of 2007 were summarized by Erickson et al. (2007, also *N. Am. Birds* 61:646), for 2008 by Erickson and de la Cueva (2008, also *N. Am. Birds* 62:622), for 2013 by Feenstra (2013, also *N. Am. Birds* 67:654), and for 2016 by Erickson et al. (2016, also *N. Am. Birds* 70:392). In addition, Erickson et al. (2016) summarized the results of all surveys through that year. Table 3 and Appendix 1 augment those results with those for 2017–2019.

Of the 14 sites (7 coastal, 7 inland) where nesting has been confirmed in Baja California, all but five (4 coastal, 1 inland) were occupied during at least one of the survey years (Figure 1). Four, all inland, were first found during this period, suggesting a population shift from the coast to higher elevations inland. However, inland sites were rarely, if ever, surveyed in earlier years. After 2013, nesting was not recorded anywhere south of Rancho Japá, only 20 km south of the international border. An average of 2.6 sites were occupied during the seven years of surveys, but only a single site was occupied in 2019.

Although the number of nesting birds seen during this interval varied widely from year to year, a steady decline is apparent (Figure 2), despite an increase in survey effort. One of the most populous colonies, Ciénega Redonda, was not even discovered until 2013. In 2019, only 150 nesting birds were observed, all at a single site. Linear regression implies that within the study period the number of nesting birds declined at a rate of 15.9 per year while the number of nesting birds per visit to colony sites declined at 0.6 birds/visit per year. Given the small number of points, these relationships are not statistically significant ($p > 0.05$), but the trend is clear. Numbers at nonbreeding sites have also fallen markedly since 2000 (Figure 3).

The aerial surveys gave us a better understanding of the region and revealed wetlands and potential foraging areas, but they disclosed no blackbirds, breeding or otherwise, not already known to us.

Phenology

Dates for observed nesting activity in Mexico ranged from late March (19 March 2019, singing on territory, Rancho Ciénega Redonda; 26 March 2000, singing on territory, and 27 March 2004, carrying nest material, Baja Country Club) to early July (7 July 2003, carrying food, and 14 July 2003, downy-headed young, Baja Country Club).

Land-Use Issues

Of the 14 nesting sites known to have been used since 1997, three have been in natural arroyos, ten have been in wetland vegetation associated with water impoundments, and one has been undocumented (Valle de Ojos Negros, exact location unknown). The suitability of the sites in natural arroyos (La Misión, San Telmo, El Rosario) changes dramatically from year to year in response to highly variable precipitation. They were last occupied in 2002, 1997, and 2013, respectively. All known Mexican nesting sites have been in

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emergent marshes except at Presa Abelardo Rodríguez, where the birds used flooded tamarisk (*Tamarix* sp.) in 2002 and possibly 2008 but not in 2016, when emergent marsh was available.

The habitats in which nesting Tricolored Blackbirds forage in Mexico have been poorly studied. We observed most birds to forage in grassland or grassland mosaics within a kilometer or two of nesting sites, but have also seen them foraging in active agricultural fields (e.g., pastures, alfalfa, row crops), dairies, and feedlots. Outside of the nesting season, Tricolored Blackbirds are most often seen in agricultural settings, especially around cattle. Throughout the year many birds have joined multi-species blackbird roosts in densely vegetated freshwater marshes.

Almost all sites of nesting and foraging are on private property, although technically all open water and wetlands in Mexico are under federal jurisdiction, with concessions to private landowners. Only the lands surrounding Presa Abelardo Rodríguez are public, under control of the city of Tijuana.

DISCUSSION

In Upper California, the Tricolored Blackbird has been intensively studied for decades, and efforts to document and monitor its status have been continuous since at least the 1960s (DeHaven et al. 1975, Meese 2015). Two thorough syntheses were recently produced in response to petitions to list the species under the United States Endangered Species Act (USFWS 2019) and the California Endangered Species Act (CESA) (Clipperton 2018). Much information is also available at <https://tricolor.ice.ucdavis.edu/>. Unitt (2004) thoroughly reviewed the status of the species in adjacent San Diego County, California. Far less work has been done in Baja California, with information gaps spanning decades, and only in the past 20 years have efforts to monitor the species become regular (Table 2).

