

Colonization of California's Central Valley by the Great-tailed Grackle

Edward R. Pandolfino, 5530 Delrose Court, Carmichael, CA 95608

Bruce E. Deuel, 18730 Live Oak Road, Red Bluff, CA 96080

Lowell Young, 5589 Meadow Lane, Mariposa, CA 95338

INTRODUCTION

During the 20th and continuing into the 21st century, the Great-tailed Grackle (*Quiscalus mexicanus*) staged one of the most dramatic avian range expansions seen in North America (Dinsmore and Dinsmore 1993, Wehtje 2003). At the beginning of the 20th century the range of this species within the United States was confined to the southern tip of Texas (Ridgway 1902). It is now at least locally common across most of the western half of the U.S., except for the most northerly tier of states – a range expansion of well over 5000% (Wehtje 2003). While the main expansion from southern Texas involved the subspecies *Q. m. prosopidicola*, a second subspecies (*Q. m. monsoni*) crossed into New Mexico from Mexico and spread mainly to the north and west, and a third subspecies (*Q. m. nelsoni*) moved from Mexico into Arizona and subsequently into California (Wehtje 2001).

The first Great-tailed Grackle found in California was near Imperial Dam in Imperial County in June 1964 (McCaskie et al. 1966). California's first breeding record came from the same area five years later (McCaskie 1970, Small 1994, contra Wehtje 2003). Patten et al. (2003) noted that, by the mid-1970s, "double-digit counts were commonplace in the Imperial Valley." From there it spread westward and first reached coastal California as a breeder in San Diego County in 1988 (Small 1994, Unitt 2004). Although it would be more than two decades before Great-tailed Grackles became broadly established in Northern California, the first harbinger of that wave reached San Francisco in 1978 (Winter and Manolis 1978). The first several California records were of the *nelsoni* subspecies, *monsoni* subsequently invaded the state, and current populations may be of either subspecies or intergrades between them (Wehtje 2001, Patten et al. 2003). Every California county now has a record of Great-tailed Grackle (Rottenborn et al. 2008) and the species shows every indication it will continue to consolidate its occupation of the state. This paper documents the timing and pattern of spread of the Great-tailed Grackle in California's Central Valley.

METHODS

To document this range expansion we collected and analyzed data from a variety of sources, including:

- North American Birds (NAB) and its predecessors, Field Notes (FN) and American Birds (AB);
- archives maintained by North American Birds Regional Editors;
- Christmas Bird Counts (CBC) (<http://www.audubon.org/bird/cbc/hr/index.html>);
- Breeding Bird Surveys (BBS) (<http://www.pwrc.usgs.gov/bbs/>);
- messages from the Central Valley listserve (http://groups.yahoo.com/group/central_valley_birds/); and
- input from numerous individuals with knowledge of local bird status and distribution.

For the purposes of this paper, we defined the CV to include the Central Valley ecoregion and the Tehama Terraces subregion as shown on the CVBC web site (<http://www.cvbirds.org/CaliMap.htm>). All county records cited here are confined to the portions of each county within the CV.

COLONIZATION

In 1979, just one year after Northern California's first Great-tailed Grackle, the CV's first two records came in quick succession: 15 September at Sacramento National Wildlife Refuge (NWR) in Glenn County and 11 November at Gray Lodge Wildlife Area (WA) in Butte County (Laymon and Shuford 1980). The next CV county to record the species was Yolo in December 1980 (LeValley and Evens 1981). Tehama was the last county to get a CV record in June 2005 (Rogers et al. 2006). Table 1 summarizes the first CV records for each county. Note that for some counties (e.g., Kern, Placer) the first record may have occurred outside the CV portion of that county.

In contrast to the first few CV records, which occurred in the northern parts of the CV, Great-tailed Grackles began breeding first in the San Joaquin Valley and gradually moved north (Figure 1). Breeders were first documented in Fresno County in 1989, then in Kern in 1990, and then throughout most of the San Joaquin Valley before spreading into the rest of the CV. Tehama is the only CV county still without a documented breeding record. The first CV BBS route to record Great-tailed Grackle was in Fresno County in 2000. By 2008 the species had been found on six BBS routes (one route in Fresno, one in Madera, and two each in Merced and Stanislaus Counties). The average interval between the first CV record and first CV breeding record for each county was 6.2 years (range 0-21). This compares favorably with the similar calculation done by Wehtje (2003) using first state records and first state breeding records (5.8 years, range 0-20).

