A Hybrid Brewer's × Black-chinned Sparrow

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Man-made environmental change is one factor that contributes to the breakdown of reproductive isolating mechanisms between species and subsequent hybridization (Mayr 1963). For example, in the eastern United States, agriculture and urbanization, which favor the Mallard (*Anas platyrhynchos*) over the Black Duck (*A. rubripes*), have led to those species' hybridization (Longcore et al. 2000). Deforestation followed by maturation of second-growth forest on abandoned farmland has contributed to the contact and well-known hybridization between the Blue-winged (*Vermivora pinus*) and Golden-winged (*V. chrysoptera*) Warblers (Confer 2006). Here I report a hybrid between the Brewer's (*Spizella breweri*) and Black-chinned (*S. atrogularis*) Sparrows, a previously unknown combination that was apparently a result of habitat change following massive wildfire.

Figure 1. Burned forest at the site of the hybrid Brewer's × Black-chinned Sparrow in Cuyamaca Rancho State Park, California, 9 June 2007. Shrubs are *Ceanothus palmeri*, after four years grown to the height of a man (Blackman, Burr, and Unitt in photo for height comparison).
Photo by James K. Wilson

In 2002 and 2003 southern California was swept by fires of a scope unprecedented since fire officials began keeping accurate records in the early 20th century. Over 738 square miles of San Diego County burned, representing 17.4% of the county's total area and nearly 25% of the area still covered by natural vegetation. The Cedar Fire of October 2003, the largest single mapped fire in California history, since at least 1910, burned 436.4 square miles including nearly all of the Cuyamaca Mountains. The higher elevations of these mountains, part of the Peninsular Ranges, were formerly covered with a forest dominated by the Jeffrey Pine (*Pinus jeffreyi*), Coulter Pine (*P. coulteri*), Incense Cedar (*Calocedrus decurrens*), White Fir (*Abies concolor*), Black Oak (*Quercus kelloggii*), Coast Live Oak (*Q. agrifolia*), and Canyon Live Oak (*Q. chrysolepis*). The Cedar Fire burned over 90% of this forest completely, consuming the canopy and leaving only a few small unburned or partially burned enclaves. Since the fire, most of the live oaks have resprouted from their branches and many of the Black Oaks have resprouted from their bases. But regeneration of conifers from seeds has been extremely low, except very locally for the Incense Cedar adjacent to incompletely burned

conifers from seeds has been extremely low, except very locally for the Incense Cedar adjacent to incompletely burned trees (Franklin et al. 2006). Following a rapid flush of short-lived fire-following specialists, recovery of the vegetation has been dominated overwhelmingly by the shrub *Ceanothus palmeri*, with the California Rose (*Rosa californica*) and Blue Elderberry (*Sambucus mexicana*) also proliferating (Franklin et al. 2006). Thus the stage has been set for an avifauna typical of coniferous forest to be replaced by one typical of chaparral and oak woodland. To assess the effects of the fires on birds, I established 46 survey routes, including five in the Cuyamaca Mountains within Cuyamaca Rancho State Park. Volunteers and I covered the routes four times during each breeding season between 15 April and 15 July as well as three times during the winter.

On 19 May 2007 Peter D. Shaw and I were walking one of the survey routes, which runs from Highway 79 southwest up the West Mesa Fire Road then north along the Fern Flat Trail to Azalea Spring. Near the junction of the West Mesa and Fern Flat trails, in the saddle between West Mesa and Arrowmakers Ridge at an elevation of 4580 feet (32.935° N, 116.572° W), we heard a peculiar variation of the Black-chinned's Sparrow's "bouncing ball bearing" song. Each note had a trilled quality to it, and the rapid trill at the end of the song trailed off into 1 to 1.5 seconds of tinkling notes resembling a Brewer's Sparrow's song. The effect was the pattern of a Black-chinned Sparrow's song overlaid over the quality of a Brewer's Sparrow's song. The bird repeated this variation several times, then performed a more typical Black-chinned Sparrow song several times, then reverted to the atypical song. It alternated the two song types repeatedly over the 20 minutes in which we watched it.

