
Comoé National Park – a key site for the conservation of critically endangered vulture species in West Africa

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Title page, large: White-backed Vultures and a White-headed Vulture gather at a shallow arm of the Comoé River to drink and bathe; small, left to right: White-backed Vulture, White-headed Vulture, Hooded Vulture.

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Summary

Vulture populations have declined throughout Africa in recent decades, and especially in West Africa vultures are now mostly restricted to protected areas such as Comoé National Park (CNP) in north-eastern Côte d'Ivoire. In 2017, the NABU International Foundation for Nature started a vulture conservation project in the Park with the aim to (1) assess the status of species of vultures in the Park and (2) to study their movement ecology in order to assess the size of reserves needed to host viable vulture populations. The final goal of the project is to raise awareness of the importance of CNP for conservation of critically endangered vulture species in West Africa, and to provide arguments for the implementation of a Vulture Safe Zone within the Park and the surrounding areas according to the concept outlined in the recent Multi-species Action Plan to Conserve African-Eurasian Vultures.

Between 30 December 2018 and 05 February 2019, 357 km of survey-tracks were walked in the south-west of the park in search for vultures. In total, there were 55 observations of White-backed Vultures *Gyps africanus*, 19 of White-headed Vultures *Trigonocaps occipitalis* and seven of Hooded Vulture *Necrosyrtes monachus*. These three species are listed as Critically Endangered by the IUCN. Twenty-one active nests of White-backed Vultures, two of White-headed Vultures and one of Hooded Vulture were found. Attempts to capture vultures to equip them with GPS-tags failed because, in contrast to 2017, vultures could not be attracted to a bait.

Although few vultures were recorded in the southern parts of the study area nearer the periphery of the Park, the results indicate the important role that CNP plays as a refuge for critically endangered vulture species in West Africa. The project will be continued to monitor abundance, distribution and breeding success of the vultures in the Park. Additionally, a project to study the role of vultures in society is planned with the aim to assess threats that vultures face outside the Park, to evaluate the potential for awareness campaigns, and to guide further conservation actions in the surrounding area.
1 Introduction

Comoé National Park (hereafter CNP) is, at 11,500 km², one of the largest national parks in West Africa. It is situated in north-eastern Côte d'Ivoire between 8.33°N and 9.50°N and 3.25°W and 4.50°W. Especially in the south-west, the Park consists of a savannah-forest mosaic with gallery forest along the main rivers (Comoé, Iringou, Kongo) (Fig. 1). Alluvial plains, characterised by the lack of trees and bushes, are often found along the gallery forest of the Comoé River (Porembski 1991).

CNP hosts five species of vultures: Palm-nut Vulture *Gypohierax angolensis* (frequent), Hooded Vulture *Necrosyrtes monachus* (frequent), White-backed Vulture *Gyps africanus* (common), Lappet-faced Vulture *Torgos tracheliotus* (uncommon) and White-headed Vulture *Trigonoceps occipitalis* (frequent) (Salewski 2000).

Between 1994 and 2000, the author spent in total about 24 months in CNP, mostly in the south-west, with regular visits to the north-west in 1998/99. The author revisited the south-west again for two visits of about two weeks each in January/February 2015 and 2016. During recent visits it was apparent that large antelopes (roan antelope *Hippotragus equinus*, hartebeest *Alcelaphus buselaphus*) were more frequent in the south-west than they were in the 1990s, and that the numbers of vultures (mainly White-backed Vultures, but also Palm-nut Vultures, Hooded Vultures and White-headed Vultures) seen were surprisingly high and with a high proportion of immature birds indicating good breeding success in recent years. This ran counter to the trend described for Africa in general and West Africa in particular (Thiollay 2006, Ogada et al. 2015) and led to the initiation of the Vulture Conservation Project of the NABU International Foundation for Nature (hereafter NABU).

With respect to CNP in Côte d'Ivoire the aims of the project are:

1. To recognize the importance of CNP for the conservation of critically endangered vulture species in West Africa and to collect data to argue for the implementation of CNP as a “Vulture Safe Zone”, a concept outlined by Botha et al. (2017).
2. To study movements of different age cohorts of several species of vultures to investigate the potential of CNP to host large viable vulture populations.

These aims are to be achieved by:

- An intensive search for vultures and vulture nests to assess the
occurrence, density and the status of species in the Park;
- The fitting of White-headed Vultures and White-backed Vultures with GPS-tags to investigate their movement ecology especially with respect to questions about their home range and use of areas outside the Park.

