

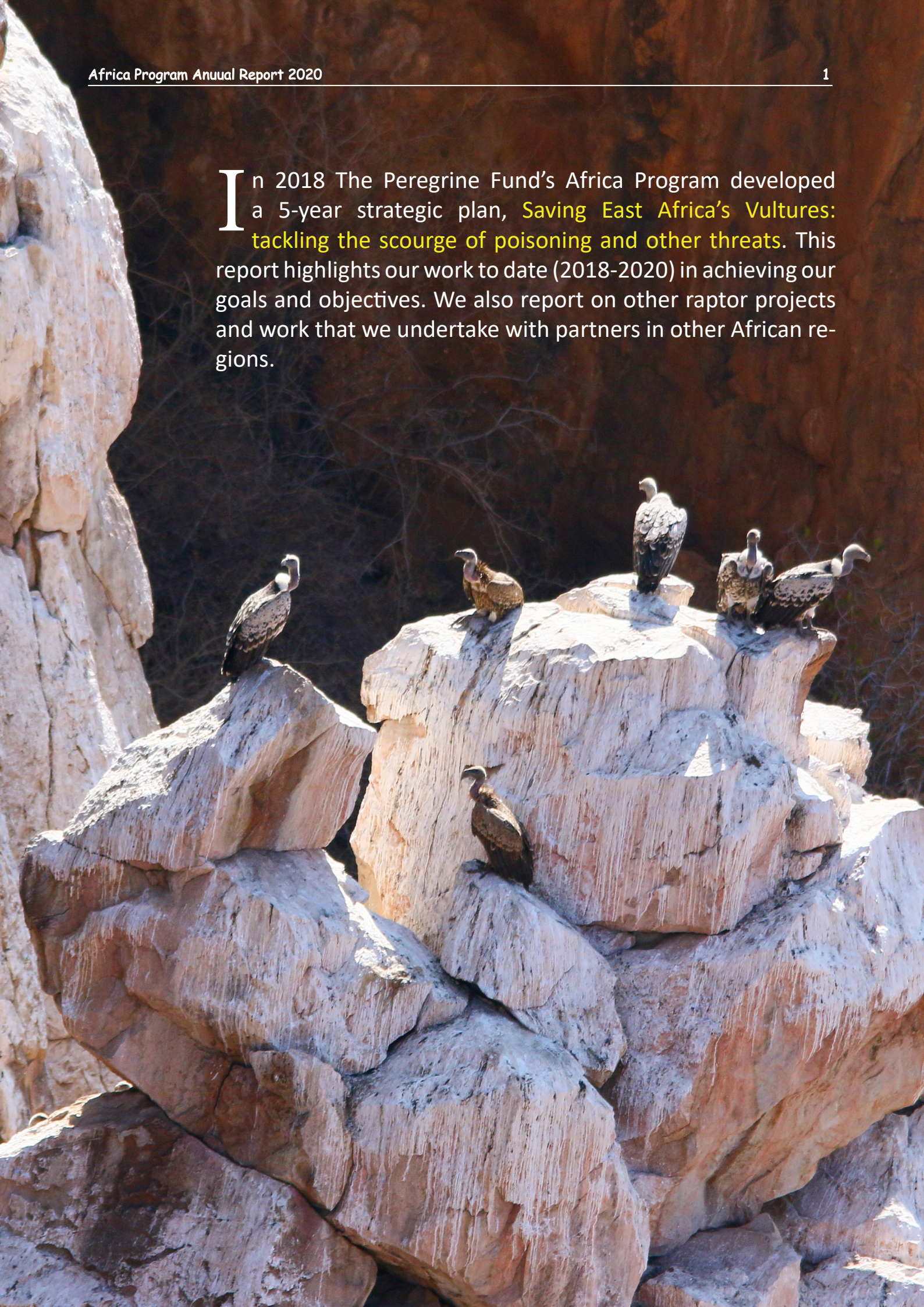
FIVE-YEAR STRATEGIC PLAN ANNUAL REPORT 2021

The Peregrine Fund's Africa Program

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and
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In 2018 The Peregrine Fund's Africa Program developed a 5-year strategic plan, **Saving East Africa's Vultures: tackling the scourge of poisoning and other threats**. This report highlights our work to date (2018-2020) in achieving our goals and objectives. We also report on other raptor projects and work that we undertake with partners in other African regions.



Project Partners



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VULTURE Specialist Group



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Summary

This report highlights our work to date based on our 2018 five-year strategic plan, Saving East Africa's Vultures. African vulture populations have undergone steep declines and the primary threat is poisoning. In Kenya farmers use pesticide-laced bait to eliminate carnivores that have killed livestock, which inadvertently poisons vultures in large numbers. Our goals are to increase vulture populations in Kenya, and to expand local conservation leadership capacity and monitoring of East Africa's vulture populations. We also conduct research and monitoring on other raptor species, notably large eagles and owls. Our work is primarily based in two human-carnivore conflict hotspot areas, the Masai Mara and Laikipia County.

In the Mara we have trained and developed five Vulture Liaison Officers (VLOs), 50 scouts, and our communication network reaches over 100 first responders to incidents of conflict or wildlife poisonings. Our VLOs conduct regular education and outreach activities to sensitize communities about the broader impacts of poisoning, which are further informed by a heat-mapping study that has identified poisoning hotspots in the Mara ecosystem. In northern Kenya the Coexistence Co-op has trained 1768 individuals how to prevent conflict by building predator-proof bomas and how to respond to poisoning incidents. Our first responder network reaches 55 communities in Laikipia and neighboring Samburu. Over three years, 660 predator-proof bomas (livestock corrals) have been built with an 83% success rate in deterring predator attacks. Communities have intervened 32 times to prevent poisonings and the biggest human behavioral changes have been building predator-proof bomas and properly disposing of poisoned carcasses.

Our road survey data collected over nine years (2010-2018) has been compared to similar data from the 1970s to produce a paper (expected to be published in June 2021) showing encounter rates for 19 out of 22 species examined had fallen, by a median of 70%. Declines had occurred among all vulture and large eagle species, and were particularly pronounced among once-common small and medium-sized raptors. We have deployed 38 GSM-GPS tracking units on three critically endangered vulture species, including two Hooded, 15 Rüppell's and 21 White-backed vultures. With our partners the Kenya Bird of Prey Trust and Mara Raptor Project, we began studies on eagles in the Masai Mara, which currently includes tracking of 32 resident Martial Eagles, 16 Tawny Eagles, and 3 African Hawk Eagles. We are also tracking two migrant species, Endangered Steppe Eagles ($n = 2$) and Wahlberg's Eagles ($n = 7$). The tracking data is supporting two post-graduate student research projects, with additional student projects planned. Mortality of tagged vultures has been low. Of 23 recoveries, only 17% ($n = 4$) were suspected to have died from human-related causes, including two poisonings and one electrocution.

Our collaborative monitoring project in the Mara monitored 129 large-raptor nests using a pole camera to view into the nests, including 47 Lappet-faced and 18 White-backed vulture nests, 12 Secretarybird nests and 10 Tawny Eagle nests. Over three years we have surveyed the three largest Rüppell's Vulture breeding and/or roosting cliffs in Kenya, twice annually, where an average of 300, 250 and 480 individuals were counted. Based on these numbers and on published studies of other species, we provide an estimate of the population sizes of seven vulture species in Kenya. Our Kenyan student continues his research and monitoring work on two species of owls and their threats.

Our collaborative work on the African Wildlife Poisoning Database continues and there are currently 1063 incidents recorded that represent 40,672 mortalities involving 62 species with vultures representing > 36% of all mortalities. We are working with partners in the Kenyan Government, the private sector and with conservation NGOs to document and begin to address the threat of energy infrastructure to raptors and other wildlife. We have established a Wildlife-Energy Working Group in support of this work. Recent control efforts to contain a multi-regional outbreak of desert locusts have caused raptor mortality, but the extent of this threat is not known. Harmful locust control efforts are ongoing and could continue for years to come.

