Marine carrion is an important food source for Hooded Vultures *Necrosyrtes monachus* on south Gambian beaches: a photographic report with a list of food items.

Clive R. Barlow[1]*, Francis Mendy[2], Russell Cryer[3] & Geoff E. Dobbs[4]

[1] Birds of The Gambia, Brusubi Gardens, Western Region, The Gambia
[2] The Gambia College of Travel and Tourism, Kanifing Campus, Western Region, The Gambia
[3] Kerr Serign, Bijolo, Western Region, Western Region, The Gambia
[4] Kololi Apartments, Senegambia, Western Region, The Gambia

*Corresponding author: birdsofthegambia@hotmail.com

http://dx.doi.org/10.4314/vulnew.v80i1.1

In The Gambia the Hooded Vulture *Necrosyrtes monachus* is widely commensal with humans, where it is a non-specialised, versatile scavenger that exploits a wide range of foraging opportunities (Barlow 2012). The species is often abundant in the proximity of fish landing sites (Barlow *et al.* 1997), but there is very little in the published literature citing any beach-feeding behaviour, despite a thorough description of diet and feeding activity by Mundy *et al.* (1992). The first direct reference to feeding on coastal beaches documents that "it is a frequent scavenger on beaches especially at fish landing sites, food items include dead fish and offal found in profusion on beaches and corpses of dolphin and turtles are another common dietary item of this vulture in The Gambia" (Barlow 2004: p. 60). Outside of the Senegambia region this type of scavenging behavior is poorly known and rarely reported. In a request for information amongst our contacts in the Hooded Vulture study community, Wim Mullié reported occasional beach-feeding habits for Hooded Vultures at Axim Beach, Western Region in Ghana, between August 2017 and July 2019, with records involving a maximum of five birds. Hooded Vultures have been observed foraging on beaches in Guinea-Bissau, both on the mainland and the Bijagós Islands (e.g. Bubabque and Orango), but details such as group sizes and identity of food items are not available (M. Henriques, T. Dodman, P. Catry, pers. comm.). There are no records of Hooded Vultures foraging on beaches from Sierra Leone where they are seen daily around Freetown (H. Shokellu Thompson, M. Kimbo, P. Robinson, pers. comm.).

Here we describe observations made between 2012 and 2020 to expand on information relating to beach-foraging activities of Hooded Vultures in The Gambia and Senegal. High population densities of the Hooded Vulture in the Western Region of The Gambia were detected by road surveys in 2013 and 2015, leading to an estimated population of 7,000–10,500 individuals in an area of *ca.* 600 km^2 (Jallow *et al.* 2016). In Casamance, southwestern Senegal, the breeding population was estimated at 2000–3000 pairs (B. Bargain in BirdLife International 2017), and 10-100 vultures are regularly observed feeding on fish discard and turtles at several beaches and landing sites, such as Kafountine (B. Bargain, pers. comm.). In northern Senegal, beach-feeding is limited to a few sightings only, involving a maximum of five birds from around Dakar up to Saint Louis. Here we present a list of dietary items and observations of Hooded Vultures feeding at ten beach locations in Western Region, coastal Gambia (coordinates provided in Table S1), between 2012 and 2020.

Common Bottlenose Dolphin *Tursiops truncatus*: Stranded dolphins occur occasionally

across the entire Gambian coastline. Groups of Hooded Vultures were observed standing on and around an unopened carcass at Ghana Town beach, 13 October 2017 (Figure 1A), illustrating a typical encounter. In the absence of the formerly resident Spotted Hyena *Crocuta crocuta*, last seen in the vicinity of southern Gambian beaches in Dec 2001, 5 km south of Sanyang (CRB, pers. obs.), more work is needed to establish if domestic dogs *Canis familiaris* are responsible for opening carcasses, enabling Hooded Vultures to access soft tissue (Figure 1B). Ted Kulongoski observed 65 Hooded Vultures feeding on an opened dolphin carcass at Kartong on 1 January 2017 (Figure 1C).

Humpback Whale *Megaptera novaeangliae*: On 24 August 2014 three Hooded Vultures fed on the remains of a Humpback Whale that washed up intact on 10 June 2014 (M. Meyer, pers. comm.) at Bantakunku Point beach (Figure 2).