After a first visit to CNP in the framework of the project in January/February 2017 (Salewski 2017) the field work for the project was continued in 2018 and 2019. The aim of this report is to present the results of the field work in CNP from 30 December 2018 to 05 February 2019.

2 Methods

2.1 Vulture search-tracks
The base for field work was the Ecological Research Station of the University of Würzburg, Germany, which is situated in the south-west of CNP at the eastern bank of the Comoé River (8.76969°N, 3.78933°W; Fig. 1). Between 30 December 2018 and 05 February 2019 vulture search-tracks were walked on 25 days during which about 357 km were covered (Fig. 1). Vulture search-tracks either started at the research station or after driving to a starting point. One camping trip, in January 2019, lasted for four days with the base 24 km north of the research station at 8.96100°N, 3.88378°W. On the vulture search-tracks, all raptors observed within a distance of about 500 m were identified with the aid of binoculars (Leica 10×42), and the position of the observer recorded with a GPS (Garmin GPSmap 62s). This does not, however, include the hundreds of Yellow-billed Kites Milvus migrans parasitus, Black Kites M. m. migrans and Grasshopper Buzzards Butastur rufipennis attracted to bush-fires. In CNP, vultures breed exclusively in Kapok trees Ceiba pentandra (Fig. 2; Salewski 2017) which grow in different types of forests. Therefore, the search was concentrated on gallery forests and forest islands in the bush-tree savannah. When a nest of a vulture was found, species and coordinates were recorded. After the field work, all data were transformed into a GIS (ArcMap 10.4.1). The coordinates of all raptors identified to species level and all nest positions have been deposited in the African Raptor DataBank http://www.habitatinfo.com/ardb_resources/.
Fig. 1. Vulture search-tracks in Comoé National Park, Côte d’Ivoire, walked in 2017–2019.

Fig. 2: Kapok tree with a nest of a White-backed Vulture. Comoé National Park, 24 January 2019.
2.2 Capture attempts

Attempts to capture vultures were undertaken on three occasions: 05 – 07 January, 16 – 18 January and 03 – 04 February. The first attempt was on an alluvial plain adjacent to a relatively large isolated tree. A dense forest edge about 100 m from the site was used to hide the author and one to two assistants from the vultures. The second site was 800 m away from the first. It was in an arm of the Comoé River that was dry with the exception of large shallow puddles to which at least up to fifty vultures, mainly White-backed Vultures, but also White-headed Vultures and Hooded Vultures, came to bathe and drink (Fig. 3). The bait was placed in the river bed a few meters from the edge of a puddle, and the baited trap was observed constantly from the gallery forest 30 m away. The third site was 100 m from the gallery forest of the Iringou River on an almost bare patch in the savannah. The site was 700 m from a tree containing eight nests of White-backed Vultures (see below), and an additional nest was discovered during the capture attempt less than 200 m away from the bait. Dead goats were used as baits. During all capture attempts a bownet with a diameter of 10ft (“monster bownet”, Northwood Falconry, Olympia, USA) was installed to capture vultures arriving at the bait (Fig. 4).

Fig. 3: About 30 White-backed Vultures and a White-headed Vulture rest at the water’s edge near a capture attempt site, January 2019.
3 Results

3.1 Search for vultures

Three species of vulture (excluding Palm-nut Vulture) and 19 species of other raptors (including Palm-nut Vulture) were encountered along search tracks (Figs. 5, 6). There was a clear pattern in the distribution of vultures. Although raptors in general were encountered more or less frequently on all trips, vultures were mostly seen in the northern parts of the research area. This pattern was, however, not as distinct as in 2017 and 2018, with observations of individuals of the three vulture species further south compared to previous years.

White-backed Vultures were encountered most frequently, on 55 occasions (Fig. 5) with between one and 47 individuals per encounter. The group of 47 was at a site where the birds bathed and drank in a mostly dry riverbed (Fig. 3).

White-headed Vultures were observed on 19 occasions. Sightings were concentrated in a relatively small area between the Kongo River and the research station (Fig. 6). Exceptions included a pair near a nest next to the Iringou River (see below), two
observations of single individuals south of the research station, and two observations north of the Iringou River. White-headed Vultures were seen either singly or in pairs. Hooded Vultures were seen on seven occasions south of the research station, near the mouth of the Kongo River and north of the Iringou River (Fig. 6).

