CONFIRMED NESTING OF AN INDIGO WITH A LAZULI BUNTING IN KERN COUNTY, CALIFORNIA

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The Nature Conservancy's Kern River Preserve, located along the South Fork Kern River (elev. 2640 feet) near Weldon, Kern County, California, comprises 1100 acres of the largest remaining example of cottonwood/willow riparian forest in California. Since 1986, 320 acres of formerly grazed pasture have been planted with Red Willow (*Salix laevigata*), Fremont's Cottonwood (*Populus fremontii*), and Mulefat (*Baccharis salicifolia*) as part of the preserve's riparian restoration program. The Kern River Research Center has been monitoring breeding birds on the restoration plots and in the natural forest since 1988.

On 28 May 1996, while surveying birds on the Kern River Preserve, Cooper located a female Lazuli Bunting (*Passerina amoena*) building a nest in a small Red Willow. Rowe checked the nest on 31 May and noted that it appeared finished. No adult bunting was seen in the area and the nest was not checked to determine the contents. On 5 June, Cooper noted the female Lazuli incubating two bunting eggs and a single Brown-headed Cowbird (*Molothrus ater*) egg. The cowbird egg was removed from the nest, shaken vigorously, and returned to the nest. While checking the nest Cooper observed a male Indigo Bunting (*P. cyanea*) singing ca. 15 m distant. The female Lazuli flushed from the nest and joined the male Indigo, both calling and flying quickly from tree to tree around the nest as Cooper approached. The male was all deep blue, as is typical of a pure adult male Indigo, and showed no evidence of being a hybrid Lazuli × Indigo. We visited the nest again on 12 June, when only one bunting egg and one cowbird egg remained. Visits on 23 and 25 June found the pair bringing food to a single nestling estimated six to seven days of age (on 25 June) on the basis of pinfeathers just breaking through the sheaths. No eggs remained in the nest. The nest was intact and showed no sign of disturbance but was inactive when Rowe returned on 29 June. With an incubation period of 11 to 13 days and a nestling period of 9 to 12 days (Payne 1992) and from the estimated age of the nestling on 25 June, the young bunting should have fledged between 26 and 29 June. Although the nest showed no evidence of depredation, we were not able to locate either the young or adults buntings on 29 June.

The nest was located on a 20-ha riparian restoration plot that was planted with cottonwood and Red Willow in 1992. Mean tree density on the plot was 268 trees per hectare; mean tree height was 5.5 m with a mean stem diameter of 11.9 cm. Mean canopy cover on the plot was 23%, mean brush cover was 4.3%, and mean forb cover was 54.1% (Kern River Research Center unpubl. data). The nest was placed 2 m above the ground in a fork of a horizontal branch in a young Red Willow approximately 4 m in height. The tree stands in a relatively open grassy area at the edge of the restoration plot among several dozen similar willows spaced ca. 4 m apart. This area differs from the rest of the restoration plot in that the trees are smaller and that there are few cottonwoods, except for several old (50–100 years) ones along the edge of the plot ca. 15 m distant. A heavily grazed pasture is located adjacent to the plot.

The Indigo Bunting has undergone a dramatic range expansion in the southwestern U.S. during the last 40 years (Johnson 1994). The first breeding record in the Southwest was in 1944 near Flagstaff, Arizona (Dearing and Dearing 1946). Indigo Buntings now breed locally in Utah, Arizona, and southern California (AOU 1983, Payne 1992). The first record of the Indigo Bunting in California was of a male collected at Mecca, Riverside County, in 1908 (Thompson 1964). By the 1950s only

a handful of records had been reported in the state. In more recent years, however, territorial males have been regularly reported throughout southern California. The first breeding record for California was of a male Indigo mated to a female Lazuli in Soledad Canyon in Los Angeles County in 1956 (Bleitz 1958). Even with the abundance of breeding-season records of territorial Indigos throughout California, very little has been published on nesting by the species in the state, and we were able to located records of only 15 instances of nesting by mixed or pure pairs (Table 1).