Short-finned Pilot Whale *Globicephala macrorhynchus*: On 5 November 2012, 160 Hooded Vultures assembled and fed on a Short-finned Pilot Whale stranding on Kartong beach (S. Jabang, pers. comm.).

Green Turtle *Chelonia mydas*: Counts of *ca.* 30 Hooded Vultures feeding on Green Turtles regularly occur. A maximum of 156 Hooded Vultures were observed feeding on a large turtle on 23 Mar 2012 at Banjul market beach (FM, pers. obs.). Hooded Vultures were observed at the carcass of a large turtle at Tanji Bird Reserve beach, 14 Oct 2012 (Figure 3A). The vultures appear to wait for turtle carcasses to be opened by domestic dogs (see comments above) and/or fisher folk who may detach the carapace to remove any edible meat. A small Green Turtle carapace attracted groups of Hooded Vultures at Tanji landing site beach, 17 November 2014 (Figure 3B). This is a regular occurrence at fishing ports. Turtle scavenging has been recorded in Casamance, south Senegal (B. Bargain, pers. comm.).

Birds: Great Shearwater *Ardenna gravis* and Great Cormorant *Phalacrocorax carbo*: Several small groups of Hooded Vultures were found feeding on Great Shearwater carcasses scattered along Tanji Bird Reserve beach in June 2014, leading to the discovery of a mass shearwater mortality event (Barlow *et al.* 2018). At Tanji Bird Reserve beach, on 20 July 2018 five birds from a group of 33 Hooded Vultures feeding on a dolphin carcass walked a few metres to feed on a dead cormorant (Figure 4). Occasionally Hooded Vultures have been seen feeding on washed-up domestic chickens *Gallus gallus domesticus* that had been taken to sea for human consumption (CRB, pers. obs.). Hooded Vultures have been observed in the vicinity of, but not feeding on, other bird species, including Great White Pelican *Pelecanus onocrotalus,* Northern Gannet *Morus bassanus,* West African Crested Tern *Thalasseus albididorsalis,* some smaller tern *Sterna* species and Grey-headed Gull *Larus cirrocephalus* (CRB, FM, RC, GD, pers. obs.).

West African Fiddler Crab *Afruca tangeri*: Hooded Vultures were observed in loose groups hunting for fiddler crabs on 22 July 2014 on a tidal inlet at Tanji Bird Reserve (Figure 5A) at a site that CRB has watched regularly since the mid-1980s, with no previous evidence of the activity. Observations of Hooded Vultures catching fiddler crabs are now regular at several mangrove-edge sites (e.g. Old Cape Road, Bakau and near Kotu Beach). The behaviour is unreported from other countries. The authors have recorded some video footage of Hooded Vultures catching Fiddler Crabs (available on request). Crabs are usually dismembered and ingested in fragments (Figure 5B). The consumption of crab species by Palm-nut Vulture *Gypohierax angolensis* documented in Guinea-Bissau (Carneiro *et al.* 2017) is not reported in The Gambia.

