

Vanishing Species: What is threatening Species? Traits of Vulnerable Species

By identifying the traits that characterize species likely to become endangered or fade to extinction, it is possible to afford them and their habitats extra protection and carefully monitor their status. The tragic losses of so many of these "red flag" species should be avoided in the future, and can be, with remedial action. Ideally, species should be conserved when their populations are still healthy, before they become genetically impoverished and their populations fragmented. The list below includes some of the characteristics many extinct and endangered species possess. Undoubtedly, the more we learn about the causes pushing wildlife and plants to extinction, the longer such a list will become.

1. Endemic species, or animals and plants that are restricted to a relatively small area, such as an island, are inherently vulnerable to extinction. They have incurred the greatest number of extinctions in the past 400 years. Changes in their habitat or losses to their populations can eliminate them. Many of these species were confined to areas that measured only a few square miles. Mainland species, likewise, can be endemic to small areas. The Slender-billed Grackle (*Cassidix palustris*) once inhabited a single marsh near Mexico City. The marsh was filled about 1910, spelling extinction for this bird. Many endangered species fall into this category.
2. Specialization of habitat or diet has caused much extinction. Animals that depend on a certain type of habitat or food source and cannot adjust to alterations, whether natural or human-caused, are extinction-prone. The Ivory-billed Woodpecker requires large expanses of old-growth forests with many dead and dying trees. The endangered Kirtland's Warbler (*Dendroica kirtlandii*) of Michigan will colonize only one type of forest: stands of jackpine trees that are eight to 22 years old on well-drained, sandy soil. This habitat must now be artificially maintained to prevent the bird's extinction. The Palila (*Loxoides bailleui*), a Hawaiian honeycreeper, is dependent on the mamane tree for feeding, which has declined as a result of logging and destruction of seedlings by introduced game species and livestock. Many endangered plants require specific soil type, climate, drainage and sunlight exposure. For those species that require unbroken stretches of habitat, such as old-growth forest, endangerment or extinction can result if the forest is fragmented.
3. Long-lived species with low reproductive rates and low natural mortality are vulnerable to extinction. Fast-reproducing species that have many young at frequent intervals and high natural mortality rates tend to be more resilient to population losses and recover quickly if their habitat has not been destroyed. Not all vertebrates fall easily into these categories, but many do, and these groupings can be at least one indication that is useful in terms of predicting which species will become endangered when their populations are reduced. Slow-reproducing animals decline rapidly from losses in their numbers, and since they often do not breed until a relatively advanced age and have few young, many decline to extinction. In some cases, such animals do not recover their former abundance, or recover very slowly. A few of these animals, including sea turtles, lay many eggs, but only a small percentage of the hatchlings survive to adulthood. Although few of the now extinct animals were ever studied in the wild, enough is known of related species to guess that many fell into this category. The Steller's Sea Cow (*Hydromalis stelleri*), for example, was a member of the Order Sirenia of manatees and Dugongs. The surviving species have few natural enemies, do not breed until age 7 to 10 years old, and have only one young every five years. Hunting caused the extinction of Steller's Sea Cow in the space of a few years, eliminating the only cold-water member of this family. Hunting threatens surviving species of this family in many areas. Manatees and Dugongs are very slow-moving, making them easy targets. The

Steller's Sea Cow may have numbered only a few thousand animals in its limited distribution near islands in the Bering Sea. Even when able to swim away, they refused to leave their mates, beaching themselves on the shores next to the slain mate. Such animals can probably not tolerate any hunting. Manatees and Dugongs, likewise, need strict protection.

Many large birds, including condors, eagles and large parrots such as macaws, have low reproductive rates. The Cuban Red Macaw (*Ara tricolor*), became extinct in 1885. If its breeding biology resembled other large macaws, it was long-lived, reaching an age up to 80 years, had only one or two chicks a year and did not breed every year. Scientists have recently discovered that even in an immense national park in Peru, wild macaws produce so few young that any losses in their numbers cause declines in their populations. This helps to explain why so many birds of prey and parrots are endangered. Passenger Pigeons were long-lived, laid only one egg, and may not have nested every year. Likewise, turtles and tortoises are long-lived, with at least one species, the Galapagos Tortoise (*Geochelone nigra*) documented as living to more than 165 years in captivity. Some shark species do not breed until the age of 20 years and produce only a few young.

