

## Territorial Behavior in Belted Kingfishers, *Ceryle alcyon*, During Fall Migration

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The Belted Kingfisher (*Ceryle alcyon*) exhibits territorial behavior during breeding and on the wintering grounds. However, behavior during migration is poorly documented. Here, I report on kingfishers exhibiting territorial behavior during fall migration along the shoreline of northern Lake Huron, Michigan.

Key Words: Belted Kingfisher, *Ceryle alcyon*, territorial behavior, migration, stopover, Lake Huron, Michigan.

The Belted Kingfisher (*Ceryle alcyon*) is widely distributed throughout temperate North America where breeding populations withdraw from northern latitudes and migrate south for the winter. Fall migration is apparent by mid-September, when birds begin to congregate along major waterways, and continues through November (Hamas 1994). Kingfishers are not known to travel in aggregated flocks, but in the Great Lakes region, Salyer and Lagler (1946) observed a continuous progression of individuals moving southward along the shoreline of Lake Michigan during October.

Like other migrants, kingfishers should seek stopover sites providing adequate resources that enable birds to continue their migration. Restricted to a diet that consists primarily of fishes and aquatic invertebrates, kingfishers' ability to find food during migration depends on clear water, in which prey are easily detected. Even wave action on lakes may determine where birds occur (Prose 1985). Thus, morphology of lacustrine shorelines may influence habitat selection by kingfishers at any time of year.

From 30 August until 23 September 2003, I observed solitary kingfishers along approximately 20 km of Lake Huron shoreline between Cedarville and DeTour Village in eastern upper Michigan. Forested peninsulas and intervening bays characterize the rocky shoreline where numerous emergent limestone boulders are erratically scattered in the shallow nearshore waters. With Great Lakes water levels at or near historical lows, kingfishers were unable to forage from tree branches overhanging water. Instead, birds either hovered over open water, or perched on emergent rocks from which they would dive for prey.

Kingfishers occurred at five different bays along the shoreline where diurnal variations in wind speed and direction sometimes generated waves that forced birds to move elsewhere. At Dudley Bay, however, which is protected from Lake Huron by a barrier island, wave action was minimal. No kingfishers occupied the bay during the breeding season, but three male kingfishers, two adults and one immature, partitioned the bay into contiguous territories which they defended for 11 con-

secutive days before departing. The birds were not marked, but individuals observed fishing from the same wooden dock or from the same exposed rocks daily were likely the same birds.

Agonistic encounters between birds included five chases observed on different days and an attack. Each interaction was accompanied by shrill rattling or screams, vocalizations typical of territorial disputes (Davis 1988). Observations were made from 06:15 – 07:30 EST when birds were likely to be foraging. Chases were initiated in response to an incursion by a conspecific into a portion of the bay occupied by another kingfisher. After driving an intruder from its territory, a pursuer would often return to the same fishing perch it occupied prior to the chase. Lincoln (1924) noted similar behavior in migrant kingfishers responding to humans. Sometimes, chases between birds over the tops of exposed boulders were saltatory. One bird repeatedly pursued an intruder which retreated to a nearby boulder, only to be pursued and displaced again.

The single attack occurred when an intruder being chased by another kingfisher retreated into its territory and landed on a dock. With its beak directed downward, the pursuer hovered less than 1 m over the perched bird which remained stationary, its crest erected and head thrown back. During the encounter, both birds were continuously emitting shrill screams. The pursuer then landed less than 2 m from the perched bird, and the two remained face to face, crests erected and vocalizing for nearly three minutes. The pursuer then returned to the portion of the bay from which the chase had originated.

Agonistic intraspecific interactions exhibited by kingfishers appear to occur throughout the year suggesting that continuous access to adequate prey is requisite and promotes territoriality wherever birds occur. During breeding, fishing areas are aggressively defended by both males and females, and overwintering territories are defended by solitary birds of all age classes, but may be temporarily abandoned during inclement weather (Davis 1980).

Although stopover territories are ephemeral, monopolizing access to prey is likely to enhance migrants'

foraging efficiency. At Dudley Bay none of the birds that I observed was marked, but 10 regurgitated pellets collected daily at the dock were likely from the same bird. Each pellet contained abundant fragments of crayfish exoskeleton in addition to some fish bones suggesting that kingfishers took prey that was most accessible and perhaps most abundant in the shallow waters of the bay. Knowing where to find food and excluding competitors in unfamiliar places are likely to enhance prospects for a successful migration (Moore 1999).

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