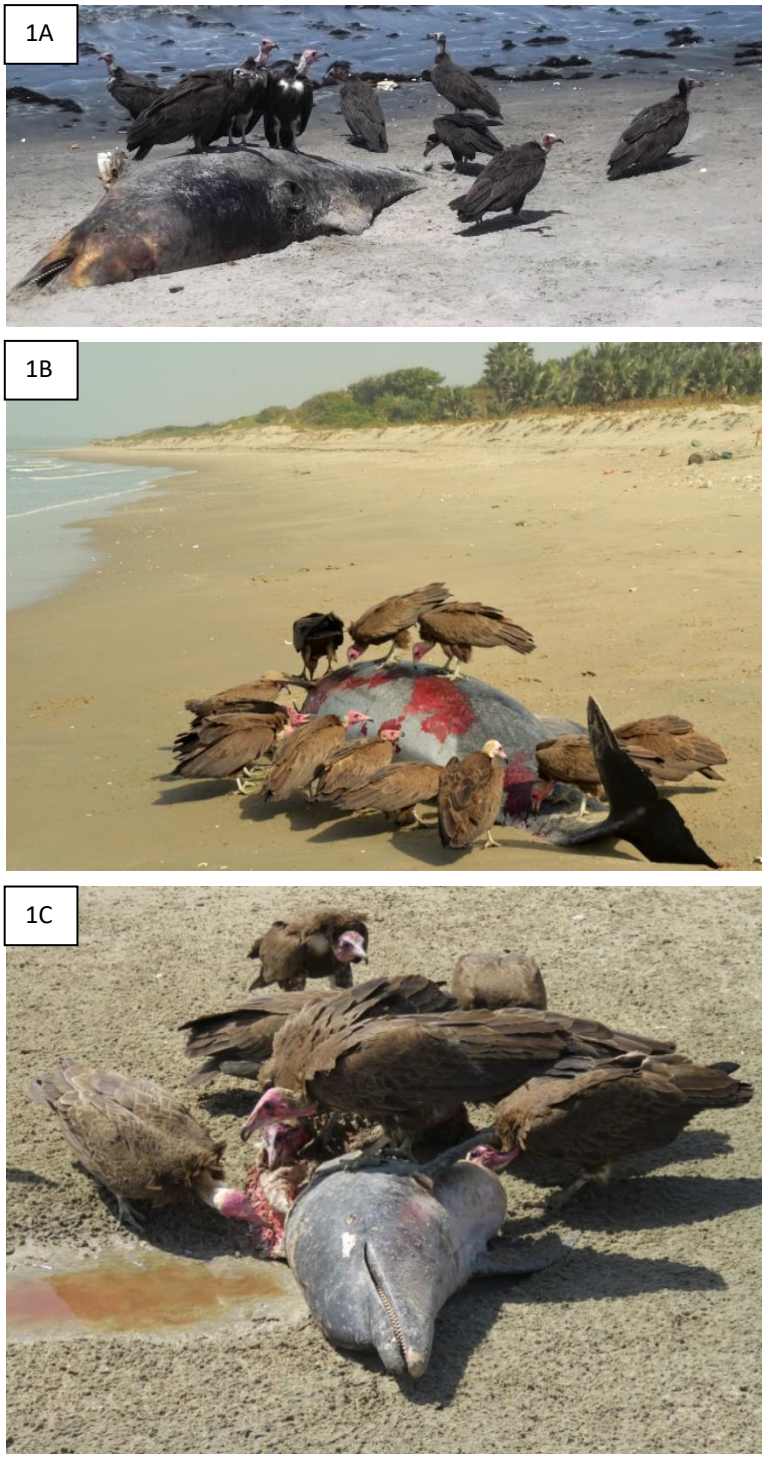

Figure 1: Common Bottlenose Dolphins *Tursiops truncatus* as food items for Hooded Vultures. (1A) Hooded Vultures assembling on an unopened carcass on Ghana Town beach, 13 October 2017 (Photo: CRB); (1B) Hooded Vultures feeding on exudates and blood from a near-intact dolphin carcass at Gunjur, 15 February 2014 (Photo: Ruth Leeney); and (1C) part of a group of 65 Hooded Vultures feeding on an opened dolphin carcass at Kartong, 1 January 2017 (Photo: Ted Kulongoski).

Figure 2: Humpback Whale *Megaptera novaeangliae* washed up intact and first reported on 10 June 2014, with Hooded Vultures still visiting to feed on remains, 24 Aug 2014, Bantakunku Point beach (Photo: CRB).

Figure 3: Hooded Vultures feeding on Green Turtle *Chelonia mydas* remains: (3A) Hooded Vultures waiting for a large turtle carcass to be opened up to access soft tissue, Tanji Bird Reserve beach, 14 Oct 2012 (Photo: CRB); (3B) the carapaces from small Green Turtles caught and discarded as fishing bycatch attract a group of Hooded Vultures at Tanji fish landing site, 17 Nov 2014 (Photo: CRB).

Figure 4: Hooded Vultures feeding on a Great Cormorant *Phalacrocorax carbo* carcass close to a dolphin stranding event which had attracted 33 Hooded Vultures, Tanji Bird Reserve beach, 20 July 2018 (Photo: CRB).

Figure 5: Hooded Vultures eating West African Fiddler Crabs *Afruca tangeri*: (5A) Part of a group of 18 Hooded Vultures watching, chasing and probing for crabs at low tide at Tanji Bird Reserve, 10 June 2018 (Photo: CRB); (5B) dismembering and eating crabs on Old Cape beach, Bakau, 7 May 2015 (Photo: Dave Montrieul).

