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## DNA analysis shows Sumatran rhinos peaked during last Ice Age, never recovered

by **Basten Gokkon** on 14 December 2017

- *Genome analysis shows that the Sumatran rhino has been on the path toward extinction for almost 12,000 years, as the end of the last Ice Age cut off much of its former territory, a new report says.*
- *Habitat loss from deforestation and overhunting further devastated the species' population, and it has never recovered.*
- *Scientists continue to make the case for captive breeding as the best effort to boost the rhino population and stave off extinction.*

The critically endangered Sumatran rhino has been on an arc toward extinction for nearly 12,000 years now, according to a new study based on genome sequencing that also found the species' population peaked almost a million years ago.

The study, [published Thursday, Dec. 14, in the journal \*Current Biology\*](#), is based on analysis of genes from Ipuh, a male Sumatran rhino (*Dicerorhinus sumatrensis*) who died at Cincinnati Zoo in 2013. The researchers found that the end of the Pleistocene, the last Ice Age, some 11,700 years ago wreaked havoc on the species.

“Our genome sequence data revealed that the Pleistocene was a roller-coaster ride for Sumatran rhinoceros populations,” lead author Herman Mays, Jr., from the Department of Biological Sciences at Marshall University, said in a statement.



Ipuh lived at the Cincinnati Zoo for 22 years until his death in 2013, and his remains are still on display at the Cincinnati Museum Center. Photo courtesy of the Cincinnati Zoo & Botanical Garden.

The genome analysis suggested that the species peaked at about 57,800 individuals at a time when fossil evidence showed an invasion of continental mammals into the subcontinent encompassing most of Southeast Asia, previously known as Sundaland, around 950,000 years ago.

By the end of the Pleistocene, the population of the world's smallest and only hairy rhino species had plummeted to 700 individuals. Today, it is estimated there are as [few as 30 Sumatran rhinos](#) left in the wild.

"This species has been well on its way to extinction for a very long time," said coauthor Terri Roth, vice president of conservation at Cincinnati Zoo.

The genome analysis sought to understand how changes in population size were related to climate change in the past.

The key cause for the rapid decline, the findings suggested, was rising sea levels that submerged the land bridges connecting the islands of Borneo, Java and Sumatra to the Malay Peninsula and mainland Asia, subsequently fragmenting suitable habitats for the rhino.

The most aggravating impact, the analysis indicated, was the reduced genetic diversity of Sumatran rhinos as a result of their geographical isolation, leaving them even more vulnerable to later threats from human activity, such as extensive deforestation and overhunting.

“Their population bottomed out and never showed signs of recovery,” Mays said.

John Payne, the executive director of the Sabah-based Borneo Rhino Alliance (BORA), who was not involved in the study, described it as “most fascinating” for highlighting two points: that the total Sumatran rhino population has likely fluctuated even in the absence of human activities, and that efforts to save a species that was likely to go extinct anyway should still be made.

Payne noted that insufficient births played a much greater role in the decline of the rhino, a solitary creature that usually lives in dense mountain forests, than either poaching or habitat loss.

As with other massive mammals, Sumatran rhinos are slow breeders. Females don’t reach sexual maturity until the age of 6 or 7, and males 10 — provided they survive poaching and human-made fires. Females only mate once every four or five years, and the species’ gestation period is 16 months. Juveniles stay with their mothers for two to three years.

“To save a critically endangered species requires that the greatest effort has to be devoted to increasing the birth rate,” Payne said. “I hope this paper can go some way to reinforcing that basic point, so that we can move away from just establishing national parks, fielding rhino protection units, and hoping for the best.”

“That was always a recipe for failure,” he added.



Rhinos enjoying a mud wallow at the Sumatran Rhino Sanctuary in Way Kambas National Park. Photo by Rhett Butler/Mongabay.

Payne also noted that the findings reinforced the importance of supporting efforts to prevent the species from going extinct.

“Animal species do come and go over periods that can be most conveniently measured in units of tens of thousands of years,” he said, but added, “To say that we should just let some species go extinct because it is ‘natural’ is nonsense.”

Widodo Ramono, the executive director of YABI, an Indonesian rhino conservation NGO, said the extinction of the Sumatran rhino would not represent the loss of just a species, but an entire genus.

The Sumatran rhino is the only surviving species of *Dicerorhinus*, the most primitive group, which evolved 15 million to 20 million years ago. It is a living relic, an echo of a past family of rhinos that once roamed the entirety of Eurasia, and the only living relative of the woolly rhino, which humans hunted to extinction 10,000 years ago.

“We still need a lot more knowledge about this species, particularly the challenges in breeding the rhinos,” Widodo said.

Despite being [a globally loved mascot](#) for wildlife conservation, the Sumatran rhino is being failed by well-meaning though ineffective conservation efforts [hamstrung by a lack of support from the government of Indonesia](#).

Cincinnati Zoo's Roth, who pioneered the captive-breeding program that began with Ipuh and spawned new hope for the revival of the species, said more needed to be done to save the rhino.

"The Sumatran rhinoceros species is hanging on by a thread," she said.