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HISTORICAL REVIEW OF ARIZONA'S NESTING NORTHERN HARRIERS, INCLUDING THE MOST RECENT CONFIRMED NESTING IN 1998

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The Northern Harrier (*Circus cyaneus*) is a widespread but locally distributed breeder in North America, ranging from Alaska across Canada to central Quebec and southern Newfoundland, south to Baja California, northern Texas, and Virginia (excluding many eastern states; MacWhirter and Bildstein 1996). It nests primarily in grassy marshes, both salt and fresh, wet prairie with tall grasses, in areas intermixed with woody growth, and also in agricultural areas (MacWhirter and Bildstein 1996, American Ornithologists' Union 1998). In the southwestern USA the species' breeding range includes the southern portions of Nevada, Utah, and Colorado and portions of California, New Mexico, and Texas. In northern Arizona its breeding is occasional or localized (MacWhirter and Bildstein 1996, AOU 1998). Here we summarize the few historical nesting records of Northern Harriers in Arizona since 1872 and report the first known nesting by the species in the state in more than a decade.

To determine the extent of Northern Harrier observations in Arizona, we reviewed museum records, historical accounts, and other publications, including the reports of the Arizona Bird Committee (Speich and Parker 1973, Speich and Witzeman 1975, Rosenberg and Witzeman 1998) and the seasonal summaries in *American Birds* and its permutations *Audubon Field Notes*, *Field Notes*, and *North American Birds* from 1947 to 1999. We contacted professional and competent lay persons with knowledge of the species in Arizona, especially those who may have reported harriers in the state during the breeding season. Nesting has yet to be confirmed for the Arizona Game and Fish Department's breeding-bird atlas survey efforts initiated in 1993 (T. Corman pers. comm.), and there are no harrier nesting records in the department's database. All Arizona harrier specimens on deposit in museums were collected during migration or wintering periods.

Northern Harriers are fairly common transients and winter visitants in Arizona; however, nesting records are rare (Phillips et al. 1964, Phillips 1968, Monson and Phillips 1981, Snyder 1998). The majority of the confirmed or suspected nestings we report correspond with the distribution map generated from breeding-bird survey results (Sauer et al. 1997). These include the northeast part of the state in the Little Colorado River valley of Navajo and Apache counties, southwest in the lower Colorado River valley of La Paz County, and in the extreme southeast in Cochise County. Rosenberg and Terrill (1986) listed the harrier as a possible nesting species for Apache County but made no specific references. Rosenberg et al. (1991) reported only two individuals in the breeding season along the lower Colorado River, near Topock, Mohave County, and near Blythe, Riverside County, California. Snyder (1998) suggested that harriers may nest "regularly but rarely" in northern and southeastern Arizona, but confirmation is difficult because of their ground-nesting habits. Although individual harriers have been observed during the breeding season, we have located only the following records of actual nesting.

The first reported Northern Harrier nest in Arizona (Bendire 1892) was near Laguna, 9 miles north of Tucson (Figure 1, locality 1), and contained two newly

