

# Birds of prey observed during vulture surveys in northeast Sudan

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## Summary

An Egyptian Vulture *Neophron percnopterus* survey was undertaken in the northeast part of the Republic of Sudan during eight days in September and October 2010. Raptor and large bird counts were conducted along 2010 km of roads travelled. In total 2818 individual raptors of 23 species were counted. The most common were the group of Black and Yellow-billed Kites *Milvus* spp. and Egyptian Vultures, forming 82.8% and 8.0% of all raptors respectively, while Snake Eagles *Circaetus* spp., Rüppell's Vultures *Gyps rueppellii*, and Hooded Vultures *Necrosyrtes monachus* accounted for 2.0, 2.8 and 1.3% of the raptor assemblage, respectively.

**Keywords** Sudan, road count, raptors

## Introduction

Large declines of vulture species have recently been reported throughout Africa (Thiollay 2006a,b, Virani *et al.* 2011, Ogada *et al.* 2016). Populations of Egyptian Vultures breeding in the Palearctic are also limited by mortality along the migration flyway (Grande *et al.* 2008), which for some populations may be unsustainably high (Angelov *et al.* 2012). The Republic of the Sudan is among the largest countries in Africa, where many species of Palearctic diurnal raptors occur during migration and overwinter (Nikolaus 1987) and the country is of international importance for wintering Egyptian and Griffon vultures *G. fulvus* from the Palearctic (Mundy *et al.* 1992). However, despite the work undertaken to date, ornithologically Sudan remains poorly explored (Bird & Blackburn 2011). The aim of the current survey was to conduct road counts of all vulture and other raptor species observed and to collect additional *ad hoc* data on limiting factors. The overall aim of the visit was to collect data about mortality among Egyptian Vultures along a power line near Port Sudan (Angelov *et al.* 2012), long-known to be very dangerous for the species (Nikolaus 1984).

## Methods

Raptor and large bird road counts were implemented from 27 September to 4 October 2010 along 2010 km in Northeast Sudan (Fig. 1). The survey followed the route from Khartoum, Wad Madani, Al Qadarif, Kassala, Port Sudan and surroundings, and Atbara, Shendi, and Khartoum. The section of road stretching up to 138 km east of Atbara was not surveyed. The habitat consisted of grasslands and agricultural land with occasional scattered trees in the south, changing into dry savanna and semi-desert, and desert in the north. All raptors and large birds seen on both sides of the road were recorded by two observers – one on each side of the vehicle. In most cases when

identification while driving was not possible, we stopped to properly identify the observed birds. Average speed was about 60 km/h. Small transects (1–30 km) away from the main route were conducted opportunistically in areas where vulture presence was recorded or suspected, e.g. cliffs with large ‘whitewash’ from vulture roosts and nests, or flying, or perched vultures. Such transects were implemented in the areas of Kassala, Port Sudan, and the savanna northeast of Al Qadarif and Suwakin. Opportunistically, we conducted five interviews with local people in order to gain an impression of potential threats for vultures, such as poisoning against wild carnivores. The main question we asked was what they do in cases of wild predators or stray dogs attack on livestock.

