

Final

Tricolored Blackbird Management Recommendations and 2005 Survey Priorities

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About the California Resource Management Institute

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EXECUTIVE SUMMARY

This report attempts to provide a framework for the study and conservation of the tricolored blackbird. Tricolored blackbirds are largely endemic to California, and more than 95% of the global population occurs in the state. In recent years more than 75% of the global breeding population was found in the Central Valley. Small breeding populations also exist at scattered sites in Oregon, Washington and western coastal Baja California (Beedy and Hamilton 1999).

The report's management suggestions follow from observations of successes and failures in previous breeding seasons (1994-2004) and from the remaining uncertainties about how to most effectively restore and manage tricolors. In preparing this report for the California Resource Management Institute, I was asked to provide information about my findings and those of others about species abundance, behavior and habitat needs and to meet with parties interested in managing or creating tricolor habitats.

Suggestions contained in this report will, if followed, help place tricolored blackbird management on a firm, knowledge-based footing. In 2005 I recommend that we:

1. Search for tricolor colonies throughout the breeding season from March 20 through Mid July. Core staff and all recruited volunteers will attempt to locate colonies throughout this interval.
2. Conduct an intensive survey in late April that will include an examination of all formerly occupied sites and an extensive effort to locate all currently active colonies. This survey will estimate the world distribution and abundance of tricolors. The survey would be organized by a coordinator and support two or more field biologists refining estimates and developing additional information about colonies located by a cohort of volunteer field observers. A system to immediately link communications between those who are involved in analysis extending beyond the scope of the survey will be necessary.
3. Collect additional information about colonies, especially reproductive success and its determinants and the characteristics of foraging habitats. This needs to involve professional biologists familiar with field study of birds.

For those whose role it is to manage tricolor populations I recommend that they:

4. Maintain and extend management practices that have shown promise and revise practices that have not been productive. Proven effective methods include silage buyouts, management of marshes and weeds on National Wildlife Refuges (NWRs) and enhancement of dry land colony sites.
5. Implement additional habitat development, maintenance and restoration measures to accommodate colonies. Incorporate tricolor habitat needs into developments such as reservoir modifications, water district actions, dairy

expansion and sewage system modifications. Incorporate tricolor habitat requirements into habitat conservation plans and natural community conservation plans (HCP/NCCP) and private development design and mitigation plans.

6. Protect settled colonies by managing water levels on public properties. Encourage volunteers to follow the fate of colonies to determine nesting colony outcomes.
7. Review the success of tricolor support actions at the end of the 2005 season.
8. Provide revised cost-effective management suggestions for further work based upon the outcome of the 2005 analysis.

Outreach:

We need to extend outreach activities to develop educational materials and to include direct interaction with the relatively few individuals who host colonies of this species. The enclosed account, a symposium published by the Central Valley Bird Club, is written by the author and by other professionals concerned with the management of this species, and is one step towards fulfilling the outreach and educational need.

We also need to interact with as many landowners who host tricolor colonies as possible. The California Farm Bureau provided an important link in achieving this need in 2004 and we look forward to extending our interaction with them and other groups and organizations in 2005.

INTRODUCTION AND METHODS

In recent years, tricolored blackbird (tricolor, *Agelaius tricolor*) studies have focused attention on the number of tricolor colonies, the number of birds in these colonies and the total number of birds reported at all colonies. The most recent comprehensive survey in 2000 showed a decline in tricolor numbers by more than 50% during the preceding six years. Urgent measures to at least stabilize tricolor numbers needed to be implemented then (2000) and also now (late 2004). Here I summarize potential management options and some of the actions already implemented that may contribute to stemming the population's decline.

The April 2004 tricolored blackbird survey, managed by Michael Green and Leo Edson, was more limited than the 2000 survey and focused on sites where large colonies were noted in the past. The purpose of that survey and its outcome is reported elsewhere (Green and Edson 2004).

