



ONCE COMMON enough to be considered garden pests, the Sumatran rhino has been decimated by hunters and loss of habitat. If conservationists cannot protect the 300 left on Earth, and if zoos fail to build a safety-net population in captivity, the species will fade into history.

SAVING THE ANCIENT RHINO

From zoos
to forests,
science vs.
extinction.

BY NEENA PELLEGRINI
Seattle Times desk editor

CINCINNATI — Emi, in her rugged way, resembles a map of time.

The mesa that gently slopes down her face is as crusted as an old lava flow baked in the hot summer sun. Horns, no more than 3 or 4 inches high, rise like jagged peaks of fossil.

Emi wears the Sumatran rhino's trademark coat of shaggy, reddish-brown hair, a vestige of its closest relative, the woolly rhino that died out in the last Ice Age.

Tufted ears flutter as she and her calf — the first Sumatran rhino bred and born in captivity in 112 years — munch on ficus browse in a balmy stall at the Cincinnati Zoo and Botanical Garden.

The pair are among Earth's rarest of creatures. Once common enough to be considered garden pests, the Sumatran rhino has been poached to near extinction for its two horns, which are coveted in Asian medicine and worth more than \$2,500 a pair on the black market.

Its withering population is fragmented and living in isolated pockets in the shrinking forests of Indonesia and Malaysia.

If conservationists cannot protect the 300 animals that are left — and the dense forests in which they live — they fear the species is dangerously close to crossing the line from the critically endangered to the living dead, if it hasn't already.



CINCINNATI ZOO AND BOTANICAL GARDEN

Emi, a Sumatran rhino, stands with her calf, Andalas, at the Cincinnati Zoo and Botanical Garden. Andalas is the first Sumatran rhino born in captivity in 112 years. The zoo plans to breed Emi again before winter.

group on Asian rhinos. The birth at the Cincinnati zoo in September was lauded for its historical achievement, the culmination of an 18-year-old, multimillion-dollar program that spans three continents.

Foose called it nothing short of



sex ratio of the animals that were captured.

Of the seven rhinos loaned to U.S. zoos, three survive: Rapunzel, a female considered too old for breeding, lives at the Bronx Zoo in New York, and Emi and Ipuh, a male, in Cincinnati.

Only 11-year-old Emi has conceived and given birth to a calf in captivity.

Hutchins said the zoo association's "captive-breeding philosophy has changed drastically" since those animals were captured.

"I'm not sure we would undertake something like this (captive program) now," given the loss of animals, he said.

"The animals would have been better in protected areas in range countries."

However, Foose defends the in situ and ex situ strategies as the best way to preserve the species and its gene pools.



"Hindsight is a Tom marvelous perspective," he said.

"If we knew everything (then) that we know today, we would have proceeded differently."

Foose believes what has been learned from all of the captured animals has shed light on their biology and "has put us on the verge or over the verge of being able to master the art and science of breeding them in captivity."

'Light bulb went off'

Breeding Sumatran rhinos has been perplexing at best.

Part of the problem is knowing when to allow the usually solitary animals in the same zoo enclosure to breed.

Males can be fatally aggressive to females, except when the females are in estrus.

In 1997, Roth of the Cincinnati zoo, discovered via ultrasound that unlike all other rhino species, the Sumatran is an induced ovulator.

are not the problem. Enforcing them is," said Osolsky of the wildlife fund.

Rhino Protection Units are used as stewards of the forests. As many as 41 units of four to five people each patrol core rhino areas in Indonesia and Malaysia to de-

Emi's hair on his desk. The renowned Harvard scientist and author considers it a talisman.

"I see it as a remnant of something that has lived for tens of millions of years that may not be here in 50," he said.

Happy rhino

The rhinoceros is one of the oldest mammals on Earth. Of the more than 30 species that once existed, only five survive: the Indian, Sumatran and Javan rhinos of Asia and the black and white rhinos of Africa. All are threatened with extinction because of poaching.

The Sumatran rhino — *Dicerorhinus sumatrensis* — is the most prehistoric and endangered of the five. Wilson says that except for several ancient, tropical bats, it is the oldest relatively unchanged mammal lineage in the world.

It also is the smallest of the rhino species at 1,300 to 1,800 pounds and 3 to 5 feet high.

"There is something about species like the Sumatran rhino that gives you a sense of life. It adds to the quality of life just to know they are out there," Wilson said.

Its range once spread from the foothills of the Himalayas, through Myanmar, also known as Burma, and Thailand to Indonesia and Malaysia. Its numbers have spiraled steadily downward as the human population has soared and spread, from 10,000 rhinos in 1900 to 1,000 in 1980.