Fish: Barlow (2004: p. 60) wrote "along the shoreline of the Atlantic Ocean Hooded Vulture is often seen in association with single or small groups of Palm-nut Vultures, very often both species are seen feeding commensally on the bodies of washed up fish." We have not recorded this relationship in any of our current observations perhaps because coastal Palm-nut Vulture encounters have declined since the 1990s (CRB, pers. obs.). Hooded Vultures are known to feed on dead or injured freshwater catfish (*Clarius* species) (Mundy *et al.* 1992). Recent, more detailed observations of Hooded Vultures feeding on fish in The Gambia are described hereafter. Groups of Hooded Vultures have been observed coming to fish offal dumped from wheelbarrows and buckets at the water's edge after gutting operations. Hooded Vultures frequently follow fishmongers across the beach when they are transporting waste to the water's edge in short, low flights and lumbering walks (CRB, pers. obs.). They have been observed in low numbers at herring bycatch events which result in fish being strewn in large numbers across long stretches of the tideline (Figure 6A). Fish waste dumps behind the beach and close to fish cleaning houses attract high numbers of Hooded Vultures. For example, a maximum of 202 individuals was recorded at Gunjur landing site on 15 November 2019 (CRB, RC, pers. obs.). The collection and raking out of fish for sun-drying for the small-scale production of poultry feed, close to and on the beach at Tanji and Ghana Town, commenced in mid-2017. This new feeding opportunity attracted groups of up to 90 Hooded Vultures which consumed fish waste and invertebrates (CRB, FM, pers. obs.). Hooded Vultures have also been observed to feed solitarily or in small groups when single large fish are washed up on unpopulated beaches away from busy landing sites (Figure 6B). Hooded Vultures will stand on dead fish in shallow water to feed and will also drag food items closer to the shore to continue feeding (Figure 6C).

Jellyfish *Rhizostoma* species: Three juvenile Hooded Vultures were observed on Kotu Beach on 20 March 2017 (Figure 7), showing interest in a beached jellyfish (possibly *Rhizostoma luteum*; K. Lewis, pers. comm.), although the photographer did not observe any definite feeding activity (M. Hall, pers. comm.). Further observations are required to confirm whether jellyfish are eaten by Hooded Vultures.

Fly larvae in ghost crab (*Ocypode* sp.) burrows and on discarded fish: Ghost crabs drag food items into their burrows upon which flies lay eggs (Barlow *et al.* 2018). A single Hooded Vulture was observed probing a ghost crab burrow for fly larvae on 13 Sept 2014 on Tanji Bird Reserve beach (Figure 8A, B; CRB, pers. obs.). On the beach at Tanji landing site, on 4 September 2015, fifteen Hooded Vultures were seen manipulating decayed fish mixed with other flotsam to feed on fly larvae (Figure 8C). Related behaviour was described by Mundy *et al.* (1992, p. 143): "[Hooded Vultures eat] maggots if the carcass is old".

Other food items (CRB, FM, RC, GD, pers. obs.): Five Hooded Vultures were observed eating a large squid (unknown species) at Tanji beach on 9 March 2018. Small ray species, usually desiccated, often attract groups of Hooded Vultures. On 30 March 2020 a single Hooded Vulture was observed carefully picking through a cluster of seaweed on the tideline on Ghana Town beach. No ingestion was evident and nothing edible was found when examining the seaweed, but immediately after this disturbance the vulture returned from a nearby tree to continue probing activities (CRM, FM, pers. obs.).

Figure 6: Hooded Vultures feeding on fish: (6A) a group of Hooded Vultures approaching discarded herring being dried for animal feed at Tanji fish landing area, 10 Dec 2017 (Photo: CRB); (6B) Hooded Vultures feeding on a puffer fish *Tetraodon* sp. on Brusubi Heights beach, well away from a bustling landing site, 9 Oct 2015 (Photo: CRB); (6C) Hooded Vulture wading in the shallows to feed on a large fish at Kotu beach, 16 July 2019 (Photo: GD).

Figure 7: Three juvenile Hooded Vultures investigate a jellyfish (possibly *Rhizostoma luteum*, K. Lewis pers. comm.) at Kotu beach, 20 March 2017 (Photo: Mark Hall).