An evaluation of alternative survey methods is provided by Yee and Miller (2004). Any change in survey methodology can produce substantial differences in the result. Estimates in Hamilton (2004) and in these recommendations are subject to small sample size and other methodological errors. Allocating greater effort and resources to a survey in 2005 will avoid this limitation and make a more effectively targeted management approach feasible. We cannot manage unknowns, either at colonies or for species-wide planning. The global distribution and abundance of tricolors needs to be determined and monitored.

My method during both the 2000 and 2004 surveys was to locate colonies and to follow up reports of colonies by others (Hamilton 2004). I searched for unreported colonies throughout the season, especially at places where tricolor colonies were seen in the past. During the latter part of the season, after May 15, my focus was upon the Sacramento Valley. After the April 17 2004 Survey I seem to have been the only observer actively searching for tricolor colonies and forwarding reports to U.S. Fish and Wildlife Service (USFWS) and the California Department of Fish and Game (CDFG.)

In 2005 I propose a thorough, season-long search for tricolor colonies. If we can locate more or all the bird's colonies, this will give us an unparalleled opportunity to learn more than our current understanding of tricolors, including especially their use of foraging habitats. We may also identify the fate of colonies including losses to predation and to food shortages. One model for analysis that would define the character of field measurements is given in my 2004 report (Hamilton).

Although global surveys should be repeated annually to revise and refine the recommendations made by DeHaven (2000), surveys in ensuing years need not be as extensive or as costly because we will know better when and where to look.

BASIC HABITAT REQUIREMENTS

Tricolor habitats can be maintained, restored or created by providing **three essential habitat components**: (1) an adequate **nesting substrate** (2) adjacency to **water** and (3) suitable **foraging areas**. If any of these essential habitat requirements is missing, tricolors will not colonize a site. By adding the missing component(s), habitat can be made usable by nesting tricolor colonies.

Nesting substrates need to be large enough (at least 2 acres) to accommodate relatively large numbers of tricolors. Most tricolors nest in large colonies (i.e., colonies >2,000 adults). Tricolors choose spiny plants (Himalayan blackberries, nettles, several other plant species) or flooded plants (emergent marsh vegetation, flooded willows and other plants) as nesting sites. The optimum size of nesting habitat is related to the extent and characteristics of foraging habitat, a poorly understood relationship. If suggestions made here are followed, this relationship will become clearer by the end of the 2005 tricolor breeding season.

The water component of tricolor habitat is satisfied by any open water source with a bank. Canals, lakeshores, residual water in seasonal watercourses and farm ponds suffice.

Tricolor foraging sites are rice, irrigated dairy forage crops such as alfalfa and silage fields, irrigated pastures and dry rangeland. Grapes, orchards and urban development represent permanent losses of tricolor habitat (DeHaven 2000). Most row crops do not meet the tricolor nesting colony foraging habitat requirement.

RESTORATION OPPORTUNITIES

We need to **prioritize restoration efforts** (DeHaven 2000). There is an under-emphasis upon evaluating management of tricolor habitats not associated with dairies, including small, high-quality perennial suburban and rural colonies. In restoration efforts we need to include all suitable habitats because the Central Valley population is, as far as we now know, a single metapopulation, i.e., it is a freely mixing set of individuals. A threat to any local population therefore is a threat to the entire population in direct proportion to numbers of impacted individuals. For this reason losses of large silage colonies, representing a substantial part of the known global population, are worrisome.

No single scheme will stabilize and maintain tricolors. The current program of the USFWS, CDFG and the author is to support tricolor colonies throughout their distribution to assure that some of them successfully produce fledglings. Established colony sites need to be maintained and, where economically feasible, new colony sites established.

We should incorporate tricolor habitat restoration into development plans and regional HCPs/NCCPs. This is a critical time for planning for tricolors before landscape planning schemes are consolidated and ratified through implementation of HCP/NCCP - related and other formalized land use conversion plans and events.

We need to **participate in local and regional restoration efforts** to ensure that tricolor habitat features are incorporated into the planning and design of these programs. The simplest restoration strategy is to provide suitable nesting sites and/or water where suitable foraging habitat exists and will be maintained.

In **Southern California** development of nesting habitat adjacent to, or in adequate proximity to foraging habitats (particularly large grasslands) is a high priority because there are only a few remaining sites adequate to support large tricolor colonies left in the region.

