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PROJECT REPORT

Assessing Togo's last Abyssinian ground-hornbill population and threats to its conservation from illegal activities in Fazao-Malfakassa National Park

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Figure 1. Abyssinian hround-hornbill at dusk. Photo by Andreas Wittke.

Cover photo: Female Abyssinian ground-hornbill in flight. Photo by Darcy Ogada.

Note: Due to the extreme rarity and elusiveness of remaining Abyssinian ground-hornbills in Togo, most photos of this species presented in this report were taken elsewhere in Africa; photos of this species in Fazao-Malfakassa National Park, Togo, are presented in the Appendix III.

Executive Summary

The Abyssinian ground-hornbill (*Bucorvus abyssinicus*) has been extirpated from much of its native range in Africa due to its persecution for bushmeat and wildlife trade, as well as the extensive destruction of the savanna woodlands that comprise its native habitat, and has been designated by the IUCN as vulnerable to extinction. To date, however, there have been no peer-reviewed ecological studies of this species in the wild. Here, we report on our investigation of the conservation status of the last Abyssinian ground-hornbill population in Togo, in Fazao-Malfakassa National Park (FMNP). The few historical reports of this species in Togo include records from Oti-Kéran National Park prior to its destruction due to domestic political conflicts starting around 1990. Since then, all documented sightings of this species in Togo have been restricted to the country's largest and most intact protected area, FMNP. The Park was once protected by the Swiss NGO Franz Weber Foundation from 1990-2015, after which the government of Togo assumed responsibility for the park's management.

Following a 2019 sighting of a single individual Abyssinian ground-hornbill in flight in FMNP, searches for this species in 2022-2023 were unsuccessful, resulting in fears the species might be extinct in Togo. However, several observations of an apparent family group of three Abyssinian ground-hornbills inside FMNP in November 2024 confirmed the survival of this species in FMNP and inspired the present study. Fieldwork began in June 2025 at the species' last (2024) sighting location, from which we conducted transects, point counts, and audio playback sessions. For the next three months we combined interviews and visits to nearby villages with targeted searches inside the national park. We visited 35 villages around the national park and performed structured interviews with 44 people who gave 45 first-hand accounts of Abyssinian ground-hornbill observations in the national park. Past sighting locations, expert opinion, and traditional ecological knowledge guided targeted searches across 396 km of transects. Unfortunately, we were unable to make any new ground-hornbill observations, but instead found significant illegal activity inside the park, including poaching, logging, and cattle herding.

Interview results showed that while some traditional taboos prohibited ground-hornbill hunting, hunting was considered the main cause of decline, with bushmeat being the primary use of the bird, and nearly half (45%) of all interviewees reported the species is hunted for belief-based use. Fewer than a fifth (17%) of interviewees reported seeing the bird in the park within the last 5 years, but more than half of all reported sightings (25 of 45) were from this period. Sightings were reported across all park sectors, with 43% attributed to river ecosystems. Our findings suggest that a small population of Abyssinian ground-hornbills remains inside the park, which are almost certainly the last remaining individuals of this species in Togo. Remote-sensing analysis also predicted Togo's most suitable habitat for the species is largely contained within FMNP. However, there is a high degree of illegal activity inside the park threatening their survival, especially poaching. Poaching sign encounter rate was about 1/1km walked in the peak dry season hunting time. Rangers are underfunded and operating in a park severely lacking in infrastructure. Unless illegal activity inside FMNP is rapidly reduced, this species will likely become extinct in Togo.

Project objectives and study design

After a group of three AGH were recorded in Fazao-Malfakassa National Park in 2024 (see Appendix II), the question rose as to what population may remain in Togo. The project's aim was to investigate these observations and clarify the status of this species within the context of its range wide decline. To achieve our three project objectives and our ultimate purpose of informing conservation actions, we combined interviews with local people and targeted searches for the bird in FMNP starting in June 2025. We also collected data on all anthropogenic activities in the park while searching for the bird. Observed illegal activities and threats to AGH were analyzed in the context of known habitat preferences to assess the species conservation status in Togo.

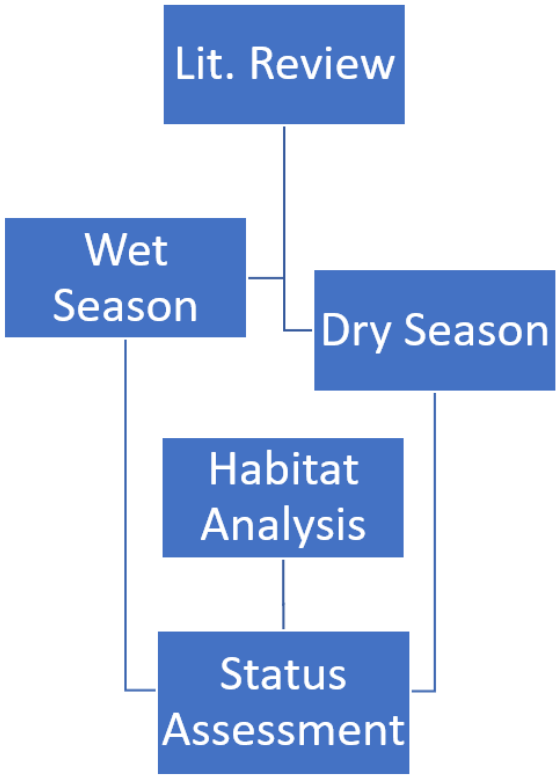
Objectives

I. Document distribution and population status of Abyssinian Ground-Hornbills in the park

II. Quantify poaching, illegal logging, and other illegal activities in the park

III. Apply the IUCN Red List criteria to assign a conservation status to Abyssinian Ground-Hornbills in Togo

Study design



Lit. Review (Obj. I)
- Range and biology
- Historical occurrences in Togo

Wet Season (Obj. I, II)
- Targeted searches
- Village interviews

Dry Season (Obj. I, II)
- Targeted searches

Habitat Analysis (Obj. III)
- Distribution predictions

Status Assessment (Obj. III)
- Reports

Figure 2. Study schema.

Range and biology: Global range maps, historical occurrences, and citizen science observations were collated to produce a comprehensive understanding of distribution. Known biological characteristics useful for field searches, such as habitat preferences, behavior, and diet were sourced from literature and discussions with experts.

Historical occurrences in Togo: All historical records of AGH occurrence in Togo were gathered and georeferenced.

Targeted searches: Transects, point counts, long-searches, and audio playback recordings were used to search for the bird in past sighting locations and suitable habitat while recording incidental anthropogenic activity encounters.

Village interviews: Structured interviews with individuals with first-hand knowledge of AGH and semi-structured group discussion on local ecological knowledge (LEK) of the bird in villages adjacent to FMNP were used to inform targeted search locations and contextualize illegal activities and threats to AGH.

Distribution predictions: Species distribution modelling techniques were used to predict suitable habitat for the bird in Togo.

Reports: The study results will be disseminated and used to inform conservation management decisions inside FMNP as well as the conservation status of the species in Togo and across its range.

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c) Henry Luedtke - Georg-August-Universität Göttingen; IBCP
d) Yendoubouam Kourdjouak - IBCP

Background

Of the 32 African hornbill species, only 3 are considered to have stable populations (Birdlife International 2026). African hornbills face an array of threats, including habitat degradation, climate change, and illegal trade (Holbech et al., 2018; Lado et al., 2025; Trail 2007). Despite this understanding, only 5 species of African hornbill are currently listed as threatened on the IUCN Red List (IUCN 2026). It is acknowledged this low number of listings may in part be due to a severe lack of quantitative data and field studies on African hornbill demographics and biology (Lado et al., 2025). Population estimates do not exist for any African hornbill species (Birdlife International 2026). An assessment of African hornbill data by the IUCN Hornbill Specialist Group concluded that 27 of the 32 species should be reclassified as Data Deficient on the Red List (Datta et al., 2020). Without baseline data, targeted conservation measures, environmental policy, and biological research are made difficult. In such circumstances, it is

important to investigate alarming reports of species declines. Here we investigate the status of Abyssinian Ground-Hornbill (AGH, *Bocurvus abyssinicius*) in Togo (Figure 3) after recent observations of the species in its last known location in the country.

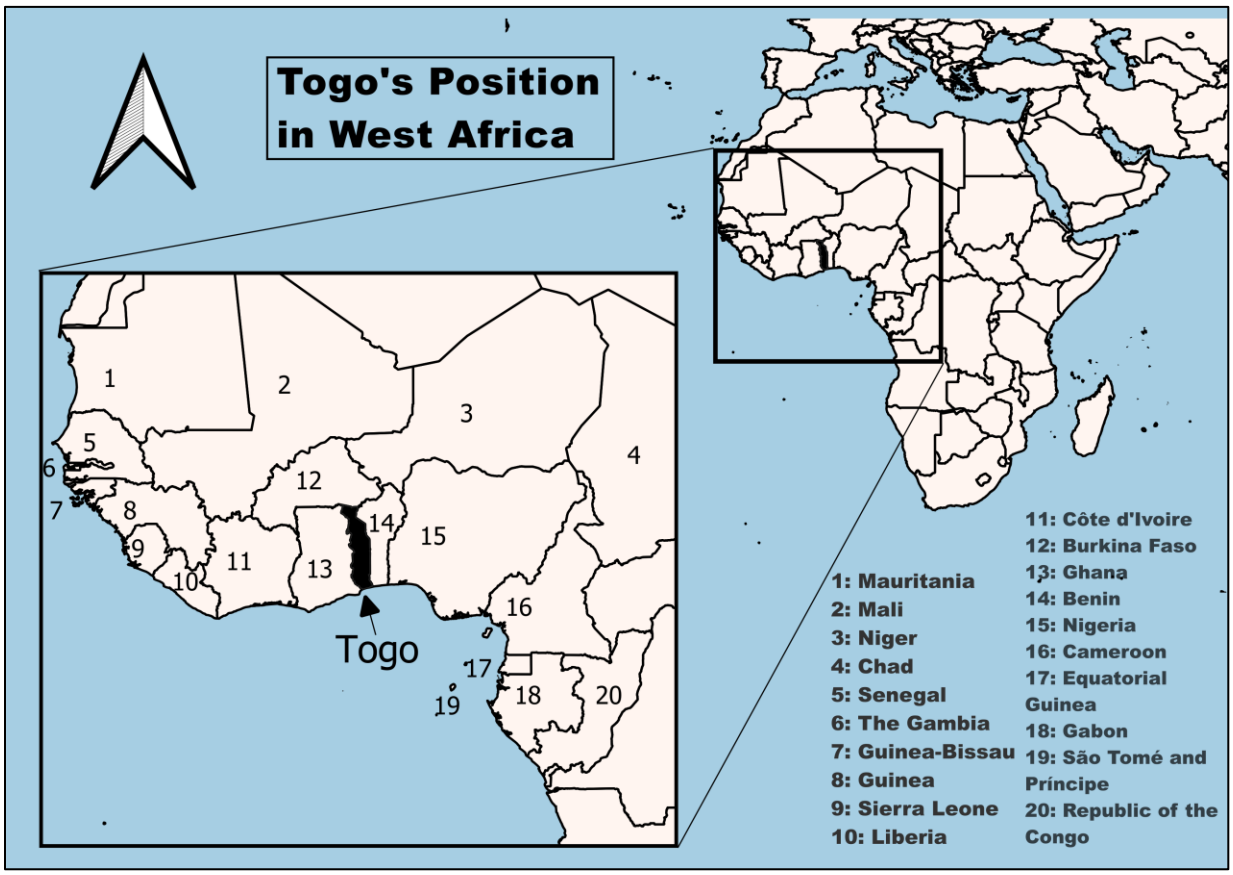


Figure 3: Togo's position in West Africa. Map by Henry Luedtke.

Species description

Of the 62 hornbill species worldwide, two are unique terrestrial species of the genus *Bucorvus* residing in Africa, known as the ground hornbills. They are the largest members of the order Bucerotiformes and represent the earliest known hornbill radiation (Viseshakul et al., 2011). The two extent species are the Southern Ground-Hornbill (SGH, *B. leadbeateri*) and the Abyssinian Ground-Hornbill (also: Northern Ground-Hornbill). Both are considered Vulnerable by the IUCN due to reported population declines and local extinctions (Birdlife International 2026). Unlike most other African hornbills, the SGH has a relevantly high number of peer-reviewed studies and is the only African hornbill with a conservation plan in place (Kemp et al., 2023). In comparison, at the time of writing, no published *in-situ* research exists for the AGH except for two ethno-ornithological studies (Asefa 2023; Asefa and Debella 2021).

Its biology is only generally described in literature. AGH are large (turkey-sized) birds, typically inhabiting savanna grassland and woodland from close to sea-level in Gambia up to 3257m in the East African Plateau. It seems to avoid dense forests but has been found in association

with gallery forest ecosystems. It roosts in trees and cavity nests like other hornbills, although it does not seal its nest entrance like other hornbills. Its call is a far-carrying, low-frequency booming, sometimes being reported as a moaning. The species is omnivorous but is often seen eating insects and small vertebrates. Their breeding behavior is poorly understood and are not known whether to be cooperative breeders like SGH. During the breeding season in West Africa, they will lay eggs between Jun-Aug. Not much is known about its preferred nesting habitat, although they seem to prefer to nest in large trees such as Baobabs (*Adansonia spp.*) but have also been seen nesting in rock crevices or on top of palm stumps (*Borassus spp.*) (Ref. Kemp 1995; Thiollay, J. M., 2002; Serle et al., 1977; Stevenson & Fanshawe 2020).

There exist various cultural associations with this species across its range. The Hausa people of northern Cameroon and present-day South Sudan use the head of the bird as a hunting decoy (Kemp 1995). In Ethiopia, the bird is prevalent in local folklore and mythology (Asefa & Debella 2021: Asefa 2023). In Gambia the bird is considered an ill omen when not seen in flight (Cawkell & Moreau 1963). One of the earliest descriptions of the bird in West Africa, from modern day Nigeria, mentions it being an important source of medicine (Denhem et al., 1826). Kemp (1995) reports that the bird "[e]njoys a totemic function in many areas, and generally unmolested."

Table 1: Number of records by country uploaded to the Global Biodiversity Information Facility.

Uganda	4,004	Niger	45
Ethiopia	1,818	Dem. Rep. of the Congo	35
Senegal	599	Côte d'Ivoire	18
Ghana	594	South Sudan	14
Gambia	541	Sudan	12
Benin	300	Somalia	9
Chad	99	Guinea-Bissau	9
Cameroon	88	Mali	8
Kenya	71	Eritrea	8
Nigeria	65	Guinea	3
Central African Republic	65	Tanzania	2
Burkina Faso	48	Togo	1
Total	**8,457**	Mauritania	1

Observation count by range states with at least one observation available on the Global Biodiversity Information Facility. (GBIF.org 9 Mar 2026). Observations were cleaned of errors, outliers, and museum records, but not filtered by time. Counts only include GBIF entries and are primarily citizen-science observations and do not encompass all historical records (e.g. Togo's count is 1 on GBIF).

West Africa population

The species is present in at least 26 countries with a range extending from Senegal and Gambia across the continent to Ethiopia and Kenya. Its total population is not known. In some areas it is locally common, such as in the large protected areas of East Africa, while in other countries it is all but extinct. Citizen science observation numbers are biased to protected areas with strong eco-tourism activity but looking at this data nevertheless gives an impression of regions with more or fewer AGH (Table 1). Despite a wide range and lack of data, Birdlife International found reports of their population declines and threats concerning enough to reassess the species in 2018 and uplist it from Least Concern to Vulnerable (Birdlife International 2018). Most concerning are the declines and extirpations being reported from West Africa where the small, fragmented remaining populations survive almost only in protected areas (Figure 4) and face local extinction.

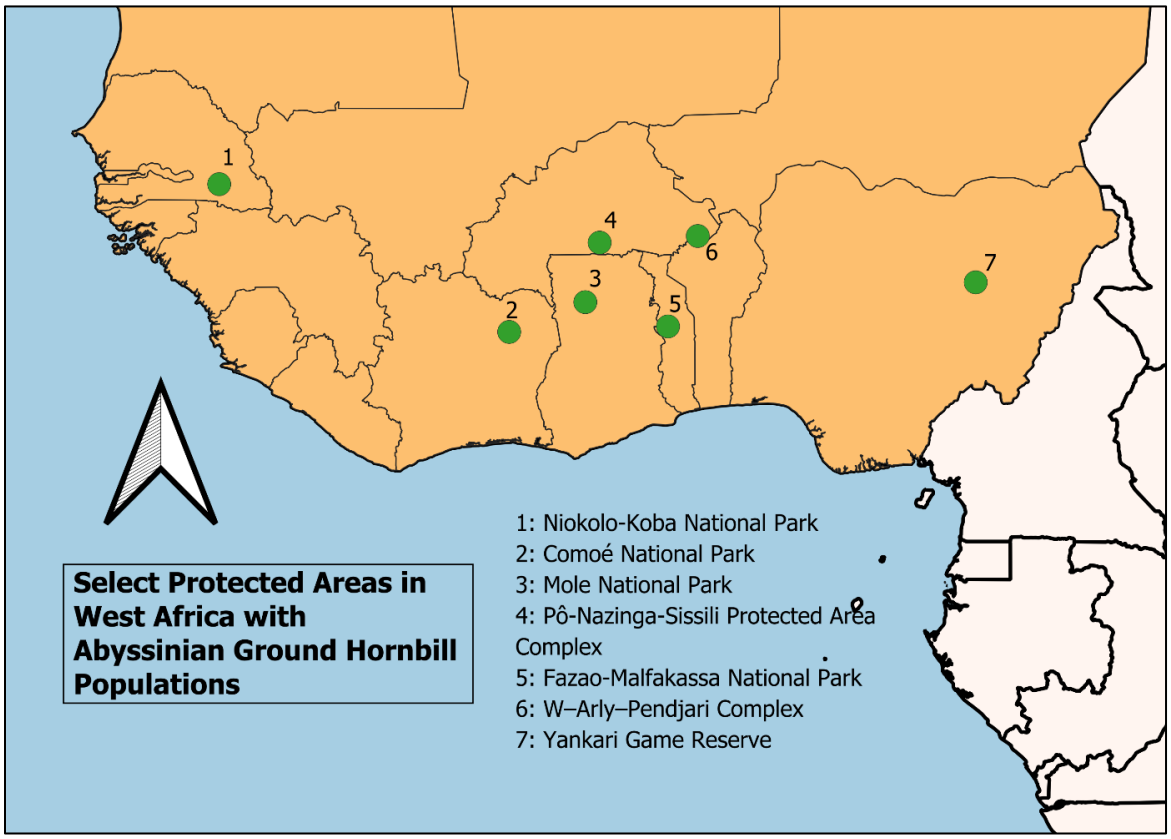


Figure 4: Selected protected areas in West Africa with AGH populations. Population presence informed by expert knowledge and citizen science reporting taken from the publicly available records on the Global Biodiversity Information Facility. (GBIF.org 9 Mar 2026). Map by Henry Luedtke.