Figure 8: (8A) A Hooded Vulture probing for maggots (fly or other invertebrate larvae) in a ghost crab *Ocypode* sp. burrow at Tanji Bird Reserve beach, 13 Sept 2014; (8B) maggots from the same burrow excavated by CRB; (8C) Hooded Vultures search for maggots on washed-up fish at Tanji fish landing site, 4 Sept 2015 (Photos: CRB).

Discussion

It is clear from our observations that Hooded Vultures forage on and around beaches in The Gambia across wet (June-October) and dry (November-May) seasons, and beach-feeding events involve all age classes, as demonstrated by plumage variations (Barlow *et al.* 1997; Figures 1-8). The Hooded Vulture is a long-lived species with advanced learning abilities (Thompson *et al*. 2020). It is reasonable to suggest that the demand for food resources created by high population densities in coastal areas of south Gambia and Casamance has resulted in conspicuous numbers of Hooded Vultures turning their attention to and combing the open beach and exploiting its environs for feeding opportunities. Significant expansion of the artisanal fishing industry over the last 20-25 years has resulted in increased amounts of edible fish waste being disposed of on the tideline around landing site beaches, creating additional feeding opportunities (CRB, pers. obs.). Hunting of live crabs by Hooded Vultures (first observed by CRB in July 2014) and wading into the shallows to feed on fish (first observed by CRB in 2015) is also a possible response to competition for food in high density living situations. The use of shoreline food resources by Hooded Vultures in The Gambia is now well established, and we presume this may have contributed in some part to the exceptional success of the Hooded Vulture in coastal Gambia and in Casamance, south Senegal, in terms of population stability or even growth (Barlow & Fulford 2013, B. Bargain in Birdlife International 2017, Jallow *et al*. 2016).

Elsewhere in the species' range, our knowledge of coastal beach use by Hooded Vultures is limited to Ghana and Guinea-Bissau where information is scant (W. Mullié, P. Catry, T. Dodman, M. Henriques, pers. comm.). Other than the Palm-nut Vulture, which is a regular beach feeder in our region (Barlow *et al.* 1997, Barlow 2004, Carneiro *et al.* 2017), we found only one published record for any other vulture species feeding on beaches in sub-Saharan Africa: Lappet-faced Vultures *Torgos tracheliotos* were seen feeding on Cape Fur Seals *Arctocephalus pusillus* in the Cape Frio area of the Skeleton Coast Park, Namibia on in February 2006 (Anon 2006). The Egyptian Vulture *Neophron percnopterus* has been recorded in The Gambia flying low over the Sanyang beach fish landing site on one occasion (Caucanas *et al.* 2018), but feeding activity was not observed.

Further research is needed to determine what proportion of the Hooded Vulture population uses the beach environment on a regular basis for feeding in The Gambia. We therefore plan to complete a series of coordinated same-day counts at and around the beaches and fish landing sites listed in Table S1. Field studies to track the sequence of events at turtle and dolphin strandings would also help to clarify the processes that facilitate vultures to gain access to soft tissues of large, stranded marine fauna. The hunting of live West African Fiddler Crabs inside and outside of their burrows, first observed in July 2014 at the well-watched Tanji Bird Reserve, appears to be limited to Hooded Vultures in The Gambia and merits a focused behavioural study.

Acknowledgements

Thanks go to Bruno Bargain, Paulo Catry, Tim Dodman, Mark Hall, Mohammed Henriques, Sulayman Jabang (DPWM), Musa Kimbo, Ted Kulongoski, Ruth Leeney, Micha Meyer, Dave Montrieul, Wim Mullié, Bram Piot, Paul Robinson and Hazell Shokellu Thompson for sharing a mix of knowledge and photographs of Hooded Vultures feeding on beaches. Krish Lewis and Kath Thorne at Two Oceans Aquarium, South Africa, helped with the identification of the jellyfish to genus and speculated on species

from a photograph. Peter Bridgeford and Holger Kolberg kindly contributed information on Lappet-faced Vultures on beaches in Namibia. Richard Reading and an anonymous referee made constructive comments at the review stage which helped improve the manuscript.