The intensity and geographic scope of our monitoring efforts have varied greatly over the years because of the constraints of available time, weather, and funding and changes in access to private property. Similarly, we have incorporated the sporadic observations of many others who used widely different methods to survey and present their findings. The itinerant and episodic nesting behavior known in California (Hamilton 1998) would have further compromised our findings but has not been documented in Baja California. Neither has double or triple brooding been confirmed in Mexico, though known north of the border. However, most areas the Tricolored Blackbird occupies in Baja California are also frequented by naturalists, and the birds are generally conspicuous at nesting sites. Thus we are confident that the numbers we report here accurately reflect a contraction in the species' distribution and a steep decline in abundance.

Primarily on the basis of A. W. Anthony's report that the Tricolored Blackbird was "rather common along the northwest coast, breeding in all freshwater marshes" (Bryant 1889), we infer the population in Mexico in the late 1800s may have numbered on the order of 10,000 birds nesting at 100 sites. We have little knowledge of the extent of coastal wetlands at that time; however, many permanent and ephemeral wetlands, both coastal and inland, have been destroyed by agricultural and urban expansion since then (Rangel

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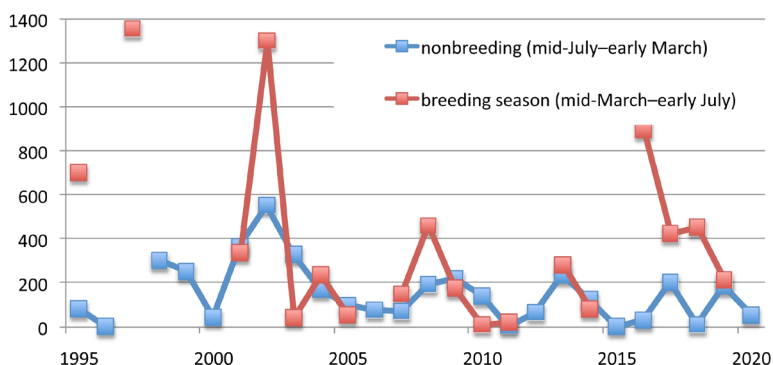


FIGURE 2. Annual number of Tricolored Blackbirds recorded in Baja California during the breeding season (mid-March–early July) and nonbreeding season (mid-July–early March), 1995–2020. The unevenness of data collection during this period must be emphasized. Many important areas (particularly Valle de Ojos Negros) were not visited annually, and several of the largest nesting colonies were not discovered until 2005 or later.

and Riemann 2015, Harper et al. 2020, pers. obs.). Cooper (1870) considered the Tricolored Blackbird “the most abundant species near San Diego” during his stay there from November 1861 to May 1862. As recently as the winter of 1979–1980, the Tricolored Blackbird was one of the nine most numerous species reported on Los Angeles County Christmas Bird Counts (Garrett 1980).

Baja California is more arid and may be more subject to variation in precipitation than southern California, so we believe the species was never abundant there. Although the livestock industry is not as widespread or as intensive in Baja California as it has been in California, we believe that the

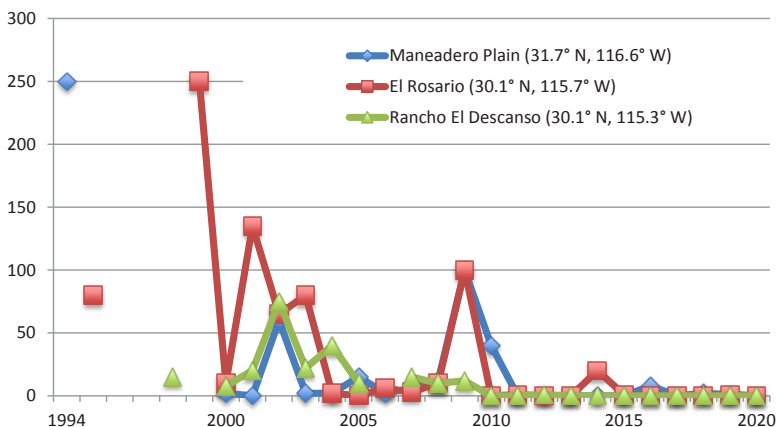


FIGURE 3. Maximum counts of the Tricolored Blackbird (during the nonbreeding season) at three sites visited most years in northwestern Baja California, 2000–2020 (with selected earlier data).