Fig. 5. Vulture observations in Comoé National Park, Côte d'Ivoire, 30 December 2018 – 05 February 2019. Shown are the observations of White-backed Vultures and other raptors including Palm-nut Vultures as well as the vulture search tracks walked in 2018/19. Not shown are observations of White-headed Vultures and Hooded Vultures (see Fig. 6).
Fig. 6. Vulture observations in Comoé National Park, Côte d’Ivoire, December 2018 – February 2019. Shown are the observations of White-headed Vultures, Hooded Vultures and other raptors including Palm-nut Vultures as well as the vulture search tracks. Not shown are observations of White-backed Vultures (see Fig. 5).

3.2 Vulture nests

In total, 24 vulture nests of three species were found in 2019 along vulture search-tracks. Additionally, O. Gurova and V. Kosarev reported the coordinates of a White-backed Vulture nest (Fig. 7). All 25 nests were situated in Kapok trees. Nests of White-backed Vultures (Fig. 8A) were most frequent; 21 were discovered. These were mostly in the gallery forest of the Comoé and Iringou Rivers, but one was in a forest island. There was mostly only one nest per tree, but one tree contained eight active nests. This tree had held two nests in 2017 and five nests in 2018. In contrast to 2018, when active nests of African Fish eagle *Haliaeetus vocifer* and Woolly-necked Stork *Ciconia episcopus* were found on one occasion each in the same tree as an active nest of White-backed Vultures (Salewski 2018), no such sharing of trees was found in 2019. The respective White-backed Vulture nests were, however, not visited in 2019. The frequency of nest occupation in the three years is in Tab. 1.
Fig. 7. Nests of three species of vulture found in Comoé National Park in 2019. The enlargement shows details of a Kapok tree in which eight nests of White-backed Vultures were close to each other.
Tab. 1. Nests of White-backed Vultures found in CNP between 2017 and 2019. 1: nest occupied, 0: nest not occupied/not present, -: site not visited.

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Two active nests of White-headed Vulture (Fig. 8B) were found in 2019, one in a forest island and one in gallery forest. One of those nests was new, but the other was active in 2017 and 2018. Breeding was not confirmed in 2019 in another nest that was occupied in 2017 and 2018, although a White-headed Vulture was observed close to the nest during one of two visits. The only nest of Hooded Vulture (Fig. 8C) observed in 2019 was in a forest island. The nest was first found in 2018 by J. Lapuente. A nest found in 2018 was not occupied in 2019, and another nest discovered in 2017 and not occupied in 2018 was not visited in 2019.

Fig. 8. Nests of White-backed Vulture (A), White-headed Vulture (B) and Hooded Vulture (C) in Comoé National Park in 2018.
3.3 Capture attempts
The capture attempts were all unsuccessful because no vultures approached the baits, although vultures were in the area and were seen in the vicinity of the capture sites. Therefore, no vultures were equipped with a GPS-tag.

4 Discussion
Vulture populations have experienced rapid declines across Africa in recent decades (Ogada et al. 2015) and several species are now listed as Critically Endangered (IUCN 2016). In West Africa, vulture populations collapsed between 1969-1973 and 2003-2004 and species such as White-headed and White-backed Vulture are now virtually extinct over large regions and almost exclusively restricted to protected areas (Thiollay 2006). For the whole of West Africa, Murn et al. (2016) estimated only about 150 nests of White-headed Vulture. Therefore, reserves such as CNP may be of the utmost importance for the conservation of vulture species in West Africa.

The observations in this and previous reports confirm the importance of CNP. Since 2017, frequent observation of White-backed Vultures and, less frequently, of White-headed Vultures, as well as the discovery of 41 and three nests respectively of these species, and of three nests of the Hooded Vulture, highlights the role of the Park.

Compared to the results of the surveys in 2017 (Salewski 2017) and 2018 (Salewski 2018), there were more vulture observations south of the research station. However, compared to the mid-1990s, White-backed Vultures were apparently less abundant in the southern parts of the area covered by vulture search-tracks from 2017 to 2019. In January 1995 and 1996, daily species lists were made based on observations about two kilometres south of the present research station (Fig. 1). White-backed Vultures were noted on 22 out of 48 days (V. Salewski, unpubl. data). In contrast, in 2017 and 2018 only one White-backed Vulture was observed during walks on vulture search-tracks south of the research station, though one White-backed Vulture was reported south of the research station by another person in 2017 (J. Korb, pers. comm.). In 2019, three observations were made during ten days along search tracks south of the research station.