We are currently mentoring five students and one Fellow in projects involving the study of African raptors or their threats. We continue our engagement amongst a network of conservation organizations and African scientists who are working collectively to find solutions to the issue of belief-based use of vultures and their parts in West Africa.

Africa's Threatened Vultures



Why vultures?

Vultures are arguably nature's most important scavengers. As the most highly evolved scavengers, they naturally and efficiently consume carrion and other organic waste, providing vital ecosystem services that benefit the environment, as well as economies. Their existence is crucial for maintaining healthy ecosystems. Despite their importance, vultures are among the most threatened group of birds worldwide. Their situation in Africa is particularly dire. In 2015 Peregrine Fund biologists together with our partners first described the African Vulture Crisis, whereby populations of seven species declined by at least 80% over three generations (Ogada et al. 2016). Four species were subsequently up-listed to Critically Endangered, and three species to Endangered on the IUCN Red List.

Our subsequent research in Kenya has shown that over the past 40 years Hooded Vultures have declined by 88%, White-backed by 75%, Lappets by 65%, and Rüppell's by 20% (Ogada et al. in review). While Kenya's most threatened vultures are Bearded, Egyptian and White-headed whose current populations are all too low to estimate rates of decline, with Bearded Vultures being nearly extinct.

The biggest threat to vultures globally is poisoning. Over recent decades, reports of vulture poisonings in East Africa widely confirm that these incidents arise from conflict between livestock farmers and

carnivores. Carnivores largely reside in protected or semi-protected areas, while the surrounding land is under increasing pressure due to the rapid growth of human and livestock populations. This has led to conflicts between people and carnivores, inflicting an increasingly heavy toll on livelihoods as well as the environment. Livestock owners often retaliate against carnivores, typically through lacing carcasses with toxic pesticides to eliminate offenders. Poisoning in areas adjacent to the Masai Mara National Reserve has resulted in a 25% annual vulture mortality rate (Kendall & Virani 2012). Lions, leopards and hyena are the typical targets, and vultures are the most numerous victims. The collapse of these threatened species is intricately linked.

In addition to poisoning, East Africa's vultures and raptors are also threatened by other human activities, particularly the rapidly increasing threat from electrocution and collision due to energy infrastructure, such as power lines and wind farms.

As populations falter, the magnitude and cumulative impacts of the threats facing vultures increases disproportionately and unsustainably. This is further impacted by vulture's life history strategy, which is characterized by delayed maturity, longevity, and slow reproduction. While their need to range over large areas to locate food requires complicated transnational conservation efforts.

Project History

The Peregrine Fund's Africa Program began focusing on vultures in 2001 primarily in response to the Asian Vulture Crisis. Field studies commenced in the Masai Mara in 2003 and subsequently expanded to northern Kenya (Laikipia, Isiolo, Samburu, and Marsabit counties) beginning in 2010. In 2019, we began vulture research in Kenya's southern Rift Valley coinciding with the development of a controversially-placed wind farm. Our work has been further supported by the development of the Multi-species Plan to Conserve African-Eurasian Vultures by the Raptors MoU under the Convention on Migratory Species (2017), as well as by the inclusion of four species of African vulture as a SAFE (Saving Animals From Extinction) species group in 2018, under the auspices of the Association of Zoos and Aquariums (AZA).

Goals

Our goals as laid out in our strategic plan are to increase populations of African vultures in Kenya, and also to increase conservation leadership capacity and monitoring of East Africa's vulture populations.

In addition, we aim to understand the foraging ecology and threats to eagles in Kenya and elsewhere in Africa. Like vultures, the decline of Africa's largest eagles has been dramatic, by over 80% in parts of their range over four decades (Thiollay 2006). Our goals are to understand the habitat requirements of large eagles and the causes of their declines in order to tackle these threats.

Objectives

1. Through our projects in the Masai Mara and the Coexistence Co-op in northern Kenya, reduce poisoning-related fatalities and the number of poisoning incidents in hotspot areas by 20-40% over the next five years.
2. Undertake ecological research, notably tracking studies to understand foraging ecology and conduct population monitoring to assess mortality levels and key threats to vultures and eagles. Determine population trends for vultures and identify important breeding locations.
3. Assess conservation management actions to increase vulture and eagle populations.
4. Increase capacity for raptor conservation in East Africa through mentoring 3–6 new undergraduate and post-graduate students.

Main project locations

Masai Mara

The Masai Mara is a large national game reserve in southwestern Kenya that is contiguous with the Serengeti National Park in Tanzania. It is named in honor of the Maasai people, the ancestral inhabitants of the area, who migrated to the area from the Nile Basin. It is one of the most famous and important wildlife conservation and wilderness areas in Africa, world-renowned for its exceptional populations of large carnivores and ungulates. It also hosts the Great Migration, which secured it as one of the Seven Natural Wonders of Africa, and as one of the ten Wonders of the World.

The Mara holds important numbers of breeding African White-backed Vultures, which nest along the large rivers that run through the reserve and the surrounding conservancies. Lappet-faced vultures are a common breeding bird and a few White-headed Vultures breed on the plains. The entire area is also vital to Rüppell's Vultures, which breed on cliffs in the Rift Valley and forage within the Mara. Martial Eagle territories occupy the entire Mara, and Tawny Eagles breed at high densities. Other eagles, such as African Hawk and Wahlberg's Eagles, are more local, and the Mara holds numerous other resident and migratory raptors.



Northern Kenya

The Laikipia plateau and adjacent areas in Samburu consist of semi-arid savanna that support pastoral livestock production and wildlife conservation. The

abundance of wildlife is second only to the Masai Mara. Laikipia is a refuge for regionally and globally significant populations of large mammals including black rhinos, elephants, wild dogs, Grevy's zebra, reticulated giraffes as well as Kenya's third largest lion population (Graham 2012). Samburu harbors among the largest breeding colonies of critically endangered Rüppell's Vultures anywhere in the world, while Laikipia is a prime foraging area. The Laikipia-Samburu landscape is of global conservation significance.

The vast region to the north of Laikipia (Isiolo, Samburu and Marsabit counties) is Kenya's last stronghold for rare and highly threatened species such as White-headed and Egyptian vultures as well as being regionally important for a variety of eagles and other raptors. Although northern Kenya remains the most undeveloped area of the country, there has been a recent rush to exploit the region's natural resources (e.g. wind power and oil) and to use the area as a transportation corridor for the East African region. Of particular relevance to birds, the Ministry of Energy has identified northern Kenya as the most appropriate area in the country for the development of wind farms.

Conservation Initiatives

Vulture Liaison Officers – Masai Mara

Our vulture conservation project in the Masai Mara has built local capacity on the ground and developed a network of Masai Vulture Protectors across the southern Kenya landscape. Our long-term goals are to significantly reduce the frequency of poisoning incidents, thereby lowering vulture mortality rates and restoring, stabilizing or increasing extant populations of vultures; while at the same time to have a beneficial impact on other scavengers and carnivores. The requirements necessary to achieve our goals are to:

1. Reduce the intensity of human-carnivore conflict, and numbers of livestock killed by carnivores, a major reason for retaliatory poisoning in so-called poisoning hotspots
2. Ensure that the clean-up of poisoning sites is effective, rapid and done safely, while rescuing and helping to rehabilitate as many poisoned vultures as possible
3. Instill a sense of ownership within local communities and a responsibility to protect vultures, while actively engaging them in vulture conservation activities

We started Rapid Response Trainings in November 2016, when we partnered with the Endangered

Wildlife Trust, Kenya Bird of Prey Trust, Mara Lion and Cheetah Project, and the Birdlife Africa Secretariat to conduct a training for Vulture Liaison Officers (VLO), scouts and rangers based in conservancies around the Masai Mara, and in Samburu and Amboseli. Trainees learnt how to respond to a poisoning incident, notably how to secure and treat live, poisoned vultures so they can be transported for rehabilitation. Together with Kenya Bird of Prey Trust and other partners, we rescued, rehabilitated and released back to the wild eight vultures in 2020 (African White-backed, Rüppell's and Lappet-faced). Trainees learnt what data to collect and how to process samples at poisoning scenes, and how to effectively decontaminate a poisoning scene by burning carcasses in a hot fire that reduces it to ash. This prevents secondary poisoning, which is an important reason why many vultures die at a poisoning scene, as incoming vultures scavenge off the poisoned carcasses. Trainees also learnt what measures can be taken to prevent people from poisoning carnivores, such as improving bomas (livestock corrals) to prevent hyenas and lions from entering.



