

# Where commerce & conservation clash: Bushmeat trade grows with economy in 13-year study

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BBPP research staff, Illidio Mebulo, collects a sample of primate tissue in the market for genetic analysis. Credit: Javier Rivas/BBPP

The bushmeat market in the city of Malabo is bustling—more so today

than it was nearly two decades ago, when Gail Hearn, PhD, began what is now one of the region's longest continuously running studies of commercial hunting activity. At the peak of recorded activity in 2010, on any given day more than 30 freshly killed primates, such as Bioko red-eared monkeys and drills, were brought to market and sold to shoppers seeking such high-priced delicacies.

Hearn's team has now published its comprehensive results of 13 years of daily monitoring bushmeat market activity in the journal *PLOS ONE*. The researchers recorded more than 197,000 animal carcasses for sale during that time and analyzed market patterns in relation to political, economic and legal factors in the country of Equatorial Guinea in central Africa.

Among their notable findings: Bushmeat sales, a proxy for the level of wildlife hunting, increased steadily over the course of the study period, in tandem with increasing economic prosperity. Bushmeat hunting also rose in response to unenforced environmental conservation laws intended to limit the practice.

The study and its findings are noteworthy both for the history of the long-running project and the conservation implications of the results.

## **Every Number is an Animal: Biodiversity Protection and Bushmeat Monitoring on Bioko**

The Bioko Biodiversity Protection Program (BBPP), a joint venture of Drexel University in Philadelphia and the National University of Equatorial Guinea (UNGE), is a comprehensive program for research, education and biodiversity protection on Bioko Island. Bioko, a volcanic island in the Gulf of Guinea, is located off the coast of Cameroon in central Africa and is part of the nation of Equatorial Guinea. Bioko's

tropical coastal and montane forests form a relatively understudied biodiversity hotspot, a critical site for numerous species of threatened and endangered monkeys, many of which are at risk because of commercial hunting.

Hearn, now an emeritus professor at Drexel University, established BBPP in 1998 and led it until her retirement in 2014. BBPP is now led by Mary Katherine Gonder, PhD, an associate professor in Drexel's College of Arts and Sciences.

Since the start of BBPP, the steady daily monitoring of the commercial bushmeat trade in the capital city of Malabo has formed one of the strongest sources of tangible knowledge about threats to monkeys and other species in the island's forests.

While Hearn, Gonder and their BBPP colleagues have shared selected data from their bushmeat market surveys with government officials and others over the years, their study's publication this week is the first time that the full set of data from many years of monitoring—from October 1997 through September 2010—has been made publicly available.

"Every number represents an animal," said Drew Cronin, PhD, lead author of the new study and a postdoctoral fellow in Gonder's lab, who earned his doctorate at Drexel under Hearn. The count of carcasses in the bushmeat market creates an objective, comprehensible representation of the losses to Bioko's forest ecosystem for those with the power to intervene to protect species at risk from overhunting.

Their count included carcasses of over 35,200 monkeys; nearly 59,000 wild ungulates; over 4,100 birds; and over 80,900 rodents.



The Pennant's red colobus (*Procolobus pennantii*), a monkey species endemic to Bioko, is restricted to the remote southwest of the island. Pennant's red colobus is frequently listed among the most-endangered primate species in the world. It was not hunted as intensely as other Bioko monkeys in the BBPP team's study. Its isolation may have had a protective effect. Credit: Araks Ohanyan/BBPP

## **Economic Growth, Protection Laws Associated with Increased Hunting**

The dynamics in how many animals were sold in the bushmeat market over time, and under what economic, political and legal conditions, are as important as the raw numbers. These trends can inform management and enforcement efforts, both in Bioko and in other places where economic and legal considerations influence the trade and overconsumption of wildlife.

One major trend that Cronin and colleagues found is that bushmeat hunting and availability increased in parallel with economic growth during the 13-year monitoring period. Concurrent with that growth, the dominant method used to capture animals for bushmeat shifted from trapping to shotguns, contributing to more hunting of endangered monkeys, which are predominantly killed by shotgun, in the later years of the study.

Cronin notes that the relationship between economic growth and bushmeat sales on Bioko reflects the nature of bushmeat consumption there. "This bushmeat trade is being largely driven by urban consumers in Malabo who don't need to eat wildlife to survive," he said. "There has been a considerable amount of economic development on Bioko, which has resulted in readily accessible alternative protein sources, such as chicken, fish and pork, throughout much of the island, but especially in Malabo. Despite this, most of the valuable bushmeat is being brought to the city and sold."

Another major finding is that the legal protections Equatorial Guinea enacted in 2007 to limit hunting and sales of primates, the species most highly threatened by the bushmeat trade on the island, were not upheld—and even backfired to the point where bushmeat hunting actually increased. Legal protections of species are necessary to limit

hunting, Cronin noted, but that is not sufficient without strong governmental support and enforcement of those laws.

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