

Tricolored Blackbird

(*Agelaius tricolor*)

Legal Status

Federal: None.

State: Species of Special Concern.



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Global and State Conservation Status: G2S2: Global Rank, G2 = Imperiled: At high risk of extinction due to very restricted range, very few populations (often 20 or fewer), steep declines, or other factors; State Rank, S2 = Same as global rank but only for the range of the taxa in California.

Recovery Plan: None, however, a Conservation Strategy for this species was prepared recently (Tricolored Blackbird Working Group 2007).

Species Description and Life History

Tricolored blackbirds (*Agelaius tricolor*) form the largest colonies of any North American passerine bird, and these may consist of tens of thousands of breeding pairs (Beedy and Hamilton 1999). Tricolored blackbirds are largely endemic to California and the state is home to more than 95 percent of the global population.

This species closely resembles red-winged blackbird (*Agelaius phoeniceus*), with subtle differences in coloration, bill shape, and overall morphology (Beedy and Hamilton 1999). The adult male is black, with shades of glossy blue, and has a bright red patch on the wing (an epaulet), similar to that of a red-winged blackbird. However, the epaulet of Tricolored Blackbirds is deeper red with a white lower border, as opposed to an orange-red patch with a yellowish border or no border at all. The adult females are brownish and black, streaked with gray—with small reddish epaulets (rarely visible in the field), pale gray or whitish chin and throat. Tricolored blackbirds have longer, slightly narrower wingtips and thinner bills than the red-winged blackbirds (Beedy and Hamilton 1999).

Seasonal Patterns

Many tricolored blackbirds reside throughout the year in the Central Valley of California (Beedy 2008). However, local populations can move considerable distances, and some are migratory and move from inland breeding locations to wintering habitats in the Sacramento-San Joaquin River Delta and coastal areas. During the breeding season, most birds nest in the San Joaquin Valley and in Sacramento County in their first breeding efforts. They may later move northward into the Sacramento Valley, northeast California, and southern Oregon to nest again (Hamilton 1998, Beedy 2008). Thus,

individual tricolored blackbirds may occupy and breed at several sites, or reneest at the same site, during a given breeding season, depending on environmental conditions and their previous nesting success (Hamilton 1998, Beedy and Hamilton 1999, Meese 2006). In fall, after the nesting season, large roosts form at managed wildlife refuges and other marshes near abundant food supplies such as rice (*Oryza sativa*) and water grass (*Echinochloa crusgalli*) (Beedy and Hamilton 1997). During winter, many tricolored blackbirds move out of the Sacramento Valley to the Sacramento–San Joaquin River Delta. Large flocks also winter in the central and southern San Joaquin Valley, and at the dairy farms in coastal areas such as Point Reyes and Monterey County (Beedy and Hamilton 1997). In early March to early April, these flocks move from wintering areas to their breeding colonies in Sacramento County and the San Joaquin Valley (Beedy and Hamilton 1997).

Reproduction

Tricolored blackbirds nest colonially, enabling them to synchronize their timing of nest building and egg laying (Beedy and Hamilton 1999). A few breeding colonies documented during fall months (September to November) had more protracted nest-building periods that led to asynchronous egg laying and fledging of young (Orians 1960). Females typically lay three to four eggs and incubate them for 11 to 14 days; then both parents feed young until they fledge 9 to 14 days after hatching (Beedy and Hamilton 1999).

Home Range/Territory Size

As many as 20,000 to 30,000 nests have been recorded in cattail (*Typha* spp.) marshes of 4 ha or less, with individual nests <0.5 m from each other (Neff 1937, DeHaven et al. 1975). Nest heights range from a few centimeters to about 1.5 m above water or ground at colony sites in freshwater marshes (Neff 1937) and up to 3 m in the canopies of willows (*Salix* spp.) and other riparian trees; rarely, they are built on the ground. The species' typically selects breeding sites adjacent to open accessible water and places its nests in a protected nesting substrate, often including either flooded or thorny or spiny vegetation. Breeding colonies must have suitable foraging space providing adequate insect prey within a few kilometers (Beedy and Hamilton 1999).

