Settlement and Breeding Colony Characteristics of Tricolored Blackbirds in 2006 in the Central Valley of California

Final Report

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Dedication

I dedicate this report to the memory of William J.Hamilton, III, for his inspiration, guidance, friendship, and support.

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Introduction

The tricolored blackbird (*Agelaius tricolor*), hereafter "Tricolor", is a North American songbird that is nearly endemic to California (Beedy and Hamilton, 1999). Due to large-scale losses of its breeding and foraging habitats, the numbers of Tricolors dropped dramatically during the 20th Century (Neff, 1937; DeHaven, et al., 1975a; Beedy and Hamilton, 1997; DeHaven, 2000; Cook and Toft, 2005) and concern for the future of the Tricolor led to a petition by the Center for Biological Diversity to list the Tricolor under the State of California and U.S. Endangered Species Acts (CBD, 2004).

The work described in this report continues efforts which began initially in the 1930's (Neff, 1937) and then more consistently in the early 1970's (DeHaven, et al., 1975a,b) to more thoroughly document the status and trends of Tricolors through field work conducted during the breeding season. This as well as prior field work emphasized the Central Valley, although the Tricolor has two distinct population segments, the Central Valley population and the Southern California population, and historically has nested in large numbers in coastal marshes in southern California (Baird, 1870; Neff, 1937; DeHaven, et al., 1975a; Beedy and Hamilton 1999; Cook and Toft, 2005). Workers in southern California have documented severe population declines in the Southern California population (Neff, 1937; Beedy and Hamilton, 1997; Unitt, 2004).

The annual search for, conservation, and monitoring of Tricolor colonies on private property, especially grain fields in the San Joaquin Valley, are the most essential components of recent attempts to stem the population decline and increase the numbers of Tricolors in California. However, events in Riverside County, in the southern California portion of the species' range, during the period of this research highlighted the fact that annual monitoring and conservation efforts must occur in all parts of the species' range, not just in the Central Valley, if the largest breeding colonies are to be identified and conserved. Similarly, monitoring by a full-time, dedicated researcher is the minimum required to document events as they occur in the field, and is essential to rapidly alert authorities so as to avert crises through immediate, appropriate responses. However, funding constraints in 2006 prevented the monitoring of the entire 2006 breeding season, and thus this report describes events from the beginning of the breeding season until the middle of June, when breeding colonies were just forming in the middle Sacramento Valley, and the fates of the Sacramento Valley colonies are largely unknown.

Several events, more thoroughly described in the body of this report, that occurred during the 2006 field season suggest that on-the-ground enhancements advocated in the draft Conservation Strategy developed by members of the Tricolored Blackbird Working Group, a volunteer effort composed of agency biologists, representatives of private property groups and non-governmental organizations (NGOs), may be effective in addressing conservation needs in the Central Valley population of the Tricolor. However, the move off of a protected area, the San Jacinto Wildlife Area, and on to private property, a nearby dairy, of the largest breeding colony in 2006 in southern California, suggests that a strategy relying exclusively upon protected areas to meet all the needs of Tricolors is naive and unlikely to sustain the species over even the short term. This

event, and the emergency measures needed to address it, suggests that an active monitoring and management effort will be essential throughout the breeding range of the species for some time to come.

Methods

Prior to field work, I contacted by telephone County Planning Department staff in Kern, Tulare, Kings, Fresno, and Madera Counties to request maps, images, or GIS layers containing the locations of dairies in these counties, as the largest breeding colonies in the San Joaquin Valley are situated in grain fields adjacent to dairies (Beedy and Hamilton, 1999; Hamilton and Meese, 2006). I then transferred all dairy locations from the original sources on to California State Automobile Association (AAA®) maps. My surveys for Tricolor settlements and breeding colonies were to include all known colony locations in these counties as well as areas in close proximity to (effectively within closest driving distance using public roads) all dairies, as I wanted to test the hypothesis that colony detection rates could be improved by a targeted search, i.e. by searching using defined criteria. My criterion, based upon previous field work and several published reports by DeHaven, Beedy, Hamilton, and co-workers, was the presence of *ad libitum* food as provisioned to livestock. Although the locations of all sources of *ad libitum* food could not be determined, I knew that dairies stored relatively massive amounts of grain, and even if the stored grain was not accessible (although in practice it usually is), the grain was still available to foraging birds either in livestock feed troughs or spilled on to the ground. Thus, having known dairy locations plotted on maps helped me to target my searches and enabled me to focus on areas that I deemed to be higher-probability areas for settling or nesting tricolors.

Field work began in late March, 2006 with surveys of the southern San Joaquin Valley. In most years, Tricolor breeding in the southern San Joaquin Valley begins in mid-to-late March (Beedy and Hamilton, 1999), but apparently due to the unusually cool, wet March weather in 2006, no settlements of Tricolors are known to have occurred by the end of March in 2006. Thus, an additional brief trip was made to Riverside County on March 29 and 30, to check on the status of the colony that normally exists on the San Jacinto Wildlife Area. However, even here Tricolors had not yet settled, and the delay in breeding was confirmed to be a geographically widespread phenomenon.

Field work continued with all known breeding colonies in the southern San Joaquin Valley surveyed within the first two weeks combined with the targeted search of the immediate vicinity of all dairies within Kern, Tulare, Kings, Fresno, and Madera counties. After all settlements and colonies had been detected in the San Joaquin Valley, I revisited all sites as frequently as possible to monitor conditions to provide both current information on the status of each colony as well as to best assess colony chronology to estimate optimal times for conducting reproductive success estimates and nest transects for breeding population size estimates. I enlarged the geographic scope of my detection and monitoring activities in the third week of April to include Merced county, surveyed the Solano/Yolo/Sacramento county area for the first

time on 28 April, and began surveys of Colusa and Glenn counties on 30 May. I monitored all active colonies through the end of my field season on 16 June.

Results

Colonies Studied. Field work started on 3/27 and ended on 6/16/2006. During this time a total of 34 colonies was studied (Table 1, Appendix I). Of these, 15 (44%) were colonies not previously documented. Despite intensive, targeted searches, not one settlement nor breeding colony was detected in Kings, Fresno, or Madera county. One of the locations listed in Table 1 and Appendix I, Capital Outing Club, Sacramento County, was discovered as a settlement on June 15th, the next-to-last day in the field; thus, the fate of this settlement is unknown, but a single day in the field on July 12th failed to detect any birds when viewed from the north boundary of Pioneer Duck Club, from where the Capital Outing Club settlement had originally been detected, nor were any birds seen or heard from San Jose Road, essentially the west boundary of Capital Outing Club, and this settlement is believed to have failed to form a colony.

Reproductive Success. Reproductive success (RS) could only be calculated at two colonies because 1) access to most colonies on private property was restricted, and 2) most larger colonies had multiple settlements, rendering estimates of productivity unreliable (Hamilton, 2000). RS was estimated at West Poso, by far the largest breeding colony in 2006 (138,000 breeding birds as estimated via line transect nest counts following the breeding season), and based upon a sample of 64 nests inspected late in the breeding season, when young were, on average, at least 7 days old, was calculated to be 1.4386. Based upon an estimate of 92,135 nests constructed (by the same line transects used to calculate total size of the breeding population here), an estimated 132,545 young was produced by this one breeding colony.

Reproductive success was also calculated at the Homen Dairy colony in Merced County, and based upon an estimate, via line transect counts, of 47, 216 nests and an RS estimate derived from 20 nests of 0.85, an estimated 40,133 young were produced by this colony.

New Colonies. A major component of this year's work was the test of an hypothesis that a new and unproven search methodology would result in the detection of new breeding colonies. As far as I am aware, previous field work had focused all searches for colonies on locations of known colonies, and little or no effort was expended in trying to detect new colonies in locations where none had been previously reported (e.g., Hamilton, 2000). I used a single criterion, locations of dairies (see Methods, page 3), upon which to target my searches and found the Voice of America colony, Tulare County, in a location not previously reported, and subsequently discovered the Owens Creek, Merced County, and Dickenson Ferry, Merced County, colonies in association with dairies, but not during the early season, targeted dairy surveys. The Owens Creek colony was discovered while en route to the San Joaquin Valley County Agricultural Commissioners meeting in Mariposa, Mariposa County. The Plainsburg Road colony, also in Merced County, was discovered by Shawn Milar, a USF&WS biologist, San Luis, NWR, who, as I understand it, was en route to view the Owens Creek colony after learning of its discovery. The Dickenson

Ferry colony was discovered while en route to the Homen Dairy colony to conduct a reproductive success estimate with Dennis Woolington, USF&WS biologist, San Luis NWR.

In addition to these four new colonies, five new colonies were discovered in Sacramento County, four by me while driving east on St. Rt. 16, Jackson Road, to survey known colony locations, and a fifth (Boys Ranch) as a result of a report by Bill Geyer, Resource Landowners Coalition Executive Director and Tricolored Blackbirds Working Group member. One new colony was reported from Kern County: Kern Water Bank New Cattails, in a rapidly-growing cattail stand that did not exist in 2005 and was too short and immature to support nesting by Tricolors only a couple of weeks before (exactly as was the case in the ECLA Pond second nesting).

Two additional new colonies, Northrup Road, Merced County, was discovered by Dennis Woolington, and Ramona Farms, Riverside County, was discovered by Tom Paulek, San Jacinto Wildlife Area Manager, when the birds that had formerly, and reliably, nested on the San Jacinto Wildlife Area moved to nest in a nearby wheat field (see additional details in the Discussion, below, and Appendix I).

Lastly, a new colony was discovered in Yolo County when conducting a survey of known colony locations. After surveying sites occupied in Yolo County in 2005 and determining that they were unoccupied, I searched first in a small cattail marsh where birds, but no colony, had been reported in previous years, and then continued to search several miles beyond this location to find foraging flocks totaling 5-700 birds. A subsequent search, ten days later, of this same area turned up a new colony in Himalayan blackberries on private property. This colony, named Bill's Grasslands, was named in honor of Bill Hamilton, who had dedicated his life following his retirement from the University of California, Davis, to the study and conservation of the tricolored blackbird.

