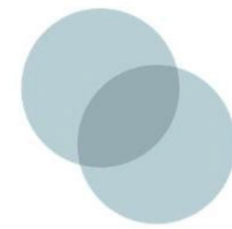


# The State of the Animals 2024

Micah Siegel





**This report** is the result of sixteen weeks of research and writing. It's the first product of my new school, Rogue Scholar Academy, in partnership with the Socratic Experience. In June 2023, I started a podcast called Nature's Guardians. Each week, I interview people working to save and help animals around the world. I learned more from my podcast than I was learning at school, so I decided to study my own way. This report is based on my interest in animals and learning from people I've spoken to. I hope you enjoy it.

Micah Siegel, May 2024

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## Foreword by Jim Steele

I am an ecologist who studied wildlife and ecosystems in California's Sierra Nevada for 30 years, culminating in a successful watershed restoration that revitalized the dwindling wildlife there.

I first met Micah when he interviewed me for his Nature's Guardians podcast. I was very impressed, not only by Micah's deep concern for animals, but by his critical-thinking skills to ensure a correct understanding of the threats animals face. I gladly offered to support his efforts on this report as a mentor.

Micah's research has been so extensive that I have learned a lot from him. Some species are definitely in trouble and need our assistance. However, efforts of conservationists for the last thirty years have largely been successful and have reversed declines in many species. Good analyses provide good remedies.

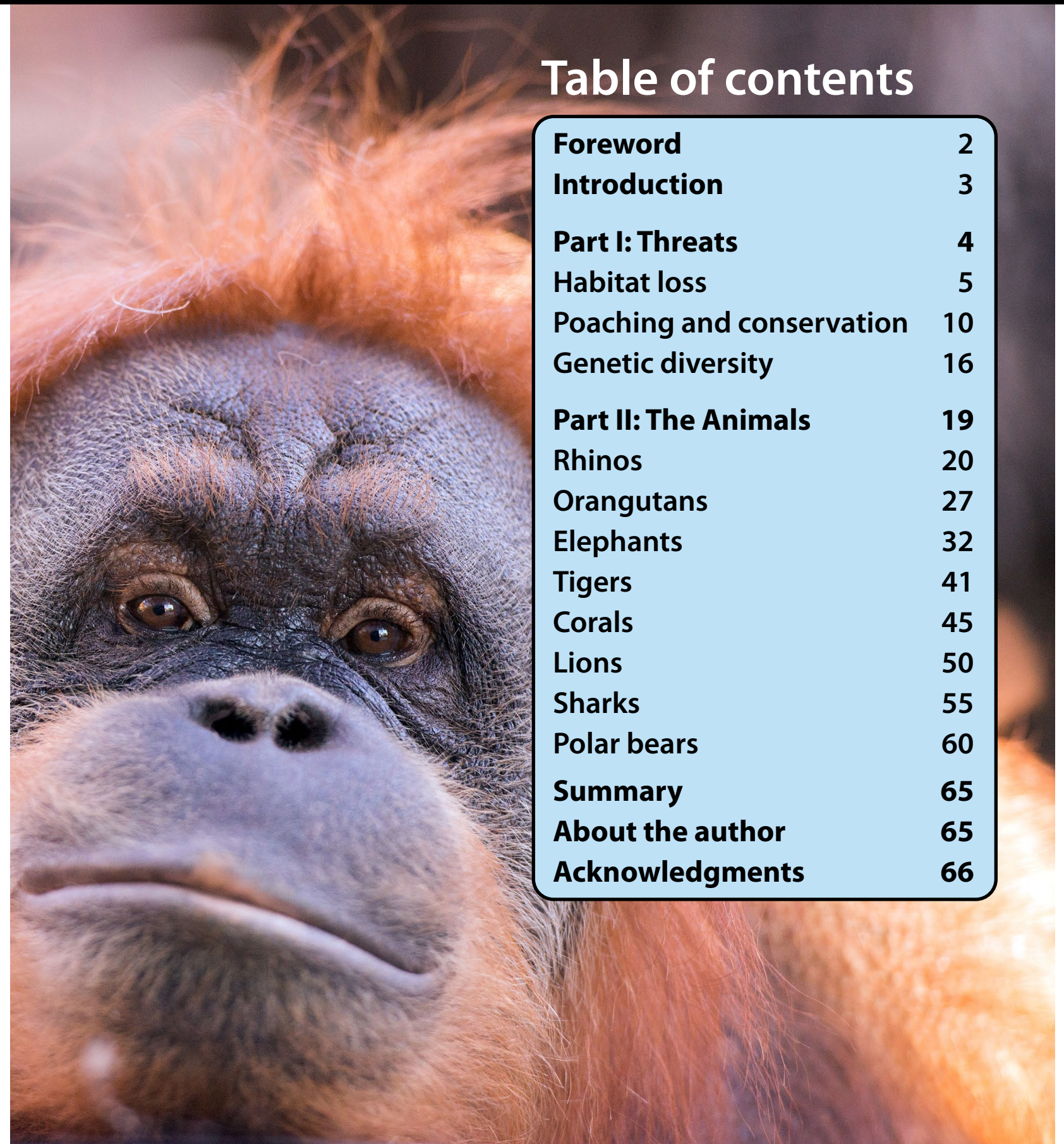
As you'll see, Micah has put together the big picture. He presents useful data and background information, in addition to telling stories from active conservationists around the world. Each chapter is interesting and enriching.

In this report, Micah paints a picture of a world where humans and animals are learning to live together. I hope you enjoy reading it as much as we enjoyed creating it.

Jim Steele, author, "Landscapes and Cycles."

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# Introduction



Hi, I'm Micah Siegel. This is the "State of the Animals" report. It's for people who want to learn and understand the situation with endangered animals.

We'll learn about poaching, habitats, genetic diversity, canned hunting, demand for animal parts, conservation tactics, rhinos, polar bears, tigers, coral reefs, and most importantly, the truth about endangered animals.

General rule, IT IS NOT WHAT YOU THINK. This is going to sound crazy, but sometimes the best way to save animals is to kill some. You'll see what I mean as you read, but there are lots of misconceptions and surprises in conservation, so get ready.

I want to mention something about the writing. I spend a lot of time asking GPT questions, and I look at a lot of sources online. Usually, to get a chapter or a section started, I'll paste in something I found useful or ask GPT to make an outline or get numbers. You might think this isn't an average 12-year-old's writing, but it's what I want in the report. I'm the chief editor, and I understand every word.

When I was thinking about making a report about conservation, I really underestimated how hard it would be. This turned out to be the most difficult project I've ever done. It was worth it, but sometimes I was working past 11pm, and some days I didn't even play any video games. Each time I thought I had discovered something that works, I learned that it's more complicated than that. I'm so glad my dad and Jim Steele, a nature ecologist, helped me along the way, even if dad was a bit annoying.

This report is a space for critical thinking. You shouldn't just take my word for everything I say. Use this report as a starting point for your own research.

Let's go!

Part I

# Threats



# Habitat loss

**Around the world**, habitat loss is probably the main and most common threat to wild animals. The forms of habitat loss are agriculture, urbanization, mining, and war. I've spoken to lots of conservationists through my podcast, and a topic that always comes up is habitat loss.

## Agriculture

Loss of habitat through agriculture involves converting forests, wetlands, and grasslands into areas for growing crops and raising livestock. Agriculture accounts for about 75 percent of global deforestation, with South America and Africa being the most affected regions. This not only leads to the destruction of habitats but also contributes to genetic diversity loss due to fragmentation. We'll talk about that more in the genetic diversity chapter.

The most common technique for clearing land is setting fires. It's dangerous but cheap. The problem is rainforests don't catch on fire nearly as easily from lightning strikes as temperate forests do – they're rain forests! They take a long time to recover from a fire.

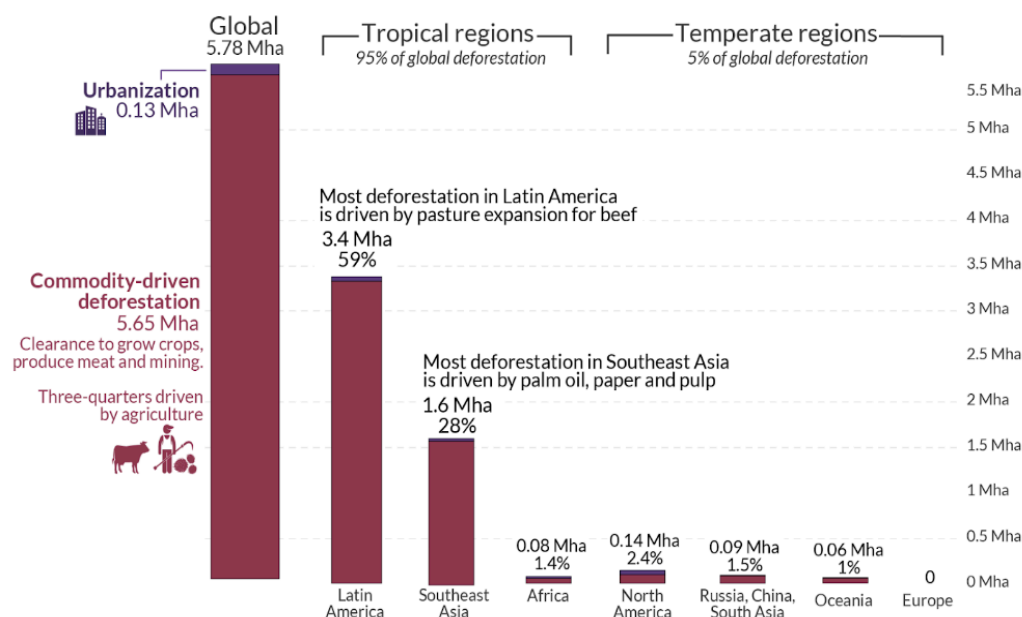


Rainforest in Brazil burned and converted to grazing land.

Temperate forests, on the other hand, evolved with fire. Since lightning strikes temperate forests all the time, temperate forests have evolved to include fires as a part of the forest life cycle.

### Nearly all of global deforestation occurs in the tropics

Deforestation is the permanent conversion of forest to another land use (such as agriculture or urban land). This is distinct from forest degradation – the logging of managed tree plantations, or wildfires – which is a temporary thinning of the canopy, and forests are expected to regrow.



The tropics are cleared to make room for agriculture and livestock.

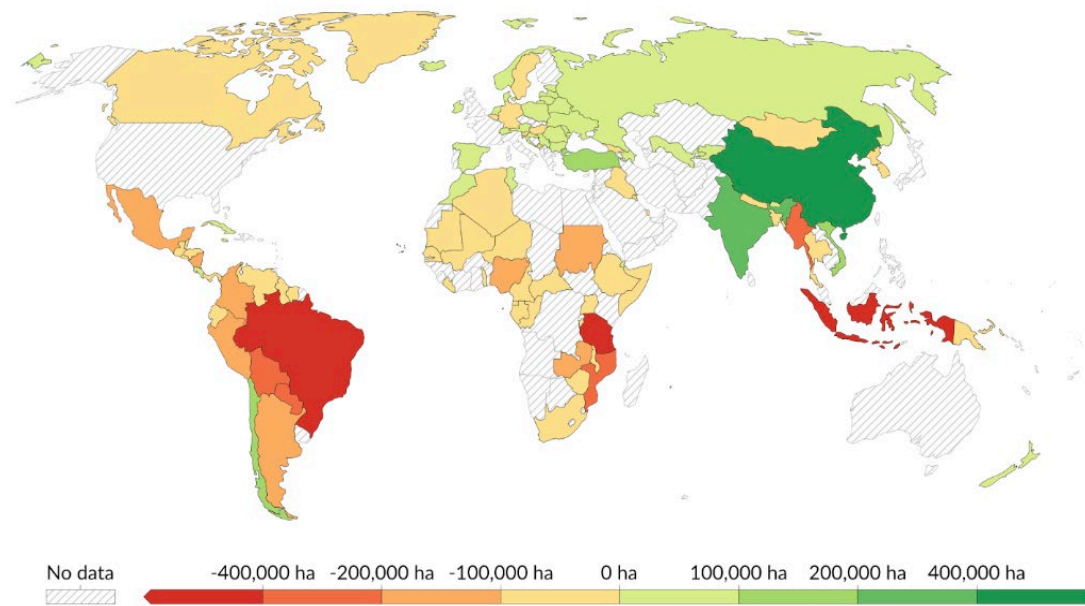
**Cattle Ranching:** Between 2001 and 2015, people turned about 45 million hectares of forest area globally into cattle pastures. In Brazil, the Amazon region alone accounted for 70 percent of the forest area replaced by cattle grazing, with an additional 20 percent in the Cerrado plains. Brazil now has the second largest cattle herd in the world.

**Soy Farming:** Soy cultivation has also led to deforestation, particularly in South America. Between 2001 and 2015, soy farms occupied 8.2 million hectares of land that had been deforested.

**Rubber Production:** A 2021 study using high-resolution satellite imagery showed that rubber plantations occupied an area of 14.2 million hectares in Southeast Asia.

## Annual change in forest area, 2015

Net change in forest area measures forest expansion (either through afforestation or natural expansion) minus deforestation



Most deforestation has taken place in tropical rainforests.

### War

War and armed conflict have surprisingly big effects on habitat. Over two-thirds of the world's biodiversity hotspots are affected by conflict. Conflict zones have an average deforestation rate 35 percent higher than non conflict zones. Research says that between 1950 and 2000, wars and conflicts contributed to 10 percent of all deforestation in the tropics.

During the Tutsi-Hutu civil war in Rwanda, over 750,000 refugees put tremendous pressure on their national-park resources, leading to more than 20,000 acres of protected area being deforested.

In Afghanistan, conflicts spanning decades have resulted in the destruction of over half of its forests, with certain areas witnessing up to 95 percent deforestation.

Mozambique, Zimbabwe, and Zambia are all recovering from decades of internal conflict. They have been working on reintroducing animals with mixed success.

### Urbanization

Rapid urban growth, particularly in developing countries, often comes at the cost of forests, wetlands, and other natural habitats. Urbanization not only leads to the end of these habitats, it also fragments ecosystems, making it challenging for wildlife.

From 1993 to 2016, around four million hectares of forest were cleared for rubber production. The majority of this forest clearance occurred since 2001. The countries most affected include Indonesia, Thailand, and Vietnam.

Most deforestation takes place in the tropics because temperate areas naturally have a lot of grassland and trees, while tropical forests have almost no open grassland. So to make money, people living in the rainforest often clear it to make room for plantations like rubber, crops, or livestock which is more profitable than forest land.

## Top ten countries with the most deforestation from 1990 to 2020

Country	Hectares lost	Farming	Livestock	Logging	Mining	Fuelwood	Infrastructure
<b>Brazil</b>	92,277,977	●	●	●			●
<b>Indonesia</b>	26,411,941	●		●			
<b>DR Congo</b>	24,474,111	●		●		●	
<b>Angola</b>	12,655,986	●				●	●
<b>Tasmania</b>	11,645,113	●		●			●
<b>Myanmar</b>	10,674,126			●			●
<b>Paraguay</b>	9,443,881	●	●	●			
<b>Bolivia</b>	6,970,958	●	●				●
<b>Mozambique</b>	6,634,000	●		●		●	
<b>Argentina</b>	6,630,892	●					●

Deforestation by country. The colors on this chart just reflect their category titles.

Urbanization is both helping and hurting forests. On one hand, better agricultural practices let fewer people produce food, so more can move away to cities. On the other hand, when cities grow, they rely on more farmland to support their growing populations. In general, larger, more mechanized farms are a better use of land than many small plots farmed by hand.

## Nature is rebounding

Despite the losses I have covered so far, nature is already starting to make a comeback. Because of improved farming practices, the global amount of land dedicated to farming is actually starting to shrink.

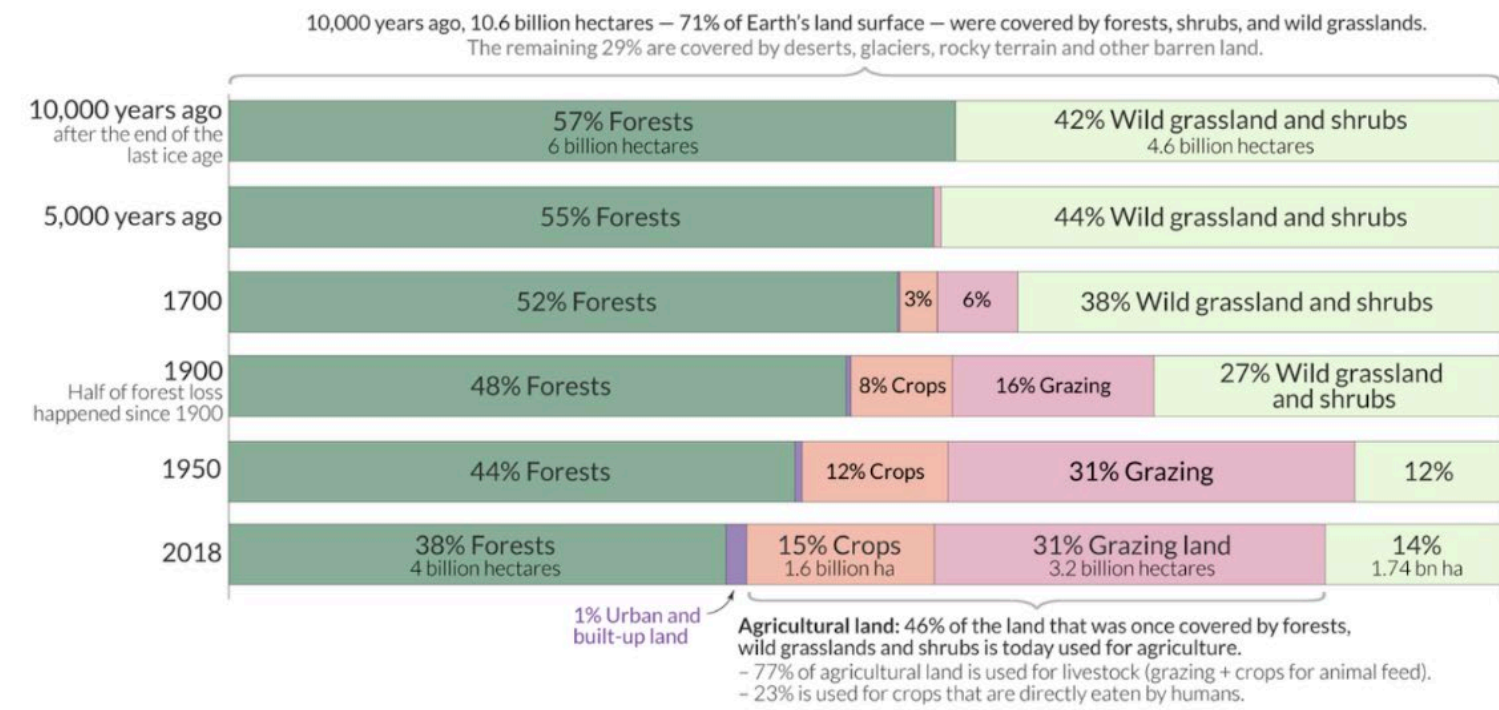
Let me explain the stacked growth chart below. The way you look at it isn't about each country's numbers going up or down, it's about the total thickness increasing or decreasing. In most parts of the world, the amount of agricultural land is stable or shrinking.

Africa, India, China, and Brazil are some examples of agricultural land still increasing (the thick end is getting wider). There's one thing that all these places have in common, they are all developing regions. Developing economies tend to have higher population growth rates and less technology. Africa has the highest population growth rate out of all continents.

Because of the improvement in efficiency and crop productivity, people are using less land to make the same if not more crop yield. According to author Jesse Ausubel, "If we stop feeding corn to cars, if we restrain our diets lightly, and if we reduce waste (one

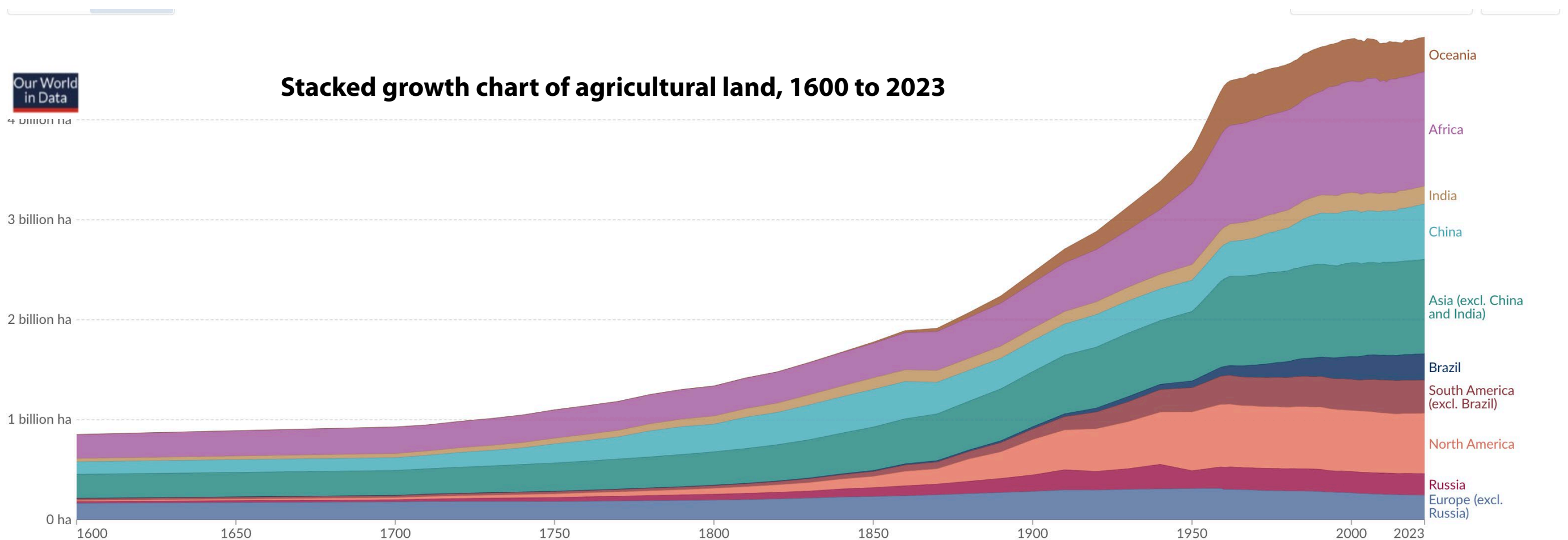
## Humanity destroyed one third of the world's forests by expanding agricultural land

Agriculture is by far the largest driver of deforestation. To bring deforestation to an end humanity has to find ways to produce more food on less land.



third of all food gets wasted), then an area the size of India could be released globally of agriculture over the next 50 years or so." Russia has already released between 30 to 60 million hectares of land to nature. Bet you didn't know that!

South Korea already recycles 95 percent of its food waste. If lab-grown meat gets better and becomes popular, and if there are new replacements for many common foods we use like palm oil and soy beans, it's possible that most of the land we use for agriculture now will go back to nature during my lifetime.



### The IUCN Red List

The International Union for Conservation of Nature (IUCN) is a global organization that does research to assess the conservation status of species, provides scientific expertise, and promotes sustainable development. It maintains the Red List of Threatened Species, advises governments and organizations on conservation policies, and fosters international cooperation to address environmental challenges.

Key activities of the IUCN include:

- Assessing the conservation status of species and ecosystems.
- Providing scientific expertise and guidance on conservation issues.
- Developing and implementing conservation policies and initiatives.
- Promoting sustainable management of natural resources.
- Fostering international cooperation and partnerships for conservation.

(I love ChatGPT)

### Mining

In the Carajas Mineral Province of Northern Brazil, extensive areas have been cleared to accommodate mining facilities. The initial deforestation involves the removal of 1,200 hectares of forest within the mines' operational zones. This area, previously rich in diverse species, is cleared for the construction of open-pit mines, waste dumps, and ore processing plants.

Gold mining in the Amazon releases 70 to 165 tons of mercury annually, contaminating rivers and reducing fish diversity significantly, with mercury levels in some fish reaching 1.7 ppm – well above the safe limit of 0.5 ppm. This pollution affects over 500,000 local residents.

The main problem with mining is all the wasted toxic minerals that contaminate habitats which people there rely on. Water is the most affected by contamination, and the biggest problem for locals. The locals must now find uncontaminated water that is safe for drinking and uncontaminated aquatic animals for eating. Even further the non aquatic animals that drink from the unsafe water and eat the contaminated aquatic life can also get contaminated, also increasing the chances for locals to eat contaminated wildlife.

### Summary

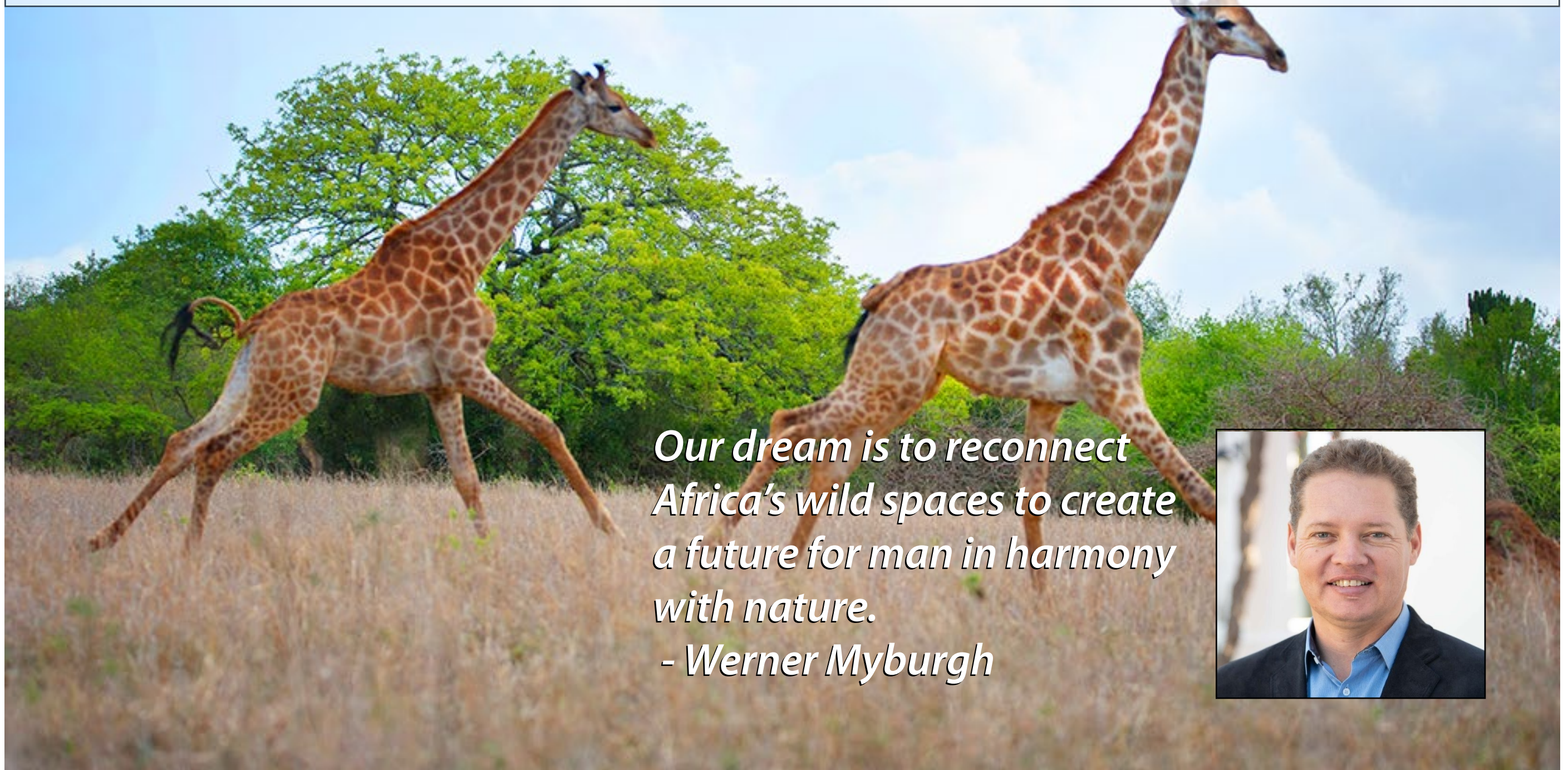
Habitat loss is arguably the main threat to most species. While many animals still live their lives as they did thousands of years ago, those on the front lines of urbanization, agriculture, mining, road building, commerce, and war are at risk. As you read the species chapters to come, realize that I'm not going to repeat that message, I'm going to focus on specific issues that affect those species. But keep in mind that nearly everyone in animal conservation is always trying to find ways to prevent loss of habitat.





