

# Rarest of the Rare

## Remote-camera images and dung-heap data give a portrait of Vietnam's rhinos

By JANET RALOFF

Vietnam's Javan rhinos live in the jungle vegetation of Cat Tien National Park.

Ina Becker

**D**ense stands of bamboo commingle with spiny rattan and an occasional small tree to form a low, prickly jungle. This is an area almost devoid of trails, much less anything so accommodating as a road.

In the dry season, the land is parched. During the other 9 months of the year, the heavens dump rain continually, creating swamps in the lowlands and steamy, slick hillsides elsewhere. And oh, those hills—not high so much as endlessly undulating. Traversing them puts a constant strain on leg muscles.

Mosquitoes ply their blood-sucking trade, in the process often infecting trekkers with the infectious agents responsible for dengue fever, malaria, or Japanese encephalitis. Huge leeches stealthily attach themselves to passersby, hoping to crawl up to a warm meal on someone's leg or perhaps neck. At bedtime, as rare travelers string their hammocks in this jungle, a snarl might pierce the dark, signaling that a tiger is on the prowl.

Surveying this area on foot is not most people's idea of a walk in the park. Yet that's exactly what conservation biologists and park guards sign up for when they come to Cat Loc, a portion of Cat Tien National Park in southern Vietnam.

Those who patrol this formidable terrain are protecting what is arguably the most endangered mammal on earth. In this 6,200-hectare portion of the park resides the last surviving remnant of Javan rhinos outside Indonesia.

Following the Vietnam War, scientists assumed that this subspecies was extinct—until the carcass of a poached animal turned up in a local market stall in 1989. Since then, scientists have been trying to protect Vietnam's elusive pocket of survivors.

urgent need to safeguard this rhino from further threats. All acknowledge that the effort will be an uphill battle. At a minimum, government officials and biologists must weigh some politically charged tradeoffs if they hope to spare this creature from extinction.



WWF/Cat Tien Natl. Park Conserv. Proj.

*On patrol: Forest guards climb a hill covered with bamboo stands and jungle vegetation in Vietnam's protected rhino area.*

There aren't many Javan rhinos in the park, and in fact, none of the intrepid conservationists has ever seen one here in the flesh. Last year, an indirect census based on hoofprints pegged Vietnam's population at only five to eight rhinos. Still, that may constitute almost 15 percent of the species' global population—and a sizable share of its biodiversity.

Several conservation groups and government agencies, including the U.S. Fish and Wildlife Service, argue that there's an

**T**he Javan, or lesser one-horned, rhino (*Rhinoceros sondaicus*) once thundered throughout Vietnam, Laos, Cambodia, Thailand, Burma, and Indonesia. Primarily a lowland dweller, populations even extended into India. In the mid-19th century, "this rhino could be found 20 kilometers from where Calcutta is now," notes Java-based conservation biologist Nico van Strien of the International Rhino Foundation (IRF), with headquarters in Cumberland, Ohio. He and other biologists were invited by the Vietnamese government to develop a rhino-conservation plan.

Today, all rhinos are endangered owing to centuries of hunting—both to fill trophy cases and to supply folk medicine's demand for rhino horns, which traditional Oriental healers still prescribe as an aphrodisiac (SN: 11/17/79, p. 346). In the most dire condition are the Javans, barely holding on with some 60 animals, and the Sumatran rhino (*Dicerorhinus sumatrensis*), with perhaps 300 individuals, all in Indonesia.

Poaching of both rhinos is now largely under control, so human encroachment and poor habitat are emerging as lead-

ing constraints on each species' recovery. Nowhere is this more evident than in Vietnam.

At about the same time the Vietnamese government made Cat Loc a rhino refuge in 1992, it designated this and the surrounding forested region a "new economic zone." In essence, the authorities invited citizens, especially ethnic minorities from crowded regions in northern Vietnam, to farm the area. People responded in droves, notes IRF program director Tom Foose.

Some immigrants took up rice farming; many others cut down forest to establish cashew plantations. Though illegal, rattan harvesting in the park also developed into a thriving trade.

Villagers' migration and activities have reduced the rhino's habitat to about 15 percent of its area in 1990, Foose reports. Some 16,000 people now live right outside Cat Loc's forest—which, he notes, is the only area of Vietnam where rhinos remain. Another 200 people have actually moved inside the park's rhino territory, reports Gert Polet of the World Wildlife Fund-Vietnam, speaking by phone from Cat Tien, 150 kilometers north of Ho Chi Minh City.