RESEARCH

DeHaven (2000) provided an example of a **prioritized research strategy**. His priorities included: a survey; evaluation of silage colony nesting habitat characteristics; studies of winter roosts; banding studies to determine mortality and movement including those to and from southern California; measurement of seasonal reproductive output (which could be determined by focused studies during an intensive survey year); and identification of foraging habitats and their characteristics. He would relate these observations to reproductive success, an analysis that could also be a potential outcome of studies made during the 2005 survey. I agree with these suggestions. A completed result of some of these investigations would be possible in 2005 if funding becomes available and the survey program briefly outlined above is implemented.

HABITAT MANAGEMENT RECOMMENDATIONS

Further recommendations by DeHaven are to: *“Prepare a written land-use trends and projections analysis specific to the Tricolor, with a view towards prioritizing the key geographic and site-specific areas where funds can best be spent to achieve long-term preservation and enhancement of Tricolor habitat.”* (DeHaven 2000, p. 20). The emphasis suggested here is to do a thorough survey in 2005 and to invest in focused studies supporting, and supported by, a species-wide survey effort. Based on existing management practices and land use patterns there is sufficient time to properly survey the species without jeopardizing its continued existence in the near future. We (UC Davis, Central Valley Bird Club, USFWS, CDFG, other participants) are capable of doing this, and if we effectively execute these tasks we will greatly advance our capacity to successfully and economically manage tricolors.

MANAGEMENT OF TRICOLOR SILAGE SETTLEMENTS:

Most wildlife agency conservation efforts concerned with tricolors are now focusing upon silage colonies.

To avoid the problem of losses in silage, deflect tricolors from settling in silage if possible (DeHaven 2000). Because silage habitat at dairies is so attractive to tricolors, loss of breeding efforts can be significant. Dairies are particularly unsuited to sustain tricolor nesting habitats because of interference with dairy farming operations, potential losses due to mowing and unmanaged predation problems. Alternatives are desirable and should be immediately implemented.

DeHaven (2000) suggested that **alternative habitats should be provided in the vicinity of dairies with a history of tricolor nesting:** *“Provide Alternative, Low-Risk Nesting Substrates. Prepare a plan for creating additional, strategically located, natural nesting substrates (i.e., marshes, blackberries, etc.) for Tricolors within key dairy regions of the San Joaquin Valley. This plan should incorporate both a stepwise approach to implementation and demonstrated before committing to full implementation. Initial focus should be in the vicinity of Corcoran, where natural nesting substrates are scarce. Any newly created nesting substrates should be protected in perpetuity, once their utility has been demonstrated. A sub-element of this plan could include purchase of land on which low-risk (but highly attractive to breeding Tricolors) grain or grain silage fieldscould be grown annually for nesting substrates.”* (DeHaven 2000, p. 2). Figure 1 shows one potential site for a tricolor colony with characteristics DeHaven suggests, using currently unutilized land along the Tule River adjacent to the TeVelde Dairy where tricolor colonies have settled in nearby triticale wheat fields in recent years.

Implement a planned program for grower involvement. In theory there are three options if tricolors settle in silage: do nothing and let growers cut through colonies, intervene and enforce federal migratory bird protections without compensation, or intervene and compensate. Only the third option is viable and the question remaining is who should be responsible for identifying problem situations, value lost to protected colonies and payment. Plans made well in advance of the season costs about the same as emergency funding. Payments at all problem sites appear to require \$100,000/year (about \$400/acre). Failure to locate that sum until harvest is imminent has created tension with growers and agencies regarding how and when to proceed.

Protect tricolors that settle on and initiate egg laying in silage fields until the nesting cycle is completed (40-80 days). The 80-day interval is necessary if renesting occurs. Renesting can overlap the initial settlement's active nests, precluding intervention and seasonal farming operations. Regardless of whether the species is listed under endangered species laws, protection of tricolor nests with eggs is required by federal law (Migratory Bird Treaty Act). Destruction of active colonies is also a counterproductive public relations problem.