VLO coordinator Abraham Loomuna leading a training for rangers in the Masai Mara in September 2020.

As part of our major achievements, we have provided leadership skills and hands-on training to five Masai Vulture Liaison Officers and a network of scouts to decontaminate poisoning sites and to collect intelligence to thwart potential poisoning activities, as well as having conducted outreach, poisoning intervention training, human-carnivore conflict mitigation and other conservation activities. The VLOs are stationed across southern Kenya. Our WhatsApp communication groups have been expanded and currently include over 100 participants from 22 different conservation organizations that regularly share information on livestock predation and poisoning

incidents related to human-wildlife conflict. As a result of our fast-growing network of trained teams on the ground, managing wildlife poisoning continues to improve, which saves vultures’ lives.

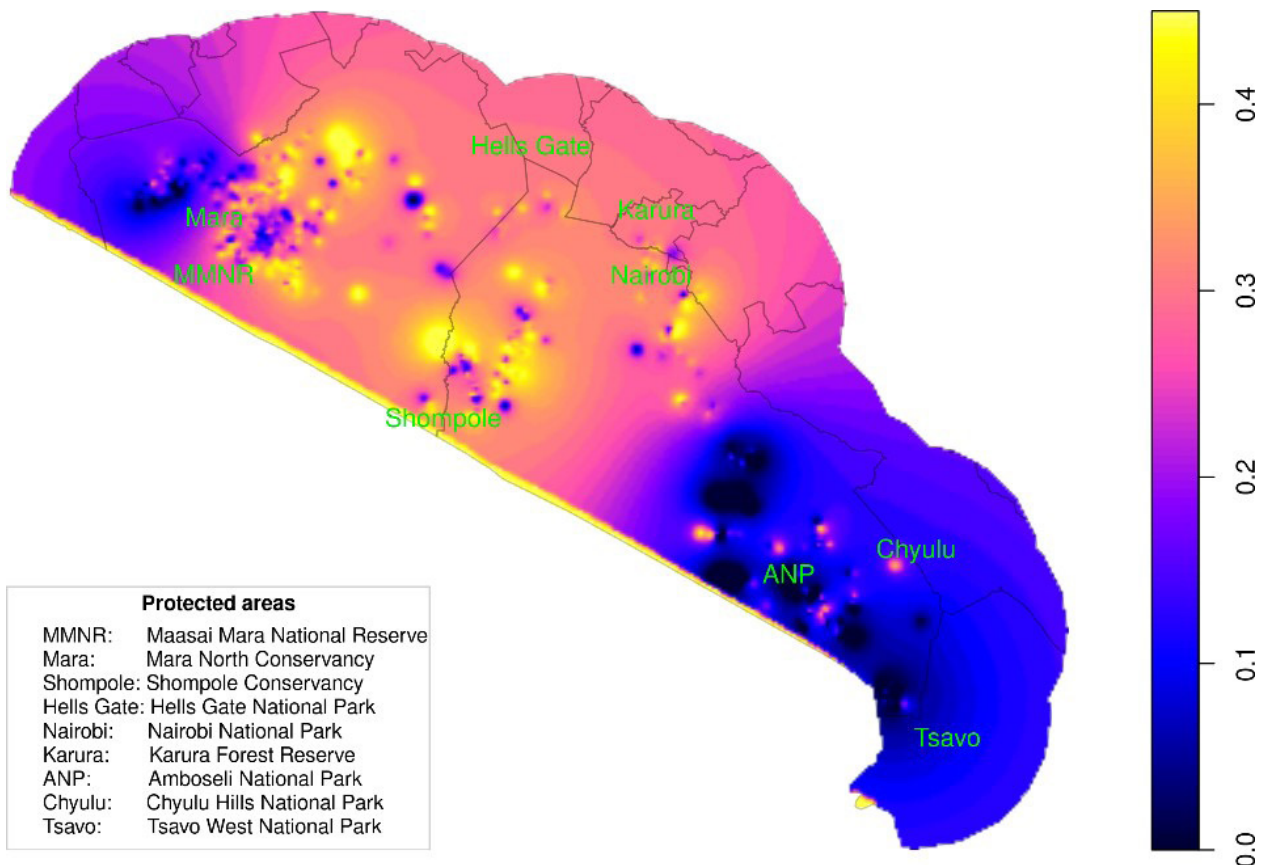
Our Education and Outreach interventions to create change focus broadly on communities, notably changing their attitudes towards poisoning, working with them to prevent poisoning from happening, and removing the prime reason for poison-baiting carnivores. We share ideas and enthusiasm about the role of vultures in maintaining ecosystem integrity, in addition to encouraging people to adopt effective methods to protect livestock from carnivore attacks. This work is led by the VLOs in their respective areas of activity, and focused on those areas with the highest risk of poisoning as determined through our heat-mapping work, which has been led since 2020 by Kenyan Zahra Diderali, as part of her MSc thesis at Oxford University. We engage communities through awareness-raising activities about the threats of poisoning to wildlife, livestock, and people. This includes making people aware of possible contamination of waterways and pasture, and the potential negative impacts for people’s health by convening community-based meetings in villages and local market places. Meetings include interactive sessions on the ecolog-

ical significance of vultures, their current conservation status, key threats with emphasis on poisoning, drivers of poisoning, types of poisons used locally, cumulative effects of poison on humans, wildlife and livestock, and possible preventive and mitigation measures.

Coexistence Co-op – northern Kenya

The Coexistence Co-op represents an innovative partnership between The Peregrine Fund and Lion Landscapes that is based on knowledge sharing with local people, who bear the costs of sharing their land with wildlife, and often perceive very little benefit in doing so. The Co-op is a holistic education, training and conflict management program that addresses the shared goals of reducing livestock lost to large carnivores and stopping the resultant use of highly toxic pesticides to kill problem carnivores, which inadvertently poison vultures and contaminate the environment. There are two main project activities:

1. Community Coexistence Training, which trains livestock owners to build predator-proof bomas to prevent livestock depredation, and addresses the widespread problem of the misuse of poisons through a One Health approach.



Updated heatmap showing poisoning risk (Z. Diderali et al., unpubl. 2020).

2. Lion Ranger program, which works to train and equip a unit of Police Reservists who are based on each large ranch and conservancy in Laikipia to prevent or respond quickly to incidences of human-carnivore conflict.

Our approach empowers communities to improve their livelihoods by offering education and training, rather than providing materials or financial subsidies.

The Coexistence Training Team is managed by The Peregrine Fund and currently employs five Kenyans full-time. We conduct 1- or 2-day training sessions about the dangers of using highly toxic pesticides to poison wildlife that provides communities with the know-how to stop the main driver of poisoning, carnivore conflict, by giving them the skills to predator-proof their livestock husbandry practices. We educate communities about improved husbandry techniques, including the proper care of dogs, after which they construct a demonstration boma. Our trainees also learn about the personal and environmental impacts of mis-using pesticides, how to safely handle pesticides, what to do if they discover a poisoning incident and how to safeguard the environment from further contamination. Our 'know-how only' approach strengthens local community capacity, as well as ownership and responsibility towards the husbandry of their livestock and the health of their environment. We further support our Coexistence Training Program by conducting evaluations of both aspects of our program (livestock husbandry and anti-poisoning) and critiquing newly built bomas within communities. Our anti-poisoning training is so unique that we have been requested and have trained numerous government officials and their staff. The demand for our training, from within Kenya as well as the wider region, far exceeds our present capacity.