Thus, in total, 15 colonies were detected in locations where colonies had not, as far as I am aware, been previously reported (Table 1). Of these, one was detected as a direct result of the targeted survey methodology, and three more were detected in association with dairies but not while conducting targeted surveys, suggesting that such targeted surveys, using *ad libitum* food (i.e. stored or provisioned grains) as a search criterion, may be a valuable addition to survey methodology. It should be noted that since no alternative survey methodology was compared to the targeted survey method employed here, it is impossible to say, unequivocally, that surveys targeted around dairies improve settlement and colony detection rates. However, if the detection rate of new colonies from 2005 is compared to that in 2006 (a valid comparison as the 2005 search for colonies was focused on existing colonies, and the observer is constant across years), I found only one new colony in 2005, Poso II, and that one was in view of, and detected while departing from, the Poso I colony. However one interprets the comparison, it is clear that in the San Joaquin Valley, Tricolor settlements and colonies are found disproportionately frequently in association with dairies. The presence of *ad libitum* food, primarily stored and provisioned grains, is likely a useful predictor of Tricolor colonies more generally, as utilization by Tricolors

of stored or provided grains has been documented from Riverside to Glenn counties (Hamilton and Meese, 2005; this report).

Interpreting Results. A few words of caution in interpreting these results may be helpful. First, it is impossible to conclude that the birds in these new colonies represent additions to the known population, as none of the birds studied is marked, and one could assert with equal authority that 1) the birds in these new colonies were derived from colonies known in prior years as one could conclude that 2) these birds represent additions to the number of Tricolors. It is simply impossible to say from the existing evidence which of these interpretations is correct, and a combination of the two is also possible. Second, the numbers in these colony size estimates are not additive, as the birds in colonies that were destroyed by harvest in the vast majority of cases can be assumed to have tried to re-nest elsewhere, and the largest colonies (West Poso, Homen Dairy, Deer Creek, Ellsworthy) were highly asynchronous - they clearly grew over time with additional settlements of birds that were derived from other locations. And birds that finish nesting or fail to nest in one location are known to try to nest again in a different location, a phenomenon known at "itinerant breeding" (Hamilton, 1998). It is precisely due to these movements of birds and to the confounding effects that such movements may have on population estimates (Hamilton, Cook, and Grey, 1995) that the counts of birds for determining the global population estimate are conducted over 3-day weekends (Hamilton, 2000).

Colonies Saved by Silage Buy-outs. Two Central Valley colonies were saved by silage buy-outs: West Poso, Kern County, the largest known Tricolor breeding colony in 2006, and Homen Dairy, Merced County, the second largest known breeding colony of 2006. In addition, the largest known breeding colony in southern California, Ramona Farms in Riverside County, was saved due to a silage buy-out (Table 1).

Colonies Destroyed. As in all recent years, several Tricolor breeding colonies were destroyed by harvest of the grain crop in which they had nested (Beedy and Hamilton, 1997; Cook and Toft, 2005). The first colony to be destroyed was at Costa's Dairy in Kern County on April 20th. Previous colonies at Costa's Dairy had also been destroyed and no attempt was made to contact the landowner subsequent to discovery and prior to harvest. It is likely, although not certain, that the birds at Costa's Dairy flew the 6.5 miles to join the West Poso colony, as in the days following the destruction of the Costa's Dairy colony, additional birds settled, primarily on the east end, in the West Poso colony. Voice of America, Tulare County, was destroyed by harvest days after the owner told Scott Frazer, USFWS biologist, Kern NWR, and me that he would not harvest the field until after the young had fledged. Owens Creek, one of the three colonies discovered in Merced Colony, was destroyed prior to but within a week of the fledging of young. Plainsburg Road, another of the newly-discovered Merced County colonies, was destroyed by harvest after an estimated 75% of the young had fledged. Dickenson Ferry, the third newly-discovered colony in Merced Colony, was being destroyed when it was discovered. Finally, Deer Creek Dairy, Tulare County, was destroyed days after the owner told Scott Frazer, USFWS biologist, that he would not cut the field until after the birds had fledged. This harvest was reported to the Fresno Field Office, Enforcement Division of the USFWS, and harvest was halted

by direct intervention by the USFWS officer but not until an estimated 60% of the colony had been harvested, including a single pass through the center of the colony. An estimated 4,000 birds remained in this colony at the end of the breeding season (Scott Frazer, pers. comm.).

Table 1. Breeding colonies and major settlements studied in 2006, ranked from smallest to largest number of breeding birds. Colonies marked by an asterisk (*) were first discovered in 2006, i.e. were in locations not previously described. Colonies marked by ‡ failed (see Results for reasons why these colonies failed). Sizes, in acres, of all silage colonies were estimated.

Colony Name	County	Substrate	No. Birds	Size (ac.)
Triangle Rock No. 2*	Sacramento	milk thistle	60	
Triangle Rock No. 1*	Sacramento	milk thistle	80	
Wind Wolves Echo Flat	Kern	nettles	200	
Solano Landfill	Solano	cattail marsh	300	
Kern River Parkway	Kern	mesquite	500	
Big Spring	San Luis Obispo	cattail marsh	500	
Readymix Pond*	Sacramento	cattail marsh	500	
Lopez Ag Services*	Sacramento	milk thistle	600	
Boys Ranch*	Sacramento	cattail marsh	800	
Elder Creek Road	Sacramento	Himalayan blackberry	2000	
Hacienda	Kern	flooded mesquite	2000	
Wind Wolves Little Lobo	Kern	nettles	2500	
Wind Wolves Santiago Springs	Kern	nettles	2500	
Kern Water Bank Nettles	Kern	nettles/mesquite	3000	
Northrup Road*	Merced	Himalayan blackberry	3000	
Kern Water Bank First Cattails*	Kern	cattail marsh	3000	
ECLA Pond First Nesting*	Kern	cattail marsh	3000	5.00
Dickenson Ferry*‡	Merced	mustard/thistle/grain	5000	25.00
Bill’s Grasslands*	Yolo	Himalayan blackberry	5000	
Ramona Farms*	Riverside	wheat	8180	13.00
Delevan T21:2‡	Colusa	cattail marsh	10000	
Pioneer Duck Club	Colusa	cattail marsh	10000	
Capital Outing Club‡	Colusa	cattail marsh	10000	
Costa’s Dairy‡	Kern	triticale	20000	20.00
Voice of America*‡	Tulare	triticale	20000	40.00
Toledo Pit	Tulare	cattail marsh	20000	
Plainsburg Road*‡	Merced	triticale/mustard	20000	30.00
Delevan T43	Colusa	cattail marsh	20000	
Owens Creek*‡	Merced	oats/milk thistle/mustard	30000	40.00
Ellsworthy	Merced	cattail/tule marsh	30000	45.00
Deer Creek Dairy‡	Tulare	triticale	60000	40.00

ECLA Pond Second Nesting*	Kern	cattail marsh	60000	25.00
Homen Dairy	Merced	triticale	70824	41.80
West Poso	Kern	triticale	138000	75.30

Colony Turnover. Previous studies have documented a relatively high degree of inter-year colony turnover, with relatively productive colony locations in one year followed by no occupancy the following year (Neff, 1942; Hamilton, 2000). Table 2 summaries a few of the larger colonies that were active in 2005 and checked and found to be unoccupied in 2006. Colony turnover may result from a variety of factors, and is of concern if formerly productive sites were active over a number of years and then abandoned, not to be used, or used by far fewer birds, in subsequent years (e.g., Unitt, 2004). Colony turnover is especially prevalent in silage fields but is generally due to factors that change within and among years; thus, silage colony turnover is not considered here.

Table 2. Sites supporting breeding colonies in 2005 and confirmed unoccupied in 2006.

Colony Name	County	Substrate	No. Birds in 2005
Waegell's	Sacramento	tule marsh	8,350
Willow Creek	Sacramento	Himalayan blackberry	5,000
Road 88B	Yolo	nettles	2,770
Conaway Ranch	Yolo	cattail marsh	6,000
Lake Success	Tulare	nettles	12,000
Acre Farms	Colusa	cattail/bulrush marsh	10,000
Stony Creek	Glenn	*Arundo donax*	6,000
San Jacinto W.A.	Riverside	cattail/bulrush marsh	10,500

Hazing. The West Poso colony settled over a period of weeks and was highly asynchronous. The number of birds present increased until virtually the entire 75.3 acre triticale field in which it was located was occupied. In most cases, there is a distinct border of unoccupied silage in silage colonies, but in this colony, any border was extremely narrow, and in the third week of April, several hundred birds, primarily adult males, were seen in the adjacent field to the north. Scott Frazer, USFWS biologist and I spoke to the owner of the fields and obtained his permission to try to deflect the birds from settling in to a new colony here. Our efforts spanned three successive days: on day one, we worked together and walked through the field where birds appeared to be settling, and yelled and raised our arms and tried our best to disturb the birds. Although the birds initially left the field, they returned to the field within 15 minutes of our departure. Early in the morning of day two, Scott returned to the field with a custom pistol that shot "cracker shells" and these were used to augment our continued efforts to disturb the birds. In addition, Scott brought his dog, and the presence of the dog appeared to be as or more effective at disturbing the birds than did our presence or the firing of the cracker shells. We worked together for approximately 90 minutes and, as on day 1, the birds seemed initially alarmed and flew from the field, but returned 15-20 minutes after we exited the field. Scott

returned to the field on day 3 and repeated the events of day 2, with similar results. On all subsequent visits to this site, no birds were seen in the adjacent field, and it appeared as though our efforts at hazing the birds and preventing a second settlement had succeeded.

Cattle Egret Predation. In April, Scott Frazer, USFWS biologist and I observed a flock of 18 cattle egrets (*Bubulcus ibis*) preying on eggs and nestlings of tricolored blackbirds at a colony in southern Tulare county (Figure 1). To my knowledge, this is the first documented case of predation on Tricolors by cattle egrets. The cattle egrets were only very mildly harassed by the

Figure 1: Cattle egrets (*Bulbulcus ibis*) in a tricolored blackbird colony; Tulare County, April, 2006.

adult Tricolors, as is typical for the species (Beedy and Hamilton, 1999) but males of the few red-winged blackbirds (*Agelaius phoeniceus*) nesting in the same silage field were far more aggressive but still essentially ignored by the cattle egrets. The extent of mortality due cattle egret predation was not determined, but in this one colony, losses of eggs and nestlings may have occurred in hundreds of nests.