In most of the CV, Great-tailed Grackles started as migratory breeders and only began to winter after a few years. Figure 2 shows this progression

Table 1. First county records of Great-tailed Grackle within the CV portion of 20 counties.

County	Date	Site	Reference
Glenn	15-Sep-79	Sacramento NWR	Laymon et al. 1980
Butte	11-Nov-79	Gray Lodge WA	Laymon et al. 1980
Yolo	27-Dec-80	Davis	LeValley & Evens 1981
Tulare	27-Apr-85	Creighton Ranch Pres.	Campbell et al. 1985
Merced	13-Nov-87	Los Banos WA	Campbell et al. 1988
Fresno	Spring 88	Fresno	fide Glenn Kottcamp
Kern	3-Dec-89	Bakersfield	McCaskie 1990
San Joaquin	Apr 94	Stockton	Yee et al. 1995
Kings	Spring 96	near Kettleman City	Jeff Seay, pers. comm.
Sacramento	25-Mar-96 ¹	Sacramento Reg. WWTP	fide Chris Conard
Madera	23-Jun-96	Chowchilla WWTP	Bailey et al. 1996
Stanislaus	24-Jun-96	Modesto	fide Harold Reeve
Contra Costa	9-May-98	Oakley	Roberson et al. 1998
Solano	1-Jun-98	Grizzly Island	Bailey et al. 1998
Colusa	15-Apr-99	Delevan NWR	Roberson et al. 1999a
Shasta	8-Jun-99	Redding	Roberson et al. 1999b
Sutter	28-Jun-00 ²	Sutter NWR	fide Mike Wolder
Placer	7-May-01	Lincoln	NAB Archives
Yuba	13-Dec-03	s. of Marysville	fide Mary Schiedt
Tehama	2-Jun-05	Paynes Creek wetlands	Rogers et al. 2006

¹ Contra Bailey et al. 1996.

² Contra Sterling 2003 and Glover et al. 2003.

with wintering birds spreading generally from south to north. The record for Yolo County in the first time period was almost certainly due to a vagrant Great-tailed Grackle. There was a lag between first breeding and first wintering for most (16/20) counties. The average interval between first breeding and first wintering (for CV counties in which breeding preceded wintering) was 3.6 years (range 0-13). Using analogous figures from Wehtje (2003) for individual states produces an average of 5.5 years between first breeding and first wintering (range 0-14). Tehama and Sutter Counties still lack any documented winter records. Figure 3 uses data from CV CBCs to track the increasing range and abundance of the Great-tailed Grackle over the past two decades.