The biodiversity of West Africa has been facing severe declines and threats for decades, and its remaining natural areas are some of the least intact and most fragmented on the continent (Brandt et al., 2017; Clements et al., 2026; Mallon et al., 2015; Norris et al., 2010). Its avifauna populations have collapsed in both what little tropical forest remains and as well as in the savanna

and grassland ecosystems (Beier et al., 2002; Thiollay 2006). Human populations in West Africa are also growing in both urban centers as well as rural settings (Walter 2021). This growth is increasing the pressure on remaining natural area fragments (Herrmann et al., 2022). In Togo, most of the wild savanna ecosystems have been converted to farmland (Bernieh et al., 2020; Ehlui et al., 2020). Between the 1970s and 1990s, Togo increased the number of its protected areas and nature reserves; unfortunately, however, many of these efforts met with armed resistance in the north of the country, culminating in the mass slaughter of wildlife and near total destruction of state-managed protected areas including Kéran National Park, Oti Wildlife Reserve, and Fosse aux Lions National Park (Tchamie 1994; Kaboumba et al., 2025). By contrast, from 1990 to 2015, FMNP was privately managed by the Swiss NGO Franz Weber Foundation, which developed and maintained the park's infrastructure and monitoring capabilities. Following FMNP's reversion from private to state control in 2015, nearly all local inhabitants are calling for the park's return to private management (Franta et al., 2026).

In 2026, there are officially registered 89 protected areas in Togo (UNEP-WCMC 2026; Figure 5); however, many are suffering from human intrusion, resource extraction, and land cover change, existing as protected areas more in name than in reality (Cheke & Walsh, 1996; Dowsett-Lemaire & Dowsett, 2019). For example, Togo's strict nature reserves are all facing a variety of human pressures. Togodo South National Park is being converted into agriculture (Akodéwou et al., 2020), Oti-Mandouri Wildlife Reserve and Kéran National Park have had their megafauna culled and the natural landscape converted into farmland or rangeland (Fousseni et al., 2012; Kaboumba et al., 2025), and Fosse aux Lions National Park has been largely deforested (Dowsett-Lemaire & Dowsett, 2019). The country's largest and least degraded protected area is Fazao-Malfakassa National Park, but it too is suffering from illegal activities (Kaboumba et al., 2025).

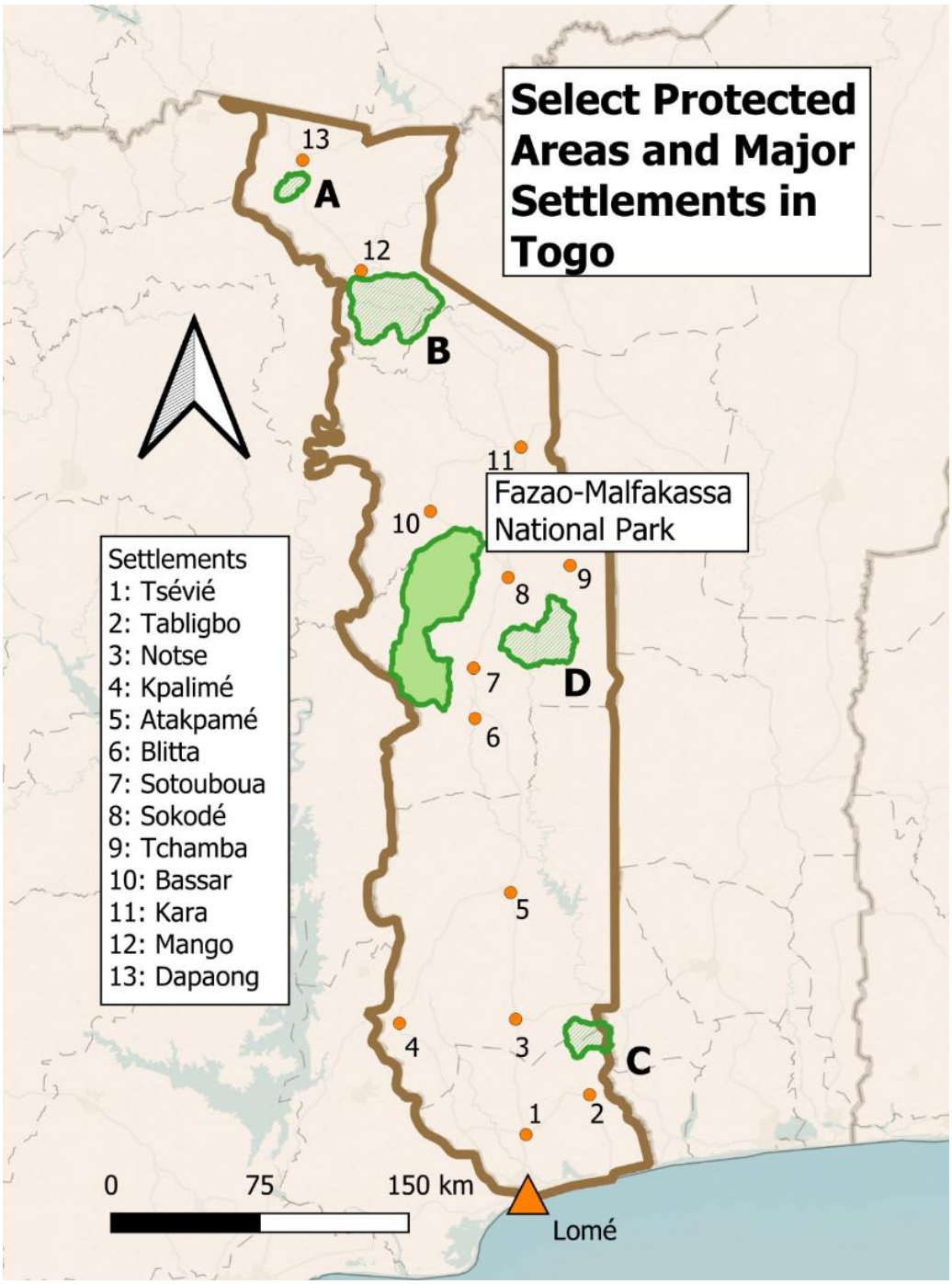


*Figure 5: Select Protected Areas and Major Settlements in Togo. All protected areas in Togo besides FMNP are heavily degraded. This includes Togo's three other national parks: **A** - Fosse aux Lions National Park; **B** - Oti-Kéran National Park; and **C** - Togodo South National Park (managed in coordination with the adjacent Togodo North Natural Resources Management Zone. The Abdoulaye Faunal Reserve (**D**) is shown here due to its proximity to FMNP and its reference in Dowsett-Lemaire & Dowsett (2019) as a protected area no longer containing AGH. Map by Henry Luedtke.*

Methods

Study location

FMNP (08°40'N 00°43'E) is Togo's largest protected area (c. 224,275.7ha) and last semi-intact natural area (Cheke 2001; Kaboumba et al., 2025; Figure 6). The park is located in the Centrale and Kara Regions of the country within the Sudano-Guinea forest-savanna mosaic and the Dahomey Gap, an ecological transition zone that separates the Upper and Lower Guinea forests by Sahel influenced savanna ecosystems.

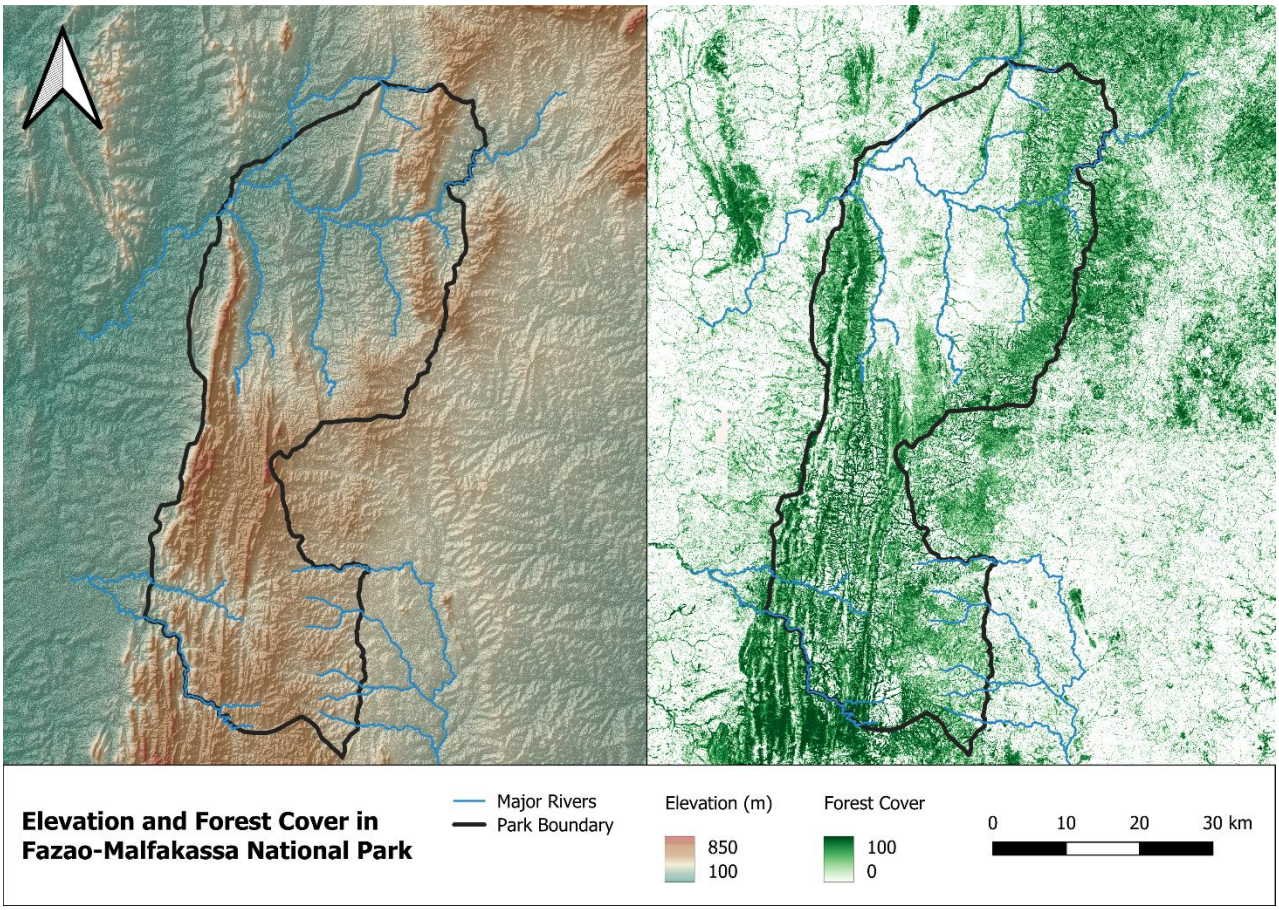


Figure 6: Elevation and Forest Cover in FMNP. Forest cover data is at 30x30m resolution taken from the year 2000 using Landsat 7 satellite imagery and displayed as percent canopy density. Low density (white) areas may qualify as savanna woodland forest classification. Forest cover data available from the Global Forest Watch data portal: https://data.globalforestwatch.org/. Map by Henry Luedtke.

The annual rainy season lasts from April to October and the dry season from November to March, with the average annual temperature at *c.* 25 °C, and the total annual rainfall between *c.* 800 and 1500mm (Segniagbeto 2017). The park contains mostly savanna grassland and woodland, but also semi-evergreen gallery forests (Dowsett-Lemaire and Dowsett 2019). Semi-evergreen forest patches also exist in the rugged hills that form part of the Atakora mountains. These hills include the Monts de Malfakassa and the Monts du Fazao. A prominent inselberg, Mont Kpéya

(841 m), exists in the middle of the park amongst undulating hills and wide bowals. The park is crossed by the Mô River in the north, and several large rivers traverse its length, including the Kamassi, Loukoulou, and Kewa Rivers. Biodiversity in FMNP is high (Figure 7). Important tree species in the park include *Acacia* spp*, Adansonia digita, Ceiba pentandra, Khaya senegalensis, Parkia biglobosa*, *Tarmindus indica* and *Vitellaria paradoxa* (Cheke 2001; Dowsett-Lemaire & Dowsett 2019). In addition to AGH, there are at least 329 bird species present including threatened species such as the Endangered bateleur (*Terathopius ecaudatus*) and Endangered martial eagle (*Polemaetus bellicosus*) (Kaboumba et al., 2025). There are also at least 57 mammal species, including the Critically Endangered African forest elephant (*Loxodonta cyclotis*), Critically Endangered ursine colobus (*Colobus vellerosus*), and the Data Deficient Walter's duiker (*Philantomba walteri*) (Assou et al., 2021; IUCN 2026).

Figure 7: Images of biodiversity in FMNP. From top left clockwise: Savanna woodland with Mont Kpéya (Photo by Henry Luedtke, FMNP), Endangered Martial Eagle (Photo by Nico Arcilla, Kenya), Critically Endangered African Forest Elephant (Photo by Nico Arcilla FMNP), Critically Endangered White-thighed Colobus (Photo by Lin-Ernni Mikégraba Kaboumba, FMNP).

Figure 8: Images of habitat in FMNP. From top left clockwise: Fazao mountains near Boulahou (photo by Sylvain Uriot), Kamaka River in the dry season (photo by Nico Arcilla), burnt savanna woodland and lush evergreen forest (photos by Henry Luedtke).

Threats

While better preserved than Togo's other protected areas, and the only one employing rangers, FMNP faces many threats. Poaching is widespread across all park sectors, including the remote interior. Illegal logging is common, especially along the park borders. Trees are primarily harvested for the production of charcoal, but also for their timber. A particular issue for hornbills and other cavity nesting birds is the widespread harvesting of honey within the park. To access the honey from wild bees, honey harvesters will fell the entire tree regardless of trunk size. This reduces available nesting habitat for cavity nesting birds which rely on such trees. A satellite imagery study found that between 1987-2015, FMNP's closed canopy forest and tree-savanna forest declined by 40% and 20% respectively while fragmentation and agricultural land increased (Astri et al., 2018).

While land conversion for agriculture and agroforestry are clear drivers of the loss of FMNP's forests, the effects of bushfires are diffuse and potentially severe. While bushfires are a natural component of savanna ecosystems, many human-made fires are started in FMNP and throughout Togo during the dry season as part of a hunting tactic by poachers and a fire regime by park management (Afelu et al., 2015). Between 2014-2020, fire frequency increased 33.35% and is likely the main driver of savanna forest cover loss in the park (Komate et al., 2024). Another significant driver of vegetation change is cattle herding. Illegal cattle herding is pervasive

throughout the park. While it is most common along park boundaries, cattle are herded essentially everywhere except for the rugged Monts du Fazao. Riverbeds and river valleys act both as access corridors as well as food and water sources for the cattle. In the dry season, cattle herders will fell trees to feed green leaves to their cattle. There is also illegal mining and fishing activity along major rivers. Agricultural land and human settlement almost entirely surround the park except for the adjacent Kyabobo National Park across the Ghana-Togo border. Agriculture has expanded into the park in a number of areas and in the 1990s, thousands of people were resettled within the park the boundary as a result of domestic political conflicts (Dowsett-Lemaire and Dowsett 2019). In 2015 the park boundary was changed, expanding certain sections while degazetting others, including the area with human settlement. Human-elephant conflict is especially prevalent in this area (Ref. Kaboumba et al. 2025).

The number of people living within a 5km radius of the park as of 2018 was estimated at 120,000 (Astri et al. 2018). Local residents are mainly of the Adélé, Agnanga, Bassar, Fulani (Peuls), Kabyè, Kotokoli, and Losso ethnic groups (Franta et al., 2026; Saparapa 2018). The populations are mainly agricultural except for the nearby city of Sokodé, which is within 10km of the park boundary. A road crosses the park linking the villages of Tassi and Fazao and is frequently traversed and utilized for honey production. Community forests have been established along the park boundary in an attempt to support local residents and act as a protected area buffer (Figure 9). In practice, many of these areas have been converted into agriculture or teak (*Tectona grandis*) plantations.

