

A.1 Tricolored Blackbird (*Agelaius tricolor*)

A.1.1 Legal and Other Status

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

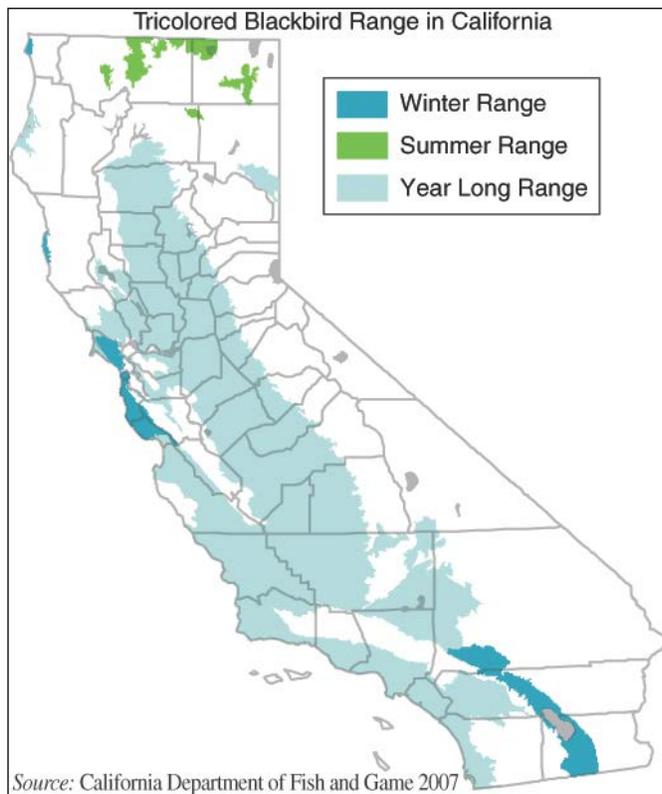


photo courtesy BCAG

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

A.1.2 Species Distribution and Status

A.1.2.1 Range and Status



Tricolored blackbirds are largely endemic to California. Other than small breeding populations at scattered sites in Oregon, Washington, Nevada, and western coastal Baja California, the entire species occurs in California (Beedy and Hamilton 1999), with more than 75 percent of the breeding population occurring in the Central Valley in any given year (Hamilton 2000). Recent surveys indicate that the overall range of the species is largely unchanged since the 1930s (Neff 1937, DeHaven et al. 1975, Beedy et al. 1991, Hamilton 1998).

Historical tricolored blackbird population sizes are unknown, but by the mid-1930s, following the removal of most major wetland areas in California, populations still likely exceeded 1.1 million adult birds (Hamilton 1998). In the first systematically conducted range-wide survey, Neff (1937) found tricolored blackbird at 252 colonies in 26 California counties, including over 700,000