These local farmers tend to be very proud of the rhinos, says Polet, who heads the Cat Tien Conservation Project. Unfortunately, he adds, "the farmers are also very poor, and their making a living these days involves cutting down forest."

What remains of the forest is no picnic for the animals, he adds. Javan rhinos prefer to eat shrubs, small trees, and the occasional mouthful of grass. Defoliants sprayed by U.S. planes during the Vietnam War, however, largely eradicated what had been the rhino's dietary staples. The bamboo and rattan, which quickly filled in the forest, remain.

On the basis of hoofprint measurements, Vietnam's rhinos are only about two-thirds as big as members of their species in Java's Ujung Kulon National Park. While this difference might be genetic, Polet notes that the diminutive stature of Vietnam's rhinos may also reflect their poor diet.

**T**hough Polet would love the opportunity to measure a Vietnamese rhino, he'd settle for just laying eyes on one. To date, he and others working at Cat Loc have had to content themselves with poring over low-contrast, mostly nighttime flash photos of the animals captured by cameras set up last May.

Polet's team identified 10 places in the park where rhinos were likely to wander, based on habitat and dung sightings. On strategically placed trees at each site, they mounted cameras and infrared sensors that trigger the shutters.

Every 2 weeks, park guards laboriously trek to each camera to exchange film. The first rolls from four of the cameras yielded a total of seven portraits—the first-ever photos of live Vietnamese rhinos. In the intervening months, however, none of the cameras has caught another rhino on film. It almost appears, Polet says, as if the cagey critters are out to sabotage the system. Where hoofprints appear, they're now behind the trees bearing cameras. Several infrared sensors have also been roughed up and shoved out of alignment, presumably by the rhinos.

Polet's hope is that photos from cameras placed in varying locations eventually will provide a noninvasive means of surveying the population over time, offering not only portraits of individuals, but also information on size, gender, and reproduction.

In the next few months, dung should also emerge as a rich source of information on these elusive populations, according to Don J. Melnick of Columbia University in New York City.

**F**or the past several years, Melnick has been fingerprinting DNA from the dung of rhinos and other endangered species. Not only do these data identify an animal's gender, but they also permit analyses of the degree to which individuals' genetic blueprints diverge.

Conservation biologists have begun using such analyses to help them manage disappearing pockets of various endangered animals. Under a U.S. Fish & Wildlife Service grant, researchers in Melnick's lab are working out methods to analyze dung from Javan rhinos. They are working with dung from Indonesia and have arranged for specimens to be sent from Vietnam within the next few months.

"There are two measures of a population," Melnick explains. A census tallies how many individuals



Forest guards place plaster casts of rhino hoofprints on a fallen tree.

exist. As important to species conservators managing recovery of populations is the effective population size—how many animals have relatively dissimilar sets of genes. If the same individual fathered many of the animals in a group, the effective population size would be significantly smaller than the census indicates.

Melnick notes that conservators often are tempted to move animals between groups to maximize their reproduction. If almost all of the seven or so Vietnamese rhinos prove to be male, for instance, biologists might consider airlifting in a few females from Java's Ujung Kulon reserve.

Yet, important adaptations to endemic diseases or other aspects of each population's local environments may underlie any genetic distinctions between the two populations—already considered separate subspecies of *R. sondaicus*. Introducing genes from one group to the other might therefore render future generations of this beleaguered species even less fit, Melnick worries.

His data already show that geographic distances between populations offer a poor gauge of genetic divergence. Black rhinos in Kenya and South Africa possess roughly the same genes, he found, indicating there would be no genetic problems in moving animals between the populations to enhance breeding.

DNA analyses of Sumatran rhinos on two Indonesian islands, however, suggest that their populations diverged some half million years ago (SN: 2/8/97, p. 92). As a result, Melnick says, "we argued very strongly that these animals not be translocated."

If the Javan rhino populations in Indonesia and Vietnam also exhibit unique genetic adaptations to their local environments, Melnick told SCIENCE NEWS, "only in the most dire circumstances would you consider interbreeding them."