### **Nature's Guardian: Werner Myburgh**

Werner has dedicated his career to connecting forests and grasslands across southern Africa to provide continuous habitat for migratory animals to help genetic diversity and prevent habitat fragmentation. Forest cover also helps wanted animals like rhinos and elephants from being spotted by poachers. Because of this, he started the Peace Parks Foundation. Peace Parks works to connect conservation areas, giving animals migratory routes and access to more land. They train rangers, count populations, create corridors, negotiate agreements between countries, work with national parks, and relocate animals to areas where they can keep growing their numbers. Since 2001, they have relocated more than 15,000 animals and connected over 600,000 square kilometers of park area to give animals more space to move and thrive.



*Our dream is to reconnect  
Africa's wild spaces to create  
a future for man in harmony  
with nature.*

*- Werner Myburgh*

### **Resources**

[Jesse Ausubel's talk, "Nature is Rebounding"](#)

[Werner Myburgh on Peace Parks](#)

# Poaching and Conservation

Poaching is the illegal capture or killing of endangered animals, often to sell parts of the animal or sell the animal alive for the pet trade. There are lots of different answers to the poaching problem, and we will go through most of them in this chapter.

## The problem

Poaching doesn't affect many species. Almost all species that are poached are extremely iconic. They are strong, fast, or ginormous. This is because of the doctrine of signatures (see the box below).

There are four main approaches to the poaching problem: stopping supply, reducing demand, sustainable hunting, and sustainable trade. But first, I'll explain the different demands for animal parts, starting with status symbols.

## Demand for status symbols

Status symbols made of animal parts like bones, horns, scales, skins, or teeth come in 3 main forms:

### The doctrine of signatures

Before we start this chapter, you have to understand the doctrine of signatures. Primitive societies believed that if you consume something strong, wise, or fast, then you will gain its best attribute. That's why so many animals like rhinos, tigers, and pangolins are killed and consumed but no geckos, sparrows, or racoons are. Shamans and traditional medicine doctors tell their patients that an old root, like ginseng, will help them live a long life. A leaf in the shape of a heart will help heal their heart. Pomegranate seeds resemble teeth, so they were used for toothaches. Maidenhair ferns look like hair, so they were made into hair treatments. And many more. The doctrine of signatures is great for marketing and is still in use today.



A ranger guards a collection of rhino horns seized from poachers.

**Art:** Rich Vietnamese and Chinese people like to show off how much money they have and how cool they are with their rhino-horn sculptures and elephant-tusk carvings.

**Delicacies:** Shark-fin soup is a well-known rich delicacy in Asia. It isn't eaten for food but mainly for fancy dinners and occasions, much like wine or champagne aren't drinks to quench your thirst. It's a status symbol in Asia and is responsible for about fifty million sharks being taken out of the ocean, fins cut off and thrown back into the ocean. We will learn much more about this in the shark chapter.

**Fashion accessories:** It is not uncommon for rich or middle-class people to wear exotic animal accessories. Purses, shoes, belts, and hats often use exotic animal skins or parts. Even my dad has a pair of lizard-skin cowboy boots and belt. Some animals and products are taken legally, and some are ranched. But many are taken illegally. Here are some examples ...

**Crocodile and Alligator Skin:** Used for high-end fashion accessories like bags, belts, wallets, and shoes. While more and more are farmed, wild populations are still targeted.

**Feathers of Exotic Birds:** Feathers from birds like parrots, eagles, peacocks, and birds of paradise are used in hats, headpieces, and other adornments.

**Elephant Ivory:** Previously used for piano keys, combs, and more until plastics replaced them. Today used for jewelry, carvings, and various decorative items. Long tusk-shaped carvings are strong status symbols, as we'll see in the elephant chapter.

**Tortoise Shell:** The shells of hawksbill turtles are used to make items like jewelry, combs, and glasses.

**Furs and Skins:** Used in luxury fashion items. Poaching for fur and skin as coats and rugs has significantly threatened certain large-cat species.

### Demand for cures

Some south east asians believe that things like rhino horn, tiger bone, pangolin scales, bear bile, etc. will heal or transfer power to them. This is obviously not true. In 2012, a man in Vietnam claimed that rhino horn cured his cancer. When the press spread his story, demand for rhino horn shot up, the price went up, and poaching more than doubled.

The demand for this fake medicine comes mostly from old people in China and Vietnam who stick to their ancient beliefs. Chinese and Vietnamese doctors generally do not prescribe these products and actually discourage them, but still some factories legally make pills and powders out of animal products and traditional pharmacies sell them to meet the demand.

Many people believe that bile from a wild bear or bone from a wild tiger is some-



Bear bile, tiger-bone wine, and ground pangolin scales are all thought to cure diseases and make people stronger. They don't, of course.



Real ivory piano keys.



Real tortoise-shell glasses frames.

how more effective medicine than from a farmed animal. Of course, the sellers just tell them the products are wild-caught, when they really aren't.

There is also a lot of corruption in the poaching supply chain – government officials are very willing to accept cash “donations” rather than do their jobs.

### Demand for products

Since ivory and tortoise shells are so expensive, these items were only available to the very wealthy. In the past decades, many countries made it illegal to im-



These three poachers were convicted of using dart guns with sedatives to stop rhinos in Kruger National Park and kill them. They are all serving 25 years in prison. The Kruger rangers are sitting in the back.



White rhino grazing. Notice the flat lips of the white rhino.

port and sell things out of ivory and tortoise shells. Although the market found substitutes, many traditional products have stayed in demand to show status.

### **Middlemen**

Middlemen are people who organize the whole process, from killing the animal and taking its parts to shipping and selling to retailers. These people make most of the money. They don't go kill animals themselves. Instead, they hire local poachers to kill the animal and bring it to the collection center, where it gets packaged and shipped using various clever techniques to an Asian country to be sold at illegal auctions. They also manage to send live animals through for the pet trade.

Poachers don't really know anything about the animals they are shipping. For example, poachers don't know pangolins eat ants, so they generally just leave the pangolin in a box with some lettuce. Most pangolins do not survive the journey.

Middlemen pay the poachers roughly five to ten percent of what they get for the product. The poachers work harder, take more risk, and make much less money. The losers in this highly profitable supply chain are the animals. If it's for a medicine that doesn't work, then everyone loses but the middlemen.

To get animals, a middleman hires a local boss who has rifles, machine guns, helicopters, and other expensive gear to protect the poachers and make sure they get the animal. That's why it's so hard for rangers – they often don't have good boots, let alone helicopters, sniper rifles with scopes, night-vision goggles, or GPS tracking.

To a middleman, poachers are expendable. If one goes to jail, there are always more at the same price. A middleman can hire extra poachers and doesn't have to worry about their families or injuries.

Poachers are generally poor people. Poaching is usually the best-paying job where they live. Even though it's very risky and the poachers do get put in jail, or even get shot by rangers sometimes, poaching is still the best option. For them it's either this risky job or a job that pays much less. If these people had better and safer options, they would take them.

### **Reducing demand**

While rangers are focused on stopping the supply of animal parts leaving their countries, people who work to reduce demand need to work in the countries where customers want to consume those products.

Famous Asian celebrities like Jackie Chan, Yao Ming, and Simu Liu make videos that reach millions of Asians to help them understand the reality behind the food



Full python boots. My dad would love a pair of these.

they order at restaurants, the drinks they have at parties, and the ivory sculptures they have in their houses.

If we can reduce the demand in the first place, then there's no poaching. But it's very difficult. Researchers say that giving people data and information doesn't work. Most appeals by government officials and celebrities don't work. Many projects are frustrated by the lack of response to their efforts. Conservationists are always trying new ideas, hoping something will catch on. In the meantime you can't just let thousands of animals get killed, so it makes sense to put money and resources into both reducing supply and reducing demand.

### **Sustainable use**

It seems like stopping poaching or reducing demand are the only ways to protect animals. But what if that's wrong? What about encouraging demand instead? Dr. Brian Child is an associate professor at the Center for African Studies at the University of Florida. Brian completely shifted my view of conservation.

The idea of sustainable hunting is to sacrifice a very small percentage of the population to trophy hunting and use the money to take care of the other 99 percent. This is essentially what Botswana is doing for elephants. Trophy hunting is legal, even if it's of endangered species and the hunters are allowed to take their trophies home, but they aren't allowed to sell them. This approach doesn't rely on any donations; it makes money on its own.

The number of foreign hunters coming to South Africa has declined by 62.4% in the last 14 years, from 16,594 in 2008 to 6,242 in 2022. So the number of trophy hunters has gone down a lot, while the amount spent has been rising a bit. Will this work in the future? The next generation of young rich people don't seem very interested in trophy hunting. For this to work, you would have to get young people more interested in trophy hunting. We'll talk more about this in coming chapters.

### **Sustainable trade**

The next step after sustainable hunting would be developing strong markets for elephant tusk, rhino horn, and other animal products, which could bring much more money to Africans than raising chickens and goats. It can be applied to trophy hunting or to captive "farmed" animals. It won't work for every species, but it's important to understand and think differently about how markets can help wild animals. Let's look at one example where it has worked very well.

### **American alligators**

In 1967, the American alligator was listed as an endangered species under Appendix I. According to Dr Rosemarie Gnam, head of the Service's Division of Scientific Authority for CITES ...

American alligators were saved by the fashion industry and sustainable trade. See next page.

### **About CITES**

Trade of animal products is governed by CITES. Pronounced "site-eez," CITES is the Convention on International Trade in Endangered Species of Wild Fauna and Flora. It's a group of experts from many countries who make international laws and regulations that govern trade of over 35,000 animal products. CITES has three main categories for animals:

**Appendix I:** Species threatened with extinction. Trade is highly restricted.

**Appendix II:** Species not necessarily threatened with extinction but require regulation to ensure trade does not threaten their survival.

**Appendix III:** Species protected in at least one country that has asked for help in controlling international trade.

CITES is a political group with a lot of people with different agendas making decisions that affect many industries. They also change their rules fairly regularly. Some people claim that markets are better at sorting these things out and CITES doesn't help, while others praise CITES' work as critical to saving many species. Both are probably true.



*We took a species that was on the brink of extinction in the 1960s, and after a short period without any harvest, we were able to reopen the commercial trade in a way that is biologically sustainable and legal. A sustainable trade supports alligator habitats, benefits human communities, and provides an economic incentive to keep populations healthy.*

They created a special tag, barcode, and traceability system for alligator skins, and in 1979, the American alligator was moved to Appendix II, because alligator farms were managing the populations so well. Trade and the fashion industry have rescued the American alligator from extinction, while also helping wild habitats for alligators. That same story applies to several other species as well.

### **Pangolin scales**

Now, let's look at pangolins. More than 100 tons (tons!) of pangolin scales and live pangolins are shipped to markets in Asia each year. More than 10 million pangolins were trafficked in the last ten years, and at least 300 are poached every day. Pangolins are the second most trafficked mammal on earth (humans are first).

Pangolins are currently classified as Appendix I under CITES: complete ban on hunting and trading. But people consume tons (seriously – did I mention tons?) of pangolin scales as a “cure” for everything from cancer to hangovers, and a few pharmacies are legally allowed to make pills with pangolin-scale powder. (How do you say “that’s insane” in Chinese?)

Could sustainable trade work for pangolins? To move pangolins to Appendix II, you'd need a certification program for scales. For any animal product, certification has three major challenges:

- 1. Illegal pangolin products will still be traded on the black market.** Without a strong branding and marketing effort, many customers will continue to get their pills from behind the counter in a small traditional pharmacy rather than certified products in upscale pharmacies.
- 2. Poachers will make counterfeit papers of certification.** This will lead to confusion in the marketplace, even with advanced technology, like holograms.
- 3. Some inspectors and people in charge of certification will be bribed by traffickers to certify their illegal pangolin scale shipments.** This common practice is a threat to sustainable trade of many products.

Pangolins have a problem: they are solitary nocturnal creatures who live in remote burrows and eat a lot of ants and termites. They are almost impossible to find in the wild. Poachers find them by showing pictures of them to locals and asking if



Pangolins are amazing! I wish Asian people didn't think their scales are medicine. They aren't. Pangolins would be best left alone.

they have seen such an animal. Then they go dig them out of the ground.

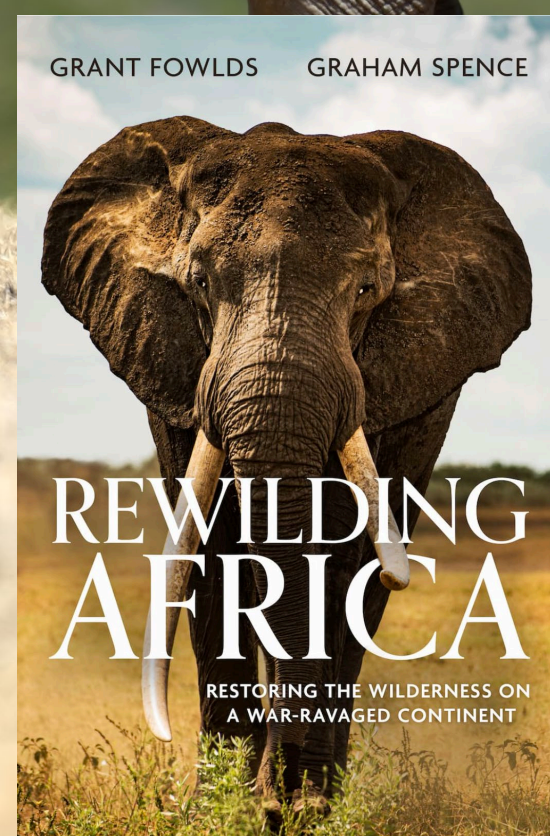
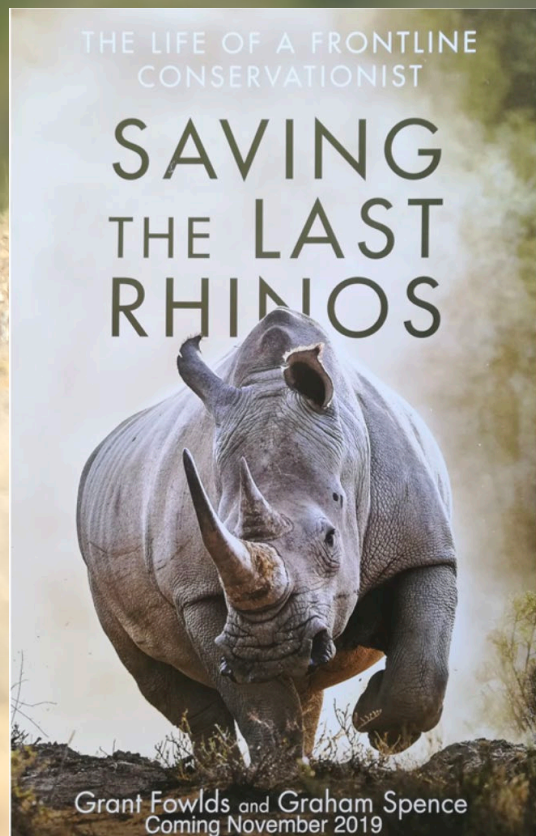
No one wants to pay to hunt a pangolin, and tourists never see them, so they don't bring any money to people who own the land. No one wants to raise pangolins and harvest their scales, because they would need an ant factory to feed them. Besides – what's the point of that? How does farming pangolins help pangolins? This is a case where sustainable use won't work and reducing demand is probably the best approach.

### **Summary**

Humans' demand for animal products can help or hurt a species. For each particular species, we need to look at how trade might be able to help and whether it makes more sense to stimulate demand or try to bring it to zero. I will talk more about these approaches in the chapters for each animal.

## Nature's guardian: Grant Fowlds

Grant has written two books all about endangered species conservation in Africa. He is dedicated to saving the wildlife he grew up with. I haven't read his books, but they look like great resources on what really needs to be done. One of his works that stood out to me is a project called *Rhino Art: Let the Children's Voices be Heard*. Grant wants to educate a million kids in Africa on humans living in harmony with nature. Learn more about Grant on [his website](#).



# Genetic diversity

Genetic diversity allows species to adapt to environmental changes, spread of diseases, and changes in other species around them. Genetic diversity is responsible for changing species to be better suited for the situation, because no species can stay exactly the same forever (except sharks).

## Habitat fragmentation

In the Amazon, about seventeen percent of the forest has been lost in the last fifty years, mainly deforestation for agriculture. Fragmentation isolates populations, reducing gene flow and genetic variability. Large mammals and other species requiring vast territories for migration are affected, but smaller species can be isolated by mountains, valleys, rivers, even highways.

Panthers are also known as mountain lions and pumas. Due to habitat fragmentation, the Florida panther population in southern Florida has become isolated from other panthers in Mexico and Central America. This isolation has resulted in inbreeding, which can promote recessive traits and cause many kinds of unnatural birth defects. Biologists have already found panthers with kinked tails and heart problems.

With expanding human settlements and agriculture, African elephant habitats have become increasingly fragmented. This fragmentation disrupts their tradition-



Reduced habitat for Florida panthers has cut them off from other populations.



Habitat loss threatens species, but habitat fragmentation can threaten genetic diversity.

al migratory routes, essential for finding adequate food, water resources, and maintaining genetic diversity through breeding between different groups. Conservationists are worried about animals' vulnerability to new viruses.

While habitat fragmentation can cause several detrimental problems, it can also help protect the animals. Sometimes conservationists fragment habitats to make sure two subspecies don't interbreed, or to give a species some protection against all the animals being wiped out by a single event or illness.

At Re:Wild, they are raising money to split the Javan rhino population and relocate half of them to a new forest, so they can grow their numbers and be protected from anything that could wipe out a single group. Fragmentation can also lead to new species or subspecies evolving in different directions.



### **Population size is not always an indicator of genetic diversity**

Species that have always had a very small population do not necessarily have a genetic-diversity problem, especially if they are well adapted to their ecological niche and face minimal external threats. The vaquita porpoise, for example, only has ten surviving adults, and they don't have much of a problem from inbreeding. The Channel Island fox, native to the Channel Islands off the coast of California, has maintained genetic health despite its small population size. At one point, the population got down to about 100; now the population is over 1,500. That genetic bottleneck did not hurt the species. This also happened to the African white rhino, whose population was between 20 and 100 at the beginning of the 20th century before coming back to about 16,000 today.

On the other hand, some species with larger populations do have genetic-diversity problems. An example is the African elephant. African elephants face genetic issues primarily due to habitat fragmentation. A study revealed that forest elephants, a subspecies, have lost up to 62 percent of their genetic diversity over the past thousand years or so.

Did you know that about 60,000 years ago, one species of mammals got down to around 5,000 breeding pairs, and today there are eight billion of them? That's us! Humans! This is called a genetic bottleneck, and many species have been through them, so they are actually fairly common.

### **Consequences of Reduced Genetic Diversity**

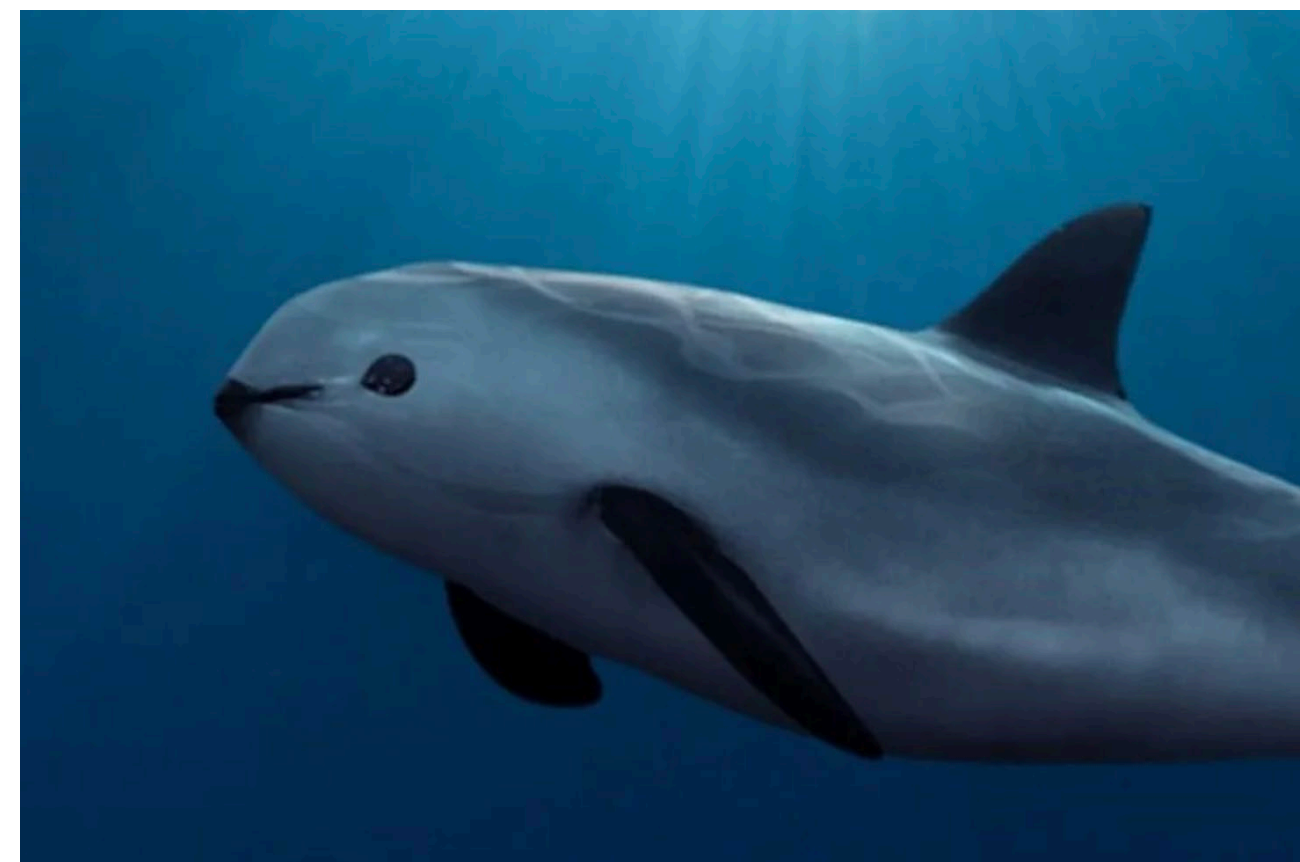
In a species with a very low population, if two animals mate, there is a higher chance that they are closely related. If the animals are related, then they will have a higher chance of inbreeding. This can increase recessive genes, causing deformations, malfunctioning reproductive systems, and a list of birth defects like blindness, loss of hearing, various heart issues, etc. Inbreeding isn't always a problem, but it often is.

Both Asian and African elephant populations are threatened by the endotheliotropic herpesvirus, which could have a tremendous impact. A larger population with a wider range of immune strategies would have a better chance to survive a disease like that.

### **Conservation and management strategies**

Conservationists in China have increased the diversity of their giant pandas through controlled breeding programs that use sophisticated genetic analysis and algorithms to decide which animals to breed.

By connecting forests and moving animals, several groups in Africa have helped several species maintain diversity and increase their range. They work with governments to give animals contiguous forest and grasslands across political borders and farms. They move animals to new habitats and protect them. This is hard work,



Only about ten of the highly endangered vaquita porpoises are left.



Researchers take blood samples for a vaccine study.

but it's necessary to ensure the survival of many migratory species across Africa.

### Summary

The loss of genetic diversity shows how important it is to maintain different groups with large numbers of animals. Over the last 500 years, humans have reduced the populations of almost all wild animal species dramatically, while increasing the number of dogs, cats, rats, cows, pigs, chickens, and other domestic animals. Conservationists are rightly worried and are spending a lot of time, money, and effort to make sure that low populations aren't at risk from genetic-diversity issues.



Conservation scientists now use genetic databases to determine which pairs to breed for optimal diversity. This is how most zoo animals are selected for breeding.

### Nature's Guardian: Rob Ogden

Dr Ogden is a conservation geneticist at the University of Edinburgh where his group focuses on the applications of population genetics and veterinary medicine to wildlife conservation and management. He is a member of the IUCN Conservation Genetics Specialist Group and a population genetics advisor to the European Association of Zoos and Aquaria. Rob runs TRACE Wildlife Forensics Network, an NGO focusing on the use of forensic science in wildlife law enforcement. He works on captive breeding programs, reintroduction of wildlife to new areas, analysis of seized animal parts, understanding invasive species, identifying fish that are caught illegally. He identifies species and provides evidence to trials prosecuting poachers, helping put poachers in jail. He's a Sherlock Holmes of poaching. Learn more at [Coalition for Conservation Genetics](#).



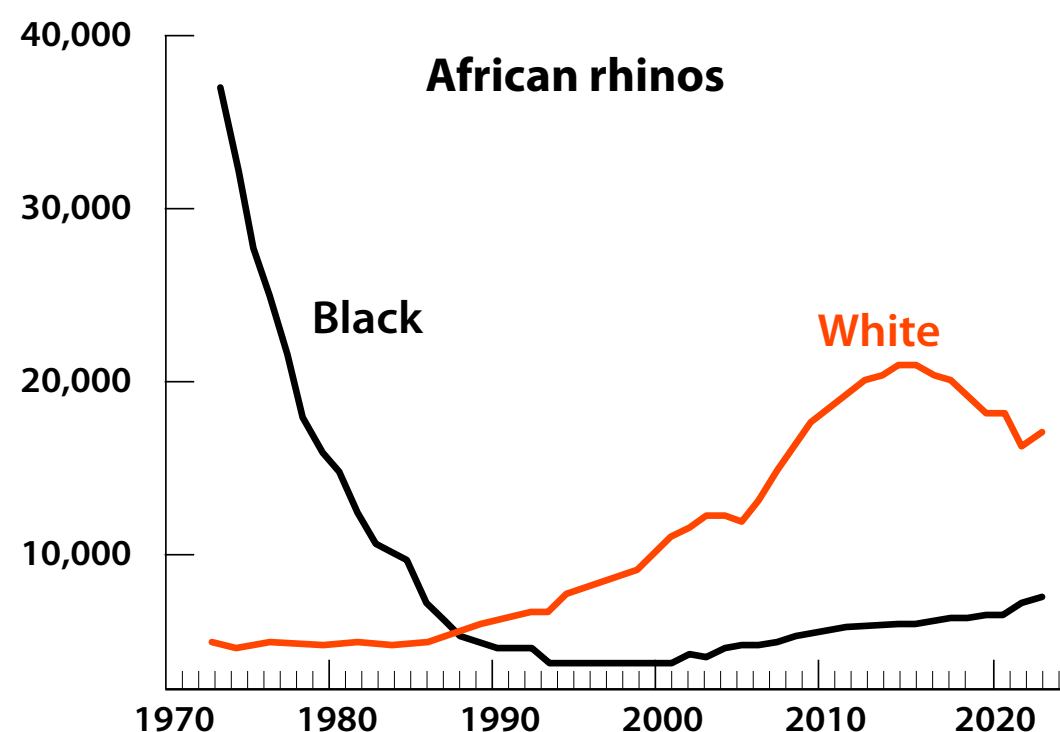
Part II

# The Animals



# Rhinos

There are five species of rhino – two in Africa and three in Asia. All rhinos are solitary – they live alone, spread out, and only meet for mating. The mothers look after their calves for 2-4 years before separating from them. They have no natural predators. They're dealing with some serious challenges, from habitat loss to the high demand for their horns.