Transects and point counts

Field work was split into two seasons, the wet season of 2025 and the dry season of 2026. Since there are extremely few historical observations of AGH in Togo and a systematic survey of the entire park was not practicable, we conducted targeted searches based off known habitat preference, expert opinion, and the knowledge of local people. Targeted searches were performed in both the dry and wet seasons. Although the terrain is more difficult during the wet season, a sighting of the bird during its breeding months and the possibility of finding an active nest site was worth the added difficulty. In comparison, visibility is greater during the dry season and the terrain more accessible due to the dieback and burning of grasses; however, poaching activity is greater.

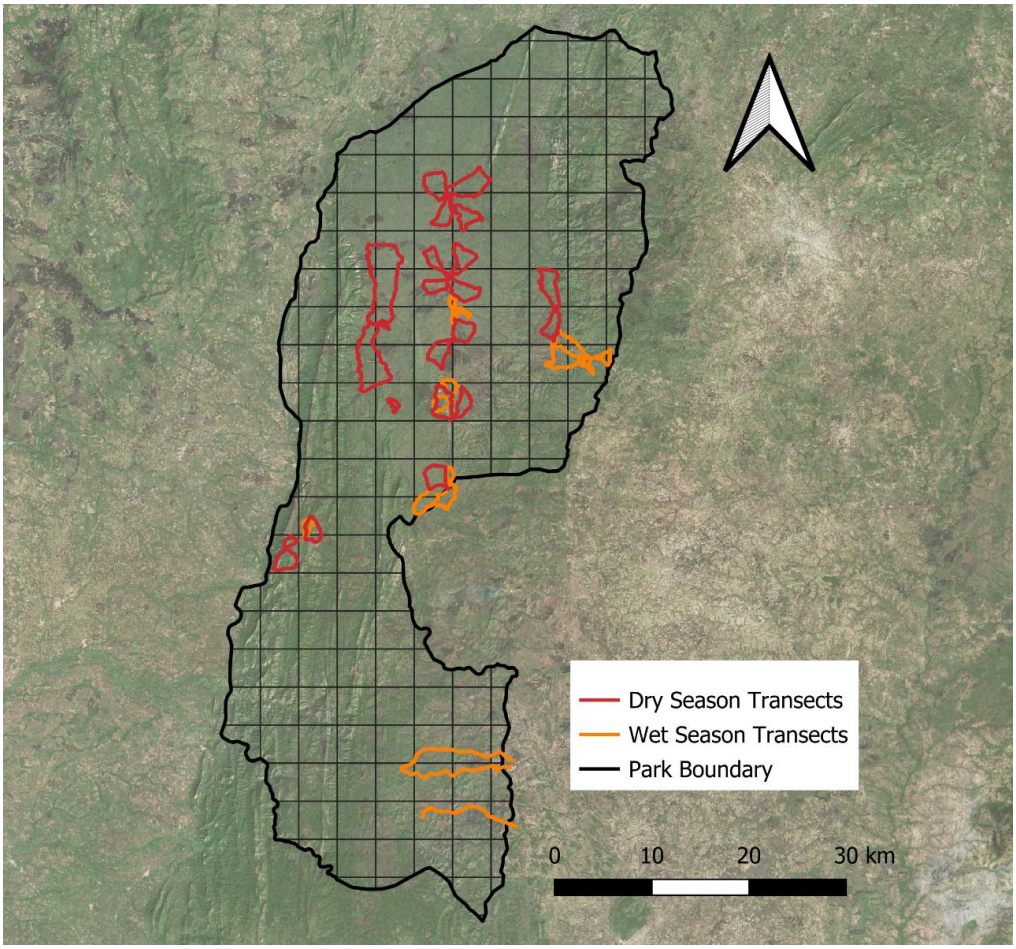


Figure 9: Transects from wet and dry seasons in FMNP over grid with 4x4km cells. Map by Henry Luedtke.

Targeted searches were primarily carried out in the form of reconnaissance ('recce') transects, but we also incorporated point counts, long-watches, and audio-playback. The transects involved walking distances between 5-20km across a diversity of habitats. Paths of least resistance were taken along rivers and over hills, selecting for directions that would give us good vantage to search for AGH but avoiding habitat known to be unsuitable, such as especially dense gallery forest or extremely rugged hills. Along the transects, 20-minute point counts were taken no less than 1.5km apart at locations with good vantage. After and between point counts and at sites at least 1km apart we stopped for 10 minutes to play audio-recording of the bird's two main calls. Transects were walked slowly and quietly at 'birding pace.' We sometimes deviated to investigate large trees for potential nest sites, especially the species *Adansonia digita, Ceiba pentandra,* and *Khaya senegalensis*. During transects and point counts, we also recorded all bird species we were able to identify, as well as any sign of megafauna or human activity. Long watches were mainly held at the bird's last sighting location, an artificial water source built for wildlife viewing. This location boasts the highest number of observation records of anywhere in the park. Watches would begin at sunrise and last roughly the entire day, except for a two-hour break from 12:00-14:00.

We also recorded all incidental observations of illegal human activity. Illegal activities included forms of logging, cattle herding, and poaching, as well as others such as mining or agriculture. All signs of human activity were marked with GPS and categorized by type and relative age. Due to the seasonality of Togo's climate, it was usually clear if signs of activity were recent or from longer than one year ago. Direct and indirect mammal observations were also recorded. Indirect mammal sign, such as tracks and scat, was only recorded if we could confidently identify the species.

Village interviews

All interviews took place during the wet season. The primary goal was to conduct structured interviews and semi-structured group discussions at as many of the *c*. 36 villages surrounding FMNP as we could. Permission for research was granted under permits No. 0019/MERFPCCC/CAB/SG/DRF JAN 2026 and No. 0205/MERF/SG/DRF JUN 2024 by the Ministry of the environment and University of Lomé. The Faculty of Sciences at the University of Lomé advised our project's plan. We presented our plan to the national park director who gave approval to proceed and informed the head rangers of all ranger stations of our project and itinerary. We aimed to find as many people with first-hand knowledge of the bird as possible. Structured interviews were conducted only with these key informants and only they provided us with additional observation accounts.

Work began in June 2025 in the village of Fazao (08°41'N 00°46'E), a major park entrance and site of the former park hotel. The village also houses one of the park's ranger stations. There, plans were made with the rangers who would be assisting us in both the bird surveys and village interviews. The head ranger of each station, after being informed by the park director of our plan, would help organize our visit to their district's villages by contacting the village chief and informing them of our plan. They also helped coordinate travel logistics, assist our introductions at each village, and find any necessary translators. They also often hosted us at their station's accommodations.

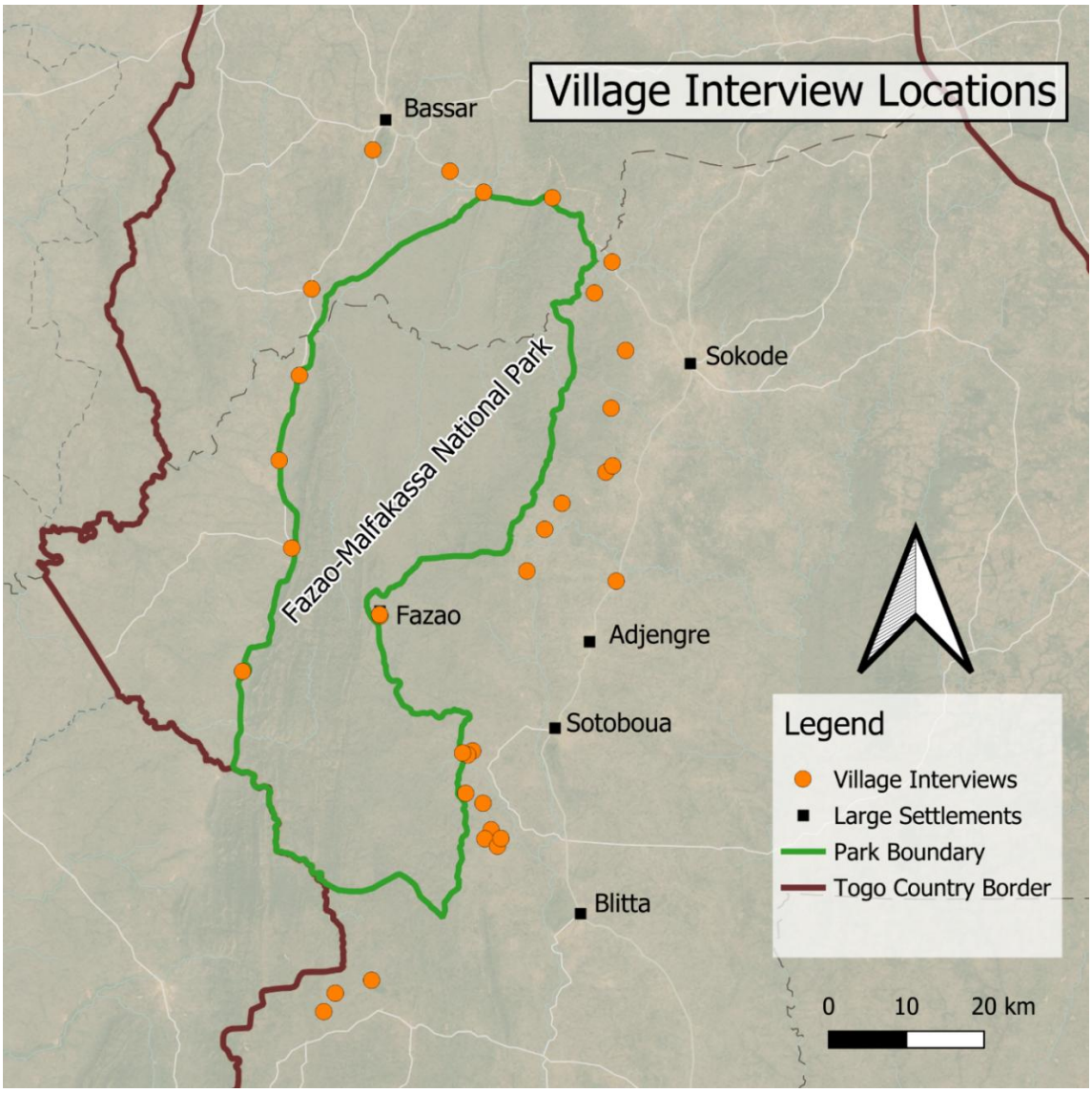


Figure 10: Structured village interview locations around FMNP. Map by Henry Luedtke.

On arriving at a village, a meeting was held with the village chief and community leaders during which we introduced ourselves and the project. After we were welcomed by the chief and local leaders, we explained in more detail that we wished to interview anyone with potential knowledge of AGH. Sometimes the chief had already gathered these people and sometimes they had to be sought later. Before beginning any interview, we requested pre-prior and informed consent aligned with the principles of the Declaration of Helsinki and the UN Declaration on the Rights of Indigenous Peoples. We emphasized that no identifiable information would be retained and the participants were under no pressure to conduct or continue the interview nor answer any question they felt uncomfortable with. After the introduction and verbal consent was obtained, we took a general tally of the number of people present at the meeting and the number of people who knew anything about the AGH. Sometimes almost the entire village would be present, while other times it would be only a select group of elders.

Figure 11: Poster used at village interviews to describe the project and study species. Poster by Lin-Ernni Mikégraba Kaboumba.

We used identification plates and audio recordings to ensure the interviewees knew the bird in question (Borrow & Demey 2022). Fortunately, AGH is unlikely to be confused with many other species, except perhaps hadada ibis (*Bostrychia hagedash)* or turkey (*Meleagris gallopavo*) if seen from a distance. One form of AGH call may be confused with that of Pel's fishing owl (*Scotopelia peli*) but the other is unique and seems to be an identifiable attribute of the bird and explains some of the local names and myths of the bird (discussed below). Using the bird's local name, rather than the French, was very useful in ensuring prospective interviewees knew the bird in question.

Table 2: List of local names by ethnicity for AGH identified during the interview process

Ethnicity	**Local names**
Bassar	Akabou Nadouka, Kabou, Kanadouka, N'druku, Okabou Nadouka, Okaboye
Kotokoli	Amabrouyo, N'droukou, N'druku, Toulou, Toulou Toulou
Adélé	Doukoulakoulè, Guetou Kpakpafui, Ògnaǹ
Kabeyè	Toulou, Toulougu
Konkonba	Oudl
Gangan	Gnonbò
Lamba	Kpimbre

Structured interviews were only sought with individuals we were confident had personally observed AGH and who could give a detailed account of their observation. It was sometimes the

case that individuals had only second-hand knowledge of the species, or they may have seen it sometime in the past but could not give a detailed account. Those with second-hand knowledge of the bird were asked to participate in semi-structured group discussion in which we inquired about local folklore, human-bird relationships, and an open discussion about that village's relationship with the national park, discussing such topics as human-wildlife conflict.

The structured interviews were done one at a time and involved ourselves, a local park ranger, and sometimes a local person acting as translator. Questions were asked in French but sometimes translated to local languages as needed. The questionnaire was comprised of 50 questions and typically lasted between 20-40 minutes. The unstructured group discussion took place with everyone present at the meeting, including those with second-hand knowledge, and discussed that community's traditional ecological knowledge of the bird and their cultural associations with it (if any). For the purposes of this study, our primary objective was detailed accounts of pasts sightings. We retained sighting records only of those able to be georeferenced within a threshold of 3km. We also conducted structured interviews with park rangers belonging to the following ranger stations: Agbamassoumou, Bounako, Elavagnon-Todji, Fazao, Folo-Banda, Hèzoudé, Kalaré, Kouvn, and Point de Vue.

Data analysis

Transect data was recorded using GPS. Three principal land conversion activities were identified: agriculture, cattle herding, and logging for charcoal. These activities were recorded as points and used to verify reports from park rangers and activity visible in satellite imagery. Polygons representing these areas were digitized by hand from Copernicus Sentinel and Google Earth satellite imagery (ESA and Sentinel Hub 2026). The presence and boundaries of adjacent community forests were digitized from old physical maps. Poaching activity was the most common and widespread activity. To investigate the prevalence of this activity and possible landscape effects on its detection rate, we used a Bayesian generalized linear mixed model (GLMM) with two predictors, terrain ruggedness index (TRI) and distance to the park boundary. Poaching activity included campsites, bullet casings, obvious poacher paths and tracks, and direct encounters with poachers. Since transects were conducted in both the wet and dry seasons, and detection probability is likely lower in the wet season due to thicker vegetation, only dry season observations were used in the models. The dry season is also the primary hunting period for poachers, although poaching still occurs year round.

To show the difference in seasonal poaching detection rates we calculated the poaching sign density per transect as the number of signs per kilometer surveyed. A Wilcoxon rank-sum test was used to compare detection density between wet and dry seasons. Since transects varied in length, to analyze the landscape effects on dry season observations, we transposed survey effort onto a 1x1km grid across the national park. Transects intersected 214 cells. Cell effort was represented as the total length in meters that a transect intersected a given cell. The average cell effort was 1.16km. Across 249.9km of dry season transects the total observation count was 261. The cell count was represented as the total number of observations falling within a surveyed cell.

TRI was calculated from a digitized elevation model (DEM) at 30m resolution for the national park. TRI is a representation of elevation heterogeneity at the centroid of a grid cell compared with its 8 nearest neighbors. TRI ranged from 0.17-8.12. Distance to park boundary was measured from the centroid of the nearest surveyed cell to the nearest point along the park boundary. Park boundary was preferred over a measurement to the nearest village as settlements around the park lie in a diffuse matrix of human habitation. Distances ranged from on the park boundary itself to 16.43km away. Cell counts were modeled as a function of TRI and distance to park boundary using a Bayesian GLMM with a negative binomial error distribution and log-link function. A log-offset was included to estimate the rate of detection as a function of cell effort. The GLMM was created using the *brms* package in R (Bürkner, 2017)

Structured interview data was collected using the free software Kobotoolbox and semi-structured group discussion information by hand. We analyzed and visualized data using Microsoft Excel, QGIS, and R version 4.5.3. For the structured interviews, question answers were given as percentages of total respondents or by profession, age, or ethnicity. Since some questions could contain more than one answer per respondent, some percentages exceed 100%. All data was then cleaned and tabulated in Microsoft excel in CSV format before being analyzed. Semi-structured interview data was collected by hand, translated to English, and summarized here to the best of our abilities.

Extent of occurrence (EOO), area of occupancy (AOO), and habitat suitability were calculated in R using newly acquired Togo occurrences and publicly available citizen science observations downloaded from the Global Biodiversity Information Facility (GBIF). EOO is area of a polygon defined by a species' occurrences whose vertices are placed at the furthest most occurrence points to form a minimum convex polygon. AOO is calculated by overlaying 2x2km grid cells over the known range of the species and counting the number of cells with at least one occurrence. Occurrences were filtered only to the years 2001-2025 and trends were shown between 5-year intervals. Habitat suitability was surmised by predicting AGH distribution using species distribution modeling (SDM) techniques in the machine-learning algorithm known as MaxNet. MaxNet is a variant of the well-established SDM program known as Maxent (Maximum Entropy) made usable within the R programming language. Maxent and MaxNet take presence-only species occurrence datasets, places them within the pixels of the geographical space of the study area and estimates the probability the species will occur across that area based on selected independent variables such as environmental or climatic conditions (Philips et al., 2006). The resulting likelihood of species distribution on any given pixel can be used as a proxy for habitat suitability given the appropriate variables were selected. We provided our model with all occurrences we collected for Togo and all those available on GBIF from the years 2001 to 2025, defined the study area as the entire range of the species and provided 12 variables selected on relevancy to known AGH biology and with low amounts of multicollinearity between eachother. The 12 variables were: the maximum temperature of the warmest month, the annual precipitation, the precipitation of the wettest month the precipitation of the driest quarter, a terrain ruggedness index, the Global Human Modification index, tree cover, shrub cover, grassland cover, wetland cover, distance to

nearest river (larger than stream Strahler order 3) and the seasonality of NDVI. We trained the model by separating the occurrences into 5 biographical folds so the model could be tested on the environmental variation that occurs across the species' continental range. The habitat suitability for Togo was visualized simply by plotting the outputs to the Togo country border.