References

Anon. 2006. Lappet-faced Vultures eating seals in the Skeleton Coast Park. *Vulture News.* 55: 32.

Barlow, C. R., Wacher, T. & Disley, T. 1997. *Field Guide to Birds of The Gambia and Senegal.* Pica Press, Mountfield.

Barlow, C. R. 2004. The utilization of oil-palm kernel by *Necrosyrtes monachus* in The Gambia. *Vulture News* 51: 60-62.

Barlow, C. R. 2012. Guest Editorial: an investigation commences to establish the present status and distribution of Hooded Vultures *Necrosyrtes monachus* in The Gambia, West Africa. *Vulture News* 62: 51–59.

Barlow, C. R. & Fulford, T. 2013. Road counts of Hooded Vultures *Necrosyrtes monachus* over seven months in and around Banjul, coastal Gambia, in 2005. *Malimbus* 35: 50–56.

Barlow, C. R., Piot, B. & Fox, O. J. L. 2018. Great Sheawater *Ardena gravis* mass mortality in The Gambia in June 2011, recent observations from Senegal, and evidence for migration patterns. *Malimbus* 40: 10-20.

Birdlife International. 2017. *Necrosyrtes monachus* (amended version of 2017 assessment). The IUCN Red List of Threatened Species 2017: e.T22695185A118599398. https://dx.doi.org/10.2305/IUCN.UK.2017-3.RLTS.T22695185A118599398.en.

Carneiro, C., Henriques, M., Barbosa, C., Tchantchalam, Q., Regalla, A., Patrício, A. R., & Catry, P. 2017. Ecology and behaviour of Palmnut Vultures *Gypohierax angolensis* in the Bijagós Archipelago, Guinea-Bissau. *Ostrich* 88: 113-121.

Caucanas, G., Piot, P., Barlow, C. R., & Phipps, W. L. 2018. A major count of the Egyptian Vulture *Neophron percnopterus* in Senegal in November 2017, with notes on its history and current status in Senegal and The Gambia. *Malimbus* 40: 55-66

Jallow, M., Barlow, C. R., Sanyang, L., Dibba, L., Kendall, C., Bechard, M., & Bildstein, K. L. 2016. High population density of the critically endangered Hooded Vulture *Necrosyrtes monachus* in Western Region, The Gambia, confirmed by road surveys in 2013 and 2015. *Malimbus* 38: 2.

Mundy, P., Butchart, D., Ledger, J. & Piper, S. 1992. The Vultures of Africa. Academic Press, London.

Thompson, L. J., Barber, D. R., Bechard, M. J., Botha, A. J., Wolter, K., Neser, W., Buechley, E. R., Reading, R., Garbett, R. A., Hancock, P., Maude, G., Virani, M. Z., Thomsett, S., Lee, H., Ogada, D., Barlow, C. R., & Bildstein, K. L. 2020. Variation in monthly sizes of home-ranges of Hooded Vultures *Necrosyrtes monachus* in western, eastern and southern Africa. *Ibis* 162: 1324-1338.

Supporting Information

Table S1. Coordinates of beaches and sites in The Gambia and Senegal mentioned in the text.

Beach name and location	Coordinates
Saint Louis, Senegal	16°02'02.8"N 16°29'21.7"W
Dakar, Senegal	14°45'46.8"N 17°27'37.2"W
Banjul Albert Market beach, The Gambia	13°27'24.3"N 16°34'19.2"W
Old Cape Road, Bakau, The Gambia	13°28'31.5"N 16°39'39.6"W
Kotu beach, The Gambia	13°27'42.6"N 16°42'27.2"W
Brusubi Heights beach, The Gambia	13°23'34.4"N 16°45'41.0"W
Ghana Town beach, The Gambia	13°23'08.1"N 16°46'28.2"W
Tanji Bird Reserve beach, The Gambia	13°22'41.5"N 16°47'18.5"W
Tanji fish landing site, The Gambia	13°21'30.1"N 16°47'56.3"W
Bantakunku beach, The Gambia	13°19'28.9"N 16°48'16.6"W
Gunjur beach, The Gambia	13°08'59.5"N 16°46'37.4"W
Kartong beach, The Gambia	13°04'41.2"N 16°46'16.1"W
Kafountine, Casamance, Senegal	12°56'22.7"N 16°44'53.2"W

******