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

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

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

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

A.1.2.2 Distribution and Status in the Plan Area

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

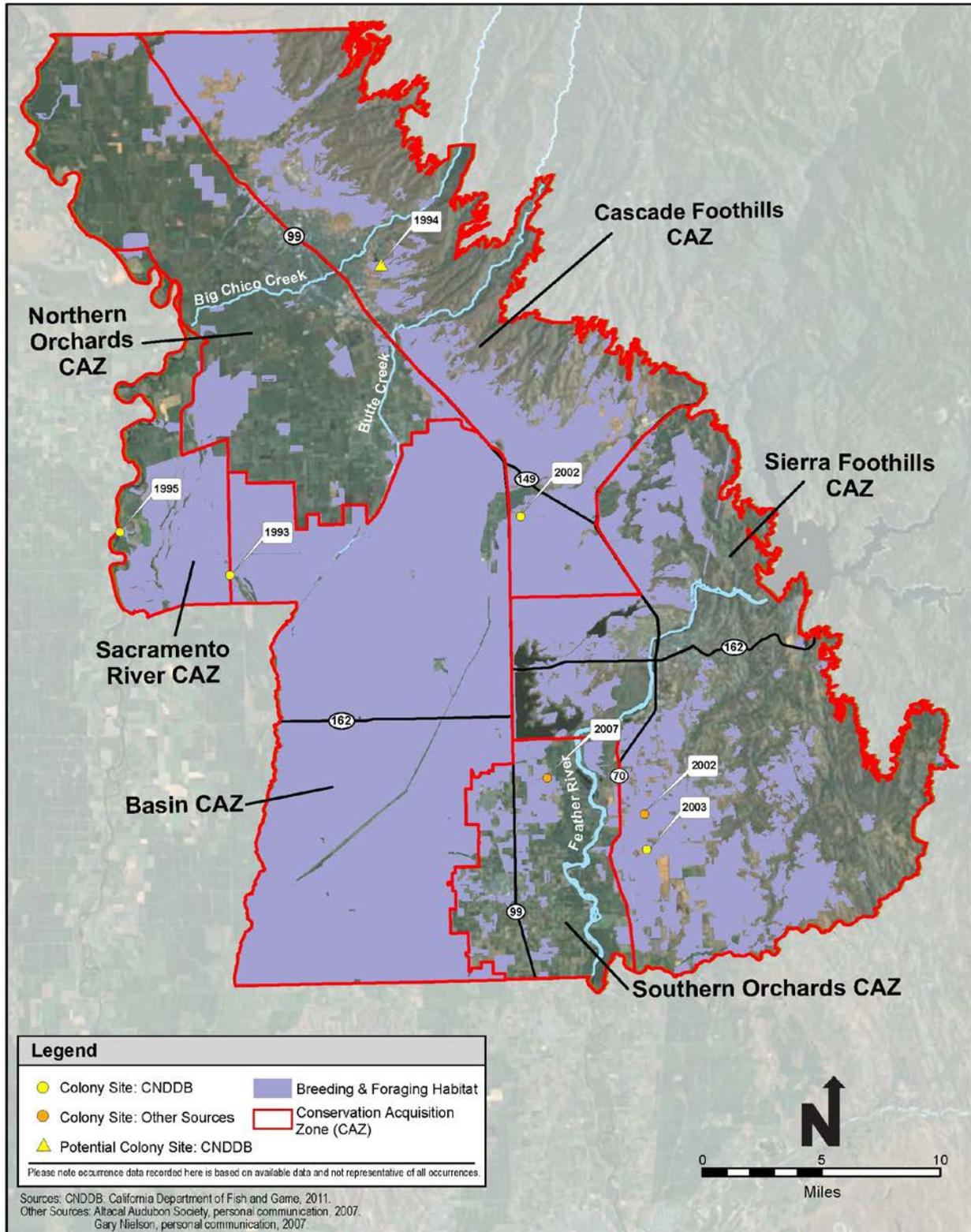


Figure A.1-1. Tricolored Blackbird Modeled Habitat and Recorded Occurrences

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

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

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

A.1.3 Habitat Requirements and Special Considerations

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

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

A growing percentage of colonies observed in the 1980s and 1990s were reported in Himalayan blackberry (*Rubus discolor*) (Beedy et al. 1991), and some of the largest recent colonies have been located in silage and grain fields (Hamilton et al. 1995, Beedy and Hamilton 1997, Hamilton 2000). Other substrates where tricolored blackbirds have been observed nesting include giant reed (*Arundo donax*), safflower (*Carthamus tinctorius*) (DeHaven et al. 1975), elderberry and poison oak (*Sambucus* spp. and *Toxicodendron diversilobum*), tamarisk (*Tamarix* spp.), and riparian scrublands and forests.

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

¹ Formerly known as *Scirpus*.

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

A.1.3.1 Foraging

Tricolored blackbird foraging habitat includes annual grasslands (particularly grazed or mowed grasslands containing short grasses less than 15 cm) (Tricolored Blackbird Working Group 2009), wet and dry vernal pools and other seasonal wetlands, pastures, agricultural fields (primarily alfalfa and recently tilled fields), cattle feedlots, and dairies. They also forage occasionally in riparian scrub habitats and long marsh borders (Beedy and Hamilton 1999).

Loss of native wetland and upland habitats in the Central Valley have forced breeding tricolored blackbirds to forage in more anthropogenic habitats. They exploit foraging conditions created when shallow flood irrigation, mowing, or grazing keeps vegetation at an optimal height of less than 15 cm (6 inches). Preferred agricultural foraging habitats include crops such as rice, alfalfa, sunflowers, irrigated pastures, and ripening or cut grain fields (e.g., oats, wheat, silage). 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). In recent years, an increasing number of tricolored blackbird adults have also foraged on grains provided to livestock in cattle feedlots and dairies.