## Background

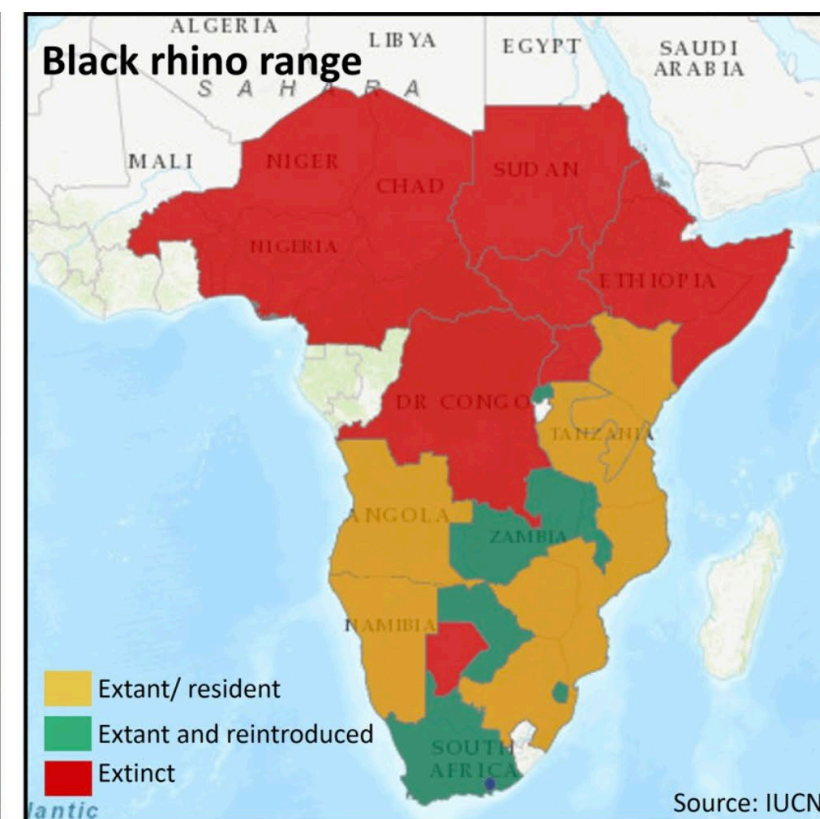
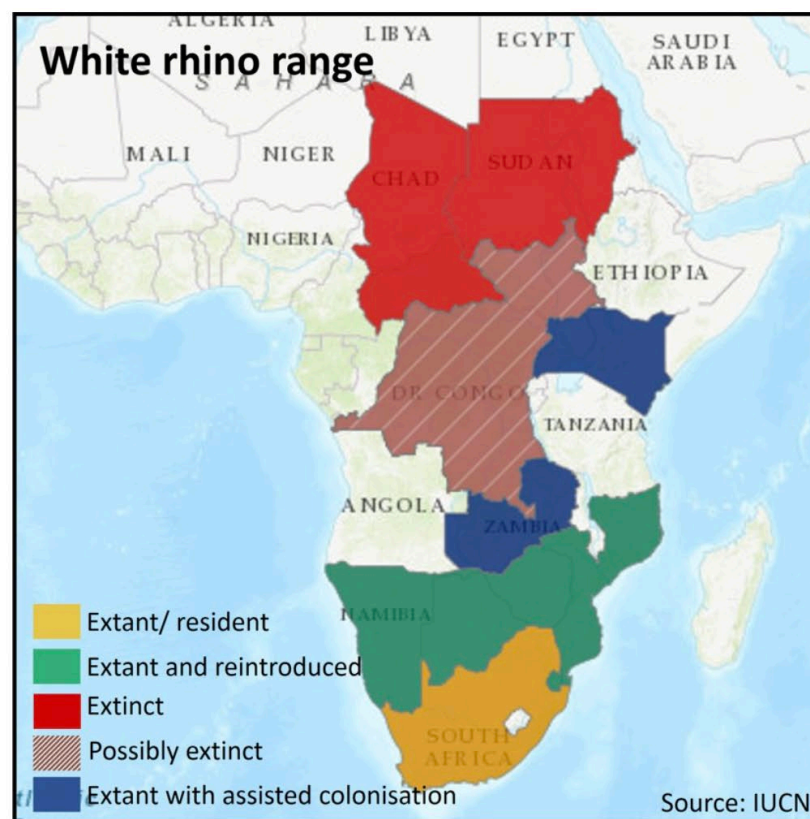
In 1900, there were about 850,000 black rhinos in Africa, and the four other species were each probably under twenty thousand. About 95 percent of the world's rhino population were black rhinos. Poaching started when Europe started colonizing Africa. Rhinos were killed for sport and horns. Black-rhino numbers were at their lowest at 3,500 in 1994. That's when conservation started. They have nearly doubled to about 6,400 today. Unfortunately, we are still losing about 500 rhinos each year to poaching. White rhinos do better in today's higher-grassland environment and are coming back nicely, though poaching remains a big problem. If you look at the graph on the left, the sharp decline in the white-rhino population since 2014 is the result of an increase in demand for rhino horn, mostly in Vietnam.

## Range

Black and white rhinos rarely meet. Black rhinos like dense bushland, and white rhinos prefer large open grassland. In the maps below, red shows where they used to be just a century ago, and the brown striped area shows where they are probably all gone. Yellow shows where they live now, and green is where they have been reintroduced (often after a war eliminated most of the native population).



White rhinos are much larger than black rhinos and have square flat lips for munching grass.





### What's working and what's not

Right now, there are two best things to do if you want to help rhinos. The first is cutting off the horns and immediately destroying them. Poachers won't kill a rhino if it has no horn. The problem is that it costs over one thousand dollars to cut off a horn, and the horn will grow back after about two years. But dehorning is saving them.

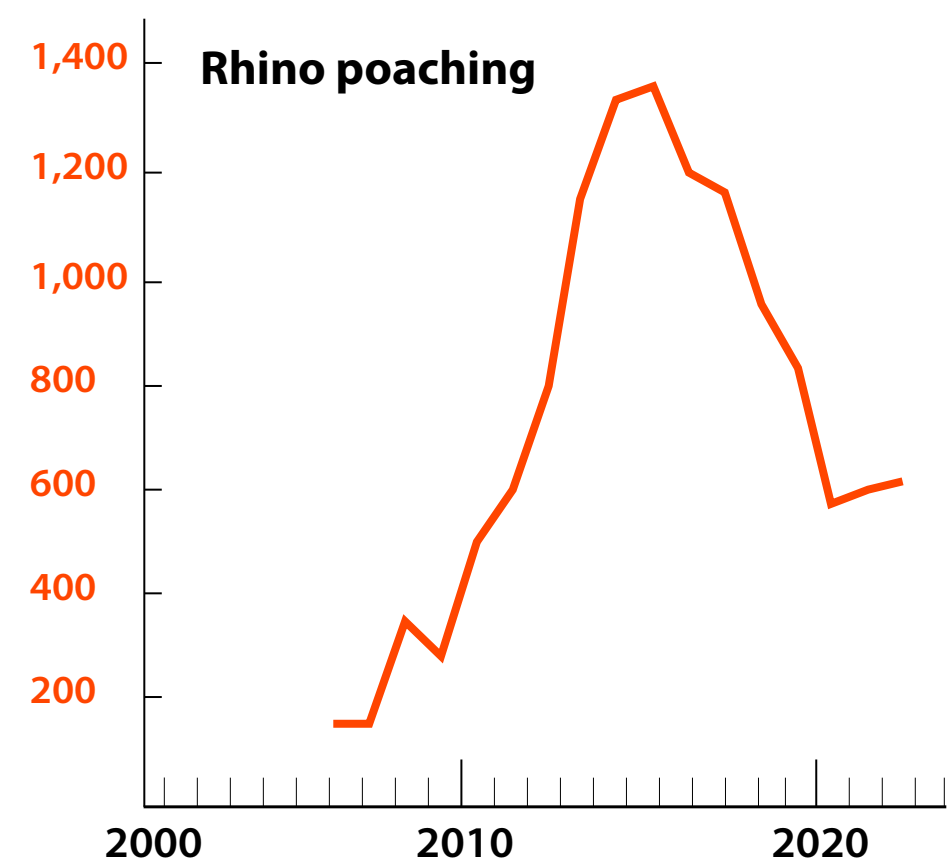
Unfortunately, the rangers who cut off the horns don't destroy them. They hide them in a "safe" place. But storing horns increases many risks. The storage facility is now in danger. Poachers often find it and take the horns (remember, they have plenty of money). And security guards are pretty easy to bribe.

At the moment, CITES doesn't allow any rhino horns to be traded. They might increase the number at some point, which is why rangers guard them. But it's just asking for trouble.

The second thing to do is to try to stop the demand for the horns at its source. The demand comes mostly from wealthy people in Vietnam and China. Some people there believe rhino horn has the ability to heal headaches, cure cancer, cure a hangover, or make them strong. Of course, there is no scientific data that horns cure anything, and traditional-medicine doctors don't prescribe it. More and more, rhino horns are being bought for sculptures and status symbols rather than medicine. Rich Vietnamese people offer their guests ground-up rhino horn mixed with water – not as a cure but as a way to show how rich and powerful they are.

Rhino horn is made of keratin, which is the same material as your fingernails. So besides the placebo effect, eating rhino horn has the same effect as chewing your nails.

Here's a real-world example of stopping demand: In Yemen, there was a long tradition that every man has to have a rhino horn dagger when he reaches a certain age. They add special decorations to show how cool and rich they are. This tradi-



In the last decade, 9,415 rhinos have been killed for their horns.



tion killed thousands of rhinos, until conservationists from the World Wildlife Fund went to Yemen and convinced them to use a type of antler that falls off naturally. It worked! Today, almost no rhino horns are imported to Yemen. That is how you save rhinos – by stopping the demand for them in the first place!

### Per-species summary

Rhino conservation is expensive, but it’s working. Worldwide, it costs around \$20 million to protect rhinos (even though we lose about 500 to poachers). It’s a huge effort that also risks the lives of rangers. In the last 30 years, we have turned the situation around from declining rapidly and out of control to declining slowly and knowing what we need to do. Here are the major problems for each species.



**Black and white rhino** conservation has improved, with more park ranger patrols in conservation areas, better tools and satellite communications, and even lie-detector tests to see who is being bribed. South Africa now has over 500 rangers protecting rhinos in Kruger National Park. Anti-poaching efforts have led to over 400 poachers apprehended in the last decade.

White-rhino populations are decreasing, but if you subtract the number born every year, they are not decreasing by much (see the graph two pages earlier). Black-rhino numbers have been steadily increasing. This is likely due to their smaller population, making them less commonly found, and the way they eat. Instead of grazing in fields like, white rhinos, black rhinos chew on bushes, which makes them harder to find.

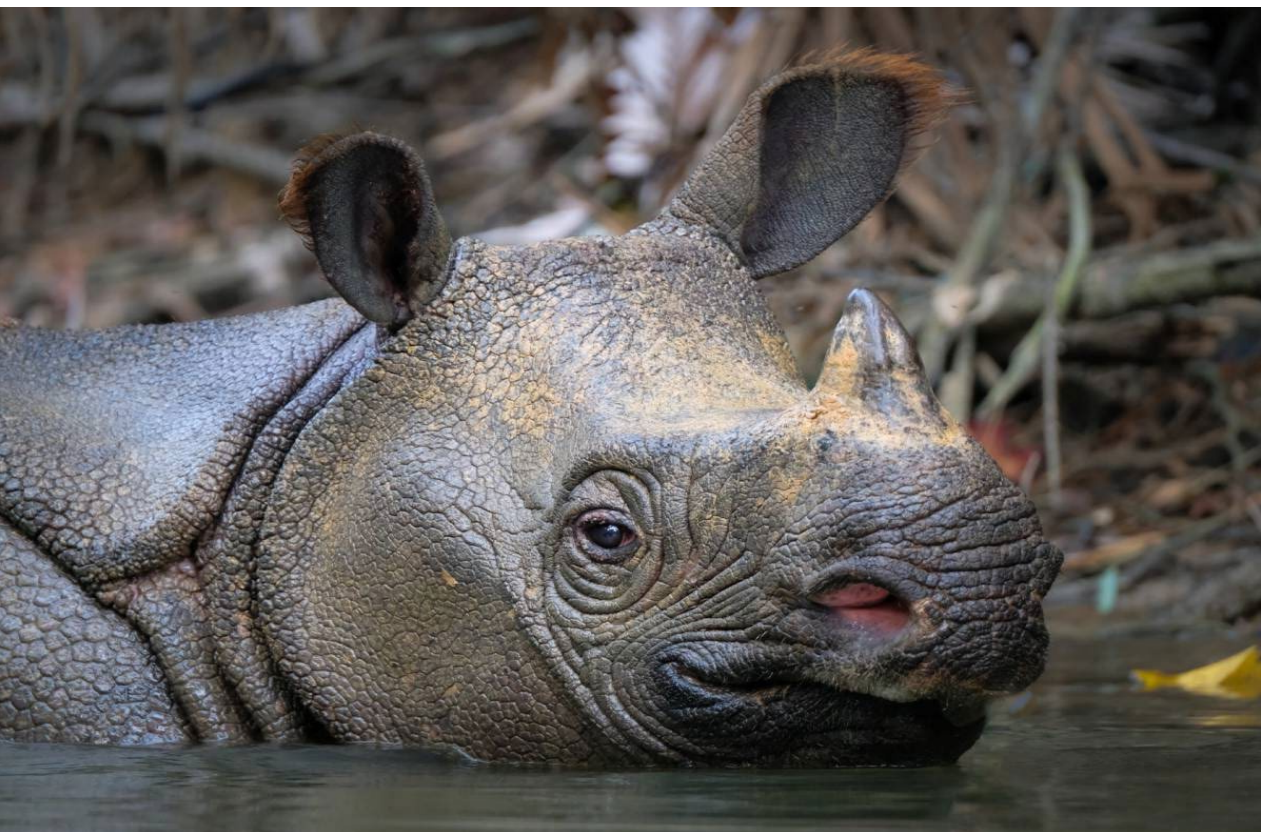
My dad once went on a walking safari to find them. He said they could hear the rhinos, but they couldn’t see them because of the tall bushes.



Black rhinos have a pinched “beak” for nibbling shrubs.



White rhinos have square, flat lips for munching short grass. They are the lawn mowers of the African savannah.



Javan rhinos are all in the same enclosure for safety. They love the water.



Sumatran rhinos are hairy and live in a large forest where they rarely encounter other rhinos, let alone humans.

**Javan rhinos** have a population under 100 individuals. They are very well guarded in their fairly small habitat. This low population means there's a high chance of inbreeding. They all live in one park, which is not that big, and the small size of the park is stopping them from increasing their numbers. Only the males have horns. There are reports that a gang of criminals has killed seven Javan rhinos in the last ten years for their tiny horns. One person has been arrested.

It's expensive to keep these rhinos protected, and they're not even doing that good of a job. Conservationists want to move some of them to a second location to help increase their numbers and make them more resilient. It's a lot of work to find and protect a new forest. Barney Long of Re:wild tells me it will cost a few million dollars, but he thinks there will be a second population in the next five to ten years.

**Sumatran rhinos** live deep in a large, dense remote rainforest in the middle of Sumatra, making them very difficult to find, preventing most poaching. In 1980, there were around 600 individuals. Today, there are between 50 and 150 left. It is very difficult to know, because it is so hard to find them in their forest. Sumatran rhinos have tiny horns that, thankfully, do not make big fancy sculptures.

Sumatran rhinos are most closely related to the woolly rhino, a large furry rhino that went extinct about 14,000 years ago. This is also why the Sumatran rhinos have hair. They look completely different from the other species.

**Greater one-horned rhinos** from India and Nepal have a population of 4,000 individuals and have fairly small horns. That doesn't mean they aren't poached, it just means there's less demand for them. The greater one-horned rhino population is increasing, from around 1,500 in 1980 to over 4,000 today.



Mother Indian greater one-horned rhino and calf.

## Sustainable use

There is much talk about the sustainable use of African rhinos. The horns are valuable, yet demand for hunting rhinos is low. About ten hunters paid for a rhino hunt in 2022. Most conservationists agree that hunting select older males provides income and helps rhino populations, but selling the horns is too problematic. Learn more by watching my interviews with experts on my YouTube channel.

## Sustainable trade discussion

Rhino horn currently cannot be legally traded. But let's assume CITES agrees to open the market completely. Here's how I think that would play out:

The people who want to buy rhino horns are not the people who want to go to Africa and hunt them. Any proper allowed trade will always rely heavily on certification of authenticity. Naturally, people would rather buy certified rhino horn. Poachers will respond by dropping their prices until some buyers buy illegal rhino horn. Then, retailers would have to drop their prices too, so people buy theirs, and so on. The middlemen will eventually win the price war, because their costs for getting a rhino horn without certification are much lower than a proper horn that benefits the farmers.

# African rhino numbers are increasing despite poaching

**A**head of World Rhino Day on 22 September 2023, African authorities have estimated that there were 23,290 rhinos across the continent at the end of 2022, 5.2% more than in 2021. Nonetheless, at least 561 rhinos were illegally killed (poached) across the continent during 2022.



Photo: Rudi van Aarde

A baby black rhino in Namibia



All a poacher has to do is shoot the rhino and cut off the horn. A farmer, on the other hand, has to dart the rhino unconscious, keep the rhino alive and safe while they do the medical procedure very carefully, certify the horn and put it into the certified supply chain. That would cost a minimum of \$2,500 each.

Another problem with legalization is corruption. Poachers will pay inspectors at the ports to sign that their product is legal and certified on both ends of the trip. Or, they will duplicate the certification symbol and paperwork, so the good guys need DNA and other expensive means to track horns in databases. Or they'll just move them in suitcases on planes. It would take a huge effort to catch bad guys and prosecute them, which is what we already have today.

Another problem is farming. A bunch of farmers could get together and just raise rhinos to produce as many certified horns as possible. In this case, the rhinos turn into cows and don't have much of a quality of life. Like the pangolins and tigers, there would be no benefit to the wild population, so you're left with a money-making business that doesn't help animals.

People I've spoken to say making rhino horn legal to trade is a wicked problem that doesn't have a practical solution. They are in favor of trophy hunting and reducing the demand for horns to zero.

On the other hand, Brian Child argues that with the right data, technology, certification protocols, and promotion, a legal market could work.

What do you think?



# The r-zero project



## Summary

As some of most well-known animal species in the world, rhinos – though threatened, poached, and trafficked every day – aren't going to disappear any time soon. There is way too much demand for rhinos to let their numbers get too low. Donors are always willing to write a check to help pay for rhino conservation.

But Javan and Sumatran rhinos aren't looking too good. They both have a population under 100 and are far less well known and iconic as the other rhino species. The experts I've spoken to say we have to spend money to protect rhinos this year and next, but realistically, the best long-term solution is to eliminate demand.

## My project to reduce demand for rhino horn

African rhinos aren't going extinct, but 450 of them are being killed every year for their horns, despite spending more than \$10 million to try to protect them. That's why I've started a project to drive the price of rhino horn in Vietnam to zero.

My goal is to work with kids in Vietnam to find ways to get their parents and grandparents to stop buying rhino horn. We will have conferences, talk with the government of Vietnam, start our own anti rhino-horn trend (similar to the ALS water bucket challenge), get corporate sponsors, work with government officials, get on the news, and work with the next generation of Vietnamese kids to destroy the rhino horn industry forever.

If we can drive the demand for rhino horn to zero in Vietnam, we can take that learning to China and do it there. That would be the end of rhino poaching. Kids can do things grownups can't. I'm looking for partners and collaborators on this project. Please contact me if you can help:

Learn more on my website: [www.roguescholaracademy.com/rhinos](http://www.roguescholaracademy.com/rhinos)

## New calf, same threats: Javan rhinos continue to reproduce despite perils

by Jeremy Hance on 19 April 2024



- Recent camera-trap images of a Javan rhino calf, estimated to be 3-5 months old in March, demonstrate that the species continues to reproduce despite being beset by challenges.
- The species is confined to a single habitat, and while its population is officially estimated at more than 70 individuals, a report last year cast doubt on those figures, alleging that 18 of those rhinos had not been spotted on camera for years.

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## Resources

- [Save the Rhino International](#)
- [Sheldrick Wildlife Trust](#)
- [Traffic](#)
- [Re:wild](#)
- [WildAid](#)
- [Research paper on legalizing rhino-horn trade](#)

A camera trap spotted a new Javan rhino calf in early 2024. That's a great sign that the efforts to protect them are paying off.

### **Nature's Guardian: Markus Hofmeyr**

This is Markus Hofmeyr, the director of WCN Rhino recovery fund. He was the first guest on my Nature's Guardians podcast. He grew up on farms in South Africa and was a rhino vet for many years. He spends his time doing research, evaluating projects, allocating money to projects he thinks will be effective, and helping those projects succeed. He is also a tireless champion of rhinos, helping people learn about them and always raising more money to support them. Markus is a superhero of the conservation world. If it has to do with African rhinos, Markus Hofmeyr is probably involved somehow.



### **Links for Markus:**

[Rhino Recovery Fund](#)

[My conversation with Markus Hofmeyr](#)

# Orangutans

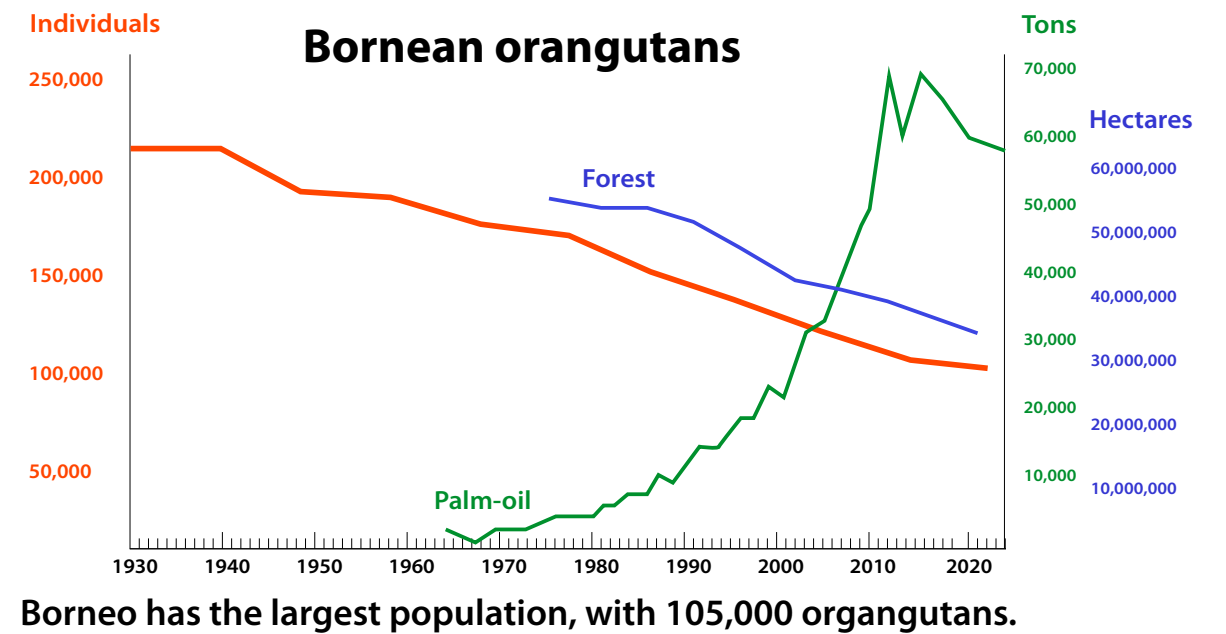
Today, you probably consumed palm oil or at least used it in some way. It's in lots of products you get at the store, drugstore, or from restaurants. Orangutans are in constant battle with the farms and companies that supply much of what's in your kitchen, and they are also being taken and sold as pets. Let's take a look at this complex situation.

## Population and background

All three species of orangutan – Bornean, Sumatran, and Tapanuli - are classified as critically endangered by the IUCN Red List. Of all three species, there were close to 230,000 orangutans in total in the 1920's. Now there are about 120,000 left: Bornean orangutans with 105,000 individuals, Sumatran with 5,000, and Tapanuli with only 800.



Orangutans only live in Malaysia and Indonesia.



## About orangutans

Orangutans are the largest arboreal animals, spending more than 90 percent of their waking hours in trees. During the day, they divide their time equally between resting and feeding. Orangutans consume more than 400 different types of food. They mostly eat fruits and other kinds of plants, but sometimes they eat insects. Almost every night, orangutans construct a sleeping platform in the trees by bending and breaking branches, leaves, and twigs. They live to 35 years in the wild and up to 50 years in captivity.

## Habitat

According to the WWF:

*The habitats of Asia's only great apes are fast disappearing under the chain-saw to make way for oil-palm and other agricultural plantations. Illegal logging inside protected areas and unsustainable logging in concessions where orangutans live remains a major threat to their survival. Today, more than 50% of orangutans are found outside protected areas in forests under management by timber, palm oil, and mining companies.*

As humans expand their farms, towns, cities, and roads, orangutan forest land is shrinking. Orangutans venturing into plantations or farms in search of food are often killed to protect the crops or the livestock's food. According to the World Bank, 34 percent of land in Indonesia is dedicated to agriculture. This isn't necessarily bad, but orangutans are paying too high a price. As we will see, things aren't as bad as some NGOs want us to believe.

## Palm Oil

Palm oil has become the world's most widely used vegetable oil; imports into the US have leapt by 485 percent in the past decade. Palm oil is generally cheaper than the other unflavored food oils on the market (soy and canola). It is present in many fast foods and roughly half of all package goods in your local supermarket, from lipstick and shampoo to cookies and bread.

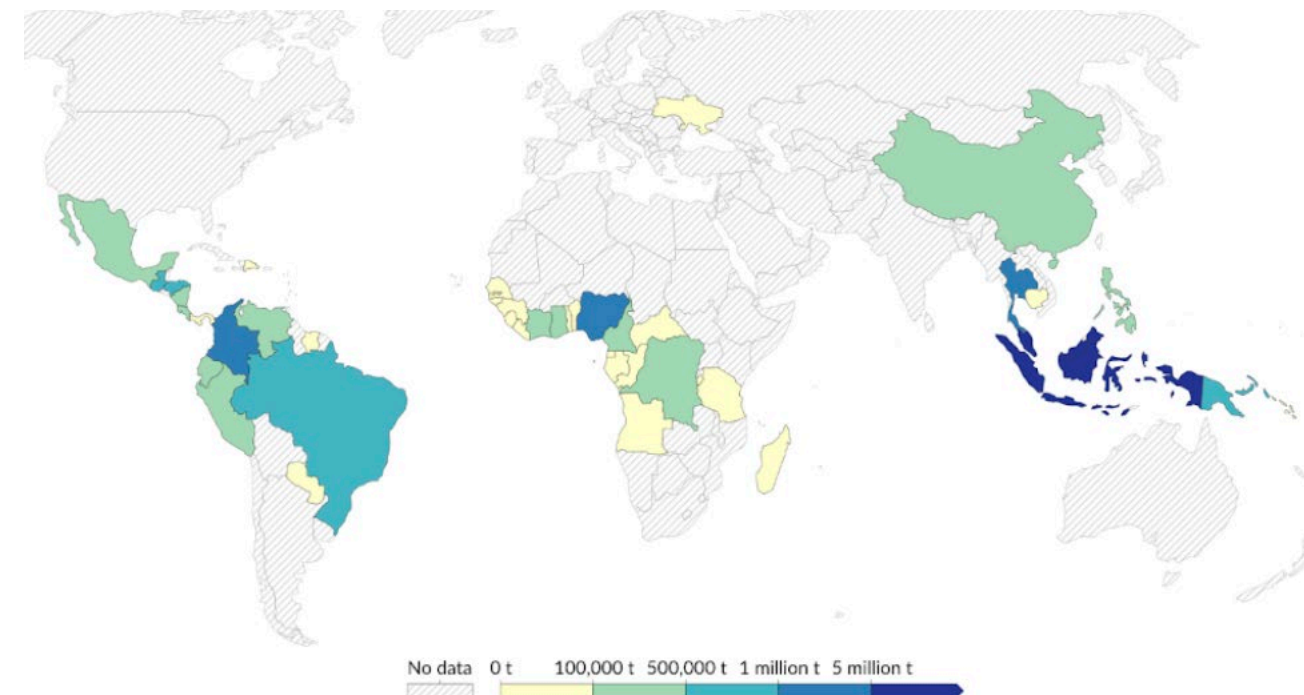
Palm-oil production impacts wildlife through habitat destruction and fragmentation. The conversion of forests to plantations leads to a decline in all animals that live there, especially orangutans. Farmers kill hundreds to thousands of animals each year to protect their operations.

