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A FALLOUT OF TURKEY VULTURES OVER FLORIDA BAY WITH NOTES ON WATER-CROSSING BEHAVIOR

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Many raptor species undertake water crossings of various lengths during the course of seasonal migration. Certain falcons (Falconidae), which use powered flight, appear to be well-suited to this strategy and routinely traverse distances of 3000 km or more (Ali and Ripley 1978, Pratt 1987). Water-crossing distances of ≤ 25 km (e.g., the Straits of Gibraltar) are much more common for all species, and most migratory routes appear to track paths which minimize time spent over water. New World vultures (Cicconiidae) are on the opposite end of the spectrum of water-crossing behavior from the falcons: they are known to attempt migratory water crossings, but are much less likely to do so than other raptor species (Kerlinger 1985) presumably because of relatively inferior ability in powered flight. I describe and analyze an unusual over-water flight of Turkey Vultures (*Cathartes aura*) in southern Florida.

On 23 January 1990 at approximately 1000 EST, I observed a large group of Turkey Vultures approaching East Cape (25°06'51"N, 81°05'02"W), the southernmost point of mainland Florida, from slightly west of due south over Florida Bay. Winds were light from the southeast at 0700 (having shifted from nearly due east overnight), but had increased to a steady 15-22 km/hr from the southeast under clear skies when these vultures first came into view less than 1 km offshore. The birds were flapping continuously at heights of 0.5-30 m and appeared to be in some distress. Within one minute, the lead vulture landed on the derelict dock upon which the observers were standing (which extended some 10 m into the bay) and immediately lay down, drooping its head and wings around the piling in apparent exhaustion. Despite the proximity of the four observers (<4 m), the remaining 15 pilings were quickly occupied, whereupon vultures began to land on the beach to either side of the dock. None of the later arrivals showed the signs of extreme exhaustion exhibited by the first bird; they simply landed and did not move once settled.

Of 96 vultures observed, 36 came in very low (< 3-4 m) and landed on the dock and beach, 49 reached the shoreline with enough altitude to rise on thermals to approximately 50 m before heading inland, and 11 birds came to rest in the water at distances of 5 to 300 m from the beach. Of those that "ditched" into the bay, nine were ferried ashore in the observers' canoe, one drowned, and one (the bird closest to shore) swam with little apparent difficulty to the beach, eventually joining the other vultures above the high water line. Before their behavior was altered by the approach of the canoe, all of the birds were approximately half submerged, but paddling quite strongly toward the beach with their feet with their wings slightly spread on the water's surface. At the approach of the canoe, the first two birds attempted to escape and had to be extracted from the water manually. They were calm once aboard. The remaining seven, possibly because they could see one of the first two rescuees perched on the gunwale drying its wings, made a frantic effort to clamber into the boat, eventually succeeding when the gunwales were rolled to water level. Upon our return to shore, one bird flew the final 20 m to the beach while the remainder hopped out as the craft made landfall. All eventually joined the birds that had landed there previously. Fifty-five minutes after the first vulture landed on the dock, all had returned to the air and flown inland.

We were unable to view this unusual migratory movement in its entirety, therefore, explanations for it are necessarily partly speculative. Much of the uncertainty that

accompanies this speculation, however, can be mitigated by existing information on vulture migration tactics and the circumstances of the fallout.

It is possible that the vultures were attempting a south to north crossing of Florida Bay by island-hopping across the many small islands in the eastern bay (Fig. 1, Route A). This route was documented by Darrow (1983) in late November 1981, when he observed a group of 355 Turkey Vultures leaving the main keys at Lower Matecumbe on a heading that would take them across Florida Bay in the direction of Flamingo (Everglades National Park). This is unlikely to have occurred in the present case for a variety of reasons, the most compelling being that East Cape lies too far west (relative to most of Florida Bay's islands) to be a reasonable destination for island-hopping migrants which would very likely aim for much closer mainland points farther east (see below). Only one small, isolated mangrove island, Sandy Key, exists in western Florida Bay from which East Cape would be an attractive destination. This key is within reasonable flight distance (11 km), but much like East Cape, it lies so far west of the other small bay islands that it would probably not be included in a trans-bay route. The vultures' approach to East Cape from the south-southwest also belies the island-hopping explanation. Had the birds departed from any of the north bay islands (which were all more or less directly upwind from East Cape), they would have approached from straight downwind, or southeast.