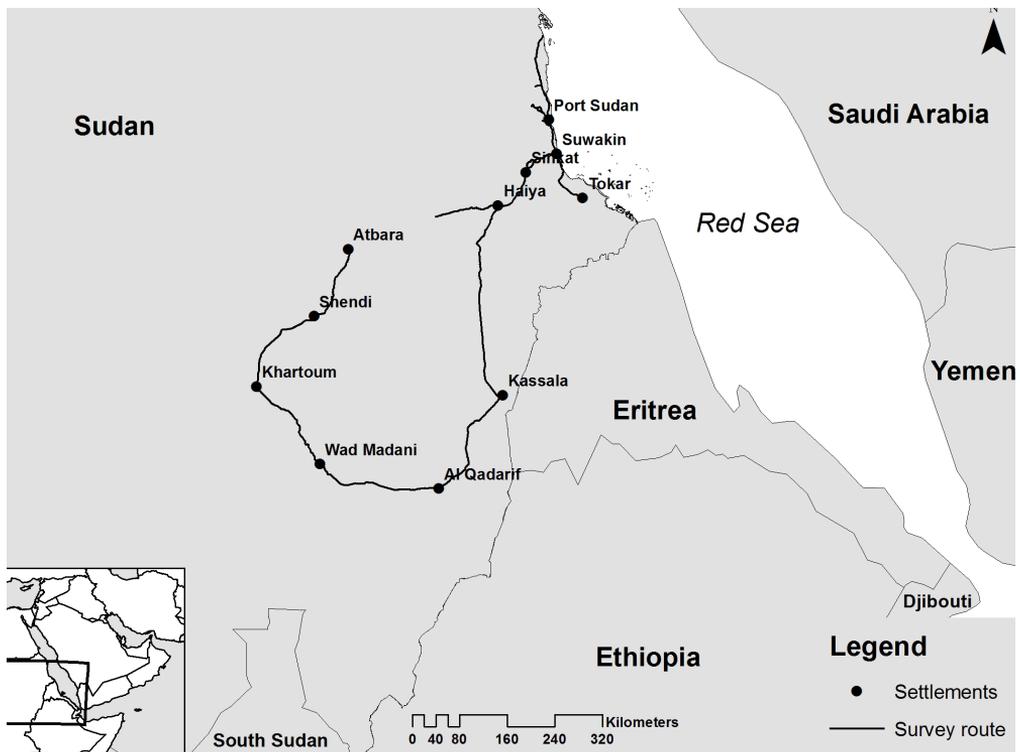


Figure 1. Map of survey route.

## Results

### *Osprey Pandion haliaetus*

Nikolaus (1987) mentioned that Osprey is a common resident breeder along the Red Sea coast of Sudan. We observed one nest with an adult bird on a halophyte bush in mangrove habitat on the Red Sea coast between Suwakin and Tokar. The base of the nest was only about 50 cm high, built on the dead trunk of a mangrove tree with the top of the nest about 1 m above the water surface.

### *Black Kite Milvus migrans* and *Yellow-billed Kite M. aegyptius*

With a total of 2332 individuals seen at 156 locations, the Black, and Yellow-billed Kites were the most common raptors, accounting for 82.8 % of the observed raptors.

Kites were common in Khartoum, where they were present in the air and dispersed over the city virtually all of the time. The numbers represent only birds seen during the transect through the city. The biggest concentrations were seen along the main road from Al Qadarif to Kassala over a stretch of 50 km before Kassala. In this area 1520 individuals were seen, with the biggest concentrations in the town of Kassala (at least 320) and at a market and village along the road, where two groups of 252 and 300 were seen. However, kites were almost constantly present in the sky along this transect, with groups largely increasing in and around villages.

On 1 October one pair was observed in a nest built on a transmission tower at c. 25 m high in the central part of the village of Suwakin on the Red Sea coast. A loose colony of four nests was located in mangrove forest in the sea 29 km south of Suwakin with ten birds perched on trees in close proximity to the nests and one bird in a nest. On 2 October a nest built on a high voltage power pole with one pair nearby was observed in the surroundings of Port Sudan.

Nine road-killed kites were found in different places along the route. Most probably all of them became victims of the traffic while scavenging other road-killed animals on the asphalt road or while trying to catch live prey crossing the road. Several times we observed that kites allowed vehicles to approach within a few metres before taking off. In one case 14 kites were observed feeding on a cow carcass next to the road.