There is some uncertainty as to whether anthropogenic habitat changes have influenced the expansion of the Indigo Bunting into the southwestern U.S. Rosenberg et al. (1991) suggested that the species' invasion of the lower Colorado River valley is, in part, a result of human-induced habitat changes. They cited highest densities of Indigos in recently burned riparian areas where willow and salt cedar (*Tamarix*) have regenerated. Johnson (1994), however, suggested that the range expansion of the Indigo Bunting throughout the Southwest in unrelated to anthropogenic habitat alterations. He reasoned that the Indigo Bunting is using both undisturbed natural habitats as well as secondary growth caused by human activities, and that the habitat which Indigo Buntings currently use was available long before expansion into the region and was much more extensive.

Table 1 Reports of Indigo and Mixed Indigo × Lazuli Bunting Pairs Nesting in California

Year	Male/ Female[a]	Location	Source
1956	I/L	Soledad Canyon, Los Angeles Co.	Bleitz (1958)
1973	I/L	Spring Canyon, near Santee, San Diego Co.	Unitt (1984)
1977	I/?	N. of Needles, San Bernardino Co.	Rosenberg et al. (1991)
1979	I/L	Ukiah, Mendocino Co.	Am. Birds 33:895, 1979
1981	I/I	Morongo Valley, San Bernardino Co.	Am. Birds 35:980, 1981
1982	I/I	Morongo Valley, San Bernardino Co.	Am. Birds 36:1017, 1982
1984	I/?	San Luis Obispo, San Luis Obispo Co.	Am. Birds 38:1063, 1984
1984	I/L	Olema, Marin Co.	Shuford (1993)
1991	I/L	Lake Cuyamaca, San Diego Co.	Am. Birds 45:1162, 1991
1992	I/L	Cajon Pass, San Bernardino Co.	Am. Birds 46:1180, 1992
1992	I\X\L/L	Cajon Pass, San Bernardino Co.	Am. Birds 46:1180, 1992
1993	I/L	Fish Canyon, Angeles Natl. Forest, Los Angeles Co.	K. Campbell (pers. comm.)
1995	I/L	Goat Rock, Alameda Co.	Am. Birds 49:978, 1995
1995	I/L	Whittier, Los Angeles Co.	L. Schmahl (pers. comm.)
1996	I/L	Kern River Preserve, Kern Co.	this study

[a]I, Indigo Bunting; L, Lazuli Bunting.

With respect to California, we concur with Johnson's (1994) conclusion that anthropogenic habitat changes probably played little or no role in the range expansion of the Indigo Bunting. Given the extent of riparian habitat destruction in California during the past 100 years, it seems reasonable to assume that much less second-growth habitat suitable for Indigo Buntings occurs in the state than naturally occurred prior to large-scale human-induced habitat alterations. Although anthropogenic habitat changes certainly influence the distribution of Indigo Buntings on a local level, as on the lower Colorado River and in the Kern River Valley, it seems likely that the ultimate reasons behind the Indigo Bunting's range expansion are unrelated to human-caused habitat modifications.

In the Kern River Valley, the Indigo Bunting, along with a few Indigo × Lazuli hybrids, is an uncommon but regular summer resident, with as many as 20 singing males on territory between early May and mid-August. Highest densities of Indigos in the valley occur between the fluctuating eastern border of Isabella Reservoir and the town of Onyx. Although most territorial male Indigo Buntings in the Kern River Valley use young (<10 years old) riparian restoration sites on the Kern River Preserve or young (<15 years old) willow stands in the draw-down zone of Isabella Reservoir, some (perhaps 20% of the population) use mature cottonwood/willow riparian forest sites with little second-growth habitat. Although Kern River Research Center biologists conduct extensive annual surveys of riparian bird species, including nest searching, along the South Fork Kern River, few bunting nests are located. This is the first confirmed nesting of the Indigo Bunting in Kern County.

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