

Elephants Without Borders Executive Summary

With the survival of the Asian elephant in crisis, scientists and conservationists are realizing that habitat protection alone is not enough to save the species from extinction. In fact, the best hope to guarantee the survival of the Asian elephant through the 21st century and beyond is to establish an aggressive managed breeding program bringing together captive elephants in the West and domesticated elephants throughout Asia. The time has come when it is no longer acceptable to manage elephants within national borders; they need to be managed as a single global population. Our global challenge is to use every living Asian elephant to revive and sustain the world's population. Domesticated elephants, and those in the care of humans, are crucial to the conservation of all elephants because they provide opportunity for research, technology, and the training of specialists that cannot be gained via non-captive populations. Equally important, the importation of second-generation, domesticated elephants from range states plays a critical role in ensuring the survival of captive Western populations by sustaining numbers and enhancing genetic diversity.

Elephants without borders. When it comes to the survival of the Asian elephant, the world's elephants must be in it together, one for all and all for one.

Elephants Without Borders

Asian Elephants (*Elephas maximus*), All for One and One for All

Picture an ocean of elephants, millions strong, flooding the lowlands and highlands of Asia from the Tigris–Euphrates River Valley in Iraq, up and over the mountains of west Asia, pooling in great numbers throughout India and Sri Lanka, flowing deep into southeast Asia and spreading north to the Yangtze–Kiang River in China. Four thousand years ago, elephants in Asia left few sustainable habitats uninhabited.¹

That ocean has evaporated. What’s left is a splattering of isolated puddles on the Indian subcontinent and in Southeast Asia, for the most part. Puddles dry up far faster than oceans. Puddles of Asian elephants *have* dried up completely in what is now Iraq and Syria, in much of west Asia, and in Java, Indonesia. They *are* drying up, quickly, in Indochina, China, Sumatra, Nepal, and elsewhere. They *will* dry up, soon, throughout the diminished range. Asian elephants are disappearing faster than this slow-to-reproduce mammal can replenish itself.

Here’s the story: The spottier and scantier pachyderm populations become, the broader and more inclusive conservation efforts must be. The time is here to think of the Asian elephant as the world’s elephant—and the world’s challenge. Call it “Elephants Without Borders.” Our global challenge is to use every living *Elephas maximus* to revive and sustain the world population. *Captive and domesticated Asian elephants are crucial to the conservation of all Asian elephants.*

Why Asian Elephants Disappear

There’s no question that *Elephas maximus* is in danger of extinction.²

We know why:

- rapid habitat loss and fragmentation (the puddle effect)
- poaching and improperly regulated hunting for meat, sport, and profit
- human–elephant conflicts over crops and land in an impoverished, overpopulated land

The puddle effect is an especially grave problem. In the northeast India–Bhutan region, the world’s largest population of Asian elephants had splintered into 14 isolated populations with 33 subgroups, according to a 1993 census (the last detailed survey available). Two populations were about to evaporate. Seven populations were not self-sustaining and rapidly dwindling. Five populations were viable, but under protected from escalating development.³ That was a decade ago. Current numbers, as yet uncounted, are probably lower.

¹ Sukumar, R. *The Asian Elephant: Ecology and Management*, Cambridge University Press, pages 1–8 (1992 edition).

² CITES classified Asian elephants as an endangered species in 1976. The IUCN (International Union for Conservation of Nature and Natural Resources) continues to categorize Asian elephants as “Endangered,” meaning “facing a very high risk of extinction in the wild in the near future.”

³ Choudhury, Anwaruddin, Status and Conservation of the Asian Elephant *Elephas maximus* in North–eastern India, *Mammal Review* 29, 141–173 (1999).

Compounding all the unnatural pressures are two biological facts:

1. Elephants are enormous animals. To survive in the wild, they require enormous tracts of land with ample vegetation and reliable water sources.
2. Elephants reproduce in extremely slow trickles. Cows (female elephants) gestate for about 22 months, the longest among mammals, and usually have a four-year break between single-calf births. (Twins are very rare.)