Foraging. The survey for new and monitoring of existing colonies precluded intensive observations of foraging birds at most colonies, but intensive observations of foraging birds were made at three colonies. At all other colonies, when foraging for animal prey (i.e. when not eating grains stored or in or spilled from feed troughs), birds left the colony and flew out of sight, and I was not able to determine foraging destinations, substrates, nor foods selected. At West Poso and, subsequently at ECLA Pond, in Kern County, the vast majority of non-dairy (i.e. for non-provisioned grains) foraging occurred in the large alfalfa (*Medicago sativa*) fields immediately south of the colonies. These colonies were intensively monitored due to the numbers of breeding birds and their relative importance to the productivity to the known, global

population, and in each of six visits to these sites, essentially all foraging activity was directed toward these alfalfa fields and occurred within 2 kilometers of the colony, as foraging birds could constantly be observed from the time they departed the colony until they returned. Only on the last day of observation, June 12th, did I see foraging birds depart the colony for a more distant destination, in this case a steady stream of foraging birds departed the colony and flew to the east-northeast. I attempted to follow the foraging birds to document their destination(s), but public road access prevented me from determining where and upon what the birds were foraging. Scott Frazer, USFWS biologist, later reported to me that he had seen birds heading in the same direction earlier in the day, and that he, too, had tried and failed to determine where and upon what they were foraging. Birds at the newly-discovered Bill's Grasslands colony were observed on three dates, and on all three occasions a region within 2 kilometers of the colony circumscribed nearly all of the area used by the foraging birds. In all cases, all of the birds were foraging in open rangelands. This was a grasshopper "breakout" year, as determined by the fact that hundreds of grasshoppers would hop away from underfoot while hiking in to the colony, and all of the prey being fed to the nestlings appeared to be grasshoppers. It should be noted that the vast majority of the grasses growing in the vicinity of the Bill's Grasslands colony are introduced exotics (John Anderson, pers. comm.).

Discussion

The events of the 2006 field season may be remembered as a turning point in efforts to understand the needs of and to most effectively conserve the Tricolor, at least the Central Valley population of the species. Although the global population continues to depend too heavily upon nesting in non-secure habitats, and a worrisome event, the move by the largest breeding colony in Southern California off of a protected area and on to a nearby dairy, reflects recent, similar events in Kern and Merced Counties, there were reasons for optimism.

The encouraging events in the Central Valley were the:

1) use in several locations of nesting habitats provided specifically for Tricolors
2) finding that targeted search may be an effective method for detecting settlements
3) apparent effectiveness of hazing in deflecting settling birds and the prevention of colony formation, and
4) fuller appreciation of the significance of the age of wetland vegetation in nesting substrate selection.

Use of Dedicated Nesting Habitat. Researchers have for at least a decade been suggesting on-the-ground methods designed to encourage Tricolor settlement and breeding, and primary among these has been the restoration of existing or provision of additional secure nesting substrate, especially cattail and tule marsh vegetation (e.g., Beedy and Hamilton, 1997; DeHaven, 2000). In 2006, no fewer than three breeding colonies were established in young cattail marsh vegetation that was established or is being maintained for the express purpose of tricolored blackbird breeding: the El Cinco/Los Alamos (ECLA) pond in Kern County, Toledo Pit in

Tulare County, and the Pioneer Duck Club in Colusa County. The ECLA pond and Pioneer Duck club marshes are being maintained through Landowner Incentive Program (LIP, a Federal-State partnership; see http://federalaid.fws.gov/lip/ lip.html) funding, and in both cases are in the second year of five year contracts, illustrating that on-the-ground habitat enhancements will be utilized by breeding Tricolors and may help to sustain the species across large parts of its breeding range. The birds at ECLA pond actually formed two colonies, separated more by time than by space. In the first ECLA colony, settled in early April, ca. 3,000 birds nested in the southeast portion of the pond, where cattail growth was most vigorous at this point in the season. In the second ECLA colony, established during the fourth week in May, a visually estimated 60,000 birds nested in fresh, rapidly-growing cattails that had been too short and immature to provide nesting substrate in April. This new colony was established mainly in the central and western portions of the pond by birds that had reared their first broods in a triticale field ca. 300 meters away. Toledo Pit in Tulare County is maintained by the Tulare County Irrigation District under contract to the U.S. Fish & Wildlife Service and has been a focus of regional tricolored blackbird restoration efforts for several years (DeHaven, 2000). Toledo Pit was burned in spring, 2002 in order to enhance nesting habitat for tricolors (PRBO, 2002), and had a series of no fewer than three settlements in 2006, ultimately supporting a visually estimated 20,000 breeding birds. Pioneer Duck Club, Colusa County had no nesting Tricolors in 2005 but in 2006, no fewer than 10,000 birds nested in the East Pond at Pioneer Duck Club, and although the breeding by the originally-settled birds concentrated at the northwest portion of the pond was largely unsuccessful (likely due to black-crowned night-heron, *Nycticorax nycticorax*, predation), breeding by subsequent settlers (or re-nesting by existing birds) was at least modestly successful, as 500 or more fledglings were observed here on July 12th. It will be interesting to see whether birds use this or the even younger vegetation in the west pond in 2007, as the cattails in the west pond at Pioneer Duck Club appeared to be too short and sparse to provide Tricolor nesting habitat in 2006, but with another year's growth, supported by the LIP water allocation, these cattails may be more attractive to nesting Tricolors.

The significance of these events is difficult to overestimate, as the long-term persistence of the Tricolor may in large part depend upon utilization of provided nesting substrate surrounded by productive foraging habitats. The ECLA Pond events are extremely hopeful, not only because the adults nested here following a successful first nesting, itself notable due to the fact that most second nesting is believed to occur in locations far removed from where the birds first nest (Hamilton, 1998), but also because the young produced by these birds were led to native breeding substrate (cattails) within days of fledging, and thus may be expected to "imprint" on cattails as nesting habitat, exactly what we would desire. Of significance to the first days and weeks of foraging by the young produced at West Poso and to the second nesting at ECLA Pond is the fact that in 2006, the local farmer to the south of the pond grew three huge fields of alfalfa, a preferred and highly productive foraging substrate of Tricolors (DeHaven et al., 1975a; Hamilton and Meese, 2006). Thus, the highly productive first nesting at West Poso (an estimated 132,545 young produced by 138,000 breeding birds) as well as the second nesting of many of the same birds in ECLA Pond was supported by productive foraging habitat at an

absolute minimum distance from the colonies, a convergence of conditions that strongly favored successful, and likely relatively productive, breeding.

Targeted Search. The early-season survey using a targeted search based upon a knowledge of dairy location yielded a large, not previously known colony in a silage field in southern Tulare County, named Voice of America for large Voice of America transmission towers located nearby. Using a targeted search methodology enabled me to devise a search route that maximized my contact with dairies while minimizing my total driving distance. Three additional colonies in grain fields were discovered, two (Owens Creek and Dickenson Ferry in Merced county) by me and one (Plainsburg Road, Merced county) by Shawn Milar of the USFWS. These were all destroyed by harvest. Certainly, targeting my search on one factor, dairies, precluded my search of regions distant from dairies, but the emphasis of my work, and the terms of my contract, dictated the detection of settlements and colonies in association with dairies, and the bulk of available evidence demonstrates a clear relationship between tricolored blackbird colonies and dairies in the San Joaquin Valley (DeHaven, 2000).

Gaps in the Breeding-season Distribution. It is as important to document the efforts made in detecting settlements and colonies that did not detect birds ("negative detection") as it is to document settlements and colonies that were found ("positive detection"). I used the same methodology of targeted search at the closest approach to dairies in Kern, Tulare, Kings, Fresno, and Madera counties and did not detect a single settlement nor colony in Kings, Fresno, nor Madera counties. These counties appear to constitute significant gaps in the 2006 breeding-season distribution of the Tricolor, and suggest, along with additional recent evidence, that the species has been extirpated, or reduced to very small remnant populations, from large parts of its range. In 2005, a single breeding colony was reported from Kings County, but this site was unknown to me until the end of the 2006 field season and not checked during the intensive early-season survey. DeHaven (2000) found large (25,000 breeding birds) breeding colonies in Kings county in the 1970's, and smaller (3,000 and 5,000 breeding birds, respectively) colonies in Kings and Fresno counties in 2000. Similarly, there were no breeding colonies reported from Placer and Sutter counties in 2005 - the only report of Tricolors in these counties during 2005 was of three foraging flocks totaling 1,600 birds. Tricolors were formerly abundant in Yuba county: Neff (1937) reported a total of 113,000 *nests* in Yuba county in 1931, but in 2005 a total of only 6,250 birds was reported (Hamilton and Meese, 2006). Several previous workers have described Sacramento County as the portion of its range where the bird was most abundant (Neff, 1937; DeHaven et al., 1975a), and previous workers found large numbers in adjoining Yolo County (Neff, 1937; Orians, 1961), but several days of intensive surveys turned up birds in very small numbers and several sites occupied in 2005 were unoccupied in 2006 (Table 1, Table 2). There were several new colonies discovered in the Sacramento/Yolo County region: Bill's Grasslands in the Dunnigan Hills of Yolo County, and the several quite small colonies along Jackson Road/Rt. 16 and the Boys Ranch colony in eastern Sacramento County (Table 1). The small colonies along Jackson Road/Rt. 16 may present opportunities for habitat enhancement (see Management Opportunities, below) - who will contact the owners of these properties to discuss possible management strategies with them?

