

1 **A.1 TRICOLORED BLACKBIRD**
 2 **(*AGELAIUS TRICOLOR*)**



photo courtesy BCAG

3 **A.1.1 Legal and Other Status**

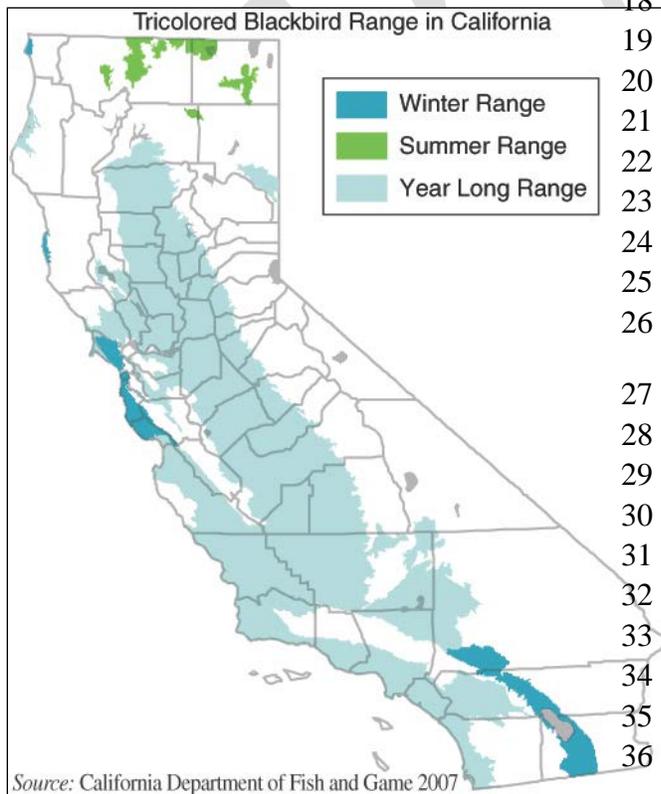
4 The tricolored blackbird is designated as a state Bird Species
 5 of Special Concern by the California Department of Fish and
 6 Game (DFG). Nest sites are protected in California under
 7 Fish and Game Code Section 3503.

8 The tricolored blackbird has no federal regulatory status; however, the species is protected under
 9 the federal Migratory Bird Treaty Act and is designated as a Bird of Conservation Concern by
 10 the U.S. Fish and Wildlife Service (USFWS 2002). A petition for federal listing of the tricolored
 11 blackbird was submitted in 2004; however, in 2006 the USFWS denied the petition, stating that
 12 there was insufficient scientific evidence to warrant listing of the species under the federal
 13 Endangered Species Act.

14 **A.1.2 Species Distribution and Status**

15 **A.1.2.1 Range and Status**

16 Tricolored blackbirds are largely endemic to California. Other than small breeding populations
 17 at scattered sites in Oregon, Washington, Nevada, and western coastal Baja California, the entire



18 species occurs in California (Beedy and
 19 Hamilton 1999), with more than 75
 20 percent of the breeding population
 21 occurring in the Central Valley in any
 22 given year (Hamilton 2000). Recent
 23 surveys indicate that the overall range of
 24 the species is largely unchanged since the
 25 1930s (Neff 1937, DeHaven et al. 1975,
 26 Beedy et al. 1991, Hamilton 1998).

27 Historical tricolored blackbird population
 28 sizes are unknown, but by the mid-1930s,
 29 following the removal of most major
 30 wetland areas in California, populations still
 31 likely exceeded 1.1 million adult birds
 32 (Hamilton 1998). In the first systematically
 33 conducted range-wide survey, Neff (1937)
 34 found tricolored blackbird at 252 colonies
 35 in 26 California counties, including over
 36 700,000 adults in just eight Central Valley

1 counties. Surveys conducted in the 1960s and 1970s indicate that range-wide populations declined
2 by more than 50 percent during the 30 to 35-year period since Neff's (1937) surveys in the 1930s
3 (Orians 1961, Payne 1969, DeHaven et al. 1975).