initial addition of cattle to the landscape may have benefited the blackbird by promoting grasslands for grazing, providing more food in the form of grains fed to livestock, and creating more opportunities for breeding in response to the building of stock ponds and other water impoundments that provide both water and nesting vegetation. The vast majority of Tricolored Blackbird observations during our surveys were in direct association with agriculture, especially involving livestock.

The increase in the level of survey and monitoring effort since 1995 led to an apparent increase in the number of Tricolored Blackbirds in Baja California. This enhanced effort also led to an increase in the number of known colony locations: of the largest colonies observed since 2015, all were discovered this century. Likewise, the overall outline of the nesting range remained intact through 2013 (Erickson et al. 2018: 29), with nonbreeding individuals seen through 2019. Moreover, the records of widest dispersal ever are from 2012 (Rancho El Águila II) and 2016 (Mexicali Valley) [Appendix 2 (see https://archive.westernfieldornithologists/archive/V52/Erickson_Appendices), Figure 1].

But the steep decline in the Tricolored Blackbird population in the core of its range in California has been well documented (Beedy et al. 2018, Clipperton 2018, Robinson et al. 2018, Goldfarb 2019, USFWS 2019) and led to the listing of the species as threatened under CESA in 2018. The status of the blackbird in southern California in particular has worsened dramatically this century, with most coastal and lowland areas now vacated entirely (Unitt 2004, Allen et al. 2016, Clipperton 2018). Unitt (2004), summarizing San Diego County atlas data for 1997–2001, listed seven nesting sites in the southern half of the county. Subsequent reports to <https://ebird.org> confirm nesting at only one of those sites, Jacumba, where the number of nesting birds has remained relatively stable since the 1970s. The largest south county colony during the atlas period (~1000 birds) was 4 km north of the international border at Campo, where by 2018 no trace remained of the marsh in which the blackbirds had nested (P. Unitt pers. comm.).

In a mark–recapture study from 2007 to 2016, Robinson et al. (2021) estimated a 51.7% annual decline in southern California and concluded “that a significant portion of the south population is lost due to emigration [to central California] each year.” We infer the same or worse is true of Mexican birds. A loss of social cohesion and population collapse in this most gregarious species may be linked.

Because the Tricolored Blackbird is highly mobile and nomadic, consisting of multiple interconnected populations (Robinson et al. 2018), its status in Mexico appears to primarily reflect forces acting more broadly than a response to local conditions. However, persistent drought and temperature rise (Cavazos et al. 2020) have exacerbated the situation, especially as it affects groundwater (Del-Toro-Guerrero and Kretzschmar 2020), and further projected warming and drying (Moser et al. 2012, Cavazos et al. 2020) will only degrade conditions further. Considering this, Erickson et al. (2018: Table 2) found many more northward range contractions (44) and expansions (28) among the native birds of Baja California and southern California than southward contractions (3) and expansions (23).

Although the introduction of livestock may have originally benefited the

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Tricolored Blackbird in Mexico, we have no reason to believe that the species was “one of the passerines best adapted to utilize the abundant supply of insects in agricultural lands” [as in] “the valleys of California during the breeding season” (Orians 1961). Now in Mexico, more “efficient” and industrial agricultural practices such as increased groundwater pumping, plastic lining of ponds to the exclusion of marshy vegetation, and the extensive conversion of open fields to greenhouse farming have greatly reduced the amount of potential habitat available for the species (pers. obs.). The continuing conversion of grazing land to vineyards is also harmful. The problems facing the Tricolored Blackbird are just the sort predicted by Stoleson et al. (2005) in discussing human population growth, habitat loss, and groundwater depletion in northern Mexico. We believe it is only a matter of time before the Tricolored Blackbird occurs in Mexico no more.