Natural means alone are unlikely to help this endangered animal sustain itself. In range states, cows begin reproducing around age 15 and will generally continue to reproduce well into their 40s or perhaps even into their 50s. In captivity, improved nutrition and health care can allow them to mature faster, reaching puberty in half the time (ages 6 to 8).

We know where: Range maps clearly show that Asian elephants are cornered. Picture elephants trapped in a flood. As the water rises, they keep hopping to higher and higher ground until they end up hanging on treetops with waves licking at their feet.

The remaining Asian elephant habitats are—figuratively—relatively remote hilltops—the last patches of undeveloped land available. Elephant populations, protected and unprotected, are penned in on all sides by a rising tide of development. So, in this sense, all elephants could be considered captives. ***There is little or no unfettered “wild” left.***

We’re not sure how many: Population totals for Asian elephants are as spotty as the populations themselves.⁴ Field studies cover only part of the range, mostly in India and Sri Lanka. Also, in dense forests, these enormous animals can remain amazingly well-hidden.

Estimates range from roughly 35,000 to 45,000 Asian elephants on Earth (IUCN). Some 15,000 of those elephants are domesticated (for logging, transportation, and so on). Fewer than 1,000 elephants live in captivity in Europe and North America.

For every Asian elephant, there are roughly 10 African elephants. Asian habitats total about 310,000 km² (the size of New Mexico) of unprotected land and 130,000 km² (smaller than Nepal) of protected land.⁵

What’s the Vanishing Point?

How many elephants does it take for a population to sustain itself and remain genetically viable? The short answer: enough to outpace mortality and counter inbreeding depression⁶. The actual numbers vary for each population depending on group size,⁷ sex ratios, geographic distribution, unnatural deaths, and other conditions.

⁴ Walsh, P and L. White, What It Will Take to Monitor Forest Elephant Populations. *Conservation Biology* 13: 1194-1202 (1999).

⁵ Asian Elephants in the Wild, World Wildlife Fund (2000).

⁶Inbreeding depression is the expression of recessive genes that affect reproduction or physiological fitness. It occurs more frequently in a genetically homogenous population than a genetically diverse one because two parents carrying the recessive gene are more likely to mate.

⁷ Small, isolated populations are at the greatest risk of not achieving an MVP due to inbreeding depression. Also, with fewer numbers to lose, unnatural pressures such as human–elephant conflicts are magnified.

Because unmanaged elephants are tough to count and monitor, these data are spotty.⁸ For example, sometimes it's impossible to tell the sex of an elephant through dense forest trees, and so that elephant isn't counted in demographic studies.

Population statistics, when available, are factored into a formula for the minimum viable population (MVP), which is expressed as probability over time: A population of x elephants has a 95% chance of surviving for 200 years, for example. Raman Sukumar, an elephant researcher in southern India, estimates that an MVP of about 150 male and female elephants can survive in utopian-like conditions.⁹ The actual MVPs needed in the Asian elephant's imperfect world are far higher.

Perhaps eight elephant populations in India have at least 1,000 members. Yet number totals alone don't ensure survival. For example, in southern India, Asian elephants face a shortage of males due to poaching.¹⁰ The elephants of Nilgiris–Eastern Ghats have a skewed male:female ratio of 1:15.¹¹ Other groups may be as lopsided as 1:20.

Along with the MVP, there's a minimum viable habitat—the smallest tract of land needed to sustain a population of a certain size. Rapid habitat loss is the number one problem for undomesticated elephants. That constant pressure, if coupled with decreased fecundity and increased mortality, can darken the long-term outlook for any Asian elephant population, large or small.

How to Make Elephants Reappear: The Role of Captive Populations

A battery of conservation efforts¹² in range states seeks to help *Elephas maximus* avoid extinction. These programs aim to expand protected habitats¹³, introduce wildlife corridors between isolated populations¹⁴, translocate small populations into larger ones, enforce anti-poaching laws¹⁵, resolve human–elephant conflicts, and conduct field studies. All well and good, but there's a critical, often overlooked, corps in the

⁸ A few examples of population studies include:

Choudhury, Anwaruddin, Status and Conservation of the Asian Elephant *Elephas maximus* in north–eastern India, *Mammal Review* 29, 141-173 (1999).