Foraging Behavior and Diet

Diets of adult tricolored blackbirds are dependent on geographic location and the availability of local insect foods. Among the most important prey for adults provisioning nestlings include Coleopterans (beetles), Orthopterans (grasshoppers, locusts), Hemipterans (true bugs), other larval insects, and Arachnids (spiders and allies) (Crane and DeHaven 1977, Beedy and Hamilton 1999). The primary diet of a colony depends on the local food availability, and large hatches of dragonflies (Odonata) are especially favorable to this species (Meese pers. comm.), and they are also attracted to large outbreaks of grasshoppers (Orians 1961). Adult females require insects to form eggs, and nestlings require insects since they are unable to digest plant materials until they are at

least nine days old and ready to leave their nests (Beedy and Hamilton 1999). During the non-breeding season, tricolored blackbirds often congregate at dairy feedlots to consume grains and other livestock feed, while others forage on insects, grains, and other plant material in grasslands and agricultural fields (Beedy and Hamilton 1999, Skorupa *et al.* 1980).

Habitat Requirements and Ecology

Nesting

Tricolored blackbird colonies require access to water, suitable nesting substrates (including marsh vegetation or thorny or spinous vegetation to protect them from mammalian predators), and foraging habitat with significant populations of insect prey within a few miles (Beedy and Hamilton 1999, Hamilton 2004). Breeding habitat includes diverse wetland and upland and agricultural areas, including those with dense cattails (*Typha* spp.), bulrushes (*Scirpus* spp.), willows (*Salix* spp.), blackberry (*Rubus* spp.), thistles (*Cirsium* and *Centaurea* spp.), and nettles (*Urtica* sp.) (Neff 1937, Hamilton 1998, Beedy and Hamilton 1999). Some of the largest colonies are in silage and grain fields in the San Joaquin Valley, and many are in the vicinity of dairies and feedlots (Hamilton 1998, Beedy and Hamilton 1999).

Foraging

Tricolored blackbirds forage in areas that provide abundant insects, including pastures, dry seasonal pools, agricultural fields such as alfalfa and rice, feedlots, and dairies. Tomatoes may occasionally be used as foraging habitat. With the loss of the natural flooding cycle and most native wetland and upland habitats in the Central Valley, breeding tricolored blackbirds now forage primarily in anthropogenic habitats. Tricolored blackbirds have been able to exploit foraging conditions created when shallow flood-irrigation, mowing, or grazing keeps the vegetation at an optimal height (<15 cm). Preferred foraging habitats include crops such as rice, alfalfa, safflower, irrigated pastures, and ripening or cut grain fields (e.g., oats wheat, silage) as well as annual grasslands and shrublands (Beedy and Hamilton 1999, Beedy 2008).

In recent years, an increasing percentage and now large majority of adults have foraged on grains provided to livestock as in cattle feedlots and dairies. Tricolored blackbirds also forage in remnant native habitats, including wet and dry vernal pools and other seasonal wetlands, riparian scrub habitats, and open marsh borders. Vineyards, orchards, and row crops (sugar beets, corn, peas, beets, onions, etc.) do not provide suitable nesting substrates or foraging habitats for tricolored blackbirds (Beedy and Hamilton 1999). Both adults feed the nestlings; adults feeding young typically forage within 5 km (3.11 miles) of the colony, but can range up to 13 km (8 miles) from the colony (Beedy and Hamilton 1999).

Some small breeding colonies may occur at private and public lakes, reservoirs, and parks provided that they are near suitable foraging habitats. Many of these colonies are

surrounded by shopping centers, subdivisions, and other urban development; adults from such colonies forage in undeveloped uplands nearby.

