



Samuel Wasser wields DNA technology to “fingerprint” poached tusks.

## Science for Elephants

Researcher uses cutting-edge methods to combat illegal ivory trade

**Give Samuel Wasser a small piece of ivory**, and he can pinpoint the African forest, valley, or grassland where the elephant once lived. Ten years of collecting DNA samples from elephant dung from across the continent have allowed Wasser, director of the Center for Conservation Biology at the University of Washington, to create a genetic map of Africa’s populations. Working with a dental forensics expert, he also invented a way to extract DNA from ivory. Now, he can “fingerprint” elephant tusks seized from poaching operations.

His work has revealed that illegal ivory headed to China and other growing markets in Asia is coming from only about a dozen poaching hot spots in Africa—some of them in the very countries that have asked for a 1989 international ban on ivory trade to be temporarily lifted so they can sell their stockpiles. Over the years, Wasser and representatives from Humane Society International have attended meetings of the Convention on International Trade in Endangered Species—which imposed the ban—and together argued against such one-off sales.

“It’s great to have him there with his personal passion,” says Teresa Telecky, director of wildlife for HSI. “A lot of times scientists don’t get involved with policy—he does.”

In 2010, Wasser’s evidence helped defeat requests by Tanzania and Zambia for an exemption to the ban; it showed that massive amounts of illegal ivory were flowing out of those countries and a legal sale could have been used to launder the black market tusks.

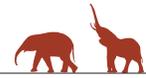
In this edited interview with senior writer Karen E. Lange and editor-in-chief Nancy Lawson, Wasser discusses his efforts to protect elephants and what’s at stake when the parties to CITES meet in Bangkok in March.

### How bad is elephant poaching in Africa today?

The price of ivory has gone up twelvefold in recent years. So it’s a high profit, low risk industry that is totally out of hand. Organized crime is driving the industry. Corrupt government officials are making so much money that they don’t even want to end the terrorism and warfare this stuff is paying for. Customs estimates that they seize about 10 percent of all contraband that’s shipped. If you apply that to ivory, there’s been an average of 20,000 kilos seized each year, which means there’s been at least 200,000 kilos of ivory shipped each year. The number of seizures in 2011 was the highest recorded yet. In early 2012, there were more than 300 elephants killed when what appears to be the Sudanese Janjaweed drove on horseback through Chad into Cameroon. Tanzania has been noted to be losing 30 elephants a day, so 10,000 a year.

### Describe the technical challenges you had to overcome to “fingerprint” ivory.

People had been trying to get DNA out of ivory for a long time, but when they would grind the ivory down to a powder so they could extract it, it was getting hot, and it was degrading the DNA.



We developed a method that gets the ivory freezing cold and very brittle. You stick a little piece into a tube with a magnet in it and stainless steel plugs on each end, and you drop that tube into a well of liquid nitrogen and shift the magnetic field back and forth. That magnet smashes the ivory against the stainless steel plugs. In three minutes it comes out like baby powder. And the DNA is perfectly preserved.

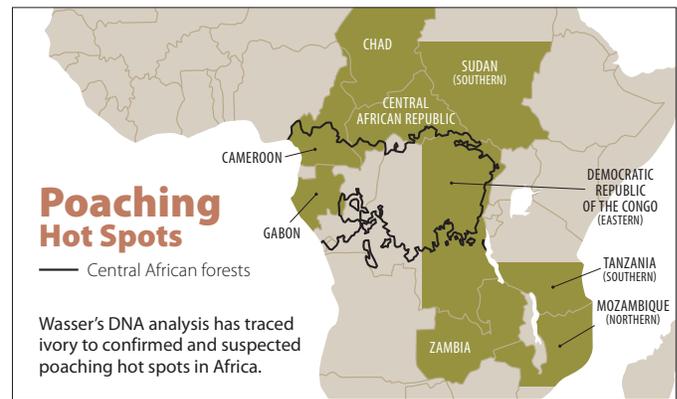
**African countries with stocks of ivory from seizures—or from animals who died naturally or were culled—argue that exemptions to the ivory sales ban will enable them to fund conservation. What’s wrong with that?**

Every single year that there are petitions for sales filed, the press goes nuts, and that’s when you see a peak in poaching. The petitions are telling all the poachers, “OK, looks like there’s going to be a sale, let’s poach and get our ivory in, so if it moves we can

smuggle it into legal sales and get a smokescreen.”

**In addition to maintaining the 1989 ivory sales ban, what can we do to protect Africa’s elephants?** When the ban went into place, there was tremendous support from Western nations, and there was a tremendous amount of money put into law enforcement, and it really did stop the trade for several years, until they started to take the money away. We need to get the source countries back into policing their ivory trades. If they don’t, we’re going to be out of elephants really soon.

Also, the last two seizures we have analyzed seem to suggest that they are stockpile ivory. There are no stockpiles that are approved for sale to other countries. Right now these stockpiles are essentially traced with a Sharpie pen. Every piece of ivory has an identification number on it written in a permanent marker. The last part of the number is the weight of the tusk. So to



smuggle illegal ivory, you have to replace that tusk with a tusk of equivalent weight. Well, how hard is that? I think CITES should say that we need to take a piece out of each of these tusks and put it away for DNA analysis.

**What role do U.S. consumers play?** There’s an enormous market in the U.S. Most of the demand is people buying small pieces of ivory from China to carve into the handles of guns and knives. Companies say the ivory is all legal, that it’s pre-ban. It costs more to test it—to age the ivory—than the ivory’s selling for. So nobody checks.

**Along with the animal suffering and deaths, what else is at stake?** You hear there’s human-elephant conflict all over Africa. Poaching is what is making this. Poachers kill elephants with the largest tusks. Those are bulls. But the next largest tusks are the matriarchs, and the matriarchs are a lot easier to find because they’re in family groups. Usually elephants stay in a protected area because it’s safe. Well, it’s no longer safe because you’re

being poached. And your leader has been killed because they shot your matriarch. So you run into this farmer’s field, and you see good food and you go after it. The farmer comes out to defend it, but because you have been subject to poaching for so long, you are scared to death of people. So you fight for your life, and you murder the farmer.

Also, an elephant does tremendous transformation to the environment. He keeps the woodland down in the savanna; he keeps areas opened up. In the Central African forests, some of the seeds are huge and the elephant is the only animal that can disperse them. The Central African forests are the second most important in the world for carbon capture. And over the last 50 years we’ve killed 95 percent of the elephants in the Central African forests—from 200,000 down to 10,000. Much of this has been during the last 15 years. Pretty soon all these mature old trees are going to die, and there’s not going to be these same species to replace them. Fifty years from now, I expect there will be major impacts on the world’s climate.



In 2010, Thailand officials seized 2 tons of tusks hidden in pallets labeled as mobile phone parts. Most poached ivory from African elephants ends up in Asia.