



CLOCKWISE FROM ABOVE: ELD'S DEER (*CERVUS ELDI*) FEMALE WITH YOUNG, KEIBUL LAMJAO SANCTUARY, MANIPUR, INDIA. KNOWN LOCALLY AS SANGAI OR BROW-ANTLERED DEER. ENDEMIC THREATENED SPECIES © ANUP SHAH; CHILEAN HUEMUL OR SOUTH ANDEAN DEER (*HIPPOCAMELUS BISULCUS*), TORRES DEL PAINE NATIONAL PARK, PATAGONIA, CHILE. ENDANGERED SPECIES © ORIOL ALAMANY; ELK (*CERVUS ELAPHUS*) BULL BUGLING IN RUT, YELLOWSTONE NP, WYOMING, USA © ROLF NUSSBAUMER; WHITETAIL DEER, FLORIDA, USA (*ODOCOILEUS VIRGINIANUS*) © BERNARD CASTELEIN; **OPPOSITE PAGE:** YOUNG MALE MOOSE (*ALCES ALCES*) STANDING IN WATER, TUPPER LAKE, ADIRONDACK MOUNTAINS, NEW YORK, US © JOHN CANCALOSI



Deer abundance: it's not what it seems

AS A FAMILY, DEER POPULATE THE WORLD IN STRONG NUMBERS. MANY SPECIES WITHIN THAT FAMILY, HOWEVER, ARE IN CRITICAL NEED OF CONSERVATION

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We often speak at meetings of hunting clubs or civic organizations, and find that most people in the audience feel they are deer experts. This is partly because deer are the commonest large mammals in Europe and North America. Many people interact with deer on a regular basis and have strong opinions on their ecology and conservation. In Europe, most people recognise several species, such as reindeer, elk, red deer, and roe deer, and they all seem to be doing well in today's world. Deer seem to adapt well to humans and their modifications to the landscape. In fact, a recent volume on deer management in Europe found at least one deer species to be abundant in most countries, and often numbers in forested areas are reaching levels of resource damage.

Appearances, however, can be deceptive; there are more than 50 species of deer in the world, but most are declining in numbers and most are not adjusting well to a world dominated by humans (Table 1). The story of deer is the story of conservation in the modern world, trying to galvanize action about an impending crisis that is not obvious to the casual observer.

Why are some deer species doing so well, while others so poorly? Let us first look at the well-off species. The deer species in North America are actually a conservation success story. White-tailed deer and to a lesser extent moose, mule deer and elk, declined precipitously in the late 1800s due to widespread conversion of land to agriculture and the unregulated sale of wild meat to commercial dealers. It was only with the creation of hunting regulations, and public agencies devoted to game restoration and habitat restoration, that deer numbers started to increase. Within 40-60 years following these activities deer numbers had increased to such an extent that landowners started to protest about wildlife damage, while deer/vehicle collisions became a serious issue. It is worth noting that, throughout most of deer range, large predators were not part of the restoration activities. While hunters were relied on to replace the native predators, an important demographic trend recently is the declining number, and ageing population, of deer hunters. The result of these intentional and unintentional activities was the restoration of deer in many protected areas to the extent that they have serious impacts on ecosystem functions, especially

in forests. These impacts cut across trophic levels, with changes in vegetation due to deer browse impacting nesting songbirds and small mammals, whose numbers affect both insect and predator populations. Today, deer are a keystone species in most forests of North America and Europe and their management is of primary concern for conservationists. This association of deer with overabundance, severe crop and forestry damage, as well as deer/vehicles collisions, makes it extremely difficult to rally the public around conserving the less known species, whose circumstances do not match those of the deer we know.