It has been stressed by previous workers (e.g., DeHaven, 2000; Beedy and Hamilton, 1997) that an emphasis must be placed on both distribution and abundance, and a regional approach may be necessary to enable us to focus on both aspects of the problem. Southern California merits its own discussion (see Recommendations, below), but these are two examples of the same concept: Tricolors may be relatively more abundant in some portions of their range than they are in others, and it is poor science, and poor policy, to focus solely on the question of how many birds are there? We need also to consider how these birds are distributed across the range of the species, and to ask how secure are the nesting colonies? We must identify and respond to threats throughout the Tricolor's range, especially when gaps in the species breeding range are identified, and move away from a silage buy-out-dependent strategy to a strategy that emphasizes breeding and foraging on secure habitats (see also DeHaven, 2000). And when management opportunities arise, we must immediately take advantage of them to make on-the-ground improvements to enhance breeding.

Silage Dependence. The nesting of Tricolors in silage has been documented since the 1960's (Collier 1968), and the increasing number, as well as an increasing proportion, of birds nesting in silage has been noted for over a decade (Hamilton et al., 1995). The proportion of birds, as well as the proportion of reproduction, derived from silage nesting seems only to continue to increase (DeHaven, 2000; Hamilton and Meese, 2006; Table 1). Although successful silage nesting can contribute substantially to overall Tricolor reproduction (Hamilton, 2005; Hamilton and Meese, 2006), the increasing reliance for successful reproduction upon a system that is dependent upon voluntary sellers is troubling and begs the question, what would happen to Tricolor reproduction if these sellers refused to sell? Certainly, the second nesting at ECLA Pond of the birds that had already nested at West Poso is encouraging, as is the heavy utilization of Toledo Pit, and hopefully these events signal the beginning of a trend, but the sheer magnitude of the silage/reproduction relationship is of great concern and substantial, rapid, on-the-ground changes will be required to reduce the dependence of Tricolor on silage and provide for a more secure, sustainable future (see also DeHaven, 2000).

Management Opportunities

A key element in on-going efforts to enhance breeding opportunities for tricolored blackbirds is to identify sites where on-the-ground management actions may be expected to have large benefits. The following are sites identified in 2006 which appeared to offer sub-optimal breeding opportunities for Tricolors but which are believed to be capable of supporting larger breeding colonies in the future. The list is by no means exhaustive, but is provided to give land managers some concrete examples of where on-the-ground modifications may be expected to have real benefits. In all cases, at these locations it may be possible to significantly enhance Tricolor breeding opportunities at little or no cost, as the three requirements for Tricolor breeding (nesting substrate, open water, surrounding foraging habitat) are already present.

At the outset, the important question to ask is, who is going to pursue these management opportunities? The role of the person or agency to pursue these and many other management opportunities is exceedingly important if we are to move away from an annual, reactive, crisis-driven effort to a strategic, long-term effort that relies more on the monitoring of implemented activities and less on surprises driven by stochastic events. It must be the role of the biologists working in the field to identify management opportunities, but the identification of management opportunities is but the first step in a process, and it is insufficient to simply create a list of such opportunities; on-the-ground changes are required - who is going to play the role of instigator of change? Answers to these and related questions are essential components of a constructive, strategic management plan.

Sacramento County. Sacramento County has suffered a steep decline in Tricolor abundance (DeHaven, 2000), and workers with extensive field experience in the county have predicted the local extinction of the species (Cook and Toft, 2005), thus, any management opportunities identified in Sacramento County ought to be vigorously and rapidly pursued.

Lopez Ag. Services/Triangle Rock Products. I am lumping these two sites, located just north of Florin Road immediately west of the Sunrise Boulevard intersection, because they share both a common border as well as a common philosophy toward wildlife. In 2006, both properties supported Tricolor breeding colonies, and staff at the Triangle Rock Products facility expressed disappointment that some of "their birds" had moved from their property, where they had bred in 2005 and, according to staff, in several previous years, and on to the adjacent Lopez Ag. Services property. Both Al Lopez, owner of Lopez Ag. Services, and Robert Fine and Glen Philips, Plant Manager and Plant Foreman, respectively, of Triangle Rock Products, expressed satisfaction in having Tricolors breeding on their properties and would likely be amenable to suggestions for making additional breeding habitat available. These properties provide both nesting substrate and water, and are surrounded by open rangeland suitable for foraging, so may contribute substantially to efforts to sustain Tricolors in Sacramento County.

Teichert Properties along Jackson Road. Although not a known management opportunity, I include Teichert properties along Jackson Road because of the known breeding colonies that occurred there in 2006 and for their potential to make a more significant, long-term contribution to Tricolor populations in the county. Teichert staff prevented my access to the Readymix Pond colony in 2006 despite repeated requests; worse, Teichert staff told me in a telephone conversation that the pond supporting the cattails occupied by breeding Tricolors in 2006 was going to be "maintained" later in the year and that this cattail stand may not persist. Given the increasingly tenuous existence of Tricolors in Sacramento County, and the predicted imminent extinction of the species here (Cook and Toft, 2005), all possibilities to sustain breeding colonies on secure habitats ought to be vigorously pursued, and Teichert staff ought to be contacted again and encouraged to adopt a much more supportive attitude toward Tricolor conservation. According to the Teichert Foundation web site (http://www.teichert.com/index.cfm?pageid=502), the Teichert Foundation provides grants for

environmental planning and preservation - perhaps Foundation staff ought to be approached to not only allow but to fund Tricolor preservation work in the Sacramento/Yolo County region.

Solano County. The "sanctuary" at the Hay Road Landfill off Hwy. 113 south of Dixon supported breeding by several thousand tricolors in 2005 but only a visually estimated 300 tricolors in 2006. Currently, the shape of this basin is most advantageous to waterfowl, and only a narrow fringe of cattails exists around the periphery of the pond. The "sanctuary" was established to mitigate Tricolor habitat loss and to provide nesting substrate (Greg Pryor, Hay Road Landfill Manager, pers. comm.) and is County of Solano property, so presumably requests made to County staff to enhance this site to better accommodate Tricolors would be favorably received. The County of Solano, as the regulatory agency responsible for the site, may also be able to facilitate on-the-ground actions designed to benefit Tricolors.

San Joaquin County. Despite intensive searches, no Tricolor breeding colonies were reported from San Joaquin county from the 2005 state-wide Survey (Waldo Holt, Tricolor Survey county co-ordinator, pers. comm.). Recent communications with several biologists with extensive experience in San Joaquin county have confirmed that no Tricolor nesting has been confirmed in the county since 2000, and only infrequent observations of single birds or small flocks of a few birds have been recorded for several years (David Yee and Waldo Holt, pers. comm.). Thus, any opportunity for establishing a breeding colony in San Joaquin county, where Tricolors were formerly common (Neff, 1937), ought to be vigorously pursued. The site of the 2000 Tricolor breeding colony in San Joaquin county is a wetland on private property just off Hwy. 12, less than a mile south of Comanche Reservoir. This marsh is not currently (in 2006) suitable for Tricolor nesting as much trampling of the vegetation has occurred due to grazing by cattle. However, if arrangements could be made to exclude cattle from grazing those portions of the marsh most suitable for Tricolor nesting, Tricolors may once again utilize this marsh for nesting, as the surrounding pastures afford foraging habitat and in years of average precipitation, there is a reliable source of open water (Waldo Holt, pers. comm.).

Merced County. The region around the Owens Creek colony, at the junction of Childs Avenue and Cunningham Road, seems ideal as a place to negotiate a conservation easement or similar instrument to provide a landowner with an economic incentive for providing Tricolor nesting habitat. The landowners in this area have both a history of such agreements as well as experience with Tricolors, and it would seem that this combination provides a unique opportunity for mutual benefit. The site supporting the Owens Creek colony was reported by local landowners to have had a history of under-production, so the economic cost to implement a strategy for providing nesting substrate here might be expected to be relatively low. In addition, this site is adjacent to a dairy with a history of use by foraging Tricolors, and is surrounded by lightly grazed pasturelands that appear to provide productive foraging for adult Tricolors seeking animal prey with which to provision their young. And the site derives its name from Owens Creek, a perennial stream the flows through the property. Why not approach the dairy industry for the funding, if any, required to establish the vegetation necessary to support a Tricolor breeding colony here?

Riverside County. The Eastern Municipal Water District (EMWD) maintains a wetland at the San Jacinto Valley Regional Water Reclamation Facility that is well known to area birders and open to the public during San Bernardino Valley Audubon Society-sponsored tours. This site was planted to bulrushes in 1993 and by 1997 hosted most of the Tricolors known to inhabit southern California (Hamilton, 2000). However, subsequent management actions limited the amount of bulrush habitat and tricolors are not known to have nested there since 2000 (Hamilton, 2000). Given the near-tragic consequences of the Tricolors' move off of the San Jacinto Wildlife Area and on to a nearby dairy's silage field in 2006, it should be seen as ever more essential to conserve, and to restore, as much Tricolor nesting habitat as possible in the entire southern California region. Perhaps negotiations with EMWD staff might lead to management actions of benefit to nesting Tricolors at the EMWD water reclamation facility and enable it to again host nesting Tricolors. Of course, the loss of the existing foraging habitat around either the San Jacinto Wildlife Area or the EMWD wetland would almost certainly spell the doom of these essential colonies (e.g., Unitt, 2004).

No doubt, numerous additional no-or-low-cost management opportunities exist, but what is essential is communication and dialogue leading to meaningful, on-the-ground change. We must identify management opportunities, but even more importantly, we must identify the agency and person who will seek to take advantage of these opportunities to enhance Tricolor reproduction throughout the range of the species.

Recommendations

Tricolored blackbirds, and much of California's biota more generally, exist in an environmental matrix that is hugely anthropogenic and likely to become more, rather than less, so in the future. The conservation of Tricolors will involve management decisions that reflect both the scientifically justified as well as the politically possible, and will of necessity continue to involve birds nesting and feeding on both private and public property, and only through a highly collaborative and productive partnership involving individual landowners and private property or industry representatives, State and Federal agency staff, non-governmental organizations, and academic scientists, all working together in an integration of science and policy, will Tricolors continue to exist far into the future.

