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SUMMER CONCENTRATION OF AMERICAN SWALLOW-TAILED KITES AT LAKE OKEECHOBEE, FLORIDA, WITH COMMENTS ON POST-BREEDING MOVEMENTS

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Abstract.—A large concentration of American Swallow-tailed Kites (*Elanoides forficatus forficatus*) was located at the west side of Lake Okeechobee on 26 July 1986. A minimum of 684 kites was present on 26 July, 202 on 1 August, 100 on 23 August, and 30 on 3 September. Temporal patterns and direction of flights suggest the kites were not migrating, but entering and departing a communal night roost. A review of historic records suggests similar concentrations may occur at Lake Okeechobee annually. I speculate that the site may be a staging area used by Swallow-tailed Kites prior to undertaking a trans-Caribbean migration to South America. If true, the site offers a unique opportunity to monitor the status of a sizeable portion of this species' North American population.

Remarkably little is known about the post-breeding and migration behavior of North American populations of the American Swallow-tailed Kite (*Elanoides forficatus forficatus*). The species is one of the first nearctic to neotropical migrants to arrive in spring (late February to early March) and depart in summer (mid-June to late August) (Sprunt 1954, Oberholser 1974), but the patterns and direction of movements are imperfectly known. For example, North American breeders spend the nearctic winter in South America (Brown and Amadon 1968, AOU 1983), but their migration route is uncertain. Stevenson (1957a) and Blake (1977) believed the species migrated overland around the Gulf of Mexico, but Bond (1971) stated that North American kites migrate directly across the Caribbean Sea through the Greater Antilles. More recently, Robertson (in press) summarized observations that suggest both routes are used.

Concentrations of apparent migrant Swallow-tailed Kites have been reported periodically in summer along the south and west shores of Lake Okeechobee since 1929 (Sprunt 1954) (Table 1). Although this phenomenon has received some attention (e.g., Stevenson 1959, 1960; Edscorn

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Table 1. Summary of historic accounts of summer flocks of American Swallow-tailed Kites at Lake Okeechobee, Florida.

Date	Number individuals	Direction traveled	Location	Reference
7 July 1929	100 +	W	Ritta Island	Collins <i>in</i> Sprunt 1954
27 July 1957	65	S	Clewiston	Stevenson 1957b
27 July 1958	60		S end of lake	Stevenson 1958
16 July 1959	94		S end of lake	Stevenson 1959
16-20 July 1959	237			Horel <i>in</i> Robertson <i>in</i> press
2 August 1960	50 +		W side of lake	Stevenson 1960
15 July 1964	100 +			Stevenson 1964
27 July 1964	100 +	W, S	W and S sides of lake	Stevenson 1964
11 July 1976	37		W part of lake	Sykes and White <i>in</i> Ogden 1976
19 July 1978	6	SE	Moore Haven	Snyder and Ogden <i>in</i> Ogden 1978
29 July 1978	12 ±	SE	Moore Haven	Snyder and Ogden <i>in</i> Ogden 1978
3 August 1978	50 +	SE	Moore Haven	Snyder and Ogden <i>in</i> Ogden 1978
16 August 1982	18	SE	LaBelle	Atherton and Atherton 1982

1980), the magnitude of the flight and factors responsible for the concentration remain a mystery. In July 1986 I located an unusually large aggregation of Swallow-tailed Kites at the west side of Lake Okeechobee, Glades County, Florida. Kites were periodically monitored in this area from 26 July to 3 September 1986. Data gathered provide insights into the migration of the species and may clarify previous comments on the importance of western Lake Okeechobee to post-breeding Swallow-tailed Kites.

RESULTS

Counts and direction of movements.—On 26 July 1986 I repeatedly drove public roads immediately south and west of Lake Okeechobee (Buckhead Ridge to Clewiston) in an effort to observe migrating Swallow-tailed Kites. Between 1015-1405 h I observed 25 kites, most moving southeast in groups of two or three. Thunderstorms interrupted observations from 1430-1645 h, but at 1650 h a soaring flock (kettle) of 102 kites was observed over the Glades County Landfill moving west-northwest (Fig. 1). By 1706 h the first kettle disappeared from view, but a second kettle containing 192+ birds formed between the rim canal and the landfill. This kettle also moved west-northwest. Kettles continued to form and move to the northwest until 1745 h. The total count for this 55 min

flight was 684 + kites. I believe this was a conservative estimate number because some kites were undoubtedly beyond my range of vision, and the pattern of movement made it unlikely birds were counted more than once.

