

## EXPANSION OF GREAT BLUE HERON AND DOUBLE-CRESTED CORMORANT BREEDING LOCATIONS IN RIO ARRIBA COUNTY, NEW MEXICO

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**Abstract**—Through 2006 there were only two records of nesting by Great Blue Herons (*Ardea herodias*) in Rio Arriba County in the 93 years after a 1913 report of a rookery. Between 2006 and 2018 the number of occupied rookeries increased from one to five, and in 2018, 30 occupied Great Blue Heron nests in five rookeries contained a minimum of 47 fledgling-sized nestlings. Incidental to heron monitoring, we also encountered two new county locations for nesting Double-crested Cormorants (*Phalacrocorax auritus*). Increased heron breeding in Rio Arriba County paralleled an ongoing population expansion in adjacent southwestern Colorado.

Great Blue Herons (*Ardea herodias*) are widespread residents of North America, breeding in every state except non-continental Hawaii (Vennesland and Butler 2011). Throughout published New Mexico ornithological history, authors have reported scattered breeding colonies along the Gila River in the southwest, the Pecos and Canadian rivers in the east, and the southern Rio Grande, but little from the northwest corner of the state (Bailey 1928, Ligon 1961, Hubbard 1978). The one historical breeding site in northwestern New Mexico in the early 1900s was in Rio Arriba County. Bailey (1928) wrote that “about 25 birds were noted July 20, 1913 at Burford (Stinking) Lake, 7,500 feet, most of them young birds that had been reared in trees along the lake shore.” Ligon (1961) observed “small rookeries” in several locations, including “in the Burford Lake area” but with no dates. It was likely that Ligon’s observation was similarly timed to Bailey’s observation, and before Wetmore’s 1918 visit, because Wetmore only observed two migrants and didn’t mention trees or nests (Wetmore 1920. Huey and Travis (1961) only saw two “summer wanderers” at Stinking Lake in 1960, but saw downed cottonwood (*Populus* sp.) along its shores. By 1987, when we began a decade of nesting bird surveys at this location (Stahlecker 1990), there was no evidence that trees had once lined any part of the shallow lake. There was a single report of four Great Blue Heron nests in the Canjilon Arm of Abiquiu Reservoir in June 1987 (Rustay in Cavitt et al. 2014); otherwise, this rookery has consistently been used by Double-crested Cormorants (*Phalacrocorax auritus*). Therefore, by 2006, there had been only the two breeding observations for Great Blue Herons in Rio Arriba County in the 93 years after the 1913 report of a substantial Stinking Lake rookery.

Similarly, Double-crested Cormorant breeding colonies were first documented on Elephant Butte Reservoir on the Rio Grande (Ligon 1961), with more prominent expansion into the Pecos drainage (Hubbard 1978), than northward along the Rio Grande. The one historical cormorant colony in Rio Arriba County in the Canjilon Arm of Abiquiu Reservoir was apparently not yet occupied in 1978 (Hubbard 1978), but it has been continually occupied since at least 1980 (Cavitt et al. 2014). While we have regularly seen Double-crested Cormorants in summer in northern Rio Arriba County, there were no other documented breeding sites in Rio Arriba or San Juan counties of northern New Mexico (Cavitt et al. 2014).

