

ONCE A RIVER IS DAMMED,
IS IT DAMNED FOREVER?

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Frontline Lessons from Vietnam's Battle to Save Biodiversity

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From leeches to social messaging, conservationists try novel strategies

It is a sweat of a climb up a series of crumbling stone steps to Ngaoi Xua Cave, one of the tourist pilgrimages in Cuc Phuong, Vietnam's oldest national park. Archaeologists have found burials, shells, and tools here—evidence of human habitation over a span of 7500 years.

As recently as the mid-1980s, a survey cited this park as “one of the richest faunal regions of Viet Nam,” with as many as 300 species of birds, 65 of mammals, 37 of reptiles, and 16 of amphibians. Among the mammals were seven primate species, bears, boars, wild dogs, tigers, two leopard species, jungle cats, porcupines, and flying squirrels.

Today, Cuc Phuong's promotional materials notwithstanding, most of those species—perhaps nearly all—are gone. Human cultures coexisted with natural systems here for at least 75 centuries but the relationship has morphed, suddenly and destructively. To reverse a seemingly inexorable trend across Vietnam, wildlife experts are generating innovations in both the art and science of conservation.

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Red-shanked douc langurs, one of Vietnam's 23 primate species and one of seven classified as “critically endangered” by the International Union for Conservation of Nature. Photograph: Endangered Primate Rescue Center.

Wildlife trade is a prime culprit. So conservationists now amputate rhino horns from living animals in Africa, to ward off Vietnam-connected poachers who find it expedient to kill the animals and smuggle the horns to Asia. Several nongovernmental organizations (NGOs) have fielded smartphone apps that encourage tipoffs from wildlife crime witnesses. One frustrated group, the Wildlife Justice Commission, presented thousands of pages of investigative evidence and testimony on trafficking to the government. After a year of what it regarded as official indifference, the NGO convened an unofficial “accountability panel” in a public hearing in The Hague to pillory Vietnam's government for its lethargy.



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Animals such as this slow loris are frequently caught in one of the tens of thousands of wire snares strewn through the natural areas of Vietnam and other countries. Photograph: Mikaaail Kavanagh—World Wildlife Fund.

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Since 2013, there have been no confirmed sightings of the saola, which was discovered by science only in 1992. Photograph: David Hulls—World Wildlife Fund.

Vietnam is home to about 10 percent of the world's plant and animal species, and the country is ranked 16th globally for biological diversity, although its land area is only the size of New Mexico. To call it a “hotspot” is to understate. Between the early 1990 s, when postwar international research resumed, and 2017, the most recent tally, at least 490 species of mammals, birds, fish, plants, and amphibians previously unknown to science have been recorded there, according to the World Wildlife Fund (WWF).

Vietnam's human population is exceptional, too. Long decades of war with Japan, France, the United States, and China finally concluded in 1979. The American War, as it is referred to there, claimed an estimated 3.3 million Vietnamese lives, civilian and military. But the population has grown from some 18 million in 1919 to circa 97 million today, making it the 14th most populous nation on the planet. The World Bank projects 120 million by midcentury. At about 750 people per square mile, Vietnam's population density is already three times that of California. The growth of its economy, often called “explosive,” “booming,” “miraculous,” is about triple the world rate, around 7.5 percent in 2018. These factors all have consequences for wildlife conservation.

Corruption, too, has its own ecosystem, and some of Vietnam's wildlife-related government personnel are part of the food chain, NGO administrators and field scientists assert. According

to Transparency International's corruption index, Vietnam scored 35 on a scale for which “zero is highly corrupt and 100 is very clean.”

Vietnam has in recent years been called the world's worst nation for criminal wildlife trafficking. It is a vortex so powerful that it pulls in those rhino horns poached on far-off African game reserves or even from zoos and museums in Europe, to be sold within Vietnam or trafficked through to China. The result is that much of the pageant of newly discovered species is quickly disappearing, along with the rest of Vietnam's bulky catalog of endangered wildlife: More than 10 percent of its 4592 animal species face extinction.

They include 19 of the 23 species of primates, and seven of those are classified as “critically endangered” —the most dire category—by the International Union for Conservation of Nature. The last rhino in Vietnam was shot by poachers in Cat Tien National Park in 2010. Despite a government “Tiger Action Plan,” the last few tigers vanished some 5 years ago, and they are now extinct in the wild in Vietnam. Only about 100 Asian elephants remain. (A newly revised “Elephant Action Plan” has been announced.)