**E**xperience with Indonesia's Javan rhinos suggests that protecting this species in Vietnam won't prove easy.

A few decades back, Java's Ujung Kulon contained far more than the 50 or so animals it has now, observes van Strien. Yet despite "no [human] encroachment, and no confirmed poaching here for years," the



Infrared-triggered cameras recently provided a few images of live Javan rhinos in Vietnam.

rhino population refuses to climb, he says. This suggests, he worries, that the area can no longer support a larger population, or in other words, "the carrying capacity for Ujung Kulon may be going down."

One concern, he notes, is that the reserve's protected trees have grown too tall for rhinos to nibble on and too dense to support shrubs that might serve as an alternate source of nutrition. For rhino managers, notes van Strien, this sets up a conflict.

"Some argue that as a national park, you shouldn't interfere but let the natural course of events proceed," he explains. "Others counter that Ujung Kulon is specifically meant for rhinos, so we should manipulate it," such as by regularly burning forest to create the clearings needed for new trees and shrubs.



Guard points out a pile of rhino dung.

An alternative approach would be to establish one or more new populations away from the reserve. "I would personally prefer . . . captive breeding of some animals," he says. Once researchers stabilize such captive groups, they could move some animals to safe habitats, he says—probably on Indonesia's island of Sumatra.

The idea is neither simple nor sure to succeed. Rhinos have remained elusive even in Ujung Kulon, so finding any to capture wouldn't be easy. If the animals prove vulnerable to stress, forced exile might compromise their health. Finally, as experience with Sumatran rhinos shows, some species simply fail to reproduce in captivity.

Indeed, these concerns fuel a reluctance on the part of Vietnam's rhino conservators to advocate moving its population out of Cat Loc and into potentially better habitat elsewhere in the park. So, a basic dilemma results: "Either the rhinos have to go somewhere else or the people must leave," van Strien told SCIENCE NEWS by phone from Ujung Kulon.

In a new report prepared for the Vietnam



Javan rhino photographed in an Indonesian wallow.

government and slated to be published soon by the Centre of Environmental Sciences at Leiden University in the Netherlands, Polet concedes there are no easy or inexpensive solutions. He favors relocating the people and leaving the rhinos be.

New settlers "should be moved out of the park as a matter of urgency," he says, and the government should ban farming immediately outside this area to create a "buffer zone" around the rhinos' domain.

Philip Wells, an Indonesia-based law-enforcement consultant with IRF, was recently invited to Cat Tien to evaluate its species-protection efforts and to train guards. Having spoken with local immigrant villagers, Wells notes that most seem sympathetic to the rhino's plight "and don't seem that unhappy about leaving—provided they got adequate compensation." Indeed, he notes, money seems available for this.

Recognizing the importance of building support in local communities for Vietnam's rhino, the U.S. government has just funded a new program to produce fact sheets for local adults and posters and storybooks for village children. It also will fund town meetings and government seminars to stress everyone's need to cooperate in this animal's protection.

At the beginning of this century, the Indian rhino had been hunted down to an estimated 20 animals. Today, Foose notes, "there are close to 2,000." Africa's southern white rhino, also down to perhaps 20 or 40 animals at the turn of the century, has bounced back even more spectacularly—to at least 8,500 animals.

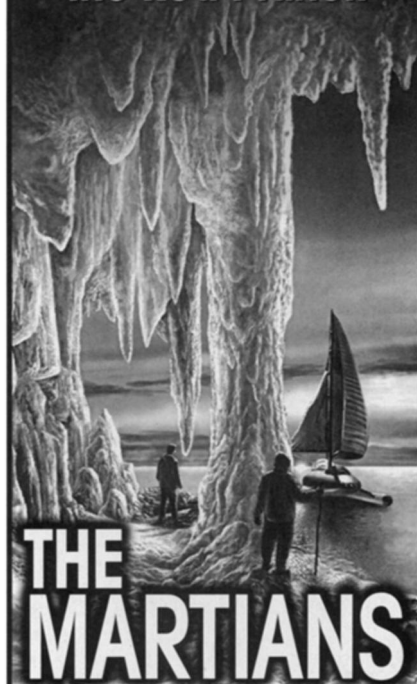
These successes fuel Foose's hope that even Vietnam's tiny population may recover. Admittedly, he says, "it will take a bit of luck—and strict protection."

With the Javan rhino being confined to Cat Tien and Ujung Kulon, "we've got all our eggs in two very fragile baskets," says veterinarian Steve Osofsky, senior program officer for species conservation with the World Wildlife Fund in Washington, D.C. "Though it's not much solace," he says, "it's also not hopeless." □

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