By the 1990s, the population plummeted at a rate of 50 percent or more, almost entirely because of poaching, according to the U.S.-based International Rhino Foundation. Today, 10 small populations of wild animals live in Indonesia on Sumatra; in peninsular Malaysia; and in the Malaysian state of Sabah on the island of Borneo. Fifteen live in captivity in Asia and the United States. There are no rhinos of any species in Washington state.

Endangered species

The animals are protected under the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES), an agreement among more than 120 nations to eliminate illegal trade in animals, plants and their parts. They also are listed as critically endangered by the World Conservation Union.

Much of the animals' habitat has been lost to logging and agriculture.

However, there still is enough tropical rainforest and mountain moss forests in the animals' original range to support 10,000 rhinos, if they could be protected, according to Tom Foose, rhino foundation program director and an officer for the conservation union's special

"I believe that the probability of survival of this species has moved from somewhere below 50-50 to significantly above it," he said.

Captive breeding may be crucial for its survival, especially if the animals die out in the wild.

He estimated that since 1984, at least \$15 million from governments, institutions, conservation and nonprofit groups and private donors has been cobbled together to protect the rhinos in the wild and maintain the animals in captivity. About \$1 million is expected to be spent this year.

Biologists and wildlife officials hope what is gleaned from the captive rhinos will unlock the window into the baffling biology of the vanishing species, which traditionally has not fared well in captivity.

"We believe

there are about six female rhinos in captivity that can still reproduce, and we are hopeful that more babies will be born," said Mohd Khan Momin Khan, chairman of the Asian rhino group and the Malaysian Rhino Foundation. "Captive animals can be put back into specially protected forest areas where they can breed naturally."

Not everyone, however, shares their enthusiasm or vision.

Other conservationists say the price in time, money and animals has been too steep and progress too slow.

The animals in the wild, they point out, are dying off faster than they are being born, and almost 65 percent of rhinos brought into captivity in the 1980s and 1990s have died. Only one calf has been produced.

They say resources would have been better used to address the issues facing the animals in the wild, such as native-habitat protection, a push for new reserves and a better census of the animals still left.

"Captive breeding of the Sumatran rhino is a black hole of investment," said Dr. Steve Ososky of the World Wildlife Fund.

"The birth (in Cincinnati) has created a sense of awareness," he said, "but it is unlikely to yield meaningful results" in the numbers of rhinos in the wild.

Alan Rabinowitz, of the Wildlife Conservation Society, which runs New York City's zoos and aquarium, concurs.

"The birth at the Cincinnati zoo was a significant event and a real step forward. Is it a turning point? Absolutely not. While getting these animals to breed and bear viable offspring is an important step



Andalas, born last fall, now weighs about 650 pounds.

forward, there is no hope for them in the wild until the issues causing their decline in the wild are addressed and mitigated," he said.

"The international conservation community, the governments of Malaysia and Indonesia, and those individuals specifically involved with Sumatran rhino conservation have not taken the necessary steps to even begin to address the real problems," he said. "Is the Sumatran rhino doomed? Not yet, but probably soon if we stick to our current path of lots of talk but little action."

Powder keg of politics

The rhinos live in one of the most biologically diverse but troubled regions in the world.

The fall of the Suharto government in 1998 and the shift of power from national to provincial control has left Indonesia economically unstable and politically volatile.

Much of the forest the rhinos share with endangered tigers, elephants, orangutans, clouded leopards and tapirs, has been lost, according to the World Bank. The land has been converted to agriculture, and illegal logging and mining have flourished.

It is estimated that the lowland forests probably will be gone in Sumatra by 2005 and Kalimantan by 2010, two of the largest of the archipelago's 17,000 islands.

What's left of the forests has been broken into fragments too small to sustain viable numbers of species and few corridors to connect populations.

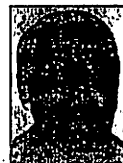
The rhinos are scattered in what remains of the lowlands and have been pushed into the dense forests of the hills and mountains.

"In the long term, the only thing that is going to save the Sumatran rhino is preserving those forests," said Michael Hutchins of the American Zoo and Aquarium Association.

While habitat preservation, in the long term, is vital, direct protection from poachers is more critical in the short term, said Nico

van Strien, an officer of the Asian rhino group and southeast Asian coordinator for the rhino foundation. "It's not doomed," he said. "But a fair section of mankind is trying to exterminate the species."

"Rhino horn is used to reduce fevers" in traditional Chinese medicine, van Strien said. Its use is recorded in China as early as 2600 B.C. "There is no scientific basis, and even if there was, that is still not reason to hunt the species to extinction," he said.