Results

Targeted searches

Across both seasons we walked a total of 396km and conducted 39 point counts across 90 days inside the park. We observed at least 160 bird species across all transects and point counts, but no direct nor indirect sighting of AGH. We recorded several new species for the park checklist, including Rufous-tailed rock-thrush (*Monticola saxatilis*) and White-backed night heron (*Calherodius leuconotus*). Significant anthropogenic activity was observed across all transects and throughout our entire time inside the national park.

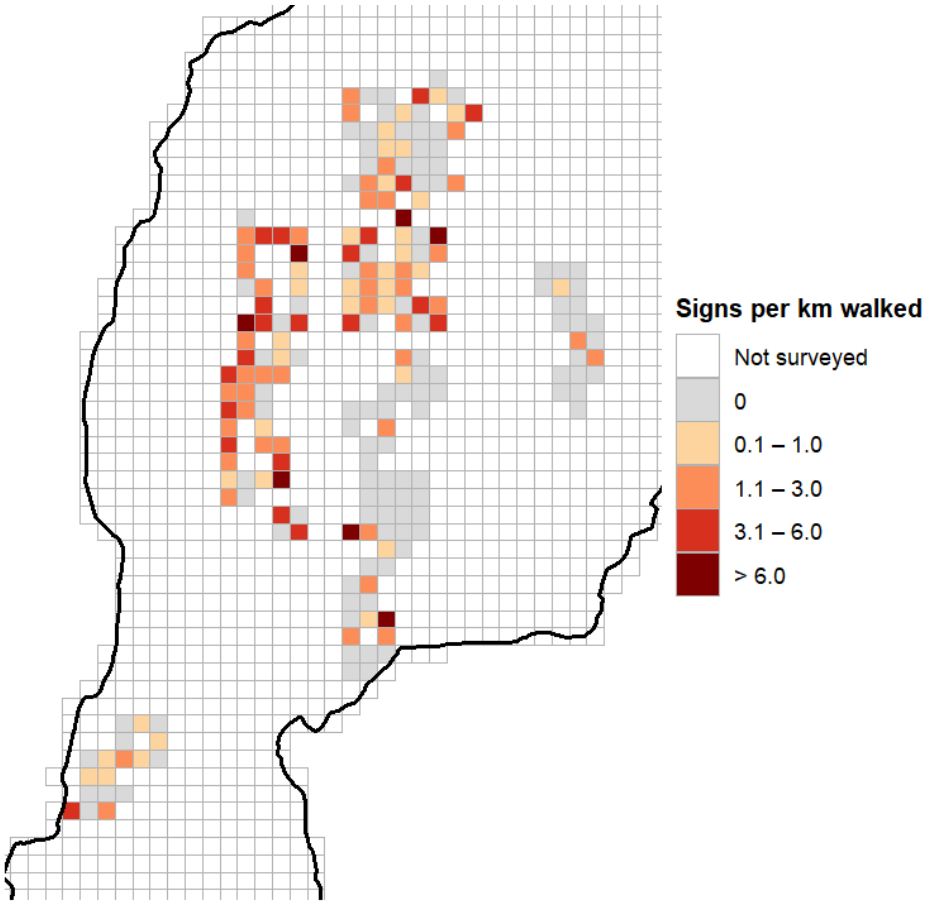


Figure 9: Poaching sign detections across northern FMNP. Grid cells are 1x1km.

We encountered the following illegal human activities inside the park: poaching, logging for honey, logging for charcoal, logging for timber, agriculture, bee-keeping, cattle herding, mining, and fishing. The most commonly encountered human activity was poaching (Table 3). Poaching was also the most widespread activity throughout the park. Of the 214 surveyed grid cells, 105 recorded poaching sign, with 261 unique instances of poaching in the dry season compared with only 16 in the wet season, with a frequency of 1.04 signs per km in the dry season compared to only 0.13 signs per km in the wet season. There was no significant association between TRI and distance to park boundary and poaching sign detection (Figure 10). Poaching is also associated with other illegal activities. For example, charcoal gatherers will opportunistically hunt while inside the park based on evidence found at logging camps. Poachers will also start bush fires as a hunting tactic in the dry season, reducing habitat for fauna and disrupting natural vegetation regeneration.

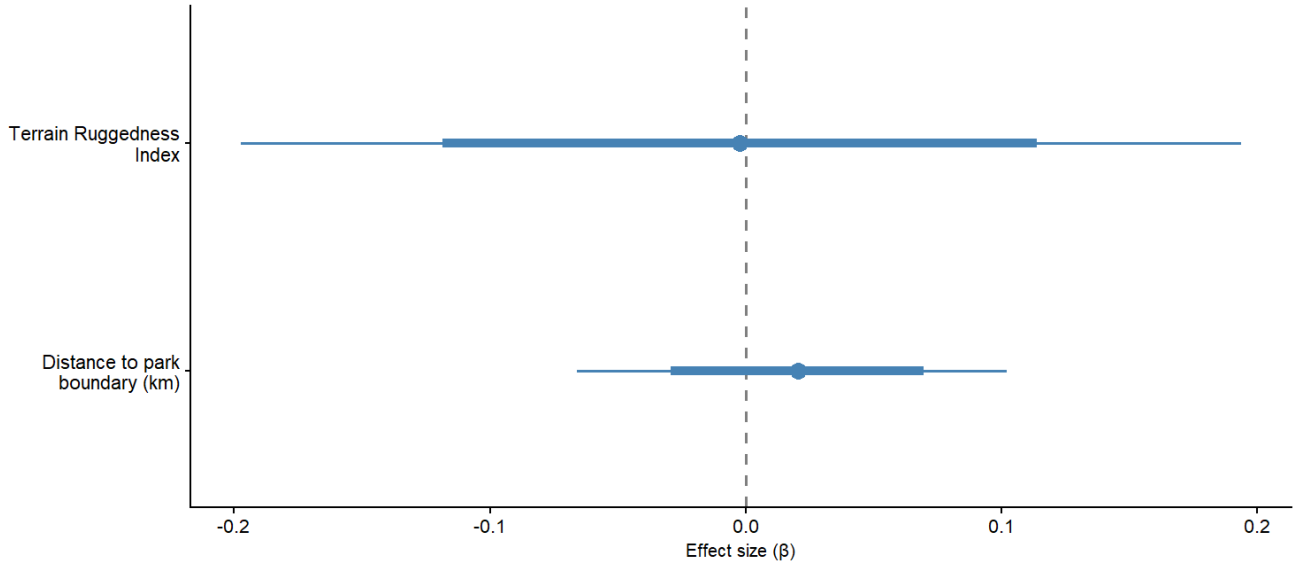


Figure 10: Predictor effect on poaching sign detection. Distance to boundary: β = 0.02, 95% CI: −0.07 - 0.10. TRI: β = 0.00, 95% CI: −0.20 - 0.19

Certain areas of the park have been so severely degraded by human activity that their capacity to support AGH breeding is unlikely. Other areas were less degraded but nevertheless contained evidence of poaching. Very concerning were the number of observations of illegal activity along rivers, the only areas in the savanna environment where large trees are common and which LEK has indicated AGH frequent. Illegal activities are also common throughout the year with some degree of seasonality, for example, poaching is more common in the dry season while mining takes place primarily in the wet season. Other threats include human-induced fires and climate change.

Table 3: Illegal activities in FMNP

(a) Activity	Count	IUCN Threat Classification
Poaching	277	5.1.1; 5.1.2
Cattle Herding	187	2.3.1
Charcoal	208	5.3.3
Planks	23	5.3.3
Honey Gathering	131	5.3.3
Mining	16	3.2
Fishing	6	5.4.3
(b) Activity	Area (km²)	IUCN Threat Classification
Agriculture	54.3	2.1.2
Cattle herding	359.7	2.3.1
Community Forests	139.8	2.1.2
Charcoal production	65.1	5.3.3

(a) Incidental observations of illegal activities recorded on transects within the national park. (b) Estimated area of degraded land in the national park from personal observation, remote sensing, and park ranger knowledge.

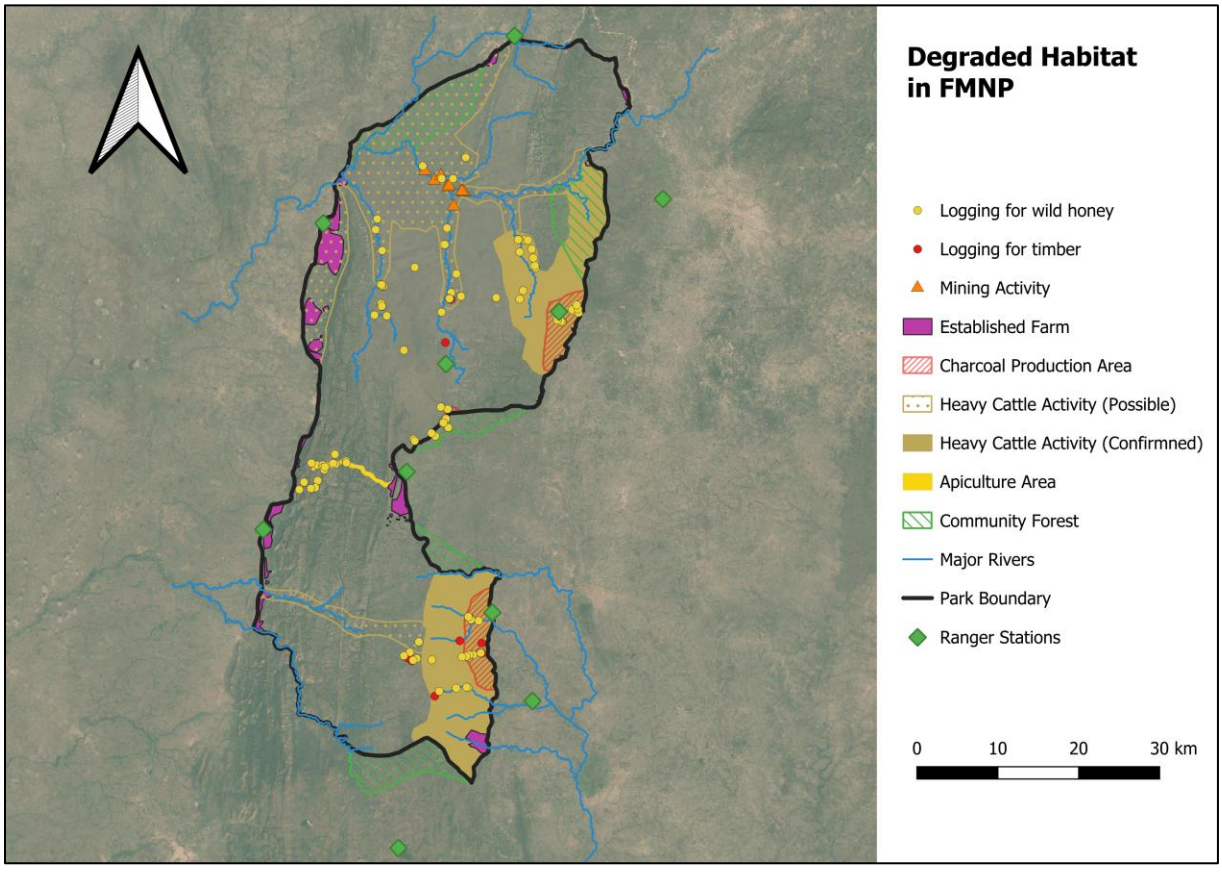


Figure 11: Degraded habitat in FMNP. Illustration of degraded areas observed by project team. (Possible) Heavy Cattle Activity areas are drawn based on satellite imagery and knowledge of park rangers. Community forests are shown here as the boundaries of some are now inside the park perimeter after the boundary line was changed in 2015 and because they have largely been converted into agriculture or forest plantations. Map by Henry Luedtke.

Figure 12: Examples of land cover degradation drivers in FMNP. From top left clockwise: Timber harvesting, cattle herding, charcoal production, felled tree for wild honey gathering. Photos by Henry Luedtke.

Demographics

We were able to visit 35 of the 36 villages and 9 ranger stations. We conducted 44 structured interviews with individuals verified to have had first-hand AGH observations within the study area. Structured-interviewees ranged in age from 25-95 ($\bar{x}$=51) and all but two were male. A diversity of ethnic groups was represented, mainly from Kotokoli (29.5%), Kabeyè (27.3%), and Bassar (20.5%) people, but also from the Tamberma, Gangan, Lamba, Konkonba, and Adélé groups. 40.0% of respondents had no formal education. 31.8% had completed only Primary school and 25% had completed middle school. Only 1 respondent had completed the 2nd level of Secondary school. Over half of the respondents (n=23) reported their main profession as farmer. 6 chiefs were interviewed and 10 eco-guards. Togo's three most popular religions were well represented: Animism (45.5%), Islam (31.8%), and Christianity (22.7%).

Presence and abundance

The most important result from our interviews was the addition of 45 AGH observations that we georeferenced within a confidence threshold of 3km. 32 of the 15 villages visited had at least one individual with first-hand knowledge of the bird (Figure 10). Observation locations were from all sectors of the park with most habitats represented at least once except for the rugged mountainous areas (Figure 13). Observation dates ranged from 1960 to 2025. Significantly, there were 22 sightings since the year 2020. 12 of these were from 2024 and 6 sightings were from the year of our study, 2025, including one observation that happened concurrent to our visit in June of that year. The median year of observation was 2022. Not all respondents were able to recall the exact month of the observation, but most sightings (35/45) were able to be linked to at least the wet or dry season (8 and 27 respectively). Of the 35 observations where respondents could give an exact number of individuals seen (not simply "at least 1"), records included AGH groups sizes ranging from 1-10, with the median record being groups of 2 birds.

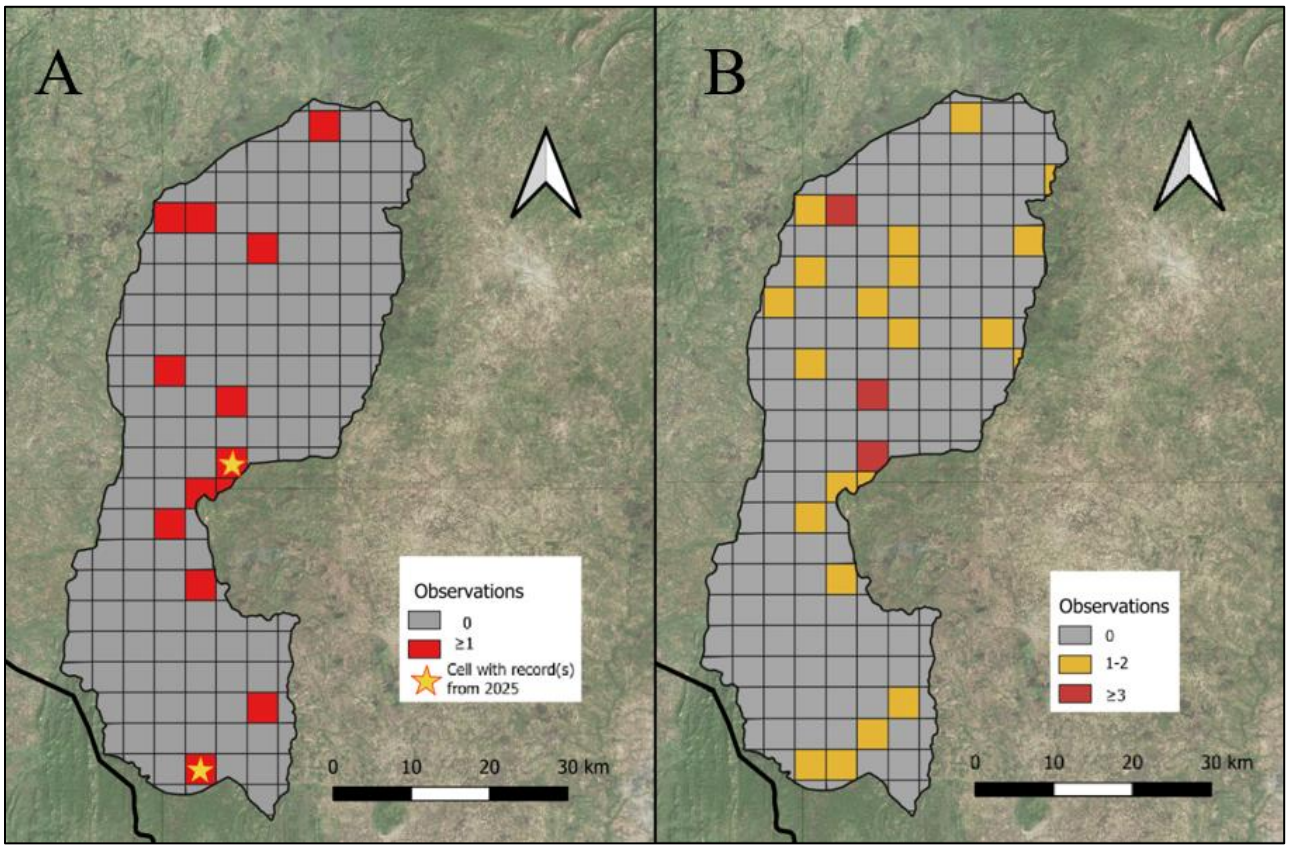


Figure 13: Observation maps. AGH sightings from interviews and literature illustrated on grid map of FMNP. Cells are 4x4km. Colors correspond to number of observations. Map A *shows observation records from 2020-2025 highlighting cells from 2025 with a yellow star. Map* B *shows all observation records locations. Maps by Henry Luedtke.*

To get an impression of a possible population trend, respondents were asked if they or others encountered the bird more or less frequently before or after the transition of FMNP management from private to state-run in 2015. They were also asked if they believed the total AGH population in FMNP declined, increased, or stayed the same. Responses suggest AGH were encountered more frequently in the past than in the present (Figure 14). 59.1% of respondents said they believed there was a decline (Figure 15). Rangers we also more likely to report a decline than non-rangers at 70% compared to 56.5%, and they were also less unsure at 20% compared to 34.8%. AGH group size of last sightings was not correlated with date of sighting and there were large groups reported after 2015, for example, a group of 6 and another of 5 AGH were reported in 2024. However, several respondents reported encountering large numbers of AGH prior to 2015. These respondents were both older park rangers and used examples 20-50 AGH seen in one day while working in the park.

