

<https://news.mongabay.com/2017/06/if-we-wish-to-save-the-javan-rhinoceros-we-must-work-to-know-it-commentary/>

Mongabay Series: [Asian Rhinos](#)

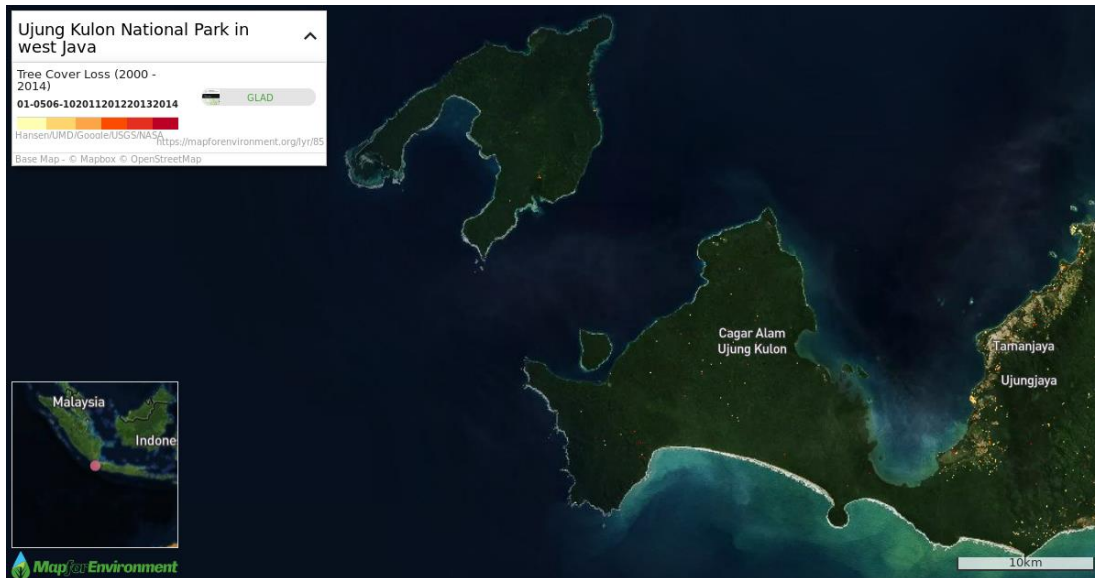
If we wish to save the Javan rhinoceros, we must work to know it (commentary)

by Francesco Nardelli on 15 June 2017

- *The Javan rhino survives in a single population of roughly 60 individuals in Indonesia's Ujung Kulon National Park.*
- *Despite successful efforts to protect the park's rhinos from poachers, the species remains at risk due to multiple threats including lack of genetic diversity, disease and natural disasters.*
- *Designing effective conservation strategies requires filling crucial gaps in knowledge about the population's size, status and behavior.*
- *This post is a commentary. The views expressed are those of the author, not necessarily Mongabay.*

Around 4,300 years ago, mainland mammoths had died out and only 300 remained on Wrangel Island off the Siberian coast. Isolated on an island in the Arctic Ocean, these woolly mammoths (*Mammuthus primigenius*) were not only the last of a dying species, they were also swamped with "bad genes." In a [recent study](#), geneticist Rebekah Rogers and biologist Monty Slatkin found that mammals in this isolated population had accumulated multiple harmful genetic mutations, diminishing individual animals' fitness and accelerating the species' descent into extinction.

There are few species for which this warning is as relevant as it is for the Javan rhinoceros (*Rhinoceros sondaicus*). The last Javan rhino surviving outside of Indonesia was killed by poachers in Vietnam in 2010. Now, the sole — and tiny — population of this Critically Endangered species is confined to a single national park in the Ujung Kulon peninsula at the western tip of Indonesia's Java Island.

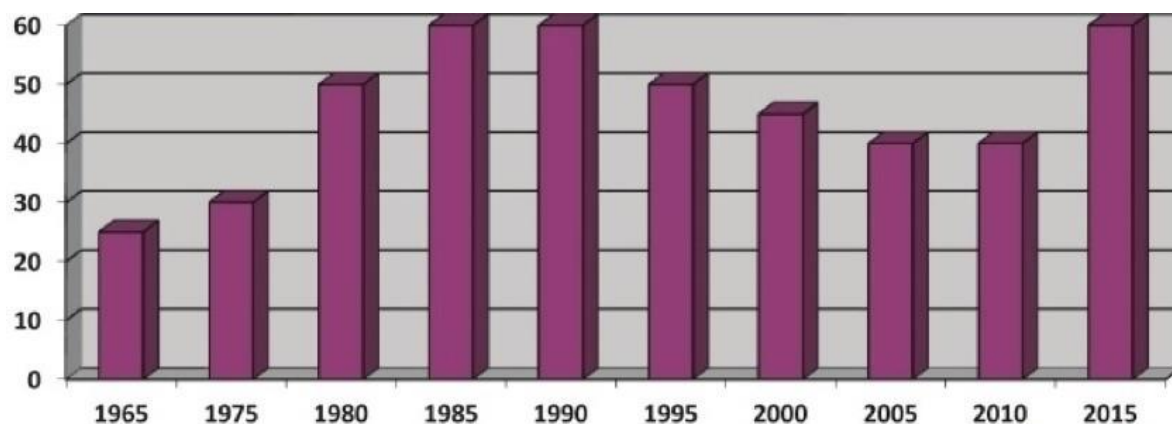


Ujung Kulon National Park sits on the southwestern tip of Java. Map created using Map For Environment.