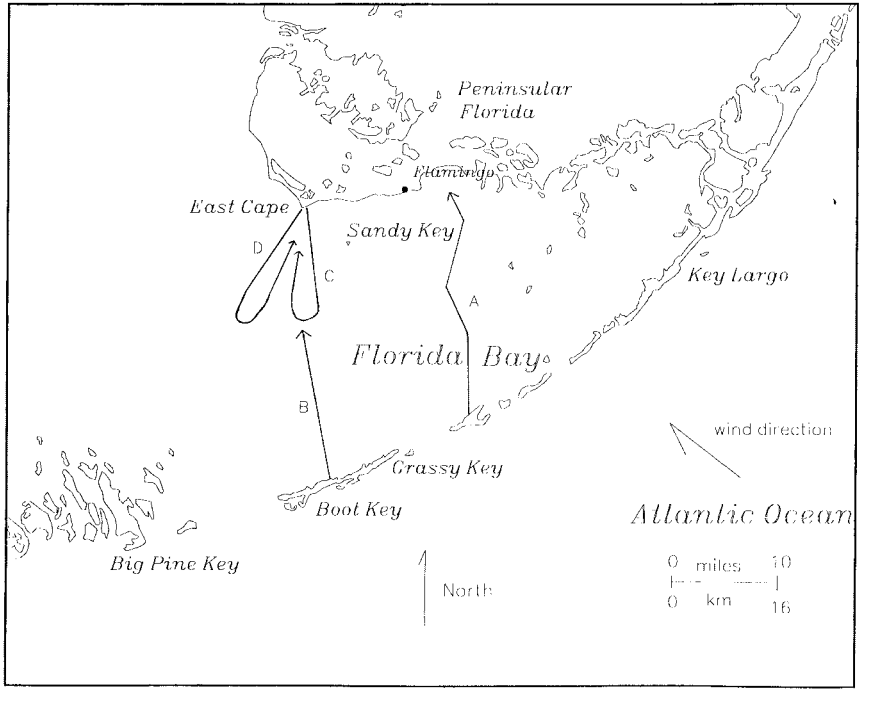

Figure 1. Possible routes used by Turkey Vultures attempting to cross Florida Bay either to or from East Cape. A) South to north island-hopping route (this path roughly delineates the western limit of small keys in Florida Bay, many of which are too small to register on the map). B) Direct route from the middle or lower keys to East Cape. C) Abortive attempt to reach Big Pine Key. D) Abortive attempt to reach Boot/Grassy Key.

Another possible explanation is that the vultures were attempting a non-stop, south to north flight from one of the middle or lower Florida Keys (Fig. 1, Route B). Although it has been suggested that Turkey Vultures are capable of migratory movements from south Florida to Cuba (Darrow 1983), between the larger islands of the Caribbean (Santana et al. 1986), and from the Yucatan Peninsula to the Gulf Coast of the United States (Kirk and Mossman 1998, Van Tyne 1945), a thorough review of this species' migration tactics clearly shows a very limited ability to make long, unaided flights over water. At Whitefish Point, Ontario, and Cape May, New Jersey, Kerlinger (1985) noted that roughly one-third of observed Turkey Vultures attempted to cross Lake Superior and Delaware Bay, but that only 10% were presumably successful. The remaining 90% returned to shore within a few minutes, some flapping hard only a few meters above the water. As neither the Whitefish Point nor the Cape May crossings much exceed 25 km, the 41+ km minimum distance between the lower Florida Keys and East Cape is probably prohibitive to Turkey Vultures in all but optimum conditions. It is also probable that vultures returning from the lower Keys would follow the main island chain northward where they could take advantage of the relatively short distances between islands and of the thermals that are produced by the land masses. Peregrines, Merlins (*Falco columbarius*), and American Kestrels (*F. sparverius*), all of which are much more likely to undertake long water crossings than Turkey Vultures, have been observed using this method to move northward through the Keys during spring migration (R. Moore, unpubl. data). More convincingly, of over 1000 migrating vultures observed from 10 Nov. through 14 Dec., nearly all followed a path either up (northeast) or down (southwest) the major keys (Darrow 1983). The one flock which deviated from these routes chose not to travel directly (over Florida Bay) to the mainland from its starting point at Grassy Key and instead moved 32 km up the main chain of islands to a location from which it could island-hop across Florida Bay (Route A in Fig. 1).