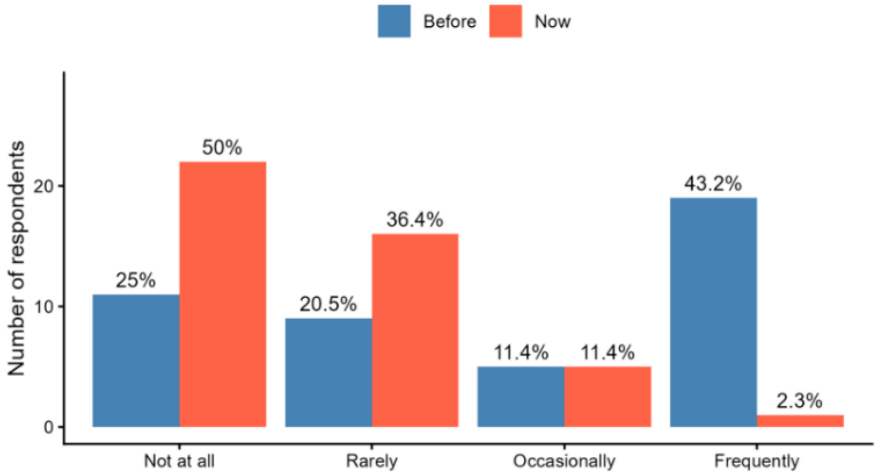


Figure 14: Observation frequency of AGH in FNMNP between the management transition from private to state, (i.e. pre-2015 and post-2015). Respondents were asked the frequency they encountered AGH across the two time periods.

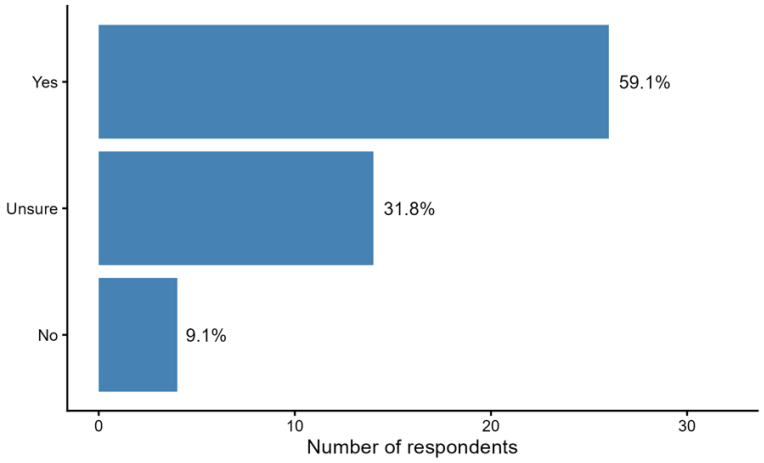


Figure 15: Perceived population decline of AGH in FMNP. Respondents were asked if they thought the AGH population had declined or not.

When asked what possible reasons there were for AGH declines, respondents most frequently reported hunting as the main driver (Figure 16). When asked what AGH were hunted for, respondents gave many uses, but the most common was for bushmeat followed by belief-based uses (Figure 17). Belief-based use encompasses a wide range of activities from traditional medicine to ritual use, with categories that can be very localized, even village-specific.

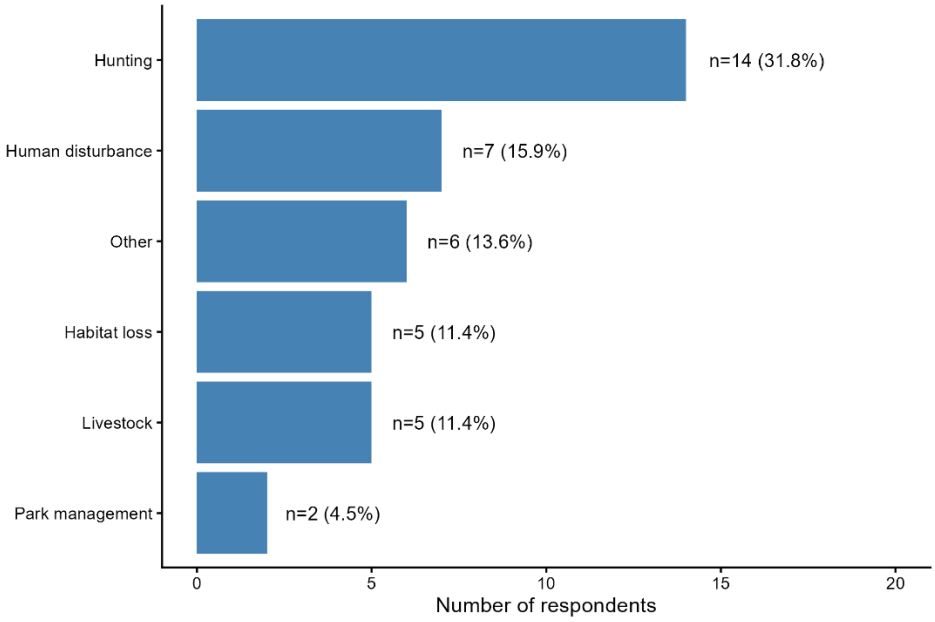


Figure 16: Perceived causes of AGH decline.

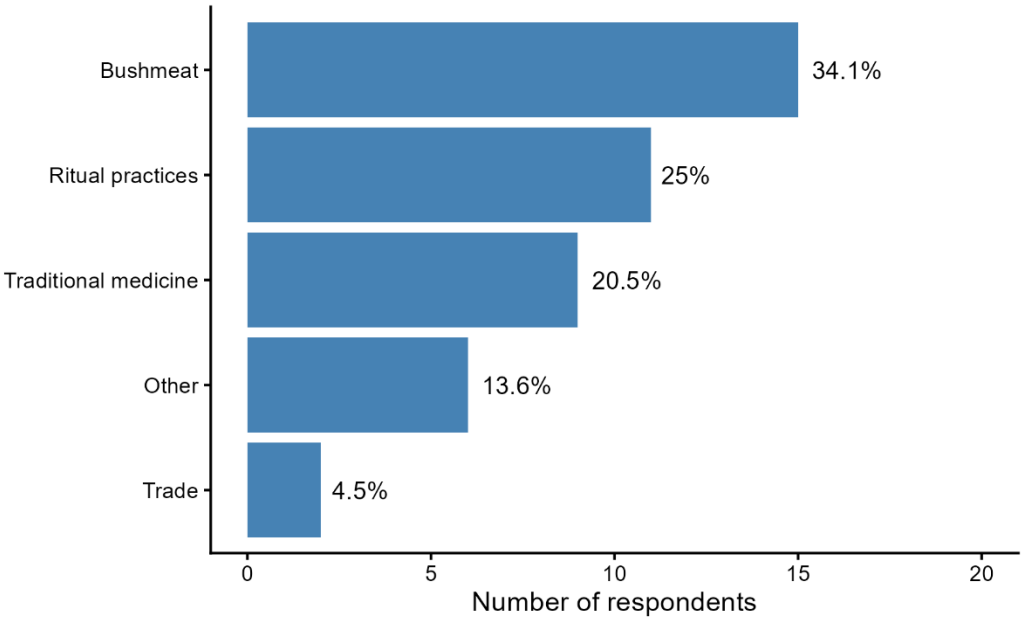
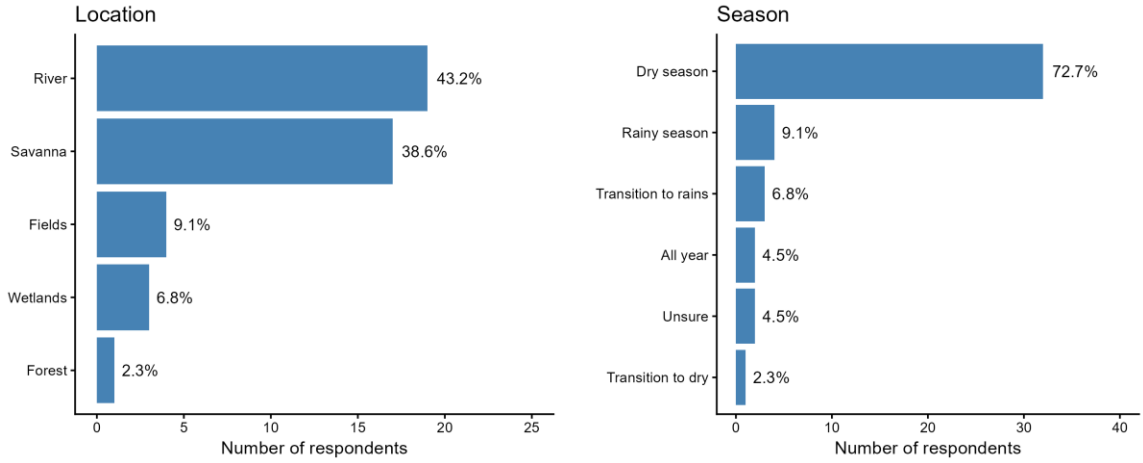


Figure 17: Reported uses of AGH after being hunted.

Local ecological knowledge

The most common habitat respondents associated with their sighting was “river/gallery forest” (43.2%) followed by “savanna” (38.6%) (Figure 18). No respondent could associate any particular tree species with AGH for roosting or nesting. However, 35 respondents had observed the bird feeding at least once and reported a diverse and omnivorous diet (Figure 20). Insects were the most frequently reported food source for the bird (45.5%) followed by fish (13.6%) and carrion (11.4%). Vegetarian food sources were reported as 29.6% of all food sources given.



Figures 18 and 19: Habitat and Season of respondents' most recent AGH observation

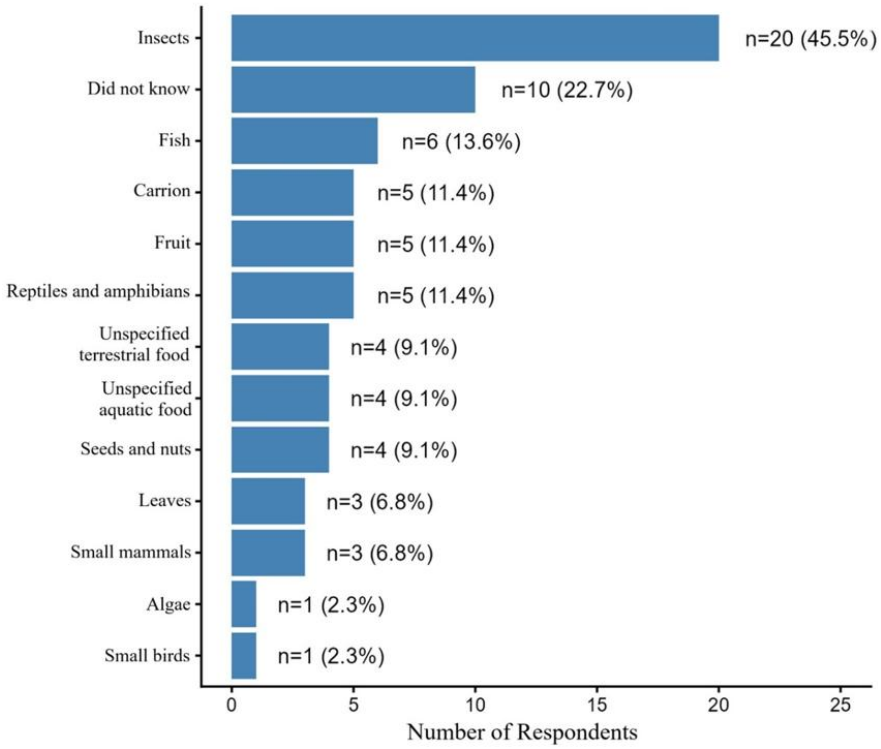


Figure 20: Respondents' observed AGH food sources.

Cultural importance

The closest we may have come to observing AGH was in the village of Boulohou, when a hunter claimed to have recently killed one bird and produced for us a handful of black feathers. They explained it had been hunted for bushmeat and medicine. Who is hunting AGH and why is an important conservation question. Interview responses indicate bushmeat and belief-based uses are primary drivers of AGH hunting in FMNP (Figure 18). No respondent claimed AGH was a primary quarry for hunters, with some interviewees explaining it was only hunted incidentally while searching for other game or if no other preferred game was found. On the other hand, structured and semi-structured interviews revealed the bird has medicinal use amongst certain villages. In structured interviews, we asked interviewees whether AGH had any cultural value to them or not. 56.8% reported that they did and 15.9% said they did not, but 27.3% said they were unsure. When asked if they knew at least one other person in their community who considers the bird culturally important, the same percentage of respondents, although not the same individuals, reported that they did. People of the Bassar ethnicity were the most likely to report AGH cultural value and the least unsure (Figure 21). Among Animist, Christian, and Muslim respondents, Animists were the most likely to report cultural value of AGH (65%) and the least unsure of their value (10%). We also inquired about interviewees perceived trends in the cultural importance of AGH within their community. 27.3% of respondents replied that AGH value either declined or has changed form within their community and 18.2% reported no change. Animist respondents were the most likely to report a decline in value and the least unsure of any value change (Figure 22).

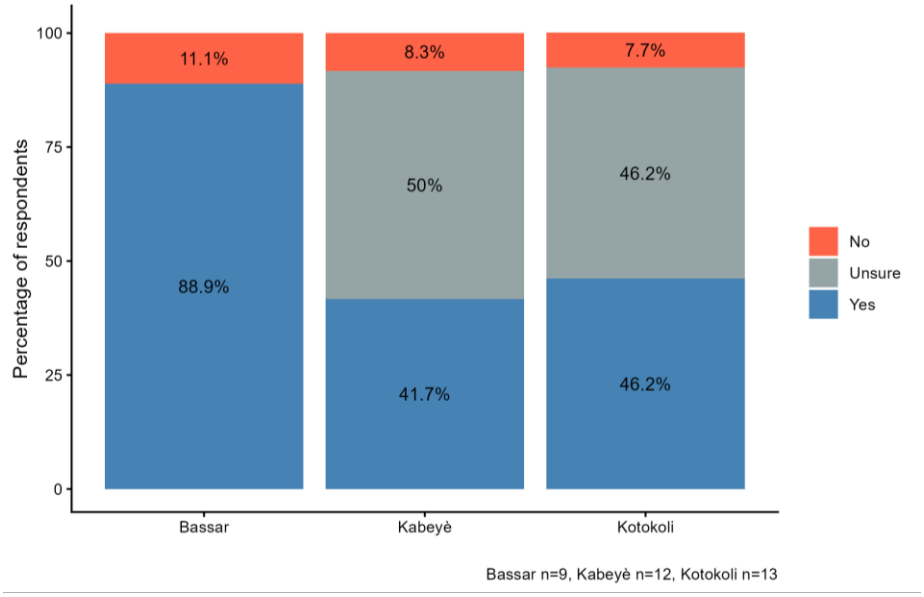


Figure 21: AGH cultural value reported by ethnicity.