How many Javan rhinos survive?

Reliable assessment of animal populations is a longstanding challenge in wildlife ecology and the Javan rhinoceros is one of the most complex and difficult cases in conservation history. Following recovery from the low point of 25 individuals in the 1960s, the population in Ujung Kulon National Park is believed to have reached about [60 animals by the middle of the 1980s](#), thanks to the efforts of the Indonesian Park rangers.

Since then, attempts to survey the population of this solitary and elusive creature have yielded highly variable population estimates, ranging from 40 to 60 individuals, although these surveys do consistently indicate a sex-ratio that is highly skewed pro-males.



©Nardelli 2016

Javan rhino population between 1965 and 2015, based on available census data

Given the small size of the population, it is highly unlikely that the variation in these surveys accurately reflects actual variation in the population (for example, between 2010 and 2015 surveys show a 50 percent jump in the population, an improbable increase for a slow-breeding species). Rather, we may assume the surveys suffered from methodological problems, such as having insufficient cameras, relying on now-outdated counting methods, or including highlands in the study areas while the Javan rhino is a lowland forest dweller.

The most recent major census, [published in 2015](#), relied on 120 remote controlled cameras, which shot thousands of frames proving the presence of 35 males and 23 females, including eight calves.

This recent census, combined with past surveys, suggests it is possible that the Javan rhino population in Ujung Kulon has stabilized at 50-60 individuals for decades. This, in turn, means we must seriously consider the possibility that Ujung Kulon National Park has reached its maximum carrying capacity and the Javan rhinoceros population its maximum density.

Has this population reached the tipping point, teetering on the edge of an extinction vortex due to the lack of genetic diversity?

A [very recent study](#) confirms the urgency of action, highlighting the additional danger of Ujung Kulon's vulnerability to natural disasters like tsunamis, which could wipe out the world's entire population of Javan rhinos in a single event.

At present, the Javan rhino appears to be heading for extinction. Meanwhile, despite years of work by conservationists, no tangible signs have emerged for a much-discussed plan to relocate some of Ujung Kulon's rhinos to a second site, nor to launch a much-needed captive breeding program of carefully selected individuals — [the safest option in my opinion](#) — which, among other considerations, would give an optimum chance to study at length this enigmatic species alive.

We do not know enough about the Javan rhinoceros to be able to prioritize effective conservation actions with certainty, though in my opinion ex-situ breeding and translocation should be on top of the list.



The Javan rhino is so rare and reclusive that this image, by conservationist and photographer Alain Compost, is one of very few that exist. Photo courtesy of Alain Compost.

What we do know about Javan rhinos

The Sundaic or Lesser one-horned Asian rhinoceros (*Rhinoceros sondaicus*), popularly known as the Javan rhinoceros, once ranged throughout the lowland mangrove forests of Southeast Bangladesh, Myanmar, Thailand, Cambodia, Laos, Vietnam, Malaysia, Sumatra, and Java. Only a few records of *R. sondaicus* report its presence in northeastern India, Eastern Bangladesh and Borneo.

It has since been exterminated over that range, except for the single population remaining in Java.

This rhino species is a retiring and solitary wanderer, only present in lowland areas, to avoid steep hills which it can't climb. Thus, despite the vast distribution range, it was nowhere common but in Java, the species' southernmost location, for reasons not yet defined.

The Javan rhinoceros is biologically dependent on evergreen sub-tropical woodlands and rainforests. These habitats protect the rhinos against sunlight and ensure a stable water supply, while the trees produce the saplings and leaves that the rhinos eat.

Javan rhinos can travel up to 15–20 kilometers (~10-12.5 miles) in a single day, but will also confine themselves to a much smaller patch for as long as three weeks at a time if feeding conditions are attractive.

Males occupy larger territories, up to three times those of females. The home range of one male typically overlaps with several females'. This makes it easy for the male to breed as often and with as many females as possible. While females' territories overlap each other a lot, males' territories do so only a little, at the periphery.

This behavior is in many respects similar to that of the Sumatran rhino (*Dicerorhinus sumatrensis*), a folivore (leaf-eating) rainforest dweller. Both species need undisturbed, vast and contiguous habitats to thrive, a condition no longer present in any present distribution area.



A Javan rhino feeding in Indonesia's Ujung Kulon National Park, the species' sole remaining habitat. Photo courtesy of Alain Compost.

Mother and calf relationship

Unfortunately, almost no data exist on the breeding of the Javan rhino.

Though there are only a few images available of *R. sondaicus*, it is worth noting an aspect of mother and calf behavior that has been observed: it appears that Javan rhino females usually precede their calves, as displayed in the [few images](#) and [videos](#) available (additional examples can be seen [here](#), [here](#) and [here](#)).

