

**Exhibit Dates: July 2013 – September 2014**

## **From Numerous to Non-existent: Common, Rare, Threatened, Endangered, and Extinct Species in the Collections of the Natural Science Research Laboratory**

The Museum's Natural Science Research Laboratory (NSRL), maintains collections of preserved mammal, bird, and invertebrate specimens, and frozen tissues of these specimens, for scientific research and education purposes. These collections represent a record of the natural history of Texas, North America, and other areas of the world.

Of the 2,331 mammal and bird species represented in the NSRL's collections, at least 197 currently are listed as at risk on either the Endangered Species list of the United States Fish and Wildlife Service (USFWS) or on the Red List of Threatened Species of the International Union for Conservation of Nature (IUCN).



## Where Did These Specimens Come From?

Most of the specimens in the NSRL collections represent abundant and widespread species that were collected from the wild for scientific research. Proper government authority and collecting permits are required and obtained for all such studies.

Many of the threatened and endangered animal specimens on display were donated to the Museum by individuals or by other museums. Most of these specimens are several decades old, and they were collected long before the species was at risk. Other rare specimens were donated to the Museum by zoological parks after the animal's natural death.

None of the specimens in the NSRL collections that currently are recognized as at risk were collected from the wild while the species had protected status.

## The Endangered Species Act – 40 Years of Protecting At Risk Animals and Plants

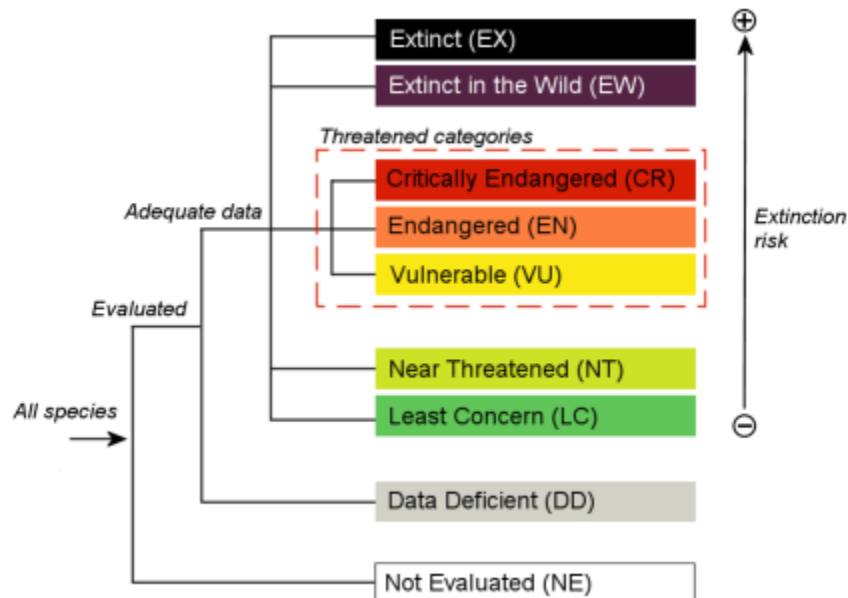
The passage of the Endangered Species Act in 1973 gave the USFWS the authority to recognize plant and animal species as threatened or endangered, and to develop recovery plans for these species.

Current Number of Endangered or Threatened Species in the U.S.

	Threatened	Endangered
Mammals	15	69
Birds	15	81
Reptiles	22	14
Amphibians	10	16
Fishes	70	83
Other Animal Groups (clams, snails, insects, arachnids, crustaceans, corals)	39	187
Plants (flowering plants, conifers, ferns, lichens)	149	667

## The IUCN Red List of Threatened Species

The International Union for Conservation of Nature maintains a Red List that categorizes species, worldwide, by level of threat to their existence. The IUCN's mission is to determine and rank the conservation status of species, on a scale from least concern to critically endangered or extinct.



## What causes a species to become threatened, endangered, or extinct?

Extinction of a species can be caused by natural phenomena, such as disease, competition with other species, or natural catastrophic events.

Most of the species that have become extinct in recent history, or currently are threatened or endangered, however, are the result of human activities.

The most common man-made threats to wild species are changes in habitat, including destruction, degradation, or fragmentation (creating small, isolated pockets of habitat). Pollution, introduction of non-native and invasive species, and over-exploitation are other common threats to the survival of many species on Earth. Climate change is recognized as an increasingly important threat and can lead to changes in a species available range, food sources, reproductive patterns, and predator-prey relationships.

## Woolly Mammoth

### Extinct



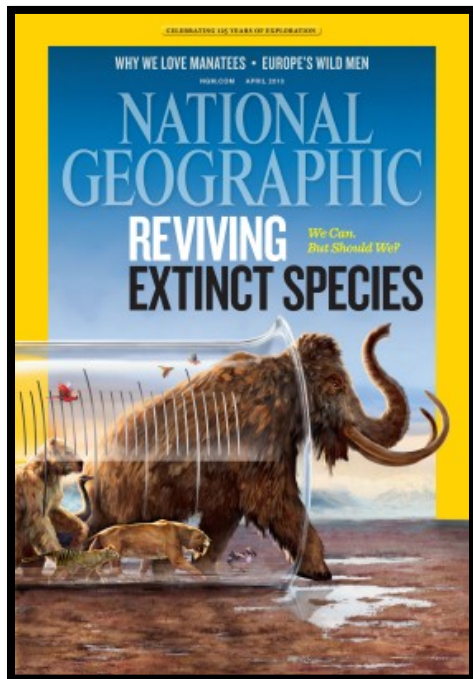
The NSRL's Genetic Resources Collection includes tubes of frozen tissue from two individual woolly mammoths (*Mammuthus primigenius*), one male and one female. The samples were collected from mammoth remains discovered in the riverbeds of the Yuribei and Khatanga Rivers in northern Siberia (Russia), just south of the Arctic Ocean. The remains were identified as being 10,000 and 53,000 years old, respectively.