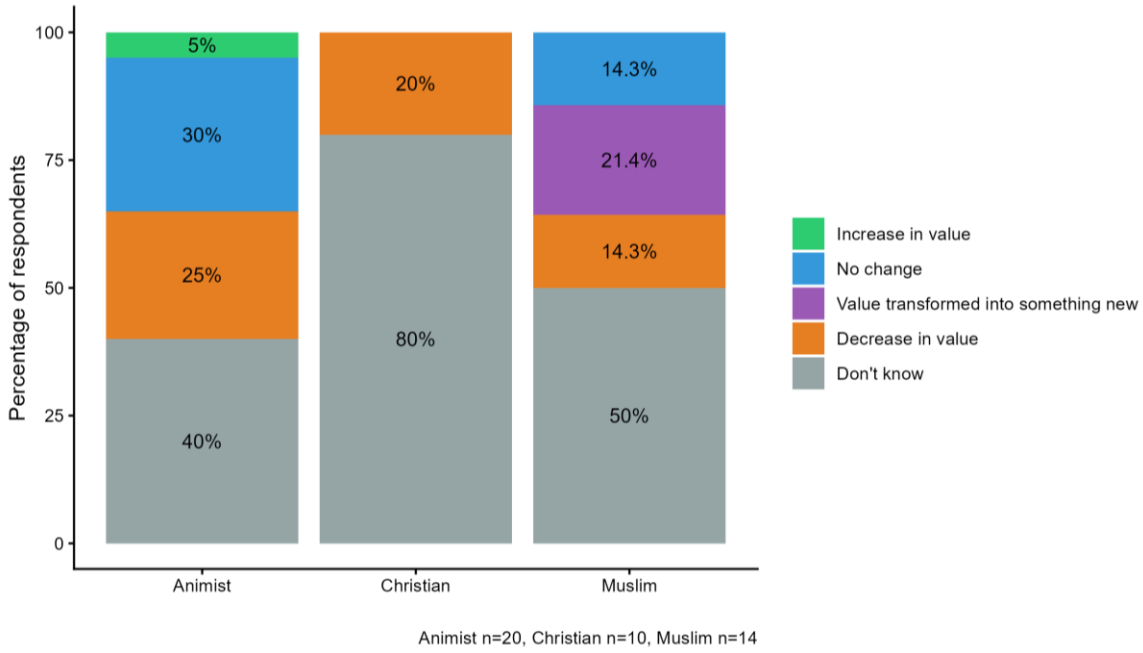


Figure 22: Cultural value change of AGH by respondents' religion.

During structured interviews we asked if respondents had knowledge of bird species being sold for ritual use for vodoo (vodun) or in so-called fetish markets. 70.5% replied that they did. We asked all respondents and all those present during the semi-structured village interviews to list bird species they knew were sold at these markets (Table 3). Despite medicinal and religious uses of AGH making up 45.5% of structured interview responses to the birds hunted use, no person explicitly said that AGH are sold at fetish markets.

Table 4: Birds reportedly sold in Fetish Markets.

Bird	**Count**		
Vulture	17	Yellow billed oxpecker	1
Tinkerbird	11	African harrier hawk	1
Swallows/Swifts	6	Black kite	1
Pied crow	5	Plantain eater	1
Owls	3	Guinea fowl	1
Parrot	3	Woodpeckers	1
Cattle egret	3	Guinea touraco	1
Violet turaco	3	Hadada ibis	1
Coucal	2	Piapiac	1
Francolin	2	Black crowned crane	1
Ostrich	2	Yellow billed oxpecker	1
Black crowned crane	1		

Regardless of reported cultural value, cultural or religious value were the most frequently given reason for conserving AGH by respondents (Figure 23). “Environmental education” was second. This category encompasses the general desire of respondents wanting their children to know about the bird and for it not to disappear from collective knowledge. Food and medicine were among the least frequently given reasons.

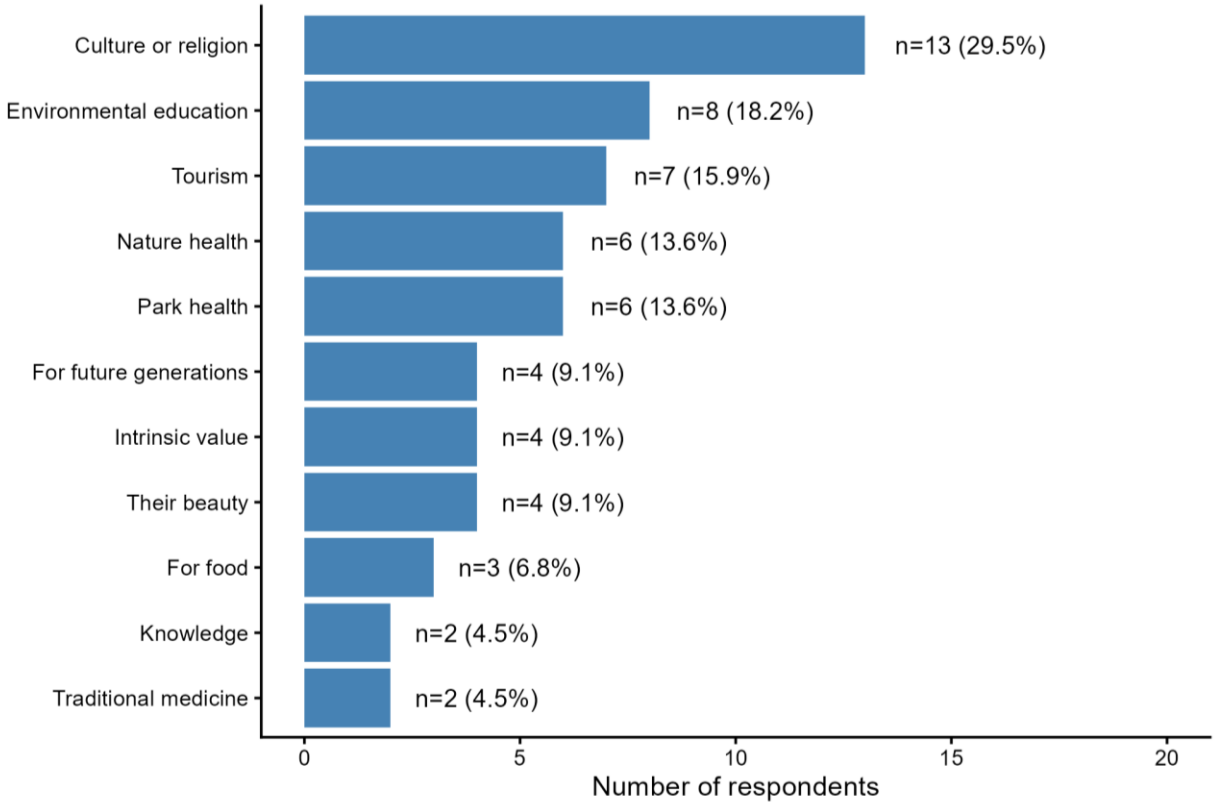


Figure 23: Reasons given when asked why AGH should be conserved. Only one respondent replied previously that AGH should not be conserved.

Taboos and folklore

In both structured and semi-structured interviews, the existence of taboos on hunting AGH were commonly reported. Some respondents explained only the best hunters and those who had gone through certain rituals were able to hunt this bird. In other villages it was explained the bird is never hunted due to it being dangerous and powerful. Nearly all the villages that reported some form of taboo also reported diseases or curses attributed to the bird. For example, AGH were commonly claimed to possess a certain disease or curse of the nose or respiratory system that one could suffer from if they ate the bird or broke its bones. Descriptions of the disease or curse ranged from symptoms similar to sinusitis, to becoming mute, being only being able to moan in a manner similar to the call of the AGH, or to the disappearance of the nose itself. Interestingly, of those who reported a cure for people afflicted with the disease or curse, they listed the feathers of the bird

being an essential ingredient. Others reported no cure or that modern medicine may allieatve symptoms but the true cure required traditional medicine using parts of the bird. The feathers of the bird were also claimed by some to be an ingredient used to treat general ailments of the nose, throat, or voice. The bird was also reported to be especially dangerous to children and also as an ill omen by some when heard or seen near a village.

Distribution

Presences were reported across the entire park (Figure 19) but never in areas of very rugged hills or in closed-canopy forests (except those associated with gallery forests). The bird occurs both far and near to the park boundary; however, there are no reports in literature of the bird existing outside FMNP in recent years and no respondent reported seeing the bird further than within 3km of the park boundary. To put the FMNP AGH population in context, we calculated the extent of occurrence and area of occupancy for the species across its entire range and then for the fragmented West Africa populations that includes Togo.

After cleaning, our occurrence range-wide dataset held 7,970 occurrences. The minimum convex polygon of these points provided an area of 8,045,100 km² for our EOO. This is less than the area reported by the IUCN at 8,880,000 km², but the inclusion or exclusive of only a few occurrence points can dramatically change the EOO. Of the 7,970 occurrences, there were 1,874 2x2km cells occupied by at least one record. Multiplying that amount by 4km² puts the area of occupancy for AGH at 7,496 km².

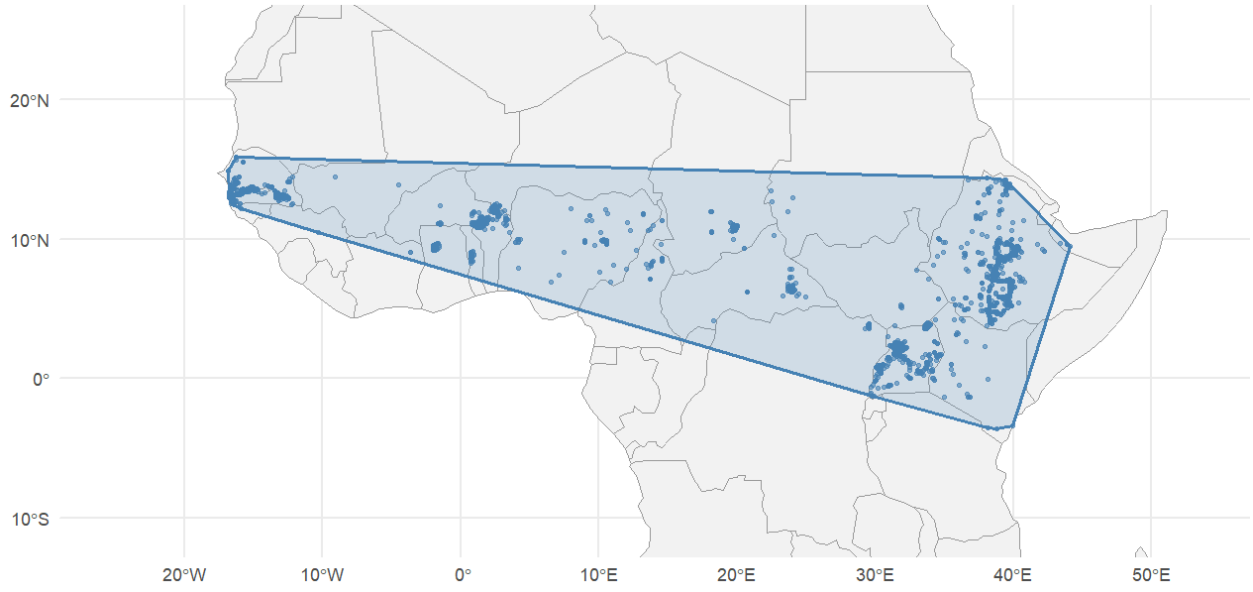


Figure 24: EOO of AGH with 7,970 occurrences plotted.

It is possible to examine changes in EOO and AOO overtime to flag potential threats to extinction by either inferred range retractions or population declines. However, EOO is extremely coarse and affected greatly by outliers, and AOO is not synonymous with occupancy or abundance. Additionally, since our data is almost entirely incidental citizen science records, there are strong

spatial and temporal sampling biases. Examining EOO and AOO trends with such data may reveal little. For example, between the years 2001 and 2025, the number of AGH records, the EOO, and AOO increased over time (Figure 25), but this is almost certainly due to the increase in popularity of citizen science reporting platforms such as eBird rather than actual population growth. Examining particular regions, such as Togo's position in West Africa between Côte d'Ivoire and Nigeria (Figure 26), also reveals little, with occurrences increasing while EOO and AOO fluctuate, again likely due in large part to sampling biases (Figure 27).

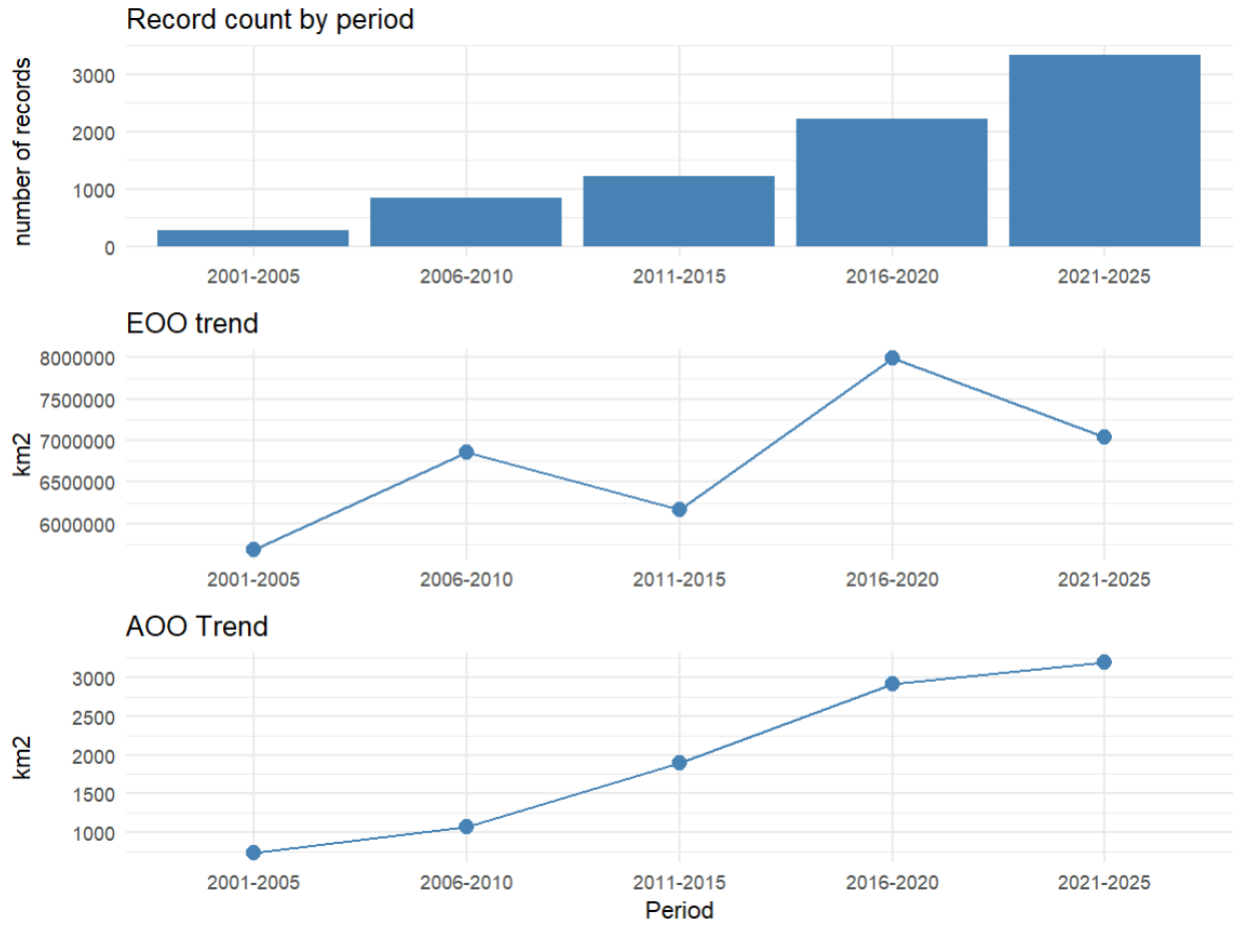


Figure 25: The number of observations and the area of EOO and AOO between 2001 and 2025 across 5 year intervals.

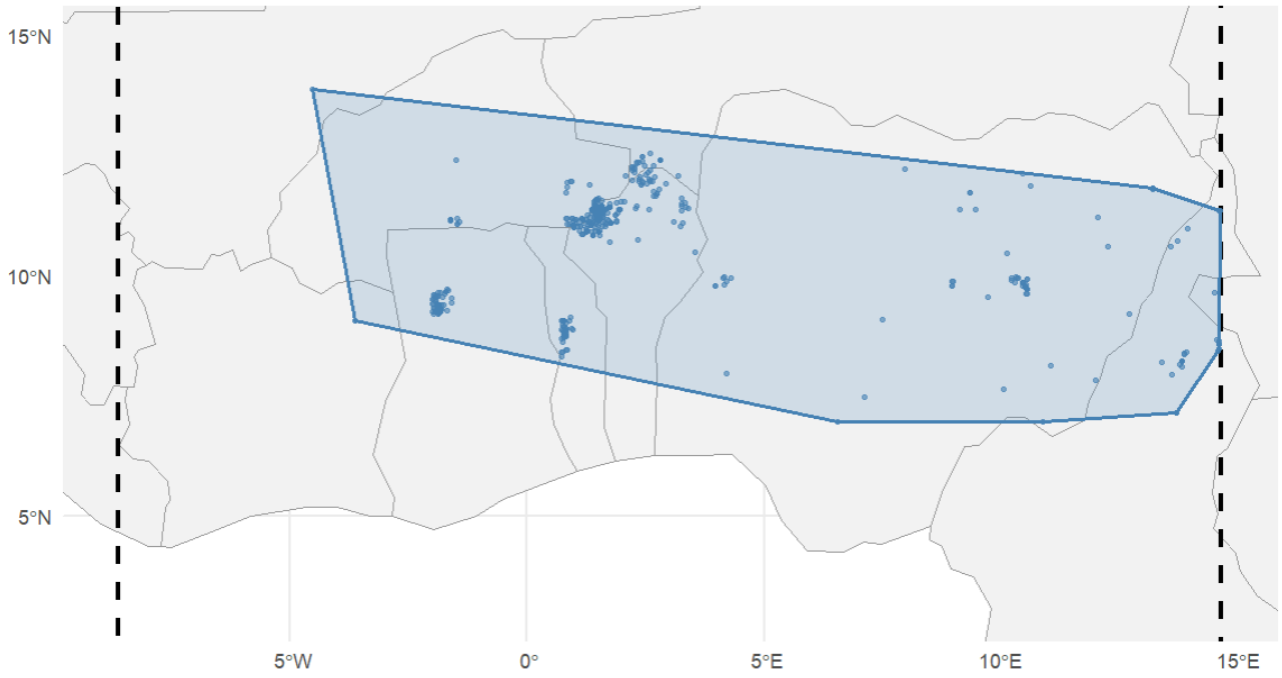


Figure 26: West Africa EOO with occurrences.