In plumage, however, the bird was much more like a Brewer's Sparrow. The crown, nape, and back were finely streaked with blackish on a sandy brown background (grayer on the central crown stripe and nape). The back had no rufous typical of the local subspecies *Spizella atrogularis cana* of the Black-chinned. The wing feathers were also edged with the same sandy buff color typical of the Brewer's Sparrow. There was a pale gray supercilium but the sides of the head were a nearly unmarked dingy gray. Photos show a slight browner outline of the ear coverts that was not obvious in the field. The bird lacked both the malar pattern of Brewer's Sparrow and the black chin of a male Black-chinned Sparrow. The underparts were light gray, looking paler than typical of the Black-chinned but grayer than the pale sand color of Brewer's. The bill was conspicuously pale yellowish pink (with a tiny dusky tip), yellower than a Black-chinned Sparrow's bill but much brighter than the neutral brownish bill of a Brewer's Sparrow. The tarsi were orangish pink.

The combination of features of the plumage, bill color, and song suggest the bird was a hybrid. Suspecting that no hybrid between the Brewer's and Black-chinned had been reported previously, I was eager for more definitive documentation. Fortuitously, while Shaw and I were studying the bird, Janet Franklin, Linnea A. Spears-Lebrun, and Heather L. Schmalbach came up the West Mesa Fire Road for their study of plant succession in the area. I asked if anyone had a camera or recording equipment, and Spears-Lebrun had a digital movie camera that recorded sounds. She kindly took several seconds of video of the bird that captured the unusual song. Still wanting better photos and recordings, however, for the next run of the route on 9 June 2007 I asked Timothy Burr to join me with recording equipment designed for birds and Thomas A. Blackman to join me with a camera and telephoto lens. Fortunately, we found the hybrid sparrow again on 9 June, singing just a short distance farther up the trail from where it had been on 19 May (Figure 1). The bird spent much of its time on exposed perches in burned trees, above the tops of the shrubs of *Ceanothus palmeri*, allowing Blackman to get numerous photos (e.g., Figures 2, 3). Likewise, the bird spent most of its time singing, allowing Burr to record over 20 minutes of song. Figure 4 presents sonograms of some variations. On 9 June the hybrid sparrow sang further variations we had not heard on 19 May, such as a series of three to five trilled notes given in the cadence of the first three notes of the Black-chinned Sparrow's song but truncated after that. It did not appear to be mated. On 30 June Philip K. Nelson and I could not relocate the hybrid sparrow, but the singing of the Black-chinned Sparrows had nearly ceased, in parallel with the fledging of many of their broods.

Figure 2. Hybrid Brewer's × Black-chinned Sparrow in Cuyamaca Rancho State Park, California, 9 June 2007. Note bright yellowish pink bill, pale supercilium, and uniform grayish cheek and underparts.
Photo by Thomas A. Blackman

Figure 3. Upperparts of Brewer's × Black-chinned Sparrow in Cuyamaca Rancho State Park, California, 9 June 2007. Note streaked crown and nape and sandy brown background color of the crown and back. From this view the bird does not look clearly different from a pure Brewer's Sparrow.
Photo by Thomas A. Blackman

Paul D. Jorgensen and Steve Jorgensen may have encountered another hybrid Brewer's × Black-chinned Sparrow while covering another of our fire-study routes, on Middle Peak in Cuyamaca Rancho State Park on 17 May 2007. Their initial impression was that the bird was a Brewer's but with a yellow bill and crown less streaked than typical for that species. Unfortunately, that bird was seen only briefly and was not singing.

The Black-chinned Sparrow has been one of the primary birds exploiting the burned areas of southern California. Though common before the fire in chaparral, it was absent from forested areas. Along the five Cuyamaca study routes it has increased significantly each year since 2003, by 2007 becoming the seventh most abundant species in the burned forest. In the chaparral-dominated habitat at lower elevations around the Cuyamaca Mountains it became even more prevalent following the fires. Just to the east of Cuyamaca, in the area primarily along the east slope of the Peninsular Ranges burned in the Pines Fire of 2002, it increased rapidly, becoming the third most abundant bird by 2005 and maintaining its numbers through 2007. On the west slope of the Cuyamaca Mountains, along three survey routes in the Cleveland National Forest through chaparral burned in the Cedar Fire, the Black-chinned Sparrow was the second-most abundant bird (after the Lazuli Bunting, *Passerina amoena*) in 2005 and the most abundant bird by far in 2006 and 2007, maintaining its numbers after the bunting declined (unpubl. data).