I returned to the area at 0855 h on 27 July. At 0939 h a loose kettle of 15 Swallow-tailed Kites appeared on the northwest horizon. This kettle flew to the southeast until reaching the Herbert Hoover Dike (rim canal) at the western perimeter of Lake Okeechobee approximately 10 km north of Moore Haven. The kettle continued moving southeastward along the rim canal. Several additional groups, ranging in size from 7 to 100 individuals, passed overhead along the same track between 0945-1100 h. A total of 147 kites was observed flying to the southeast. The morning flight was much more dispersed than that of the preceding evening, and many kites probably passed beyond my range of vision to the north and south.

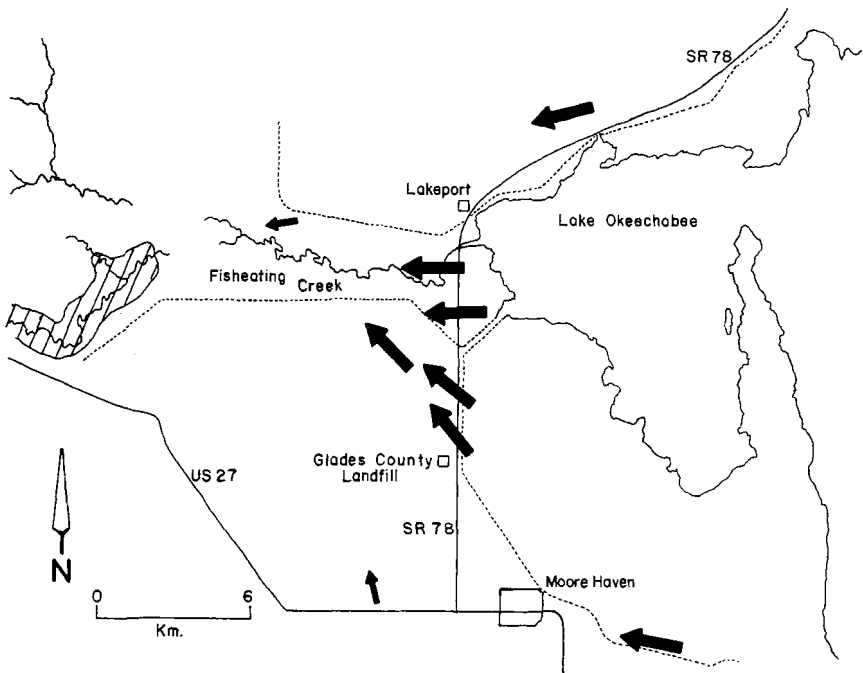


Figure 1. Map of southwestern Lake Okeechobee and western Fisheating Creek, Glades Co., Florida, showing relative size and direction of travel of American Swallow-tailed Kite kettles (dark arrows) observed between 1500-1800 h on 26 July, 1 August, 23 August, and 3 September 1986. Large arrows represent kettles of ≥ 50 kites; small arrows represent kettles of < 50 kites. Hatching denotes cypress swamp on Fisheating Creek, and broken lines denote dikes.

I conducted afternoon (1600-1800 h) counts on 1 August, 23 August, and 3 September. Total Swallow-tailed Kite counts for these days were 202, 100, and 30, respectively. These evening flights were more dispersed than on 26 July, and the location of the main flight line varied from SR 27 6 km west of Moore Haven to 10 km northeast of Lakeport (Fig. 1). The direction of movement varied on each day; however, compass bearings taken along flight lines of each kettle intersect in an extensive cypress swamp on Fisheating Creek (Fig. 1).