### **Egyptian Vulture *Neophron percnopterus***

Nikolaus (1987) described the Egyptian Vulture as, "still fairly common" in desert, semi-arid grassland and villages and added that their numbers had decreased noticeably in most areas except the Red Sea region, where Palearctic migrants are expected. Almost 20 years later Nikolaus (2006) recorded almost no vultures in areas that previously had healthy populations and suggested there was a continuing and very strong decline of all vulture species in Sudan. During this survey 226 Egyptian Vultures were seen, which accounted for 8 % of all raptor observations; 91.6 % of all Egyptian Vultures were seen in or near the immediate vicinities of villages or towns. Larger congregations existed at Port Sudan where, on 30 September, 34 were seen at midday perching on the ground next to a small waterhole among large livestock farms on the northern edge of the town. The age structure of the birds was as follows: adult 23, 4th plumage 1, 3rd plumage 1, 2nd plumage 6, juvenile 3 (Clark & Schmitt 2004). Another group of at least 40, mostly adults, together with a similar number of stray dogs was seen at the town's slaughterhouse on 1 October around the area where animal remains were dumped in a small valley. About 40 were observed at Haiya on 3 October, where most of the birds were taking off from a roadside restaurant where there were remains of slaughtered animals. On the same day, 105 km west from Hiya, 54 Egyptian Vultures were roosting on high-tension power lines next to a small roadside settlement, comprising 24 adults, 27 immatures and 3 of unidentified age. Identification of all birds by age class was not possible due to the distance from the road and the decreased light in late evening.

Three quite probable local resident pairs were seen in the Red Sea Hills. A pair was seen perched in midday on a shaded part of a niche, very suitable for breeding and with a probable nest as the site had 'whitewash' typical for the species. Another probable pair was seen near the dirt road from Port Sudan to Khor Arba' At, preparing to roost together on a cliff niche with 'whitewash' typical for the species, indicating

traditional use as a favourite perch site. A third pair of adults was flying together in synchronous flight near a small settlement north of Port Sudan.

Two adult Egyptian Vultures were observed feeding on the asphalt road on the remains of a road-killed Black/Yellow-billed Kite, showing a very high tolerance to approaching cars, taking off only in the last few metres and putting themselves at significant risk of being hit. One road-killed adult vulture was observed on the road between Port Sudan and Suwakin, while another adult with an injured wing was seen at Haiya. Vulnerability of the Egyptian Vulture to road collision has already been reported for Sudan, Spain and Socotra Island (Nikolaus 1984, Hernandez & Margalida 2009, Porter & Suleiman 2012). Angelov *et al.* (2012) reported 17 electrocuted Egyptian Vultures along a 31-km section of power line near Port Sudan, while the same power line had already been described as heavily lethal to the species and other large raptors in previous surveys (Nikolaus 1984).

### **Hooded Vulture *Necrosyrtes monachus***

The Hooded Vulture in Sudan is described as, “very common in the south, rare in the north” (Nikolaus 1987). In total, 37 individuals were seen at three locations. The first two were in the only densely forested area along the route, part of the Eastern Sudanian savanna zone, where 35 Hooded Vultures were seen at two different locations 6.5 km apart. The first group of 20 was feeding on a dead cow in the forest next to a temporary nomads’ camp. The second group, consisting of 15 Hooded Vultures together with other scavengers, was flying and appeared to land next to a carcass. Two Hooded Vultures were seen flying over Sinkat in the Red Sea Hills.

### **White-backed Vulture *Gyps africanus***

Only one observation was made, of six birds seen together with 15 Hooded Vultures, 4 Black Kites and one Tawny Eagle *Aquila rapax* in a forested landscape. The area offered suitable breeding habitat. The birds were seen flying around and landing on the trees; probably there was a carcass nearby.