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Terrestrial leeches retain traces of DNA from their prey for months. The DNA can be used to confirm the presence of rare mammals in the forests of Vietnam. Photograph: Andrew Tilker.

Saola were the first new large mammals to be identified by science in 55 years when they were discovered in 1992. They are exquisite, 200-pound antelope-like bovids with scimitar horns, and they were thought to number in the hundreds only a few years ago. Sought after

exhaustively by researchers, none has even been photographed by a camera trap since 2013, although hunters report hard-to-verify encounters with saola in places such as Pu Mat, one of the many national parks that has seen years of heavy poaching pressure.

Blood revelations

“That doesn’t mean they aren’t still out there,” says field ecologist Andrew Tilker, who works with both the Leibniz Institute for Zoo and Wildlife Research and Global Wildlife Conservation. Tilker has been surveying for saola and a suite of other scarce animals along the spine of Vietnam's Annamese Mountains since 2012, often living in the jungle full time. “You just need a better way to find them.

“The terrain is... you have to see it to believe it,” he said. “It's incredibly rugged, rocky, very wet. It's a nightmare to work in. Of course, that's also what makes it so much fun,” he added. It is, in addition, one reason that these mammals went undiscovered by the outside world for so long.

The extinction emergency and the difficulty of locating rare species in such conditions has generated a new detection technique, first tested in Vietnam, that uses blood-sucking leeches to gather “environmental DNA.” The DNA of prey remains in leeches’ microplumbing for months. They “are ideal for this method, due to their diverse prey base and readiness to attack humans, making them easy to collect,” as the authors reported in the journal *Current Biology* in 2012. “Aside from leech dietary revelations, the method has potential to revolutionise mammal detection surveys in tropical habitats,” they report.

“Collecting leeches? You just walk barefoot, stop every few meters, and pick them off,” Tilker says. Stored in a preservative chemical solution and forwarded to a lab, they are ground up for genetic sequencing that matches trace materials to specific mammal species.

Tilker's surveys have already confirmed the persistence and general location of some rare mammal species in the Annamites, though not saola as of this writing. “If we have a list of high-priority species, we can potentially send more resources there,” he said. “We can know how populations are faring, or whether anti-poaching patrols are having an effect.”

All such work goes forward under a grim deadline. An estimated 20 million gallons of defoliants, including Agent Orange, were sprayed on natural habitats during the American War, with lingering impacts, and Vietnam has lost more than 15 percent of its tree cover from

other causes just since 2001. The poachers’ technology has advanced, too. Hunters indiscriminately use cheaply produced snares made from wire or bicycle brake cables.

The authors of a 2018 report in the journal Biodiversity Conservation found that snares maim and often kill animals as large as bears and elephants and as small as partridges or tortoises. In the Hue/Quang Nam Saola Reserves, for example, their use is accelerating: 10,000 snares were found there in 2011, and 23,000 in 2015. “The pressures are very, very high throughout the region, and this is just to feed the illegal wildlife trade,” WWF conservation director Ben Rawson told me.

Hotlines and sting operations

The technical term for the result is defaunation, also called “empty forest syndrome.” It is in common use now to describe many of Vietnam's natural areas, including national parks and preserves. Snares can erase even small-animal populations, and poachers also hang mist nets in the trees to entrap birds in flight. They are resold as pets in cages that festoon storefronts in Ho Chi Minh City (Saigon) or along Hoang Hoa Tham Street in Hanoi, or they are consumed in the many restaurants that cater, illegally, to an avid taste for bushmeat in Vietnam and China.

Quyen Vu, the founder and executive director of the NGO called Education for Nature—Vietnam (ENV), can guide interested visitors to several such restaurants, because they have been reported to her organization's national wildlife trafficking hotline. ENV deploys teams posing as customers to survey hundreds of hotels and restaurants in major cities. “We don’t trust law enforcement. We do it ourselves,” she said.



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Captured wild birds for sale along Hoang Hoa Tham Street, Hanoi. Photograph: Stephen Nash. Poachers use mist

nets to capture forest species such as this red-whiskered bulbul. A recent survey by TRAFFIC, a nongovernmental organization, found that at least 115 songbird species are being captured and sold as pets in Hanoi and Ho Chi Minh City. Photograph: Stephen Nash.

