

LACK OF RECOVERY OF THE YELLOW-BILLED MAGPIE FROM THE WEST NILE VIRUS IN CALIFORNIA'S CENTRAL VALLEY

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The 2005 outbreak of West Nile virus (WNV) in California's Central Valley was followed by declines in several species of birds, including the Loggerhead Shrike (*Lanius ludovicianus*), Western Scrub-Jay (*Aphelocoma californica*), Yellow-billed Magpie (*Pica nuttalli*), American Crow (*Corvus brachyrhynchos*), and Oak Titmouse (*Baeolophus inornatus*) (Airola et al. 2007, Koenig et al. 2007, Pandolfino 2007, Crosbie et al. 2008, Pandolfino 2008a, Wheeler et al. 2009, Smallwood and Nakamoto 2009). Prior to the 2005 outbreak, the Loggerhead Shrike was acknowledged to be in decline across most of its range (Yosef 1996, U.S. Fish and Wildlife Service 2002), and the Yellow-billed Magpie had declined locally in some areas in the Coast Range and southern California (Roberson 1985, Lehman 1995, Koenig and Reynolds 2009).

From 2008 to 2010 I monitored results from Central Valley Christmas Bird Counts (CBC) for signs of recovery among these species, finding that abundances of the Western Scrub-Jay, American Crow, and Oak Titmouse appear to have recovered to levels comparable to their pre-WNV level, while the Loggerhead Shrike and Yellow-billed Magpie showed no evidence of recovery (Pandolfino 2008b, 2009, 2010).

For this analysis I used data from CBC circles (<http://netapp.audubon.org/cbcobservation/>) and Breeding Bird Survey (BBS) routes (Sauer et al. 2011) in the Central Valley (Figure 1) from 1979 to 2012. To ensure that I was using data from within the normal range of the Yellow-billed Magpie, I included only CBC circles that had averaged at least one Yellow-billed Magpie per party hour prior to 2005 and BBS routes that had averaged at least 10 Yellow-billed Magpies per run prior to 2005.

The numbers of Yellow-billed Magpies recorded on both CBCs (winter) and BBS routes (summer) every year since the 2005 WNV outbreak were lower than any recorded between 1979 and 2005 (Figure 2). The apparent effect of WNV can be seen on every CBC circle and BBS route (Table 1). Post-WNV numbers were lower on all 16 CBC circles and on all 10 BBS routes. The overall declines of 62% from CBC data and 56% from BBS data are comparable to prior published results for both the breeding season (declines of 22–83%; Koenig et al. 2007, Crosbie et al. 2009, Wheeler et al. 2009, Smallwood and Nakamoto 2009) and winter (42–64%; Airola et al. 2007, Pandolfino 2008b, Crosbie et al. 2009) and support the conclusion that recovery is not evident.

Since 2006, anecdotal reports of local recovery of Yellow-billed Magpie numbers have appeared in various California list-serve discussions and web sites (e.g., <http://ebird.org/content/ca/news/yellow-billed-magpie-survey-report>). At the suburban Cardinal Oaks Park east of Sacramento I noted that magpies, which were present in double-digit numbers prior to 2005, were completely absent during 2006 and 2007. Magpies began to reappear in this park in 2008 and were back to pre-2005 numbers by 2009. These anecdotal observations suggest that magpies may be reoccupying some prime locations where the local population was severely reduced or eliminated. However, data from CBCs and BBS routes showed no recovery on a broader scale.

As noted above, even prior to WNV, the Yellow-billed Magpie had been extirpated from some localized areas in the Coast Range and southern California (Roberson 1985, Lehman 1995, Koenig and Reynolds 2009). Nevertheless, prior to 2005 the population was stable in the Central Valley and at the scale of the species' entire range (Butcher and Niven 2007).

The lack of recovery of the Yellow-billed Magpie in the Central Valley may be due to the continued presence of WNV. While there has been no outbreak on the scale