DISCUSSION

The role of humans

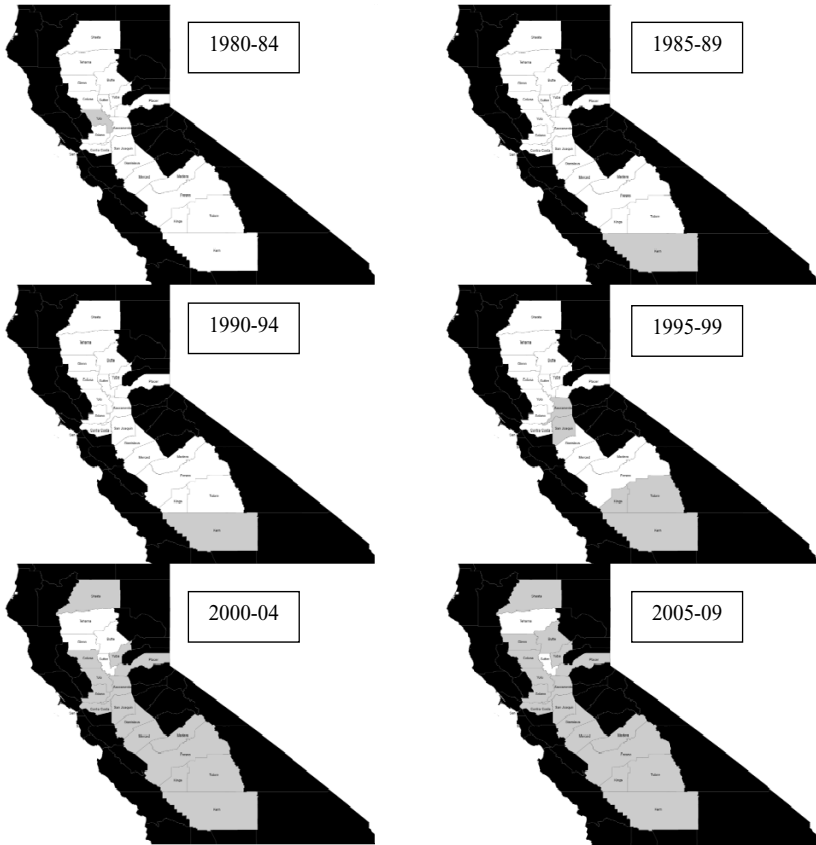
Among California's non-introduced bird species, perhaps only the Cattle Egret (*Bubulcus ibis*) (Telfair 2006) and Brown-headed Cowbird

Figure 1. Counties shaded gray had at least one breeding record of Great-tailed Grackle within the CV portion of that county during the time period shown. Data from: from AB, FN, NAB, and NAB Archives; Snowden 2001; Glover 2009; pers. comm. M. Carpenter, S. Hampton, R. Leong, H. Reeve, J. Seay, B. Williams, M. Wolder, and D. Yee.



(*Molothrus ater*) (Rothstein 1994) compare to the Great-tailed Grackle in terms of the scale and rapidity of their range expansions. In all three cases, human alteration of the landscape is a crucial factor. While agricultural practices have been key elements in the spread of Cattle Egrets and Brown-headed Cowbirds (Siegfried 1978, Rothstein 1994, Lowther 1993, Telfair 2006), the Great-tailed Grackle has benefited from both agricultural practices (Selander and Giller 1961) and from human habitation (Johnson and Peer 2001, Wehtje 2003) in close proximity to natural and man-made breeding habitats (e.g., artificial wetlands). As noted by Wehtje (2003), “This range expansion has been marked by great-tailed grackles preferring human-modified environments as breeding grounds, especially in the western

Figure 2. Counties shaded gray had at least one winter record of Great-tailed Grackle within the CV portion of that county during the time period shown. Data from: FN, AB, NAB, and NAB Archives; pers. comm. C. Conard, J. Davis, B. Deuel, S. Glover, R. Leong, H. Reeve, J. Seay, B. Williams, D. Yee, and B. Yutzy.



states. This association appears to benefit the species in two ways; nest predation is lessened in such areas compared with natural conditions, whereas [sic] human activities tend to generate an abundant and consistent food supply for feeding offspring.”

In many CV counties, the sites where breeding was first detected were often in wetlands closely associated with urban areas. Examples include: Butte County, Thermalito Forebay (adjacent to urban areas of Oroville); Contra Costa County, McNabney Marsh (adjacent to urban areas of Martinez); Fresno County, Fresno (ponds in urban area); Madera County, Chowchilla WWTP (within approximately one km of urban areas of Chowchilla); Placer County, Sun City Lincoln Hills (surrounded by subur-