### **Rüppell’s Vulture *Gyps rueppellii***

Rüppell’s Vulture in Sudan was described as, “the most common vulture in the north” (Nikolaus 1987). We observed it at four locations while cliffs with ‘whitewash’, indicating the presence of *Gyps* vultures, were seen at seven more sites. On 28 September around 12:30 at least 40 vultures were seen flying and landing on a big roost next to Kassala town, where historically, a “very large” colony existed (Nikolaus 2006). The cliffs were covered with a large amount of ‘whitewash’, reaching 10–20 m on some ledges. The number and size of the ‘whitewashes’ indicated the presence of hundreds of Rüppell’s Vultures, but it is not known whether such numbers still occur there, because, depending on the climatic conditions, ‘whitewash’ may persist for years. Interestingly, during a visit in autumn 2005 there were no vultures sighted at the cliffs (Nikolaus 2006), suggesting the extinction of the colony at that time and subsequent recolonization. A probable breeding colony was located about 80 km southeast of Wad Madani, where 30 vultures were observed (28 of them flying), with at least 3 pairs engaged in courtship flights, while another possible pair was perching on a suitable nesting ledge covered with whitewash.

### **Snake eagles *Circaetus* spp.**

In total, 56 individuals of three species were observed at 36 locations on 27 and 28

September (up to 6 eagles per location). Fifty of them (89%) were recorded during a transect about 100 km along the main road west of Al Qadarif in grassland and agricultural habitat. Species composition included 42 Short-toed *C. gallicus*, 12 Black-chested *C. pectoralis*, and 2 Brown *C. cinereus*. More than 90% of the observed snake eagles were perching on medium and high voltage electricity pylons along the road. Considering the difficulty in identifying Beaudouin's Snake Eagle *C. beaudouini*, especially when perched at a distance (Clark 2000), it is possible that some individuals of this species were confused with Short-toed or Black-chested Snake Eagles. Geographically, our observations were several tens of kilometres more to the northeast than the northern-most records for the species in Sudan (Nikolaus 1987). The northern-most observation of a snake eagle during our survey, was one Short-toed Snake Eagle about 20 km southwest of Kassala.

#### **African Harrier Hawk *Polyboroides typus***

One adult observed on 27 September was perched on a power pole next to the main road 88 km west of Gedaref.

#### **Harriers *Circus* spp.**

Three species of harrier, totalling 24 individuals were seen during the survey, of which 4 were Western Marsh *C. aeruginosus*, 5 were Montagu's *C. pygargus*, and 4 were Pallid *C. macrourus*, and 11 female and juvenile Pallid or Montagu's Harriers. Among these, 16 (67%) were seen along 33 km in open grasslands immediately north of Kassala, representing two Pallid, one Western Marsh and 8 female and juvenile Pallid or Montagu's harriers. Three other Western Marsh Harriers were seen at different sites along the Atbara-Khartoum road. One Pallid Harrier was seen about 55 km southwest of Atbara and one between Gedaref and Wad Medani.

#### **Grasshopper Buzzard *Butastur rufipennis***

In total 8 Grasshopper Buzzards were seen at four sites. Two birds were seen at 26 km and two more at 22 km west of Al Fao in an agricultural landscape, the other two (of 3 and 1 birds) at 32 and 38 km north-northwest of Kassala in vast grasslands. Nikolaus (1987) mentioned that, "very large numbers concentrate in the Khartoum-Gedaref area in September-October". This, compared with our observations, suggests a possible population decline or a change in the non-breeding grounds of this species.

#### **Red-necked Buzzard *Buteo auguralis***

Nineteen Red-necked Buzzards were seen at 15 sites along 160 km, mostly west and northeast of Gedaref, together with three unidentified buzzards. Most of these birds were perching on medium voltage power lines along the road. Our observations of this species are in accordance with the distribution map given by Nikolaus (1987).

#### **Lesser Spotted Eagle *Aquila pomarina***

Two juveniles were seen landing at a night roost in palm trees in a valley east of the reservoir of Khor Arba'At northwest of Port Sudan.

#### **Tawny Eagle *Aquila rapax***

The species was seen at only two locations. One adult was seen perching on a high voltage power line next to the road. On the next pylon there was a big eagle-type nest, most probably belonging to this species. High voltage power lines are increasingly

used for nest sites across the range of this species (Jennings 2010, Tarboton & Allan 1984), but to our knowledge it has not been recorded in Sudan. One adult was seen together with a group of 15 Hooded Vultures, 6 White-backed Vultures and 4 Black Kites in a forested landscape, offering suitable breeding habitat, with birds flying around and landing on trees probably next to a carcass. In the same area one dead adult was seen next to the road, probably killed by a car.