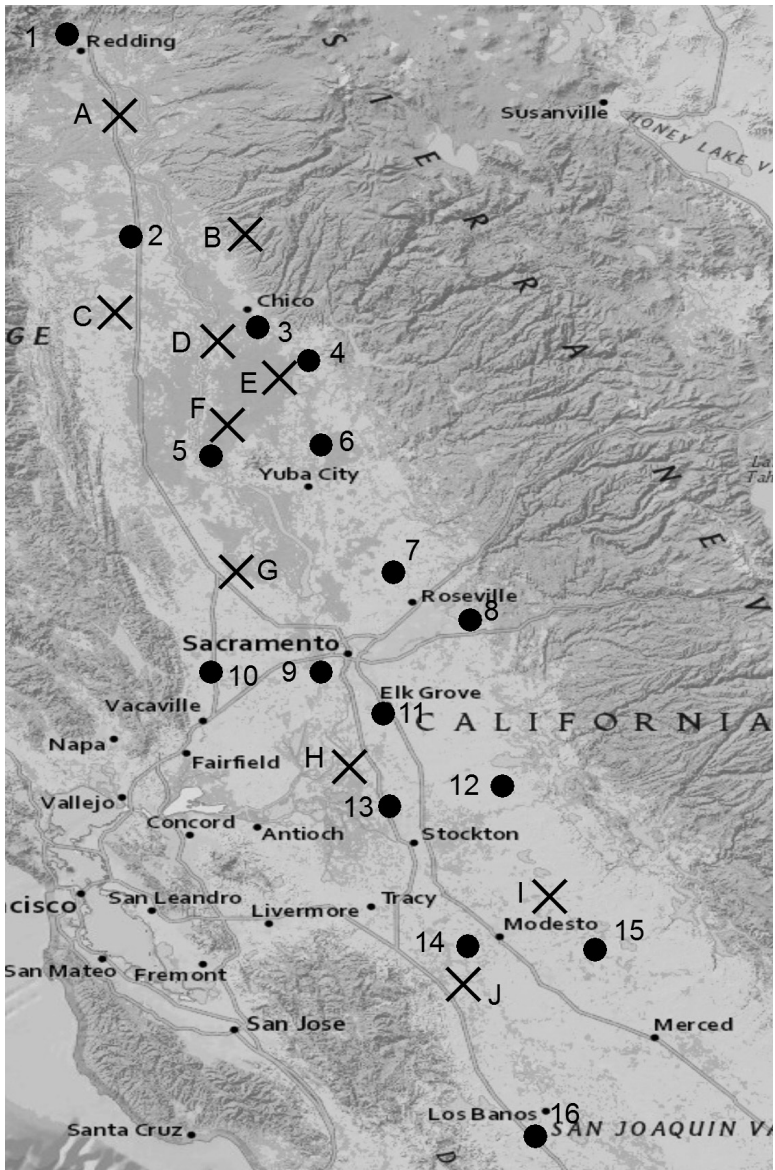


Figure 1. Approximate locations of the 16 CBC circles (filled circles) and 10 BBS routes (crosses) used for analyses of trends in numbers of the Yellow-billed Magpie. CBC circles: 1, Redding; 2, Red Bluff; 3, Chico; 4, Oroville; 5, Peace Valley; 6, Marysville; 7, Lincoln; 8, Folsom; 9, Sacramento; 10, Putah Creek; 11, Rio Cosumnes; 12, Wallace-Bellota; 13, Stockton; 14, Caswell-Westley; 15, La Grange-Waterford; 16, Los Banos. BBS routes: A, Red Bluff; B, Cohasset; C, Orland; D, Glenn; E, Oroville; F, Pennington; G, Zamora; H, Staten Island; I, Hughson; J, Westley.

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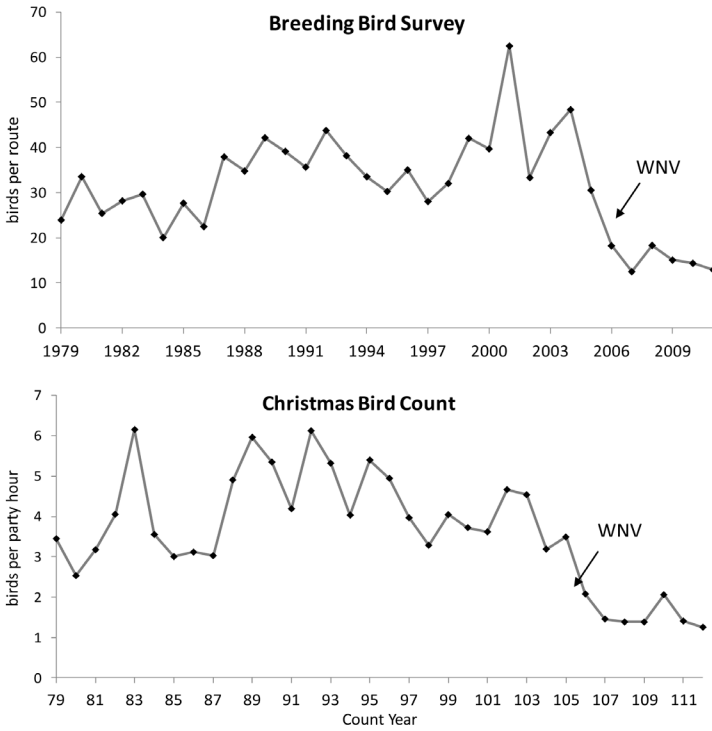