Data collected from evening counts and the single morning count revealed a possible temporal pattern in Swallow-tailed Kite movements. During the single morning observation period, kites did not appear until 0939 h, and the magnitude of the flight peaked between 1030-1045 h. Large numbers of kites first appeared in the evening about 1530 h, and counts peaked between 1615-1715 h (Fig. 2).

Behavior.—The kettling behavior of Swallow-tailed Kites was similar to that of other soaring falconiforms (Heintzelman 1975). During evening flights, individuals tended to gather in loose flocks 10-30 m above ground level (agl) over the rim canal. These loose flocks appeared to move parallel to the canal until a thermal or suitable updraft was encountered, whereupon the flock would rapidly gain height. Additional birds usually joined such rising flocks from below and above, eventually forming a compact kettle. Occasionally kettles ascended out of sight, but more commonly small groups would leave the kettle as they approached the upper limits of visibility (about 1000 m agl). Departing groups typically formed loose lines, gliding in a gentle descent in the direction of travel. Three groups that were followed after leaving a kettle glided for 8.5-10.0 km before soaring to regain altitude.

DISCUSSION

The periodic accounts of large flights of Swallow-tailed Kites around Lake Okeechobee in summer have led to speculation that the lake lies along a major migration route for the species (Stevenson 1958, 1959, 1960, 1964). There is little doubt that large numbers of kites migrate through south Florida (Stevenson 1964, Ogden and Stevenson 1965, Robertson in press). Stevenson (1964) felt that perhaps all Swallow-tailed Kites in the southeastern United States used this pathway. Presumably, these birds continue south across the Caribbean Sea to South America (Bond 1971, Robertson in press).

My observations support arguments that a major Swallow-tailed Kite migration route passes through south Florida. Although the size of the United States breeding population is not known, Robertson (*in Cely* 1979) estimated that 250-400 pairs nested in south Florida. J. Cely (pers. comm.) estimated that 50-60 pairs occur on the Francis Marion National

Forest in South Carolina. A few nesting pairs occur in the Okefenokee Swamp, Georgia; northwestern Florida; Mobile River Delta, Alabama; and Atchafalaya River Basin, Louisiana (Parker 1984). Given the generous assumption that a minimum of 50 pairs breed annually in each of the latter areas, and each pair fledges 2.0 young, the population size in the southeast in summer could be as large as 2,600 individuals. Thus, a minimum of 26% of this estimated population was present at Lake Okeechobee on 26 July 1986. The actual size of the population is likely smaller; average fledging success and the number of adults in some sub-populations are probably lower. Additionally, kites from northwestern Florida, Alabama, and Louisiana may follow a more western migration route through Texas and eastern Mexico (Stevenson 1957a, Robertson in press).

The direction of Swallow-tailed Kite movements in the late afternoon at Lake Okeechobee was the reverse of the expected southward orientation of migrants in south Florida. Whereas it is possible kites were migrating north following a route that would take them around the northern Gulf of Mexico, I believe another explanation is more plausible. The reversal in the direction of movements between morning and afternoon flights, convergence of evening flight lines, and the timing of flights suggest birds were moving to and from a communal night roost. I was unable to verify the presence of such a roost due to access and logistic constraints; nevertheless, this hypothesis best explains all observations. Swallow-tailed Kites are typically gregarious during migration (Bent 1937, Sprunt 1954, Snyder 1975), and communal roosting has been observed previously at Corkscrew Swamp, Florida (J. Hansen and T. Below in Ogden 1977) and in South Carolina (J. Cely, pers. comm.).