By contrast, Indian rhinos' calves precede their mothers, as is visible in a [number of images](#).

The same difference in behavior is recognized in the black and the white African rhinos: black rhino calves follow their mothers and white rhino calves precede theirs. This contributes to the faster decline of Black rhinos, due (besides poaching), to predation by spotted hyaenas (*Crocuta crocuta*), compared to [no records of predation](#) on white rhino calves by the same predator.

Tigers (*Panthera tigris*) likely killed significant numbers of Javan rhinos. This trait could well be a further cause of the Javan rhino demise in its former range and is an example of the necessity of knowing much more about this distinctive species.

The habits of the Indian- or greater one-horned rhinoceros (*Rhinoceros unicornis*), a member of the same genus as the Javan rhino, are well-known thanks to the restricted range and openness of its habitat and in-depth studies that have described the species and collected extensive data. The Javan rhinoceros, on the other hand, has a much more complex history, with few records, some not confirmed. For example, a [2016 study by Kees Rookmaaker](#) concluded that previously cited reports of Javan rhinos in Bhutan actually referred to Indian rhinos — additional proof that the critically endangered Javan rhinoceros needs to be further researched.



Rhino patrol in Ujung Kulon park. Successful anti-poaching efforts have been crucial in maintaining the park's rhino population in recent decades. Photo by Rhett A. Butler for Mongabay.

What can be done

Beyond the IUCN's Species Survival Commission (IUCN SSC) 2002 guidelines to assist in identifying when ex-situ management may contribute to species recovery, and because the necessity of linking surveys to ecological processes, there is an urgent need for a program to pinpoint and constantly monitor Ujung Kulon's rhinos by conservation personnel as well as via technological aides like tracking equipment and still- and video-camera traps.

No non-intrusive option should be discarded in order to oversee these invaluable rhinos and collect as much data as possible. Far-from-accurate information about the size and status of the population could jeopardize any conservation efforts.

It is also necessary to carry out extensive and accurate soil and fecal analyses to identify the presence, location and type of pathogenic agents affecting Javan rhinos, and to devise strategies to halt their spread and eventually to get rid of them.

In addition, it's critical to intensify the search for optimum habitat for *R. sondaicus* outside the Ujung Kulon NP peninsula for translocation of some individuals. Translocation areas could perhaps be determined using the Habitat Suitability Index, a simple scoring system for evaluating the quality of potential habitats.

However, before any transfer is attempted, several prerequisites should be met, taking account of biological and health considerations, the suitability of the habitat at the release site and its 'free of infectious agents' status, the genetic makeup of the founder population and pre-release necessities of the animals in question.

After these assessments are completed, some selected individuals can be captured with the pitfall traps method. Once settled down, I believe these rhinos should be moved to the various release sites and be confined in large enclosures for the time necessary to become accustomed to new conditions physiologically and behaviorally.



Nineteenth century illustration of a Javanese rhino. The species is so elusive few photographs exist. Image courtesy of the Biodiversity Heritage Library.

Whether due to present factual or future uncertain events, the Javan rhino is on the brink of extinction.

Research is urgently required to enhance the condition and ecological needs of this still poorly known species on time to improve ongoing efforts and put new specific actions at work. Examples of species saved from extinction and reintroduced into the wild are

now so numerous that ex-situ breeding should today be considered a priority, not a last resort.

Otherwise, the Javan rhino could soon go the way of the woolly mammoth.

Citations:

- [Amman H. 1986.](#) Contributions to the ecology and sociology of the Javan rhinoceros (*Rhinoceros sondaicus* Desm.). Inaugural dissertation, Basel University. pp i–x, 1–229.
- [Haryono M. et al. 2015.](#) Monitoring of Javan rhino population in Ujung Kulon National Park. *Pachyderm* 56: 82-86
- [Kruuk H. 1972.](#) The spotted hyena: a study of predation and social behavior. *University of Chicago Press*. Chicago, IL. 335 p.
- [Laurie, W.A. 1978.](#) The ecology and behaviour of the greater Indian one-horned rhinoceros. PhD dissertation. *University of Cambridge*, Cambridge. 450 pp.
- [Nardelli F. 2016.](#) Current status and conservation prospects for the Javan rhinoceros *Rhinoceros sondaicus* Desmarest 1822. *International Zoo News* 63 (3): 180-202
- [Rookmaaker L.C. 2016.](#) On the alleged presence of the two-horned Sumatran rhinoceros and the one-horned Javan rhinoceros in the Himalayan kingdom of Bhutan. *Pachyderm* 57: 116-117
- [Rogers RL, Slatkin M \(2017\).](#) Excess of genomic defects in a woolly mammoth on Wrangel island. *PLoS Genet* 13(3): e1006601. doi:10.1371/journal.pgen.1006601
- [Setiawan R. et al. 2017.](#) Preventing Global Extinction of the Javan Rhino: Tsunami Risk and Future Conservation Direction. *Conservation Letters*, April 2017, Wiley Periodicals.