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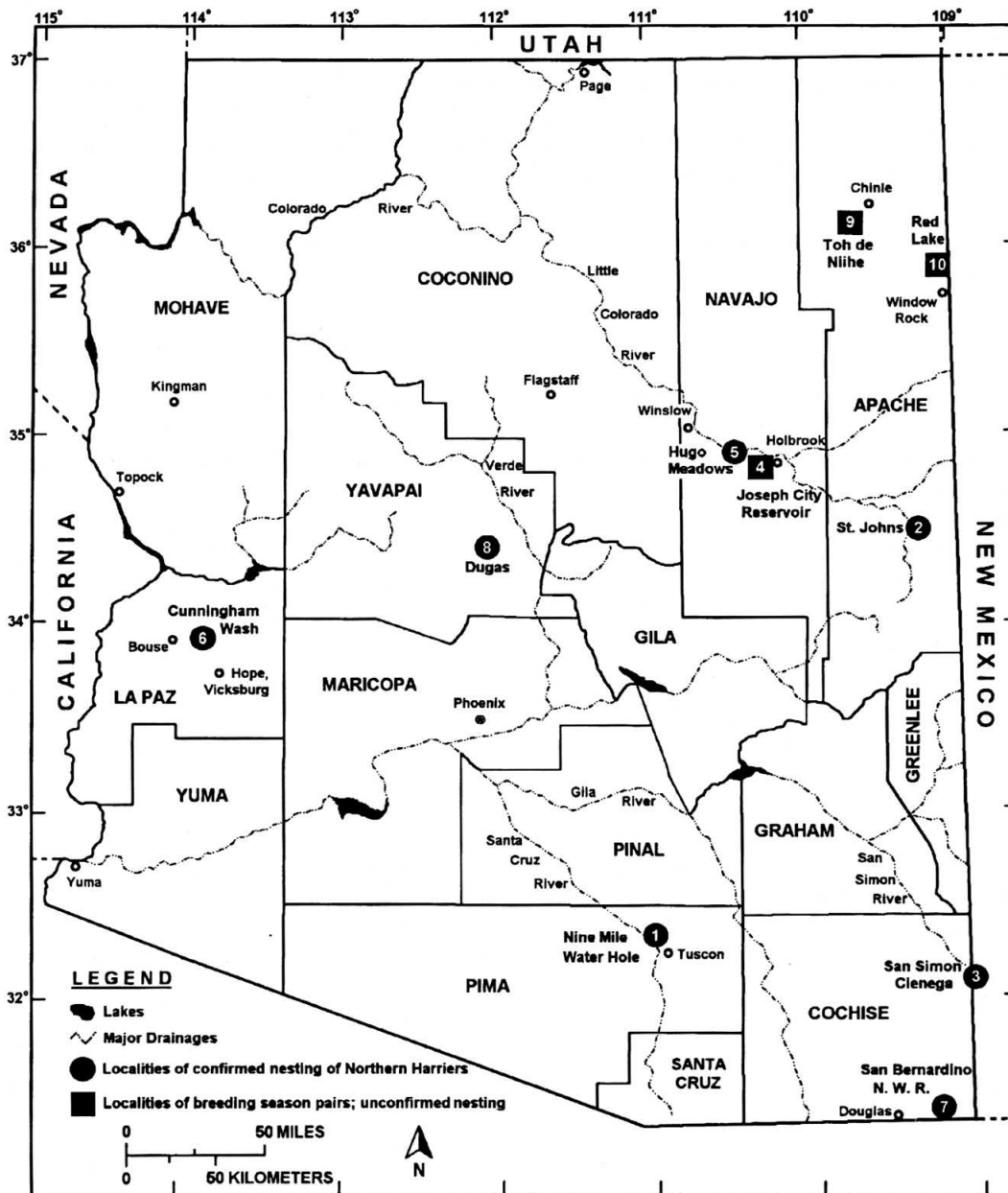


Figure 1. Localities of confirmed (circles) and suspected (squares) nesting Northern Harriers in and near Arizona, 1872–2000.

hatched young and a hatching egg. The “Laguna” near Tucson (not to be confused with Laguna near Yuma) was an old sink along the Santa Cruz River (Phillips et al. 1964) and is probably the same as the historic “Nine Mile Water Hole” near the confluence of Rillito Creek (J. Betancourt and J. Fonseca pers. comm.). Bendire (1892) also reported on other observations of harriers breeding in Arizona, including an account by J. Swinburne that the usual number of eggs in Arizona was two or three. Lacking any specific location, we map Swinburne’s record(s) at St. John’s (Figure 1, locality 2), given that he lived there and there is suitable habitat nearby along the Little Colorado River.

No other confirmed or suspected breeding Northern Harriers were described from Arizona until the latter half of the 20th century, although Ligon (1961) found two

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nests in New Mexico less than 2 km east of the Arizona border at San Simon Cienaga along the San Simon River in Hidalgo County on 6 June 1935 (Figure 1, locality 3). Nearly 30 years later, Phillips (1968) said that a “possibly” nesting harrier was seen in northeastern Arizona at the Joseph City reservoir (= Cholla Lake?), Little Colorado River valley, Navajo County (Figure 1, locality 4). While he gave no date for this record it was possibly some time between the publication of Phillips et al. (1964) and 1968. However, Monson and Phillips (1981) made no mention of this observation, and Monson (pers. comm.) has no knowledge of it.