Collaborative Effort. It is clear from the years of work with this species that only through a highly collaborative effort involving many in the public and private sectors will the Tricolor have any real chance of long-term survival. The resolution to the crisis in Riverside County in 2006 is but the latest example of a productive collaboration, in this case how both a non-governmental organization (Audubon California) and industry (represented by Resource Landowners Coalition) can come together, in this case in an emergency situation, to save an exceedingly important breeding colony from destruction. All members of the Tricolored Blackbird Working Group, especially those working to help to draft the Conservation Strategy, are aware of the need to move away from crisis management and a reactive approach to a more sustainable, pro-active

approach to management, and this transition will of necessity involve many with diverse backgrounds representing diverse constituencies. The Tricolored Blackbird Working Group provides an excellent forum to enhance communication and to build trust, essential ingredients for any partnership, and helps to forge the bonds that will be required to ensure that the Tricolor remains a conspicuous part of California's natural heritage for years to come. If the tricolored blackbird is to continue to nest in its spectacular colonies from San Diego throughout the Central Valley and to the coast, the strategy developed by the Tricolored Blackbird Working Group will have to be implemented across productive landscapes on private and public properties supporting breeding and non-breeding birds in a matrix including agriculture, marshes, and open rangelands. All concerned have roles to play, and each is an essential part of the whole.

Industry Participation. It is essential that we have the full participation, knowledge, and support of industry, primarily the dairy, agriculture, and building industries, in all of our efforts and responsibilities. To my knowledge, industry has not offered nor has it been requested to actively support any of the essential activities needed to conserve Tricolors. The Resource Landowners Coalition, directed by Bill Geyer, has provided some funding for surveys and research during an unknown number of recent breeding seasons, but no funds from Resource Landowners Coalition, as far as I am aware the only previous source of industry funding, were provided to support this year's field work.

Industry should be requested to provide:

- help with obtaining permissions for access
- help with buyout contacts, negotiations, and funding
- help with education and outreach to all in the dairy, farming, and home construction industries
- funding for research and monitoring, habitat restoration, education and outreach, and other activities required to restore Tricolor populations and implement the actions described in the Conservation Strategy for the Tricolored Blackbird

The agriculture, dairy, and building industries may be severely impacted should the Tricolor be listed for protection under the Endangered Species Act, yet as far as I am aware, these industries have played no role since the 1930's in funding nor facilitating the essential on-the-ground activities that now, and have historically, fallen to state and federal agency biologists and U.C. Davis and collaborating researchers (with the possible exception of industry as represented by the Resource Landowners Coalition, as previously noted). There are clear and essential roles to be played by industry collaborators in facilitating access to private property, including dairies, agricultural fields (including rice paddies), and other private properties where Tricolors nest and forage. There are clear and essential roles to be played by industry in assisting with and funding silage buy-outs; to date, it has fallen upon National Wildlife Refuge staff to communicate and negotiate with landowners over the terms of silage purchase or delays in harvest. Why is industry not participating in these efforts? Similarly, there are clear and essential roles for industry to play in the development and distribution of educational and outreach materials to

inform farmers, ranchers, developers, and other property owners of the efforts underway to conserve and enhance Tricolor populations - why has industry not offered or been asked to provide guidance, financial support, and assistance in developing and distributing these materials? Finally, all who have worked with Tricolors are aware of the effects of insufficient funding to support all aspects of Tricolor work, including essential monitoring and research activities (both breeding and non-breeding season), data management, and database development - industry ought to be expected, and requested, to play a significant role in helping to fund these activities.

Develop and Implement Strategy. All aspects of our work need to be standardized, proactive, and consistent from place to place, year to year, and situation to situation. There must be a coherent strategy developed and implemented to most effectively and efficiently conserve Tricolors. To date, no coherent strategy has been developed, although the Conservation Strategy, if funded and implemented, holds much promise to fill this gap. The most serious deficiencies in the Conservation Strategy are the lack of clearly articulated roles, including especially the roles of industry, the lack of defined responsibilities (who is responsible for carrying out the roles), and the lack of an identified funding source and mechanism. Historically, our efforts have focused on the breeding season, and on a sort of triage for silage colonies identified by dedicated Tricolor field researchers, where scarce financial resources (derived, with the lone exception of Riverside County in 2006, from taxpayer dollars) would be expended on the conservation of the largest colony, or couple of colonies, located in the grain fields of landowners willing to accept cash payments to delay harvest until after the young Tricolors had left the field. All other colonies in silage fields would be destroyed when the fields were harvested, as was the case again this year. This "silage buy-out" effort, and the process of contact, negotiation, and payment, should be defined with roles for both industry and government participation and the responsibilities of each clearly defined. Historically, and continuing through 2006, silage buy-outs proceeded in a kind of fevered, crisis situation; such an intervention method satisfies no one and increases the chances of an unwanted, and unfortunate, outcome. It is essential that our overall strategy include an education and outreach component that explains the dairy/Tricolor and rice/Tricolor relationships to all dairy owners and managers and rice farmers to provide information on what to expect should a Tricolor settlement be documented in a grain field on private property or Tricolors be found foraging, perhaps by the thousands, in a ripening rice field. We must better define the roles to be played by all of those involved in all aspects of the silage buy-out process, especially the industry roles, and implement the process consistently. Similarly, we should educate rice farmers of the protected status of the Tricolor, how the Tricolor occurs in typically mono-specific flocks in rice paddies during the "milk stage" of rice maturation, and how Federal statutes prevent them from killing Tricolors as they are otherwise allowed to do, without permits, for other blackbird species under Title 50 Section 21.43 of the Code of Federal Regulations. We should know what we're going to do and how we're going to do it before the field season even begins, and have clearly-defined roles and responsibilities and immediate access to names, phone numbers and other contact information required to implement our strategy.

Although the emphasis here is on the silage buy-out process and foraging flocks of Tricolors in rice paddies, the same things can be said for any settlement or colony detected on private property: we need to define, standardize, and implement a process that contains clearly defined roles, and that is known and agreed to by all, and that makes best use of the resources and talents available. Our strategy and monitoring efforts should not be confined to the breeding season: we know next to nothing about the movements, habitat associations, food sources, or many other essential aspects of Tricolor biology during the non-breeding season, yet losses during the non-breeding season may be just as important, from a population biology perspective, as those during the breeding season (DeHaven, 2000), and our strategy must include efforts to monitor and document Tricolor biology year-round.

Funding. Funding has been a perennial problem, and the funding shortfall was especially acute in 2006 - insufficient even to allow for a complete-breeding-season monitoring effort and offering no support whatsoever for the requisite subsequent period of data synthesis and report writing. Funding ought, at a minimum, to be provided for a dedicated Tricolor researcher to be in the field during the entire breeding season and support essential post-breeding season report preparation and write-up. Funding ought to be a shared responsibility, with core funding provided by state and federal agencies as well as industry groups. Additional funding for education and outreach, special projects and other needs may be provided by NGOs, and perhaps even foundations or interested philanthropic individuals. There are compelling reasons to have a dedicated Tricolor researcher working year-round, as non-breeding season distributions and habitat dependencies are just as important as breeding season dependencies, and may have as great an effect on the population as breeding-season factors (DeHaven, 2000), yet nearly nothing is known of non-breeding season biology. If a large-scale banding program begins in 2007, as has been proposed, it will be even more important to deploy a researcher in the non-breeding season, as the amount of information to be derived from a population containing marked individuals of known age and natal origin is orders of magnitude greater than what can be known by studying an unmarked population.

An especially worrisome prospect is the reduction in federal funding for the LIP program. This program is an essential component of our current efforts to reverse the decline in numbers of Tricolors, providing funding for silage buy-outs, on-the-ground habitat improvements (ECLA pond and Pioneer Duck Club), and even support for Sustainable Conservation, the group that is facilitating discussions leading to the development of the Conservation Strategy. If LIP funding is eliminated, as seems increasingly likely (Dean Kwasny, pers. comm.), will alternative sources of funding support our conservation efforts? Likely a diverse funding base, representing government agencies, industries, NGOs, foundations, and philanthropic individuals, will be required to implement the kinds of actions necessary to sustain Tricolors over the long-term.

Monitoring and Research. It will remain essential for some years to come that an annual, full-season monitoring effort be conducted by an experienced professional. Nothing is known of the events of the end of the 2006 breeding season as the end of employment of the only dedicated Tricolor researcher was June 16th, 2006. A settlement was initially documented at Capital

Outing Club, Colusa County, on June 15th, indicating that the breeding season was far from over in the middle of June. At a minimum, monitoring ought to begin in mid-March and extend through the end of July. Historically, and presently, funding has supported a breeding-season monitoring and research effort, to the great detriment of documenting the dynamics of Tricolor movements, habitat associations, and food resources utilized during the non-breeding season. There are essential and potentially quite significant unanswered questions regarding Tricolor movements and habitat requirements during the non-breeding season, and these must be included in our monitoring and research activities. If a banding program is initiated in 2007, as has been proposed, then a year-round monitoring effort would be even more desirable and provide the opportunity to answer questions that have gone unanswered for decades (DeHaven, 2000).

Increased Emphasis on Southern California Population. We need a dedicated, experienced research/monitoring person for southern California just as much or more than we do for the Central Valley, as both Neff's (1942) and DeHaven et al.'s (1975b) extensive banding efforts failed to detect interchange between the Central Valley and southern California populations. Thus, the southern California and Central Valley populations are distinct populations segments that are geographically, and may be genetically, distinct (Beedy and Hamilton, 1999). The southern California population is known to have suffered a steep decline in the 20th century, due primarily to urbanization (Unitt, 2004). The Tricolor was once the most abundant bird near both San Diego and Los Angeles (Cooper in Baird, 1870; Neff, 1937), but the number of Tricolors in San Diego county was no more than 8,000 in 2004 (Unitt, 2004) and several workers in southern California believe that this population segment is at risk of extinction (P. Unitt, pers. comm., T. Paulek, pers. comm.). The southern California monitor should interact extensively with existing field workers who have experience with Tricolors and coordinate the existing volunteer network to accumulate data on observations of groups of birds, settlements, and colonies and integrate these data with those accumulated in the Central Valley. All of the recommendations re: industry roles, providing access, etc. pertain as strongly to southern California as they do to the Central Valley and a vigorous ANNUAL monitoring effort ought to be established beginning in 2007. The events of 2006 in Riverside County should serve as a wake-up call and we ought to learn the lessons of this experience, as they may suggest to us the kinds of crises, and appropriate responses, to be expected in the future. To start, we need to enlist the assistance of an existing network of volunteers who are already in the field, have a history of observing Tricolors, and who possess relationships with field workers who may help to report observations. We should seek the support of perhaps single individuals at each of the seven southern California counties who may serve as report/data aggregators, and who then provide reports to the southern California monitor. No fewer than four counties (Riverside: Tom Paulek, San Bernardino: Bob McKernan, San Diego: Phil Unitt, Los Angeles: Kimball Garrett) already have biologists with interests in Tricolor conservation and who may be willing to help to annually monitor all known colonies in the region.

