

SHORT NOTE

Fiji's collared kingfishers (*Todiramphus chloris vitensis*) do hunt for fish in inland waters

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The collared kingfisher (*Todiramphus chloris*) is a widespread species occurring from Ethiopia, Oman and India through South-east Asia, northern Australia to the Pacific with 49 subspecies currently recognised (Woodall 2001). Fry *et al.* (1992) and Woodall (2001) note that, where the collared kingfisher overlaps with other halcyon kingfisher species, it is primarily a bird of coastal and mangrove areas but can range inland in places where it is the only kingfisher species. However, Dutson (2011) notes it occurs alongside other tree kingfishers in inland parts of the Solomon Is.

In Fiji, the collared kingfisher (locally known as the white-collared kingfisher) is the only kingfisher species, and it occurs in both coastal and inland environments (Watling 2001). The 3 Fijian subspecies, including *T. c. vitensis* on Viti Levu, are sometimes placed within the sacred kingfisher (*T. sanctus*) group (Pratt *et al.* 1987; Woodall 2001).

According to the major texts on Fiji's birds, fish are considered to form only a small part of the collared kingfisher's diet, and it appears that

when fish are taken, this is only in mangroves and beachpools. For instance, Watling (2001, p. 137) states the collared kingfisher feeds "predominantly on large insects such as grasshoppers and crickets, also lizards, young birds and crabs" and that "fish are only very occasionally taken - from mangroves and reef pools". Ryan (2000) found collared kingfishers to feed primarily on insects, while Belcher and Sibson (1972, p. 20) state that "fish form but a small part of its diet which normally includes large insects, crabs, skinks and geckos and sometimes even small birds" and suggest the kingfisher "should more correctly be termed 'kinghunter', as it is rarely observed to dive into streams or pools". Similarly, Clunie (2007, p. 68) lists insects, worms, crabs, lizards, and bird's eggs and nestlings as the diet for the collared kingfisher in Fiji, although notes the species also "dives for fish and prawns". Mercer (1966) lists lizards and grasshoppers as favoured prey but notes small crabs and nestlings also are taken.

On Tonga, Steadman and Freifeld (1998) suggest the collared kingfisher feeds primarily on large insects and small lizards, although occasionally small fish are caught on the reef at low tide. The reported lack of fish in the diet of kingfishers in

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inland habitats appears to reflect the published literature for the species elsewhere in its wide distribution. For example, Fry *et al.* (1992, and repeated in Woodall 2001) states that mangrove and coastal populations of collared kingfishers take mainly small crabs, shrimps, mudskippers and other small fish, but inland, the species feeds on cicadas, beetles, carpenter bees, wasps, grasshoppers, earthworms, snails, land crabs, spiders, frogs and snakes, and less commonly, mice, and the eggs and nestlings of small birds. A total of 54 prey items identified in a collared kingfisher in Vanuatu comprised equal numbers of skinks, locusts and beach-pool fish, 8 butterflies and other insects and a crab (Fry *et al.* 1992).

On each day of 1-5 Jun 2011, we observed 2 collared kingfishers actively fishing daily in an inland fresh water-body in Fiji. The site was a 50 m deep freshwater lake formed from a former quarry at the Raintree Lodge, Colo-i-Suva (18° 02' 10" S, 178° 27' 57" E) on the island of Viti Levu. The lake is 240 m a.s.l., ~8.5 km from the nearest coast, and is fringed by rainforest (effectively adjoining the Colo-i-Suva Forest Park). On 2 Jun, between 1450-1515 h we observed the 2 kingfishers make 11 attempts to catch fish of which 6 were successful. The prey captured on each occasion was a small tilapia (*Oreochromis* sp.), with most about the size of the bird's bill (*i.e.*, ~5 cm). The lake was well stocked with this fish.

On 3 occasions, the fish was struck on the branch between 9-11 times and then consumed. On 2 of these occasions the fish appeared to be swallowed but was then regurgitated where it was struck a few more times. Tail fanning and flicking, and forward and backward movement of the head were observed while the birds were watching for prey, but also while beating and consuming fish.

Over the 5 days, 2 different foraging behaviours were observed. The 1st involved perching on a branch overhanging the water ~4 m high and diving at fish within a few metres of the branch. The 2nd foraging behaviour involved flying from the lake edge out to ~20 m, diving, and then flying back. When successful, fish were taken from the surface of the water with the bill and sometimes head submerged, but diving below the water was not observed. The foraging methods observed were consistent with what has been previously reported for the species fishing in coastal environments; for example, Woodall (2001) reports most prey taken within 30 m of perch sites in Peninsular Malaysia.

Although Watling (2001, p. 137) suggests that the collared kingfisher "is often mobbed by small birds

but pays little attention to them", we observed a Vanikoro flycatcher (*Myiagra vanikorensis*) harassing and displacing a kingfisher from its vantage perch while searching for prey.

The observations described provide new information on diet and foraging strategies of the collared kingfisher. According to the literature, fish do not appear to be recorded in the diet of collared kingfishers occupying inland habitats. Further, where fishing does occur in coastal environments it is within shallow waters (*e.g.*, reef pools); the freshwater environment in our observations was a deep lake in a disused quarry. The birds at Colo-i-Suva were observed consistently hunting on the lake with fish being the only observed target on all days during our visit. This suggests that at least some collared kingfishers feed on fish in inland waters in the Pacific region.

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