Unfortunately there are no examples in the emerging world of deer species being considered overabundant. Table 1 is a summary of the IUCN Red List for deer and shows that few deer outside of Europe and North America are not threatened or endangered. For a quarter of the species we do not know enough to determine their status (referred to as Data Deficient). For more than half of the species we are concerned about their future. There are consistent reasons across the world why deer species are declining; loss of habitat and unregulated hunting. We are even unsure of how many species of deer exist, as small cryptic species of deer in the forests of South America (*Mazama* sp.) and Asia (*Muntiacus* sp.) seem to be discovered with each new exploration of river drainages or mountain tops. We do know that large deer species outside of North America and Europe are in dire conditions, due to the ease of hunting with modern weapons and their use as meat or in traditional medicine. For the smaller species, their low numbers are often linked to lack of control over snares set for bushmeat that is used locally or transported to the larger cities as a delicacy. For some species, such as huemul in the mountains of Argentina and Chile, their decline seems to be linked to an inability to coexist with domestic dogs and livestock. Unless reserves established at lower elevations can exclude these animals the species outlook is of concern. In both Asia and South America, dam construction for hydroelectric power and reservoirs is removing wetland habitats that were home for both large and small deer species.

The good news is that we know everything we need in order to conserve the rarer deer species. Habitat needs are known, or can be estimated, and we can control poaching on public

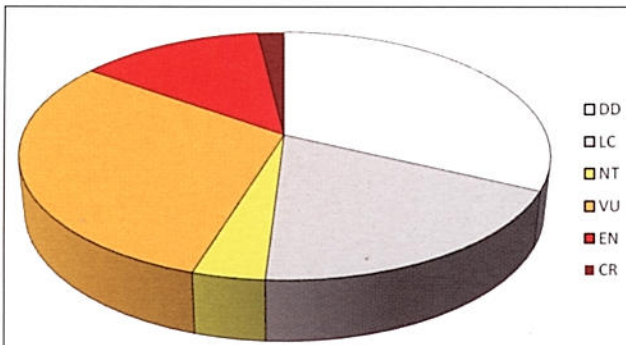


Figure 1. The relative number of deer in each category of endangerment according to the IUCN Red List. DD are Data Deficient species for whom we do not know enough to rank their level of endangerment. The remaining categories are in increasing level of concern (Least Concern (LC); Near Threatened (NT); Vulnerable (VU); Engangered (EN); and Critically Endangered (CR). We do not include 2 species where one has gone extinct in the last 50 year (*Rucervus schomburgki*) and one is present only in semi captive populations (*Elaphurus davidianus*).

lands if supported by the public will and sufficient funds are allocated. In addition, deer are easily bred in captivity, easily translocated and provisioned at new sites, and usually their habitat can be easily manipulated to increase forage. Restoring deer populations through restocking or better management does not garner the same extreme of human/wildlife conflicts involved with bringing back large predator, although farmers will suffer increased crop losses that will need remediation.

Restoring deer usually has the added benefit of restoring cultural and economic activities that can be sustainable, if managed properly. There is no reason why emerging countries cannot derive income from deer species; what is lacking is effective regulation. There is great potential to leverage funds

for deer conservation. Tiger conservation is presently an Asia-wide effort that has garnered the backing of the World Bank and multinational corporations. Tigers, as well as other large predators, will only persist in the wild if their prey base persists, and the diet of tigers across most of their range is deer. The zoo community can rally to the cause by displaying the diversity of international deer species and generating interest and funding for conservation within range countries. Zoos have done this in the past, for example conserving the Chinese Pere David's until the Chinese government was ready to resume stewardship. The hunting community has played a strong role in recovering deer species within North America and Europe through their support of licensing fees, taxes allocated to game lands, personal efforts on private lands, and support for national legislation.

It is hopeful that this support can be expanded to the developing world, especially for large species that are considered trophy animals.

One of us (WJM) once spent a long dry season looking for the endangered Elds deer in Laos. I would show local villagers photos of the deer, and one villager got very angry and started pointing into the forest and toward his crop fields. After a quick translation he reported that he hated that deer, as they nightly came out from the forest to eat his crops. He hoped I had come to remove all the deer. That was the only population of deer we located in the country and the species still retains its endangered status on the IUCN Red List. The villagers in that region were not convinced that their locally abundant deer was anything special and they assumed everyone had the same large deer eating their crops.