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

A.1.4 Life History

A.1.4.1 Seasonal Patterns

As noted above, tricolored blackbirds occur in the Plan Area and Sacramento Valley primarily during the breeding season. In late March and early April, they vacate wintering areas in the Sacramento-San Joaquin Delta and along coastal central California and arrive at breeding locations in the Sacramento Valley. During the breeding season, the species often exhibits itinerant breeding – moving to new breeding locations following previous nesting attempts elsewhere (Hamilton 1998). Following breeding, there is a significant post-breeding movement in the Sacramento Valley from other breeding locales, where large post-breeding roosts are established from late summer into the fall. At some point during the fall (September to November), post-breeding roosts are vacated as birds migrate back to wintering locales.

A.1.4.2 Reproduction

Female tricolored blackbirds breed in their first year, but most males apparently defer breeding until they are at least 2 years old (Payne 1969). Egg laying can begin as early as the second day after nest initiation but ordinarily starts about 4 days after arrival at breeding sites (Payne 1969). One egg per day is laid, and clutch size is typically three to four eggs (Payne 1969, Hamilton et al. 1995). Only females

incubate and brood (Orians 1961). Emlen (1941) and Orians (1961) estimate the incubation period at 11 or 12 days. Hatching is asynchronous.

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

A.1.4.3 Foraging Behavior and Diet

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

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

A.1.5 Threats

A.1.5.1 Habitat Loss and Alteration

Habitat loss and alteration is the most significant historical and ongoing threat to the tricolored blackbird. Conversion of California's native landscapes to agriculture removed vast areas of wetland and caused the initial decline in the tricolored blackbird population. Conversion of suitable agricultural lands for urbanization permanently removes breeding and foraging habitat for this species. In urbanizing areas, habitat fragmentation and proximity to human disturbances has led to the abandonment of large historical colonies.

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

A.1.5.2 Predation

Tricolored blackbird colonies have always been subject to predation by a variety of bird and mammal predators, including coyotes (*Canis latrans*), gray fox (*Urocyon cinereoargenteus*), striped skunk

(*Mephitis mephitis*), raccoon (*Procyon lotor*) and a variety of raptors. As available habitat becomes increasingly limited and food resources become more concentrated, predation can have a substantially larger impact on nesting colonies. In urbanizing areas, nonnative predators, especially feral cats, can also have a dramatic impact on nesting colonies.

A.1.5.3 Human Disturbances

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

A.1.5.4 Poisoning and Contamination

Poisoning and contamination have caused mass mortality of tricolored blackbirds. Until the 1960s, thousands of tricolored blackbirds and other blackbirds were poisoned in efforts to control damage to Central Valley rice crops. Complete nesting failure of a large colony (about 47,000 breeding adults) occurred at Kesterson Reservoir in Merced County due to selenium toxicosis (Beedy and Hayworth 1992). In a Kern County colony, all eggs sprayed by mosquito abatement oil failed to hatch (Beedy and Hamilton 1999); and Hosea (1986) has attributed the loss of at least two colonies to aerial herbicide applications (Yolo Natural Heritage Program 2008).

A.1.6 Relevant Conservation Efforts

The Tricolored Blackbird Working Group, a voluntary group of state and federal agency biologists, nongovernmental organizations, industry representatives, and academic scientists, meets twice yearly to discuss efforts to conserve the tricolored blackbird. In 2007, this group prepared a conservation strategy for this species (Tricolored Blackbird Working Group 2007, updated in 2009). Conservation priorities identified by this conservation strategy included maintaining, enhancing, and protecting existing habitat suitable for nesting, foraging, and wintering activities; creating and restoring additional protected breeding habitats to support tricolored blackbird nesting and foraging; identifying mechanisms for the protection of nesting and foraging habitats; surveying private lands (to the extent allowable by law) and identifying the largest and most vulnerable colonies; encouraging private landowners to protect active breeding colonies; and encouraging and enhancing active breeding colonies on public lands (Tricolored Blackbird Working Group 2009).

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

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

A.1.7 Species Habitat Suitability Model

A.1.7.1 Nesting Habitat

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

A.1.7.2 Breeding and Foraging Habitat

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

A.1.7.3 Assumptions

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

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

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

A.1.8 Recovery Plan Goals

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

A.1.9 References

A.1.9.1 Literature Cited

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A.1.9.2 Personal Communications

- Phil Johnson, Altacal Audubon member, meeting with Altacal Audubon on nest site locations, May 10, 2007.
- Gary Nielson, Altacal Audubon member. Provided nest site locations for tri-colored blackbirds in Butte County in 2007.
- Jim Snowden, Wildlife Biologist. Formerly with the California Department of Fish and Game, Telephone conversation, May 14, 2007.