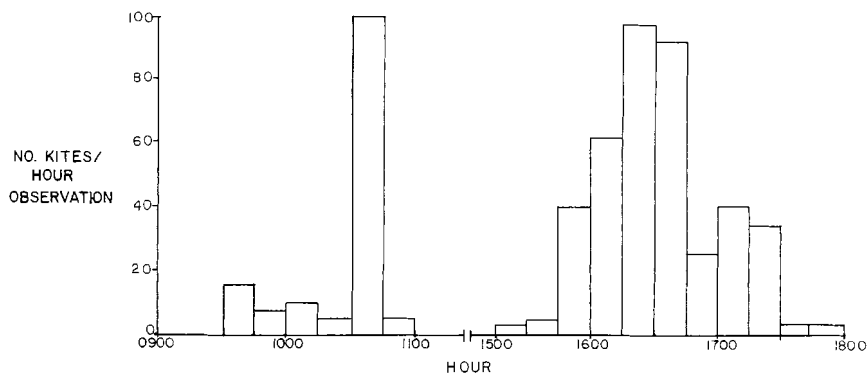


Figure 2. Plot of number of American Swallow-tailed Kites observed per hour of observation at western Lake Okeechobee, Florida. Data for 0900-1100 h are based only on 27 July 1986. Data for 1500-1800 h were collected on 26 July, 1 August, 23 August, and 3 September 1986.

The question of why Swallow-tailed Kites concentrated at this site cannot be answered with available data, but speculation is possible. Assuming kites do follow a trans-Caribbean migration route to South America, there is little evidence the birds stop to forage in either the Greater or Lesser Antilles; migrant flocks only have been reported from Cuba and Jamaica, and the species does not appear to occur regularly on either island (Barbour 1943, Bond 1971). This suggests kites may make the crossing in one flight at high altitude. Many birds that undertake such long-distance migratory flights, including some falconiforms that breed in North America but "winter" in the neotropics, accumulate deposits of peritoneal and subcutaneous fat shortly before departing (Welty 1975, Smith 1985). I suggest that Swallow-tailed Kites may pause during (e.g., in the case of more northern birds) or before their southward migration in south Florida to build-up fat reserves. Given the species' gregarious nature, concentrations in the vicinity of large expanses of suitable foraging habitat would be expected. J. Cely (pers. comm.) noted that radio-tagged Swallow-tailed Kites in South Carolina foraged extensively over freshwater marshes. This community is abundant on the south and west sides of Lake Okeechobee, and this may in part explain the presence of the observed kite concentration. However, large expanses of freshwater marsh exist further south in Florida in the Everglades, but few Swallow-tailed Kites are observed there in summer (W. Roberson, pers. comm.). It seems likely the concentration at Lake Okeechobee is in part food determined, although the important prey species are unknown. A second contributing factor may be the juxtaposition of marshes and extensive cypress swamp, which affords suitable roosting habitat, on the west side of Lake Okeechobee at Fisheating Creek.

More than a single season of observations are needed to determine whether Swallow-tailed Kites concentrate annually at Lake Okeechobee. Despite numerous reports that suggest concentrations occur regularly (Table 1), Edscorn (1980) searched for migrating kites from the Big Cypress Indian Reservation to Lake Okeechobee on 14 July 1980 but saw only nine birds. The question of regularity is of more than academic importance. The Swallow-tailed Kite has declined drastically in abundance and range in North America since the late 1800's (Cely 1979, Parker 1984, Robertson in press), and the species is currently a Category 2 candidate for federal listing as a threatened or endangered species (USFWS 1985). Information on current population status and trend is required to accurately assess the need for management. If western Lake Okeechobee is an annual staging area for migrant Swallow-tailed Kites, it offers a unique opportunity to monitor the status of the southeastern population.

POSTSCRIPT

At 1730 h on 4 August 1987, Lance Ham and I located the communal Swallow-tailed Kite roost by helicopter. The roost was in the general area suspected in Fig. 1, but its exact location is being withheld to insure the security of the site. Photographs taken from the air revealed 882 perched kites, and an additional 200 or so kites were observed flying toward the site. I returned and counted 1,339 kites leaving the roost between 0824 h and 0904 h on the morning of 7 August 1987. If the estimated population size generated in this paper is correct, approximately 50% of the United States population was using the site on this day. The number of kites at the site had declined to 523 by 17 August 1987. The roost was located in an insular, open stand of small (<10 m tall) cypress trees about 1 ha in size. Roosting kites crowded into the tops of about half of the trees in the stand, with some trees supporting over 100 birds. Water depth under the roost was about 1 m on 6 August. A deep, densely vegetated freshwater marsh surrounded the roost site, and isolated it from more extensive cypress stands 0.3 km to the north-west and south. The closest uplands were 0.5 km to the west.

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