4 Systematic tricolored blackbird surveys were conducted throughout California in 1994, 1977,
5 1999, and 2000; cosponsored by the USFWS, DFG, and California Audubon (Hamilton et al. 1995,
6 Beedy and Hamilton 1997, Hamilton 2000). Results of these surveys show a significantly
7 declining trend in tricolored blackbird populations in California since the 1930s and a dramatic
8 decline since 1994. Hamilton (2000) reports a 56 percent statewide decline between 1994 and
9 2000 (from 369,359 to 162,508 adults), and a 69 percent decline in the Sacramento Valley during
10 that period (from 98,362 to 30,979 adults).

11 The most recent statewide surveys have been coordinated by the Point Reyes Bird Observatory,
12 with assistance from Partners in Flight, USFWS, DFG, and California Audubon. In 2001, this
13 survey effort documented 32 active colonies with an estimated 142,045 adults statewide
14 (Humple and Churchwell 2002). Surveys conducted in 2008 included 35 California counties,
15 stretching from San Diego County, at the southern end of the state, to Shasta County in the north.
16 At that time, a total of 395,321 birds were estimated. Kern, Tulare, and Merced counties in the
17 San Joaquin Valley accounted for 314,936 (79.7 percent) of the total (University of California
18 Davis 2008).

19 These survey results would seem to indicate a stable or possibly increasing population in the
20 state; however, the data indicate that tricolored blackbird populations are declining in several
21 areas of the state where the species was formerly common, particularly in Southern California
22 and several Central Valley counties. For example, in San Joaquin County, no active colonies
23 were documented in 2008. Therefore, while the number of birds may have increased statewide,
24 they have concentrated into a significantly smaller effective range (University of California,
25 Davis 2008).

26 **A.1.2.2 Distribution and Status in the Plan Area**

27 Tricolored blackbird colonies were historically reported primarily from the central and western
28 portions of the Plan Area, where freshwater marsh habitats occurred in greatest abundance, and
29 where, in subsequent years, rice farming continued to provide some available habitat. Tricolored
30 blackbirds occur in Butte County primarily during the breeding season. Breeding season
31 movements occur as birds occasionally move into new breeding locations for second and third
32 nesting attempts; and while post-breeding birds can be observed in Butte County and other
33 Sacramento Valley counties into October and November, most birds migrate to wintering areas
34 in the Sacramento-San Joaquin Delta and coastal areas during the non-breeding season.
35 Occurrences of tricolored blackbirds in the Plan Area are shown in Figure A-1.