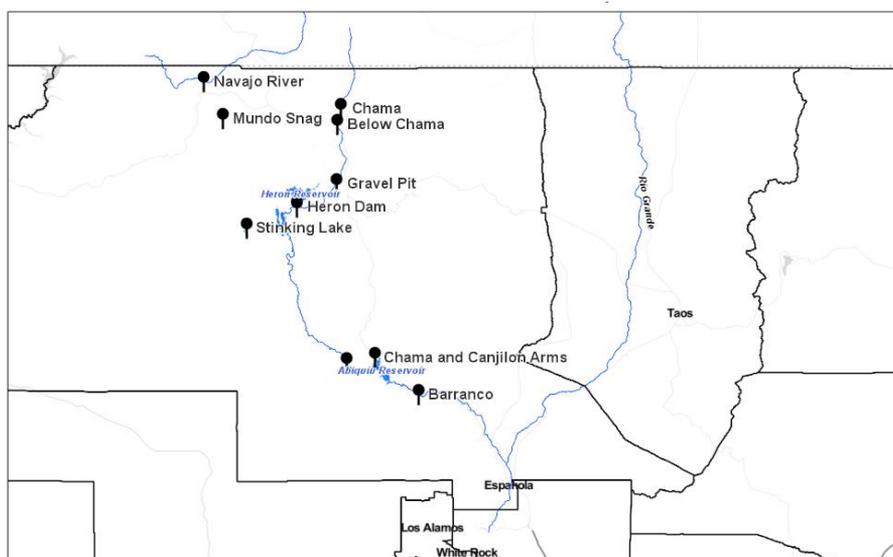
## METHODS

**Summary of Search Effort.** Great Blue Herons and Double-crested Cormorants, primarily piscivorous, are most likely to nest in trees near water. In the western U.S., nests are usually high in large deciduous cottonwoods along streams or lakes, though evergreen conifers and firs are also utilized as Great Blue Heron rookery sites (Vennesland and Butler 2011). Thus, breeding efforts by these species would most likely be encountered along the Rio Chama between Colorado and its confluence with the Rio Grande (110 km, excluding reservoirs), the Rio Grande between the Taos County line and Espanola (35 km), the Navajo River north of Dulce (25 km), and backwaters of major reservoirs (Heron, El Vado, and Abiquiu) and smaller lakes, mostly on the Jicarilla Apache Nation (Figure 1). Starting in 1981 and continuing through 2017, DWS spent hundreds of hours in the field throughout Rio Arriba County. JSP, an astute bird observer, was a resident of Barranco, adjacent to the Rio Chama in southern Rio Arriba County, from 1977 to 2018. WHH's field time in Rio Arriba County was largely restricted to annual participation in the Migration Day Count on the second Saturday of May 2007–2013.

Where public roads allowed viewing of riverside trees, they were scanned most breeding seasons, often in search of raptor nests, but rookeries were also likely to be noticed. Importantly, road views likely did not give complete coverage because of distances from trees and view angles. Fortunately, most reaches of the Rio Chama and Rio Grande (within Rio Arriba County) were canoed at least once between 1988 and 2018 during the breeding season, though some were paddled many times and some may only have been paddled once. Note, however, that a concerted search for rookeries of either species was not undertaken in a purposeful or systematic manner until 2018. Despite the inconsistencies in coverage, we believe that rookeries are so obvious that where we did search during the 30 years, that rookeries most likely were not present or they would have been documented.

**Great Blue Heron Rookery Locations and Histories.** Our first documented Great Blue Heron rookery of three nests was on the Navajo River on 2 April 2006. In 2017, we found 23 occupied Great Blue Heron nests in five different locations and counted a minimum of 33 fledging-sized nestlings. In 2018 we found 30 occupied Great Blue

Heron nests in the same five rookeries and counted a minimum of 47 fledgling-sized nestlings. While these two censuses document an established breeding population, three of eight rookeries found since 2006 were later abandoned. We provide herein summaries of documented locations for herons (Fig. 1) and the known nesting effort for the period 2006–2018 within the county. Nesting colonial waterbirds are susceptible to nest failures or reduced reproduction by human disturbance (Skagen et al. 2001); we urge birders and photographers to view these rookeries from a safe distance (> 300 m) and from public roads. Almost all rookeries were on private or tribal lands, requiring permission for access. One was on New Mexico Department of Game and Fish lands with visitation rules.



**Figure 1.** Rio Arriba County, New Mexico, historical colonial waterbird rookeries (Stinking Lake and Canjilon Arm, Abiquiu Reservoir) and more recent rookeries documented between 2006 and 2018.

## RESULTS

**Navajo River/Jicarilla Nation.** This rookery of three nests was discovered on 2 April 2006 and fledged two young/nest. Two pairs nested successfully in 2007 (four fledglings), one pair in 2008 (two fledglings). The rookery was vacant, though annually checked, through the remainder of the observation period.

**Below Chama.** We found two heron nests on 4 April 2007 in a cottonwood along the Rio Chama just below the town of Chama by canoeing down the river. Two nests were again occupied in 2008 and viewable with difficulty from public roads. Further use

of this rookery was not documented, but it may well have fallen into disuse with the establishment of the larger rookery within the town of Chama. The river reach from Chama to NM Highway 95 was not canoed again, but it was checked by spotting scope before leaf-out in 2018 and no rookeries were found.

**Chama.** We were told of this rookery by others in 2009. Most nests were apparently on the back side of trees visible from public roads. We found 13 occupied nests in 2011, at least five in 2013, and at least four in 2017. At least five nests had incubating herons on 17 April 2018, four had adults standing over unseen young on 11 May, and the only one visible through the leaves on 17 June had 3 near-fledging young. We assume this rookery was occupied in interim years as adults were counted there during each year's Migration Day Count, but inventories of nests were not made.

**Chama Arm, Abiquiu Reservoir.** One occupied nest was recorded here in 2012. The site was not revisited until 2017, when no evidence of a nest was found. The river reach from El Vado Dam to about 5 km above the reservoir was canoed almost annually, including in 2017 and 2018. No evidence of nesting in Chama Canyon (32 km) or below the Monastery of Christ in the Desert (14 km) was ever encountered.

**Heron Dam.** We discovered this rookery surrounding an Osprey (*Pandion haliaetus*) nest in 2016 on a coniferous slope on the south side of the Chama River. At least eight nests were occupied. On 1 July 2017, 13 of 15 nests contained at least 26 nearly full grown young. In 2018, 12 of 18 nests had incubating adults on 17 April. On 17 June there were seven empty nests, five nests with three young each, one nest with one young, and three nests with standing adults. It is possible this rookery was occupied before 2016, but the viewing distance combined with an incomplete record of when it was visually searched leaves uncertainty as to when it became established.