The next report, also in Navajo County, came nearly a decade later when Witzeman et al. (1977) reported R. L. Todd’s having seen a male and female apparently throughout the summer in apparently suitable breeding habitat near Chevelon Creek, east of Winslow. Monson and Phillips (1981) reported this sighting as southeast of Winslow. Monson (pers. comm.) provided specifics from a letter to him by Todd on 7 October 1977: “At Arizona Game and Fish Department’s Chevelon Wildlife Area, we flushed a female harrier from the proximity of a male Greenwing Teal (*Anas crecca*) carcass (which we didn’t discover until the next day) on June 27, 1977. Then on the following morning, approximately a mile to the east over Hugo Meadows [Figure 1, locality 5], a male harrier flew over and coursed about at (what seemed to me) rather high altitude (for a harrier) for a minute or two. Both sexes were not seen on the same day or at the same exact site. This was the extent of our observations. Wildlife Manager Ken Clay (stationed at Winslow) later told us that seemingly paired Marsh Hawks could be found ‘all summer’ at most of the wetter meadows along the Little Colorado River in that region.”

Millsap (1981) located a nest with three eggs on Cunningham Wash (Figure 1, locality 6) northwest of Hope (Hope is 3 and 35 km southeast of Vicksburg and Bouse, respectively). Some confusion as to the precise location has persisted (Monson and Phillips 1981, Rosenberg and Witzeman 1998). Millsap described the nest site as follows: “Eggs were deposited on a mat of red brome (*Bromus rubens*) near the edge of a large stand (2 ha) of big galleta (*Hilaria rigida*) and Johnson grass (*Sorghum halapense*) surrounded by creosote bush (*Larrea tridentata*) and white bursage (*Ambrosia dumosa*).” He also noted that the nest site was near a communal winter roost site used by Northern Harriers along Cunningham Wash. Rosenberg et al. (1980) went on to say, “Ironically, this nest was bulldozed, before any young fledged, by Central Arizona Project workers attempting to create a lake as mitigation for loss of wildlife habitat!” Also in 1981, on 12 June, R. L. Todd encountered a male Northern Harrier during the breeding season near St. John’s in Apache County—Swinburne’s location (Rosenberg et al. 1981).

Witzeman and Stejskal (1985) reported A. Moorehouse’s account of a failed nesting attempt by Northern Harriers at San Bernardino Ranch from 25 May to 27 June 1985. The ranch is located along the Mexican border on San Bernardino National Wildlife Refuge east of Douglas in Cochise County (Figure 1, locality 7). Moorehouse (pers. comm.) described the habitat as “a seasonally wet swale (then dry) overgrown with annual and perennial herbaceous plants including grasses intermixed with scrubby woody vegetation.” Two years later, on 18 June 1987, a male harrier was seen in the same area (Witzeman and Stejskal 1987). Also during 1985, a pair spent the summer at Moaning Lake (also known as Toh De Niihe) in the Navajo Nation, west of Chinle near Cottonwood Wash, Apache County (Jacobs 1986). We consider this a probable breeding record because the pair was present throughout the breeding season, even though nesting was not confirmed (Figure 1, locality 9). Several older nestlings were brought to the Arizona Game and Fish Department’s Adobe Mountain Wildlife Center during the mid-1980s (no specific date available; Snyder 1998, R. Glinski pers. comm.). Apparently their nest, in an agricultural field near Dugas, Yavapai County (Figure 1, locality 8), was destroyed during a crop harvest.

On 24 March 1998, Mikesic twice flushed a female harrier from dense vegetation

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in Hugo Meadows (34° 56' 22" N, 110° 30' 01" W, elevation 1498 m), near the confluence of the Little Colorado River and Chevelon Creek, 17.5 km southeast of Winslow, Navajo County—the same area where Todd observed harriers during the breeding season in 1977 (Figure 1, locality 5). This 190-ha alkaline meadow is vegetated primarily with saltgrass (*Distichlis spicata*), iodine bush (*Allenrolfea occidentalis*), and the nonnative camel thorn (*Alhagi maurorum* = *A. camelorum*). A strand of spring-fed and perennially wet marsh, primarily of dense bulrush, 20 to 40 m wide, and over 200 m long, winds through the meadow. The second time the female flushed, she flew north about 200 m and was joined by an adult male, which promptly dropped prey to her. She fed on the ground, then returned within 5 minutes to the same area of the marsh from which she had arisen. Observations were suspended to preclude disturbing the potential nesting site and risking nest abandonment.