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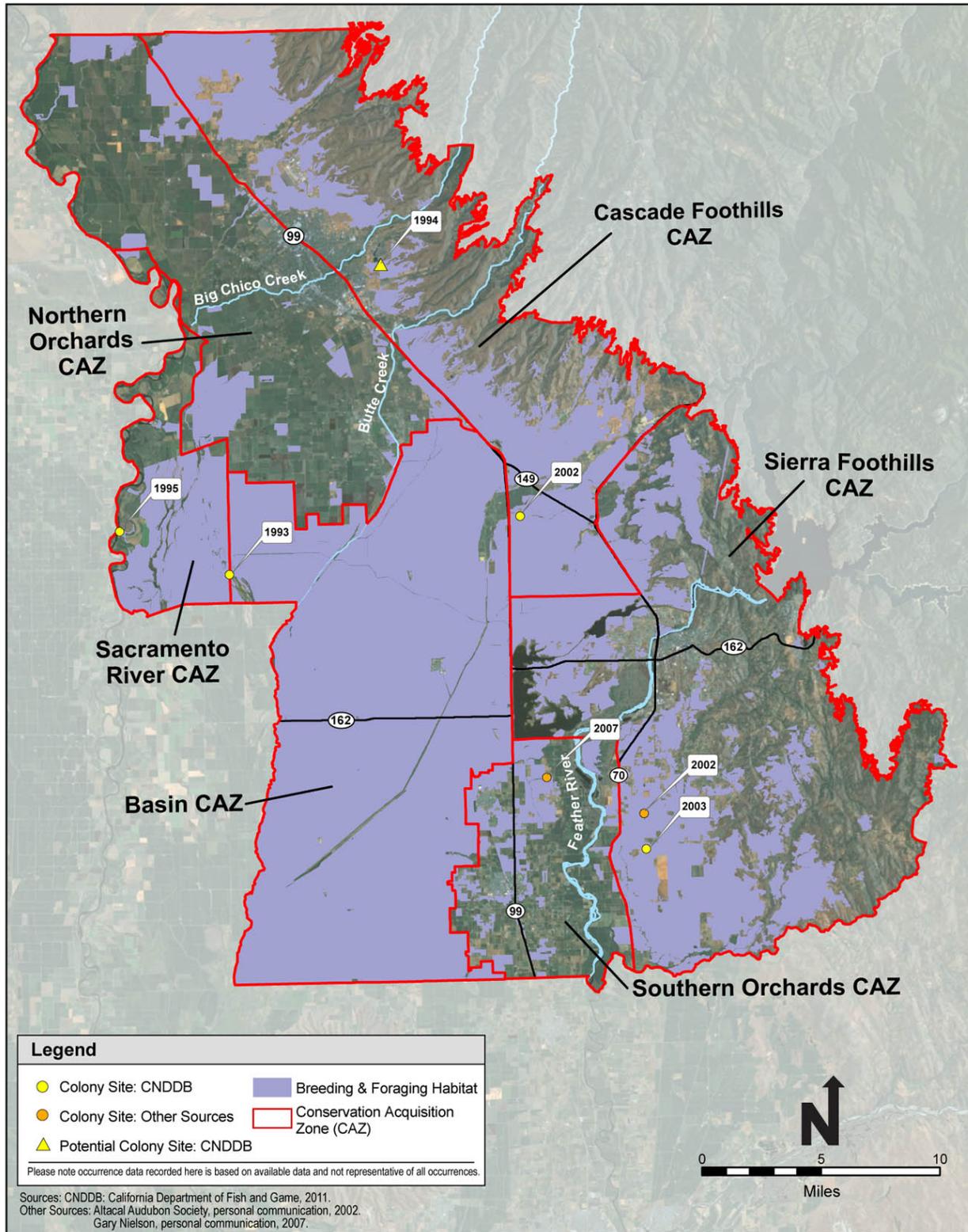


Figure A-1. Tricolored Blackbird Modeled Habitat and Recorded Occurrences

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2
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4

1 Few breeding colonies remain in Butte County. Neff (1937) estimated a high of 159,000 adults
2 in over 30 breeding colonies in Butte County from 1931 to 1937. Beedy et al. (1991)
3 summarized data from the 1930s and reported a high of 336,263 adults in 32 colonies in Butte
4 County during that period. Populations were dramatically reduced in subsequent decades –
5 52,500 by 1961 (Orians 1961); 25,000 by 1972 (DeHaven et al. 1975); and 6,500 by the mid-
6 1990s (Hamilton 1998). Beedy et al. (1991) report only three extant colonies in Butte County by
7 1989.

8 The Point Reyes Bird Observatory (PRBO)-coordinated statewide survey in 2001 identified only
9 one active colony in Butte County located along Lone Tree Road with an estimated 500 adult
10 blackbirds (Humple and Churchwell 2002) (Figure A-1).

11 Altacal Audubon also report activity in blackberry bramble on Table Mountain (Phil Johnson
12 pers. comm.) in the eastern portion of the Plan Area and Snowden (pers. comm.) reports recent
13 breeding season observations of a flock at Llano Seco; however, nesting has not been confirmed
14 from either area.