Palm-oil farmers kill millions of animals over the years. On the other hand, palm-oil production has contributed to economic growth in producing countries, providing jobs for millions of farmers and workers. This leads to more income, better access to education and healthcare, and overall improved quality of life.

Thirty five percent of all vegetable oil used in the world is palm oil. Eighty five percent of palm oil farms are in Indonesia and Malaysia. Palm oil is in lots of things, even medicine. Palm oil is so important to our everyday lives, yet we don't even



In 2020, Indonesia had around 14 million hectares of oil palm plantations, while Malaysia had approximately 5.8 million hectares. Right: A mother and her baby in Borneo.



The top five palm-oil producing countries are Indonesia, Malaysia, Thailand, Columbia, and Nigeria. In this report, I'll only talk about Indonesia and Malaysia, because that's where orangutans are.

know it's there.

Several of the wealthiest families in the world made their money in palm oil. The oil palm tree only grows within ten degrees latitude north and south of the equator. Soy can be grown in most parts of the world, while oil palms need much more sunlight and moisture all year round. Palm plantations benefit from the natural inputs that other farms must pay for.

Palm plantations are in direct competition with other uses for tropical forests. For this reason, the government and some nonprofit organizations created regulations to limit the expansion of plantations and reforest land that is no longer in use.

According to Global Forest Watch, Indonesia has converted over ten million hectares of primary forest to farms over the last twenty years. That's an area bigger than Ireland!



## Threats from farmers

Orangutans have no food to eat in palm plantations, yet they can't avoid them. The plantations are enormous. Orangutans will either starve, be found and killed by the farmers, or escape back into the forest. If the orangutan is a baby, farm workers will sometimes capture it and sell it on the black market.

Annually, up to 3,000 orangutans, primarily infants, are rescued from palm-oil plantations or orphaned due to the death of their mothers. These young orangutans require rehabilitation and care, which spans five to seven years per orangutan and is very resource-intensive, with costs ranging from \$3,500 to \$5,000 per year for each orangutan. This includes medical care, dietary needs, and the construction and maintenance of semi-natural habitats for their development.

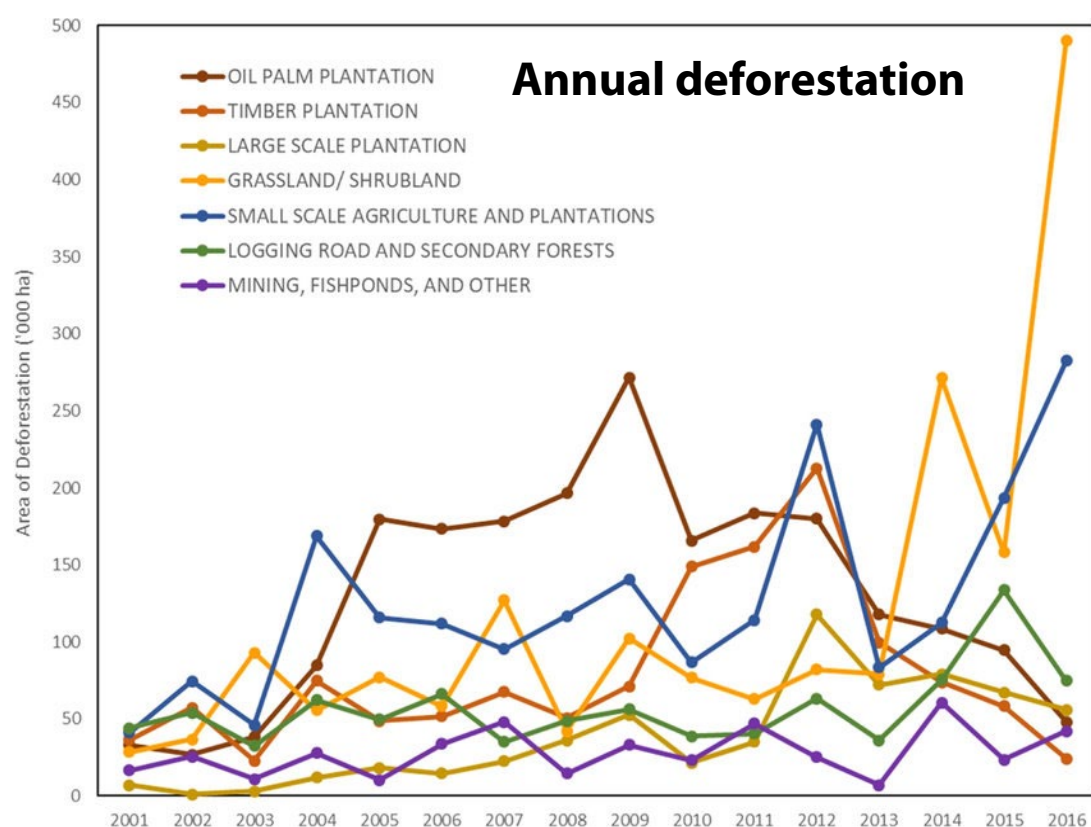
Only a fraction of rehabilitated orangutans, typically fewer than 20%, are successfully reintroduced into the wild, largely due to the limited availability of suitable, protected forest areas. Securing and preparing a protected release site can cost tens of thousands of dollars.

## Deforestation in Indonesia

Deforestation for palm oil peaked in 2009 and has been declining since. At this point, palm oil represents a small percentage of land being cleared each year, but there are still a lot of hectares used for palm oil. The main problem now is non-farmland being converted into pastureland. That's fine for cows, but it would be nice if they could reforest some of that land to make a bigger habitat for wildlife.



Orangutans are amazingly good at swinging in trees.



This chart from 2016 shows that plantations are no longer expanding and taking forest land, but grasslands are. Whether this is for grazing or just a natural invasive species is not clear.

## Sustainable palm oil?

The Roundtable on Sustainable Palm Oil is a group focused on making the palm oil industry less harmful to natural landscapes and wildlife. They are also working with local communities who rely on the industry for their income.

RSPO offers certification to palm oil producers, processors, and traders who comply with its sustainability standards. Sometimes companies do this because they actually care about the environment, but most of the time they comply just to get the certification to use in advertising and build their "eco friendly" brand. It costs \$10,000 to \$50,000 to get certification depending on if you pass their standards initially or have to change the business so you do. Twenty to twenty-five percent of global palm oil production is now certified.

Unfortunately, it doesn't look like the RSPO certification is doing its job. A study that looked at 535 plantations in Indonesian Borneo had the goal of learning whether RSPO-certified plantations were any better than non-certified plantations.

The study concluded:

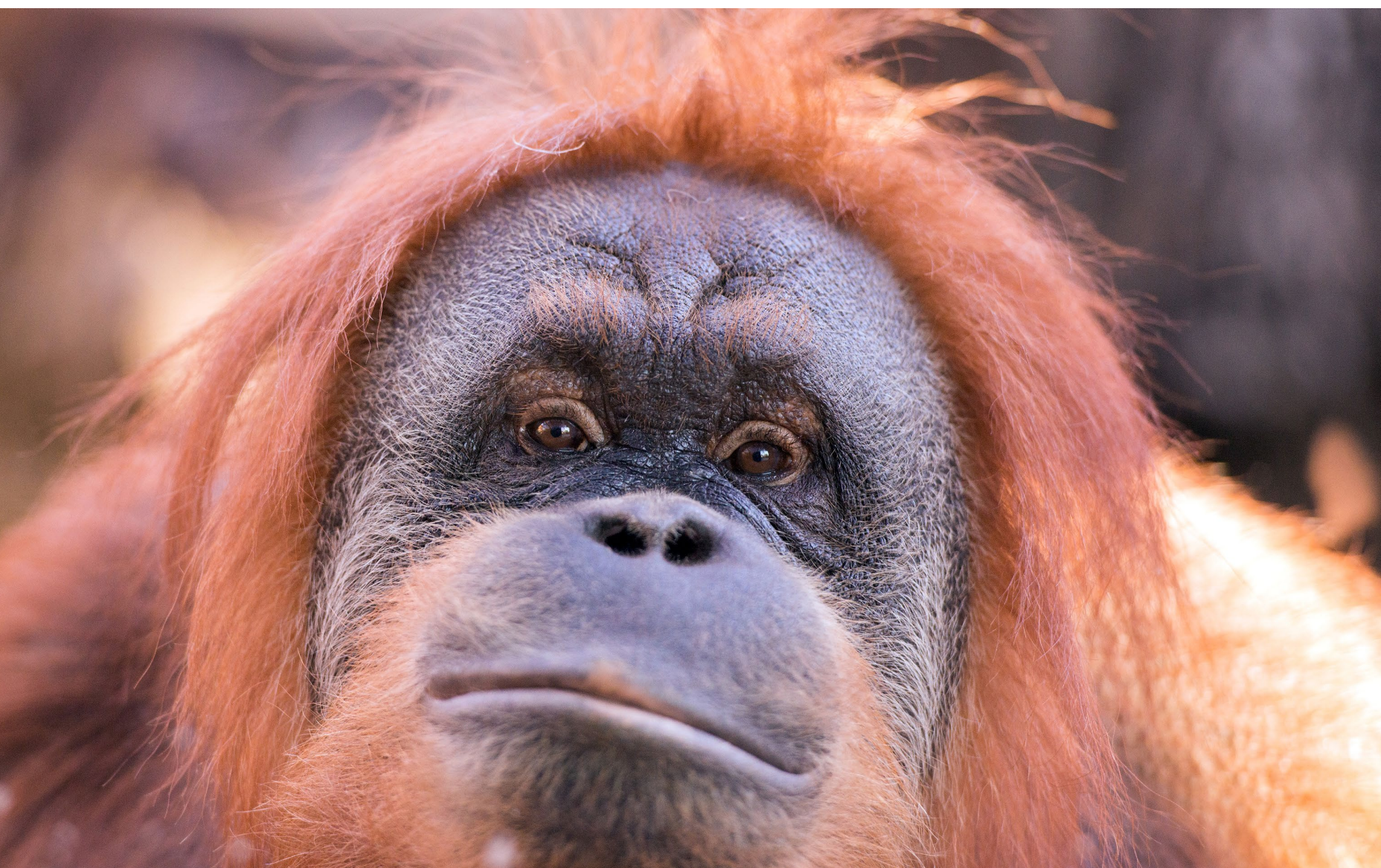
*... RSPO certification did result in better economic sustainability than that seen in non-certified plantations. However, the environmental and social benefits were unclear. It found no evidence that RSPO certified plantations retained orangutan populations more effectively. There was no evidence of decreased fire hotspots in RSPO certified areas.*

### **Orangutan trade**

In some Asian cultures, parts of orangutans are used in traditional medicine and sold as souvenirs. But this is not the real problem these days, because those people who would have used orangutan parts as medicine instead have them as pets.

Baby orangutans are highly valued in the illegal pet trade. Poachers generally kill the mother to take the infant, as orangutan mothers are very protective and will not abandon their young. Female orangutans don't even start to reproduce until age 15, and then they only give birth approximately every 7-8 years, making population recovery very difficult.

Poor care, disease, injury, and the psychological trauma of losing their mothers means most captive infant orangutans don't survive their first year. It's estimated



About 1,000 baby orangutans are abducted and trafficked yearly, that for every orangutan that survives, another six to eight die.

The maximum prison sentence for traffickers in Indonesia is five years and a fine of up to \$6,000. While this used to be a lot of money, the pet trade is now so lucrative that criminals take about 1,000 baby orangutans out of the jungle every year.

I'm smelling a combination of ancient laws, short prison sentences, ignoring calls for changes in rules, and flat-out corruption in Indonesia.

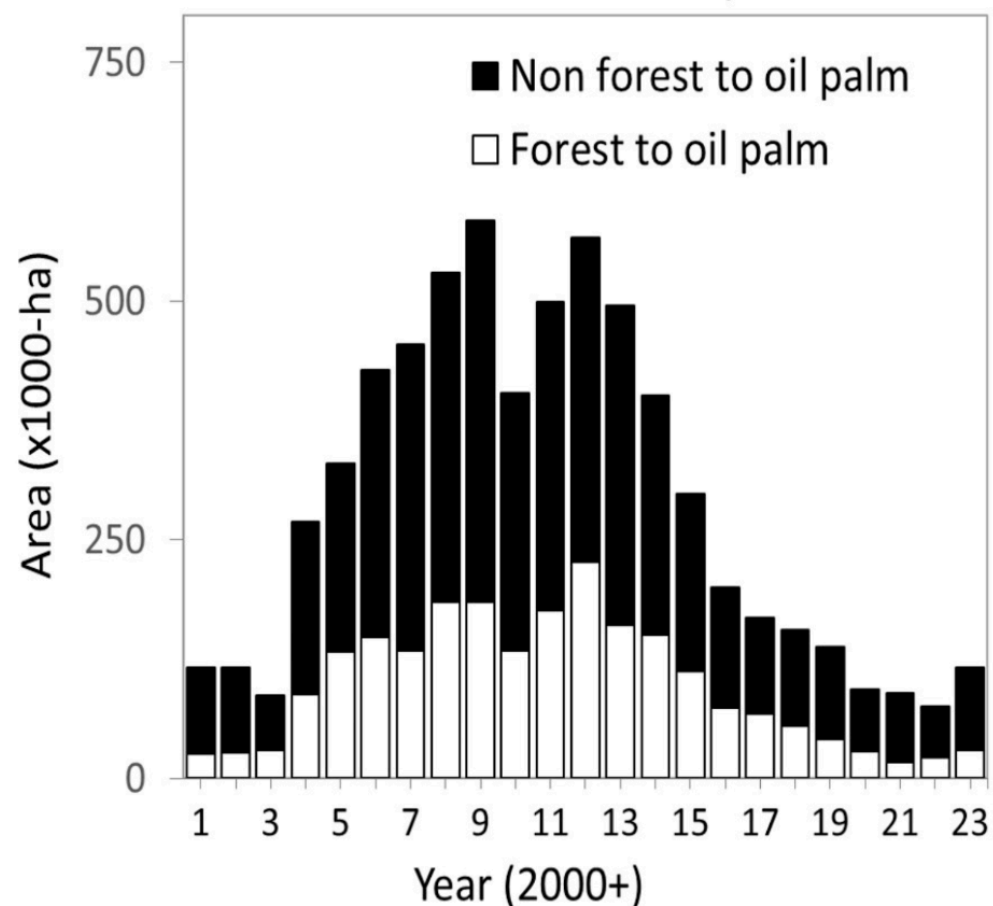
In Vietnam, animal trafficking carries a prison sentence of up to 15 years. The Vietnamese government takes this issue seriously, but the Indonesian government doesn't.

### **Main threats**

The increase of the amount of palm-oil plantation hectares has essentially ended, but there's a little spike going back up again recently.

At this rate of deforestation, palm oil is no longer

## Industrial Oil Palm Expansion



Palm-oil plantation expansion has dropped considerably over the last ten years.

### Summary

Most species except rats, cockroaches, pigeons, and bedbugs are threatened by urbanization and agriculture. Orangutans are no exception. Indonesia's fast-growing population requiring food and jobs is slowly taking over their natural habitats. Most of the land is now cleared for uses other than palm oil.

I don't think Bornean orangutans should be classified as critically endangered, because there are over 105,000 of them. But the Sumatran and Tapanuli orangutans certainly should be. Fortunately, orangutans are getting a lot of help. It's expensive, but it's working. Trafficking is definitely the largest threat facing orangutans, driven by the international demand for orangutans as pets and the mostly corrupt Indonesian government.

### Resources

[The Orangutan Project](#)

[RSPO](#)

[Harrison Ford goes to Indonesia](#)

expanding much, but plantations still are dangerous for orangutans. RSPO and other projects don't seem to be helping enough to make plantations more efficient and safer for wildlife. There's no reason we can't convince plantation owners to stop killing orangutans who wander onto their property, but it isn't happening at the moment.

The biggest threat to orangutans is probably corruption. There's a YouTube video in which Harrison Ford goes to visit the forestry minister of Indonesia to talk about deforestation. The minister avoids the questions and says yes, it's very devastating. But our people are just now experiencing democracy you see, etc. It's clear from the interview, he's just waiting for it to end so he can go back to being corrupt.

Orangutans were not designed to resist humans. People will do anything to make money. We need some famous Indonesian celebrity to show the cruelty of keeping orangutans as pets and help drive the demand for them to zero.



# Elephants

Elephants are the largest land animal in the world. The IUCN Red List classifies them as either critically endangered or endangered, depending on the species. Globally, the ivory trade industry is worth \$23 billion per year, and ivory sells for approximately \$3,300 per pound. Let's learn how elephants are doing, why their tusks are worth so much, and what we can do to help them.

## Background

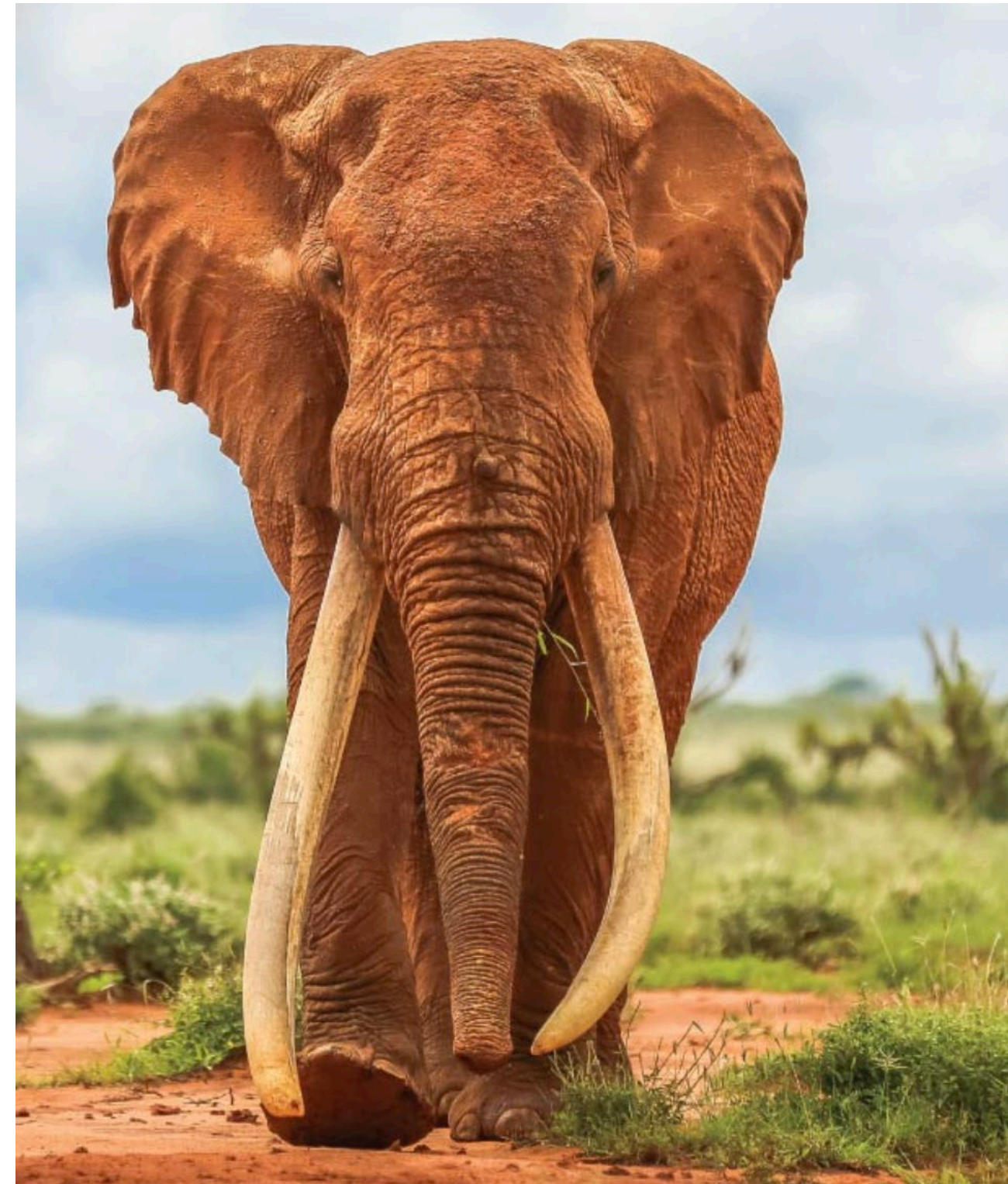
Before 1800, there were five to ten million African elephants and several hundred thousand Asian elephants. Poaching started when Europeans were colonizing Africa. Between 1950 to 1970, poaching of many species, including elephants, increased dramatically. It is estimated that elephant populations halved in the 1980s. Beginning in 1990, conservation really started. The rate of poaching declined, but still elephant numbers were decreasing and are just leveling off now. Here is a summary of each species:

**African Savannah Elephant:** Estimated to number around 415,000, this species has seen some population recovery in southern Africa. Over the entire continent, the numbers are now stable. Between 1966 and 1994, the South African government killed 16,210 elephants in Kruger National Park in an effort to keep their numbers under 8,000 and maintain the ecosystem. Park officials ended that policy of culling and now manage more than 31,000 elephants. Over the past 20 years, the number of elephants increased in all Southern Africa states. However, the Great Elephant Census of 2016 revealed a 30% decline over seven years in some regions.

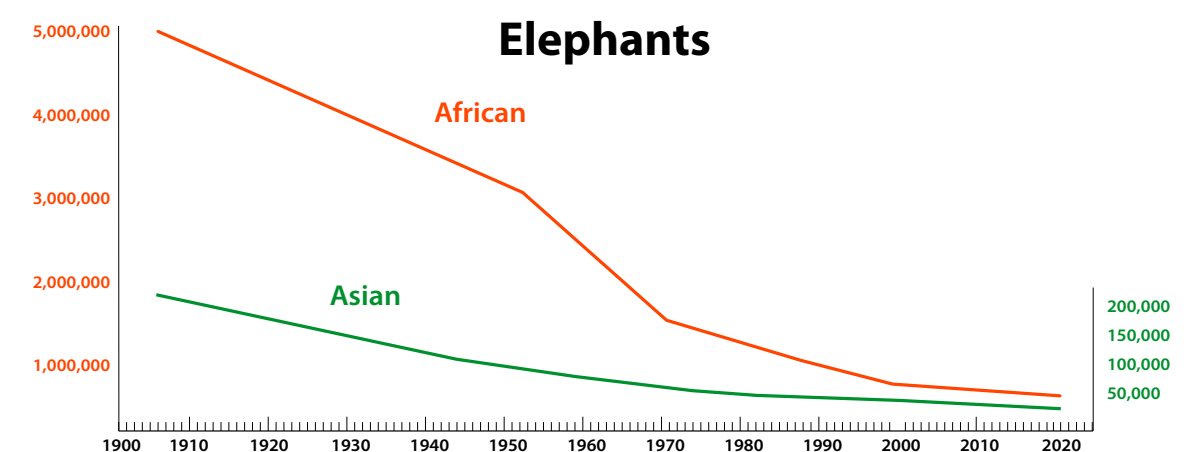
**African Forest Elephant:** With possibly fewer than 100,000 remaining, forest elephants have declined in population over 60% in the last decade. Most of them live in West Africa, where they are not popular tourist attractions and not well guarded.

**Indian Elephant:** Their numbers are estimated at about 27,000 to 34,000 but are decreasing due to ongoing habitat loss. Wild Indian elephants are in constant contact (and often conflict) with local farmers. The use of elephants for labor, entertainment, and cultural and religious practices has removed elephants from the wild.

**Sri Lankan Elephant:** With an estimated population of 6,000, these elephants are fighting urbanization. The government's Elephant Fence Project, initiated in recent years, aims to create boundaries between human settlements and elephant habitats to reduce conflict.



While some elephant populations are doing well, only about 25 of these "big tusk" elephants are left in the wild.





**Sumatran Elephant:** Estimated to have fewer than 2,000 individuals left, they've been fighting palm-oil plantations and have lost 70 percent of their habitat over 25 years. Initiatives include setting up protected zones, like the Leuser Ecosystem, enforcing stricter anti-poaching laws

**Bornean Elephant:** With only 1,500 to 2,000 left, they also face oil-palm cultivation. In 2012, the government moved many elephants out of a forest that was being fragmented by palm-oil plantations and into a more suitable environment.

### Elephant-tusk products

Elephant tusks aren't just carved into sculptures, they have traditionally been used to make all kinds of products. Piano keys used to be made of ivory, since plastic didn't exist. After plastic was invented in the 1950s, many people still wanted ivory products to display as status symbols. The US market for ivory consists mostly of southeast Asian and Chinese immigrants who keep their tradition. Because of the large population of Asians in the US, the American ivory market is ranked fifth in the world.

### Demand for elephant tusks

Tusks are made into sculptures, jewelry, and household items. In China and Thailand, an elephant tusk in your house is a symbol of wealth, power, and religion. Ivory products are a popular way to show off wealth. Catholicism is also a problem – in the Philippines, the government began in 2015 to reduce the making and sale



All kinds of products and carvings are produced from ivory. Many have become so traditional that modern versions, which of course are just as good, are not accepted as substitutes for the "real thing."



Elephants in India and Thailand are often used for pageants, shows, and entertainment. But they are slaves, not pets.



The seized ivory in this photo was from one store in New York's Chinatown. It was worth an estimated \$4.5 million.



of religious carvings that have been a big part of the demand for ivory. They have burned tons of seized ivory and made many arrests, and still people demand traditional ivory for religious purposes.

### Ivory bans

The US ivory market collapsed in 1990, when the United States banned the import and export of ivory less than one hundred years old in conformance with the CITES trade ban.



A typical carved tusk. These sculptures are highly valued, often given as business gifts, and cost tens of thousands of dollars, keeping the poachers, carvers, and middlemen in business.

staining with tea, coffee, and dyes to create a yellowed or aged appearance, applying heat to darken the surface, and using sandpaper and other materials to simulate wear and tear. Countries like the US will inspect ivory to make sure it is the proper age. However, a study revealed that, in their tests, the ivory was wrongly identified by the inspectors 86 percent of the time! In many cases, it doesn't matter, because poachers bribe inspectors to say the ivory is legal. Ivory is estimated to be a \$23 billion business worldwide.

Today, about 43 percent of ivory products are bought for personal purposes, 44 percent are given as gifts to friends and family, and 12 percent are given as business gifts. After the Chinese government banned trade of elephant ivory, the die-hard buyers continued to buy ivory at about the same rate; about a third of people who buy ivory every now and then stopped; and the rest slowed down but continue to buy illegal ivory products once in a while. In 2023, an undercover operation in Miami found more than 350 real ivory products for sale in gift shops to tourists.