Sukumar, R., et al. Demography of Captive Asian Elephants (*Elephas maximus*) in Southern India, *Zoo Biology* 16:263-272 (1997).

Sukumar, R. *The Asian Elephant: Ecology and Management*, Cambridge University Press, pages 202–208 and Appendix IV: Population Viability Analysis (1992 edition).

Do Tuoc, Conservation of the Asian Elephant in Indochina, Proceedings of the Asian Elephant Group Conference, Hanoi, Vietnam (1998).

⁹ Sukumar, R. *The Asian Elephant: Ecology and Management*, Cambridge University Press, page 204 (1992 edition).

¹⁰ Unlike African elephants, only some Asian bulls have tusks, and no cows have tusks.

¹¹ Menon, V. and Kumar, A., Signed and Sealed: The Fate of the Asian Elephant, Asian Elephant Conservation Centre, Wildlife Protection Society of India (1998).

¹² Santiapillai, C. and Jackson, P., The Asian Elephant: An Action Plan, IUCN, Switzerland (1990).

Asian Elephants in the Wild, a WWF report of the status of the Asian elephant (2000).

¹³ Choudhury, A., Status and Conservation of the Asian Elephant *Elephas maximus* in North–eastern India, *Mammal Review* 29, 141-173 (1999), for one example.

¹⁴ Johnsingh, A.J.T. and Williams, A. Christy, Elephant Corridors in India: Lessons for Other Elephant Range Countries, *Oryx* 33 (3), 210-214 (1999).

¹⁵ MIKE (Monitoring the Illegal Killing of Elephants), CITES

Signed and Sealed: The Fate of the Asian Elephant, by Vivek Menon and Ashtok Kumar, Asian Elephant Conservation Centre, Wildlife Protection Society of India (1998).

“Fears for Asian Elephant Rise With Ivory Sale,” by Ranjit Devraj, *Global Information Network*, (11/13/02)

conservation battle: *Captive and domesticated populations are vital forces in the struggle to save Elephas maximus.*

The benefits of captive populations go far deeper than public awareness and education, though these aspects are important. The benefits are scientific, critical, and direct:

Elephant Access: Undomesticated Asian elephants are tough to find. Unlike savannah-dwelling African elephants, these beasts live in dense forests. Many populations have fewer than 100 members, scattered in groups of fewer than 10. Bulls roam in smaller bachelor groups or alone.

Even when field researchers locate Asian elephants, they usually can't (and shouldn't, for safety reasons) get near these wild animals. From a distance, through field glasses, for a brief time, maybe one day but not the next, a field scientist can study the behavior of a group or bull.

A case in point: Trinh Viet Cuong may be the world's most dogged and yet unfulfilled field zoologist. For a decade, he has tracked Vietnam's elephants in their hilly forest habitats. There are, maybe, 100 of them scattered in 17 locations. As reported in *Environmental News Network*¹⁶, Cuong rarely sees them. For a three-year stretch, he found only their dung, footprints, and other traces. (Soon, he probably won't even find those vestiges. The population is demographically extinct, and translocation into a large group is the best hope for survival.¹⁷)

By contrast, scientists and other researchers can access captive and domesticated elephants readily, regularly, and intimately. They can observe and monitor a pregnancy from conception to birth (field scientists usually can't tell by sight if an elephant is even pregnant). They can take regular blood samples to track hormonal changes over time. They make behavioral observations of the same animals, day after day. That's how researcher Katy Payne discovered that elephants communicate by infrasound. After collecting data at the Oregon Zoo, she used her methodical findings to explore elephant communication in the field.