15 **A.1.3 Habitat Requirements and Special Considerations**

16 Tricolored blackbirds are considered to be one of the most colonial species of North American
17 passerine birds (Bent 1958, Orians 1961, Payne 1969, Beedy and Hamilton 1999). As many as
18 30,000 nests have been recorded in cattail marshes of 4 hectares or less (Neff 1937, DeHaven et
19 al. 1975), and individual nests may be built less than 0.5 meter (m) from each other (Neff 1937).
20 It is possible that the species' highly synchronized and colonial breeding system may have
21 adapted to exploit a rapidly changing environment where the location of secure nesting habitat
22 and rich insect food supplies were ephemeral and likely to change each year (Orians 1961,
23 Collier 1968, Payne 1969). There are three basic requirements for establishment of tricolored
24 blackbird breeding colony sites: (1) open, accessible water; (2) a protected nesting substrate,
25 including either spiny, thorny, or flooded vegetation; and (3) a suitable foraging space which
26 provides adequate insect prey within a few miles of the nesting colony (Hamilton et al. 1995,
27 Beedy and Hamilton 1999).

28 The selection of nesting habitat has changed dramatically over time as freshwater marsh habitat
29 has been removed. Almost 93 percent of the 252 breeding colonies reported by Neff (1937)
30 were in freshwater marshes dominated by tules (*Schoenoplectus*¹) and cattails (*Typha* spp.). The
31 remaining colonies in Neff's study were in willows (*Salix* spp.), blackberries (*Rubus* spp.),
32 nettles (*Urtica* spp.), or thistles (*Cirsium* and *Centaurea* spp.). By comparison, only 53 percent
33 of colonies reported during the 1970s were in cattails and tules (DeHaven et al. 1975).

34 A growing percentage of colonies observed in the 1980s and 1990s were reported in Himalayan
35 blackberry (*Rubus discolor*) (Beedy et al. 1991), and some of the largest recent colonies have been
36 located in silage and grain fields (Hamilton et al. 1995, Beedy and Hamilton 1997, Hamilton

¹ Formerly known as *Scirpus*.

1 2000). Other substrates where tricolored blackbirds have been observed nesting include giant reed
2 (*Arundo donax*), safflower (*Carthamus tinctorius*) (DeHaven et al. 1975), elderberry and poison
3 oak (*Sambucus* spp. and *Toxicodendron diversilobum*), tamarisk (*Tamarix* spp.), and riparian
4 scrublands and forests.

5 Males initially select breeding sites and establish nesting territories while females select the nest
6 site location. The first nests in a colony generally occur in the densest vegetation, usually in the
7 interior of the nesting habitat. Nests are added in concentric circles gradually or in synchronous
8 pulses as the colony forms (Collier 1968).

9 Nests are bound to upright plant stems usually from 1 inch to about 5 feet (a few centimeters to
10 about 1.5 m) above water (Beedy and Hamilton 1999). Nests are rarely constructed on the
11 ground (Neff 1937) and are occasionally found above 10 feet (3 m) in riparian habitats.

12 **A.1.3.1 Foraging**

13 Tricolored blackbird foraging habitat includes annual grasslands (particularly ungrazed
14 grasslands containing tall grasses), wet and dry vernal pools and other seasonal wetlands,
15 pastures, agricultural fields – primarily alfalfa and recently tilled fields – cattle feedlots, and
16 dairies. They also forage occasionally in riparian scrub habitats and long marsh borders (Beedy
17 and Hamilton 1999).

18 Loss of native wetland and upland habitats in the Central Valley have forced breeding tricolored
19 blackbirds to forage in more anthropogenic habitats. They exploit foraging conditions created
20 when shallow flood irrigation, mowing, or grazing keeps vegetation at an optimal height of less
21 than 15 cm (6 in). Preferred agricultural foraging habitats include crops such as rice, alfalfa,
22 sunflowers, irrigated pastures, and ripening or cut grain fields (e.g., oats, wheat, silage).
23 Vineyards, orchards, and row crops (sugar beets, corn, peas, beets, onions, etc.) do not provide
24 suitable nesting substrates or foraging habitats for tricolored blackbirds (Beedy and Hamilton
25 1999). In recent years, an increasing number of tricolored blackbird adults have also foraged on
26 grains provided to livestock in cattle feedlots and dairies.