May 2021 Update

2021 nesting season: Successful nesting of approximately 250 adults underway in May at Rancho Ciénega Redonda (<https://ebird.org/checklist/S88464198>), but no other active colonies found. The good news of this increase over the 150 in 2019 is tempered by the blackbirds’ failure to nest in 2021 at the closest colony to the north in California (Jacumba, where 300 birds nested in 2019), though 700 birds nested at the Rancho Jamul Ecological Reserve (Anita Hayworth pers. comm.), 14 km north of the international border.

Maximum winter count, 2020–2021: 50 in Valle de Ojos Negros 20 January 2021 (<https://ebird.org/checklist/S79626512>; see also Appendix 1).

RECOMMENDATIONS

Others have suggested to us that we be more positive about the blackbird’s prospects and advocate more for the conservation of freshwater wetlands in Baja California. We fully support such conservation efforts, but this unique nomadic species is not the best for making that case. We believe scarce funding and resources are better directed to other less mobile wetland species, some of which are endemic to the region, such as fairy shrimp (*Anostraca*), the western spadefoot (*Spea hammondi*), and California vole (*Microtus californicus*). Nevertheless, should conservation measures for the blackbird in Mexico be pursued, we offer these recommendations, without regard to funding, all for northern and high-elevation sites, prioritized as follows.

1. Valle de Ojos Negros has long been the most important location for the Tricolored Blackbird in Mexico, but opportunities for nesting have been limited in recent decades. It is quick and relatively easy to establish emergent marsh vegetation suitable for nesting blackbirds, so efforts to secure multiple impoundments for this purpose are our primary recommendation. Impoundments need not be dedicated for this purpose permanently, so long as there are multiple impoundments, or locations for impoundments, available to provide marsh somewhere every year. To the extent practicable, impoundments should be located near existing dairies or other cattle operations. The swale at Rancho La Campana, often overrun with cattle, would be a great place to start. This process should be codified in some fashion. The maintenance of food resources is also critical and must not be neglected in local land-use planning.

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2. In the high country near the California border, the marsh at Ciénega Redonda supported some of the largest blackbird colonies in the 2010s, but the marsh was almost entirely cleared prior to the 2019 season and no nesting occurred that year. Not coincidentally, the valley to the east (formerly used by foraging blackbirds) was also cleared and graded for a planned subdivision. Allowing the marsh to reestablish itself and thereafter protecting and managing it would benefit the blackbird. In addition, foraging areas nearby need to be identified and protected.

3. Close to Ciénega Redonda is Rancho Ciénega Redonda, a private recreation area also home to many nesting blackbirds in the 2010s. The current owners are sympathetic to the blackbird—although partial clearing of the marsh was underway in November 2020—so their continued support should be secured and management for the marsh should be recommended. Foraging areas may be shared with blackbirds from Ciénega Redonda.

4. Another high-elevation site that has been important for nesting blackbirds is Rancho Japá. It is currently in wild country with abundant opportunities for nesting and foraging, but the owners have not been cooperative. Protecting habitat there for the long term should be a high priority.

5. Presa Abelardo Rodríguez has provided nesting sites for blackbirds on occasion since at least 2002, but varying water levels have made suitable conditions fleeting. Although the reservoir is located in an increasingly urban and industrial setting on the outskirts of Tijuana, sufficient foraging areas may continue to be available within the reservoir basin itself, especially with restoration. Establishment, protection, and management of marsh at the reservoir could also provide nesting habitat for several other species of conservation concern such as the Least Bittern (*Ixobrychus exilis*), White-faced Ibis (*Plegadis chihi*), and Clark's Marsh Wren (*Cistothorus palustris clarkae*) (N. Am. Birds 70:392), whether or not blackbirds colonize. It should be noted, however, that the reservoir is situated at a relatively low elevation, something that may not bode well for the Tricolored Blackbird in the long run.

6. Nesting in the pond at Ejido José María Pino Suárez (also known as Tres Pozos) has been documented only once (2005), but the area has been visited rarely. Conditions at this high-elevation site appear good for the Tricolored Blackbird, and 12 birds were observed there in 2019. Maintenance of the marsh's suitability for nesting blackbirds and nearby areas for foraging blackbirds would be beneficial.

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