

Florida Field Naturalist

PUBLISHED BY THE FLORIDA ORNITHOLOGICAL SOCIETY

VOL. 29, No. 2

JUNE 2001

PAGES 41-74

Florida Field Naturalist 29(2):41-46, 2001.

A REVIEW OF THE BREEDING STATUS OF THE SHORT-TAILED HAWK IN THE LAKE ISTOKPOGA REGION, HIGHLANDS COUNTY, FLORIDA

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Abstract.—The Lake Istokpoga region, including Istokpoga Creek, had the largest breeding concentration of the rare Short-tailed Hawk (*Buteo brachyurus*) documented at any historical locality in Florida. We reviewed this breeding information from the 1910s-1920s. Recent surveys revealed that breeding birds only were present north of Lake Istokpoga along Arbuckle Creek, where nesting was confirmed in 1996 (and subsequently). Non-breeding birds, however, were present during the spring and summer to the south and east of the lake, especially along or near Istokpoga Creek (now Canal) that connects the lake to the Kissimmee River. We argue that restoration of mature swamp forest in the Lake Istokpoga region should be concentrated along and near Istokpoga Canal, where Short-tailed Hawks in the future may become reestablished as breeding birds in this historical area.

The Short-tailed Hawk (*Buteo brachyurus*), listed as rare by the Florida Committee on Rare and Endangered Plants and Animals (Mill-sap et al. 1996), has not had many historical nest sites documented and described. Ogden (1974) discovered seven nests and listed only 13 found previously in Florida. Stevenson and Anderson (1994; archives of Tall Timbers Research Station) stated about 24 egg sets were in museum collections. However, this total included six egg sets of the Red-shouldered Hawk (*B. lineatus*) from 1928-1929 (including Western Foundation of Vertebrate Zoology 82277; Stevenson and Anderson 1994) that C. E. Doe claimed were egg sets of the Short-tailed Hawk from Highlands County (T. Webber, *in litt.*). Reliable information on

Short-tailed Hawks in Highlands County included the discovery of four nests by Brandt (1924) and Nicholson (1951) in baldcypress (*Taxodium distichum*) swamps at Lake Istokpoga and along Istokpoga Creek in 1910 and 1923, the largest concentration documented at any historical locality in Florida.

Lake Istokpoga was surrounded by extensive baldcypress swamp (formerly one of the largest in the interior of Florida) and swamp forest dominated by several other species, primarily located to the south and east of the lake (Brandt 1924). These forests were almost entirely eliminated by timber operations, canal construction, and agriculture. Examination of aerial photographs from the U.S.D.A. Agriculture Stabilization and Conservation Service, Highlands County, indicated most forest clearing occurred from the late 1940s to the early 1960s, with smaller areas cleared as late as the 1970s. Istokpoga Canal was dredged just south of the creek in 1948 and the water control structure put in place in 1949. By the 1950s, the course of the creek is less definite in aerial photos and by the 1970s the creek is invisible. Diversion of water to the canal was likely responsible for the loss of baldcypress and other riparian vegetation along Istokpoga Creek and the eventual obliteration of the creek. Based on this habitat loss, including apparent loss of historic nest sites, and information in Ogden (1988) and Millsap et al. (1996), we infer that breeding Short-tailed Hawks are rare around or near Lake Istokpoga apart from the north shore near the mouth of Arbuckle Creek (which contains the largest extant swamp forest in the area).

M. A. McMillian sampled the avifauna on and around Lake Istokpoga over the last ten years, intensively over the last two. D. B. McNair sampled Istokpoga Canal for seven days from mid-March to mid-April 2000 to accord with the timing of Nicholson's trip to the area (see below). K. D. Meyer has conducted a detailed study of Short-tailed Hawks in Florida since 1998, including the Lake Istokpoga region. We compare our results to historical information to examine the suggestion of Millsap et al. (1996) that breeding Short-tailed Hawks are probably absent from the area except north of Lake Istokpoga along Arbuckle Creek. In addition, because information on historical nest sites of Short-tailed Hawks is scarce (although see Brandt 1924, Bent 1937), we provide documentation for the three nests discovered by Donald John Nicholson in 1910 and more information associated with Brandt's activities in the 1920s.

Nicholson visited Lake Istokpoga and Istokpoga Creek from 10 March to 18 April 1910 (Howell 1932; pers. exam. of unpublished journal) when he was 17 years old. Much later (Nicholson 1951), he published a note that documented three nests of Short-tailed Hawk that he found on this trip. Earlier, Brandt (1924) cited data for two of these nests, using information taken from a dated entry (12 April) in an un-

published journal of Nicholson's, and Bent (1937) cited Brandt's paper. Only a portion of this journal (from 27 March to 18 April) is extant, but it contains substantial unpublished information about the Short-tailed Hawks and clarifies errors and discrepancies in the above accounts. In addition, we located information from Nicholson's unpublished field notes, which are archived at the Florida Museum of Natural History and Archbold Biological Station. The new breeding information did not include specific collecting localities.