Free contact (very simply put, this means that the animal and the trainer share unrestricted access to the same space—the animal is not confined by bars, tethers, etcetera) elephants offer the easiest access.¹⁸ A simple example is an animal that lifts its foot on cue to allow for inspection or treatment. Dr. Dennis Schmitt¹⁹, a leading expert in elephant reproduction, explains, “Free contact elephants are much more compliant, and it's easier to work with them. For example, it's much easier to examine the eye, which is a delicate thing, because the elephant holds steady.” Untrained captive elephants are accessible, too, he points out, but “they sometimes choose not to be compliant and may require chemical restraint for minor procedures.” They may also require physical restraints, such as chutes, which may obstruct access for some procedures.

¹⁶“Vietnam's Wild Elephants,” by Andrea Pawlyna, *Environmental News Network* (9/14/00).

¹⁷ For more information: Do Tuoc, Conservation of the Asian Elephant in Indochina, Proceedings of the Asian Elephant Group Conference, Hanoi, Vietnam (1998).

Sukumar, R., *Estimating Elephant Densities in Forests through Direct and Indirect Methods, Conservation of the Asian Elephant in Hanoi, Indochina* (1999).

¹⁸ Free contact animals, almost all cows and castrated bulls, are trained to accept direct human handling and to respond to commands. Circuses and some zoos follow this husbandry practice.

¹⁹ Interviewed in January 2003.

Undomesticated elephants in Asia require tranquilizing for hands-on access. Tranquilizing large, wild animals is risky, especially if researchers aren't well-trained in drugs and dosages. "They don't tranquilize wild elephants to study them unless there's another reason, such as translocating the animal, or when the benefits far outweigh the risk," says Dr. Schmitt.

Controlled Research Studies: Access to captive elephants makes easier—and often makes possible—a variety of research studies.²⁰ Findings from these studies lead to better management of all Asian elephants.

Dr. Bets Rasmussen, an expert in chemical communication from Oregon Health and Science University, relies on elephants managed in a primarily free contact system²¹ to sample compounds produced by male and female elephants. She collects urine and breath samples. She vacuums up secretions from the temporal gland (between the delicate eye and ear). Dr. Rasmussen analyzes these secretions in parts per billion for up to 400 compounds.

For a trickier procedure, a trainer commands an unrestrained elephant to lie on its side and open its mouth. Dr. Rasmussen then kneels and inserts a thin, foot-long infant feeding tube through a winding duct on the roof of the mouth that leads to a secondary olfactory, the vomeronasal organ.

"It takes about 30 seconds to a minute," she explains. "There's no flinching, no increase in eye blinking, and no trauma or pain. The elephant doesn't show any reaction."

The tube captures a minute droplet of mucus. Proteins in the mucus help transport pheromones (compounds released from the elephants that send chemical messages to other elephants) to the olfactory organ. Such chemical iota could contribute to solving an elephantine problem in Asia—keeping farmers and crop-raiding pachyderms apart.

Fifteen years of analyzing elephant compounds has led to the discovery of which chemicals function as powerful attractants or repellents.²² In an experiment involving a bull and several cows, she dotted the ground with a female pheromone and several control compounds.

"The bull goes to the pheromone right away and then looks to the females," she recalls. "He tests each one (for fertility, by sniffing the urine by his regular nose and demonstrating flehmen), but none of the females are near ovulation. So the bull goes back to the spot and tests each female again. He kept repeating this, checking them out, 20 times."

No question: That sweet-smelling acetate is one powerful attractant. By contrast, a malodorous musth²³ secretion by a 40-year-old bull repels young bulls and causes alarm and agitation in pregnant females.

²⁰ Smith, B. and Hutchins, M., The Value of Captive Breeding Programmes to Field Conservation: Elephants as an Example. *Pachyderm* 28:(Jan-Jun):101-109 (2000).

Schulte, B.A., Social Structure and Helping Behavior in Captive Elephants, *Zoo Biology* 19:447-459 (2000).

²¹ Interviewed in January 2003.

²² Rasmussen, L.E.L, Mellifluous Matures to Malodorous Musth, *Nature* 415: 975-976 (2002).