Three months after authorities are notified of a violation, a return visit is made to the restaurant, and the results are made public in a “report card” on the effectiveness of government agencies that are supposed to crack down on trafficking. The strategy has braced enforcement. In Ho Chi Minh City the survey found 78 violators in 2014, out of 300 places checked. In 2017, 400 were surveyed, but only 28 were guilty of serving wild meat.



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Quyen Vu is executive director of Education for Nature—Vietnam, which monitors wildlife trafficking as well as law enforcement. Photograph: Stephen Nash.

To relax, Quyen Vu sometimes listens in as events unfold at ENV’s sparse headquarters on the 17th floor of a building in a central district of Hanoi. “If I’m lucky I can overhear [on speakerphones] a sting operation involving government officials who don’t want to do the job, or I’ll hear our investigators switch their voice to a Southern accent so they can set up a buy, and the police can come and raid the place,” she said.

Late last year, I watched while nine employees fielded calls, gathered email and social media tipoffs, logged data, and monitored active cases. In the coastal city of Vung Tung, one of about 7000 volunteers in the ENV’s national network had spotted two rare Owston's civets for sale on the Internet, for around \$200—well above a month's income for the average Vietnamese worker. A sting had been set up in cooperation with local authorities, and now the sale was underway. Cheers went up when word came through that the deal was done. The animals were confiscated and were soon en route to a rescue center.

In serious cases, the ENV’s work is only half complete at this stage. Every effort is made to follow the trail to higher-up traffickers, if possible, and to pressure local authorities to exact maximum penalties, rather than winking at violations. In 2018, ENV’s wildlife crime unit logged 1666 cases, comprising 4781 individual violations, ranging from selling and advertising to smuggling and hunting.



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Delacour's langurs, bred in captivity at the Endangered Primate Rescue Center, have been successfully reintroduced at the nearby Van Long Wetland Nature Reserve. Photograph: Endangered Primate Rescue Center.

Cuc Phuong—A dangerous place for wildlife

In 1962, amid the early convulsions of the American War, Vietnam's founding father Ho Chi Minh traveled 100 miles south from his Hanoi headquarters to announce the creation of Vietnam's first national park. “The current destruction of our forests will lead to serious effects on climate, productivity, and life,” he said. “The forest is gold. If we know how to conserve and manage it well, it will be very valuable.”

Although 29 other national parks have been established since then, Cuc Phuong is still the largest, at nearly 85 square miles. However, “there are no large mammals in the park,” said Adam Davies, director of the Endangered Primate Rescue Center (EPRC). Some smaller birds survive. “Maybe deer,” he added. “It's quite empty here now.” This rescue center and another one adjacent to Cat Tien National Park in the south take in primates that have been seized in raids on illegal trafficking operations. Here at Cuc Phuong, four species of langurs—also known as leaf-eating monkeys—lorises, and black crested gibbons are supplied with 100 kilograms a day of carefully catered diets of leaves gathered out in the forest. The animals are restored to health and, when the circumstances are unusually auspicious, reintroduced to the wild.

But not at Cuc Phuong. Among several novel approaches at the EPRC, this is a central one: They protect the primates from the national parks that are supposed to function as natural habitat but cannot. “It's not suitable here because of the level of poaching and lack of protection,” Davies said, except for the smaller and more furtive lorises, which can more easily evade poachers.

Further reading

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Schnell IB, et al. 2012. Screening mammal biodiversity using DNA from leeches. *Current Biology* 22: R262–R263. (<https://doi.org/10.1016/j.cub.2012.02.058>)

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“There are not many sites currently in Vietnam that are suitable for reintroduction so building and maintaining a genetic preserve of the animals here is quite important. So we’re breeding endangered species here,” Davies said. They include Delacour's langurs, first discovered by science at Cuc Phuong but now extirpated. The EPRC’s small group of them has led to a successful reintroduction at the nearby Van Long Wetland Nature Reserve, which now has a breeding, and expanding, population.

Also represented here: six Cat Ba langurs—about 10 percent of the planet's remaining population of this, the rarest of Vietnam's critically endangered primates. The rest of the species persists in Cat Ba National Park, in island habitat increasingly fragmented by the crush of new high-rise hotels and other tourism development along the shores of Halong Bay. Researchers are modeling the prospects for that population now, Davies said, to determine whether their survival odds are better in what remains of the wild on Cat Ba Island, or whether they should be captured, protected, and bred, to await improved circumstances and eventual hoped-for reintroduction or translocation to new habitat.