Local community leader pointing out the challenges of allowing small children to herd livestock in conflict hotspots.

Since 2017 our team has trained 1280 community members about the dangers of wildlife poisoning and how to build predator-proof bomas. We have trained

an additional 488 conservancy rangers and staff of the Kenya Wildlife Service, Kenya Forest Service, Administration Police, Directorate of Criminal Investigations, and Kenya Prisons about how to rapidly and safely respond to poisoning incidents. Each training consists of 15–20 people in order to ensure it is quality-focused, hands-on, and all participants benefit equally. Women have represented 39% of trainees.



Training rangers from Samburu National Reserve.

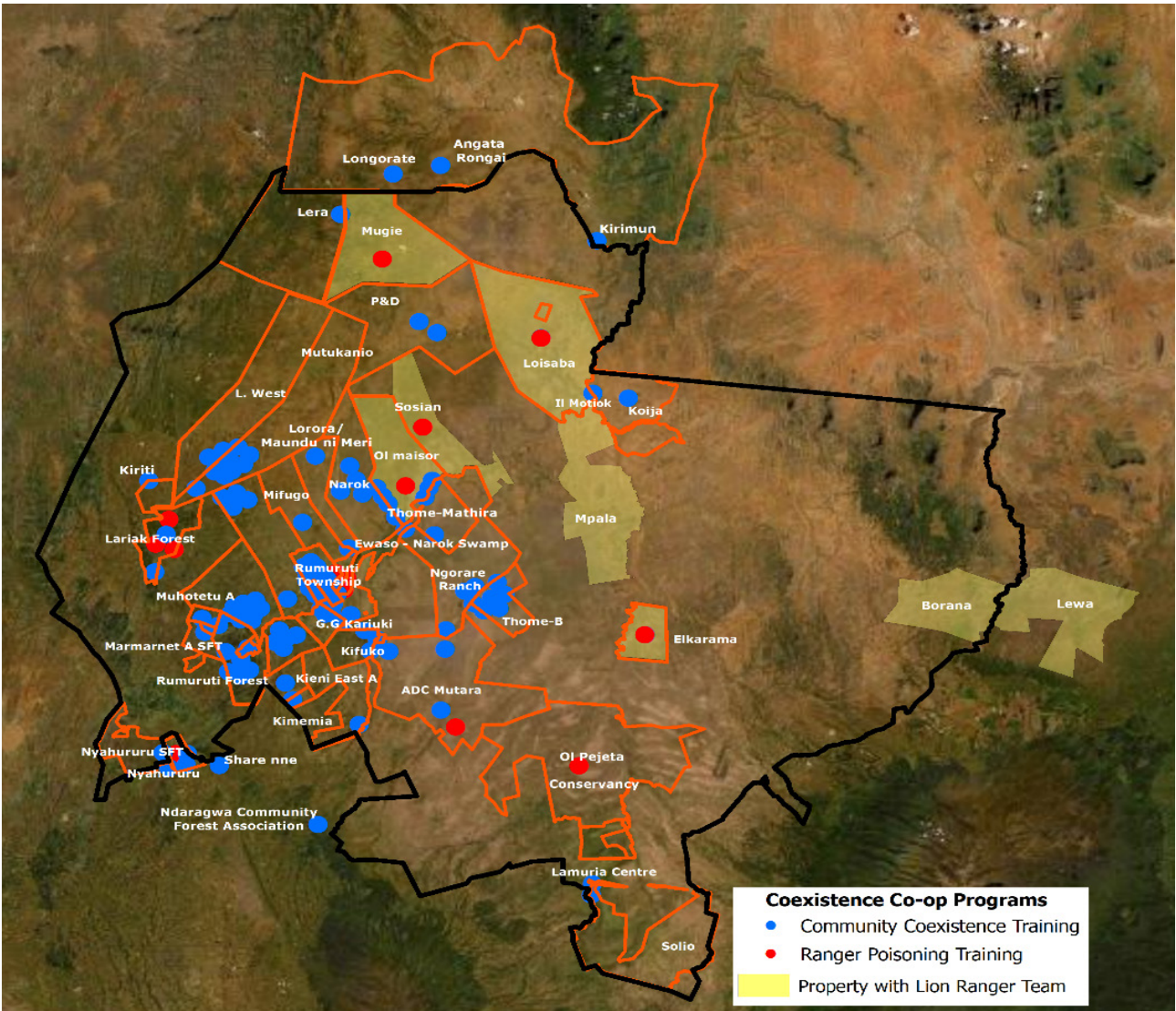


Team of female trainees from Angata Rongai village learning how to build a predator-proof boma.



Demonstration boma built by trainees.

Our trainees know how to prevent predator conflict and how to respond if conflict, or poisonings occur. Importantly, we have built and maintained a network of first responders who help prevent conflict and poisonings across 55 communities in Laikipia and neighboring areas of Samburu.

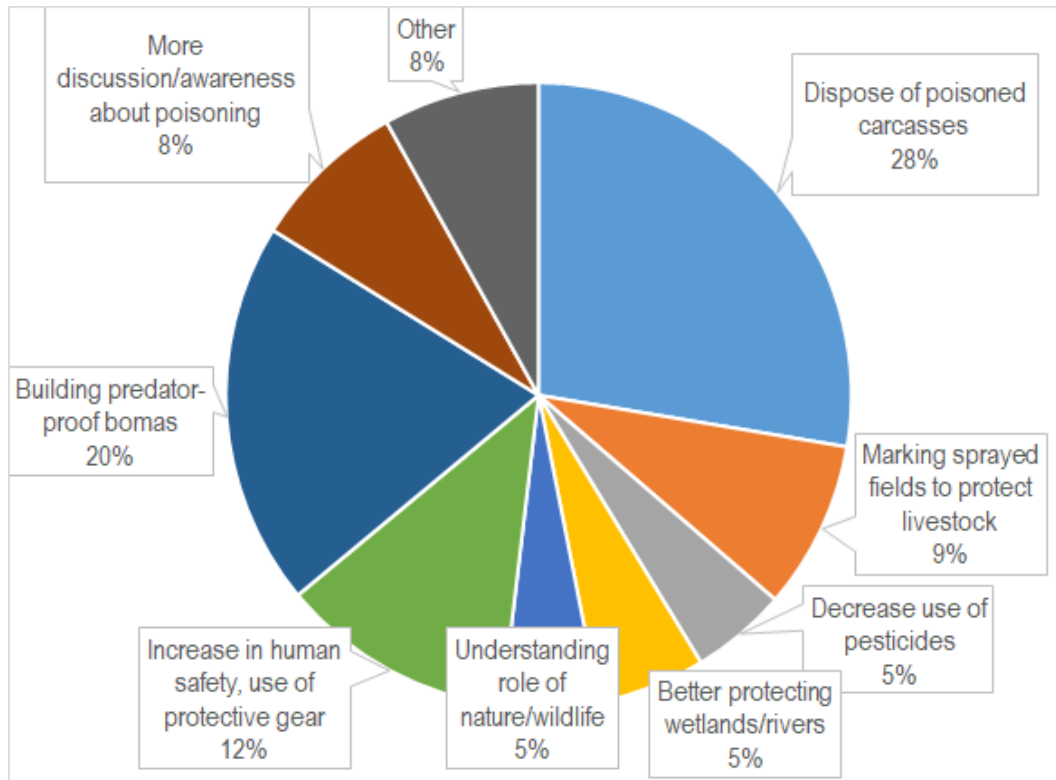


Communities within Laikipia and neighboring Samburu County where the Co-op has provided Coexistence Training, as well as eight properties with Lion Ranger teams.