The third and most likely explanation is that these birds were observed during the return from an abortive attempt to cross from East Cape directly to the lower Florida Keys. The mid-December date of this incident makes southerly movement likely, although migratory irregularities (e.g., reverse migrations, etc.) are known to occur at many peninsular dead ends, and specifically at southernmost Florida (Darrow 1983). More importantly, other observations show that Turkey Vultures which encounter water barriers of more than 20 km sometimes attempt crossings but usually do not complete them. East Cape, like Cape May and Whitefish Point, is in a perfect position to lure birds into a crossing attempt. Vultures that have migrated down the west coast of Florida are ultimately funneled to the point of East Cape from which the Keys are easily visible (from a flight altitude) approximately 40 to 50 km away. Birds bound for these islands must choose between negotiating this distance at least partially over water and traveling eastward 3 to 4 times that distance across southern Florida and down the upper Keys. I suggest that the observed vultures, in an attempt to cross Florida Bay, departed East Cape either to the southeast toward Boot Key or Grassy Key and were blown slightly to the west upon their return (Fig. 1, Route C), or to the southwest towards Big Pine Key, a path they retraced on the return trip (Fig. 1, Route D).

Turkey Vulture behavior associated with crossing substantial bodies of water has rarely been recorded, therefore, it is unknown how wind speed and direction may have affected these birds' decision to cross. Flying directly or obliquely into a 15-22 km/hr wind may intuitively seem unwise for a long water crossing, yet it has been consistently noted that opposing winds are favored by some raptor species during autumn migration and at fall water crossings (Rusling 1936). Turkey Vultures at the tip of the Delmarva Peninsula will readily cross the 18 km-wide mouth of Chesapeake Bay on southeast winds (R. Moore, unpubl. data, Rusling 1936). The structures of the Chesapeake Bay Bridge and Tunnel system, however, offer rest areas of which these birds often make use. Kerlinger (1985) suggests that some raptor species do not cross water barriers with

following winds because returning to the point of origin is more difficult should it be necessary to abandon the attempt.

Mote (1969) reported a flock of 56 vultures that attempted to land on the superstructure of a fogbound motor vessel in Florida Bay, approximately 8 miles from East Cape (position deduced from description of route). Several of these exhausted birds drowned, but all mortality was apparently associated with failed attempts to land on the moving boat. Unfortunately, observers were unable to note the direction from which these birds arrived. There are no published reports of raptors "ditching" after failing to negotiate a water barrier. Although the literature is replete with accounts of dead raptors collected on the beaches of the world (Lambert 1983, Zu-Aretz and Leshem 1985), a review of water-crossing literature (Kerlinger 1989) makes no mention of reports of live birds that went into the water while trying to make landfall. Conventional wisdom maintains that beach recoveries represent individuals that exhaust themselves after becoming lost or misdirected over water during inclement weather (e.g., poor visibility, strong unfavorable winds), but this fallout of Turkey Vultures indicates that some species incur mortality as a result of poor judgment during fair weather crossings.

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