### **Bonelli's Eagle *Aquila fasciata***

A pair of adults with an indication of probable breeding and one dead adult electrocuted under a power line were observed northwest of Port Sudan (Angelov & Hashim 2011).

### **Booted Eagle *Aquila pennata***

One light morph individual was seen in soaring flight over Sinkat on 29 September.

### **Lesser Kestrel *Falco naumanni***

One adult male was seen on 30 September in a flat desert area several kilometres northwest of Port Sudan.

### **Lanner Falcon *Falco biarmicus***

Three breeding territories were recorded. Two of them were on cliffs north of Port Sudan with pairs observed near traditional nesting sites (one of the birds was inspecting an old nest built by Brown-necked Ravens *Corvus ruficollis*). One adult was perched on a cliff suitable for nesting that had typical large falcon 'whitewash', located about 30 km north from Derudeb. One adult was observed over Sinkat and one on a high voltage power line nest Port Sudan.

## **Discussion**

Our observations contribute to the growing body of more recent ornithological data on the status and threats to raptors in Sudan (Angelov & Hashim 2011, Bird & Blackburn 2011, Angelov *et al.* 2012).

Our survey was conducted mainly along the most intensively used asphalt roads in the northeast of the country in areas where high human population density was concentrated. Urbanization and increasing human populations are reported to cause negative effects on large raptors in Africa (Thiollay 2006, 2007). While for some species like Black, and Yellow-billed Kites and Egyptian Vultures, areas of human habitation in the tropics are attractants (Fergusson-Lees & Chrisite 2011). Thus, we suggest that extrapolation of raptor counts along the main roads in northeast Sudan will most likely give a biased picture of the raptor populations in that part of the country.

The geographic region where Egyptian Vultures were mostly seen lies 100 to 200 km north of the wintering range of the species as identified by Buechley *et al.* (2018). Earlier publications suggest that historically observed congregations of Egyptian Vultures in the Red Sea Hills area in autumn are formed by migrating and wintering Palaearctic birds, possibly mixed with North African resident individuals (Meinertzhagen 1954, Nikolaus 1987, Angelov *et al.* 2012). However, recent data using satellite telemetry suggest that Palaearctic migrants may not fly along the west coast of the Red Sea in autumn but do so in spring (Buechley *et al.* 2018). However, given the relatively small number of vultures tracked, it cannot be determined with certainty that the congregations of Egyptian Vultures we observed were resident or migrants.

Food availability seems not to be a limiting factor for vultures since more than 100 livestock carcasses (mainly cattle) were seen within a few tens of metres from the main road during the survey. Few of them were fresh, but we saw no scavengers feeding or flying around them, except for Black and Yellow-billed Kites. The areas where vultures were encountered most often were inhabited mainly by nomadic pastoralists. These pastoralists increasingly use firearms to hunt wild animals, which were said to be declining because of the increase in armed civilians. The use of poisons against wild carnivores is forbidden and seems to be an unused practice, but more research is needed. The few interviewed pastoralists said that if they have problems with carnivores attacking their livestock, they usually shoot them, but they do not use poison baits. Large congregations of stray dogs occur at the municipal slaughterhouse in Port Sudan, where until several years ago orders for shooting them were regularly issued by the municipality and poison baits had not been used.

Currently there is a large increase in electricity infrastructure across Africa (Smallie *et al.* 2009), which at medium voltage, is most often unsafe for large birds. In this respect, there is an urgent need for close dialogue between government bodies in the environment sector, electricity companies, power pole production companies, and conservation managers. However, to date there has been very little action undertaken in this respect across the continent, while probably hundreds of thousands of kilometres of electricity infrastructure are planned to be built in Africa in the next decades (Smallie *et al.* 2009).

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