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A billboard image, produced by the wildlife protection nonprofit TRAFFIC, is part of a campaign to persuade Vietnamese males to stop using rhino horn. Photograph: TRAFFIC.

Similar conditions prevail at Cat Tien National Park, 4 hours north of Ho Chi Minh City.

Although some rare species such as gibbons, sambar deer, and civets persist in the park, poachers are a constant threat and, according to a park ranger, populations are dwindling. Beginning pay for those rangers is \$200 per month. Some have been caught helping the poachers—a far more lucrative pursuit—though I was also told that if they are discovered, these cases are dealt with severely by park administrators.

Across the Dong Nai River from Cat Tien is the Dao Tien Endangered Primate Species Centre, an island sanctuary that protects lorises, langurs, and gibbons more effectively and, as at Cuc Phuong, pursues research on reintroductions.

Reworking social messaging

It is widely believed that substances such as powdered rhino horn are mainly consumed as a cure for cancer or other terminal diseases, or as aphrodisiacs. But survey research on the use of powdered rhino horn led by TRAFFIC, an international NGO working in Vietnam, suggests that other motives may drive demand even more, and that data has led to new tactics.

Research identified the most prolific users of rhino horn in Hanoi and Ho Chi Minh City as urban middle-class males aged 35 to 55. TRAFFIC profiled the archetypal consumer as “Mr. L,” in order to use social marketing approaches to undermine his motivations. The word “Chi,” which means “strength comes from within” in Vietnam, is the basis for this behavior change initiative—the first of its kind for which the impact can be evaluated, according to an interim report by TRAFFIC and cofunders the WWF, Save the Rhino International, and the UK and French governments.

Mr. L is married with children and wants to be seen as an independent, confident leader. His top priorities are career success, social status, and emulating the lifestyle of his peers. He is impervious to appeals on behalf of endangered species. Survey responses: “That animal lives in the forest, we have never seen them, so if it's extinct, perhaps nothing impacts to our life.” “If rhinos go extinct, I feel sorry, but it's normal, dinosaurs went extinct but nothing happens.” “That's not my job, it's poachers who kill them not me, I only buy it.”

The campaign engaged the Mr. L group with activities such as bike rides, golf events, billboards, and a website, all promoting the power and authenticity of “Chi” as opposed to the borrowed, weaker magic of rhino horn. “BE AWARE,” one billboard pitch offers, showing an image of two men in business suits, one whispering into the other's ear. “Wise men know the

truth. They use natural means to keep their body free of toxins. Vitality comes from lifestyle, not from a piece of horn.”

Formal partnerships were developed in the transport, e-commerce, and other business and government sectors. They championed the delivery of the Chi brand and its message to more than 90,000 employees. The billboards appeared at Hanoi's Noi Bai International Airport and a Chi Lunar New Year calendar was distributed among 500 senior government officials.

Anecdotal evidence of its impact from the program's first 4 years was compelling, though the data from a follow-up survey were mixed, especially in Ho Chi Minh City, where a fad for rhino horn as a sex aid caught hold. Madelon Willemsen, until recently the country director in Vietnam for TRAFFIC, has concluded that much stiffer punishments must be meted out to traffickers and intermediaries as the social campaign to change consumers continues.

Other nations, she added, should be called on to exert far more pressure on Vietnam's government for that to occur. “They need to be told that if we do a trade deal with you, then we’re going to hold you accountable,” she said. “And that is not being done.” The United States spends billions of dollars in Vietnam, “but as soon as you talk to the ambassador about linking that to wildlife trafficking they just say, yeah, well, we can’t really do this.”

Compared with 20 years ago, enforcement and government action in Vietnam are much improved, Quyen Vu said. “We get more reports of wildlife crime, more prosecutions, there are better laws, and many more Vietnamese raise their voices and report the crimes to us. The effort is getting so much better. But it is not comparable with the weight of destruction. It doesn’t mean we have those animals back.” And, she wondered, “Do any of these species have time?”

Stephen Nash (snash@richmond.edu) is a visiting senior research scholar in the journalism department at the University of Richmond. He is the author of *Grand Canyon for Sale—Public Lands versus Private Interests in the Era of Climate Change*, University of California Press, 2017.

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