### Poaching

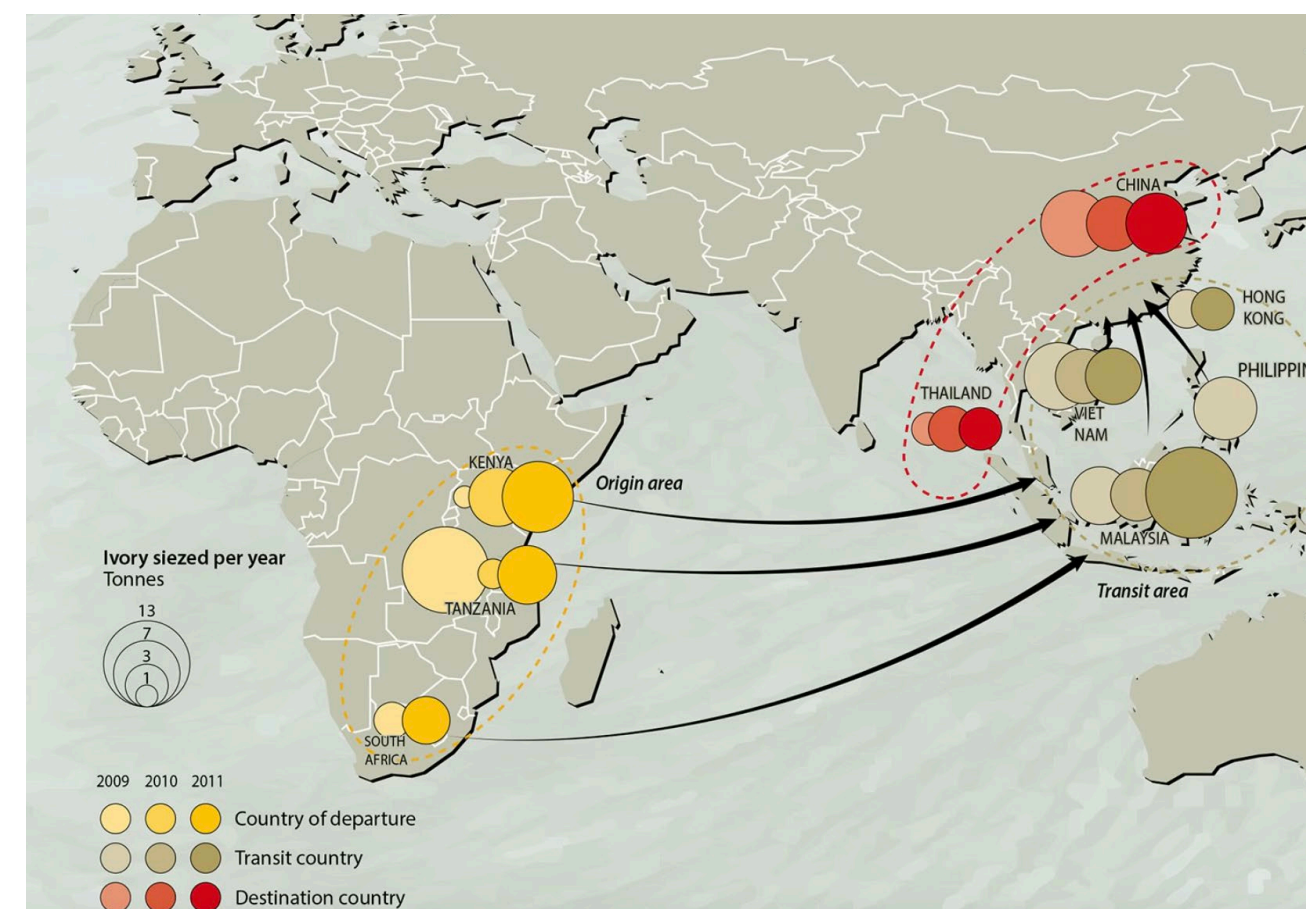
Today, around 20,000 elephants are poached every year for their tusks. That's more than 50 elephants every day! According to the IUCN, global illegal ivory trade has

### The top five countries with most demand for ivory

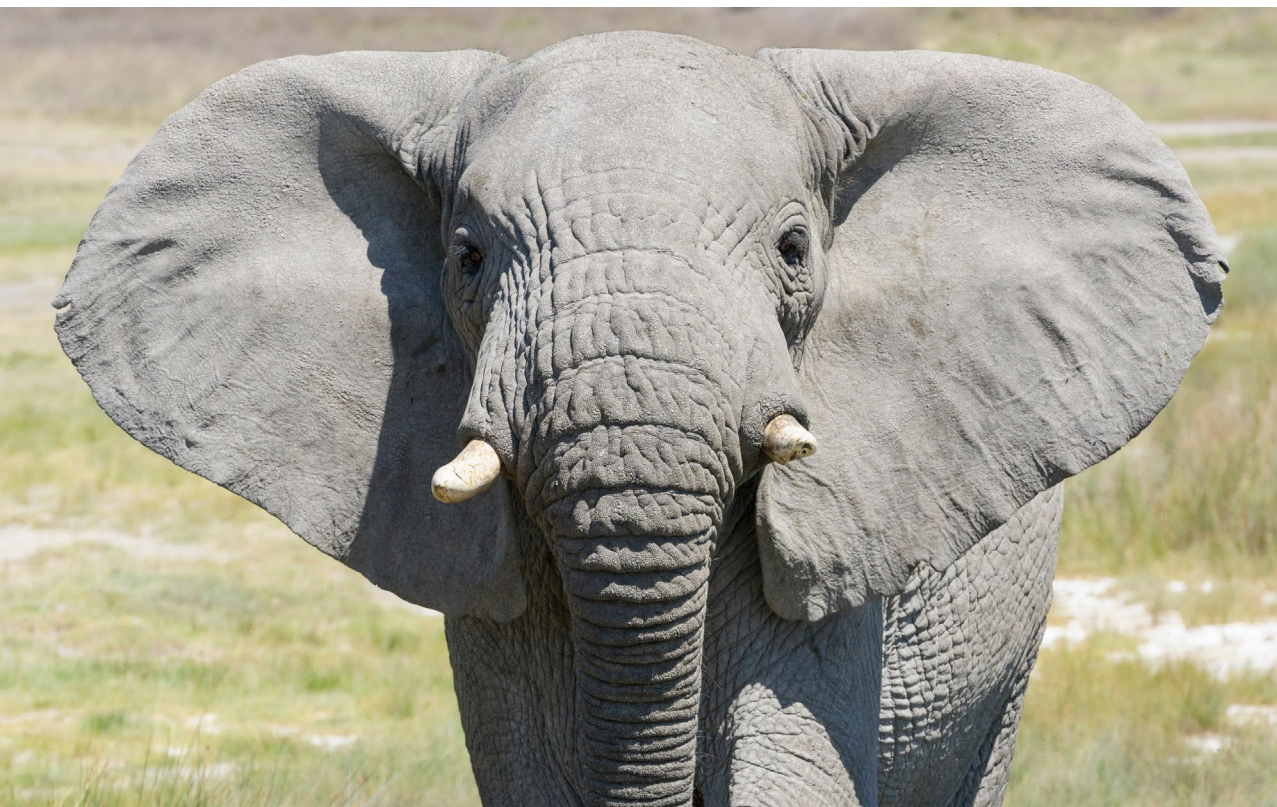
- 1 China
- 2 Thailand
- 3 Vietnam
- 4 Philippines
- 5 United States

In 2008, CITES approved a disastrous "one off sale," which stimulated more demand and raised the price of ivory, increasing poaching. A 2017 US law makes it illegal to trade ivory products made after that year. In China, it's illegal to make, sell, or trade ivory products. It's not illegal to own ivory products that were purchased legally before the ban. Still, rich Japanese, Thai, and Chinese buy them for even more money on the black market to show off how powerful and rich they are. Remember the doctrine of signatures?

In China, ivory sold before the most recent ban remains legal. Because of this, many manufacturers make their ivory products look old. Methods include



Ivory makes its way from Africa to the big Asian markets. The US gets most of its ivory products from carvers in Asia.



Male elephants flare their ears to scare you, but it's just a signal, not a threat.

*Meanwhile, the management of a legal ivory trade requires strong systems of control at every point in the commodity chain to ensure that illegal ivory is not laundered into the legal market. With recalcitrant Japan continuing to ignore CITES, “untransparent” Namibia “losing tolerance” with CITES, and Zimbabwe ranking 157 out of 179 on the corruption perceptions index, not even the basics for controlled trade are in place.*

The word “ivory” also refers to teeth of other animals, like walrus. According to US federal law, walrus ivory offered for sale may only be carved by native Alaskan artists. Most laws affecting walrus tusks encourage the use and sale of tusks from animals who die naturally.

### **Habitat loss**

Besides poaching, habitat loss in Africa and Asia is extensive. It leads to reduced space, food shortages, and water scarcity directly affecting elephant populations. It can also result in smaller, isolated populations, which are more vulnerable to extinction due to

more than doubled since just 2007. They say that seizures of illegal ivory shipments over 800 kg in size (that’s about one ton) have doubled since 2009.

Most tuskers (males with huge tusks that reach the ground) have been poached already. Today, there are only 25 tuskers left in the world. Because they have been mostly eliminated, almost all elephants born today have genes for smaller tusks. Even that doesn’t protect them from the constant demand for ivory.

### **The ivory supply chain**

Elephant tusks are taken in Africa, sent to a transit country like Vietnam or Malaysia, and there they are manufactured into products and usually carvings. The products are then sold to middlemen, who then sell them to stores and galleries in big cities.

As one writer put it:



Kenya is famous for burning ivory. In 2016, the government of Kenya burned this pile of 115 tons of ivory to show poachers they weren’t going to have a future. But it hasn’t worked. With the price of ivory at \$1,500 per kilo (\$3,300 per pound), poachers have the money they need to stay ahead.



Elephant populations in Southern Africa are all growing. Herds are led by a dominant female..

and costly ways of protecting them. While everyone agrees anti-poaching efforts are critical, they are still losing 50 elephants a day. It seems like a never-ending battle that the poachers will always win – but read on!

**Managing elephants:** It's not easy managing elephants. Sam Ferreira, director of South African National Parks oversees more than 33,000 elephants. They provide jobs, bring tourists, alter the landscape, and inspire children. It takes money to maintain the fences, prevent poaching, and monitor the health and safety of elephants. They need constant access to fresh water. It takes a lot of work with neighboring communities, and the government will often pay a farmer who loses food to hungry elephants coming through their gardens. Elephants uproot trees, break fences, look for water on private property, tangle with predators, and alter the landscape considerably. Elephant herds have to be looked after throughout the entire year, as they search for fresh water and grass while seasons and landscape change.

reduced genetic diversity and increased inbreeding. Additionally, elephants don't mix well with local communities and often get shot.

The establishment and upkeep of protected areas for elephants, which include national parks and reserves, involve substantial expenses. It probably costs around \$100 million globally, combining funds from government budgets, international aid, and private donations, aimed at preserving and expanding over 50 designated elephant-conservation areas.

### **What's working**

Because of the demand for ivory, elephants are still losing the battle. But there is some good news ...

**Anti poaching:** Anti poaching requires a lot of preparation and a lot of money. Since anti-poaching is basically fighting fire with fire, the troops protecting the elephants will have to be as strong if not stronger than the poachers. I discussed before in the poaching chapter that the poachers are very well equipped and generally have a huge advantage over rangers. Because rangers really do get shot and die trying to help elephants, using rangers on the ground is one of the most risky



My dad took this picture in Namibia. We are planning to go on safari in 2025.



Elephant polo is a popular sport among rich Asians and even has companies sponsoring the teams. Yet these elephants have no choice.



A mahout uses a bullhook to control his elephant. The elephant endures tremendous pain when the crowds are not looking.

**Partners in ecotourism:** Conservationists have thought about giving local communities part of the profit if they don't shoot elephants and help contribute to ecotourism. This is essentially what Poonam and Harsh have done for Tigers in India. In some regions in Africa, people are trying this as well.

### Elephants in captivity

About one fourth of all Asian elephants are in captivity, used in circuses and shows for tourists, and some are "employed" doing logging and other work. The shows are highly controversial. Most experts say the shows will end when people no longer want to pay to see them. Making them illegal just creates more corruption.

The capture and taming of elephants began in the Indus valley in Afghanistan more than 4,000 years ago. Captive Asian elephants are often referred to as domesticated, but this is not true. Captive elephants are tamed, not domesticated. They are essentially working slaves used to make money. When their economic value goes below their cost, they are sold to circuses or temples for children to ride on.

As early as 1400 BC, elephants' enormous size and power was used on the battlefield and recorded in Thai history. Porus, emperor of India, used 85 elephants to confront Alexander the Great at the battle of Hydaspes in 326 BC.



Who is this little guy and why is he in an elephant chapter? This is a hyrax, the elephants' closest living relative. Can you believe that? They had a common ancestor about 50 million years ago.

# EMERGENCY! STOP THIS REPORT RIGHT NOW!



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Breaking news, April 4, 2024 ...

## Botswana threatens to send 20,000 elephants to Germany in trophy hunting dispute



An elephant is seen at the Chobe National Park in Kalahari desert at Kasane, Botswana on October 13, 2023. According to World Wildlife Fund (WWF) data, there are nearly half a million elephants around the world, approximately 90 percent of which are African elephants. Murat Ozgur Guvendik/Anadolu/Getty Images

**(CNN)** — Botswana's President Mokgweetsi Masisi has threatened to send 20,000 elephants to Germany amid a dispute over the import of hunting trophies.

"Twenty thousand elephants for Germany, this is not a joke," Masisi told German tabloid Bild.

The African leader criticised the German government – particularly the environment ministry – for seeking to ban the import of trophies despite Botswana's "overpopulation" of elephants.

Earlier this year Germany's environment ministry, which is headed up by Steffi Lemke of the Green party, raised the possibility of stricter limits on the import of hunting trophies due to poaching concerns.

### Botswana has too many elephants!

Botswana's president threatened to send elephants to Germany because the German government announced they didn't want German hunters going to Botswana to hunt elephants and bring home their trophies. They thought it looked bad. I thought it was time to learn what was really going on.

### Sustainable use of elephants

Dr. Brian Child is an associate professor in the Department of Geography and the Center for African Studies at the University of Florida. He spent twelve years working for Zimbabwe's Department of National Parks and Wildlife Management.

Brian completely shifted my view of conservation by explaining the concept of sustainable use of animals. The day before I talked with Brian, I was writing this chapter, explaining how we need to stop hunting elephants. Now, I want to *increase* the demand for trophy hunting – to save elephants! Brian and others in Botswana have turned the situation from a market failure to a market success. In his eyes, the demand for trophy hunting elephants, and the demand for their tusks as sculptures, can be used to fund conservation. Let's see how that's working out and what should be done in the future.

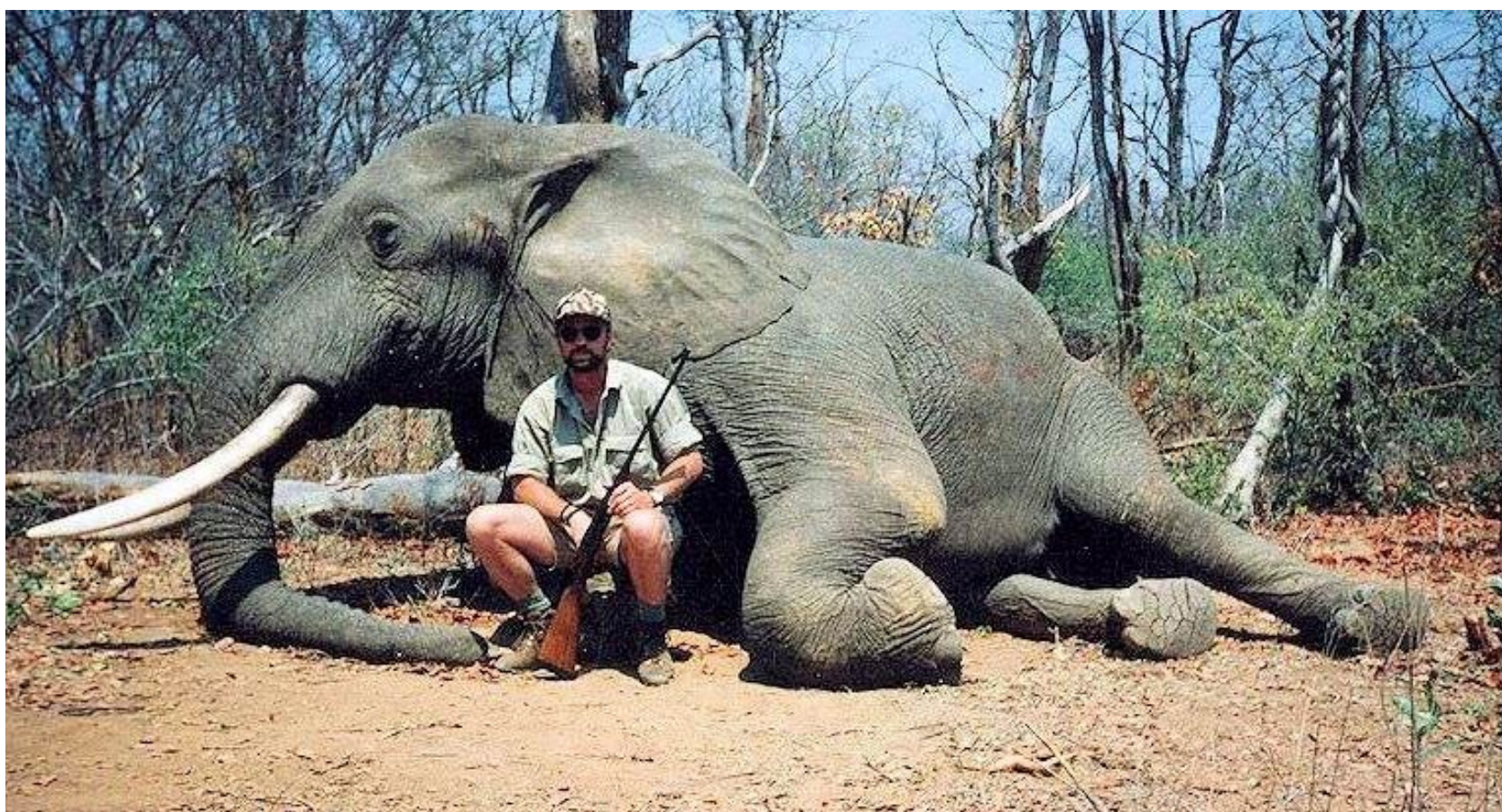
In most countries, farmers are allowed to own cows and goats but not wildlife. So most farmers have

small farms and barely make a living. Elephants are wild. They eat crops, destroy trees, and search for water among all the small farms. Most farmers are not fond of elephants and sometimes even shoot them.

But if the farmers could own elephants the way they own cows, farmers could make much more money, because one elephant is worth 1,000 cows. Hunters are willing to come to Africa and pay \$50,000 to \$100,000 to shoot an elephant. In Botswana, farmers pool their land to create habitat for elephants and get a share of the profits when an elephant is trophy hunted. Botswana allows hunters to come shoot an older male elephant who is past his reproductive years and take the trophy back home (this is what the Germans didn't like). In Botswana, hunters shoot one elephant out of 400, and the other 399 elephants have a safe, well cared-for environment. Now, Botswana has 130,000 elephants – more than any other country in the world by far!

Fifty years ago, Kenya had about 150,000 elephants. Now they have about 15,000. Kenya is focused on strict policies and rules, no trophy hunting, no ivory trade, and lots of law enforcement. They burn and waste huge piles of ivory instead of working to make it legal to sell the ivory.

Kenya and Botswana have opposite approaches and opposite results. In Kenya, it costs the government a fortune, and they are losing about a dozen elephants to poachers every day. In Botswana, they have too many elephants, and the government makes money through taxes because the people get richer. It would be great if Botswana could send elephants to Kenya, but it's too expensive to ship them and too far for the elephants to walk.



Before I talked with Brian, I thought this was terrible. Now I think it's great! Rich hunters provide all the money to preserve habitats and take good care of elephants. Hunters are really saving elephants.

In Tanzania, photo safaris make money because they specialize in luxury experiences for really rich people. But Kenya has many more tourists who are not ultra-rich. In Kenya, photo safaris don't make enough money to support all the land, people, and resources needed to maintain a large habitat that is good for elephants. Also, Kenya's neighboring countries are less supportive of conservation, making it more difficult to maintain good habitat for animals.

### **Sustainable trade of ivory**

CITES makes international laws and regulations that don't allow exportation and trade of ivory. All African elephants are included in Appendix I of CITES, except for the populations of Botswana, Namibia, South Africa and Zimbabwe, which are included in Appendix II. Hunters can take their trophies home, but they can't sell the ivory. No ivory trade is allowed.

This is too bad. There's still a lot of demand for ivory products in Asia. We shouldn't discourage that, we should be marketing elephant hunts and selling certified ivory products to people in Asia.

As I mentioned in the poaching chapter, certification has issues. There is always someone willing to fake certification, bribe an official, or sell ivory cheaper. Smart people agree that trophy hunting on shared land will help save the people and elephants of Africa. They disagree about whether to allow the trade of ivory.

I understand. I would be in favor of trading ivory if I thought it would really benefit the people of Africa, but I'm not sure it would, because Asian middlemen know how to make most of the money.

What do you think?

## Summary

No, the president of Botswana is not going to actually send elephants to Germany. He was using the press to tell Germans what they don't know – that hunting elephants is sustainable. Sustainable use ideally wouldn't require this much government support. Not all countries have a good government like Botswana. If sustainable use could work without relying too much on the government, it would have a better chance to spread. Done right, sustainable use is a model that can make Africa into an international wildlife tourism destination for centuries.

Sustainable trade is another story. It will take a lot of changes to make sustainable trade work for the people of Africa. But, if it can be done, it would let Africa stay at the center of wildlife tourism forever, not just as long as donors keep sending money. Brian wants people to rethink conservation. I hope he gets his way.

## Resources

[Elephant Crisis Fund](#)

[Save the Elephants](#)

[Wildlife Conservation Society](#)

[Sheldrick Wildlife Trust](#)

[Brian Child's article on elephants](#)

[My conversation with Brian Child](#)

[CITES update on African elephants](#)

### Nature's Guardian: Brian Child

Prof Brian Child is a recognised academic, educator, practitioner and scholar in the fields of protected area economics, wildlife and community cross-scale governance, sustainability and capacity building. He has forty years experience in park management, private conservation and community-based natural-resources management in southern Africa. Among other roles, he chaired IUCN's Southern African Sustainable Use Specialist Group for six years; led the development of Zimbabwe's Communal Area Management Programme for Indigenous Resources (CAMPFIRE); and did extensive consulting for World Bank, UNDP, NORAD, USAID, and more. Brian is a strong supporter of sustainable use and trade for many African species. He wants to help get Africans out of the poverty trap and create a thriving economy that is good for people and animals for the long term.



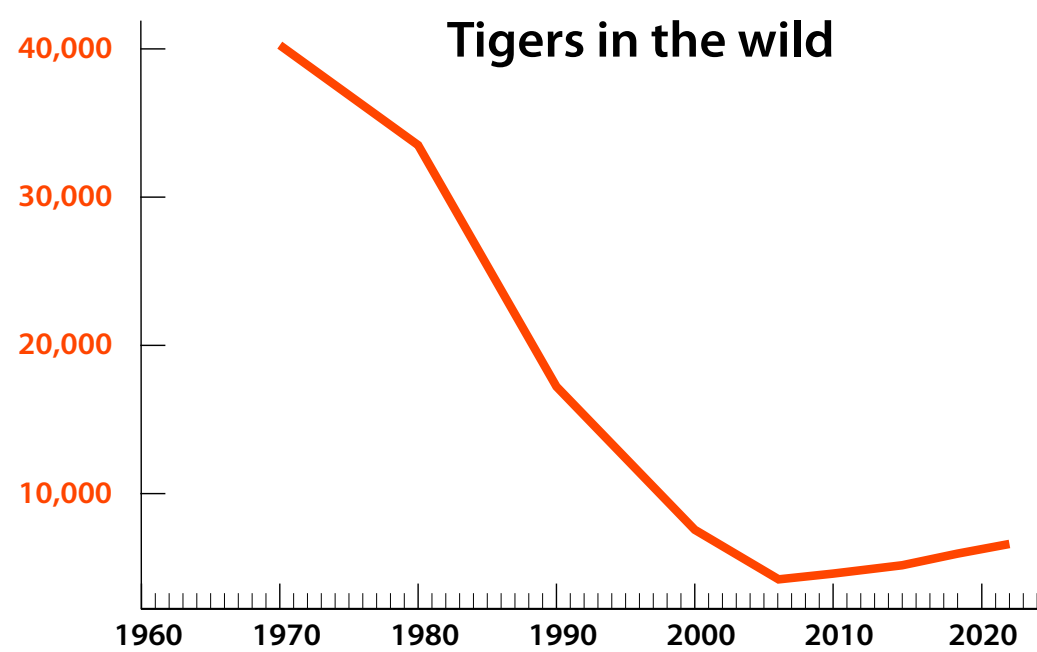


# Tigers

Wild tiger populations have been in decline for decades. Until recently, when tiger numbers in India started to turn around. Their wild population has tripled since 2006. The number of tiger farms has also increased. Yet the number of tigers poached every year hasn't changed much. What's going on with tigers?

## Background and population

The graph below shows that tiger populations have been rapidly decreasing for the last fifty years. We also know that during this time, three tiger species have gone extinct and that the South China tiger is now extinct in the wild, with only 100 individuals remaining.



Since 2006, tigers in India have started to come back. Really? Tiger populations aren't actually increasing, but our technology to track and count them is. Tigers are extremely elusive and difficult to count. But in the last twenty years, using camera traps and GPS tags, researchers have been able to get a more accurate count. They are learning that the situation for tigers may not have been as bad as they thought twenty years ago. Still, only about 4,000 tigers are in the wild today, and that's not a good report card on humans.

## Demand for tiger parts

Tiger bones, teeth, and claws are used in traditional Asian medicine, particularly in China, Vietnam, and East Asia. Tiger-bone wine is a traditional "remedy" to "treat" various conditions like arthritis, yet none of these "cures" actually works.

## Three tiger species have gone extinct ...

**Bali tiger** (*Panthera tigris balica*): Known to inhabit only Bali, Indonesia, the Bali Tiger was the smallest of the tiger subspecies. It became extinct in the 1940s, with the last known individual reportedly shot dead in 1937. Their extinction was primarily due to habitat loss, poaching, and a reduction in prey.

**Javan tiger** (*Panthera tigris sondaica*): Once found on the island of Java, Indonesia, this tiger was larger than the Bali tiger but still faced extinction for similar reasons: habitat destruction, poaching, and loss of prey. It is believed to have gone extinct in the mid-1970s, though there is recent DNA evidence that at least one may still be alive.

**Caspian tiger** (*Panthera tigris virgata*): Also known as the Persian tiger, it lived around the Caspian Sea in Iran, Turkey, and parts of Central Asia. It became extinct in the early 1970s, mainly due to hunting and habitat destruction.