Sharply define when in the nesting cycle the opportunity to harass or harvest fields where tricolors show signs of settling ends. I assume this is when the first eggs are laid. USFWS should provide us with the appropriate policy direction. USFWS and CDFG should work proactively with those dairy operations that choose to both harass and allow nesting. Development of educational materials and formalized funding mechanisms will assist in the success of either choice.

The CDFG and USFWS can grow suitable nesting substrate crops on refuges when they are in the vicinity of silage foraging habitat.

REDIRECTING MANAGEMENT EFFORTS TO HABITATS NOT ASSOCIATED WITH DAIRIES:

Since solutions to the silage problem are straightforward, we can de-emphasize silage in further management and research analysis and consider the overall circumstances of tricolors.

Support colonies and alternative colony habitats throughout the San Joaquin Valley to accommodate early season (March and April) settlement. When the 2004 Survey and silage settlement was occurring, about 65% of all tricolors observed were settled in habitats other than silage (Hamilton 2004). Early settlement also occurs in dry rangeland settings (Hamilton 2004, Table 3) where 21% of all production (10% of all birds) occurred in 2004. Thus, there *are* places available and suitable for tricolor settlement at the beginning of the season when settlement in silage colonies occurs. It is desirable to increase the number of tricolors doing so. Substantial areas where habitat enhancement and development can be implemented include cattail ponds in large alfalfa-growing areas, stream and canal bank blackberry thickets and rangeland in the Central Valley and foothills where all habitat components are present or can be provided. A detailed list of possibilities is beyond the scope of this report.

Identify the relationship of rice cultivation in the Sacramento Valley to late season tricolor production. The annual April survey procedure measures the relationship of tricolors to environments *before* rice-dependent habitats are settled during May and June (Hamilton 1998). In 2004 the majority (64%) of all measured and extrapolated reproductive success by tricolors (49% of all birds located in 2004) was by colonies associated with rice foraging (Hamilton 2004). If the Central Valley tricolor population is assumed to be a single metapopulation, as suggested above, the relatively productive rice-dependent colonies need, at the very least, to be identified because they are one nucleus for tricolor fledgling production.

Hosting tricolors in introduced plants is an issue for some involved in tricolor management. But we host waterfowl in rice and corn stubble and Mountain Plovers on exotic grasslands and rangeland. There is no example known to me of tricolor colonies foraging in primarily native plant communities, although this may be the case in some scrub habitats. We can replace exotics as nesting substrates, but not without learning how to effectively cultivate nettles and other native plant species suited to the needs of tricolors. Landowners of rice or other crops that can host tricolors are likely to choose to

participate in cultivating the appropriate plants only if they receive assurance that they will not incur a regulatory burden by doing so.

POTENTIAL HABITAT RESTORATION AND DEVELOPMENT INITIATIVES:

Prioritize restoration efforts to align expenditures and habitat allocations with established protection priorities and the goal of successfully producing as many fledglings as possible in as many places as possible.

Participate in restoration efforts to be sure the requirements for tricolors are included if production of tricolor habitat is, or can be suggested to be, one of the objectives of the project.

Give greater attention to foraging habitat requirements. Because foraging habitat has a vastly greater spatial extent than nesting substrate (Hamilton 2003), foraging habitat in many cases is a more demanding and difficult requirement to satisfy. No minimum for foraging habitat can now be defined, but colonies with less than 200-300 acres of foraging habitat do not persist and access to several thousand acres is necessary to maintain most large colonies. There are three broad categories of tricolor foraging habitat, (1) irrigated agricultural pastures and feed growing areas such as silage and alfalfa fields, (2) rice and (3) dry rangeland (Hamilton 2004). Dry rangeland is extensive in parts of the range of tricolors such as in the grassland foothills of the San Joaquin and Sacramento Valleys. The requirement for water renders most of this otherwise capacious habitat unusable by tricolors. Where there is adequate water, as in Sacramento County, vineyards and houses are replacing grasslands.