27 Proximity to suitable foraging habitat appears to be important for the establishment of nesting
28 colonies as foraging initially occurs in the field containing the breeding habitat (Cook 1999). Most
29 other foraging occurs within 3 miles (5 kilometers [km]) of the colony site; however, foraging ranges
30 vary from colony to colony due to differences in the matrix of agricultural land uses and cover types
31 and can extend up to 8 miles from the colony site (Beedy and Hamilton 1999, Cook 1999).

32 **A.1.4 Life History**

33 **A.1.4.1 Seasonal Patterns**

34 As noted above, tricolored blackbirds occur in the Plan Area and Sacramento Valley primarily
35 during the breeding season. In late March and early April, they vacate wintering areas in the

1 Sacramento-San Joaquin Delta and along coastal central California and arrive at breeding
2 locations in the Sacramento Valley. During the breeding season, the species often exhibits
3 itinerant breeding – moving to new breeding locations following previous nesting attempts
4 elsewhere (Hamilton 1998). Following breeding, there is a significant post-breeding movement
5 in the Sacramento Valley from other breeding locales, where large post-breeding roosts are
6 established from late summer into the fall. At some point during the fall (September to
7 November), post-breeding roosts are vacated as birds migrate back to wintering locales.

8 **A.1.4.2 Reproduction**

9 Female tricolored blackbirds breed in their first year, but most males apparently defer breeding
10 until they are at least 2 years old (Payne 1969). Egg laying can begin as early as the second day
11 after nest initiation but ordinarily starts about 4 days after arrival at breeding sites (Payne 1969).
12 One egg per day is laid, and clutch size is typically three to four eggs (Payne 1969, Hamilton et
13 al. 1995). Only females incubate and brood (Orians 1961). Emlen (1941) and Orians (1961)
14 estimate the incubation period at 11 or 12 days. Hatching is asynchronous.

15 Hatching to fledging requires approximately 24 days. Therefore, a successful nesting effort
16 requires approximately 45 days from nest initiation to independence of young (Hamilton et al.
17 1995). However, because birds may continue to be recruited into the nesting colony following
18 initial nest establishment, the colony itself remains active and in various stages of the breeding
19 cycle for an extended period, sometimes more than 90 days, but generally requires at least 50
20 days for a complete breeding cycle of a less asynchronous colony (Beedy and Hamilton 1997).

21 **A.1.4.3 Foraging Behavior and Diet**

22 Like other blackbirds, tricolored blackbirds often forage in flocks. They usually forage on the
23 ground by walking, hopping, or taking short flights. Most forage within 5 km (3 m) of their
24 colony site (Orians 1961).

25 Tricolored blackbirds are opportunistic foragers, consuming any locally abundant insect
26 resource, including grasshoppers, beetles and weevils, caddis fly larvae, moth and butterfly
27 larvae, and dragonfly larvae (Orians 1961, Beedy and Hamilton 1997). Plant material is also
28 taken, particularly concentrated agricultural food resources (Skorupa et al. 1980). During the
29 breeding season, animal matter constitutes the majority of the food volume for nestlings and
30 fledglings (91 percent) and females (56 percent); while less for that of adult males (28 percent)
31 (Skorupa et al. 1980).

32 **A.1.5 Threats**

33 **A.1.5.1 Habitat Loss and Alteration**

34 Habitat loss and alteration is the most significant historical and ongoing threat to the tricolored
35 blackbird.. Conversion of California's native landscapes to agriculture removed vast areas of

1 wetland and caused the initial decline in the tricolored blackbird population. Conversion of
2 suitable agricultural lands for urbanization permanently removes breeding and foraging habitat
3 for this species. In urbanizing areas, habitat fragmentation and proximity to human disturbances
4 has led to the abandonment of large historical colonies.