## Six species are left ...

**Bengal tiger** (*Panthera tigris tigris*)

**Indochinese tiger** (*Panthera tigris corbetti*)

**Malayan tiger** (*Panthera tigris jacksoni*)

**Siberian or Amur tiger** (*Panthera tigris altaica*)

**Sumatran tiger** (*Panthera tigris sumatrae*)

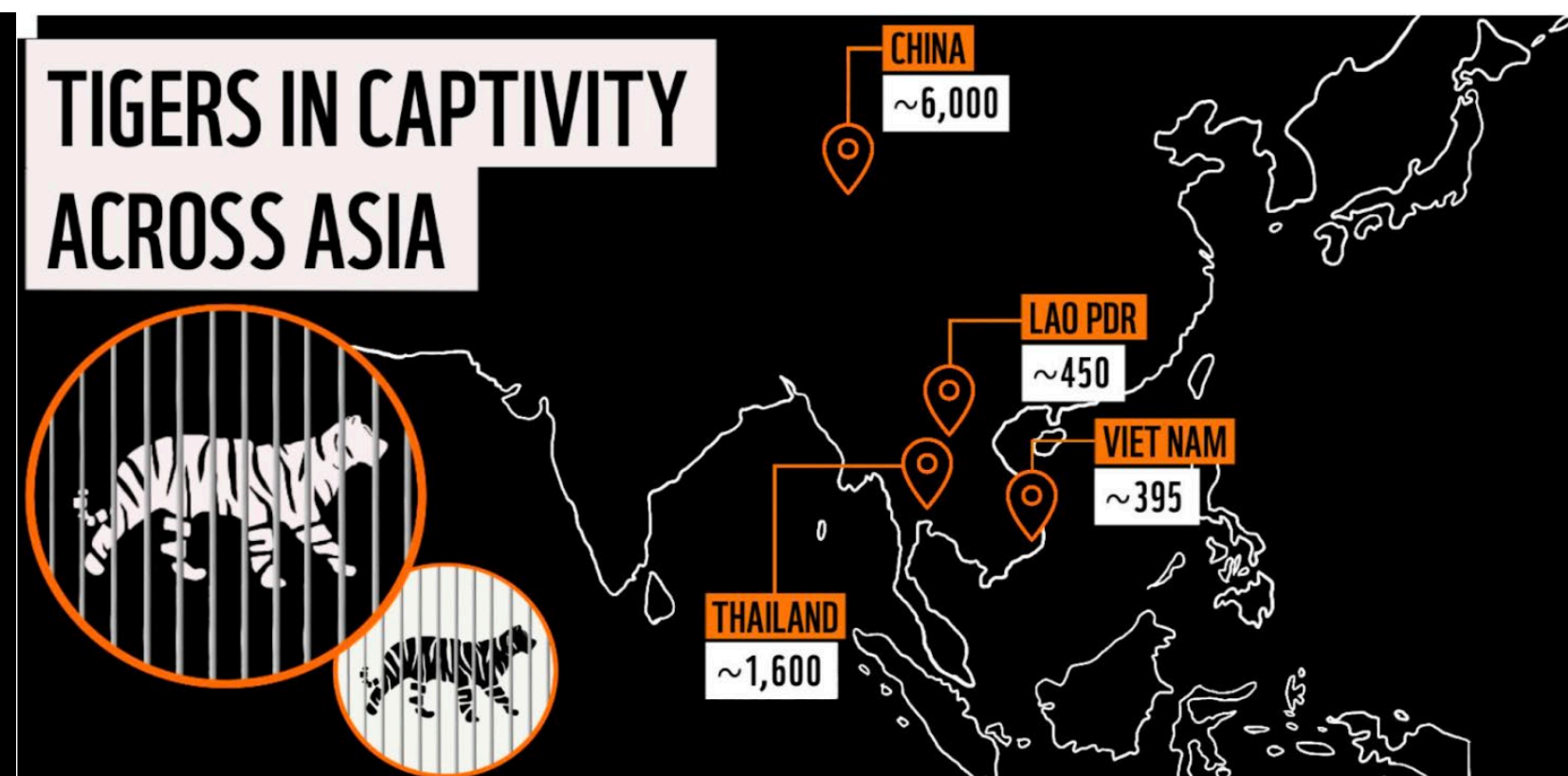
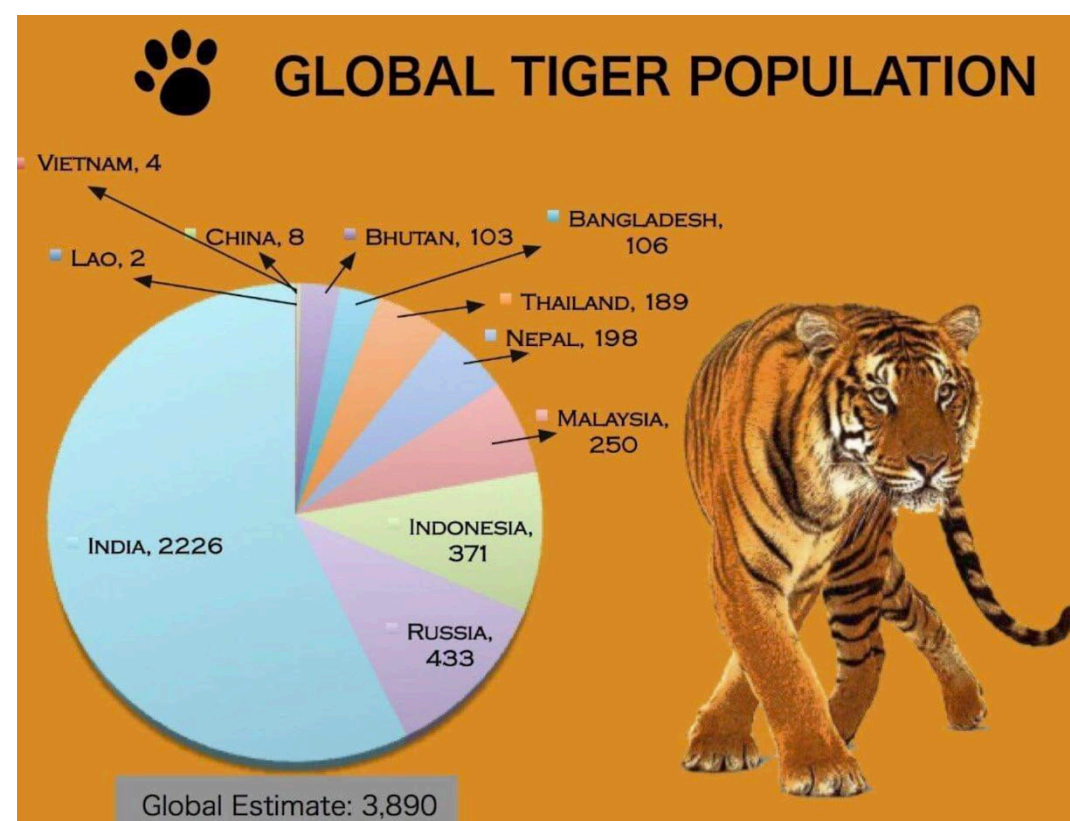
**South China tiger** (*Panthera tigris amoyensis*), which is currently considered functionally extinct in the wild but still exists in captivity.

People in Asia will pay for almost any bone or tooth from any predatory cat to use as fake medicine. When buyers can't get tiger parts, or it just gets too expensive, they switch to lion bone, jaguar claw, or leopard teeth, they don't really care which. The doctrine of signatures is a strong effect!

Tiger skins are highly valued as luxury items and are used for decoration and as status symbols. The fur can be made into rugs, coats, and other decorative items. Wealthy buyers will pay \$10,000 to \$20,000 for a rug. The hides of albino tigers can sell for even more.

### Tiger farming and poaching

An alternative source for the usual illegal poaching trade is tiger farms, which take longer and more money to set up but also can serve as illegal visitor attractions, like shows and petting events. Poor regulations and weak law enforcement facilitate traffickers moving tigers, or their parts and products, out of these facilities and into the markets.



Tigers in captivity in Asia number over 8,000. In the US, tigers in private hands number around 5,000.

Tiger farms produce more tiger products, but they only account for 30 percent of seized tiger products crossing the border into China. The rest of the demand is met by domestic Chinese suppliers, who don't have the same kinds of inspections. As you can see in the map above, China has the most tigers in captivity. The US is in second place.

Conservationists often argue that farms take pressure off wild tiger populations, but that doesn't appear to be the case. These tiger-farming facilities have existed for a very long time. China established its first tiger farm in 1986. But poaching rates have stayed roughly the same. Kanitha Krishnasamy from TRAFFIC says ...

There is corruption in the Chinese government, which explains why officials are so hesitant to end these farms. There are about 8,900 tigers held in over 300 facilities across Asia – mostly in China, Thailand, Laos, and Vietnam.

Wait a minute – there are twice as many tigers in these illegal tiger farms as there are tigers in the wild?

Yes. Tiger farming has hugely increased total tiger populations. Considering that these tigers' entire lives are spent locked in a cage just to make money, I'm not sure it's worth it. Some people say tiger farms help preserve genetics and prevent extinction. I think tigers aren't going extinct anyway, because they are critical for tourism and tigers in the wild are increasing (see my interview with Poonam and Harsh).



*If there was any indication that tiger farms led to tigers in the wild not being poached, we would have seen it by now. We haven't. There's no evidence to show that poaching of tigers in the wild has gone down because of tiger farming.*

### Main threats

Tiger farming is absolutely the greatest threat to tigers, because tiger farms provide a miserable life and death for the animal. Farming is simply another industry that profits from the exploitation of animals.

Tigers in the wild are doing well and have been increasing in population, despite the fact that poaching numbers haven't really changed much. As with many other predators, wild tigers face threats from habitat loss and poaching.

### Summary

The Thai government recently raided a large and well known tiger farm. The Vietnamese government is also determined to end tiger farming. China, which holds by far the most tiger farms, is making too much money off them to stop. Chinese people are willing to pay for tiger shows, petting events, and tiger skins, and government officials will gladly take money to not do anything about it.

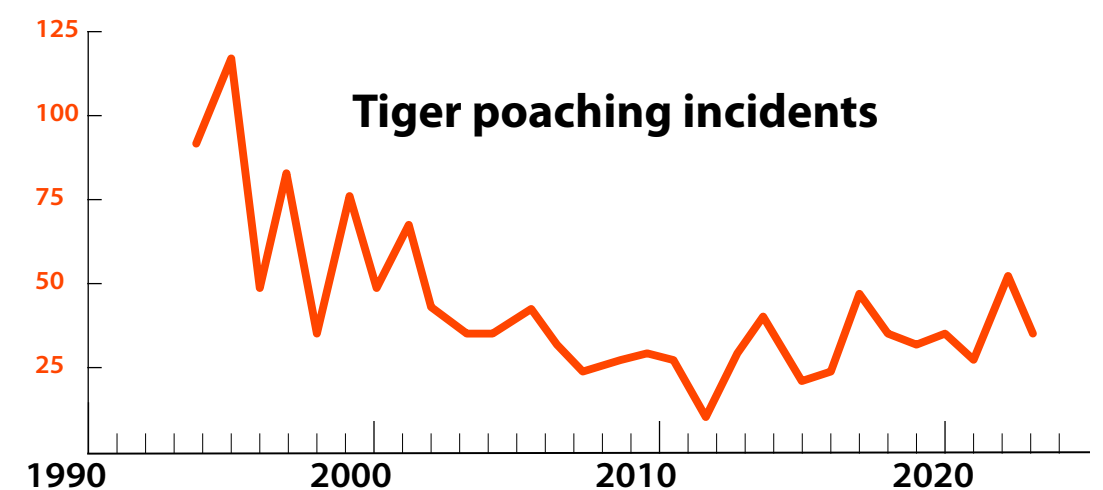
Tiger farms don't benefit tigers. Tigers should only exist in the wild. The sooner tiger farms disappear, the better.



Wild tigers are solitary, coming together only for mating. Female tigers give birth to litters of two or three cubs after about 3.5 months. Cubs are born blind and dependent on their mother.



Most tigers in captivity are out of sight of the public and inspectors. Those being raised for their bones have very poor conditions and health until they die.



Poaching is on the rise since 2012 because demand continues to increase.

### Resources

[TRACT](#)

[WildCats](#)

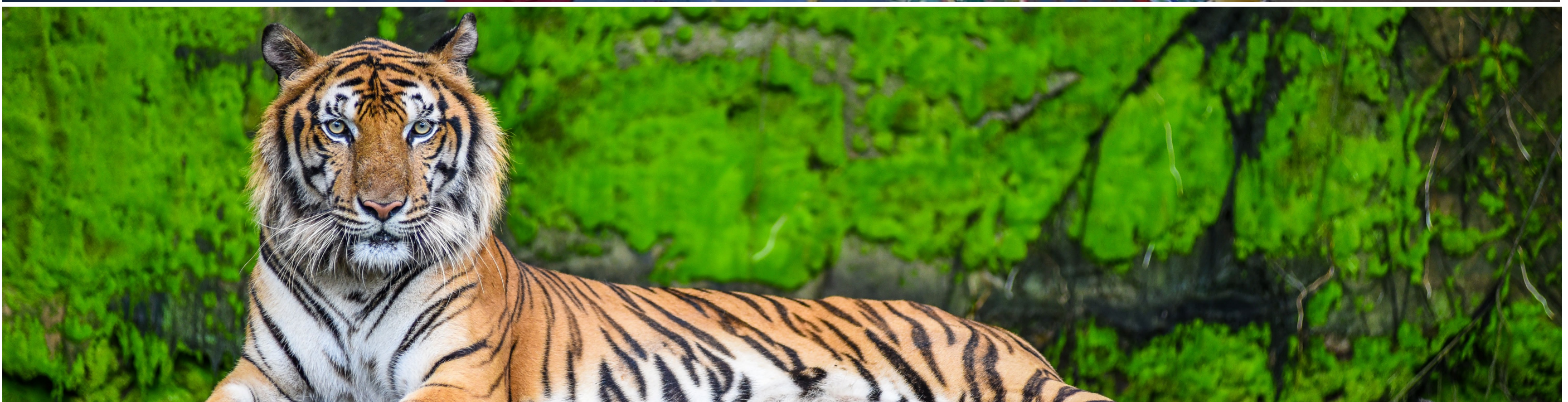
[Panthera](#)

Watch my interview:

[Nature's Guardians Poonam and Harsh](#)

## Nature's Guardians: Poonam and Harsh Dhanwatey

Poonam and Harsh created TRACT – the Tiger Research and Conservation Trust. They have transformed a small park in India into an ecosystem that works for tigers and the farming community around it. They have worked extensively with local people to learn how to live with tigers and build tiger tourism that supports the community. They and their team have been so successful increasing the tiger population in their area that they're exporting tigers to other forests that need more tigers.



# Corals

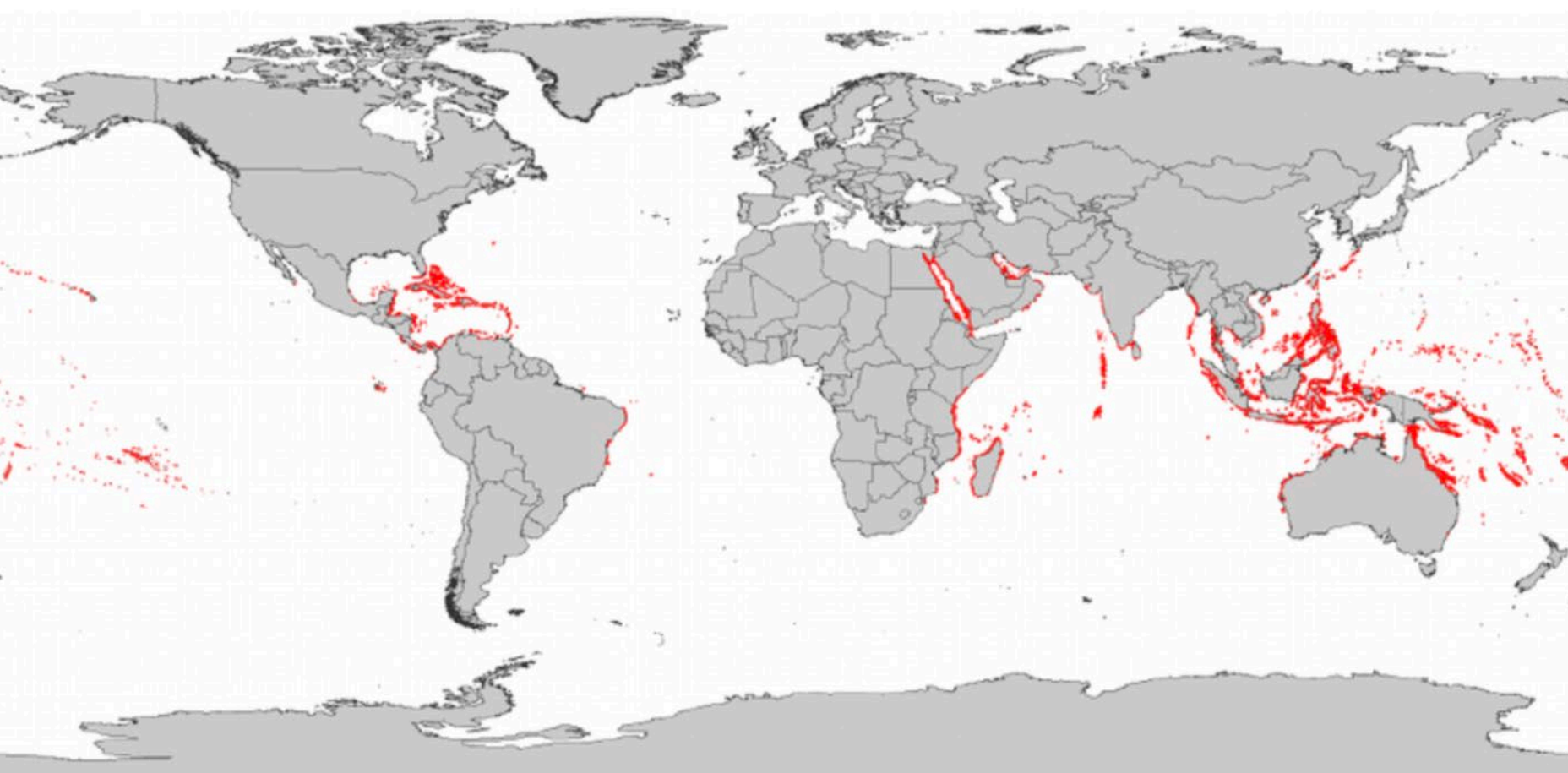
Corals are animals! Did you know that? I didn't. Coral reefs are essential marine ecosystems that cover an area of 284,300 square kilometers globally. The IUCN Red List categorizes most coral species at either least concern, near threatened, or vulnerable. A lot of people – especially journalists – say corals are dying, they're bleaching, they're acidifying. Without help, they will be gone soon! Is that true? Let's find out!

## What are Corals?

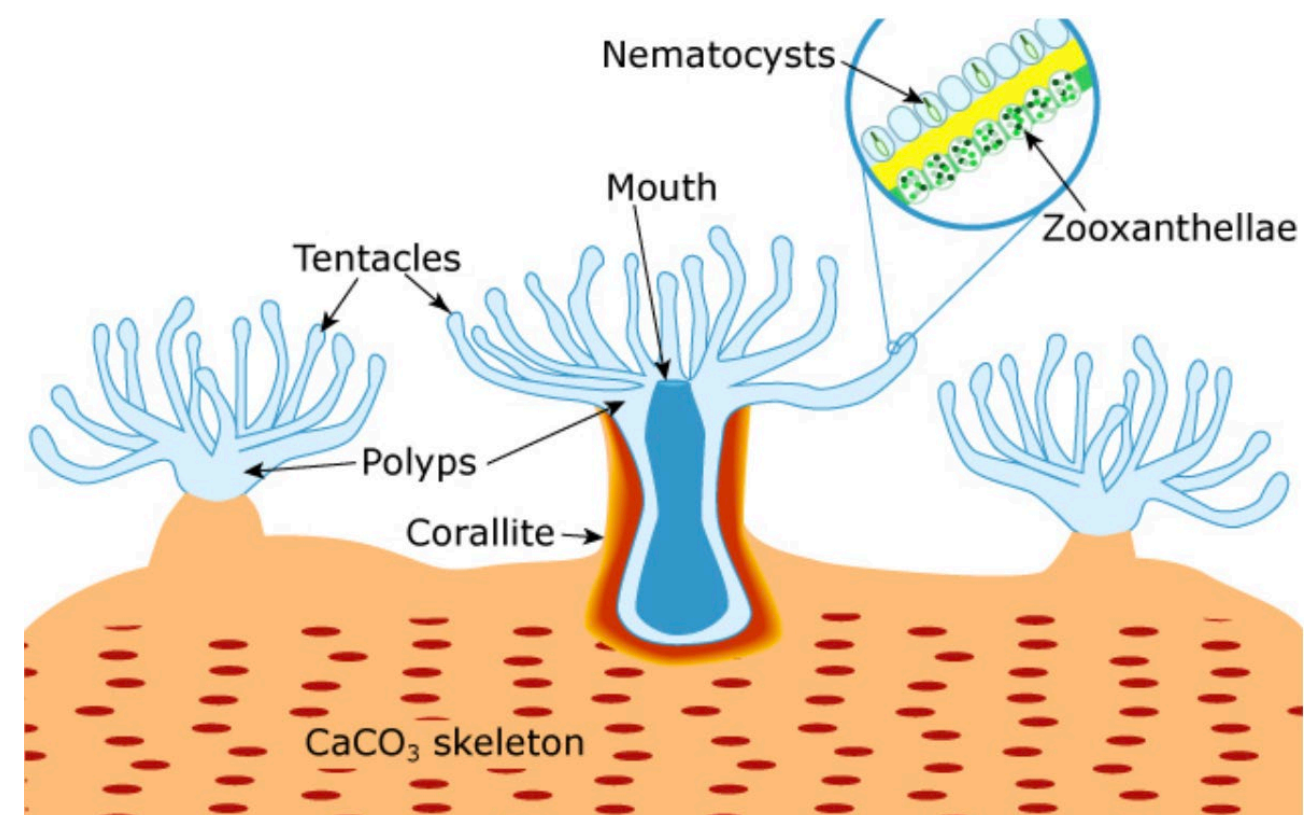
Corals are colonies of tiny creatures called polyps, which can live for a range of 2 to over 900 years, depending on the species. Polyps feed on algae and plankton floating by, and they construct shell homes to protect and expand the colony. Those shell homes are the coral we see. Think of each polyp like a tiny creature making its own protective home so it can come out and feed. The zooxanthellae algae (see diagram) provide photosynthesis, turning sunlight into food for the corals.

## Misconceptions

Corals can live in cold waters. While it is true that many coral species form reefs in warm, shallow, sunlit waters (like the Great Barrier Reef), corals can be found in all of the world's oceans, from deep, cold waters to murky regions. Cold-water corals can live at depths of up to several thousand meters. We will meet more misconceptions about corals soon.



Corals live in most shallow, warm-water environments around the world. Cold-water and deep-water corals not shown.



Corals are animals, similar to snails, who make their own shells. They need to host zooxanthellae to work together to get energy from sunlight.

## Range

Warm-water corals live in shallow seas with temperatures from 68°F to 86°F (20°C to 30°C). Cold-water corals live in temperatures from 32°F to 54°F (0°C to 12°C).

Shallow-water reefs typically form in depths less than 150 feet (45 meters), where sunlight can reach the symbiotic algae, zooxanthellae, which the coral needs for photosynthesis. However, deep-water or cold-water reefs can exist at depths of 2,000 feet (610 meters), far below the limit for sunlight penetration. These deeper corals rely on capturing food particles from the water rather than on photosynthesis.

On average, reef structures are capable of growing vertically at a rate of about one inch (2.5 cm) per year. They grow taller when sea levels rise, and they sprout new corals lower down as sea levels fall. Most reefs are sitting on top of hundreds of feet of dead coral shells from many thousands of years of growth.

Most reefs have an outer reef that protects an inner lagoon from storms and waves. The lagoon protects many species that are born and live in the lagoon for perhaps years before venturing out into the ocean. This outer/inner structure is the result of the corals' ability to grow and change as conditions do.

### **The Great Barrier Reef**

The Great Barrier Reef is the largest reef system in the world. It's over 1,400 miles (2,250 km) long! There are between 1 to 17 trillion corals in the Great Barrier Reef. It's very difficult to count coral, so this range is very large. The GBR is composed of over 2,900 individual reefs, with over 800 known species of hard corals and about 150 species of soft corals.

Colorful corals on the Great Barrier Reef.



Rangiroa's outer reef is far off to the left and right, with an inner protected lagoon.

# Ocean heat is driving a global coral bleaching event, and it could be the worst on record



Coral bleaching in the lagoon of the Great Barrier Reef's Lady Elliot Island, on February 19, 2024.

Rebecca Wright/CNN

**This CNN article on coral bleaching doesn't explain that bleaching is part of the coral's natural life cycle and is not a danger.**

Corals' main predator is the crown-of-thorns starfish, which invades a reef and eats most of the coral. While this is devastating to those corals, the corals and starfish have evolved together over millions of years. They always stay in balance. The starfish are not an invasive species; they don't take over. Even after the starfish munch an entire reef's worth of coral, the corals always come back.

The other big threat to reefs are tropical storms, which can destroy a reef in a few hours. This has also been going on for millions of years, and the corals always come back from those, too. The graph on the right shows coral cover in the great barrier reef today. Ten years ago, cyclone Hamish destroyed thousands of square kilometers of reefs. The reef recovered after the journalists had already left with their scary stories.

In general, reefs don't need much protection. Corals have adapted to be resilient against the most common events. Corals stay at the depth they need by building layers up or down. As sea levels have risen more than 100 meters in the last 20,000 years, most reefs are now more than 100 meters thick. In fact, many mountains and parts of whole continents are built of ancient coral reefs. You may even have the remains of an ancient reef in your dining room under your plates and glasses.

## Ocean acidification

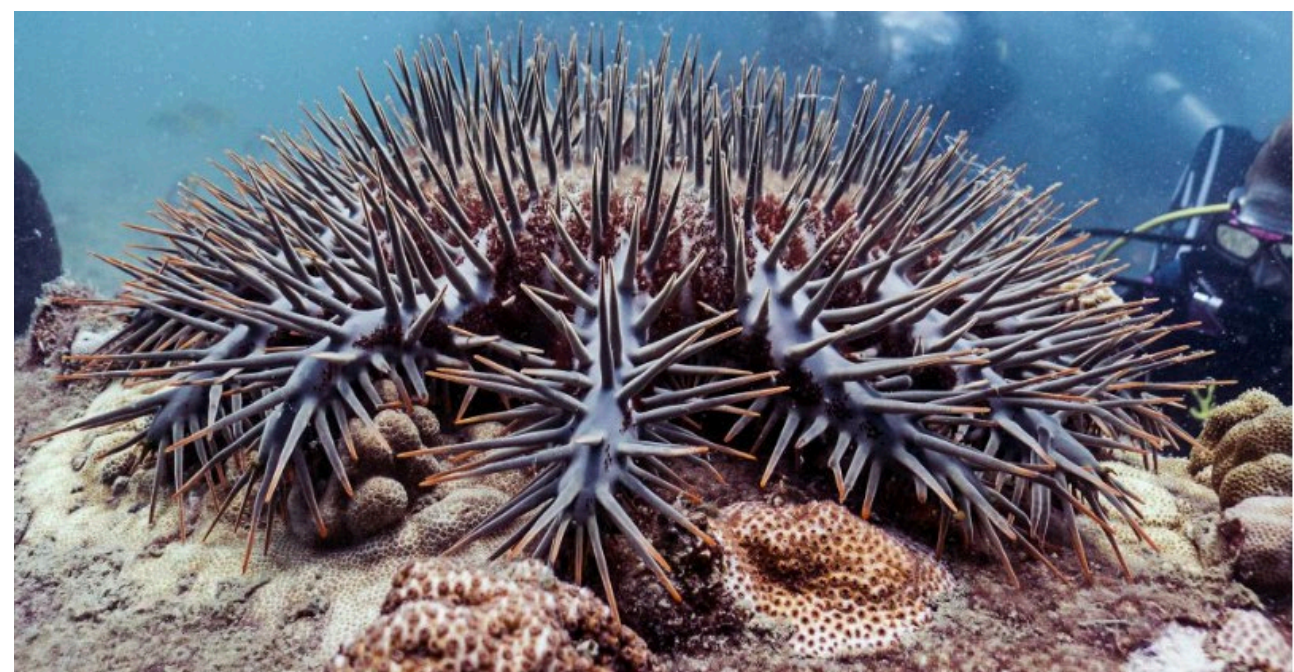
Ocean acidification is a very misleading and manipulative term. Why? Because if you look at the pH scale, you will see that more than 8 is basic, and lower than 6 is

## Coral Bleaching

Coral polyps take on a special algae called zooxanthellae that live inside the coral and provide photosynthesis, turning sunlight into glucose. Each different zooxanthellae gives the coral its color. Corals occasionally change zooxanthellae to adapt to changing conditions. When they get rid of their colorful passengers, the coral turns white but is very much alive, preparing to collect a new zooxanthellae. Most corals can last for months in this bleached state, waiting for just the right algae to repopulate. People who don't understand this think the corals are dead, but they aren't. Bleaching is a natural cycle. It's how corals adapt. They can even have multiple zooxanthellae, making it possible for parts of the coral to have different colors.