Species Distribution and Population Trends

Distribution

Tricolored blackbirds are endemic to the western edge of North America; however, >95 percent of the global population resides in California where breeding has occurred in 46 counties (Beedy and Hamilton 1999). Except for a few peripheral sites, the geographic distribution has not declined; breeding colonies in northeastern California, southern Oregon, Washington, western Nevada, and central and western Baja California have been documented (Beedy and Hamilton 1999). While the overall geographic breeding distribution of the species may not have changed since historical times, there are now large gaps in their former range encompassing entire counties (e.g., Kings, San Joaquin, Riverside, San Bernardino counties).

Population Trends

The first systematic surveys of the tricolored blackbird's population status and distribution were conducted by Neff (1937). During a 5-year interval, he found 252 breeding colonies in 26 California counties; the largest colonies were in rice-growing areas of the Sacramento Valley. Neff observed as many as 736,500 adults per year (1937) in eight Central Valley counties. The largest colony he observed, in Glenn County, covered almost 24 ha (59 ac), and contained more than 200,000 nests (about 300,000 adults). Several other colonies in Sacramento and Butte Counties contained more than 100,000 nests (about 150,000 adults).

DeHaven *et al.* (1975) estimated that the overall population size in the Sacramento and northern San Joaquin Valleys had declined by more than 50 percent since the mid-1930s. DeHaven *et al.* (1975) performed surveys in the areas surveyed by Neff (1937) and observed significant population declines and reductions of suitable habitat since Neff's surveys. Orians (1961) observed colonies of up to 100,000 nests in Colusa, Yolo, and Yuba Counties but did not attempt to survey the entire range of the species. Recent statewide censuses have shown dramatic declines in tricolored blackbird numbers in the Central Valley (Beedy and Hamilton 1997, Hamilton *et al.* 1999, Hamilton 2000, Green and Edson 2004, Cook and Toft 2005). Statewide totals of adults in four late-April surveys covering all recently known colony sites were 369,359 in 1994, 237,928 in 1997, 104,786 in 1999, and 162,508 in 2000 (Hamilton 2000). In April 2004, statewide surveys focused on only those colonies that had supported >2000 adults in at least one previous year. Of 184 sites surveyed, only 33 supported active colonies at the time of the survey. Of the 33 colonies, 13 held >2000 adults each, collectively representing >96% of the census total (Green and Edson 2004). A statewide survey performed on April 25 to 27 2008 found a total of 394,858 adults at 155 sites in 32 counties (Kelsey 2008).

Distribution and Population Trends in the Plan Area

In Yolo County, tricolored blackbirds historically bred primarily in marshes with emergent vegetation. The species forages in grasslands, wetlands, and agricultural fields from March through July, but are irregular visitors during the remainder of the year (Yolo Audubon Society Checklist Committee 2004.). Recent surveys revealed very few nesting colonies in Yolo County (Meese pers. comm.). Fourteen colonies were documented in the county from 1994 to 2004, with populations estimated from 15 to 1,500 adults. Surveys in 2007 revealed a highly successful colony of more than 30,000 breeding adults in milk thistle on the Conaway Ranch in the Yolo Bypass. This was one of only three documented colonies statewide that were large and successful, and this colony was estimated to have produced about 30,000 young (Meese 2007). Other recent colony sites in the county included: “Bill’s Grasslands,” a newly-discovered colony located within a patch of Himalayan blackberry approximately one km south of the intersection of County Roads 92B and 15B, that was active in 2006 and again in 2007 and a colony in milk thistle on County Road 88B, about two km north of State Route 16 that was active in 2005 and 2007, but not in 2006. Four small colonies were also found in the Yolo Bypass in 2005 that have not been occupied since. A historical colony at the Sunsweet Drying facility, just south of County Road 27 and about 1 km west of I-505, has not been active in the past three years (Meese pers. comm.). A total of 1,900 adults were observed at two colonies in the Yolo Bypass during the 2008 statewide survey (Kelsey 2008).