Provide open water drinking places immediately adjacent to potential colony sites. In rangeland, water is the limiting tricolor habitat ingredient. A 4-acre, well-sealed cattail pond capable of supporting 4,000 breeding tricolors requires about 20 acre-feet of water per year. A spring growing nettles sufficient to maintain several thousand tricolors requires less than half that much water. It is placement of water sources rather than the amount of water that is the challenge in managing tricolor habitat development.

Support private tricolor restoration efforts, especially outside the floor of the Central Valley. The success of the Wind Wolves Preserve tricolor management efforts in dry land Coast Range foothills is an example of effective management of rangeland and mountain springs to accommodate tricolors. The tricolor population there remains stable despite recent droughts, because livestock are prevented from trampling most wetland vegetation. In much of the San Joaquin Valley, ordinary grazed rangeland provides tricolor foraging habitat, but water insufficiency there results in tricolors settling near dairies with associated alfalfa, silage and irrigated pasture acreage. Small (5-10 acres) ponds in the vicinity of large alfalfa operations (but not at dairies) will attract beneficial insect devouring tricolor colonies.

Make tricolor habitat management a priority on small (10-50 acre) blocks of nesting habitat surrounded by larger foraging habitat used for other purposes such as

waterfowl winter habitat, as is already done routinely at Delevan, Kern, Merced and San Luis NWRs. If agricultural operators, especially large-scale alfalfa growers, can be persuaded to create ponds or other successful tricolor habitats near dairies, intrusion of colonies into silage will be avoided. Most tricolors join a few large colonies to nest (Beedy and Hamilton 1997). That was the case for the limited 2004 Survey (87% of all birds located were in the 10 largest colonies, a number that would be smaller with a more complete survey). This relationship often is stated with negative implications, emphasizing risks associated with the extreme gregariousness and coloniality of tricolored blackbirds. But effective management at these few large colonies also can enhance tricolor reproductive potential and success. Coloniality and extensive aggregation offer the opportunity to the manager to focus specific management actions upon identifiable and relatively limited areas.

Identify tricolor colonies in the rice growing districts and encourage owners to maintain them. Vigorous Himalaya blackberry coves in riparian and farmland settings untreated by herbicide are highly attractive to tricolors. Less than one percent of all Himalayan blackberry thickets are used for nesting by tricolors. An obvious management strategy is to identify sites used by tricolors, to contact owners and encourage them to protect them. Although blackberries pose some problems to rice growers because they may eventually block vehicular access on levee roads they are easily and legally eradicated mechanically or with herbicides. Judicious efforts to remove blackberries, where particularly favorable colony sites impede traffic, will leave tricolor nesting habitats intact. This initiative can be enhanced by incentives. My limited experience contacting rice growers hosting tricolor colonies on their property, through the California Farm Bureau Federation, has been uniformly positive and supportive.

Himalayan blackberry colonies may be more likely to succeed when they are in open, as opposed to wooded, riparian settings. Himalayan blackberries trailing into flowing deep canals are desirable when located near suitable foraging areas, because they attract tricolors and are relatively immune to raccoons and other predators including black crowned night herons. The failure of the large colony at O'Neill Forebay in 2004 may be related to its woodland setting. In the early 1990s, open space Himalayan blackberry coves at O'Neill Forebay were used by tricolors and suffered minimal losses to predators. O'Neill Forebay is public land and a site where the quality and extent of tricolor habitat could be enhanced without substantially interfering with current operations.

HABITAT FEATURE REQUIREMENTS

Since much of the habitat range of tricolored blackbirds is subject to significant development activity in California, a focused approach to tricolor habitat requirements is needed. All of these initiatives need to provide the particular set of tricolor habitat requirements, a little open water, a protected nesting place and appropriate foraging open space. In many cases conversion of a landscape from uninhabitable to habitable by tricolors requires only a modest change, especially where the open foraging space

requirement is already satisfied. If additional initiatives suggested below are implemented, there is the possibility of enhancing habitats and the abundance of tricolors in California, not only in wildlands but also in agricultural and urban settings:

1. Be sure the proposed colony will have **access to suitable foraging habitat**.
2. **Locate colonies nearby persistent open water** (for the duration of the breeding season) with a shallow edge to make bathing possible.
3. **Be sure the nesting site area habitat is sufficient**. The nesting area must be at least 15 m wide and include an expanse, at least **two acres and preferably more**, of emergent marsh vegetation to host a substantial colony.
4. **Colonies can thrive in unirrigated dryland settings** (Hamilton 2004, Table 3). These colonies may be less vulnerable to land use conversions than irrigated agricultural lands. The amounts of water required are small and do not represent serious competition with urban and agricultural demands.
5. **Proactively incorporate suitable tricolor habitat** into new dairies, agricultural operations, reservoirs, suburban development and housing developments.
6. We also need to **support uniquely important, small high visibility colonies** near urban areas; see education-based rationale in Hamilton (2003). These sites will be lost forever if they are not protected and managed now.

2005 SURVEY

The 2004 Survey highlighted the importance of utilizing highly skilled ornithologists with years of bird-counting experience to assist the effort. We need to be sure these individuals are advised well in advance of the plan for a more extensive survey in 2005 and seek their participation.

In 2005 I recommend that we do a continuous search for nesting tricolor colonies throughout the breeding season. In most recent years we have determined relatively little about the overall distribution and abundance of tricolors. Several years of April surveys have left us with a redundant understanding of where tricolors are in April. If we find, for example, 75% of all tricolors in late April and if the average tricolor nests 2.7 times during the breeding season (a hypothetical but carefully calculated estimate) we would find 28% of all tricolor nesting effort in April, mostly clustered in the San Joaquin Valley. To manage a species declining throughout its geographic distribution we need a broad geographic and temporal understanding of tricolor distribution and abundance. A survey usable to set a species-specific management plan we need to adequately represent Southern California and the Sacramento Valley.

Measurement of regional declines is an urgent management priority that needs season-long evaluation. Tricolors are declining in Southern California (Unitt 2001), Sacramento County (DeHaven 2000) and at all coastal locations (personal observations). We need to identify places where tricolors can be preserved, restored and/or established. In Southern California the last opportunities to protect grassland areas large enough to accommodate large tricolor colonies are at hand.

Another goal of the 2005 survey should be to **identify management opportunities and priorities**. If we intensify the survey effort and expand it to cover the entire breeding season, mid-March through July, we should be able to gain a more accurate understanding of the current circumstances of tricolors. A complete survey in 2005 will enable us to quantify foraging habitat characteristics throughout the geographic distribution of tricolors. For a brief evaluation see Hamilton (2004). Without these data it will be difficult to plan and implement the most effective management alternatives.

The propensity of **tricolors to concentrate breeding efforts at a relatively small number of sites** needs to be accounted for in any evaluation of abundance. Any scheme to sample a specified set of locations will be inaccurate unless it also accounts for large colonies not necessarily settling at the prescribed set of locations. In my (Hamilton 2004) analysis of tricolor colonies, about 100,000 of 402,000 nesting attempts observed and reported were at colony sites not reported in previous years. Estimating numbers of birds at colony sites also needs to be supported by in-colony post-season estimates of the number of nests. In my report (Hamilton 2004) about half of the 402,000 nesting attempts observed and reported were changed by more than 50% as a result of post-season estimates of the number of nests. This is an essential and time-consuming process necessarily done in the heat of the Central Valley summer.

AUTHOR QUALIFICATIONS, ACKNOWLEDGMENTS AND FUNDING

I (Hamilton) am a Certified Senior Ecologist, Ecological Society of America. Previous publications listed in the bibliography identify my competence as a scientist with a history of work with tricolored blackbirds. The recommendations here are modest refinements of management recommendations in Beedy and Hamilton (1997).

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Clendennen provided access to and information about tricolors at the Wind Wolves Conservancy, San Emigdio Ranch in Kern County.

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Figure 1. Tule River passing through the Greg TeVelde Ranch, Tulare County, California (June 2004). The river is used by the neighboring tricolored blackbird colony for bathing, drinking and to wet nesting material. The scene is included here to demonstrate the availability of non-agricultural space that might be used to support vegetation to accommodate nesting tricolors when they are displaced from triticale or other silage crops.