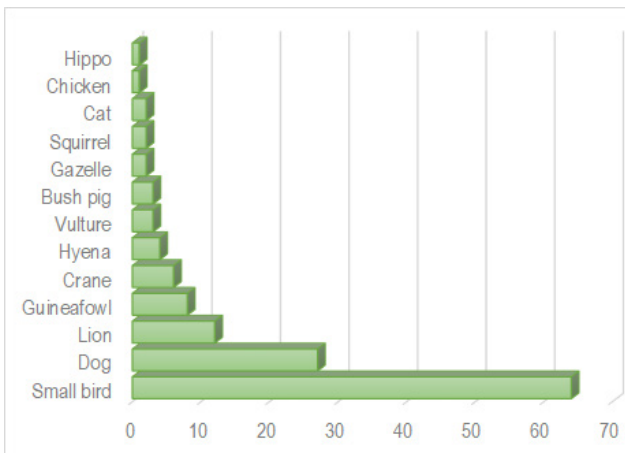
Over the past three years, 660 predator-proof bomas have been constructed by communities within carnivore-conflict hotspots. These bomas have been 91% successful in deterring livestock loss in homesteads.

Example of a predator-proof boma constructed by a recent trainee. Key features include chain-link fencing, a sturdy door, opaque walls, and pegs holding the chain-link securely to the ground.





Changes in human behavior with regards to poisoning based on 296 trainee evaluations.



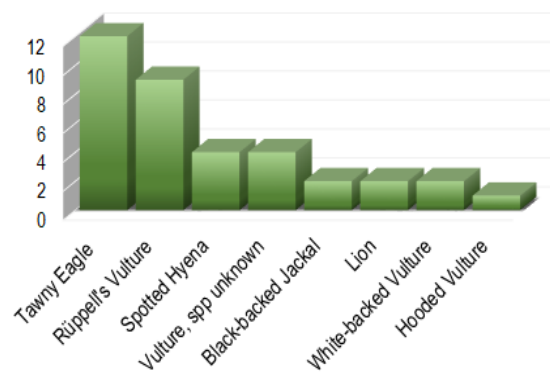
Communities and/or individuals have intervened 32 times to prevent poisonings of the following species.

Lion Landscapes has trained and deployed 46 Lion Rangers on nine ranches and conservancies, who have responded to 291 incidences of human-wildlife conflict. Additionally, these Lion Rangers are working towards preventing conflict on a daily basis, through talking to neighboring communities and commercial livestock owners about local lion movements, predator-proof livestock husbandry, and the environmental dangers of poisoning.

Poisoning incidents

As we continue our monthly trainings, which have

been disrupted twice due to Covid-19 restrictions, there remains a number of hotspot areas that we have yet to reach. In these areas there have been six poisoning incidents, four of which have occurred since the beginning of Covid-19 restrictions (March 2020).



Six poisonings have killed the following species and numbers.

We suspect that covid-related economic impacts have led to a greater intolerance of wildlife, of which many species are a threat to local livelihoods. We've recorded a rise in carnivore poisonings and there has been a similar increase recorded for Grey Crowned Cranes by partner NGOs. Cranes are widely poisoned in Africa due to conflict with farmers when the birds dig up and consume freshly planted maize seeds.

Recent media coverage of the Coexistence Co-op

[BBC, Saving Africa's vulture from an 'extinction crisis'](#)

[Living Bird Magazine, The Race to Save Africa's Vultures](#)

[Boots on the Ground podcast, Darcy Ogada on the Conservation of Vultures](#)

[Reuters, Poisoned carcasses killing off Kenya's vultures](#)

Raptor research and population monitoring

Annual raptor road surveys led by TPF were undertaken from 2010 through 2018 for the purposes of monitoring population trends and training Kenyans in raptor identification and monitoring. Surveys were primarily done in northern (Samburu, Isiolo, Laikipia counties) and southern Kenya (Amboseli and Tsavo NPs), with additional data included from the Masai Mara and Marsabit. The results have been analyzed and compared to road survey data collected along the same routes during 1970–1977.



Counting raptors during road surveys in northern Kenya.

The resulting publication, 'Evidence of widespread declines in Kenya's raptor populations over a 40-year period' is in the final stage of review and we expect it to be published in June 2021. The abstract is as follows:

Kenya's wildlife has been declining substantially for decades, due to rapid human population growth and its associated impacts on natural habitats. Predators and scavengers are particularly sensitive to anthropogenic pressures, and their changing status has corresponding impacts on the ecosystem services they provide. To estimate rates of change in Kenya's raptor populations we compared linear encounter rates (individuals 100 km⁻¹) recorded during road surveys conducted in 1970–1977 and 2003–2020. Encounter rates for 19 out of 22 species examined had fallen, by a median of 70% among those showing a significant or near-significant change. No species had increased significantly. Declines had occurred among all vulture and large eagle species, and were particularly pronounced among once-common small and medium-sized raptors. Our findings demonstrate the importance of protected areas (PAs) for Kenya's remaining raptor populations. The median encounter rate for vulture and large eagle species had fallen by 23% within PAs and by 76% in unprotected areas. Smaller species showed divergent trends in relation to PA status, their median encounter rate increasing by 104% within PAs while declining by 85% elsewhere. Based on projected declines over three generation lengths, 45% of the species examined would qualify as nationally Endangered or Critically Endangered. Key threats include electrocution/collision with energy infrastructure, deliberate and incidental poisoning, and threats related to habitat destruction. Kenya's raptor declines could be reversed through enhanced management of PAs, mitigation of specific threats and the implementation of species recovery plans; all requiring steadfast government commitment and close collaboration with conservation stakeholders.

We have supported similar road surveys led by our partners in Uganda (NatureUganda and Makerere University) and Ethiopia (Hawkwatch International). In Uganda we have supported road surveys for five years, which have resulted in the publication of four scientific papers that have greatly increased our knowledge about the importance of protected areas for Uganda's raptors. In Ethiopia, our partners have combined the results of raptor road surveys (partially supported by TPF), citizen science observations, and vulture tracking data to produce a paper, *Priority areas for vulture conservation in the Horn of Africa largely fall outside the protected area network* (see full reference under Publications) that will greatly expand our limited knowledge of vulture populations in a country that is critical for their conservation.

Vulture and eagle tracking studies

We began studying vulture movements in 2013 and continue to expand our tagging efforts annually as funding allows. In total, we have deployed 38 GSM-GPS tracking units on three critically endangered vulture species. These include 2 Hooded, 15 Rüppell's and 21 White-backed vultures. The locations for trapping and tagging vultures are the Masai Mara and Laikipia, Samburu and Marsabit counties. More recently we have begun tagging vultures in Kipeto, the location of a controversially-placed wind farm approximately 70 km south of Nairobi. However, we are not reporting on those results here.



Martin Odino about to release a tagged White-backed Vulture in Jaldesa, Marsabit County.

Tagging vultures has vastly expanded the knowledge we have of these extremely wide-ranging birds. We have been able to study both local ranging behavior, as well as dispersal of young birds throughout the East African region and beyond. Tagging is also essential for understanding threats to populations and identifying mortality hotspots, as well as for the identification of important breeding and roosting areas, particularly in remote areas of the country. With rapidly improving tracking technology, studies to better understand foraging behavior are now possible.



Above and previous: Dr. Gathoni from Kenya Wildlife Service, Dr Ralph Buij, Simon Thomsett of Kenya Bird of Prey Trust and a local official tagging and releasing a Rüppell's Vulture in the Athi-Kapiti area south of Nairobi.