4. Flightless birds and slow-moving animals are helpless in the face of hunting pressure and predation by introduced predators and humans. Unwary animals, such as many island species that have evolved in the absence of predators fall into this category. Flightless birds, such as the Great Auk, Great Elephant Bird, Dodo, many Pacific Island rails and tortoises, are among species that lack defenses or cannot quickly escape predators, human or other. In addition to being flightless, many extinct birds lacked defensive behavior or the instinct to hide in underbrush as a result of their having evolved in predator-free environments. Predators introduced into their habitats, as occurred on many islands, soon eliminated them. Even the thick shells of tortoises were not effective defenses against predators such as rats, who ate young tortoises, and humans easily captured these slow-moving animals. Although our attitudes are more humane toward these vulnerable animals today than hundreds of years ago, tortoises and sea turtles are still killed for trade or by vandals for sport. Some surviving flightless birds on islands have official protection and a better future than they had in previous centuries, while others do not.
5. Large animals have been vulnerable to overhunting since the Pleistocene Epoch. In recent centuries, whales were added to the list of large species unable to escape guns or harpoons. The largest lemur and bird species of Madagascar were killed off by the Malagasy immigrants thousands of years ago, as were many large flightless birds by the Maori when they first arrived in New Zealand. Large animals are often killed merely because they make large targets or for trophies for those who enjoy slaughtering animals. Animals of large size require considerable amounts of habitat and are, therefore, naturally more rare than species with smaller habitat requirements. When human populations rise and wilderness is replaced with towns and industry, large animals are the first to disappear, due either to loss of habitat and prey or because they are killed as potential threats. Most of the largest mammals on Earth are now on the endangered list of the *2000 IUCN Red List*, including both species of elephants, all the rhinoceros species, and many large antelope and big cats such as the Tiger, Cheetah, Leopard and Lion. They have declined from hunting or persecution and are being crowded out of their habitats by human activities. Large animals are often keystone species at the top of their food chains or play important roles in ecosystems. Their absence is indicative of damaged or incomplete ecosystems. Elephants are important in spreading seeds of many plants through their dung, and large predators play a major role in the health and physical characteristics of their prey. The African savannahs without Lions, Leopards and Cheetahs would soon be overpopulated and overgrazed by their numerous prey species. The Elk of Yellowstone National Park became overpopulated in the absence of the Gray Wolf, and grazed certain plants so heavily that some bird species and other

wildlife disappeared and certain tree species became rare. In spite of the wolves. Importance to ecosystems, they are killed with impunity by livestock owners and others who consider them threats.

6. Wild animals and plants which have a value as food, pets, ceremonial objects or marketable products to humans are prime candidates for extinction. The list of animals that have been hunted to extinction for food is long. Within the past 400 years, many large land tortoises, the Great Elephant Bird, moas, Steller's Sea Cow, Auroch and Quagga were all extinguished by hunting for food. The unique Huia bird of New Zealand had plumes that were sold for large sums, helping to drive its limited population to extinction. Hawaiian songbirds were hunted to extinction for their colorful feathers, which were used in ceremonial headdresses and capes. Within the past decade, trade has increased as a threat to wildlife with the rise in Asian economies. This has fueled the Traditional Medicine markets, which consume vast numbers of animals, threatening many of them. The vacuuming of the seas by commercial fisheries has resulted in depletions and endangerments. The once abundant sturgeon of the Caspian Sea, for example, sources of Beluga and other expensive caviar, are now critically endangered as a result of unrestricted fishing and poaching for the luxury gourmet market. The bushmeat markets of West and Central Africa sell tons of slaughtered monkeys, forest antelope, Chimpanzees, Gorillas and other wildlife, devastating species whose tropical forest habitats are being logged. Hunting for food is also a major threat as firearms become available to native peoples who once used primitive weapons. Southeast Asian wildlife is under siege by people who once hunted only for their own purposes but now find that a wide range of wildlife can be sold in local meat markets or for Traditional Medicine. They set nooses and traps, killing rare monkeys and antelope, birds, snakes, turtles and tortoises, pangolins and lorises, clearing out the forests of wildlife. The pet trade is driving many colorful tropical birds, reptiles and primates to endangered status. Luxury goods, such as high-priced reptile products, provide an incentive to hunt--legally or illegally--lizards, crocodiles and snakes for this market, endangering many species. Trophy hunting of endangered species by healthy hunters is a major threat to a growing number of animals, especially since the largest specimens are killed; these are the ones that should be left to breed. The higher the value of the animal or product, the greater the threat to that species.
7. Altruism, or the unselfish care for members of one's own species, highly admired as a human trait, has been fatal to many animals--the Passenger Pigeon, Dodo, Carolina Parakeet and Steller's Sea Cow, for example. In their evolutionary history, this behavior served to preserve bonds between animals and to frighten off predators. When confronted with guns or other weapons wielded by humans, however, animals that come to the aid of fallen mates or flockmates can be easily killed themselves. Refusal to leave their wounded fellows hastened the extinction of many species. Endangered species with these traits include wolves, gorillas, whales and elephants.
8. Species breeding in colonies or requiring large numbers of their own kind for protection, to locate food sources or for other means of survival, are vulnerable to extinction. The Passenger Pigeon was a colonial nesting bird and could only survive among large numbers of its own species, flocking and seeking food sources over large areas. When flocks were fragmented, these separated populations declined to critically low levels, even though their total numbers may have been in the tens of thousands. The Passenger Pigeon may have become critically endangered as soon as its migrations, feeding and nesting behavior were interrupted, even though it appeared to observers at the time to be plentiful. These pigeons had longevity of several decades, and failure to reproduce would take some time to be noticed in the overall population. But when there is little or no introduction of young into a population over a period, it can suddenly crash with little warning, as the Passenger Pigeons did. Wild parrots tend to feed, roost and spend their time preening and in courtship as a flock. For some species, these flocks number in the thousands of

birds. When netted or caught by various means for the pet trade, which threatens a large number of species, their flocks are broken up and they are no longer able to function as a group. Their breeding is curtailed or stopped altogether, and they may no longer fly in groups seeking fruiting trees or mineral licks when they fear being captured. Flamingos require large numbers of their own kind for feeding, flocking, migrations and breeding, and their population's crash if any of their survival requirements are not met.