Threats to the Species and Other Conservation Issues*Habitat Loss and Degradation*

The greatest threats to this species are the direct loss and degradation of habitat from human activities (Beedy and Hamilton 1999). Most native habitats that once supported nesting and foraging tricolored blackbirds in the Central Valley have been replaced by urbanization and agricultural croplands unsuited to their needs. In Sacramento County, an historic breeding center of this species, the conversion of grassland and pastures to vineyards expanded from 3050 ha in 1996 to 5330 ha in 1998 (DeHaven 2000) to 6762 ha in 2003 (Calif. Agric. Statistics Serv., <http://www.nass.usda.gov/ca/>). Conversions of pastures and grasslands to vineyards in Sacramento County and elsewhere in the species’ range in the Central Valley have resulted in the recent loss of several large colonies and the elimination of extensive areas of suitable foraging habitat for this species (Cook 1996, DeHaven 2000, Hamilton 2004).

Direct Mortality During Crop Harvest

Entire colonies (up to tens of thousands of nests) in cereal crops and silage are often destroyed by harvesting and plowing of agricultural lands (Beedy and Hamilton 1999, Hamilton 2004, Cook and Toft 2005). While adult birds can fly away, eggs and fledglings cannot. The concentration of a high proportion of the known population in a few breeding colonies increases the risk of major reproductive failures, especially in vulnerable habitats such as active agricultural fields.

Predation

Historical accounts documented the destruction of nesting colonies by a diversity of avian, mammalian, and reptilian predators (Beedy and Hamilton 1999). Recently, especially in permanent freshwater marshes of the Central Valley, entire colonies have been lost to black-crowned night-herons (*Nycticorax nycticorax*) and common ravens (*Corvus corax*). Recently, cattle egrets (*Bubulcus ibis*) have been observed preying on tricolored blackbird nests, and at one colony in Tulare County more than 125 egrets were present throughout the breeding season (Meese 2007). Some large colonies (up to 100,000 adults) may lose >50% of nests to coyotes (*Canis latrans*), especially in silage fields, but also in freshwater marshes when water is withdrawn (Hamilton *et al.* 1995). Thus, water management by humans often has the effect of increasing predator access to active colonies.

Poisoning and Contamination

Various poisons and contaminants have caused mass mortality of tricolored blackbirds. McCabe (1932) described the strychnine poisoning of 30,000 breeding adults as part of an agricultural experiment. Neff (1942) considered poisoning to regulate numbers of blackbirds preying upon crops (especially rice) to be a major source of mortality. This practice continued until the 1960s, and thousands of tricolored blackbirds and other blackbirds were exterminated to control damage to rice crops in the Central Valley. Beedy and Hayworth (1992) observed a complete nesting failure of a large colony (about 47,000 breeding adults) at Kesterson Reservoir, Merced County, and selenium toxicosis was diagnosed as the primary cause of death. At a colony in Kern County, all eggs sprayed by mosquito abatement oil failed to hatch (Beedy and Hamilton 1999). Hosea (1986) attributed the loss of at least two colonies to aerial herbicide applications.

Other Conservation Issues

Important information gaps in the ecology of the species include the effects of land use changes on the reproductive success of colonies and on the distribution of wintering birds, the relationship of invertebrate prey abundance and brood size, winter distribution, diet, and survival rates, and measures of suitable foraging habitat (Beedy and Hamilton 1999, Meese 2007).

Tricolored Blackbirds have been the focus of recent management concern due to population decline, very limited global range, and vulnerability of large breeding colonies to habitat losses, predation, and human-induced impacts. Recommendations for the species conservation (Beedy and Hamilton 1999, Hamilton 2004) include frequent monitoring of breeding and wintering population sizes, colony locations, and reproductive success; protection of colony locations and foraging habitats; protection of colonies on farmland by avoiding harvesting/tilling until young have fledged; providing adequate protection in Habitat Conservation Plans; focusing on dairy-dependence for breeding and wintering populations; developing or restoring breeding habitat near

reservoirs, rice fields, alfalfa fields and other optimal foraging habitats; and managing major predators in or near breeding colonies, including common ravens, black-crowned night-herons, cattle egrets, and coyotes when feasible.

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