Rasmussen, L.E.L. et al., The Olfactory Adventures of Elephantine Pheromones, *Biochemistry* (2002, in press).

²³ Musth is a poorly understood, periodic condition in bulls that causes them to secrete mucus from the temporal lobe and act more aggressively and erratically.

By using captive elephants to get a solid scientific handle on these and other compounds, Dr. Rasmussen was able to conduct pointed field studies in southern India, where she took urine samples and mucus samples from tree rubbings.

“I knew just what compounds to look for because of my studies with captive elephants,” she explains.

A long-term goal would be to combine natural repellents with other chemicals to make them last longer, and then use them along with other methods²⁴ to ward off crop-raiding elephants.

Breeding Success: If the goal is to make Asian elephants reappear, then achieving their biological potential for breeding is half the battle. (The other half is decreasing mortality, below.) Domesticated and captive elephants boost breeding potential in at least two important ways.

First, on a simple level, they increase the total population numbers, no small thing for the world’s slowest breeders. Working elephants in some timber camps in India (in the Mudumalai Wildlife Sanctuary and Indira Gandhi National Park, for example) are producing a surplus of calves.²⁵ These elephants receive care, a steady supply of food, and protection from poachers and hunters. Also, working cows have access to ranging bulls, which sire significant numbers of the calves. As a result, this domesticated population is self-sustaining (as long as the elephants are of economic value).

Second, captive populations allow scientists to research ways to increase fertility. Lately, western breeding programs have been showing both progress and promise due, in large part, to advances in science and technology. For example, scientists recently discovered a method to identify the one or two days per cycle in which a female elephant is fertile.²⁶ Scientists also conduct ultrasound examinations to determine if otherwise healthy females are infertile due to pathology or scarring,²⁷ to monitor pregnancies, and to artificially inseminate females with greater accuracy (below). They can perform these ultrasounds on trained, free contact elephants without the use of drugs or restraints.

Advances in husbandry, health care, and diet of captive populations also enhance breeding. At the *Ringling Bros. and Barnum & Bailey Center for Elephant Conservation* (CEC) in Florida, a captive-born elephant named Shirley became pregnant at 7 years old by 9-year-old bull Romeo and recently gave birth to the first second-generation calf at that facility. Captive bulls can begin to breed earlier, too. Teenagers can have unchallenged access to females, whereas their range state counterparts defer to older, larger bulls in their 30s and 40s.

²⁴ Sukumar, R., *The Asian Elephant: Ecology and Management*, Cambridge, p. 108–134 and 211–218 (1992 edition).

²⁵ Sukumar, R., et al., Demography of Captive Asian Elephants (*Elephas maximus*) in Southern India. *Zoo Biology* 16:263-272 (1997).

²⁶ Dehnhard, M., et al., Demonstration of 2-unsaturated C19-steroids in the Urine of Female Asian Elephants, *Elephas maximus*, and Their Dependence on Ovarian Activity, *Cambridge* 121:(3):475-484 (2001)

Rasmussen, L.E.L., Source and cyclic release pattern of (Z)-7-dodecenyl acetate, the pre-ovulatory pheromone of the female Asian elephant. *Chemical Senses* 26:(6):611-623 (2001).

Slade, B.E., Schulte, B.A., Rasmussen, L.E.L., Oestrous State Dynamics in Chemical Communication by Captive Asian Elephants, *Animal Behavior*, (2003: in press).

²⁷ Hildebrandt, T. et al, Ultrasonography of the Urogenital Tract in Elephants: An Important Tool for Assessing Female Reproductive Function, *Zoo Biology* 19: 321-332 (2000).

Artificial Insemination²⁸: Captive elephants are essential for developing and improving artificial insemination (AI) techniques. As of January 2003, in North America, AI has successfully produced two Asian elephant babies. The first (in 1999), Haji, was born at Dickerson Park Zoo in Springfield, Missouri, but later died of a virus. The latest (November 2001), Kandula, lives at the National Zoo in Washington, D.C.