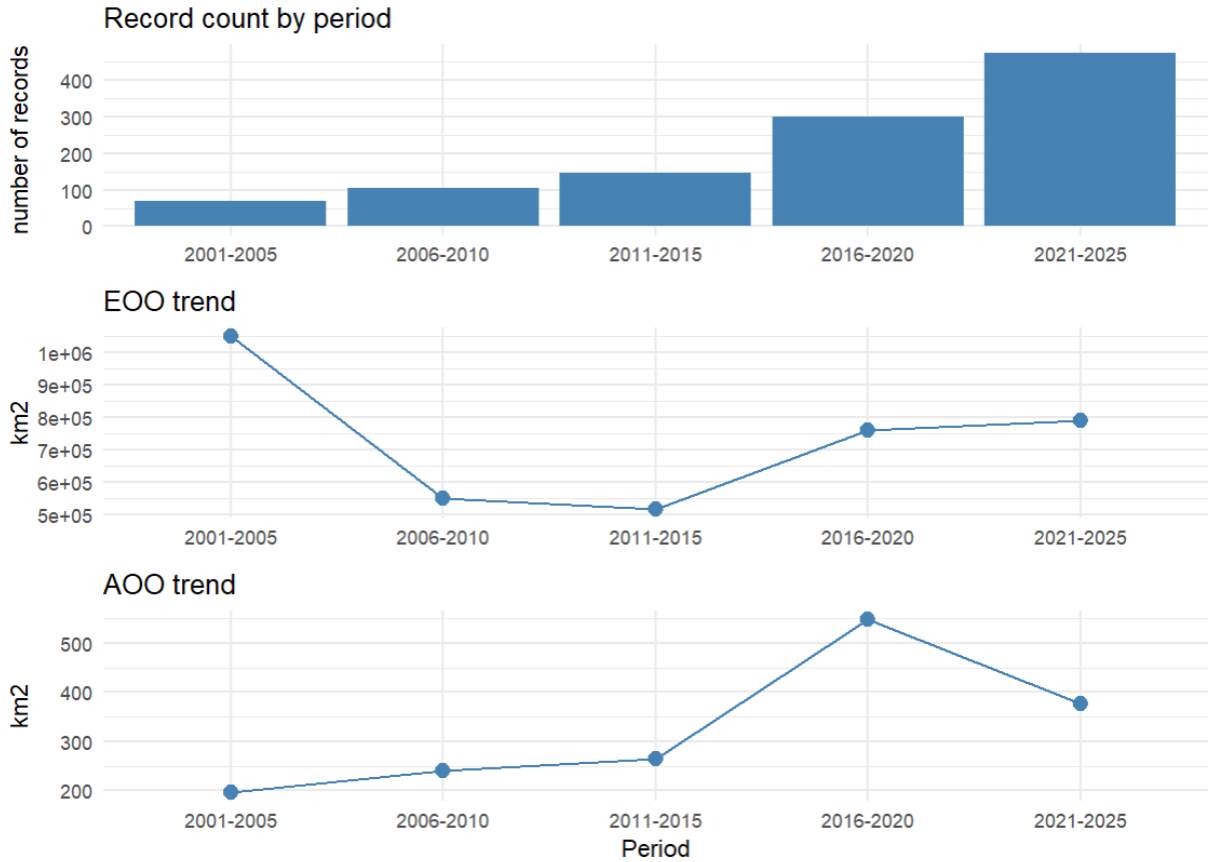


Figure 27: Trends for West Africa. Current EOO in this region is 1,159,521 km² and AOO is 1,372 km².

Habitat

The species' restriction to protected areas in most of West Africa is likely a result of both persecution by humans and diminishing available habitat. Côte d'Ivoire, Ghana, Togo, Benin, and Burkina Faso have lost enormous areas of natural savanna and forests (Acheampong et al., 2019; Kombate et al., 2024; IGN FI, 2021; Ouedraogo et al., 2011). To assess what suitable habitat remains for AGH in Togo, we created a species distribution model trained on occurrences from across its range and interpolated the predicted distribution of the species in Togo for use as a proxy for suitable habitat.

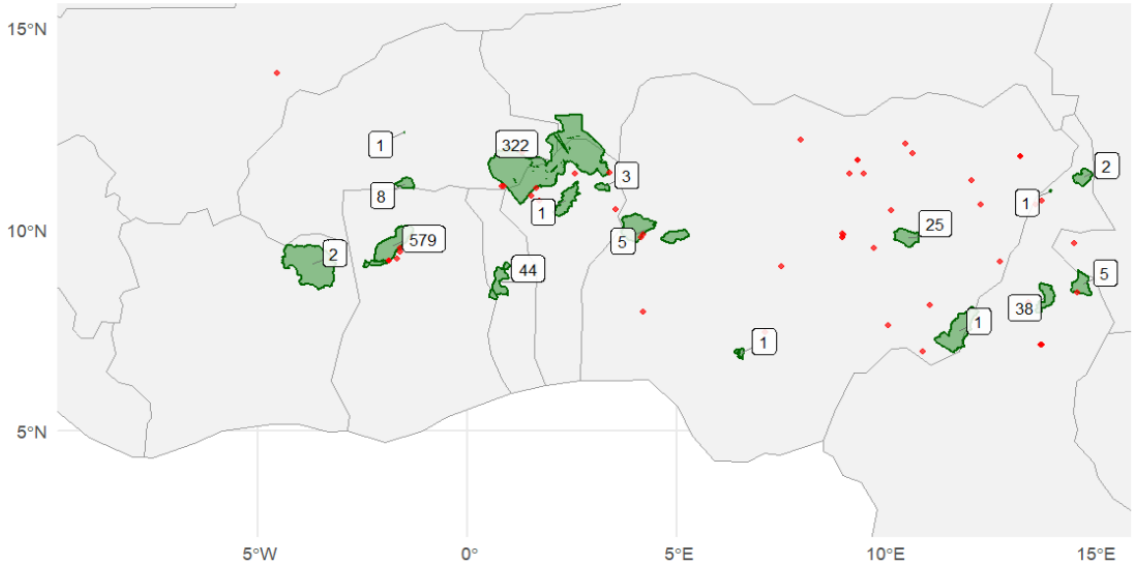


Figure 28: Map of protected areas in West Africa with AGH records since the year 2001. Green polygons are protected areas with observation counts attached. Red dots are observations at least 1km outside a protected area.

While part of the sampling biases are spatial, with incidental citizen science observations likely occurring near protected areas where eco-tourism is more common, the sampling may still be picking up actual distribution patterns. This is why field studies and expert knowledge are so important for status assessments as it is well agreed that AGH numbers are in decline, contrary to observation trends, and that the species seems relegated in West Africa to a few protected areas, in accordance with observation records. Given this, the actual observation counts and their dates are less telling than their locations. For example, in this region, Ghana has by far the most observation records at 588 and one of the fewest is Côte d'Ivoire with 2. The Ghanian records almost entirely come from Mole National Park, which has an established ecotourism industry whereas the occurrences in Côte d'Ivoire come from Comoé National Park, which despite being one of the largest protected areas in the country sees far fewer tourists yet it possesses a known population of AGH. Sampling biases acknowledged, of the 1,098 records from 2001-2025 in this region, only 83 lie outside a protected area boundary and that number drops to 60 if one includes records within 1km of a protected area boundary.

The model predicted the distribution of AGH across its entire range including a within a 55km buffer, meaning roughly half of the country of Togo (Figure 29). Suitability classification thresholds were determined by non-fixed 10th percentile training presence values and divided into 4 categories: Low Suitability is considered the range between the lowest value of all known occurrences and below the value that 90% of all other occurrences. Moderate Suitability is above the worst 10% but below the median. High Suitability is above the median and below the top 10%. Very High Suitability is any value above 90% of all other occurrences. Only 6.99% of Togo's land area can be considered moderately suitable AGH habitat and only 0.04% highly suitable. Of the parts of Togo considered moderately suitable, 28.65% lies within FMNP and 81.23% of the little highly suitable habitat there is lies within FMNP.

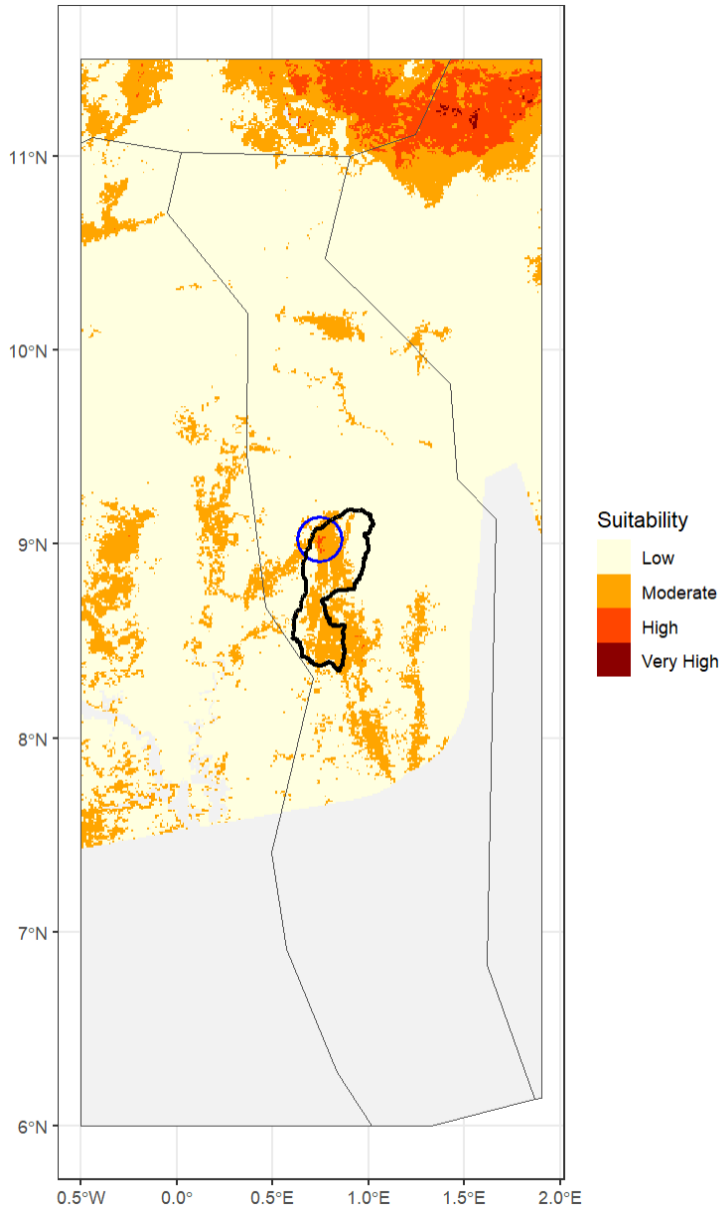


Figure 29: Classified habitat suitability for Togo. The black-bordered polygon represents FMNP. The blue circle locates the only unfragmented area of high suitability habitat in Togo.

One of the predictors used to model AGH distribution was the Global Human Modification Index (GHM) (Kennedy et al., 2019). GHM can represent relative natural area intactness from human degradation. The presence of roads, settlements, and agricultural activity for example are important independent variables in predicating species distribution and also for guiding conservation actions. To show the importance of FMNP for preserving natural ecosystems and suitable AGH habitat we have mapped GHM and another index that quantifies degradation, the Forest Landscape Integrity Index (FLII) (Grantham et al., 2019). 95.2% of least modified landscapes (bottom 2%) in Togo occur in FMNP and 99.9% of the most intact forest landscapes occur inside FMNP.

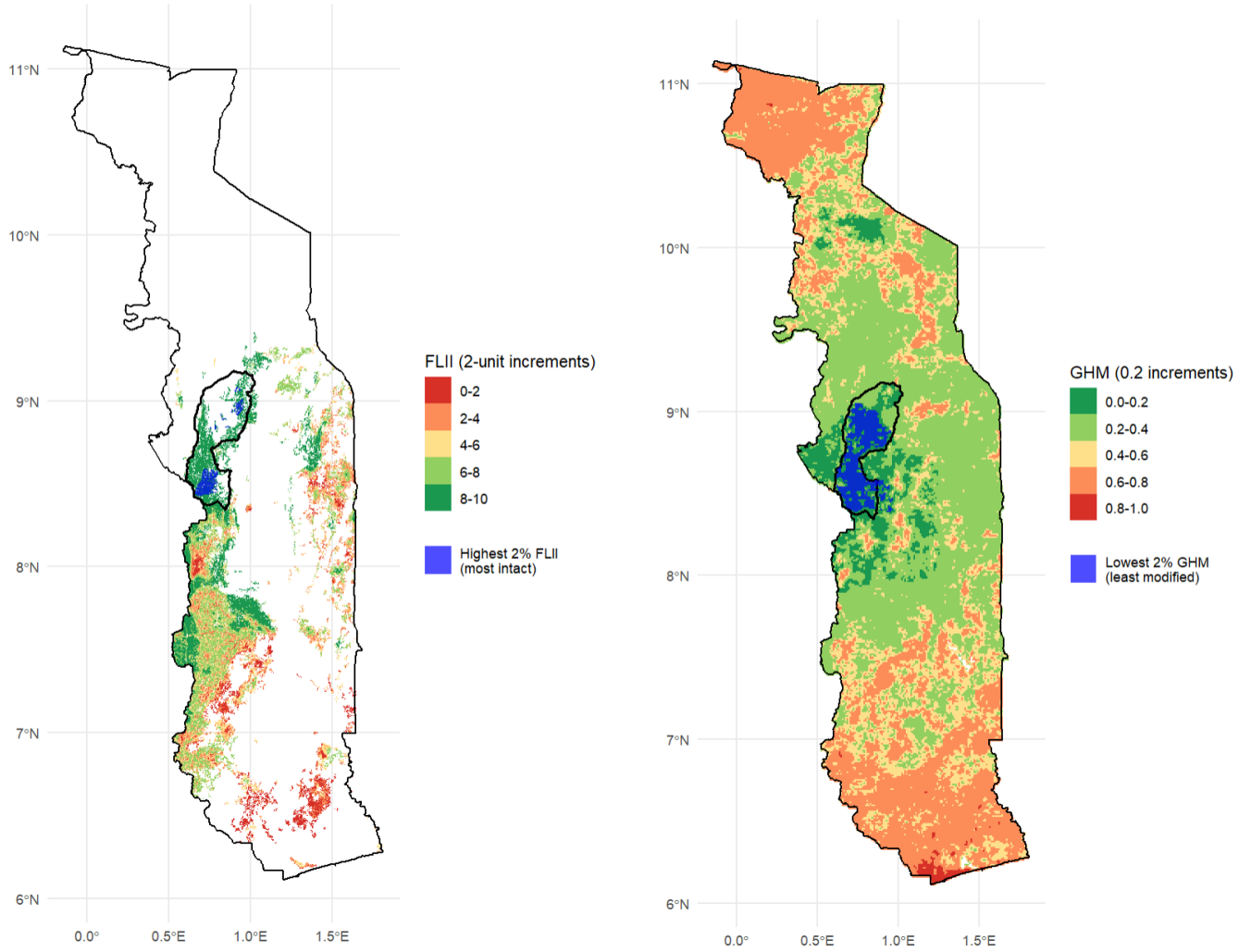


Figure 30: FLII and GHM in Togo with equal interval classification increments. Low FLII represent poorly intact forest landscapes while high GHM values represent heavily modified landscapes. To illustrate areas of the highest intactness, the top 2% most intact forest landscapes and least modified landscapes are represented in blue. FLII is calculated at 300m resolution while GHM is at 1km.

Conservation priority areas

Roughly half (1,116 km²) of FMNP is either moderately or highly suitable AGH habitat and/or very intact landscape. To identify potential areas of extremely high conservation value for AGH, we drew minimum convex polygons around non-fragmented highly suitable habitat and areas of the park that were at least moderately suitable and overlapped with the most intact landscapes in the park (i.e. a triple overlap area of moderate or higher AGH suitability, FLII, and GHM) and greater in size than 10 km². This produced three main candidates for priority conservation zones (Figure 32). We also included major rivers for conservation consideration as it was shown through structured-interviews that AGH frequent rivers, especially during the dry season, and these areas were considered by us to be the most biodiverse from our observations of faunal abundance and diversity during the recce transects. Rivers in FMNP are also frequented by poachers and act as corridors of illegal activity within the park.