Protected Areas. There has been an emphasis on protected areas, especially National Wildlife Refuges and State Wildlife Areas, in the conservation of Tricolors, and it is of concern that the network of protected areas will be expected to do more than is biologically possible to conserve

the species. The multi-species habitat conservation plan (MS HCP) has become a popular tool in attempts to conserve populations of plants and animals while allowing additional development to proceed, and the focus of most HCPs is the provision of protected areas within which are supposed to occur all of the resources necessary to meet the immediate as well as the long-term needs of all species (http://www.fws.gov/endangered/hcp/). However, some wildlife populations require large areas to meet essential needs, and often the dimensions of these required areas greatly exceed the boundaries of the protected areas in which widely-ranging species are supposed to occur. In the case of the Tricolor, large areas must be provided around their breeding colonies as the birds are known to forage across a minimum 6 Km radius area of their colonies in order to find the animal prey required for females to form eggs and for adults to feed their young (Beedy and Hamilton, 1999). Where animal prey is scarce, the foraging birds may travel up to 13 Km in order to find sufficient food (Beedy and Hamilton, 1999). Further, breeding colonies that are typically located in protected areas may shift to private property and thus become subject to catastrophic loss, as was the case in 2006 in Riverside county (more thoroughly described in Appendix I). Our strategy must include, but not depend exclusively upon, protected areas and their staffs. We must acknowledge the essential roles to be played by private property, for nesting and especially for foraging, encourage landowners who are providing essential nesting and foraging resources for Tricolors, and focus our attention on monitoring and management on both protected areas and private property.

Access. Access to breeding colonies, especially the largest breeding colonies, is essential to quantitatively estimate: 1) numbers of nests built by breeding birds and, 2) reproductive success, yet access is frequently difficult or impossible to obtain (e.g., in 2006: Deer Creek Dairy, Solano Landfill, Readymix Pond). We need a better plan to assure access to as many colonies as possible. A currently unfilled role is that to be played by a person or agency for field workers to contact to attempt to provide access to private property, and in the development of our overall strategy, we need to discuss the issue of access and to identify specific individuals in specific regions who may be contacted in an attempt to ensure access to private property.

Eyes on the Ground. We need to identify, contact, and request the assistance of agency and other personnel whose responsibility it is to be outside from March through June each year to enlist their support in reporting flocks or settlements of Tricolors. Possible agencies include water agencies, levee maintenance personnel, soil conservation and other natural resource personnel, and all State and Federal wildlife agency personnel. Also Nature Conservancy, Audubon California, and other environmental NGO staff. These field workers should each get, at a minimum, a copy of the brochure produced in 2006 and up-to-date information on whom to contact to report Tricolors. Certainly, having a web site and dedicated email address where observers could report and record their observation would be a huge asset and meet multiple needs (see Web Site, below).

Marsh Management. It became clear through several conversations with State (Tom Paulek) and Federal (Dave Hardt, Dennis Woolington, Mike Wolder) biologists as well as two private landowners with marshes on their properties that the age of marsh vegetation (cattail, *Typha* spp.,

and bulrush, *Schoenoplectus* spp.) is of critical importance to nesting Tricolors, and that in most cases, Tricolors will move in to a cattail marsh when the cattails are in their second year of growth and shun marshes when cattails are more than six years old (Mike Wolder, pers. comm.; Hamilton and Meese, 2006). This strong preference for young, rapidly-growing cattails appears to be widely applicable across the species range, as birds nesting in young, rapidly-growing cattails were observed from Kern County (Kern Water Bank First Cattails, ECLA Pond) to Colusa County (the section of Pond T43 utilized by Tricolors in 2006 was burned in 2003, Mike Wolder, pers. comm.). Might it be possible that the age/condition of marsh vegetation helps to explain the well-documented but poorly understood phenomenon of low colony fidelity/high colony turnover (Neff, 1942; DeHaven, 2000; Hamilton and Meese, 2006; this study)?

From a management perspective, it may be essential to document the age of marsh vegetation and to seek to manage marshes for Tricolors in a way that will provide young, rapidly-growing cattails that appear to be most attractive to them. In some cases (e.g., Ellsworthy in Merced County), the marsh may be large enough that stochastic events may be sufficient to provide a range of ages of cattails, whereas in others (e.g., Toledo Pit in Tulare County, San Jacinto Wildlife Area in Riverside County, and most others), the basins containing the marsh plants may be so small that they must be actively managed (i.e. older cattails removed) to provide for the age classes (and attendant structural characteristics) that Tricolors prefer. At a minimum, the age of marsh vegetation utilized by nesting Tricolors should be documented, whenever known, to thoroughly document this relationship and to best inform land managers who are attempting to attract nesting Tricolors and outreach efforts (see below) should include the sharing of this essential information. In some cases, there may be regulatory or other conflicts in actively managing marsh vegetation; for example, in the case of burning, where a manager may wish to remove old, senescent marsh vegetation by burning but may be prevented from doing so due to environmental regulations. San Jacinto Wildlife Area, formerly home to the largest Tricolor breeding colony in southern California, may be an example of such a situation (Tom Paulek, San Jacinto Wildlife Area manager, pers. comm.). In such cases, assistance ought to be provided to enable managers with former, current, or potential Tricolor colonies to manipulate marsh vegetation to enhance its desirability to nesting Tricolors (see Wetland Inventory, below).

Wetland Inventory and Assessment. We need an inventory of all wetlands known to have supported Tricolor breeding colonies, a qualitative assessment of the suitability of each for Tricolor nesting, and specific management recommendations for each site. If it is true, as we believe, that Tricolors will move in to a wetland, at least one dominated by cattails, when the cattails are in their second year of growth and then move out of or shun a wetland with vegetation that is more than 6 years old, it would be potentially advantageous to maintain an inventory of wetland age/condition for all wetlands known to have supported Tricolor colonies. This inventory should include wetlands on State (e.g., San Jacinto Wildlife Area, Riverside County) and Federal properties (e.g., Kern, Merced, Delevan National Wildlife Refuges), county or regional agencies (e.g., Hemet water treatment plant, Riverside county; Kern Water Bank, Kern county; Hay Road landfill "sanctuary", Solano county), duck clubs (e.g., ECLA pond, El Cinco duck club, Kern county; Ellsworthy, Merced county; Pioneer, Capital Outing Club, Acre

Farms in Colusa county), and private property (e.g., Comanche wetland, just south of Comanche Reservoir, San Joaquin county; Waegell's and several Teichert properties, Sacramento County). As described above, it is now believed that it is the younger, most actively-growing wetland vegetation (cattails and tules) with a minimum of senescent and dead stems (a minimum of "lodging" in the parlance of many wetland managers) that is most attractive to Tricolors and that most often supports breeding colonies. Since the historical factors that would have produced a constantly-changing mosaic of wetland ages (fires, floods, droughts) have essentially been eliminated, it is necessary for active management to attempt to mimic these effects and to provide the vegetation characteristics preferred by nesting Tricolors. As a component of our strategy, we need to try to maintain wetland vegetation in a state that is most attractive to Tricolors and to educate managers and landowners to the values of young wetland vegetation to Tricolors and to encourage "best practices" - wetland management that will, at least as an essential component, encourage the vigorous growth of younger plants and the removal of old, dead or senescent, slowly-decaying plants. It may be useful to bring together a group of biologists who have on-the-ground experience with both Tricolors and wetland management and seek their input into the development of a set of guidelines intended to assist land owners and land managers seeking to maintain wetland vegetation suitable to Tricolor nesting.

CD. There ought to be a CD ROM with video, sound clips, images, and summaries of essential information (e.g., the Conservation Strategy) that is available for cost-free distribution to field personnel, farmers, landowners, and other interested persons who may help to identify or be affected by settlements and breeding colonies. Copies of the CD ought to be made available to County Agricultural Commissioners, for their own use and for their distribution, in parts of the state within the breeding range of the Tricolor to inform them and the farmers with whom they interact of the status of the Tricolor and of efforts to conserve it. Many other agency personnel (e.g., Kern Water Bank, State Wildlife Area and State Parks, wildlife biologists at military installations with known or potential Tricolor habitat) would benefit from the educational opportunities a CD would provide.

Outreach. The effort to conserve the Tricolor badly needs additional outreach activities. We need to provide outreach to at least three constituencies: first, for landowners who had, have, or may have breeding colonies on their properties; second, for natural resource managers who may be expected to provide breeding or foraging habitat; and third, for field personnel of federal, state, and county agencies. There is great need for dairy operators and rice farmers, in particular, to have current and comprehensive information on the tricolored blackbird and of efforts being made to enhance its populations in lieu of a formal listing under the ESA. All dairy operators, not just those that have previous experience with Tricolors, should receive educational materials informing them of our activities. Likewise, all rice farmers should receive the same or essentially similar materials to educate them to differences, both biological and legal, between Tricolors and other blackbird (and similar) species. Natural resource managers need to become better informed of Tricolors for similar reasons. Finally, several federal, state, and county agencies have personnel in the field who could serve as "extra eyes" to report large flocks of blackbirds.