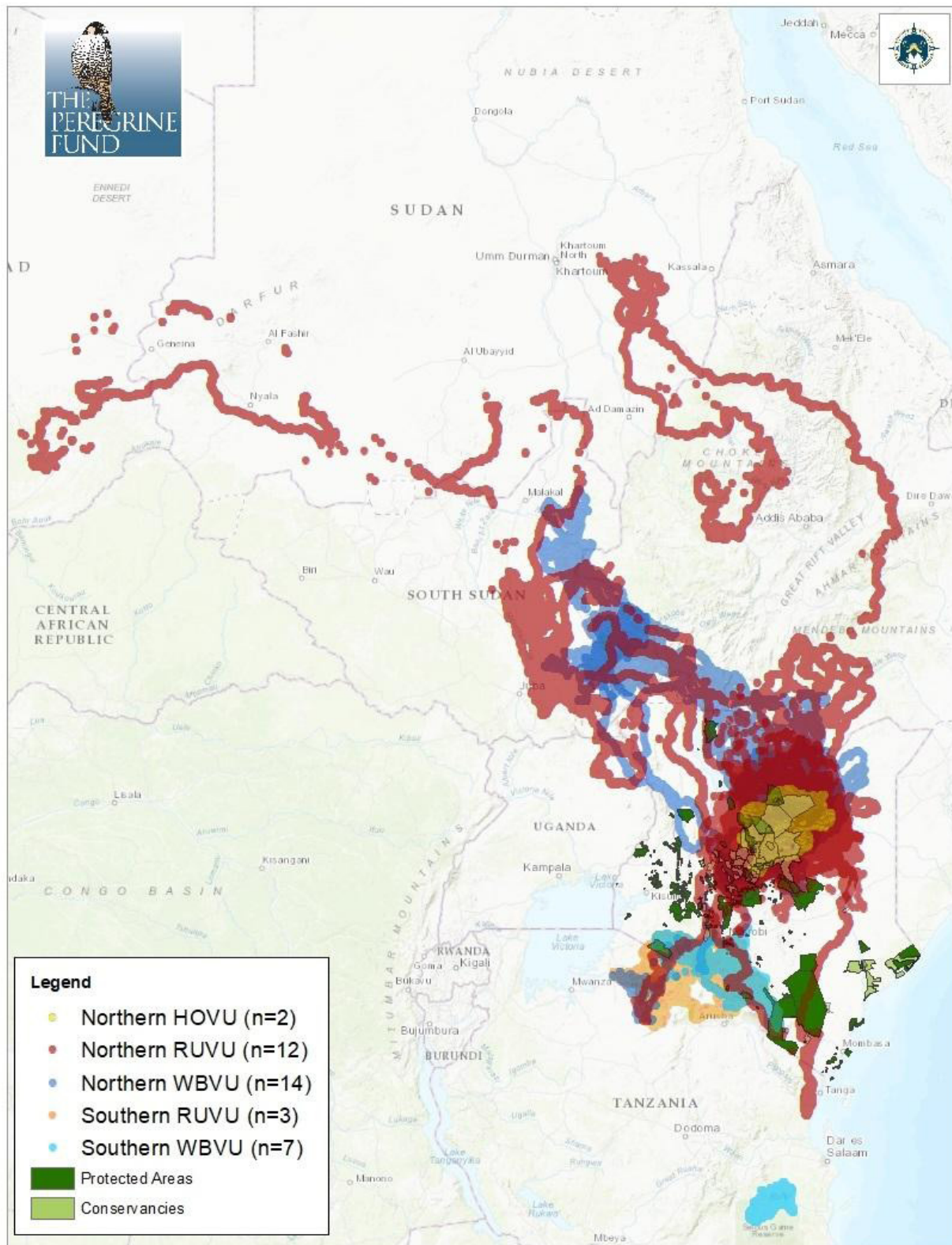
With regards to eagles, we have established a partnership with the Mara Raptor Project and Kenya Bird of Prey Trust, and others, that has initiated in-depth studies on the foraging ecology and movements of eagles in the Masai Mara. Currently GSM-GPS tracking of 32 resident Martial Eagles, 16 Tawny Eagles, and 3 African Hawk Eagles is underway. In 2020 we also initiated a tracking study of Endangered Steppe Eagles, which breed in central Asia and visit East Africa during their non-breeding season. All of these eagles are threatened by power lines, persecution and poisoning, and we aim to examine where mortality happens in order to address threats wherever possible. Finally, we are tracking 7 Wahlberg's Eagles that were tagged in the Mara as part of a continental collaboration to identify their main non-breeding areas and the threats faced in these locations as well as on migration.



Shiv Kapila of Kenya Bird of Prey Trust and Parmuntoro Lemein of Mara Raptor Project releasing a Tawny Eagle in the Masai Mara.

Results

Vulture and eagle movements



Map showing the movements of 38 vultures across Kenya as well as into nearby areas of Tanzania, Uganda, Ethiopia, South South, Sudan and Chad.

The tracking data is currently being used for an MSc study on vulture movements in relation to poisoning incidents, and it will also help us to locate poisoned carcasses, i.e. when a tracking unit gives a warning signal that a bird is immobile. In southern Kenya the tracking data will be used to estimate collision risk with turbines at the Kipeto wind farm, in order to predict high risk areas and conditions for vulture collision. This will support on-site mitigation, such as shut-down on demand measures taken to prevent vulture mortality. The data also has been used by developers to help prevent the placement of wind turbines in important vulture flyways and other high-use areas. We are also collaborating on a large-scale study of the ranging behavior of vulture sub-populations throughout the continent, which will provide important recommendations for the conservation of Africa's vultures.

The Martial Eagle tracking data is part of a collaborative PhD study by Stratton Hatfield, and is in the process of being analyzed. The tracking data for the other eagle species will be part of future post-graduate student research projects.



Migration tracks of two Steppe Eagles from 15 December 2020 through 15 April 2021. Both eagles were tagged in the Masai Mara.

Mortality from vulture tracking studies

We currently have 15 vultures whose tags are still active. For the other 23 tags that are no longer active, 74% were due to problems associated with the tags or data transmission (36% no longer working due to battery life, 23% vultures flew out of range, 18% of tags fell off, both intentionally and unintentionally). Among the remaining tags, 17% were known or suspected to be due to vulture mortality (two were suspected of being poisoned, one was electrocuted, and one died due to an unknown cause), the fate of the two remaining tags/vultures (9%) is unknown.

Monitoring breeding vultures and raptors

Southern Kenya

Our collaboration with the Mara Raptor Project and Kenya Bird of Prey Trust is led by Parmuntoro Lemein and is focused on the central, eastern, and southern areas of the Maasai Mara National Reserve and neighboring Siana Conservancy. Lemein was able to monitor 129 large-raptor nests using a pole camera to view into the nests. These included 47 Lappet-faced and 18 White-backed vulture nests, 12 Secretarybird nests and 10 Tawny Eagle nests. Lemein also monitored two White-headed vulture nests. This data will contribute to our understanding of the breeding success of vultures and other raptors, which over the long run will shed light on their population dynamics in this important area, and will contribute to our analysis of population trends as measured by road surveys.