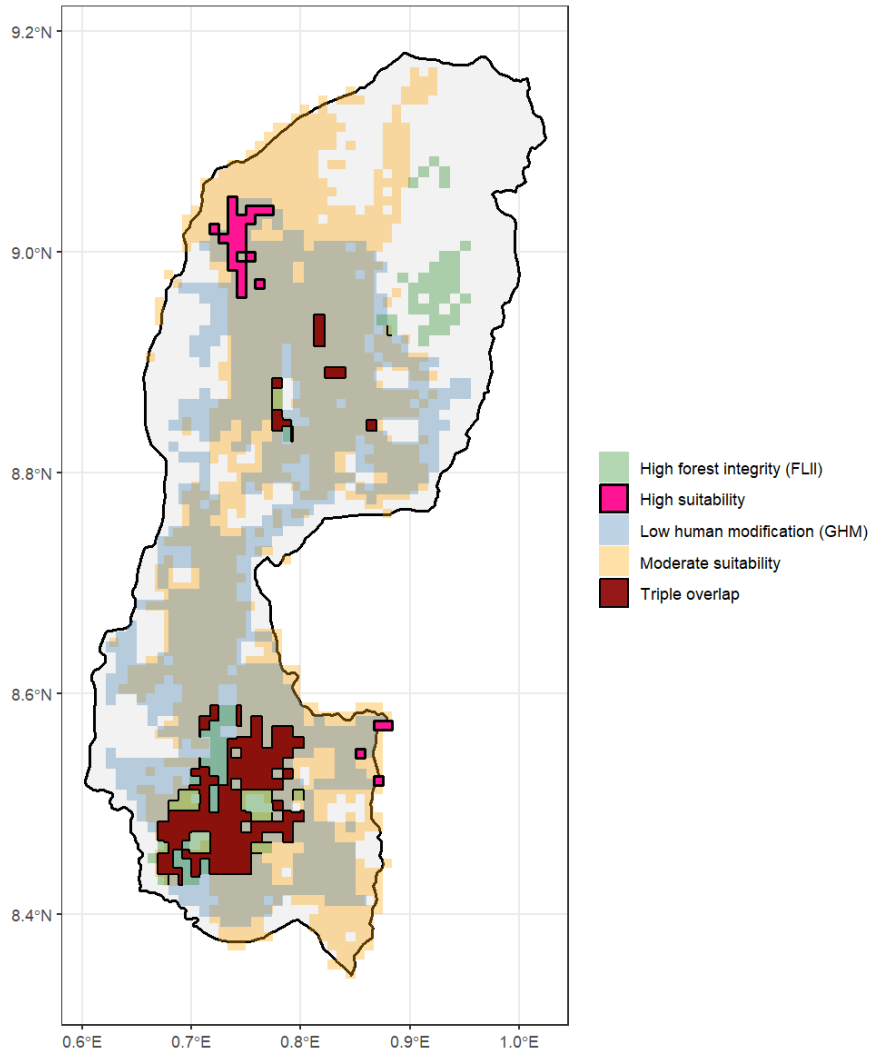


Figure 31: Map of FMNP that shows the top 2% of FLII and bottom 2% of GHM along with areas of moderate suitability, high suitability, and areas where moderate or higher suitability overlap with both FLII and GHM thresholds (triple overlap).

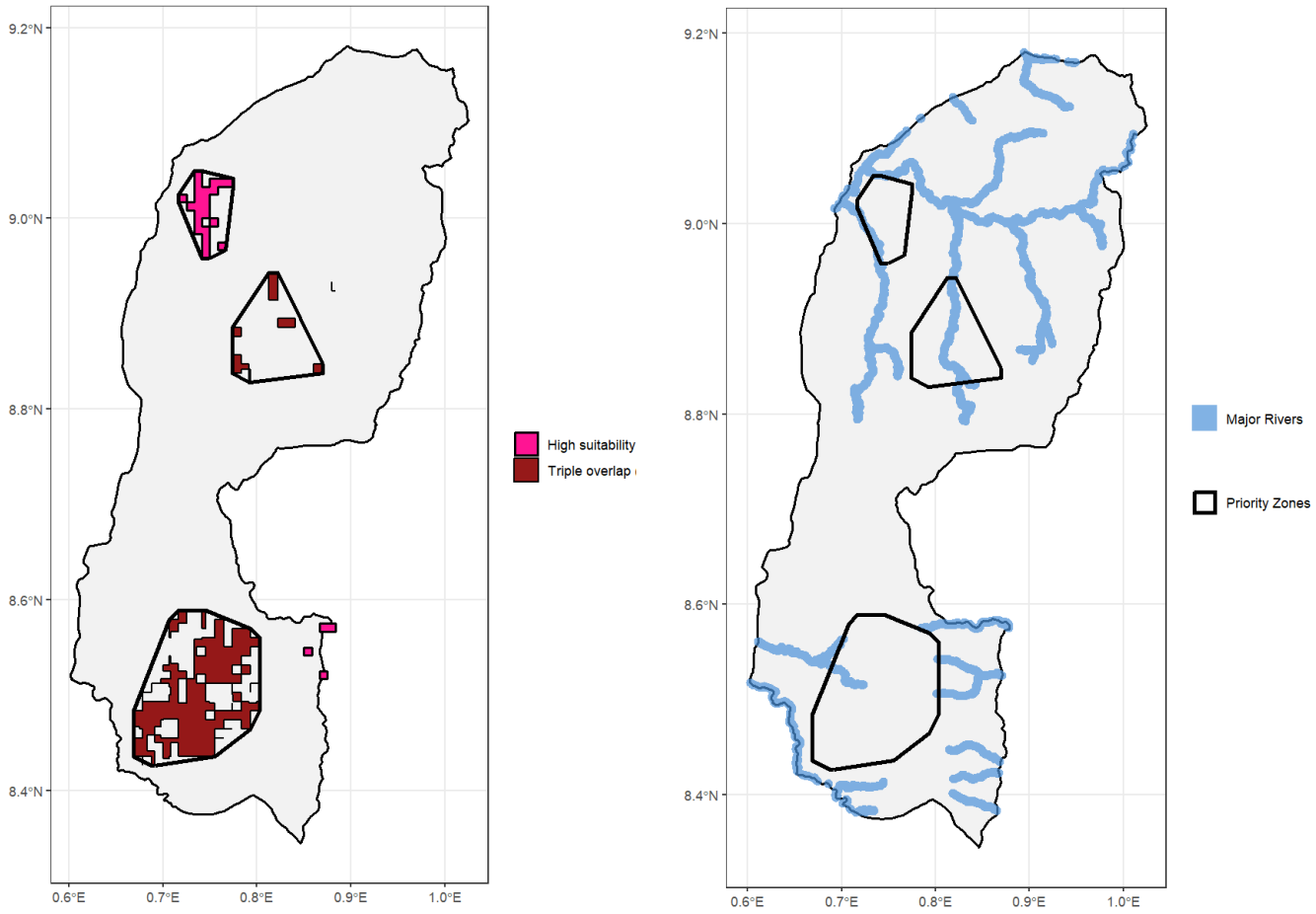


Figure 32: (L) Three potential priority conservation areas drew around triple overlap cells and non-fragmented high suitability areas. (R) Proposed priority conservation areas and major rivers illustrated with a 0.5km buffer.

Discussion

Population estimate

Because we observed no AGH and did not systematically survey all available habitat, a population estimate for this species is not possible. The number of observation reports and the breadth of the date range, from the 1960s until present is encouraging from a conservation perspective as it was not unreasonable to fear the bird had gone extinct or that the individuals reported in 2024 were the among last AGH left in the park. We now know at least that this is not the case given the number of different people from different areas of the park reporting the species in the last five years. While we cannot estimate the abundance of this species in Togo, there is no evidence that it exists anywhere else but FMNP and it is reasonable to assume that the population in FMNP is not large given how few people knew the bird and our lack of any sightings. Concurrent to our targeted searches were also several mist-netting and ringing projects taking place inside the national park at diverse locations, including past sighting locations of AGH, tallying around 200 days spent inside the park in 2025 and 2026. Those researchers also reported no AGH observations or sign.

Local ecological knowledge

Given the lack of field studies on AGH, traditional ecological knowledge can be especially valuable at enlightening our understanding of this bird's localized behavior, but caution should be applied given the low number of interviewees and potential interweaving of cultural lore and observed behavior. Nevertheless, habitat association responses suggest need for further study. Most literature on the bird describes its primary habitat as savanna woodland and grassland to even semi-arid environments. With 43.2% of respondents describing their observation habitat as "river/gallery forest" and the sighting location with the most observations being a year-round water source. AGH association with rivers and water sources deserves investigation. During the dry season, many, but not all, fauna are attracted to water sources for a variety of reasons: food, shade, nest or roosting sites, water, etc. AGH were commonly reported not only "near" rivers but walking down the riverbeds themselves and "drinking" from pools. Whether or not AGH regularly drink from water sources is not known. It could be that they are instead fishing for the small fish and invertebrates trapped in the rivers' pools. How this behavior compares to other AGH populations and the species as a whole is also not known. It is possible the populations of West Africa are biogeographically distinct from other populations across its range.

On the other hand, responses regarding diet conformed well to present literature which mainly agree the bird is omnivorous. What exactly AGH are consuming is not well known however and it could be that AGH diet is localized or seasonal. The degree that AGH is omnivorous should be better investigated. One of the only plant's specifically identified to be eaten by AGH is the fruit of the tree *Cordia africana* (Rüppell & Vogel 1835). Dietary preference is useful information for conservation management.

Figure 33: Female AGH with a snake. Photo by Darcy Ogada.

No respondent had observed the bird nesting. Nor could any respondent comment on AGH preferred nesting or roosting trees. Identifying preferred nest sites by tree species and diameter, as well as habitat, would be very helpful in designating priority conservation areas and in guiding future field studies.

Conclusion and conservation implications

Our study shows there likely exists a remnant population of AGH in Togo at least greater than the group of three seen in 2024. FMNP is the last habitat for a number of threatened species, AGH included. Poaching is the most direct threat to remaining AGH. These are large, slow-flying birds, with known value to local hunters for bushmeat and belief-based uses. Hunting taboos, while present to some degree, are unlikely to be sufficient protection for remaining AGH given how few people reported any knowledge of the bird, let alone cultural values that include hunting prohibitions. Poaching is especially dangerous for the remaining birds as only a few adapt hunters would be capable of eliminating the population even if conservation monitoring improves. Poaching activity has been found in all areas of the park. Water sources and river habitats seem to be especially frequented. Accessibility (measured by terrain ruggedness and distance from the park boundary) seem to have no effect on limiting poacher presence in the park. Indeed, it is well known by park rangers that poachers prefer the denser forests of the mountains and gallery forests because of the higher abundance of prey.

Figure 34: Male AGH. Photo by Darcy Ogada.

Honey hunting is of particular concern as honey gatherers fell trees to access wild bee hives. Since bees often make their hives on large trees and/or inside tree cavities, this activity is directly reducing the available nesting habitat for AGH and other cavity nesting taxa. A better understanding of AGH nesting habits would help prioritize the monitoring of key habitat. The rate of deforestation in the park, the removal of cavity trees by honey hunters, and the high human activity levels along water courses raises the concern that even if AGH do not succumb to poaching, the remaining population could become functionally extinct due to their specific breeding requirements.

Cattle herding is widespread and the amount of parkland already degraded by cattle is concerning. Its effects on AGH are not known. However, a side-effect of cattle herding is the clearing of ground vegetation and the creation of a network of unofficial paths through the park facilitating easier access deeper into the protected area and increasing the number of ingress points along the park boundary while weakening its delineation with adjacent agricultural land.

The most worrisome finding from our study was the degree of degradation and lack of intact habitat left in FMNP. We accessed points in the park's center furthest from the park boundary and still found significant human activity. Large trees (>1.5m dbh) were not common. Rangers informed us that such large trees were being selectively logged in many places around the park. No transect produced no sign of human activity and only two transects produced sections without cattle sign (a stretch of 5km along the Kamassi River and the area west of Point de Vue ranger station). Along less impacted stretches of river the abundance of birds and mammals was noticeably greater.

Interestingly, park residents did not report AGH being sold in fetish markets, despite their being known fetish trade item in West Africa (Williams et al., 2013), including in Togo's largest market found in Lomé (Figure 35). The belief-based value of this bird to local communities is intertwining with their larger value at major fetish markets that also serve a greater number of buyers and are linked with international consumers of hornbills and their parts, including AGH. It is becoming clear there is increasing international demand for African hornbills and their parts (Su et al., 2024). Recent studies analyzing trade data show AGH are commonly traded on international markets and their demand in European and Middle Eastern markets is growing.

Figure 35: Head of Bucorvus abyssinicus *being sold in a fetish market in Lomé, Togo. Photo by Nico Arcilla.*

Limitations

Our study faced several limitations. Firstly, it was not possible to systematically survey the entire park area in a manner sufficient for estimating AGH abundance, nor are there enough historical data or any prior studies for analyzing population trends. Even conducting recce transects that allow for paths of least resistance did not alleviate the sheer challenge of traversing the rugged and remote terrain of the park. We frequently encountered persons conducting illegal activities inside the park which interrupted or invalidated our transects. Vegetation around gallery forests could be dense, obscuring sightlines, and the grass in the wet season rapidly grows to a height not conducive to terrestrial bird searches. Security concerns around elephants and illegal activities precluded surveying certain areas of park, particularly the far south and far north areas.

Secondly, we surely could not find every individual with first-hand knowledge of the bird and there may have been individuals with knowledge who declined to speak with us. With that said, there seemed to be a genuine dearth of knowledge amongst local peoples of this animal, probably due to its avoiding built areas and low population numbers.

Our study would have been aided by more information on the bird's biology, including local diet and habitat preferences, especially their preferred roosting and nesting trees. The bird is not elusive in areas where it is common and is held in zoos around the world. Better knowledge sharing and greater interest in field studies will greatly assist future conservation research.

Recommendations for conservation actions and future study

I) More frequent patrols by park rangers would have the greatest immediate effect on the conservation of FMNP. Local residents understand that park entry is illegal as are activities such as hunting and cattle herding. Currently, park rangers are underpaid and lack sufficient resources for effective monitoring of illegal activities (Franta et al., 2026).

II) The conception of priority habitat in FMNP is now warranted. Certain areas of the park have been converted into agriculture and others have been thoroughly destroyed by cattle herding. Remaining less-degraded areas of the park and biodiverse habitats (e.g. water sources, gallery forests) should be classified as priority habitat and receive special monitoring attention, including the highly suitable habitat and triple overlap areas shown above along with major river ecosystems and permanent water sources.

III) Education and behavioral change initiatives should be piloted. Almost all respondents stated AGH should be conserved, some mentioning the bird's "beauty" or "goodness." Many respondents did not know the bird may disappear from the park and expressed their wish for this not to happen. Disseminating information on the park's fragility and state of degradation should at least accompany any punitive campaigns by law enforcement.

IV) More field studies on AGH are desperately needed. We lack some of the most basic information on this bird's biology and demographics, which is hampering informed conservation decision-making. Some of this information can be readily gained by field studies in areas where the bird is common. To date, this project and a 2022 survey in Nigeria are the only field studies to report any findings on this unique species (Barshep & Mohammed 2022).

Statement on permissions and ethics

The study was conducted in accordance with the Declaration of Helsinki. Informed consent was provided by all study participants prior to interviewing.

Permits were granted by authorities at Togo's Ministry of Environment and Forest Resources and the University of Lomé (Permit No. 0019/MERFPCCC/CAB/SG/DRF JAN 2026; No. 0205/MERF/SG/DRF JUN 2024). Access to ranger stations and communities was granted by their respective authorities.

Figure 36: Abyssinian Ground-Hornbill pair. Photo by Andreas Wittke.

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Appendices

Appendix I: Historical records of Abyssinian ground-hornbill in Togo

Locality	Year	Date	Group Size	Source
FMNP (08°40’N 00°43’E)				
Mare aux Crocodiles	2024	25 Nov	3	(Kaboumba et al., 2025)
Mare aux Crocodiles	2024	22 Nov	3	“ ”
North of Mont Kpéya	2019	15 Apr	1	(Dowsett-Lemaire & Dowsett 2019; Dowsett-Lemaire 2021)
North of Fazao	2005	10 Dec	2	(Radley & Campbell 2008)
Woro R.	1989	8 Aug	5	(Cheke & Walsh 1996)
Woro R.	1988	1 Sep	2	“ ”
South of Bagan	1983	5 Jul	2	(Cheke & Wash 1984)
Oti-Kéran NP (10°12′N 00°37′E)				
unspecified	?	Mar	?	(Cheke & Walsh 1996)
unspecified	?	May	?	“ ”
unspecified	?	Aug	?	“ ”
Mandouri (10°51′N 00°49′E)	1989	11 Jul	3	“ ”
Bismarckburg (8°10′N 00°41′E)	1897	Feb	?	(Reichenow 1902)
Sokodé (8°59′N 1°08′E)	1897	Apr	?	“ ”
Kirikri (9°12'N 1°25'E)	1897	Apr	?	“ ”
Abdoulaye WR (8°40'N 1°20'E)	a.2015	?	?	(Dowsett-Lemaire & Dowsett 2019)

Appendix II: The most recent record of AGH in FMNP

The last record of AGH in Togo from 2024 referenced in this report and mentioned in Kaboumba et al. (2025) is described here. During an ornithological survey of the park, researchers from the International Bird Conservation Partnership (IBCP), Abiola Sylvestre Chaffra, Lin-Ernni Mikégaba Kaboumba, Dr. Nico Arcilla, and Yendoubouam Kourdjouak, observed a group of three AGH on 22 Nov at around 09:00 in the close proximity of a permanent water feature known as *Mare aux Crocodiles* (8°45'N 0°48'E), about 8km north of the village of Fazao. The observation occurred while travelling north along a park road that passes directly by the feature. The three birds, a male, female, and another too distant to determine age or sex, flew from the ground into the tree canopy before fleeing out of sight. The team encountered three birds again at nearly the same location on 25 Nov at around 14:45. Again the birds fled and they were not seen again despite immediate searches. The area had been severely burned just prior to the sightings, and some areas were still in the process of burning during these days. These fires were lit by poachers as a hunting tactic, a common practice in FMNP.

Appendix III: Photos of Abyssinian ground-hornbill in Togo

These photos were taken in FMNP during the November 2024 sighting and represent some of the only photographic records of the bird in Togo. Photos by Nico Arcilla.