It was my experience in both 2005 and 2006, with similar experiences reported by previous workers, that many property owners feel threatened by the presence of tricolored blackbird breeding colonies on their properties, while others may actually be trying to attract the birds or are delighted to know that their property is providing essential resources for the species (e.g., the Waegell family in Sacramento County, the owner of the property on which is situated Bill's Grasslands in Yolo County). For those who feel threatened or who are uncertain as to what, if any "consequences" may ensue should Tricolors breed on their property, it would be tremendously helpful to have an individual who is trusted and, ideally, a member of the local community, to provide accurate information on the status of the birds and of efforts being made to conserve them. Such activities, provided by one seen as a "neutral third party", would help not only to inform, but also to build communication and trust between landowners and investigators who may want to access private property to monitor breeding birds.

The second type of outreach would be tailored toward providing Tricolor breeding habitat information for State, Federal, private, and other land managers who wish to attract Tricolors to nest on their properties. For example, if a public or private landowner wishes to support nesting Tricolors and has marsh vegetation on his/her property, s/he could be provided information on the ages at which marshes become attractive, and then unattractive, to breeding Tricolors and on what management actions might most benefit Tricolors. In cases where nettles, thistles, blackberries or other plants are available to breeding Tricolors, an outreach effort may stress the kinds of nesting substrate configurations most likely to attract Tricolors over the long term.

Outreach to field personnel could greatly enhance detection efforts. Given that there is in most cases but a single person dedicated to detecting and monitoring Tricolor settlements and breeding colonies, having the assistance of the additional field personnel of federal, state, and county agencies in reporting flocks of blackbirds would be extremely helpful in detection efforts. Of course, an essential component of these efforts is to provide clear instructions on how and to whom to report settlements, breeding colonies, or other aggregations of blackbirds.

Web Site. A component of our overall strategy ought to be the development and maintenance of a dedicated tricolored blackbird web site that provides information on all aspects of Tricolor biology and conservation, that is of equal utility to high school students as it is to land managers, and that may serve to accumulate and record reports of flocks, settlements, and colonies of birds. It is only a very few Californians who are even aware that the Tricolor is a different species than the red-winged blackbird, and nearly no one is aware of the severe decline in the abundance and distribution of the bird and of the efforts being made to increase its abundance and to bring the bird back to regions from which it has been extirpated. A dedicated web site could serve a multitude of educational, outreach, and data management functions, and may help to serve as a sort of clearinghouse of information for those wishing to learn more about the Tricolor or to report their own observations from the field.

Regional Approach. Previous workers have advocated a regional approach in Tricolor conservation, as what makes sense for Tricolor management in San Diego County may not be at all appropriate in Colusa County. Thus, as we develop strategies to conserve and enhance Tricolor populations, we ought to tailor our efforts to suit regional conditions. We ought to request the assistance of experienced field personnel to identify the most appropriate regions, but it may be helpful, and conserve the precedent, to recognize the 7 regions, and counties therein, in Hamilton (2000): 1) southern California, 2) the San Joaquin Valley (roughly the "dairy region"), 3) the Sacramento Valley, 4) the San Francisco Bay Delta, 5) the North Coast, 6) the Central Coast, and 7) the Northeast Interior. By adopting a regional approach to our efforts, we acknowledge the differences in the physical environments and dominant land uses of the regions and may more usefully target our monitoring, research, and management efforts and recommendations.

Banding. It has been several years since there has been an effort to band Tricolors (Hamilton and Meese, 2006), and decades since Neff (1942) and DeHaven (1975b) banded large numbers of birds, yet the need for better documenting and understanding the temporal and spatial movements of Tricolors is greater than ever. Significantly, neither Neff nor DeHaven used color bands, and both relied upon reports from hunters or others who had killed birds to obtain return information. Hamilton used color bands, but the number of birds banded, as well as the number of sites at which they were banded, was too few to ensure a large and representative sample of bird movements through space and time, although a total of five banded birds, from a single banding effort in 2000, was observed in 2005 (Hamilton and Meese, 2006). Annual color banding of Tricolors should begin in 2007, preceded by a meeting of biologists with extensive banding experience, including state and federal biologists and staff of PRBO Conservation Science, to develop a comprehensive, efficient, and effective banding strategy. Rich DeHaven has expressed interest in assisting with this phase of the banding program, as well as in the design of a trap to capture birds to be banded, and has strongly advocated for color banding of fledged birds (DeHaven, pers. comm.). It is essential that any banding program be backed by the concomitant development of a database management system that efficiently and reliably accumulates observations of banded birds, including web-based data entry. Both the existence of the banding program, as well as the web-based data entry system (and non-web based alternatives) ought to be well advertised to county, state, and federal field staff, Audubon chapters throughout the state, TNC and other environmental NGO's, environmental consultants, and others who are frequently in the field. In addition, ads ought to be placed in appropriate media (e.g., bird club bulletins, "The Flock" - newsletter of the American Ornithologists' Union), and other appropriate outlets, and assistance sought for reporting observations of banded birds.

Data Management. A large body of information, in the form of multiple mostly non-electronic data sets, has been produced by a number of field workers over several decades, but this information is difficult for most to access and has never been accumulated and standardized into a relational database management system and made available through a single easily-accessible source. To most efficiently and effectively develop a conservation strategy, as well as to assess

our progress toward our goals, we must develop a more sophisticated data management system. We need a system that is tailored to Tricolor data and that provides the means to both efficiently input the existing data and also to query and report out the data once they have been entered. This system ought to be a stand-alone application that requires little or no training in its use, and that allows users to easily answer questions, such as: 1) what is the history of occupancy of a breeding colony?, 2) who are the landowners of a particular colony site and what is their contact information?, 3) what reports have been published that refer to work done at a particular site?, 4) what reproductive success estimates have been done for a particular site or nesting substrate type?, 5) what colonies were known from San Diego county in 1990, where were they located, and how many breeding birds were estimated at each? These and many other questions of interest to researchers and managers can presently be answered only through a tedious and very time-consuming review of the literature, whereas they would be nearly instantly answered if a dedicated tricolored blackbird database were to be developed. This database ought to contain information on both colonies ("site-level" information, such as accepted name, geographic coordinates, history of occupancy, spatial dimensions, etc.) and observations of flocks of birds ("observation-level" information, the "who, what, when, where" kinds of information, with complete contact information). And, both the colony and observation data ought to be reliably geo-referenced and easily output for analysis in a GIS. The database system ought to include a component to accumulate, standardize, query, and report the observations of banded birds (previous section).

Mega-trends

Although there is much good news to report from 2006, it must be stressed that the events of a single year are but a single data point in a trend, and the factors responsible for the widespread reductions in abundance and distribution continue, and may overwhelm our efforts to conserve Tricolors if permanent, secure nesting and foraging habitats are not soon provided. For now, the decline in numbers of Tricolors appears to have been halted due, primarily, to the conservation of the largest silage colonies, but the species' distribution continues to shrink, with few if any birds being reported from large parts of the species' range. The situation in southern California is critical, as suburban development continues to reduce available nesting and foraging opportunities, and workers in southern California are quite pessimistic about the species chances for survival there (e.g., Unitt, 2004; Tom Paulek, pers. comm.). In the Yuba/Sacramento/San Joaquin/Yolo/Solano County region, much the same can be said, as this former stronghold of the species (e.g., Neff, 1937; Orians, 1961; Payne, 1969; DeHaven et al., 1975a) loses more nesting and foraging habitat to suburban development and perennial, woody vegetation (primarily vineyards and almond orchards). Sacramento and Yolo counties were intensively searched in 2006, yet the numbers of colonies and birds found were both far less than in 2005 (Hamilton and Meese, 2006), and no breeding colonies were detected in San Joaquin county during the 2005 statewide Survey (Hamilton and Meese, 2006) nor were any known to local experts from 2006 (Waldo Holt, pers. comm.).

It is far too early to declare success in our efforts to conserve the tricolored blackbird, as again in 2006 more silage colonies were destroyed than were conserved, more development permanently eliminated nesting and foraging habitats, no birds were seen in entire counties within the species' range despite intensive search (Fresno, Kings, Madera) and numbers of birds continued to decline in counties where they had formerly been abundant (Solano, Yolo, Sacramento), the inability of protected areas to conserve this wide-ranging species was documented in Riverside County, and insufficient funding was available to monitor an entire breeding season. We know what we need to do, but we lack the financial resources to do it. We need a coherent strategy, with well-defined roles and responsibilities, and the funding necessary to implement our strategy to achieve demonstrable on-the-ground change of the sort seen at ECLA Pond, Toledo Pit, and Pioneer Duck Club, and a data management system to more easily and completely document and assess the results of our efforts.

A USFWS biologist asked upon seeing the spectacle of tricolored blackbird settlement and nesting in Toledo Pit in April, 2006 "why can't we have more of these?" Why, indeed.

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Appendix I. Brief descriptions of events at all colonies studied in 2006 and additional notes on colonies active in 2005 and repeatedly visited in 2006 to confirm that no colonies were established.