5 In some places, most historical breeding and foraging habitats have been eliminated, and there is
6 little or no breeding effort where once there were large colonies (Orians 1961, Beedy et al.
7 1991). Elsewhere, populations have shifted from freshwater marsh as a nesting substrate (Neff
8 1937) to Himalaya blackberry thickets (DeHaven et al. 1975) and more recently to cereal crops
9 and barley silage (Hamilton et al. 1995). Nests in cereal crops and silage are often destroyed by
10 agricultural operations and harvesting and plowing of these crops is currently the most common
11 reasons nesting colonies are destroyed on agricultural lands. These agricultural actions can
12 affect tens of thousands of birds, causing failure of the entire breeding efforts of a colony. In
13 addition, the conversion of agricultural land from crops with high insect activity (e.g., alfalfa,
14 sunflowers) to vineyards and orchards decreases the insect food source available for the
15 tricolored blackbird (University of California, Davis 2008).

16 **A.1.5.2 Predation**

17 Tricolored blackbird colonies have always been subject to predation by a variety of bird and
18 mammal predators, including coyotes (*Canis latrans*), gray fox (*Urocyon cinereoargenteus*),
19 striped skunk (*Mephitis mephitis*), raccoon (*Procyon lotor*) and a variety of raptors. As available
20 habitat becomes increasingly limited and food resources become more concentrated, predation
21 can have a substantially larger impact on nesting colonies. In urbanizing areas, nonnative
22 predators, especially feral cats, can also have a dramatic impact on nesting colonies.

23 **A.1.5.3 Human Disturbances**

24 Entire tricolored blackbird colonies, which can include up to tens of thousands of nests, can be
25 destroyed by the harvesting and plowing of agricultural lands in which the colonies have
26 established (Beedy and Hamilton 1999, Hamilton 2004, Cook and Toft 2005). Adult birds fly
27 away during these disturbances; however, eggs and fledglings ultimately perish. Tricolored
28 blackbird colonies are also highly sensitive to less intrusive human disturbances. Close proximity
29 to urban areas can cause permanent abandonment of colonies. Increases in noise, loose pets, and
30 human presence can cause nest abandonment. Even entry into colonies for management or
31 scientific purposes can cause disturbance and should be avoided (Beedy and Hamilton 1999).

32 **Poisoning and Contamination.**

33 Poisoning and contamination have caused mass mortality of tricolored blackbirds. Until the
34 1960s, thousands of tricolored blackbirds and other blackbirds were poisoned in efforts to control
35 damage to Central Valley rice crops. Complete nesting failure of a large colony (about 47,000
36 breeding adults) occurred at Kesterson Reservoir in Merced County due to selenium toxicosis
37 (Beedy and Hayworth 1992). In a Kern County colony, all eggs sprayed by mosquito abatement

1 oil failed to hatch (Beedy and Hamilton 1999); and Hosea (1986) has attributed the loss of at
2 least two colonies to aerial herbicide applications (Yolo Natural Heritage Program 2008).

3 **A.1.6 Relevant Conservation Efforts**

4 The Tricolored Blackbird Working Group, a voluntary group of state and federal agency
5 biologists, nongovernmental organizations, industry representatives, and academic scientists,
6 meets twice yearly to discuss efforts to conserve the tricolored blackbird. In 2007, this group
7 prepared a conservation strategy for this species (Tricolored Blackbird Working Group 2007).
8 Conservation priorities identified by this conservation strategy included maintaining, enhancing,
9 and protecting existing habitat suitable for nesting, foraging, and wintering activities; creating
10 and restoring additional protected breeding habitats to support tricolored blackbird nesting and
11 foraging; identifying mechanisms for the protection of nesting and foraging habitats; surveying
12 private lands (to the extent allowable by law) and identifying the largest and most vulnerable
13 colonies; encouraging private landowners to protect active breeding colonies; and encouraging
14 and enhancing active breeding colonies on public lands (Tricolored Blackbird Working Group
15 2007).