It's a start. The promise of AI is to impregnate cows that don't have access to bulls. That's the rule in most Western zoos. Notable exceptions are the *Ringling Bros. Center for Elephant Conservation*, which houses five bulls; the Oregon Zoo, which houses three bulls; and the Dickerson Park Zoo, which housed three bulls until one died in 2002.

Bulls are extremely difficult and dangerous to transport, and so, currently, cows make the honeymoon trip for mating, which is easier. AI promises to eliminate some of the travel and expense. By helping transcontinental elephants (and perhaps, in the future, transglobal elephants) breed, AI also has the potential to diversify the gene pool.

"Potential" is a key word here. There are still some high hurdles to jump, according to Dr. Dennis Schmitt. Interestingly, unlike African elephant semen, frozen Asian elephant semen is "motile but not fertile," he says. Asian elephant semen has to be very fresh. That means (1) testing a female for fertility, (2) if she's fertile (a one- or two- day window), immediately collecting semen from one or more bulls conditioned to donate it, (3) examining the semen for active sperm, (4) transporting the semen ASAP to the cow, and (4) impregnating her. All of this must occur on the same day.

The challenge, says Dr. Schmitt, is to find an additive that would allow the semen to be frozen and banked. A sex selection process (sorting sperm by sex) would also be a welcome breakthrough, allowing captive breeding programs to increase the number of females, and, thus, the number of pregnancies. *Once the challenges are met, AI could provide "equal opportunity siring" for Asian elephants around the globe.*

Technology Transfer: Even if Asian elephant semen isn't easily transportable, technology and elephant management knowledge are. Researchers in Europe and North America can export their methods to range states and vice versa. The Asian Elephant Conservation Act (1997)²⁹ provides funds for training and studies in range states. Riddle's Elephant Breeding Farm and Wildlife Sanctuary in Arkansas conducts workshops for elephant researchers and trainers from around the world.

Bringing Them Up Alive

The flip side of increasing fecundity is decreasing mortality. There, too, captive studies benefit all Asian elephants. To name a few:

Death Intervention: Both domesticated and undomesticated mothers, especially first-timers, can sometimes kill or harm their newborns. One obvious and simple advantage of responsible captive facilities is that caretakers can immediately intercede to save the calf's life until the mother stands down. Veterinarians can be

²⁸ Faust, L. et al., Modeling the Effects of Artificial Insemination on the Demography of Captive Asian Elephants, Department of Conservation and Science, Lincoln Park Zoo.

²⁹ The Asian Elephant Conservation Reauthorization Act (HR 700) has ensured funding for Asian elephants through 2007 for 46 conservation projects in 12 countries.

on hand to assist in difficult births and check the health of the baby and mother. Researchers can study the mother's behavior to determine its cause and prevention.

Disease Treatment and Prevention: Asian elephant caretakers are developing and improving treatments for elephant illnesses, such as foot diseases (sometimes fatal in elephants)³⁰, tuberculosis³¹, and the deadly Elephant Endothelial Herpesvirus (EEV)³². EEV has turned up in range state elephants, as well as in Western facilities. Again, captive elephants, Western and Asian, provide a controlled, accessible population for disease specialists to study.

Saving the Captive Population

Captive Asian elephants are vital for the conservation of *Elephas maximus*, and yet western populations themselves could die out in a matter of decades. In 1976, the Convention on International Trade in Endangered Species of Flora and Fauna (CITES), which regulates the trade of undomesticated elephants and first generation domesticated elephants from range states, effectively ended the movement of elephants to the West.

As of 2000, North America is home to 285 elephants.³³ Yet here's how the demographic deck is stacked against them:

- Only the breeders—35 of them—count toward the MVP.
- Many of these breeders won't breed for long due to advanced age (a consequence of both the 28-year CITES treaty and a century of scant success with captive breeding).
- Many cows in their 30s and 40s have not yet bred, and so are likely to have physiological barriers (scarring, pathology) to fertility.³⁴
- Not all the breeders have access to mates, since the elephants are scattered across a continent in more than 100 facilities.
- Many facilities have no bulls, which are more difficult to handle and more expensive to house.