Colony Name	County	Comments
West Poso	Kern	the largest colony of 2006, with an estimated population of 100,000+ birds, settled over a long interval and not synchronous; in large (73 ac.) triticale field with adjacent alfalfa fields; birds began to settle on next field to north but hazing by Scott Frazer (USF&WS, Kern NWR) and Bob Meese appeared to prevent settlement in this additional field - believed to be the first demonstration of successful hazing to deflect settling birds; essentially the entire original field settled, and was bought by USF&WS; Boschma Dairy, farmed by David Daniels; determined by line transect nest counts to have supported breeding by 138,000 birds
Costa's Dairy	Kern	settlement observed 4/5; cut 4/20; settlement prior to cut estimated at 15-20,000 birds; in ca. 20 ac. of silage heavily infested with mallow and some mustard; birds likely moved to West Poso after harvest
Deer Creek Dairy	Tulare	very large, developed over several weeks, asynchronous; birds primarily in mallow portions of dirty silage field; ca. 40 ac.; owner offers to not cut silage for one month provided that we do not enter property; seeks no monetary compensation; group of 15-20 cattle egrets preying on nestling tricolors on 4/25 and 4/26, first known instance of cattle egret predation; Warren Hettinga owner; estimated 60,000 birds; more than half of colony cut unexpectedly on 5/3; law enforcement action initiated; ca. 4,000 birds reported by Scott Frazer at end of breeding season
Voice of America	Tulare	new colony; initially a large settlement estimated at 30-40,000 birds but decreased in size over 3+ weeks, likely losing birds to the growing Deer Creek Colony; last estimated at under 20,000 birds; in silage; owner Jake Slegers contacted by Scott Frazer and me on 4/25 and says that he is amenable to not harvesting until after young have fledged; I find field cut, colony destroyed on 5/2

Kern Water Bank	Kern	checked early in season (3/31) with Dave Hardt, two sites occupied last year had 1-200 chorusing males; checked again 5/3, find two colonies, named Nettles and First Cattails; Nettles was occupied last year, and appears to hold ca. 1,500 birds while First Cattails is a new colony in new substrate not available until this year and not suitable for tricolor nesting until the past week or two (too short, immature), and appears to have ca. 3,000 birds; enter New Cattails colony on 5/22, check 21 nests, find 19 of them empty, due in all likelihood to predation by black-crowned night herons
Kern River Parkway	Kern	checked early in season (3/31) with Dave Hardt, two sites occupied by 1-200 chorusing males; not checked again
Ramona Farms	Riverside	birds formerly nesting in San Jacinto Wildlife Area moved into silage on Ramona Farms; delay in harvest via payment to owner of $13,000, by Audubon California, reimbursed by local developer ($8,000) and Resource Landowner Coalition (Bill Geyer; $5,000); 13 ac. wheat field occupied by 8,181 breeding birds, estimated by nest transects conducted with Tom Paulek on 6/9
Toledo Pit	Tulare	not occupied when I checked on 4/3; checked by Nick Stanley, Kern NWR, occupied by ca. 5,000 tricolors during last week of April;; colony first observed by me 5/10; complex settlement, birds continue to settle here over several weeks, likely due to destruction of Deer Creek and VOA colonies, reaching a peak of ca. 20,000, visually estimated, on 5/12 and last observed on 6/13 when basin is nearly dry due to lack of irrigation; mammalian predators have free access, and very few white-faced ibises are seen on 6/13 - these are especially vulnerable to mammalian predators if water is removed; water reportedly restored by breaching levee, not confirmed, ultimate fate of this colony unknown
ECLA Pond	Kern	new colony in El Cinco/Los Alamos Duck Clubs pond just east of last year's Poso 1 colony; a LIP-supported pond of cattail marsh that supported cattail marsh for the first time last year and supports nesting tricolors for the first time this year; ca. 3,000 birds; after West Poso colony finishes, both young produced and adults move in to ECLA Pond, and

		many adults, estimated visually as 60,000, begin nesting again; confirmed 2nd nesting on 6/12 when I check 30 nests and find mostly eggs and young
Owens Creek	Merced	new colony; found while driving to San Joaquin Valley County Agricultural Commissioner's meeting in Mariposa on 4/18; in field of volunteer grain and milk thistle; large, ca. 30-40,000 birds; synchronous; location next to road affords excellent viewing; ca. 30 ac., visually estimated; found destroyed 5/18 when young were within a week of fledging
Plainsburg Road	Merced	new colony found by Shawn Milar, USF&WS, San Luis NWR Complex on 4/19; in silage infected with much mustard near dairy of unknown name; estimated at 15-25,000 birds; on undulating topography, difficult to estimate size, but visually estimated as 40 ac.; destroyed by harvest on 5/19, video of harvest; an estimated 75% of young fledged prior to harvest
Homen Dairy	Merced	silage field immediately adjacent to Merced NWR on Homen and Sons Dairy; growing colony, not synchronous; owner reportedly told by veterinarian that field not suitable for silage, may present disease problems to cows; owner agrees not to harvest 40 acres but rest of field, apparently including many tricolor nests, harvested on 4/27 - observed and took video of harvest from Merced NWR boundary; estimated 30,000 birds, may still be growing; silage occupied estimated at 41.8 ac., nest transects done by me, Dennis Woolington, and Tim Keldsen on 6/8 and used to derive an estimate of 70,824 breeding birds
Ellsworthy	Merced	cattail and bulrush marsh colony active in 2005; observed once, on 4/20, birds were silent - incubation likely underway on this date; estimated at 20,000 birds; visited repeatedly through 6/14; breeding here complex, confirmed by nest inspection to have involved renesting by same adults and colony highly asynchronous due also to addition of birds, likely from Kern and Tulare county colonies; ultimate size of colony difficult to determine, estimated at 30,000+

Solano Landfill	Solano	ca. 300 birds on 4/28, cattail marsh much less dense than in 2005; this site, reported by landfill staff to be a tricolor mitigation pond and known to them as “the sanctuary”, has great potential for tricolors if it is recontoured to eliminate the deep, open water and large central island; in its present configuration, it is a Canada goose breeding area and marginally suitable for tricolors; this was the largest of three breeding colonies reported from Solano County in 2005, with 3,000+ breeding birds
Elder Creek Road	Sacramento	these three Himalayan copses, occupied in 2005, were again occupied on 4/28; an estimated 2-3,000 birds present
Waegell’s	Sacramento	not occupied on 4/28; > 8,000 birds in 2005
Conaway Ranch	Yolo	not occupied on 4/28; being drained for road work, no open water; estimated 7,500 birds in 2005
Dickenson Ferry	Merced	new colony, found as it was being destroyed on 5/11; in mustard/thistle (plus silage?) adjacent to dairy; viewing from road to east of colony; visually estimated as 20-30 ac., but unknown amount already harvested when I discover colony; 3-5,000 adult birds seen
Northrup Road	Merced	new colony discovered by Dennis Woolington; in Himalayan blackberry copse on private property between Northrup and McCullagh Roads off of Hwy. 140; originally estimated at ca. 8,000 birds when settling on west end of blackberry copse, but likely ca. 3-4,000 at end of nesting on east end of copse
Big Spring	SLO	colony on private property observed on 5/23 with Michael Bell, TNC; unknown size, as adults and fledged young have left site and are seen in small groups in general vicinity; lots of raccoon tracks seen in mud at periphery of colony; cattail marsh
Hacienda	Kern	inspected by air boat with Dave Hardt on 6/13; Boswell Co. property; highly dispersed breeding colonies in salt cedar (*Tamarix*) over water; likely 2-3,000 birds on this date, but these almost certainly represent renesting by birds that have completed a first nesting

Bill's Grasslands	Yolo	new colony in Dunnigan Hills of northwest Yolo County, discovered on 5/26 on private property owned by Bruce Rodegerdts, who planted Himalayan blackberries from local stock ca. 40 years ago because he likes tricolors and wanted them to breed on his property; ca. 5,000 breeding birds, as many as have ever nested there, according to owner; named in honor of Bill Hamilton
Readymix Pond	Sacramento	new colony on property owned by Teichert Aggregates; discovered and confirmed ca. 500 bird breeding colony in cattail marsh on 5/16; Teichert refused repeated requests for access to more thoroughly document colony; was told by Barry Baba, Teichert wildlife biologist, that company intends to "maintain" the pond containing the cattail marsh; it will be of interest to see what happens to the cattails following the maintenance
Lopez Ag Services	Sacramento	new colony; discovered on 5/16; in milk thistle (*Silybum marianum*) on top of large compost pile; ca. 600 breeding birds; Lopez Ag Services is a composting operation serving regional farmers; the owner, Al Lopez, is a wildlife lover who did not know of the tricolor colony but who is glad that they are on his property, as he likes to watch the birds in the small marsh on his property
Triangle Rock	Sacramento	two new colonies discovered on 5/25 in milk thistle (*Silybum marianum*); Triangle Rock is the old name for a company bought out by Vulcan Materials; I stop in at office to seek permission to access property and am astounded to learn that even the receptionist knows about the tricolors; she calls Glen Phillips, plant foreman, who spends over an hour with me, showing me the property and the efforts being made to attract wildlife; he is quite knowledgeable about field ID of birds and plants and quite proud of response of wildlife to their efforts; he introduces me to Robert Fine, plant manager, who is similarly enthusiastic about wildlife and who informs me that no one has ever stopped in to inquire about the nesting tricolors, but that the birds have been here for several years; he expresses disappointment that they have "lost some of their birds" to the Lopez Ag Services operation next door

Boys Ranch	Sacramento	new colony on private property; information on colony provided by Bill Geyer; observed on 6/16, most birds have left although flocks of mixed adults and juveniles come and go, and I enter marsh (primarily cattail, with some tule mixed in) and find two nests with young and eggs, some apparent renesting; colony likely ca. 800 adults; burned in 2003, no cattails in 2003
Pioneer Duck Club	Colusa	Jeannie Cave, owner; delightful woman, very enthusiastic about tricolors and supportive of conservation efforts; in 2nd year of 5 year LIP contract; settlement discovered on 5/30, ca. 10,000 birds; complex settlement, far fewer birds seen in area originally settled on 6/6, but new settlement in southwest corner of same pond, with total still around 10,000 birds; 500+ fledglings seen and heard on 7/12/06, so colony was ultimately successful, but how many young may have fledged not determined
Capital Outing Club	Colusa	settlement seen on 6/15; ca. 10,000 birds; site quiet on 7/12/06 so settlement failed to produce a colony or colony established and then failed
Delevan T43	Colusa	ca. 20,000 birds seen settling on 5/30; birds in late incubation/early nestling stage on 6/15; Mike Carpenter, USF&WS, visually estimates 40,000 birds here; some activity of foraging birds seen 7/12/06 and flocks of 50-100 adults + fledglings seen in vicinity, so colony successful, but estimate of number of fledged young not available
Delevan 21:2	Colusa	ca. 10,000 birds seen settling on 6/6, colony quiet but birds still very active on 6/15; told by Mike Wolder and Mike Carpenter, USF&WS that colony failed in late June; both inspected marsh for nests, found mostly empty nests but also some eggshell fragments and evidence of apparent raccoon predation; water being drawn off of this pond during colony establishment; possible that birds from this pond re-nested in T43, as this would help to explain why foraging by adults was observed on 7/12/06