16 Other recommendations for species conservation (Beedy and Hamilton 1999, Hamilton 2004)
17 include the monitoring of breeding and wintering population sizes, their colony locations, and
18 reproductive success; the protection of colony locations and foraging habitats; the protection of
19 colonies on farmland by the avoidance of harvest and tilling until young have fledged; the
20 provision of adequate protection in Habitat Conservation Plans; a focus on the dairy dependence
21 of breeding and wintering populations; the development or restoration of breeding habitat near
22 reservoirs, rice fields, alfalfa fields, and other optimal foraging habitats; and the management of
23 major predators in or near breeding colonies.

24 The tricolored blackbird is a covered species or a proposed covered species in several regional
25 conservation plans in the Central Valley region of California, including the Placer County
26 Conservation Plan, the San Joaquin County Multispecies Habitat Conservation and Open Space
27 Plan, the East Contra Costa County Habitat Conservation Plan/Natural Community Conservation
28 Plan, the Natomas Basin Habitat Conservation Plan, the South Sacramento County Habitat
29 Conservation Plan, the Bay-Delta Conservation Plan, the Solano County Multispecies Habitat
30 Conservation Plan, and the Yolo County Natural Heritage Program Plan.

31 **A.1.7 Species Habitat Suitability Model**

32 **A.1.7.1 Nesting Habitat**

33 Specific nesting habitat features are not included in this model because tricolored blackbirds nest
34 in marshes, thickets, and other habitats that could be smaller than the minimum HCP/NCCP land
35 cover type mapping unit. Six known colony sites and one potential colony site, which are known
36 from the Plan Area, are demarcated on the map; only one of these is thought to be active.

1 **A.1.7.2 Breeding and Foraging Habitat**

2 Breeding and foraging habitat includes grasslands, grasslands with vernal swale complex, vernal
3 pool, altered vernal pool, managed wetlands, emergent wetlands, irrigated cropland, irrigated
4 pasture, and rice with a minimum patch size of 40 acres within the Plan Area.

5 **A.1.7.3 Assumptions**

6 Preferred foraging habitats include agricultural crops such as rice, alfalfa, irrigated pastures, and
7 ripening or cut grain fields (e.g., oats, wheat, silage, and rice), as well as annual grasslands, cattle
8 feedlots, and dairies (Beedy and Hamilton 1999). Tricolors also forage in remnant native
9 habitats, including wet and dry vernal pools and other seasonal wetlands, riparian scrub habitats,
10 and open marsh borders (Tricolor Blackbird Working Group 2007). Tricolored blackbirds have
11 three basic requirements for selecting their breeding colony sites: (1) open, accessible water; (2)
12 a protected nesting substrate, including either flooded, thorny, or spiny vegetation; and (3) a
13 suitable space providing adequate insect prey within a few miles of the nesting colony (Hamilton
14 et al. 1995, Beedy and Hamilton 1999). Proximity to suitable foraging habitat appears to be
15 extremely important for the establishment of colony sites (Tricolor Blackbird Working Group
16 2007). In the Plan Areas, suitable habitats with these attributes are found within the land cover
17 types mentioned above.

18 Following breeding, there is a significant post-breeding movement into the Sacramento Valley
19 from other breeding locales, where large post-breeding roosts are established from late summer
20 into the fall. It is assumed that these post-breeding roosts and post-breeding individuals could
21 occur in the identified land cover types above the minimum patch size anywhere within the Plan
22 Area.

23 A 40-acre minimum patch size was selected and designed primarily to eliminate small open
24 grassland and pasture patches at the higher elevations where tricolored blackbirds are not
25 expected to occur in the breeding and post-breeding season. This patch size is assumed to be
26 below the actual minimum patch size for this species during winter (for which there is limited
27 data available) to avoid underestimating available habitat. At some point during the fall
28 (September-November), post-breeding roosts are vacated as birds migrate back to traditional
29 wintering locales in the Sacramento-San Joaquin Delta and along the Central California coast
30 (Beedy and Hamilton 1999).

31 **A.1.8 Recovery Plan Goals**

32 Currently, there is no recovery plan for the tricolored blackbird.

33

1 A.1.9 References

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