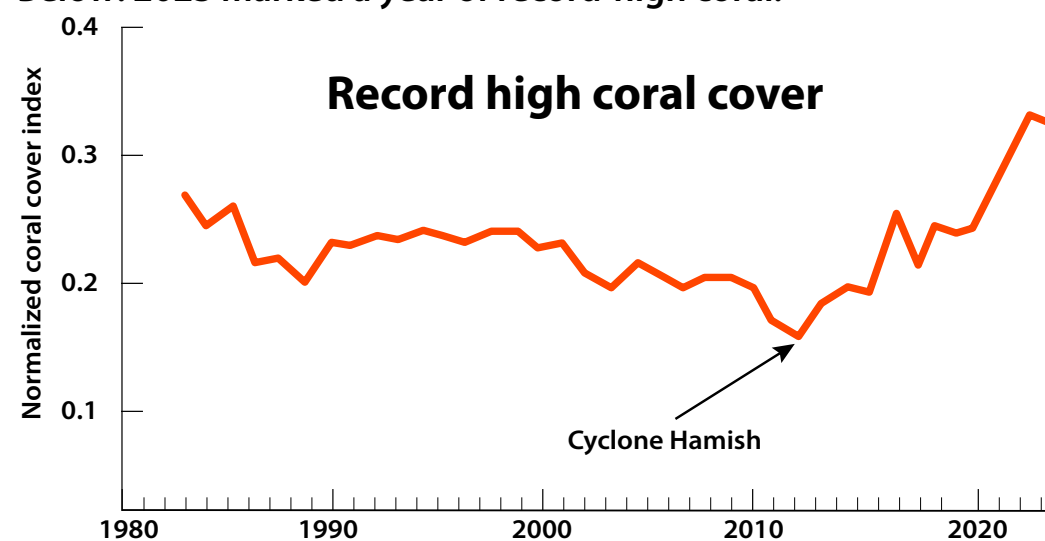
## Dangers to coral

Most coral reefs are about a mile and a half or more away from the mainland, so farm runoff and other pollutants generally don't bother them. Water quality initiatives have reduced agricultural runoff at the Great Barrier Reef by 25% since 2008. That might have helped the beaches a bit but probably didn't do much for corals, since most of that reef is about 20 miles from the mainland.



Crown-of-thorns starfish - the natural predator of corals.

Below: 2023 marked a year of record-high coral.





Soft corals in Thailand.

considered acidic. 6-8 is the neutral zone. Rain water is a 5 or 6 on the scale, meaning it is technically slightly acidic, but it isn't harmful. Marketers use the term "acidification" to scare the public because it makes money and sells advertising.

Ocean water is slowly going from 8.1 to 8.0 or so, which means oceans are becoming slightly less basic, not more acidic. They are going toward neutrality, not toward acidity. It would be unusual if ocean pH never changed. The US environmental protection agency says:

*"Prior to the Industrial Revolution, the average ocean pH was about 8.2. Today, average ocean pH is about 8.1. This might not seem like much of a difference, but the relationship between pH and acidity is not direct. Each decrease of one pH unit is a ten-fold increase in acidity."*

**Point one:** less alkalinity could actually be a difference, but it's not ocean acidification since it's still on the basic side of the scale. Since both alkalinity and acidity can be dangerous, nearer the neutral point (7) is probably safer than deeper into alkalinity.

**Point two:** yes, one pH unit lower is a ten-fold decrease in alkalinity, but this is less than one-tenth of a full unit lower.

Unfortunately, US Environmental Protection Agency, it's very unlikely that a slight trend toward neutrality has any effect on the ocean at all. You also can't assume that all oceans and areas in oceans have the same pH levels; there are, without a doubt, some areas with slightly higher pH levels and others with slightly lower. Natural variability has always been part of the oceans and always will be.

You might be thinking: "Micah, if people think corals are in danger, but they are actually doing well, what's the issue?"

Since a lot of people are being told corals are dying, conservationists have started to kill their main predator legally. Conservationists (supposedly the good guys) have killed over a million crown-of-thorns starfish to "protect" the corals from these "invasive predators." It may be that they are more interested in government money than corals.

### **Habitat Loss**

Unlike many other species, corals are not threatened by habitat loss. The ocean doesn't have nearly as much physical destruction as land does. Urbanization accounts for a small amount. China's recent destruction of reef tops for military bases in the South China Sea is about the worst kind of destruction we see with reefs. The establishment of over 16,000 square kilometers of new marine protected areas in the last five years help to safeguard critical coral habitats and biodiversity. Coun-



tries like Belize and the Bahamas have implemented successful coastal-management programs that have led to the restoration of significant coral areas and nursery habitats. And more seawalls, bridges, and piers are built as structures for future marine life rather than just piles of rocks.

### Summary

Corals are doing well. With reef cover at an all-time high, the only problem is that people think there's a problem. This is a great lesson to understand that you always have to question the incentives and use critical thinking to figure out the answers for yourself. This report is no exception! You should be skeptical reading this report, and not just accept everything I say as true. If you find a mistake or have other data, please let me know!

### Resources

[Peter Ridd's Facebook page](#)

[Peter Ridd's 2024 Coral Reef report](#)

[My interview with Peter](#)

[Paper: Is the Great Barrier Reef Threatened?](#)

### Nature's Guardian: Peter Ridd

Peter is doing great scientific work telling the truth about how corals are actually doing. He was chairman of physics at James Cook University in North Queensland. He has spent his career documenting the health of the Great Barrier Reef. He was targeted and fired for his excellent research because it went against the coral emergency the university wanted. Don't believe everything you read. Go to his website and learn his story. He's now chairman of the Australian Environmental Foundation. Corals are doing fine. Learn about his story and go see the reef for yourself.



## Lions

In this chapter, we're going to learn about the life of farmed lions. These are captive lions for entertainment, hunting, and the Asian market for lion parts. First, these illegal businesses use young lions for entertainment and petting, then they charge hunters to kill them when they're adults, and finally they sell their parts for Asian medicine. We'll also learn about wild lion populations and how they are doing.



## Background and population

Fifty years ago, the total lion population was over 100,000. Now it's around 22,000. We don't have numbers on captive lions, except that there are between 8,000 to 12,000 lions living in over 350 farms in South Africa. There are hundreds of lions in private zoos in the US.

The Asiatic lion population, which is the only lion species native to India, increased from 180 in 1970 to an estimated 650 by 2017. This rise is almost certainly the result of improved counting technology rather than increasing numbers, but at least there seems to be a decent and stable population of lions in India.

Can lions climb trees? While all lions are capable of climbing trees, very few do. They are actually fairly clumsy tree climbers but can do it if they need to or they see a good place to take a nap. Three small populations are known to climb trees: those in the southern tip of Queen Elizabeth Park in Uganda, a group near lake Manyara in Tanzania, and the lions of Gir National Park in India.

## Demand for lions

In some African cultures, mostly in the Congo, lion parts are used in traditional medicines. Lion body parts, especially paws, are symbolically associated with power, wisdom, and nobility. They are used in rituals, cultural regalia, and traditional healer practices. Once again, the doctrine of signatures (see page 10) creates a false demand for parts that is terrible for lions and useless to humans.

Most of the lions in Africa are in national parks. But private reserves keep their own lions for paying tourists. These reserves are fenced, and lions are bought and sold between them. Many lions are kept in illegal private "farms," where they are used for tourism, hunting, and selling body parts. As usual, many government officials manage not to notice what's going on.

There is a growing market for lion parts in Asia. More and more, lion bone is being used as a substitute for tiger bone. When the tiger-bone buyer runs out of tiger bones, they start taking lion bones. All the bones look the same, and they all do the same thing: nothing.

Lions are one of the African big-five iconic animals (buffalo, elephant, lion, leopard, and rhino), which comes from the list of trophies hunters want most. Hunting is not permitted in national parks. Some private reserves offer expensive wild-lion hunts, while the majority of hunting is for captive lions, who are often drugged to make them easier to shoot. This is called canned hunting.

## Lion farms

A recent study by Panthera suggests that the targeted poaching of wild lions for their skin, teeth, claws, and bones accounts for 35% of lion killings. Other killings involve farmers protecting livestock, and the rest take place on lion farms.

There are between 8,000-12,000 lions in over 350 farms in South Africa. Lion



Most lions don't like to climb trees, but the tree-climbing lions of Queen Elizabeth National Park in Uganda are an exception.

farms are tourist facilities where they raise lions to be hunted and usually have a pay-to-pet program while the lions are very young. These popular attractions are designed to be fun, gentle, interactive, and “a great introduction to wild animals for kids.”

When the cubs are six months old and they are bigger, their job description changes. Many facilities offer a walk-with-lions activity to unsuspecting tourists, but they never reveal that when these lions are older, they will be killed for the bone trade or killed by hunters in “canned” lion hunts.

At one year, the lion is out of the public eye. Now it’s about reducing the cost of keeping a lion looking just good enough to be shot. It can cost from \$2,500 to \$5,000 to hunt a canned lion. After the lion is killed by the client (which does not take long - they are essentially out in the back yard and fenced in), the valuable remains go to Asia for fake medicine. It’s also not uncommon that the client takes a piece as a trophy, like a claw or, more rarely, the head.

### **Main threats to lions**

Wild lion numbers are heavily linked to the density of their prey populations. In search of food, lions often become trapped and killed in snares that were set for bushmeat poaching.

Lions will hunt livestock on farms. Farmers kill lions whenever they get the chance. To stop this, conservationists are reinforcing livestock enclosures, using guard animals, GPS collars, and community-based conservation programs that provide compensation for livestock losses.

Africa has the highest rate of human population growth of all the continents. It’s inevitable that humans spread toward natural animal territories, increasing human-animal conflict. Fragmented populations, livestock intervention, bushmeat hunting, targeted poaching, and lion farming (or canned hunting) are the main problems to lions. The biggest threat to lions, though, is habitat loss.

You may visit our lion camp see the lions, cubs, white lions and tigers. Play with the lion cubs (once-off) at R60.00 per person.



Lion petting is popular and pays well in South Africa. These cubs will never be wild. This facility also trades lion cubs for tiger cubs, so they can charge the guests for several “experiences” that all add up.



This lion was from the Wag-’n-Bietjie farm outside Bloemfontein, South Africa. It had no food and no water for 3 days. There’s not even enough room to stand up in the metal cage. Lions like this are just waiting to be shot and have their bones sent to a drug-store in Asia.

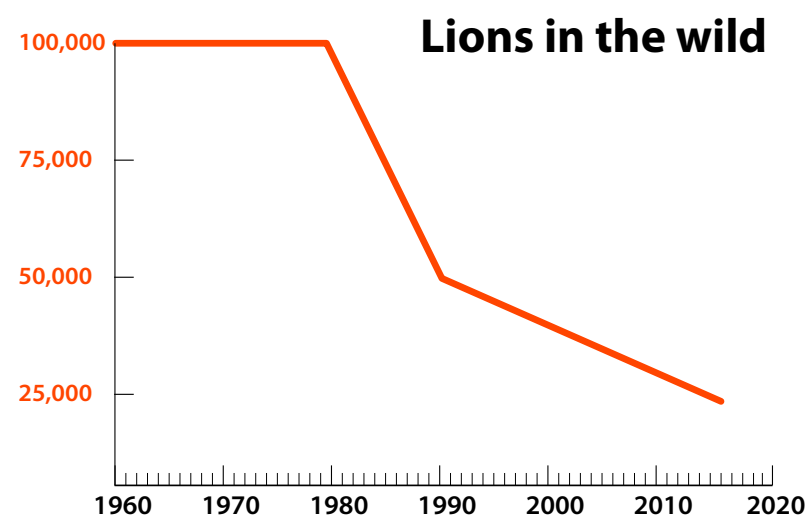
## Habitat loss

Lions once roamed from Europe to the southern tip of Africa, and from West Africa to India. Today, lions live in just eight percent of their historic range.

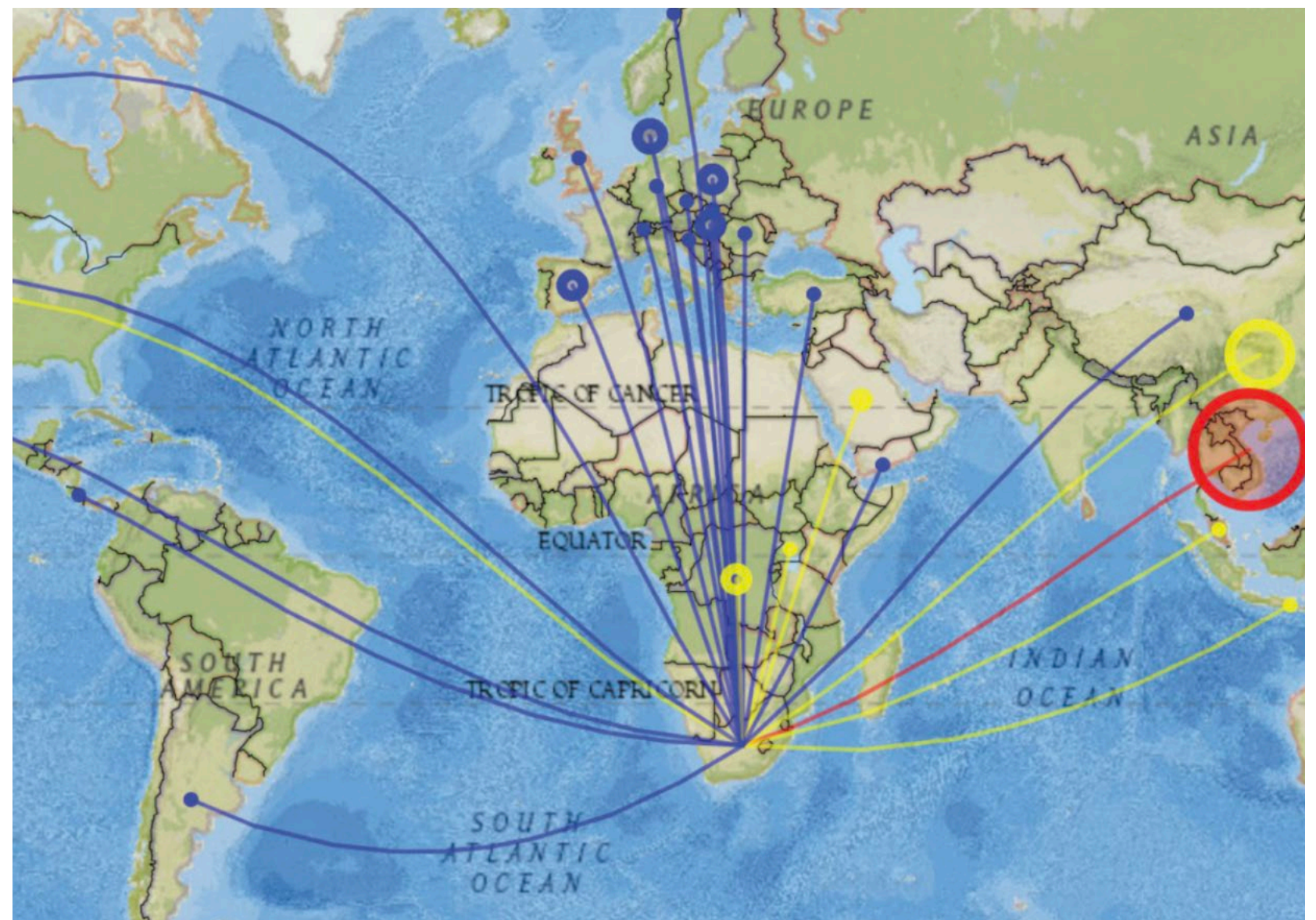
With rapidly growing human populations, there is increased human-wildlife interaction, which is usually where the human wins and the lion loses. Many such movements of people into lion landscapes result in complete habitat loss due to conversion to agriculture and settlement.

## Sustainable use and trade

At the moment, lions are on Appendix II, which means trophy hunting and trade is allowed but strictly regulated. The quotas change every few years. Unfortunately, it's not well enforced. They have allowed



Lion family in Kenya. Humans should never touch lion cubs.



Tracking lion parts from the farms of South Africa. Blue are legal export markets. Yellow and red are illegal. Red shows that most China-bound parts go through Vietnam. Circle indicates market size.

hunters to take younger males and breeding females. Hunting should only involve young solitary lions or older males who are no longer pride leaders. Shooting a leader can result in the death of most of the pride by the next incoming male.

Lion trophy hunting is a good candidate for sustainable use. Farmers can combine their land into a collective reserve and bring enthusiastic (and rich) hunters in to shoot a few lions each year, while providing prey animals and habitat for the remaining lions. They can charge for mounting and shipping lion heads and rugs back home, and hope they come back for another one soon.

Sustainable trade should be possible. There's no reason African land owners couldn't get bones from lions who are hunted and die naturally and sell them to Asians for fake medicine. Done right, sustainable use and trade of lions could make African farmers much more wealthy than defending their cows and goats with rifles. Hunting brings in ten times more money than farming crops and livestock.

## Summary

There is obviously corruption in the South African government to do nothing about canned hunting. They are aware of the problem and are trying to fix it (see the last link in the resources section). Those lion farmers have money and “good relationships” with their local officials, and families want to pay for petting and shows. So there’s still a lot of work to be done.

There is a huge difference between canned hunting and trophy hunting. Lion farms advertise and deliver hundreds of abused and malnourished lions to hunters each year. That should stop. Lions should not be entertainment for children, they should not be touched, and they should not be kept in cages. Africans could make even more money and preserve the habitat by switching to sustainable use and trade. This is not only true in places like South Africa, where lions are captive, but also in other countries, where hunting is done poorly or not allowed at all.

## Resources

[Global White Lion Protection Trust](#)

[Lion guardians](#)

[Ewaso Lions](#)

[Panthera](#)

[African Lion & Environmental Research Trust](#)

[African Lion Working Group](#)

[Kevin Richardson Foundation](#)

[Lion Recovery Fund](#)

[My talk with Peter Lindsey](#)

[South African government proposal to end canned hunting](#)

## Nature’s Guardian: Peter Lindsey

Peter Lindsey is the director of the WCN Lion Recovery Fund. He studied at Oxford and graduated with a PhD from the University of Pretoria. He has worked in Botswana, Kenya, Mozambique, Namibia, South Africa, Zambia, and Zimbabwe. He is now the director of the Lion Recovery Fund, where he supports projects to help lions across Africa. Peter told me he chose lions because “Lions are an umbrella species. When you protect their habitat and make sure their prey species are healthy, more of all kinds of animals, plants, and insects benefit from that protection.”



# Sharks

Can you guess how many sharks are killed every year? Ten thousand? A hundred thousand? One million? Actually, humans kill 100 million sharks every year – around 274,000 every day! Why are sooo many sharks being killed, and what can we do about it?

## Population and background

No one knows how many sharks there really are in the world. But we do know that lots of shark species are losing population rapidly, and in just fifty years humans have killed billions of sharks. Most shark species are classified as vulnerable by the IUCN Red List, and almost all of them have demand in international trade.

## Shark fishing

Sharks live in every ocean, so it's inevitable that fishermen catch sharks. This is called bycatch. It's when a boat sets out to catch a specific species but ends up with other species as well. But, since shark meat is valuable, fishermen often like accidentally catching sharks, making it not so accidental. Because of this, many fisheries rely on catching a couple sharks now and then. But it's not a couple of sharks. It's millions.

Of that 100 million, approximately 35 to 50 million sharks are caught as bycatch, and the rest are targeted for specific species and markets. There are over 1,000 species of sharks, and they come in two main kinds.

## Pelagic sharks

Pelagic sharks roam the world's oceans in search of prey. They can swim thousands of miles and cross oceans. The great white and bull sharks are examples. About 20 million pelagic sharks are "accidentally" caught

Sharks often have sucker fish called ramoras that hold on for protection and get a free meal when the shark feeds.

on longlines each year. These are fishing lines that can be up to 60 miles long, with thousands of hooks that each have small bait fish on them to attract predators, mainly tuna and swordfish. Sharks eat this bait too and get caught. So do many other animals, including turtles, dolphins, sea lions, and even birds. On the other hand, many sharks get a free meal by eating the fish that have been caught on the lines, taking money away from the fishermen.

The other two methods for catching fish in the ocean are purse seines (a type of vertical cylindrical net that closes and traps fish) and gill nets. While some sharks can be saved from purse-seines, gill nets pretty much kill anything in their path.

According to the World Wildlife Foundation, 17 out of the 39 pelagic shark species are threatened with extinction. This may not be true. I don't believe everything the WWF says without checking, but certainly humans are taking too many pelagic sharks, and most of them are bycatch.

## Reef sharks

Reef sharks are generally harmless to humans. Their prey are colorful reef fish. They are also caught on longlines, either specifically targeting sharks or as bycatch for other species. Some fishermen use gill nets near reefs. A 2020 study revealed that twenty percent of reef systems had no sharks, and that's not the way it should be, nor is it healthy for the reef ecosystems. It also showed that local fishing for local markets was depleting many reef fisheries, while commercial fishing for reef sharks is more manageable, because it can be controlled better by policies and agreements.

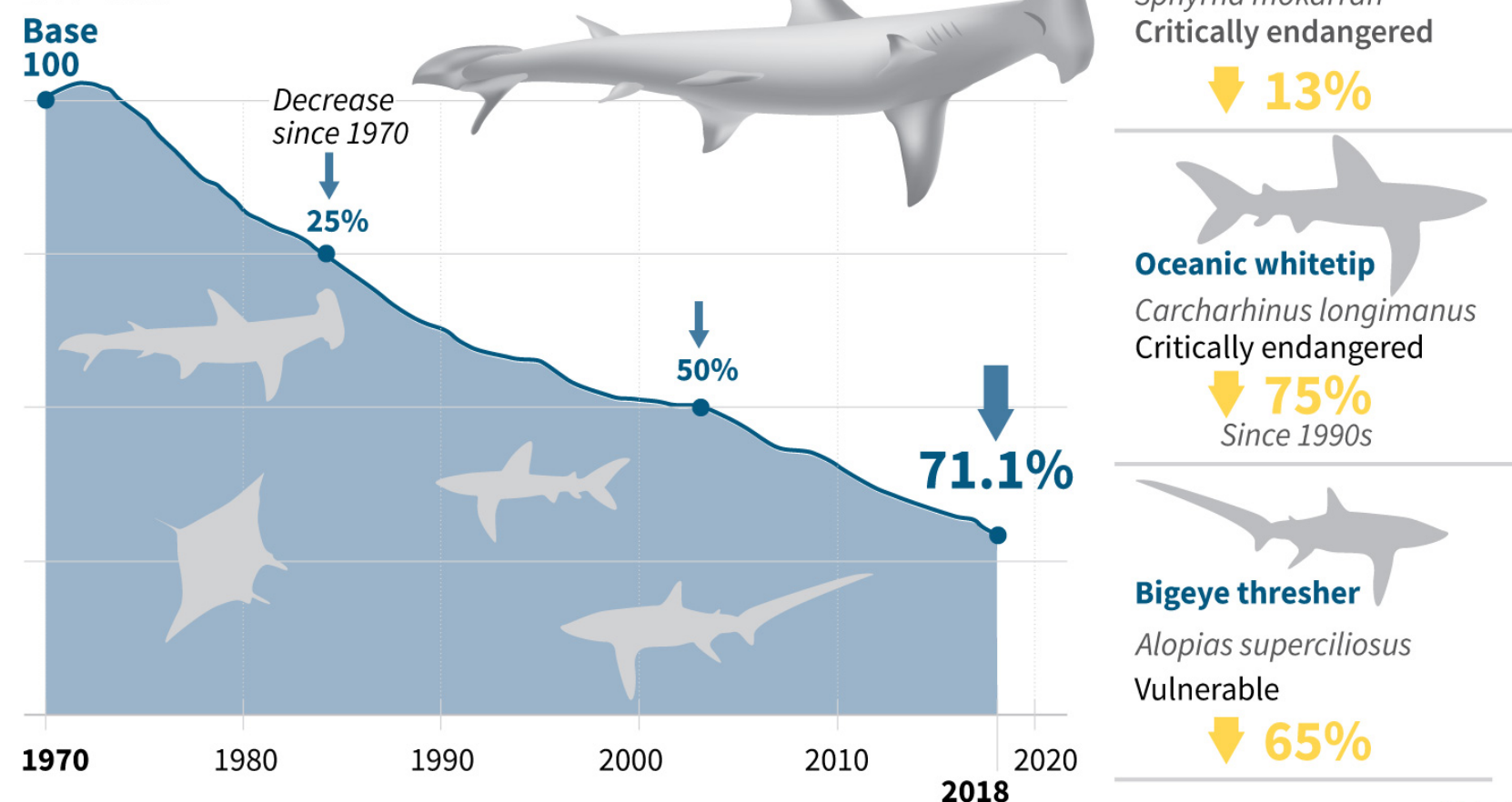
In Indonesia, fishermen target whale sharks because their fins, meat, and oil can all be sold. Another problem for reef sharks is the destruction of mangrove swamps, which is where they lay eggs and young sharks typically spend their first year.

## Sharp drop in shark numbers

The global abundance of 18 species of oceanic sharks has declined by 71% since 1970, according to a new study published in Nature journal on January 27

### Change in estimated population size

18 oceanic sharks and rays  
1970 - 2018



Source : Pacoureau, Rigby, Kyne, Dulvy et al; Half a century of global decline in oceanic sharks and rays - nature, Jan 27, 2021

Dozens of shark species have seen huge population declines.



A black-tip reef shark swims in shallow waters.

## The shark trade

Because the market is changing, we really don't have good numbers for where sharks are being fished, shipped, and consumed. Most of the data stops at 2019. In the years 2009 to 2019, Spain became the world's largest shark exporter and one of its top importers, as Chinese consumers are less interested in shark meat than they are in shark fins.

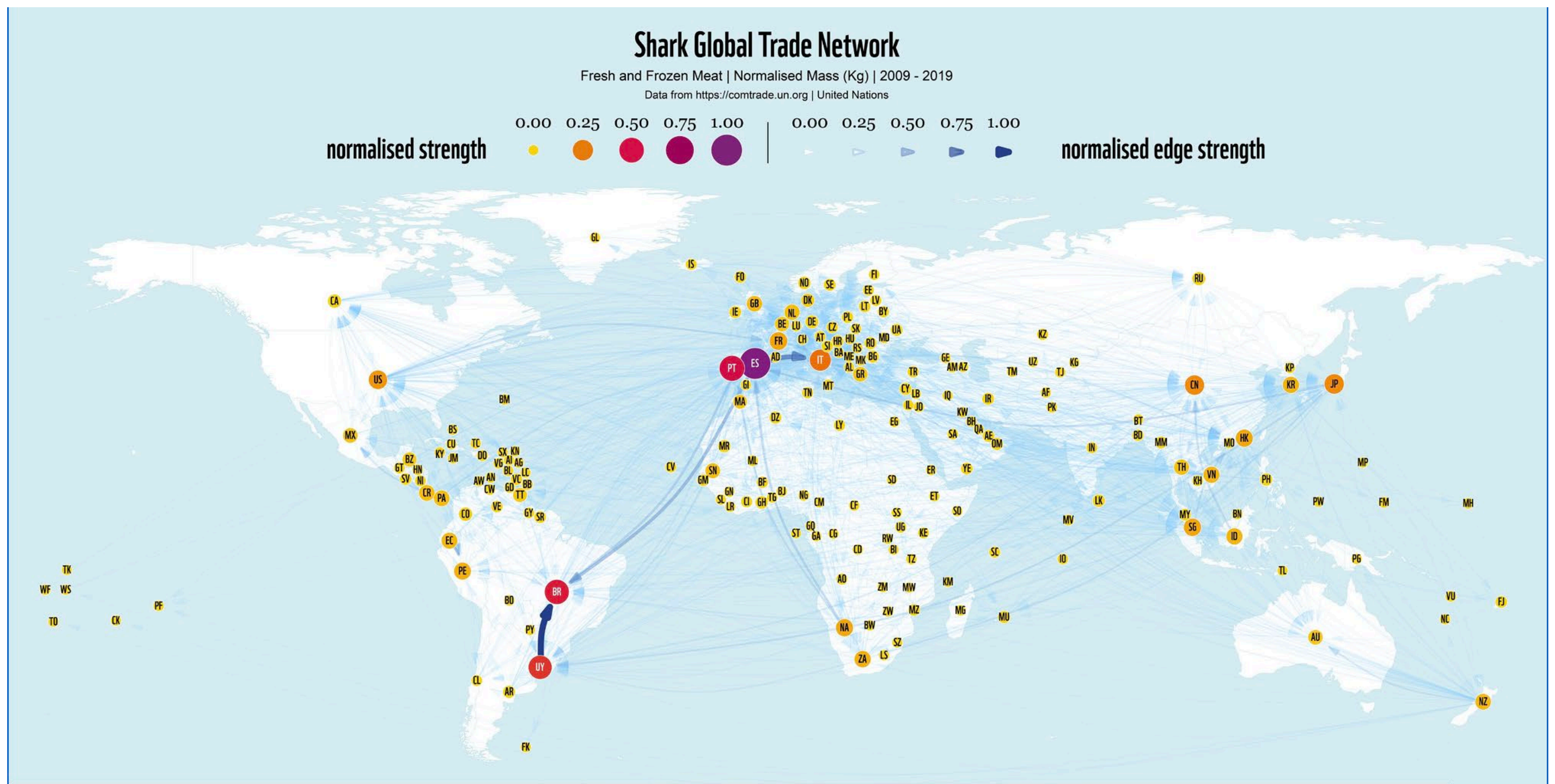
Today, the major markets for shark meat are the EU and the United States. The graph on the next page shows the movement of shark products by volume between countries (it's really cool).

