

# Legalizing ivory trade won't save elephants, study concludes

By [Virginia Morell](#) Sep. 15, 2016 , doi:10.1126/science.aah7306

Is killing elephants—legally—the best way to save them? The controversial idea will get a hearing next week at a major conservation meeting in South Africa, where elephant-rich African nations will renew a push to scrap a long-standing global ban on ivory sales and replace it with a limited legal trade in tusks taken from carefully managed elephant populations. A legal market, they argue, will undermine the poaching that is depleting herds and provide a financial incentive for protecting them. There's just one problem, a new study says: African elephants grow and reproduce too slowly to support a robust global trade in the material, used for carvings and jewelry. "The demand for ivory is simply too great; it outstrips what elephants can produce," says biologist David Lusseau of the University of Aberdeen in the United Kingdom, the study's lead author. Trying to essentially farm African elephants for their tusks will likely "kick them into extinction," he says.

The study is certain to fuel debate at the 17th meeting of the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES), which runs from 24 September to 5 October in Johannesburg, South Africa. Many African herds are in serious danger: A recent survey of savanna elephant populations estimated that poachers killed 30,000 animals annually between 2007 and 2014, reducing the population to fewer than 400,000. Overall, researchers estimate that African elephant numbers have plummeted more than 95% over the past century. In the late 1980s, similar trends prompted CITES members to institute the ivory ban. It passed over the objections of southern African nations with relatively healthy elephant populations, which argued for a regulated trade. But with the exception of limited ivory sales that CITES approved in 1999 and 2008, the ban has held firm and has helped rebuild some populations despite the overall decline.

Next week, three nations—Zimbabwe, Namibia, and South Africa—are expected to offer proposals for restarting a legal ivory trade. All argue that some elephant populations are healthy enough to be managed for ivory production. The proposals envision taking tusks from both animals that are intentionally killed—sometimes because they become nuisances, trampling crops and threatening people—and those that die naturally.

The idea prompted Lusseau and animal behaviorist Phyllis Lee of the University of Stirling in the United Kingdom to develop a model to predict how much ivory might be sustainably harvested. Because they doubt that naturally dead elephants could fill the demand, they based their model on hunting. Using fertility, mortality, and growth data collected in Kenya's Amboseli National Park, where researchers have studied elephants since 1972, they constructed a virtual herd of 1360 elephants. Then they calculated how much ivory the herd could sustainably produce under various harvest scenarios.

Not much, the researchers report in the 15 September issue of *Current Biology*. In a best-case scenario, in which neither poachers nor a natural disaster like a drought shrinks or stresses the herd, only 100 to 150 kilograms of ivory could be harvested annually. That's roughly equivalent to removing just a single large male each year.

Any attempt to increase or even maintain ivory production would run into two problems, Lusseau says. One is that managers would "quickly run out of the biggest males [which produce the most ivory], and so you have to take several smaller animals to harvest the same amount of ivory," leading to a kind of death spiral. Another is that large males are typically 45 to 55 years old, so it takes decades to replace them.

Such issues mean ivory yields from managed herds would be "far below" current global demand, estimated at 210 metric tons annually, predicts Samuel Wasser, a conservation geneticist at the University of Washington, Seattle. "It becomes clear that a legal ivory trade could never be sustainable," Wasser wrote in an email. Even at low harvests, managed herds would ultimately face extinction.

Advocates for legalization say the study has flaws. One is that Amboseli's relatively small elephant herd is "far from the real situation" elsewhere in Africa, says Rowan Martin, a wildlife consultant in Ruwa, Zimbabwe. (He is part of Zimbabwe's CITES team and helped craft its legalization proposal.) Instead, he says, modelers should draw data from managed populations of some 20,000 animals, like those in southern Africa. He estimates that by culling females, managers could skew the herds in favor of males and in 40 years boost ivory production to 17,500 kg annually, mostly from natural deaths.

Martin's large herd assumption is "not at all realistic," Lee responds. Zimbabwe, she notes, had some 82,000 elephants according to the recent census, but many of the animals "live in small herds of only 5000 to 7000" animals each, closer to the study scenario. Other researchers fear that even discussing legalization will make matters worse for elephants. "It gives a positive signal to would-be buyers and the chain of criminals involved in the trade," says elephant behaviorist Joyce Poole, who co-directs ElephantVoices, a conservation group in Nairobi. Lee says: "We should retain the ban, and eliminate the demand, not try to fill it."