Nico van Strien

Horn is made of keratin, the same protein from which human hair and fingernails are composed, and grows throughout an animal's life. It is attached to thick skin, not central cores of bone,

which makes it easy to remove, according to Esmond Bradley Martin, one of the world's leading experts on rhino conservation and trade in the animal's horn.

"The rhino horns from Asian rhinos are considered more efficacious than African rhino horns in medicines; therefore the prices are about 10 times more than for African horn," he said.

The Sumatrans' horns are small by rhino standards and weigh, on average, 250 grams a pair, he said. The wholesale value of the horn is over \$10,000 per kilogram, or \$2,500 a pair.

Ox horn has been substituted, according to the World Wildlife Fund, but it takes approximately 30 grams of ox horn to replace 0.3 grams of Asian rhino horn.

At least two Sumatran rhinos were poached last year, one in Malaysia and one in Indonesia, and there is no sign that the situation is stabilizing.

Politics, corruption, poverty and lack of law enforcement all play a role.

"In many of these places, laws

dict intruders. They also do some sleuthing to identify poachers in the area, van Strien said.

About \$650,000 will be spent on the units this year, but the rhino foundation estimates twice as many are needed to adequately patrol the forests.

Ososky said political will is as important as preserving and protecting habitat.

"Conservation has to be seen as a viable land-use choice by local people, and that goes hand in hand with education," he said.

Arduous to track

As elusive as a leprechaun, the Sumatran rhino stealthily traverses the thick forests with remarkable agility and power for its size. So rare are sightings that few trackers have ever seen more than its three-toed footprints in the mud.

"Census on the species has been virtually impossible," said Terri Roth from the Cincinnati zoo. Habitat is difficult to penetrate, and rhinos are hard to see in the dense, dark forests.

As browsers, the animals eat leaves, twigs and fruit, and feed before dawn and at sunset. They move mostly at night, scent-marking their turf. The animals are solitary except when they mate or rear calves.

No one is known to have ever seen them breed in the wild, and experts theorize the animals cross into each other's territories to use salt licks, rainwater ponds and mud wallows, where they spend most of their days.

The Sumatran rhino has been an equally vexing creature in captivity, not thriving well and baffling to breed, more difficult than even the giant panda.

With rhino populations declining drastically, in 1984 the Asian rhino group launched a program to capture "doomed" Sumatran rhinos — those whose habitat was earmarked for development or that couldn't be protected — for breeding in captivity in Western and Asian zoos, where other rhino species have reproduced reasonably well, said Foose of the rhino foundation.

From 1984 to 1994, 40 Sumatran rhinos were captured in roundups primarily funded by four North American zoos.

Only 13 of those animals are alive today, most in three managed breeding centers in native habitat in Indonesia and Malaysia. (In addition, one calf was born but not bred in captivity in Malaysia.)

Foose blames many of the animals' deaths on diet and management problems.

Their failure to reproduce has been blamed partly on the skewed

meaning the female won't produce eggs that can be fertilized by male sperm without the hormone that comes with breeding. Blood-hormone levels reveal when the female is in estrus.

"As soon as that light bulb went off ... we put all the pieces of research together, and everything else fell into place," she said.

The second obstacle was getting Emi to carry a calf full term. She had miscarried all five of her previous pregnancies.

Emi's progesterone levels, which went up during pregnancy, dropped when she miscarried. The zoo's team concluded the miscarriages were linked either to the hormone levels or the stress of being housed too closely to other rhinos.

"It was easier to try the progesterone first," Roth said.

The team did, and 475 days after Emi and Iphh mated, a 72-pound male calf was born. He is called Andalas — the ancient name of Sumatra, the Indonesian island on which his parents were born.

Andalas gains about 2 pounds a day, and now weighs about 650 pounds. Molds already have been made of his feet to help trackers determine the age and size of the animals they are following in the wild.

A mother lode of promise rests on these rhinos. Biologists and wildlife officials hope what they learn will make Andalas more than an anomaly or a footnote in zoological history.

A \$125,000 exhibit renovation and expansion for Cincinnati's rhinos should be completed soon, Roth said.

A second pool and a mud wallow have been built, and more cover has been added to mimic the dark forest and limit the animals' exposure to direct sunlight, which could be linked to some eye ailments that have crept up in captivity.

Fresh from Florida

The renovation comes in addition to the \$100,000 the zoo annually spends on its three rhinos, most of it for fruit and fecus browse that is shipped in fresh from Florida and California.

It is an investment, Roth says, that already has reaped a treasure trove of physiological and behavioral data, information that never has been available before.

Andalas probably will be weaned in the fall, and Emi will be bred again before winter, she said. The zoo team would like her and Iphh to produce several more calves together.

And perhaps, they say, a safety-net population in captivity finally can be built.