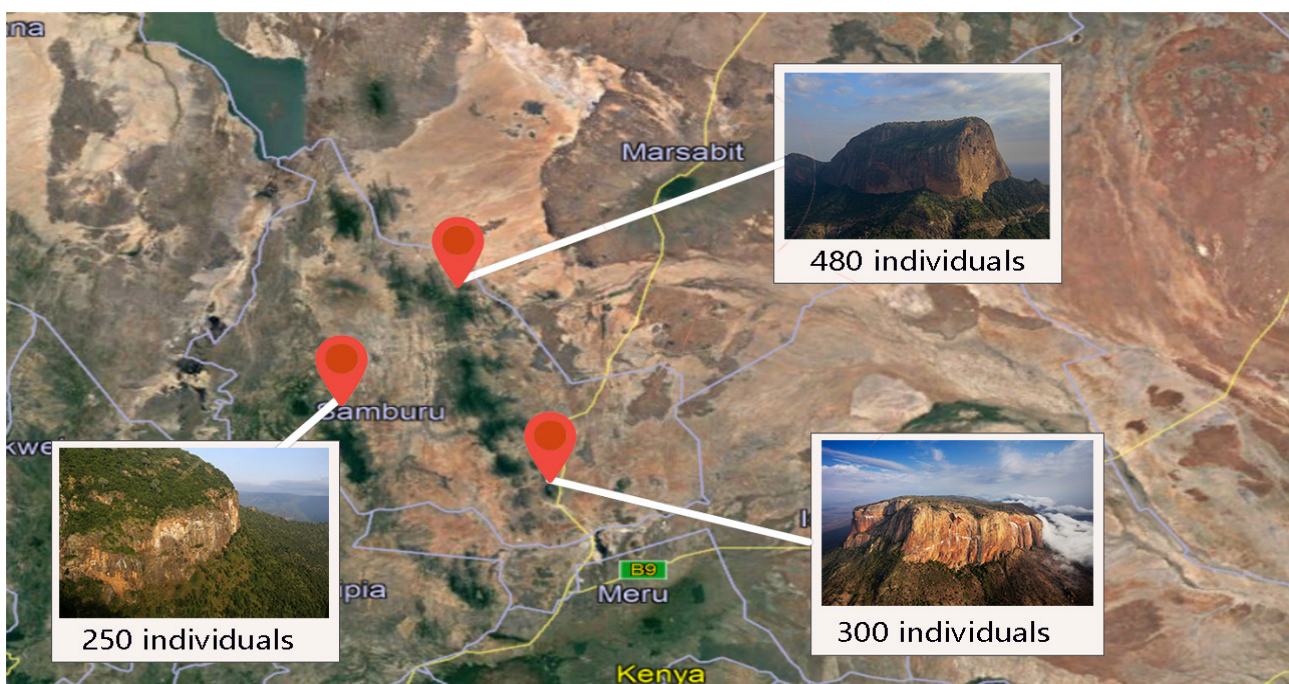
Parmuntoro Lemein checking the status of an African Fish Eagle nest in the Mara.

Northern Kenya

Preliminary analyses have identified a few important breeding locations for tree-nesting vultures based upon the movements of our tagged birds and other fieldwork. The most notable areas are Marsabit National Park and Samburu National Reserve. Riverine vegetation inside community conservancies (e.g. Melako, Kalama, Namunyak) also supports breeding vultures. Interestingly, we do not know of any active vulture nests in Laikipia County.

Since 2017 aerial surveys of three major Rüppell's Vulture breeding and roosting cliffs in Samburu County have been conducted twice annually, with the exception of 2020 due to Covid-19 restrictions. Surveys are conducted using a small four-seater helicopter with two photographers and a pilot. We count both breeding and non-breeding individuals. Photographs are taken of individual nests as well as of the locations of nests relative to their position on each cliff. Using the photographs, each nest is given a unique number to facilitate the counting of breeding attempts and breeding success. However, this species breeds during most, if not all, months of the year, so obtaining an accurate count of the total number of breeding pairs would require more frequent surveys that are spread throughout the year. The cost of conducting each survey is a limiting factor for expanding this work.

Below: Map of three Rüppell's Vulture breeding cliffs in Samburu County. Numbers represent the average number of individuals counted, which includes both breeding and non-breeding individuals.



Through our long-term collaborator Kenya's Owl Man, Paul Muriithi, we monitor threats to owls, notably the illicit trade in owls and their eggs for belief-based use. Admittedly, our efforts are not systematic due to very limited funding. Paul also monitors the breeding success of a small number of Mackinder's Eagle Owl pairs in central Kenya, which are frequently targeted by egg collectors. Paul is also undertaking an extensive search for the Abyssinian Owl on Mt Kenya, a species that was last confirmed in Kenya in 1961. In partnership with Stratton Hatfield and Pete Steward, six Audio Moths—acoustic logging devices that are similar to camera traps, but which opportunistically record audio, rather than visual footage—were recently placed in previously known habitats of the Abyssinian Owl. This data is yet to be analyzed.



Paul Muriithi on Mt Kenya searching for the Abyssinian Owl.

Vulture population estimates

Beginning in 2018 we have conducted aerial surveys, by plane and helicopter, throughout Kenya to estimate the population size of Rüppell's Vultures in the country. In total we have flown to 15 known or suspected vulture breeding cliffs where we have counted vultures and recorded breeding attempts, giving us a good general estimate, which is admittedly an underestimate, of their national population size. The table below depicts estimates for most species of vulture in Kenya.

Species	Estimate of Individuals	Sources
White-backed Vulture	1000-2000	Virani et al. 2010, 2011; Kendall & Virani 2012; Ogada et al. in review
White-headed Vulture	60-100	Virani et al. 2011; Murn et al. 2016; Ogada et al. in review
Hooded Vulture	800-1500	Virani et al. 2011; Ogada & Buij 2011; Odino et al. 2014; Ogada et al. in review
Rüppell's Vulture	2000-3000	Virani et al. 2011, 2012; Ogada et al. in review; Ogada unpub. data
Egyptian Vulture	< 100	Virani et al. 2011, Ogada et al. in review
Lappet-faced Vulture	400-800	Virani et al. 2011, Kendall & Virani 2012; Ogada et al. in review
Bearded Vulture	< 5	S. Thomsett pers. comm.; observations at former breeding locations by ornithologists and citizen scientists
Palm-nut Vulture	Unknown	

Threats

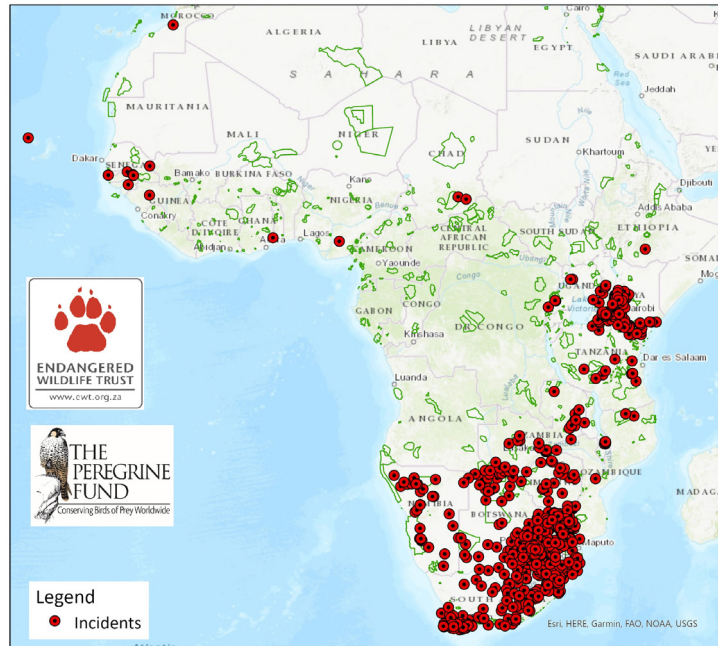
African Wildlife Poisoning Database

Poisoning is the biggest threat to Africa's vultures as well as being a considerable threat to many other wildlife species across the continent. Poisons are frequently used to eliminate conflict-causing species like large carnivores, gamebirds, primates and elephants, while scavengers such as vultures and eagles are often unintended victims. Poisons are used to harvest fish and birds for food, and for obtaining animal body parts to supply the trade in belief-based use. Given the scope of illicit wildlife poisoning, the [AWPD](#) functions as a centralized and accessible database to document the scale of wildlife poisoning, identify hotspots and targeted species, and as an important tool to aid in informed decision-making and research outputs to reduce the impact of poisoning on vultures and other African wildlife.