Captive Asian elephants in Europe, though nearly 500 strong, face the same fate for similar reasons. About 90% are females, and not all of these cows are breeders due to advanced age.

There's also a financial impediment to captive breeding. Half of the calves born will be male. Within 10 or so years, each bull will require separate, expensive housing arrangements to safeguard other elephants and elephant caretakers. For example, the *Ringling Bros. Center for Elephant Conservation*, owned and operated by Feld Entertainment, Inc., the parent company of *Ringling Bros. and Barnum & Bailey® Circus*, has five bulls and five bull barns.

³⁰ Mikota, S. et al, Tuberculosis in Elephants in North America, *Zoo Biology* 19: 393–403 (2000).

³¹ Csuti, B. et al, *The Elephant's Foot*, Iowa State University Press (2001).

³² Burkhardt, S., et al., Genetic and Ultrastructural Characterization of a European Isolate of the Fatal Endotheliotropic Elephant Herpesvirus. *Journal of General Virology* 82:(3):475-482 (2001)

Schmitt, D.L., et al, Use of Fanciclovir for the treatment of Endotheliotropic Herpesvirus Infections in Asian Elephants (*Elephas maximus*), *Journal of Zoo and Wildlife Medicine* 31:(4):518-522 (2000).

³³ Asian Elephant Studbook, Mike Keele, Oregon Zoo (2000)

³⁴ Hildebrandt, T., Ultrasonography of the Urogenital Tract in Elephants: An Important Tool for Assessing Female Reproductive Function, *Zoo Biology* 19: 321-332 (2000).

“*Ringling Bros.* is committed—long-term—to caring for all our elephants,” says John Kirtland, Feld Entertainment’s Executive Director of Animal Stewardship. “That’s the advantage of a for-profit company. Part of our revenue from ticket sales is allocated for our conservation efforts.”

Some non-profits, such as the National Zoo, which has a breeding center on the drawing board for 2007, also have funding to expand their elephant facilities. Those that don’t have such resources, can’t take the chance of breeding males due to American Zoo and Aquarium Association (AZA) rules, which include minimum indoor space requirements of 600 square feet and use of special elephant restraint devices (ERD) for bulls. Moreover, intact adult bulls by their nature typically must be housed alone. In short, there are high costs involved in having bull elephants.³⁵

Suppose the bull housing crunch is solved. Suppose all the breeding elephants in North America achieve a high fecundity rate, soon. Suppose the mortality rate drops to record levels, soon. That’s still not enough, according to a demographic model by Robert Wiese.³⁶ With numerical certainty, he reports, this population does not meet the MVP: *North America’s Asian elephants will be demographically extinct within a few decades if they rely on captive breeding alone.*³⁷

With ideal conditions, reaching a self-sustaining population in North America by 2050 would require a low mortality rate and an average of nearly 14 births per year. In the 1990s, captive births of Asian elephants trickled in at one or two per year. A more feasible solution is to import second generation domesticated elephants from range states, including timber camps that have a surplus of elephants.

Elephants Without Borders

The issue has come full circle. Captive populations play a critical role in conserving the entire population of Asian elephants, which benefits from research, technology, and training of specialists. Range state elephants play a critical role in ensuring the survival of captive Western populations, which need to import second-generation, domesticated elephants from range states to sustain their numbers and genetic diversity.

Elephants without borders. When it comes to the survival of *Elephas maximus*, the world’s elephants are all in it together, one for all and all for one.

³⁵ AZA Standards for Elephant Management and Care, Space 1.4.1, Restraint 5.5.1.

³⁶ Wiese, R., Asian Elephants are Not Self-sustaining in North America, *Zoo Biology* 19:299-309 (2000).

³⁷ Schmid, J., Status and Reproductive Capacity of the Asian Elephant in Zoos and Circuses in Europe, European Endangered Species Programme (1997).

Wiese, R. Asian Elephants are not self-sustaining in North America, *Zoo Biology* 19:299-309 (2000).