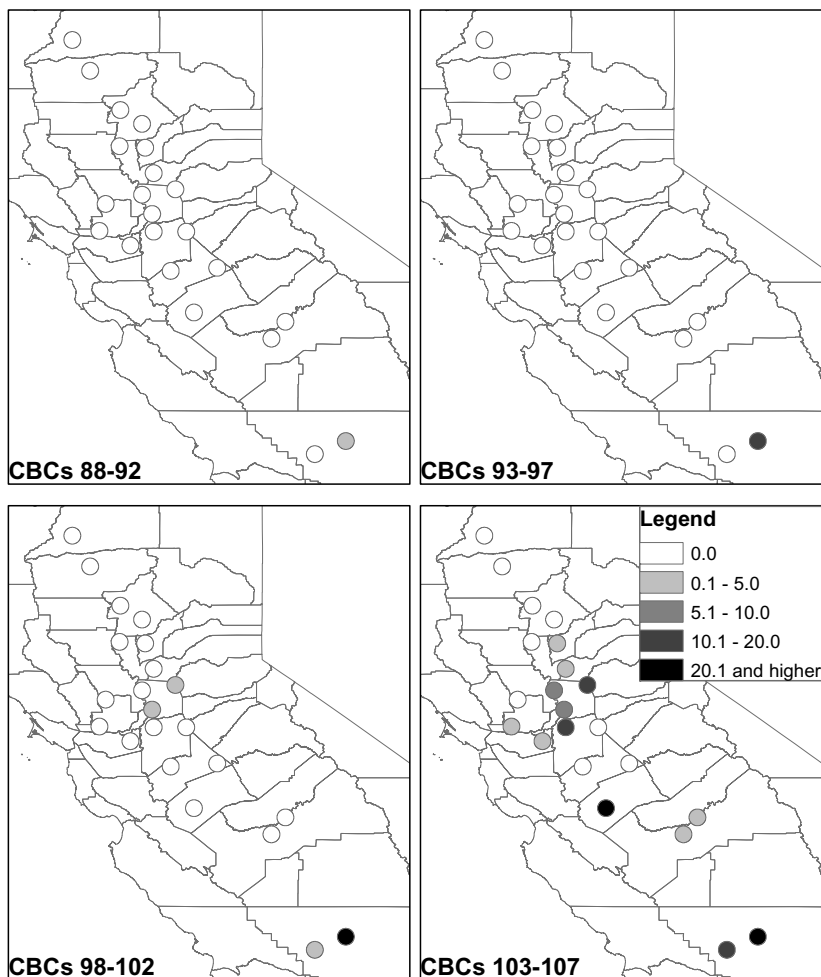
ban development); Sacramento County, Regional WWTP (within 3 km of urban areas of Elk Grove); Shasta County, Kutrass Lake (within urban Redding); Stanislaus County, Modesto Creekside Golf Course (surrounded by urban areas of Modesto). One must acknowledge that urban areas also have more birders and, therefore, nesting birds are more likely to be found in these areas. However, birders visit many non-urban sites with suitable habitat and the majority of the currently active nesting colonies of which we are aware are still within or adjacent to areas of human habitation. Among the non-urban breeding sites, most are in managed wetlands (e.g., Sacramento NWR, Delevan NWR, Yolo Bypass WA). The key element which all these sites have in common is cattail (*Typha* spp.) and/or tule (*Scirpus* spp.) marsh with a source of summer water managed by human intervention. Although Great-tailed Grackles use a wide variety of habitats for nesting throughout their breeding range (Jaramillo and Burke 1999), nearly every site we know of in California is in cattail/tule marsh. Urban sites have the added benefit of providing Great-tailed Grackles some of their favorite foraging sites such as dumpsters, parking lots, fast-food restaurants.

Human population growth rates in California's CV have been among the highest of any region of the U.S. during the period of the Great-tailed Grackles' colonization (U.S. Census data 1980, 1990, and 2000). Much of this population growth has been accommodated by development of large tracts of land into suburban housing. In order to comply with regulatory requirements, developers are generally required to avoid wetlands within these developments. The result of this 'avoidance' requirement is often the creation of perennial wetlands (where they may have previously been seasonal) in close proximity to dense human development. This creates ideal habitat for Great-tailed Grackles and may be another factor in this species' colonization of the CV.