A number of threats are responsible for the decline of African vulture populations (Ogada et al. 2015, Botha et al. 2017). On an Africa-wide scale these include intentional and unintentional
poisoning, habitat destruction and fragmentation, decline of food availability as well as electrocution on and collision with power infrastructure. In West Africa, intentional poisoning for belief-based use has been highlighted as the main threat (Botha et al. 2017). Vultures are traded in markets on a large scale and this probably contributes significantly to their decline (Nikolaus 2011, Buij et al. 2016).

Many of these threats are not relevant for vultures within the border of CNP. There is no traffic or power infrastructure within the Park. There is no logging and in consequence there are many suitable trees for nesting. Poaching now also occurs at a low level (pers. obs., but see below), although it was widespread in the 1990s and 2000s (Fischer & Linsenmair 2001, Henschel et al. 2010). Consequently, large mammals are apparently more abundant at least in the south-western region of the Park compared to the 1990s (pers. obs.) so food appears readily available. Failure to attract vultures to baits may be indicative that there is no lack of carcasses. Furthermore, the high frequency of immature birds, including assemblages of up to 40 individuals, indicate considerable breeding success in recent years; this would not have been possible without sufficient habitat and food availability.

Capture for belief-based use is likely to be the main threat to vultures within CNP. Signs of poaching and poachers were observed in the southern part of the study area in 2017, 2018 and January 2019. Fishing nets were found and fishermen observed at several sites along the Comoé River in 2019. Shots were heard and smoked meat smelled near our campsite north of the Iringou River in January 2019.

The following scenario is speculative because data are not available. Poaching was probably widespread in the 1990s and 2000s in the Park (Fischer & Linsenmair 2001, Henschel et al. 2010) leading to a reduction of vultures in the south-west part of it. With the outbreak of Ebola in neighbouring countries, a ban on bush meat was implemented in Côte d’Ivoire in 2012. This probably led to a collapse in the trade in large mammals and vultures from the Park. Although the ban on bush meat was lifted in 2016 and bush meat is again available, e.g. in the market in Bouaké (pers. obs.), the second largest town in the country, poaching is still at a low level in the Park giving hope that the situation for vultures will remain favourable in the future. However, increased signs of poaching observed in January 2019 compared to previous years show that enhanced efforts are
necessary to conserve the Park’s wildlife for the future.

5 Perspective
NABU will continue its project. In accordance with the suite of essential actions in the Multi-species Action Plan to Conserve African-Eurasian Vultures (Botha et al. 2017), monitoring of vultures and their nests will be continued. The aims of future monitoring in CNP are to obtain reliable data for each vulture species on population size, trends and distribution.

For these aims, additional areas of the Park will be searched in the coming years. Questions that should especially be addressed are: how far away White-backed Vultures breed from the gallery forest; how widespread the White-headed Vulture is in the Park; and whether the observed gradient of decreasing numbers of vultures in the south of the Park is a latitudinal gradient or indicative that vultures become rarer towards the Park’s edges? The latter possibility might reflect higher levels of threat closer to inhabited regions. Furthermore, future monitoring should aim to reveal whether the observed relatively large number of immature vultures leads to increasing numbers of breeding pairs and spread of nests into currently uninhabited areas such as the southern edge of the Park.

The project will also attempt to study the movement ecology of vultures in the Park using GPS tags. The aim is to collect data on ranges and dispersal of vultures in order to assess the size of protected area needed to host a viable population, and to assess the risk that individuals will leave the protected area in search of food, nesting sites or mates.

In cooperation with the University of Nangui Abrogoua, Abidjan, a project is planned to monitor breeding success of the vultures in the Park, contributing to an understanding of population dynamics. A second project will address the importance that vultures have to society in order to understand the background of the threats to vultures. This would include a survey of markets and interviews with people dealing in, using, or hunting vultures.

The goal of the project is to establish CNP as a zone in which vulture populations thrive and reproduce and from which they can spread. A necessary precursor to this will be the establishment of awareness and education programmes about the role of vultures in the conservation of biodiversity, and the ecosystem services they provide. These
project aims to transform large areas of country outside protected areas into a general ‘vulture-friendly-landscape’ in which people and vultures live together without conflicts. This will conform to the concept of “Vulture Safe Zones” as outlined by Botha et al. (2017), in which significant areas of land are managed in favour of vultures, working with land owners and land managers to encourage positive action for vultures. The implementation of a Vulture Safe Zone in and around CNP is the final goal of the NABU’s vulture project in Côte d’Ivoire.

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7 References


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