Everyone is an expert on their local deer, but we have to realize that not all deer enjoy the population status of deer in Europe and North America. Most deer need conservation assistance quickly, and only by thinking and acting beyond our local situation will we save much of the diversity we so admire in deer.

Data Deficient	Least Concern	Near Threatened	Vulnerable	Threatened	Critically Threatened
<i>Mazama americana</i>	<i>Alces alces</i>	<i>Elaphodus cephalophus</i>	<i>Blastocercus dichotomus</i>	<i>Axis calamianensis</i>	<i>Axis kuhlii</i>
<i>Mazama nana</i>	<i>Alces americanus</i>	<i>Ozotoceros bezoarticus</i>	<i>Hippocamelus antisensis</i>	<i>Axis porcinus</i>	
<i>Mazama temama</i>	<i>Axis axis</i>		<i>Hydropotes inermis</i>	<i>Dama mesopotamica</i>	
<i>Muntiacus feae</i>	<i>Capreolus capreolus</i>		<i>Mazama bororo</i>	<i>Hippocamelus bisulcus</i>	
<i>Muntiacus gongshanensis</i>	<i>Capreolus pygargus</i>		<i>Mazama bricenii</i>	<i>Muntiacus vuquangensis</i>	
<i>Muntiacus montanus</i>	<i>Cervus elaphus</i>		<i>Mazama chunyi</i>	<i>Rucervus eldii</i>	
<i>Muntiacus puhoatensis</i>	<i>Cervus nippon</i>		<i>Mazama pandora</i>	<i>Rusa alfredi</i>	
<i>Muntiacus putaoensis</i>	<i>Dama dama</i>		<i>Mazama rufina</i>	<i>Axis calamianensis</i>	
<i>Muntiacus rooseveltorum</i>	<i>Mazama gouazoubira</i>		<i>Muntiacus crinifrons</i>		
	<i>Mazama nemorivaga</i>		<i>Przewalskium albirostris</i>		
	<i>Muntiacus atherodes</i>		<i>Pudu mephistophiles</i>		
	<i>Muntiacus muntjak</i>		<i>Pudu puda</i>		
	<i>Muntiacus reevesi</i>		<i>Rucervus duvaucelii</i>		
	<i>Muntiacus vaginalis</i>		<i>Rusa marianna</i>		
	<i>Odocoileus hemionus</i>		<i>Rusa timorensis</i>		
	<i>Odocoileus virginianus</i>		<i>Rusa unicolor</i>		
	<i>Rangifer tarandus</i>				

Table 1. Endangerment status of each deer species according to IUCN Red List. We do not include two species where one has gone



MAIN PIC: ELD'S DEER (*CERVUS ELDI*) MALE PORTRAIT, KEIBUL LAMJAO SANCTUARY, MANIPUR, INDIA. KNOWN LOCALLY AS SANGAI OR BROW-ANTLERED DEER. ENDEMIC THREATENED SPECIES. © ANUP SHAH; **BELOW, CLOCKWISE:** CHINESE WATER DEER (*HYDROPOTES INERMIS*) MALE, CAPTIVE, FROM CHINA AND KOREA, VULNERABLE SPECIES © ROD WILLIAMS; CHINESE WATER DEER (*HYDROPOTES INERMIS*) BUCK IN WOODLAND SHOWING TUSKS, CAPTIVE, KENT, UK © DAVE BEVAN; KUHLS / BAWEAN HOG DEER (*AXIS KUHLII*) NATIVE TO BAWEAN ISLAND, INDONESIA. CAPTIVE. EDINBURGH ZOO, CRITICALLY ENDANGERED © MARK BOWLER; BARASINGHA / SWAMP DEER (*CERVUS DUVAUCELLI*) STAG, KAZIRANGA NATIONAL PARK, ASSAM, INDIA © MATTHEW MARAN



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