Mechanism

Data for the CV suggest a general pattern of spread from south to north, with birds initially staying only for the breeding season (at least in the northern areas) and gradually becoming year-round residents. This pattern of colonization is similar to that seen through much the range expansion of the Great-tailed Grackle (Dinsmore and Dinsmore 1993, Wehtje 2003). In order for a species to occupy a rapidly expanding range there must be some efficient mechanism for finding and occupying new sites. The mating system of the Great-tailed Grackle as described by Johnson et al. (2000) may provide such a mechanism. Breeding colonies consist of a small number of territorial males which mate with most of the females and sire most of the offspring. Non-territorial resident males remain within the colony during the breeding season relying on opportunistic extra-pair copulations to produce offspring. A third group of 'transient' males spends a small amount of time at the colony, also looking for opportunities to breed. These transient males

Figure 3. Average number of Great-tailed Grackles recorded on CV CBC counts over the period indicated. The CBCs refer to CBC Count Years with Count Year 88 covering winter of 1987-88 and so on.



may find new potential sites as they move away from a colony. In addition, both territorial and resident males may abandon the colony once nesting is in full swing and breeding opportunities are few. These birds may also find new potential breeding sites. Indeed, Wehtje (2003) suggested that this mating system may contribute to the rapid spread of the Great-tailed Grackle. Consistent with this, we and others have observed single, lone males in late spring and early summer in sites with suitable breeding habitat, but with no history of breeding activity (D. Cooper, J. Davis, J. Sterling, W. Wehtje, pers. comm.). Also consistent with this hypothesis is the fact that most first state records are of single adult males (Dinsmore and Dinsmore 1993, Wehtje 2003). This was also the case in 12 of the 20 first CV county records.

Impacts on other species

In spite of the tremendous expansion of the range of these large, noisy birds and their tendency to create relatively dense breeding colonies, there is little documentation of negative effects on populations of other bird species. Rutledge and Chandler (1972) observed nest site competition with Red-winged Blackbirds (*Agelaius phoeniceus*). Bent (1958) provided circumstantial evidence for nest predation by grackles. However, the only direct observations of nest predation we found were accounts of predation of Reddish Egret (*Egretta rufescens*) and Tricolored Heron (*Egretta tricolor*) eggs (Pemberton 1922, Cahn 1923) and predation of both eggs and nestlings of the White-winged Dove (*Zenaida asiatica*) (Cottam and



Figure 4. Male Great-tailed Grackle (*Quiscalus mexicanus*) near Lincoln, Placer, Co., 17 April 2008.

photo © Jack Ferrante

Trefethen 1968). Blankinship (1966) noted increases in White-winged Doves at a site in the lower Rio Grande Valley of Texas following attempts to exterminate local Great-tailed Grackles. However, Cottam and Trefethen (1968) noted little impact on White-winged Doves at sites other than the lower Rio Grande Valley. Further, recent studies by Hayslette et al. (2000) in south Texas found no evidence of impacts on White-winged Dove productivity by Great-tailed Grackles. There are anecdotal accounts of Great-tailed Grackles killing (but not eating) other birds: Yellow Warbler (*Dendroica petechia*) (Lamb 1944), House Sparrow (*Passer domesticus*) (Hansen 1976), and Barn Swallow (*Hirundo rustica*) (Clapp 1986).

Of potentially more significance for the CV, is a claim on the National Audubon Society web site (<http://web1.audubon.org/science/species/watchlist/profile.php?speciesCode=tribal> – accessed 27 November 2009) that one of the most significant threats to the Tricolored Blackbird (*Agelaius tricolor*) is from, “increased nest predation (especially by locally increasing Great-tailed Grackles)”. However, Bob Meese (pers. comm.), who has observed the two species nesting in close proximity at several California locations, does not believe that nest predation by the grackles has any measureable impact on Tricolored Blackbird productivity. There is also circumstantial evidence that Great-tailed Grackles may have displaced Yellow-headed Blackbirds (*Xanthocephalus xanthocephalus*) from some California sites (Ted Beedy, Brian Williams, pers. comm.). This is clearly an area that needs more study and the opportunities to do such studies continue to expand.

Those who find themselves living next to an active breeding colony and have not learned to love the loud, bizarre, complex, and comical songs of the male Great-tailed Grackle may reach different conclusions about the ability of these birds to have a negative impact on their environment. These authors respectfully disagree.

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Figure 5. Male Great-tailed Grackle (*Quiscalus mexicanus*) at the Yolo Bypass Wildlife Area, Yolo Co., 30 May 2009.

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