Shark cartilage and liver oil are common ingredients in the medical and cosmetics industries. Many beauty products contain squalene, which is a special kind of oil that comes from the liver of sharks, but it can also be found in plants like olives. It's a great moisturizer that helps keep skin soft and smooth, which is why it's used in lots of skin creams and lotions. If you want to help sharks, buy products with squalene that comes from plants, not sharks.

## Demand for sharks

The total market for all shark products is now over \$4 billion per year, and it's changing. Ten years ago, sharks were used primarily in China, Taiwan, Malaysia, and Vietnam to make shark-fin soup. When rich people in these countries have events or go out for dinner, they often have shark-fin soup, especially the high-power government officials. Yet the government





The World Wildlife Fund does a good job tracking shark issues. Most shark products get into Europe through Spain.

of China declared years ago that shark-fin soup (see image page 58) should not be used at state dinners and events. So the people in charge of keeping people from committing crimes are the ones committing the crimes.

The flavor in shark -fin soup doesn't even come from the shark fin, which is almost tasteless. The role of a shark fin in shark fin soup is to provide texture (and status). Apparently, it can be described as "between chewy and crunchy". It isn't about eating, it's not about enjoying a fancy meal at all. It's all about showing how rich and powerful you are. Shark-fin soup isn't food, it's a signal.

Demand has been decreasing ever since 2006, when Yao Ming and WildAid collaborated to make a

Export		Import	
TOP EXPORTERS	VOLUME (t)	TOP IMPORTERS	VOLUME (t)
Spain	183,884	Brazil	149,484
Portugal	104,758	Spain	136,144
Uruguay	72,839	Italy	88,876
Japan	59,117	Portugal	60,316
USA	49,422	Uruguay	56,963
Namibia	37,492	China	34,809

Spain is the main hub for import and export of shark products for Europe. Brazil imports a surprising amount of shark meat - I wonder why?

video that told millions of people to stop eating shark-fin soup. It worked. In the Guangzhou markets – the new center of China’s shark fin trade – wholesale traders complain of dwindling sales and falling prices. Retailers, who were selling medium-sized shark fins for as much as \$300 per pound are now only able to charge half as much. One Guangzhou wholesaler said “shark fin is a dying business” and another said “Yao Ming’s commercial single-handedly ended my business.” Since 2007, there has been an eighty percent decline in prices paid to fishermen for shark fins.

Of twenty Beijing restaurant representatives interviewed, nineteen reported a significant decline in shark fin consumption. All agreed that WildAid PSAs featuring Yao Ming had “definitely raised awareness among customers.”

That was followed by a law making it illegal to take fins off sharks. Now, if a ship catches a shark, it has to bring the entire shark back to sell the whole fish. As a consequence, much more shark meat is now available on the market. Shark meat sells for about \$1.50 per pound.

The demand for fins hasn’t disappeared entirely. Shark-fin soup remains on the menu in Hong Kong and Taiwan, and demand is growing in places like Thailand, Vietnam, Indonesia, and Macau.

### Misconceptions

People are naturally afraid of sharks, even though sharks almost never hurt humans. Sharks kill about ten humans each year. That’s nothing compared to the number of sharks killed by humans every year, let alone every day. Coconuts kill more people than sharks do.



As usual, people buy shark products thinking they will become strong like sharks and it will cure them, but there is no evidence that shark products are beneficial for humans.



A bowl of shark-fin soup.



Thousands of shark fins dry in the sun, but this scene is becoming less and less common.

### One step forward, one step back

Researchers say that to save sharks, anti-finning laws are not good enough, and there should be more extensive fishing regulations. Shark fishing regulations, including bans on cutting off fins, increased tenfold since 2000. Unfortunately, shark meat is cheap and plentiful. It’s used in many dishes that require just “fish meat,” including fish and chips, fish paste, fish cakes, curries, frozen meals, and even dog treats. Demand for shark meat is growing, probably because of its low price. Fortunately, there are concerns about shark meat containing mercury and not being healthy – how can we boost that message more widely?

Twenty nine countries and overseas territories have already prohibited shark fishing in their waters. The Bahamas, for example, discovered that sharks were worth much more as a dive attraction for the eco-tourism industry than on the menu at restaurants.

## Nature's Guardian: Laurene Schiller

Laurene Schiller is working on lots of things marine wildlife related, including bycatch and sustainable fishing, biology, and fisheries. She was a co-author on the peer-reviewed paper *Global shark fishing mortality still rising despite widespread regulatory change*. She is a champion of data-driven fishing regulation.



## Summary

People are eating much less shark-fin soup, but from the shark's point of view, not much has changed. Still, 100 million sharks are killed each year, less for their fins but now for low-grade restaurant meat and industrial food products.

What will it take to reduce the number of sharks killed each year? Yao Ming's video with WildAid was a miracle, but we're going to need another one to save sharks.

## Resources

[Wild Aid 2017 report on shark fins](#)

[All WWF shark reports \(there are many\)](#)

[Global status and conservation potential of reef sharks](#)

There are about 130,000 to 200,000 whale sharks in the world. They have no teeth and are filter feeders, like manta rays. They are often hunted locally for meat. A large number are killed each year by ships, so groups are working to help ships avoid them.

# Polar bears

According to the IUCN red list, polar bears are categorized as vulnerable. In this chapter we're going to answer the question: Are polar bears actually vulnerable, and if not, why do so many people say that they're going extinct?

## Background and Population

There are now about three times more polar bears than there were in the Sixties. Polar bears currently have a relatively large population size, and their historical range has not shrunk since 1979.

In 2015, the IUCN listed polar bears as "vulnerable to extinction." In 2016, the US Fish and Wildlife Service upheld its 2008 conclusion that polar bears were "threatened with extinction" under the US Endangered Species Act. In both of these cases, polar-bear conservation status was based on computer-modelled future declines, not observations. Many organizations predicted wrongly that polar bear populations would go down, when in fact they more or less stayed the same.

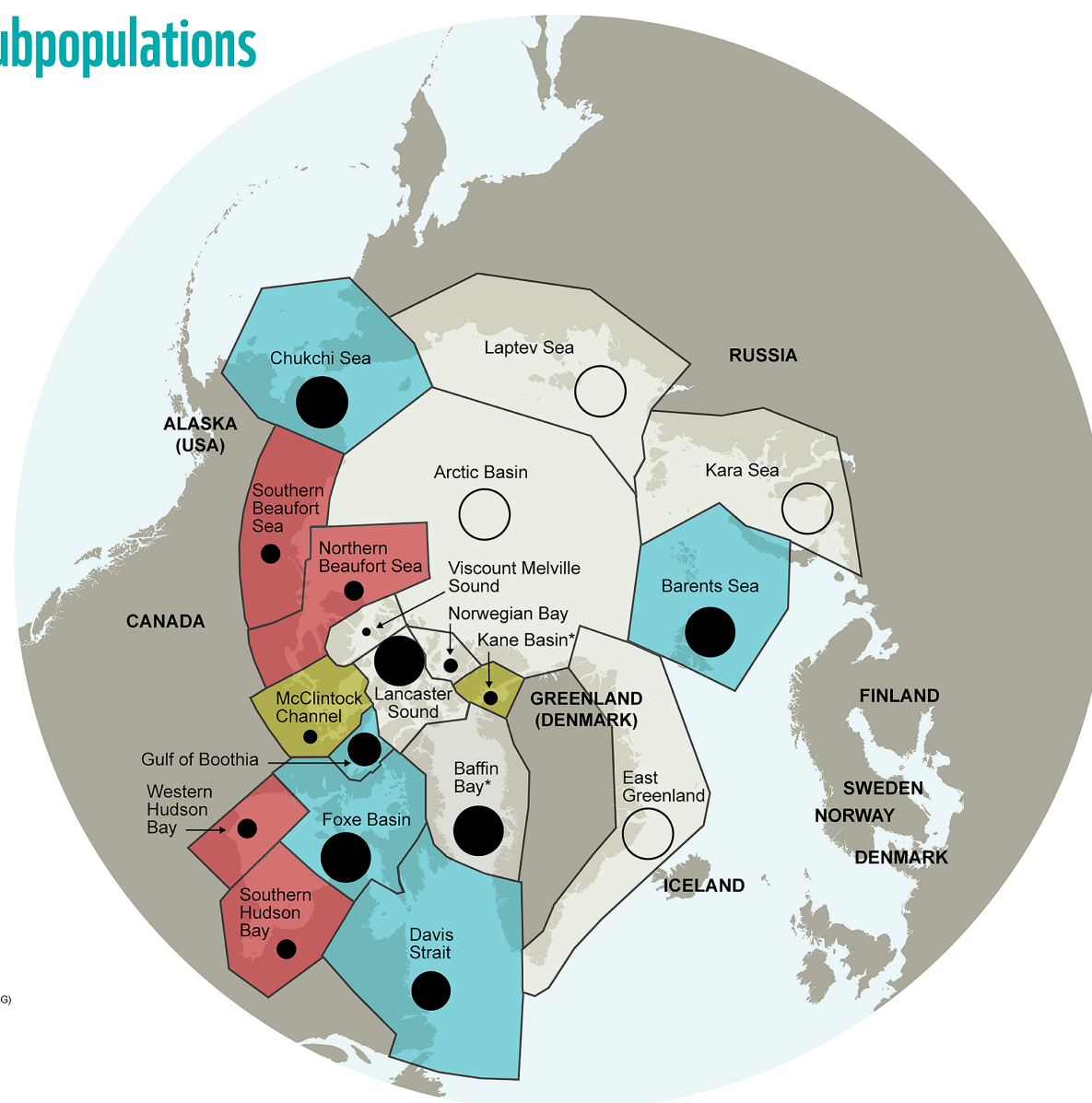
## Trends in Polar Bear Subpopulations

### SUBPOPULATION SIZE (Number of bears)

- < 200
- 200-500
- 500-1000
- 1000-1500
- 1500-2000
- 2000-2500
- 2500-3000
- Unknown

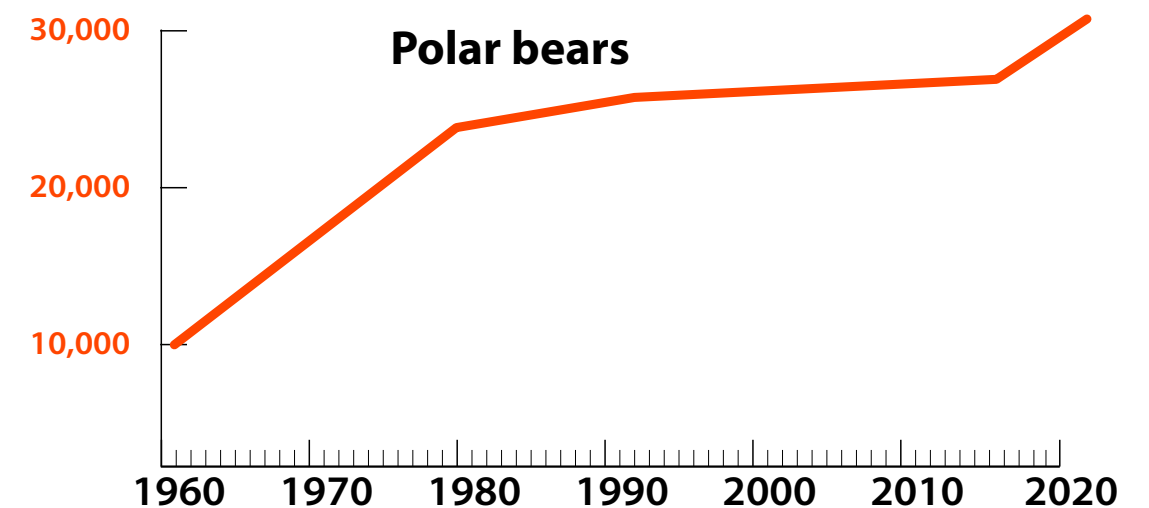
### POPULATION TREND (2019)

- Stable
- Increasing
- Declining
- Data deficient



Produced by WWF Canada, June 2017.  
Sources: IUCN Polar Bear Specialist Group, June 2017. (\*Population trends not yet officially designated by PBSG)  
Range Boundaries IUCN 2012.  
Projection: North Pole Stereographic.  
© 1986 Panda symbol WWF-World Wide Fund for Nature (also known as the World Wildlife Fund)  
© "WWF" is a WWF Registered Trademark.

Polar bears are counted in groups. When bears wander from one area to another, that can affect the local count but not the total population. The red areas don't mean they are losing polar bears overall.



Polar bears are doing very well, despite 800 bears still being killed by hunters each year.

## Arctic ice and the polar-bear feeding cycle

The mainstream press keeps saying that the bears are starving because they rely on sea ice to hunt and store energy during the summer and autumn, when food can be scarce. To understand what's going on, we need to understand two types of ice and the polar-bear feeding cycle.

Fast ice is attached to land, while pack ice floats and moves (see image next page). Fast ice is stable but fairly thin. Pack ice is thicker.

Polar bears' main prey is the ringed seal. There are over 2 million Arctic ringed seals. Because there are so many, the IUCN lists ringed seals as a "Species of Least Concern".

Ringed seals live almost the entire year in the water. They remain in the water all winter by creating and maintaining breathing holes in the thin fast ice. In March and early April, the seals come onto the ice to give birth to pups and nurse them for about eight weeks on the ice, making them vulnerable to polar bears and arctic foxes at this time.

Just then, female bears and their cubs emerge from winter hibernation, hungry. Bears quickly gain weight as they catch ringed-seal pups during the nursing season. They live off that energy for the rest of the year until the next feeding season.

During summer, the seals are hidden in the pack



Fast ice is thick and steady. Its forward edge advances and retreats with the seasons. Pack ice moves and provides shelter for seals in summer.

for hours and swim long distances. Very few polar bears die by drowning.

We know that arctic ice levels aren't hurting polar bears. In fact, there were some summers about 8,000 years ago that probably had no ice at all! Even then, the polar bears did great.

Old polar bears can die of many causes, especially after hibernation, when they are weak and hungry. It's these bears that people like David Attenborough catch on camera to "show" that "polar bears are in danger". They never come during or after feeding season, always just before.

### **Polar bear hunting**

Polar bears have no natural predators. As long as they



ice and are hard to catch, but the bears don't feed during summer. More open water lets sunlight reach more phytoplankton, increasing fish populations that ringed seals depend on. More ringed seals means more food for polar bears next spring.

If there is a loss of fast ice before the ringed seal pups have finished nursing and acquire waterproof fur between late May and early June, the pups can die from exposure to cold water. But this rarely happens. Seal pupping season seems perfectly timed with fast ice season. Bears eat lots of pups, but many survive. Once the pups are in the water and safe, the fast ice always melts every summer and reforms in the autumn. After June, bears will eat opportunistically, but they don't gain weight after the spring season. They don't need to eat again until the following spring.

The amount of ice in the Arctic ocean varies from year to year and over dozens of years as it responds to the amount of heat coming into the Arctic from the south. Some people say that polar-bear hunting grounds are losing ice, causing them to have to swim until they are exhausted and start to drown. But polar bears are excellent swimmers. Because of their fat, they float naturally and can stay in the water



A polar bear and her two pups getting fat on seals during the spring months.

have enough ringed seals and are left alone, their numbers will naturally go up until they reach an equilibrium population. The biggest problem bears face is humans hunting them with guns and bows. Did you know hunters with permits legally kill 600-800 bears every year?

The IUCN Red List says (my bold):

*The US, Canada, and Greenland allow and manage a subsistence harvest of polar bears; harvest is prohibited in Norway and Russia. The principal use of polar bears is for subsistence purposes, including consumption of meat; use*

of hides for clothing; and small scale handicrafts. Whole hides may be used for subsistence needs, kept as trophies, or sold on open markets. The financial return from the sale of legally taken Polar Bear hides can provide important income for local people in Canada and Greenland. **Sport hunting of Polar Bears only occurs in Canada and must be guided by local Inuit hunters.**

Not only do hunters kill bears, both the hunting experience and the parts may be freely sold to make money. In Russia, killing bears is against the law, though there are said to be dozens of illegal hunts every year.

Now, I'm no expert, but I get the feeling the locals are pretty happy with their government allocation of hunting permits. They sell at least some of their permits to trophy hunters as part of a "polar bear hunting package" (see advertisement, below).

Drikus Gissing, a researcher from Nunavut territory, Canada, says the situation for polar bears isn't as dire as some make it out to be. With about 13,000 bears in

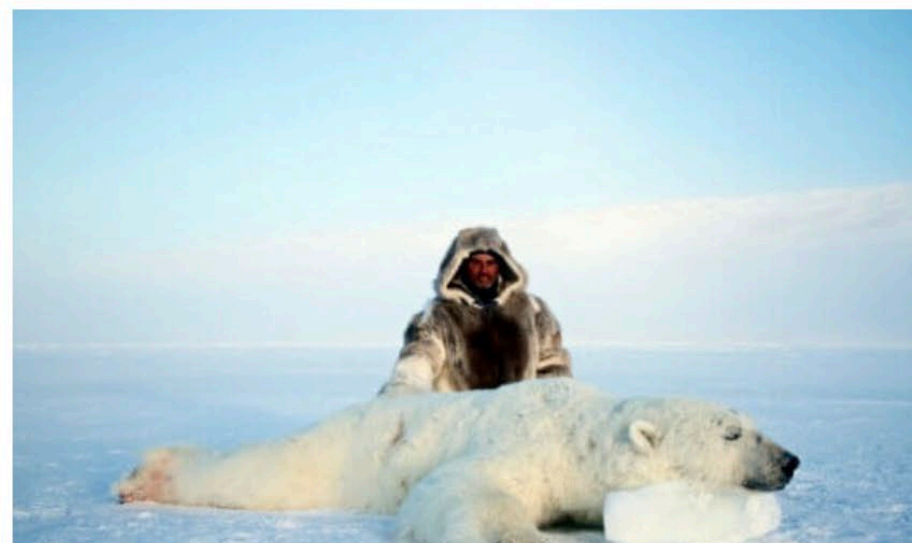
Nunavut, he says, more than 80 percent of Canada's polar-bear hunting takes place there. Nunavut now has more bears coming into town looking for food than ever before. That's a good sign. But it also means there's more human-polar bear interaction and conflict. Shootings of so-called "problem bears" have spiked over the past two decades, up from 13 killings in 1999 to 91 killings in 2012.

### Ringed-seal hunting

Ringed seals are illegal to hunt except for specific indigenous tribes who have been hunting them for a long time and have made a tradition out of it. Every year these tribes take about 110,000 to 130,000 ringed seals legally. This makes less food available



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Do these look like subsistence hunters to you?

## Nunavut Territory Polar Bear Hunting

Outfitter #062

from \$50,000

**SPECIES:** Polar Bear  
**LOCATION:** Nunavut  
**METHOD:** Rifle, Archery, Muzzleloader  
**DATES:** March 1 to May 31 is the date range that Spring Hunts occur. Exact starting dates are negotiable with Arctic air travel flight schedules taken into consideration, and are covered in each client's hunting contract.  
 August 1 to the first week of November are their Late Summer - Early Fall Hunts  
 Note: If extra hunting days are needed, to a maximum of 5, they will be at the additional cost of \$1,000 CAD per day payable directly to your guide.

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This outfitter is the longest operating outfitting company in Nunavut offering the very finest in polar bear, Greenland and Barren-Ground Muskox, Central Canada Barren-Ground and Arctic Islands Caribou, Barren-Ground Grizzly and Atlantic Walrus hunts. Actually, this outfitter has pioneered polar bear hunts in the high arctic since 1981, and has maintained virtually 100% hunting success rate for the Resolute area.

Hunting is done from camps situated in prime areas that may be up to 100 miles from the village of Resolute. Muskox are found south of Resolute and can be hunted

[Read more about the trip](#)

for the bears. I don't think it's a huge problem, but on the other hand, we know it doesn't benefit polar bears. Government rules and regulations have more impact on polar-bear numbers than the environment does. Humans are clearly the main threat to polar bears, not temperature or ice.

### Sustainable use?

Polar bears aren't threatened by poaching and habitat loss like elephants. Polar bears have a lot fewer life-threatening problems than elephants do. So there's not much to reinvest in to make more polar bears from the money you get from trophy hunting. It's a good way to make money, but it doesn't help polar bears. Polar bears naturally do well and increase their population without being "managed."

Native people are killing about two percent of the total polar bear population every year. Polar-bear numbers are increasing more than two percent every year. As long as they aren't in competition with humans for their habitat, leaving them alone is probably the best approach to polar-bear conservation.

### Summary

So what's the answer to the question I asked at the start? We know polar bear numbers have tripled since the Sixties. We know the amount of fast ice in the Arctic is not a problem. We know that 600 to 800 polar bears are being killed every year legally. We know their main food source, ringed seals, are hunted legally because there are so many. Does that sound like a species in trouble to you?

Polar bears are a cute and iconic species. Conservation organizations scare you with the idea that polar bears are on the brink of extinction, sea ice is melting, and act now to save them. Find an old starving bear and Photoshop him onto a small piece of ice floating in the ocean. It works. Marketers use emotional images to separate you from your money.

The screenshot shows the website for the Endangered Species Coalition, specifically the Polar Bear page. The top navigation bar includes links for 'WHO WE ARE', 'WHAT WE DO', 'MEDIA & PUBLICATIONS', 'CONTACT US', 'EVENTS', and 'DONATE'. The main header features a large image of a polar bear walking on a small piece of ice. Below the image, the text reads 'Polar Bear' and 'MAMMALS'. There are social media icons for Facebook, Pinterest, and Twitter. A navigation menu below the header lists 'Mammals', 'Birds', 'Reptiles', 'Amphibians', 'Fish', 'Plants', and 'Invertebrates'. A red box highlights a paragraph of text: 'Globally polar bear populations continue to decline. The United States is home to two distinct populations, of which, both are in decline. The Beaufort Sea population decline from an estimated 1,800 individuals in the 1980's and 1990's to 1,500 individuals in 2006. Population numbers for the Chukchi Sea area are incomplete.'

A misleading website asking for donations to "save the polar bears" from "population decline."



Despite being hunted, polar bears are doing extremely well. They are exceptionally good swimmers.

### **Nature's guardian: Susan Crockford**

Susan is a real polar-bear expert (yes, there are fake polar-bear experts). She has more than forty years of experience in zoology with a life-long interest in polar bears. She's done multiple interviews, written lots of papers, and has written a "state of the polar bear" report. Her books, lectures, and blog are important sources of information on the state of polar bears today. Her book "The Polar Bear Catastrophe that Never Happened" is great for kids. Susan doesn't believe the "doom and gloom" projections are accurate, and she wants people to know how polar bears are really doing. They're doing great! Take a trip to Churchill Canada and see them yourself.



### **Resources**

[Susan Crockford's website](#)

[The Polar Bear Catastrophe that Never Happened](#) by Susan Crockford

[Polar Bear Evolution: A Model for How New Species Arise](#), by Susan Crockford

[Churchill Wild Polar Bear Safaris](#)



## Summary

I hope you've learned a lot from this report. I certainly have. Before I researched and wrote this report, I thought I was an expert on animals. After all, I had interviewed dozens of experts for my podcast! Boy, was I wrong. I found out I was really a beginner, I was overconfident, and I wasn't being a critical thinker. Now I know there's a lot more for me to learn.

There's so much more to helping animals than simply putting poachers in jail, or jumping to simple conclusions about what works for other people and places. Conservation is a very complicated topic. The deeper you look into it, the more complicated it gets, especially when it comes to implementing real-world solutions with real people and real animals.

Every species is different. There is no "one size fits all" solution. For some species, like elephants, the answer is sustainable hunting. For sustainable use and trade to work for more species, it would have to be less reliant on government. For example, Mozambique has a communist government that isn't going to let individuals own the land and profit from trophy hunting. Corruption varies from one country to another. For American alligators, sustainable trade worked. For pangolins and polar bears, leaving them alone is the best solution.

We've learned about animals in this report but we've also learned about people. Mostly, I learned that conservation is really about money, politics, and economics. Many conservation organizations are honest and want to do the right thing for animals, but many others are willing to tell you a story – right or wrong – to get your money. Even if it's for a good cause, you have to watch out. There's always a lot more to the story than the headlines "Polar bears on the brink of extinction!" or "Last chance to save the coral reef!" Remind me not to be a journalist when I grow up.

My website: [www.roguescholaracademy.com](http://www.roguescholaracademy.com)

My YouTube channel: [www.youtube.com/@natures\\_guardians](http://www.youtube.com/@natures_guardians)

Contact me for any reason, especially interviews, sponsorships, and spokesperson work: [roguescholarmicah@gmail.com](mailto:roguescholarmicah@gmail.com)



### **Nature's Guardian: Micah Siegel**

Micah Siegel is a 12-year-old student in Bethesda, Maryland. Micah is a videogamer and loves to exercise. He loves to ski, ride his bike, skateboard, and play tennis. He has a pet parrot named Fruity. In the summer of 2023, he went with his dad and brother on a 31-mile wilderness hike in a remote forest in Pennsylvania. He has been to the Galapagos Islands, the Amazon rainforest, Canary Islands, Switzerland, London, Amsterdam, and the Bahamas. He has been river rafting on the Salmon river in Idaho and on a rafting trip in Ecuador.

Micah loves animals and wants to help them. In May 2023, he and his father started a podcast called Nature's Guardians to tell the stories of humans working to save and help animals around the world.

In September, 2023, Micah received a \$10,000 grant from Tyler Cowen's Emergent Ventures. With that money, he and his dad and brother will go to South Africa and Botswana in spring 2025 to make documentary films of people saving animals. His goal is to work with conservation organizations to help raise awareness of the issues people and animals face in preserving wildlife and ecosystems.

Although he loves the taste of meat, Micah has been vegetarian since summer 2023. He looks forward to eating lab-grown meat someday, so animals don't have to suffer to make food for humans.

## Will you be my mentor?

If you have read my report this far, you may be the kind of person who would want to mentor me in my development. I'm homeschooling myself. I want to blaze a trail for other independent young thinkers. To do that, I'm looking for mentors to work with me on projects like this. You can learn more and apply here:

[My mentor page](#)

## Acknowledgments

Jim Steele was my guide for this project. He helped me brainstorm the chapters and gave me lots of encouragement and advice, plus he helped with editing.

My dad did some stuff, thanks dad. My teacher Karen French encouraged me to get out of the school routine and create my own curriculum. Michael Strong and Albert Loan supported me in creating my own school as an offshoot from their school, The Socratic Experience. A bunch of people were willing to help out when I asked them to talk with me. Brian Child changed my thinking about elephants. Laurenne Schiller helped me understand the shark trade and sent me a paper to read. Grant Fowlds and Markus Hofmeyr gave me great advice on rhinos. Thanks also to Tony Szczur and Stuart Downs for their help finding all the misatkes during copyediting.