Listen Now

Some songs sung by the hybrid Brewer's × Black-chinned Sparrow in Cuyamaca Rancho State Park, California, 9 June 2007.
Recordings by Timothy Burr

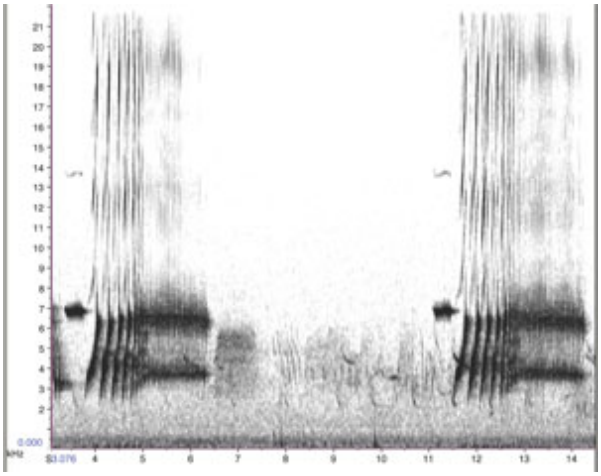

Figure 4A. Most frequent song, in which the pattern of the Black-chinned's song seems overlaid over the quality of a Brewer's song. Note the layers of harmonics in the terminal trill, as in Brewer's but not as in the Black-chinned.

Brewer's Sparrow's response to the fire has been more complex. The species nests primarily in the Great Basin but also locally in the San Gabriel (K. L. Garrett in McCaskie 1995), San Bernardino, and San Jacinto (Grinnell and Swarth 1913) mountains of southern California. Former nesting habitat at low elevations in cismontane southern California (Simi and San Fernando valleys, Los Angeles County; Etiwanda and Highlands, San Bernardino County; Willett 1933) has now been nearly eliminated by agricultural and urban development, although R. L. McKernan reported a nest with eggs at Winchester, southwestern Riverside County, 13 May 1992 (McCaskie 1992). For San Diego County, Stephens (1919) wrote vaguely that a few Brewer's Sparrows bred on the eastern slope of the Peninsular Ranges and collected a specimen at 6000 feet elevation in the Cuyamaca Mountains on 21 May 1893. But, except for Claude G. Edwards' report of one singing bird at 850 feet elevation in Marron Valley in 1991, no summer or nesting records followed until 2001, with the discovery of an ultimately unsuccessful nest in Montezuma Valley near Ranchita in northeastern San Diego County and two fledglings in McCain Valley in southeastern San Diego County (Unitt 2004). The Pines Fire of 2002 burned most of the stand of *Artemisia tridentata* in Montezuma Valley where the birds had nested in 2001. But subsequent surveys to study the effects of the Pines Fire revealed that Brewer's Sparrows continued to occur in small numbers in spring between Ranchita and Peña Spring, more consistently in unburned than in burned areas, and also sporadically in burned chaparral elsewhere along the upper east slope of the Peninsular Ranges. As in 2001, most birds apparently departed the area before nesting successfully. But on 4 June and 2003, at elevation 4000 feet near Jim Spring about 2.5 miles east of Ranchita, along an unburned route covered for comparison with the burned study routes, Philip K. Nelson saw a fledgling Brewer's Sparrow begging from its parents. In burned chaparral on the west flank of the Cuyamaca Mountains along Boulder Creek Road, I had one on 27 June 2005 and two together on 19 April 2007. Along the five routes in the burned forest of the Cuyamaca Mountains our only sighting of a Brewer's Sparrow was of one near Azalea Spring, about 2 miles north of the hybrid, on 15 June 2007 by T. A. Blackman.