Established in 2012, the AWPD and is jointly managed by the Endangered Wildlife Trust and The Peregrine Fund under the auspices of the Vulture Specialist Group of the Species Survival Commission of the IUCN. It aims to capture available data of all wildlife poisoning events that occur in Africa, including current and past incidents, through engagement with an extensive network of organizations and individuals across the continent and also by means of a user-friendly App that simplifies electronic capture of data.

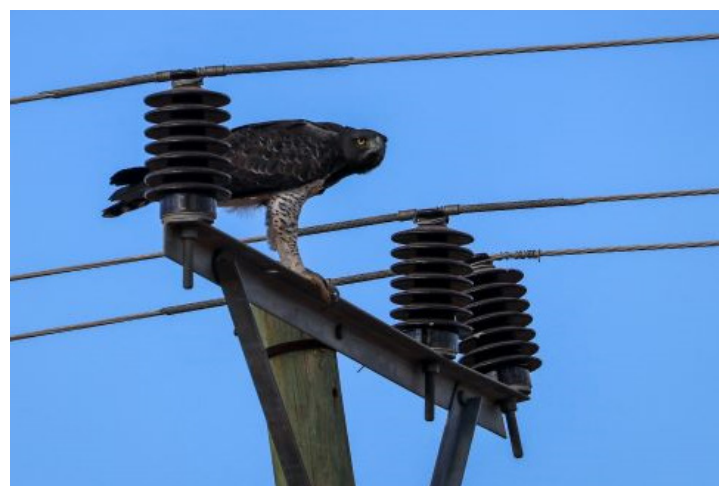
Electrocution and collision

There is little doubt among those knowledgeable about raptor populations in Kenya, that electrocution, and to a lesser extent collision, involving power poles and lines is the most rapidly growing threat to raptors, countrywide. Kenya's energy distribution network has multiplied many times in the past two decades and the country's Rural Electrification Programme has seen a huge expansion in the number of unsafe power pole configurations across vast areas of the country. Despite previous attempts by TPF to better understand and tackle this threat, its present and expanding scope requires



Map of wildlife poisoning incidents recorded in the African Wildlife Poisoning Database. Note incidents are highly reflective of local reporting efforts and gaps are unlikely to correspond to a lack of poisoning, but rather a lack of reporting.

- Contains data from 1961–present
- 1063 records of poisoning incidents
- 40,672 mortalities
- 58 wildlife and 4 domestic species
- Vultures represent >36% of all mortalities recorded
- Species worst affected is White-backed Vulture, 6495 killed
- Lower taxa poorly represented



Martial Eagle dangerously perched on a power line.

multi-sector, strategic discussions between government parastatals, international donors who fund energy infrastructure, conservation NGOs, and private sector companies.



Electrocuted Eastern Chanting Goshawk at Kipeto, 27 Sep 2019. These pylons are lethal to perch-hunting raptors in particular, and likely cause the most mortality among this species and Augur Buzzards at the site.

In 2020, working in collaboration with private-sector energy partners and the National Museums of Kenya (NMK), we agreed on a working collaboration between Kenya Power—the state-owned energy and distribution company—and NMK to document the threat of energy infrastructure to Kenya’s wildlife and to begin discussions on a national strategy focused on creating awareness and training key staff of Kenya Power as an initial step toward reducing this threat. Together, we established the Wildlife-Energy Working Group in late 2020 to further engage with Kenya Power on this issue. By early 2021 we had an agreement to begin awareness and sensitization training with Kenya Power’s managers and engineers in four key regions, however these plans are currently on hold due to Covid-19 restrictions. In the coming months we expect to train one of the four regions identified as we seek funding to expand this work to the other three regions. We have also created a database to record wildlife injuries and mortalities due to energy infrastructure.

Desert Locust Control

In late 2019 an unprecedented outbreak of desert locusts began threatening pastureland and crops in northern Kenya. It had been over 70 years since Kenya’s last major locust invasion and the government was not prepared. What followed was a large-scale and logistically difficult control effort involving the spraying of broad-spectrum pesticides, a number of which are banned in Europe and parts of the US because of impacts to humans, ground water, and beneficial insects such as bees. Thus far 475,000

gallons (1.8 million liters) of chemical pesticides have been sprayed over 4.35 million acres (1.76 million hectares; McConnell 2021). The consequences for raptors of consuming pesticide-sprayed locusts has been previously documented. Unfortunately, the locust outbreak coincided with Covid-19’s arrival and a subsequent 3.5 month lockdown, in addition, most of northern Kenya is very remote with challenging conditions, which meant that documenting the negative impacts of control efforts was impossible. However, anecdotal evidence received from concerned individuals and through the Kenyan news media justified our concerns.



Aerial view of locust swarms. The yellow-brown tree canopies are all locusts.

Mortality associated with locust spraying. A Black-capped Social Weaver in Laikipia.



The Peregrine Fund alongside a number of other conservation partners working in northern Kenya began advocacy and awareness efforts aimed at the Kenyan Government to persuade them to register and use a safe and proven bio-pesticide Metarhizium, which is a fungal organism lethal only to locusts and grasshoppers. To date, the FAO-Kenya report on the scale and impacts of the initial round of control efforts has not been released (see McConnell 2021 for

further details). Another wave of locusts is currently threatening northern Kenya and if current climatic conditions persist it would seem that the cycle of locusts and spraying will continue for some years to come with potentially serious consequences for raptors, particularly species such as Peregrines, Lanners, Red-footed and Amur falcons, Common and Lesser kestrels, Steppe Buzzard, Steppe Eagle, Secretary-bird, and Eurasian Hobby.

Related media coverage

[A locust plague hit East Africa. The pesticide solution may have dire consequences.](#) T. McConnell, National Geographic, 24 March 2021.

[Safer, more effective ways to control locusts](#) D. Ogada, Daily Nation Op-Ed, 18 March 2020.

Student mentorship

One of the most important aspects of our work in Africa is to increase capacity in raptor and vulture conservation. There are approximately 145 species of raptor (including owls) in Africa, which is second only to Asia. Yet, in many African countries there is little in-country capacity to study or monitor raptor populations. The Peregrine Fund's Africa Program has long recognized this gap and since its beginnings has prioritized the training and mentoring of African nationals, as well as facilitating and mentoring non-nationals to conduct studies on African raptors. To date, 17 students have completed BSc, MSc or PhD research projects, with another six research projects currently ongoing.

The following are six current students/fellows and their projects:



Sidney Shema, EDGE Fellow, Identifying the habitat preferences of Secretarybirds in southern Kenya



Identifying poisoning hotspots and key conservation areas for critically endangered *Gyps* vultures in northern Kenya



Paul Muriithi, Diploma candidate, Kenya Wildlife Service Training Institute, Ecology of Long-eared Owls on Mt Kenya



Michael Agunbiade, PhD candidate, Brandenburg Technical University, Germany, Assessment of ecosystem services provided by Hooded Vultures in The Gambia



Stratton Hatfield, PhD candidate, Wageningen University, The Netherlands, Martial Eagle *Polemaetus bellicosus* foraging ecology in the Maasai Mara, Kenya



Eric Ole Reson, PhD candidate, School of Life Sciences, University of KwaZulu-Natal, South Africa, Understanding the drivers of vulture poisoning in southern Kenya

Partner-led Projects

Through the auspices of the Vulture Specialist Group of the IUCN, we convened a group of vulture-focused NGOs and West African researchers to discuss a regional approach to the widespread and growing threat of belief-based use of vultures and their parts. We held regular meetings for more than six months resulting in an agreement to develop a Regional Strategic Plan focused on the illicit trade in vulture parts. Currently, this group, led by BirdLife International, are working with the Conservation Planning Specialist Group of the IUCN to engage with relevant stakeholders in West Africa toward drafting the Strategic Plan, which is expected to take the better part of one year to complete.

Related media coverage

[Growing Demand for Vulture Heads Threatens the Birds' Survival in Africa](#)

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[IUCN Vulture Specialist Group Newsletter, March 2021](#)

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