Figure 2. Abundance of the Yellow-billed Magpie on Central Valley CBCs from count year 79 (winter 1978–79) to count year 112 (winter 2011–2012) and on BBS routes from 1979 to 2011.

seen in 2005 since that year, WNV continues to be present in the region (Wheeler et al. 2009, Centers for Disease Control 2012). Infected magpies’ extremely high rate of mortality (Crosbie et al. 2008, Wheeler et al. 2009) and the apparent absence of seropositive birds (with antibodies to WNV) among magpies that survived the 2005 outbreak (Crosbie et al. 2008) suggest that there may be very few WNV-resistant individuals in the Central Valley. Another major WNV outbreak could cause a further loss of Yellow-billed Magpies in the region.

Data on the numbers of infected birds and human beings suggest that 2012 saw the highest levels of WNV in the southern Central Valley since 2005 (Centers for Disease Control 2012). Therefore, monitoring of CBC and BBS data after 2012 may show further local declines in magpies there. Wheeler et al. (2009) noted that, with WNV now endemic to the Central Valley, localized species are less likely to recover from population losses. The entire range of the Yellow-billed Magpie lies within areas of persistent WNV. Therefore, recovery of the population to pre-WNV levels may be unlikely. In addition, the continuing conversion of oak savanna to urbanization and intensive agriculture such as vineyards (Zach et al. 2002) further reduces the habitat available for magpies. On a more positive note, the Yellow-billed Magpie population in the Central Valley has adapted well to human-altered landscapes such as rural residential and suburban areas. This provides some hope that, if a WNV-resistant

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Table 1 Average Abundance of the Yellow-billed Magpie pre- and post-West Nile Virus

	Pre-WNV ^a	Post-WNV ^b	Change
CBC circle			
Chico	5.7 ± 1.0	2.8 ± 0.5	-52%
Caswell–Westley	22.9 ± 3.6	3.6 ± 0.7	-84%
Folsom	1.7 ± 0.7	0.4 ± 0.04	-78%
Lincoln	5.1 ± 0.6	1.1 ± 0.2	-78%
Los Banos	6.4 ± 0.6	3.0 ± 1.4	-53%
La Grange–Waterford	3.9 ± 0.5	2.2 ± 0.4	-43%
Marysville	37.9 ± 20	1.6 ± 0.2	-96%
Oroville	1.0 ± 0.1	0.2 ± 0.1	-75%
Putah Creek	3.8 ± 0.2	2.4 ± 0.2	-38%
Peace Valley	2.5 ± 0.2	0.5 ± 0.2	-79%
Red Bluff	3.3 ± 0.3	1.6 ± 0.1	-52%
Rio Cosumnes	3.7 ± 0.3	0.9 ± 0.1	-76%
Redding	1.3 ± 0.1	0.6 ± 0.1	-49%
Sacramento	6.1 ± 0.4	3.1 ± 0.3	-48%
Stockton	1.4 ± 0.1	0.8 ± 0.2	-40%
Wallace–Bellota	2.8 ± 0.2	1.7 ± 0.2	-39%
All circles combined	4.2 ± 0.2	1.6 ± 0.1	-62%
BBS route			
Cohasset	19 ± 2	13 ± 1	-30%
Glenn	26 ± 3	3 ± 1	-87%
Hughson	49 ± 5	33 ± 8	-34%
Orland	35 ± 4	9 ± 2	-74%
Oroville	40 ± 3	24 ± 3	-40%
Pennington	29 ± 3	9 ± 2	-70%
Red Bluff	11 ± 1	2 ± 1	-86%
Staten Island	12 ± 3	7 ± 1	-44%
Westley	60 ± 5	17 ± 7	-72%
Zamora	54 ± 7	28 ± 6	-48%
All routes combined	35 ± 2	15 ± 2	-56%

^aBirds per party-hour 1979–2005 for CBC data, birds per route 1979–2005 for BBS data.

^bBirds per party-hour 2006–2012 for CBC data, birds per route 2006–2011 for BBS data.

subpopulation develops, it may find ample habitat in which to expand. In contrast to magpies in the Central Valley, those in the Coast Range and southern California do not readily use urbanized landscapes (Koenig and Reynolds 2009), and that population may be at higher risk of further declines and/or range contractions.

I thank Dan Airola, Walter Koenig, Paul Lehman, and Philip Unitt for their helpful reviews and suggestions, which improved the focus and clarity of the paper. I am also indebted to the many volunteers who participate in Christmas Bird Counts and run Breeding Bird Surveys. These data sources are invaluable tools to help us understand avian population trends.

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Accepted 15 March 2013