(1) South of Istokpoga Creek, along the shore of Lake Istokpoga. Nicholson (1951) stated he shot a light-morph female on 18 April 1910 at a completed but empty nest that he had staked out for three weeks. His field notes state he left his camp on 18 April, and shot the female on 2 April, probably along the shore of Lake Istokpoga one-half mile south (= west) of the creek (Nicholson 1951; cf., Brandt 1924, Howell 1932). His journals provide no description of the nest or nest-site except that he shot the bird in a "cypress"; the description in Nicholson (1951) may refer to another nest. Dissection of the bird revealed that the adult would have laid eggs within 1-2 days. This specimen was destroyed (burned) along with several others of Nicholson's most valuable specimens in 1915 when Nicholson was away from home.

(2) South of Istokpoga Creek, along the shore of Lake Istokpoga. Nicholson found a nest on 4 April, somewhere within 15 km south (= west) of Istokpoga Creek, probably within 3.5 km of the creek mouth. Nicholson revisited the site on 12 April, when one dark morph adult was at the nest (see Brandt 1924). This nest was about 15 m up among the upper-most branches of a "cypress" (*contra* Nicholson 1951). The nest was built of baldcypress twigs and moss and lined with leaves and moss, which Nicholson (1951) mistakenly attributed to another nest. The nest contained two downy white young about one week old. Nicholson took these young back to his camp near the mouth of Istokpoga Creek but lost both birds before returning home.

(3) Along Istokpoga Creek, probably about one-quarter mile from the mouth since Nicholson heard nocturnal vocalizations of an adult Short-tailed Hawk (pertaining to this breeding pair) from his camp; Nicholson (1951) states the nest was three-quarter mile away from his camp. He reported a light-morph adult in the area as early as 10 March (Nicholson 1951), yet his journal indicates he first discovered this bird on 10 April. Nicholson found the nest in a vine-covered baldcypress overhanging the creek on 11 April. The nest was 9 m up on the extreme outermost branches of a large limb. The nest was built of sticks and moss and lined with green oak and gum leaves and green baldcypress boughs, which Nicholson (1951) mistakenly attributed to another nest (see Brandt 1924). On 12 April, Nicholson collected the two eggs which had been incubated 18-20 days although he dropped and broke one of the eggs on

14 April. Nicholson traded the remaining egg in 1910 or 1911 to W. Raine of Toronto, Canada, but we have been unable to locate this egg (see Houston 1981 for information on disposal of the Raine collection).

Brandt (1924) found his Short-tailed Hawk nest with two eggs (Carnegie Museum 5041) in the baldcypress swamp near the mouth of Istokpoga Creek and about 300 m from the lake. A. H. Howell, who was with Brandt, collected one dark-morph adult (sex unknown; United States National Museum 298211), a tail-only specimen. Later in the 1920s, A. H. Hardisty (an associate of Brandt) collected three more egg sets of Short-tailed Hawks at Lake Istokpoga. We have been unable to locate these sets, but the description in Nicholson's notebook is consistent with Short-tailed, not Red-shouldered hawks. Furthermore, A. H. Hardisty collected an adult light-morph Short-tailed Hawk of unknown sex (Museum of Comparative Zoology 328550) at "Istokpoga Creek, Istokpoga Lake" on 25 March 1928. This specimen, which is now at the National Museum of Natural History (USNM 291403), is a trunk skeleton with humeri and tibiae (J. Dean, *in litt.*).

In 1996, McMillian discovered one pair of dark-morph Short-tailed Hawks breeding along Arbuckle Creek just north of Lake Istokpoga and again at another nest in the same area in 1997. From 1998-2000, Meyer and associates located and studied three nesting attempts in the area discovered by McMillian. Each of these five nests fledged two young, three of which were fitted with radio transmitters by Meyer and associates. Two adults (male in 1999, female in 2000) also were tagged. All were dark-morph birds. The male tagged in 1999 was replaced by an unmarked dark-morph male in 2000; a light-morph interloper briefly occupied the nest area that year. The forest tract along the creek is a mixed old-growth, second-growth baldcypress stand, about 1.6 km long and 200 m wide except where the birds nest where the width of the tract expands to about 0.8 km. Other dominant trees in the mixed stand include red maple (*Acer rubrum*) and sweetbay (*Magnolia virginiana*). The understory is very open. Nests have always been placed high (≥ 25 m) in baldcypress trees in the mixed old-growth stand; the nest trees in 1996-1997 were 125-150 m from the creek. This forest tract is inundated by water during the nesting season except under drought conditions.