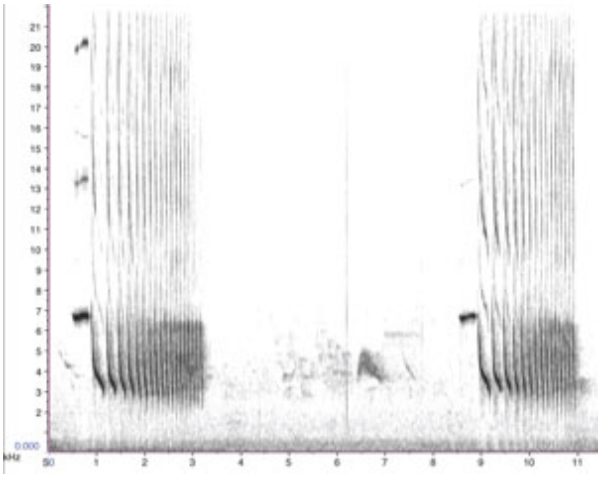

Figure 4B. Song resembling a typical Black-chinned Sparrow's song, with the terminal trill shortened.

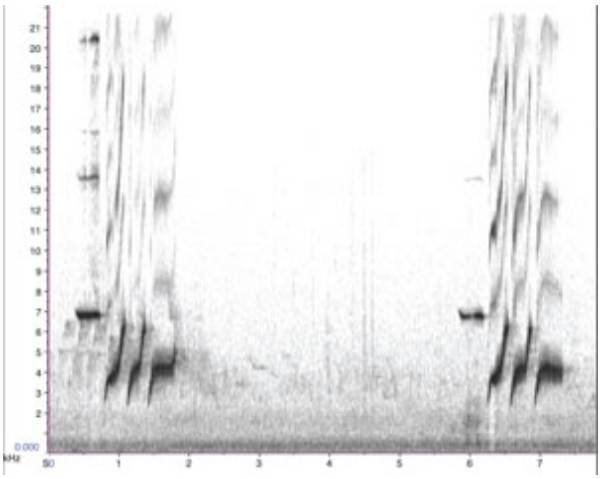

Figure 4C. Song consisting of three trilled notes in the cadence of the first three notes of a typical Black-chinned Sparrow's song. Again, note the harmonics.

Thus it appears that a few Brewer's Sparrows were attracted into the burned zone, where they encountered a superabundance of Black-chinned Sparrows. Under these conditions a Brewer's Sparrow was unlikely to encounter its own species but was never far from the territory of a Black-chinned. When one species is rare in an area where a closely related species is common the situation may to lead to hybridization, as in the case of a hybrid Western (*Piranga ludoviciana*) × Scarlet (*P. olivacea*) Tanager collected in Minnesota (Tordoff 1950), repeated hybridization between the Lazuli and Indigo (*Passerina cyanea*) Buntings in California (Rowe and Cooper 1997, Unitt 2004), and the Yellow-crowned Night Heron (*Nyctanassa violacea*) nesting with Black-crowned Night Herons (*Nycticorax nycticorax*) and fledging two hybrid young at North Island Naval Air Station, San Diego County, in 2007 (M. F. Platter-Rieger, T. Shepherd, T. Burr, T. Conkle unpubl. data).

Fire is a regular feature of the southern California environment, with many species in diverse groups of organisms, including birds, adapted to exploit it. But fires on the scale of those of 2002–03 may lie outside variation expected apart from human influence. In the Cuyamaca Mountains the high density of trees and the prevalence of fire-intolerant trees such as the Incense Cedar and White Fir was a result of decades of fire suppression (Krofta 1995); most of the forest had not burned since before 1910. Although the fires of 2002 and 2003 spread rapidly and burned intensely because the vegetation was so dry following years of drought, especially severe in 2001–02, all were started, whether accidentally or intentionally, by careless and ignorant people.

Brewer's Sparrow has reportedly hybridized with the Clay-colored Sparrow (*Spizella pallida*; Suchetet 1897, Cockrum 1952) and Chipping Sparrow (*S. passerina*; Pyle and Howell 1996). But according to McCarthy (2006) no hybrids involving the Black-chinned Sparrow are known previously, and the combination I report here is new.

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