Ask the Experts About the World's Asian Elephants

- There are surplus domesticated elephants in some Indian timber camps, including camps in Mudumalai Wildlife Sanctuary and Indira Gandhi National Park. There aren't enough breeding females in North America to sustain the population. Does it make sense for these camps to export their surplus females for captive breeding?
- There aren't enough bulls in range countries, especially where poaching is a problem. Western facilities are currently limited in their ability to house bulls. Does it make sense to translocate young, captive-bred bulls to *well-managed and protected* areas in Asia?
- The North American Asian elephant population is too small and too old to be self-sustaining. Every elephant counts. Why isn't there more cooperation between all facilities that house Asian elephants—zoos, circuses, and sanctuaries?
- Because of a 1989 ban on logging to preserve forests, Thailand now has some 4,000 domesticated elephants that are unemployed. Is it feasible to relocate these working elephants to facilities around the world that can care for them? Or, should organizations from around the world support them to ensure continued survival?

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Key Documents

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IUCN: ASIAN ELEPHANT SPECIALIST GROUP MEETING

The SSC Asian Elephant Specialist Group met in Cambodia recently to draw up an Action Plan for elephant conservation in all of the 13 range states, following continued pressure from deforestation, hunting, and major changes in land use. The estimated number of wild Asian elephants is between 37,000 and 45,000. Many of

the leading government decision makers on wildlife and forestry policy in Asia attended. Other delegates from 13 Asian countries, including Myanmar and China, as well as many international specialists, brought expertise in every form of elephant conservation--from tracking ivory poachers to promoting local pride in elephants. Discussions focused on the major issues facing the Asian elephant in the wild, including its near extinction in Vietnam, widespread land conversion on the Indonesian island of Sumatra, and the potential for conservation efforts in the little-studied forests of Myanmar. Four task forces were established: human-elephant conflict, poaching and the ivory trade, captive elephant management, and data management.

Baseline species data sets

These will underpin SSC's biodiversity information and analyses. They will be made publicly available, through the SSC website, in formats and at scales that will allow users to perform analyses in support of their own objectives. This service is fundamental to SIS. SIS baseline species data sets will include:

- * species distribution maps;
- * population trends;
- * ecological requirements (e.g., habitat preferences, altitudinal ranges);
- * degree of threat (conservation status according to IUCN Red List Categories and Criteria);
- * types of threat;
- * conservation actions (taken and proposed); and
- * key information on use. In addition to the freely available basic data sets, SIS will support two further categories of products, each of which will have potential to generate revenue.

Signed and Sealed: The Fate of the Asian Elephant (poaching), by Vivek Menon and Ashtok Kumar, Asian Elephant Conservation Centre, Wildlife Protection Society of India, 1998. Recent news: "Fears for Asian Elephant Rise With Ivory Sale," by Ranjit Devraj, *Global Information Network*, 11/13/02 (one-time sale of stockpiled African ivory currently under consideration by CITES). Funds raised will be used to help support remaining populations.

Electronic Databases

Asian Elephant Database (bibliography of science papers): <http://www.elephantcare.org/database.htm>

Coyler Institute (bibliography of 425 scientific studies):
http://www.colyerinstitution.org/elephant_references/reference_collection.htm

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Organizations

Ringling Bros. and Barnum & Bailey Center for Elephant Conservation

CITES (Convention on the International Trade in Endangered Species)

IUCN: World Conservation Union (Raman Sukumar) <http://www.iucn.org/>

World Wildlife Foundation

Smithsonian Institute's Conservation and Research Center (Michael Stüwe)

Elephant Conservation Center of the Thai Forestry Organization

Food and Agricultural Organization of the United Nations (Richard Lair)

Society for Conservation Biology

International Elephant Foundation

Friends of the Asian Elephant

Elephant Care International

Living With the Elephants Foundation

European Endangered Species Programme (EEP) www.worldzoo.org

Center for the Study of Elephants (Carson, California)

Riddle's Elephant Breeding Farm and Wildlife Sanctuary, Arkansas

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