Many species of birds have breeding strategies in which male birds will not breed unless they are able to display courtship behavior in the company of other males, vying for the approval of females. Birds of paradise, cocks of the rock in South America, prairie chickens and grouse of North America are among birds that display for the benefit of females, who choose among them. Such birds require specific conditions to breed, and habitat alterations, reductions in their populations or hunting pressure that keeps them from exposing themselves in the open can prevent their breeding.

Mammals, reptiles and amphibians also have male contests of strength, agility or other mark of superiority of species. Wild sheep and deer vie for females by head butting and challenging one another. Many types of tropical frogs emerge during the breeding season to form groups that display to one another for the benefit of females. Male Plowshare Tortoises joust with one another in attempts to upend the rival and will not breed if only a single male and a female are placed together. Without rivals for competitions, male breeding behavior may not be triggered, preventing reproduction.

Zoos and zoologists are only beginning to understand some of the instinctive responses necessary for breeding. Our traditional concept that a compatible pair of animals will reproduce is often incorrect, and populations of animals must not be allowed to be so reduced that their natural breeding behavior and other survival needs are not met.

Thus, while population numbers can provide important information about the status of a species, without additional information, such as the traits mentioned above, the data can be extremely misleading and inapplicable. The number of individuals surviving in a species, when known, must also be placed into a context greater than their rate of decline and habitat status. Unless the entire breeding biology, behavior and other aspects of species' survival needs are taken into account, extinction cannot be predicted, or status properly evaluated.

Some species now extinct suffered from several of the above factors, which hastened their extinction. The Passenger Pigeon, for example, required enormous amounts of food, mainly from nut-bearing trees in old-growth forests, and was relatively long-lived, killed for food and commercial sale, and lived colonially. Elephants and manatees are among endangered species with many vulnerable traits, including large size, altruism, slow-reproduction, low natural mortality and longevity. They are also slow-moving and valuable in trade and as food sources.

These traits indicate only vulnerability to extinction caused by humans, not species likely to become extinct through natural selection. Sea turtles, for example, have lived on Earth for more than 200 million years. By any standard, they are a superbly successful, adaptable species that, prior to recent exploitation, showed no signs of decline. Their vulnerability lies in their inability to flee rapidly in the water or while laying eggs onshore when preyed on by humans.

Many endemic species occupy very limited habitats and have small populations but have not been listed as threatened if their environments or populations have not declined. The majority of these species have prospered for thousands of years in stable environments, and only the intrusion of human-related activities and domestic animals upset this equilibrium. Such species are extremely vulnerable to even

minor habitat destruction or hunting pressure and should be carefully monitored for losses in their populations.

Because of human technology and weaponry, all animals have become vulnerable. Animals that for thousands of years used natural camouflage, stealth and intelligence to escape from natural predators, have become easy prey for human hunters and fishermen. Predators, never in their evolutionary history preyed upon, now find themselves targeted by hunters, trappers and poisoners. Sonar locates fish schools and whales, and heat detectors and night-view binoculars observe animals in darkness. Cleverly constructed blinds hide hunters from view. Animal scents are used to lure wildlife, and hunters imitate animal sounds or use tape recordings of their calls to lure them to traps or within shooting range. Some hunters use the signals emitted by radio transmitters placed in wild animal collars by biologists for tracking, to hone in and pursue them to their deaths. Guns equipped with telescopic sights can fire at targets mile away, killing animals before they are even aware of the hunter. Other weapons include sophisticated traps, nets, snares, guns, harpoon guns and high-speed vehicles and boats, with which people can run down, maim and kill even the swiftest and most intelligent animals. These devices give humans such an advantage that they render the natural protections animals have evolved over eons completely ineffective. Hunters are able to kill the fittest and strongest specimens through these means. In the process, we are changing the course of evolution from survival of the fittest to survival of animals that are tolerated by humans and those able to persist in an increasingly polluted, damaged and ecologically impoverished natural environment.

Those species whose populations have become greatly reduced are vulnerable to extinction through genetic impoverishment and inbreeding. Such species usually remain rare or gradually fade into extinction as fertility declines. The critical low level which results in extinction is different with each species and cannot be predicted with certainty.

Just as the story of North America's lost species and environments is illustrative of many similar tragedies, the account below of the civil war in Rwanda and the former Zaire encapsulates the major threats to wildlife and the environment. It also makes abundantly clear that the survival of humans, animals and the environment are intrinsically linked. The influence of countries that contribute foreign aid to poor nations half a world away, and interfere in their politics, is another important element that can greatly affect the survival of wildlife and the natural world.