Upon returning to the area at 14:00 on 5 May 1998, Mikesic observed the female harrier land in the same bulrush stand. Approaching the strand, he flushed the incubating female from a nest containing five eggs. The nest was 61 cm in diameter and composed entirely of woven bulrush. It was exposed from above but set in the surrounding vegetation so that it was undetectable from a distance >3 m. Photographs were quickly taken, and the female returned to the nest within 10 minutes. No attempt was made to determine the fate of the nesting attempt. Photographs of this nest and surrounding habitat were deposited in the archives of the Navajo Natural Heritage Program, Window Rock, Arizona, and at University of Arizona, Tucson.

The meadow and bulrush strand at this site provides suitable nesting habitat for harriers. Although Northern Harriers had been previously observed foraging at Hugo Meadows on numerous occasions (mostly September through March) and suspected of nesting, breeding had not been confirmed. This 1998 nesting confirmation gives credence to the suspected nesting reported for the area by Todd in 1977.

Mikesic investigated a pair of harriers on 21 June 2000 at Red Lake (Figure 1, locality 10) in the Navajo Nation (on the Arizona–New Mexico state line, 25 km north of Window Rock). The female landed in, and remained for at least 30 minutes within, a 10-ha stand of bulrush (*Scirpus americanus*) at the lake's north end; however, a nest was not located. On 9 June 2000, he located a harrier nest with four eggs in San Juan County, New Mexico, 93 km northeast of Red Lake; this nest was on bare ground within a fallow agricultural field vegetated solely with Russian thistle (*Salsola iberica*).

Further investigation in Arizona may show nesting by harriers to be more common than the current records reveal. Rosenberg et al. (1980) suggested that "late spring harriers should be watched more closely, as they may occasionally breed." Also interesting is Millsap's (1981) finding his nest close to a communal wintering site, a possible guide to nesting harriers. The winter of 1979–1980 was wetter than average and undoubtedly produced an abundant growth in the grasses of the area and perhaps prey. This along with the communal roost may have stimulated nesting in such an arid area.

Nesting by Northern Harriers in Arizona may be opportunistic. Craighead and Craighead (1969) mentioned that migration enables raptors to adjust their numbers to those of their prey. They demonstrated that, in winter, the great mobility of raptors allows them to concentrate from distant areas to take advantage of dense prey populations, although the birds' breeding densities do not vary from year to year. Newton (1979) found that during the breeding season raptors settle in an area partly on the basis of sufficient food supply, partly on the basis of other raptors already there. We suspect that vegetation densities, and small-rodent populations, were higher than normal in 1998 because of above-average precipitation induced by El Niño. Thus, we suspect that nesting by harriers in Arizona may result from their remaining to take advantage of elevated prey densities encountered during winter or spring migration.

The harrier was probably more common and widespread as a breeding species in

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Arizona in the past. Much of the wetland formerly available has been lost, degraded, or fragmented through various human activities. With some exceptions, the marshes and backwater lakes historically associated with the Salt, Verde, Gila, San Pedro, Santa Cruz, San Simon, Colorado rivers have disappeared (Minckley and Brown 1982, Brown 1985). The 1872 site described by Bendire (1892) no longer exists. Wetlands in northern Arizona between Joseph City and Winslow, including the Hugo Meadows area, are diminishing (Brown 1985). On the other hand, artificial wetlands like farm and stock ponds, sewage-treatment ponds and recharge basins, cooling ponds at power plants, and irrigated fields may provide new habitat for nesting harriers. The lower Colorado River between Topock and Yuma is another area with potential to support nesting harriers, with the creation of lakes and marshes in the area's national wildlife refuges. Although there have been no reports of harrier nests in this region, nesting efforts could go undetected because of the difficult access of some of these sites and the difficulty of locating nests.

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