In 2000, McNair discovered single adult dark-morph birds hunting in loose association with Black (*Coragyps atratus*) and Turkey (*Cathartes aura*) vultures (cf., Brandt 1924) at distinctive ecotonal sites along or near Istokpoga Canal on 14 March and 30 March. The two sites were located approximately 5 km apart. More importantly, the three dark-morph juveniles tagged at nests at Arbuckle Creek consistently occupied the area east and south of the lake from March to August (K. Meyer, unpubl.). Radio locations ranged from Istokpoga Canal

southwest to the southern tip of the lake and east to the Kissimmee River. In addition, the two tagged breeding adults from Arbuckle Creek also used this area, but only after their young had left the nest area and prior to autumn migration (K. Meyer, unpubl.).

The observations reported by McMillian and Meyer confirm the suggestion of Millsap et al. (1996) that Short-tailed Hawks nest along Arbuckle Creek near Lake Istokpoga. McMillian has assiduously searched for nesting Short-tailed Hawks at other potential forest tracts around or near the lake but has not found other breeding pairs. K. Meyer (unpubl.) also has never observed breeding Short-tailed Hawks in this area except at Arbuckle Creek. During the breeding season, this species requires mature baldcypresses or other tall trees (e.g., magnolia; Brandt 1924) in swamp forests (and several other habitat types; see Ogden 1988, Millsap et al. 1996) in which to place their nests. Mature baldcypresses remain along sections of the lakeshore, especially the south and east sides and about three-quarter mile from the lake along the only backwater slough with large trees (baldcypresses with dbh of 1 m) that empties into Istokpoga Canal. The size of this forest tract has remained about 0.4×0.4 km since at least 1970. However, agricultural development and suburbanization of the lakeshore have reduced the width of baldcypress stands and other riparian vegetation to a narrow corridor that rarely measures over 50 m wide. Nesting Short-tailed Hawks may require relatively large woodlands (Ogden 1974, 1988; Millsap et al. 1996), at least in landscapes around Lake Istokpoga, although they may select rather small stands within heterogeneous and relatively open landscapes, but these areas are located near larger forest tracts (K. Meyer and T. Dellinger, pers. comm.). Regardless, nesting habitat varies and the constitution and scale of critical habitat components are currently being investigated (K. Meyer, unpubl.).

The five tagged birds from March to August in the same areas along or near Istokpoga Canal, as well as our discovery of single birds at two sites in mid-to-late March, is clear evidence that these habitats are suitable for foraging by Short-tailed Hawks. The birds were not breeding along the small backwater slough that empties into Istokpoga Canal, nor in 50-year old baldcypresses or other trees that formed a narrow broken corridor along the canal, nor in nearby woodlands including a blackgum swamp. The three tagged immature hawks may have been on their home or activity range which may have a diameter as large as 2.5 km (Fish-eating Creek; Ogden 1974), but the data clearly document that the presence of birds during spring and early summer cannot be assumed to be breeders. Nonetheless, Short-tailed Hawks are somewhat resilient (cf., Millsap et al. 1996) in their ability to adjust to massive land-use changes that have occurred along or near Istokpoga Creek (now Canal).

D. J. Nicholson would not find breeding Short-tailed Hawks today in the areas he originally discovered them in 1910, but the presence of non-breeding birds foraging along or near Istokpoga Canal suggests that habitat maturation coupled with restoration efforts could allow this species to reestablish itself as a breeder in this historical area if no further degradation occurs. Modern scientific data obtained by radio-tagging birds coupled with breeding information obtained much earlier by Nicholson and several other individuals clearly suggests that this historical area should be the focus of restoration efforts around Lake Istokpoga. In the future, forested drainages apart from Arbuckle Creek on the northern shore may contain breeding Short-tailed Hawks.

ACKNOWLEDGMENTS

We thank R. Corado of the Western Foundation of Vertebrate Zoology (WVZ) for locating and sending us a copy of the incomplete journal of D. J. Nicholson's trip to Lake Istokpoga in 1910. We have deposited copies of this journal at the Florida Museum of Natural History (FMNH) and Archbold Biological Station. We thank T. Webber, Collections Manager at the FMNH, for allowing access to copies of the field notes and journals of D. J. Nicholson and his brother W. H. Nicholson which are the property of the FOS; the originals are archived at the WVZ. We also thank T. Webber for sharing his information and correspondence about the collecting activities of C. E. Doe and A. Pirie of the Museum of Comparative Zoology and J. Dean of the National Museum of Natural History for answering our query about the specimens collected by A. H. Hardisty and A. H. Howell. K. Meyer thanks T. Dellinger, T. Morris, R. Ridall, and G. Zimmerman for their dedicated field efforts toward finding nests and radio-tagging Short-tailed Hawks. Finally, we thank two anonymous individuals for their reviews of the manuscript.

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