**Mundo Lake/Jicarilla Nation.** A ponderosa pine (*Pinus ponderosa*) snag within the lake provided a great perch for piscivorous birds for the entire survey period. There were no nests in the tree from 1983 to 2016, nor in early April 2017, but two herons were incubating on 13 May 2017. One pair had three large young on 28 June; the other nest then contained a brooding Double-crested Cormorant. The young herons had fledged and two cormorant nestlings were full-size on 23 July 2017. Three nests were being incubated by adult herons on 12 May 2018, and five fledgling-sized young were counted in two of the nests, while an adult was incubating/brooding in the third nest on 29 June. A cormorant was also perched at the top of the snag, but there appeared to be no location to place another nest on the few remaining limbs.

**Barranco.** This rookery of two nests was discovered 13 May 2017 and fledged two young from each nest. In 2018 we followed the nesting cycle of four nests, which each fledged two young. Additionally, on 23 June at least four Double-crested Cormorant nests were visible lower in the tree. This river reach was canoed last in 1996, but JSP lives nearby and we are certain the rookery was established in 2017.

**Tierra Amarilla Gravel Pit.** Two of four nests were occupied when this rookery was discovered on 9 April 2017. The empty nests suggest occupancy prior to 2017. In 2018, four of five nests were actively being incubated on 17 April, and on 17 June all five nests had near-fledging young, totaling 14 young herons. This river reach from NM Highway

95 bridge to El Vado Reservoir was paddled 11 times during the survey period. The last was in 2012, and neither this nor the Heron Dam rookery were noted, though the latter could have been missed from river level.

**Other River Reaches.** On 1 May 2018 we canoed 32 km of the Rio Chama from Abiquiu to the U.S. 285 bridge near Chili and saw only one heron and found no rookeries. An 8 km section of the Rio Grande above its confluence with Rio Chama was canoed annually from 2005 to 2014. The 11 km Rio Grande reach from the Taos County line downriver was last canoed in 2015. Six km from Velarde to Lyden were canoed on 19 May 2018 and no rookeries were found.

## DISCUSSION

We recognize that our survey effort over the 30 years summarized herein was inconsistent. But we also believe that, given our continued presence during the breeding season in Rio Arriba County 1988–2018, and also given the senior author’s interest in birds nesting in large stick structures in trees and on cliffs, that the expansion of Great Blue Heron nesting colonies in Rio Arriba County in the past decade was reasonably well documented.

The most recent published survey of colonial waterbirds in the Southern and Middle Rio Grande Valleys did not find nesting Great Blue Herons much farther north than Quates Marsh, Socorro County, near the north end of the Elephant Butte flood pool; the aerial survey effort also included the Rio Grande as far north as Albuquerque (Stahlecker 2009). Though pioneering herons could have come up the Rio Grande after that survey, possibly also establishing intermediate rookeries unknown to us (but perhaps known to others), we believe it is more likely that colonization of Rio Arriba County came from the north rather than the south. As late as 1979–1983, Great Blue Heron breeding in Colorado occurred mostly in its northeastern quarter, with 69% of 1604 nests recorded there, though 29% of all Colorado nests during that period were in Gunnison and Delta Counties in western Colorado (Miller and Graul 1987). During Colorado’s first Breeding Bird Atlas effort (1987–1995), Great Blue Herons were reported as possibly breeding in extreme southwestern Colorado (Dexter 1998), but with no nests recorded in priority blocks there. During the recent Atlas effort (2007–2012), breeding doubled in priority blocks (tripled if including non-priority blocks) and was confirmed in 17 blocks in southwestern Colorado (Brown and Dexter 2016). Meanwhile, Great Blue Herons bred at Morgan Lake, San Juan County from 2004 to 2011 and near Bloomfield in 2011 (Cavitt et al. 2014). We believe, but cannot substantiate, that the expanding Colorado population likely also expanded into suitable but vacant habitat in northern New Mexico.

Double-crested Cormorants have nested at Abiquiu Reservoir since 1980 (Cavitt et al. 2014). However, there are no other published breeding locations in San Juan and Rio Arriba counties (Cavitt et al. 2014) for this species. There were no confirmed southern Colorado breeding locations for this species during Colorado Atlases I (Potter 1998) or II (Brown and Potter 2016); the Mundo Lake nesting pair in 2017 were the first breeding

range extension in northwestern New Mexico since 1980. Further, snag loss in Abiquiu Reservoir has diminished the availability of nest sites there: on 22 June 2018 we saw only eight occupied nests. The new colony of cormorants near Baranca could be an alternative to this long-term nesting colony. For this species, it is possible that nests in the lower canopy could easily be missed by our raptor nest search image, meaning that expansion could have begun earlier and still undocumented cormorant colonies might exist in Rio Arriba County.

We and others will likely continue to follow breeding efforts at these newly described colony locations. Similarly, while the Morgan Lake rookery has been well documented, the San Juan and Animas rivers in San Juan County should be searched to further document expansion of Great Blue Heron nesting on those rivers. There could be more rookeries on these rivers than the lone report near Bloomfield in 2011 (Newman in Cavitt et al. 2014). At least one heron rookery on the San Juan River below Shiprock on the Navajo Nation has been seen (C. Smith, in litt.).

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