*Tubes of frozen woolly mammoth tissue samples, donated to the Museum in 1994.*



*Woolly mammoth replica at the Royal BC Museum in Victoria, British Columbia, Canada.*

What caused the last of the mammoth species to go extinct, at the end of the Pleistocene (Ice Ages)? Climate change during that period in Earth's history is the leading theory. What role ancient peoples may have played in their extinction is unclear and widely debated.



Recently, scientists in Russia and South Korea have embarked on an ambitious project to try to clone a woolly mammoth by using frozen tissues, such as the ones in the NSRL collections. They are attempting to create a living woolly mammoth by inserting the DNA-storing nucleus of a mammoth cell into the egg of an Asian elephant, and implanting the embryo into the womb of a female elephant. So far, no one has been able to harvest eggs successfully from an elephant, so the experiment has not yet been attempted.

Advances in science have made the possibility of bringing back extinct species, especially of more recently-extinct animals, very real. This possibility raises many complex ethical issues, as well as environmental concerns that the scientific community has only begun to explore and debate. The *National Geographic* article highlighted here is a recent example of the on-going discussion among scientists about the feasibility, and the pros and cons, of bringing back extinct species.



*Lyuba, a mummified infant woolly mammoth. This photo was taken while the preserved baby mammoth was part of a special exhibit, "Mammoths and Mastodons," at the Field Museum of Chicago.*

This mummified baby mammoth, dubbed Lyuba, was discovered lying on a river bank in Siberia in 2007. Lyuba was just one month old when she died more than 40,000 years ago. Researchers theorize that she drowned in river mud and froze in a piece of ice. Thousands of years later the ice floated to the surface and then melted, due to global warming. Her body remained so well-preserved that researchers have been able to identify her last meal in her stomach – her mother's milk and dung.

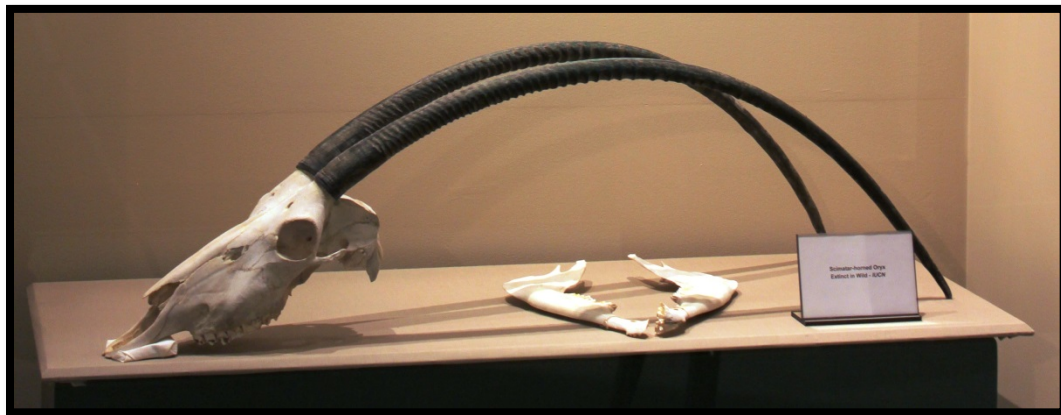
## Scimitar-horned Oryx Extinct in Wild



The scimitar-horned oryx (*Oryx dammah*) formerly inhabited much of North Africa. This species has been listed as Extinct in the Wild since 2000.

This spiral-horned antelope is adapted to arid grasslands and semi-desert habitats. Oryx populations originally began to decline as a result of climate changes that caused the Sahara regions of North Africa to become even drier than usual. The eventual extinction of the oryx was due primarily to overhunting for its meat, horns, and hide. Habitat loss and competition with domestic livestock also contributed to the extinction of the species.

The scimitar-horned oryx still can be found in zoological parks and in some privately-owned captive herds. A global captive breeding program for the species was initiated in the 1960s, and fenced-in herds have been reintroduced in several national parks in the African nations of Tunisia, Morocco, and Senegal as part of long-term reintroduction efforts.



This skull of a scimitar-horned oryx shows the spectacular spiral, backward-curving horns of the species. The horns of an adult can reach 3 to 4 feet in length. Both males and females have horns, although the horns of the females tend to be narrower in diameter.

## Western or Lowland Gorilla

**Critically Endangered - IUCN**

**Population Trend – Decreasing**



*Male western gorilla at the Bronx Zoo.*

The western gorilla (*Gorilla gorilla*) was first categorized on the IUCN Red List as vulnerable in 1986. It was elevated to Endangered status in 1996, then to Critically Endangered in 2007. This species has suffered dramatic population declines due to continued poaching (even in protected areas) and to the spread of the Ebola virus, a deadly disease that also affects humans. In some areas, gorilla populations have been reduced by over 90%. Overall, their numbers have declined by more than 60% over the last 20 to 25 years.

Controlling the threats of poaching and disease are extremely difficult. Furthermore, gorilla reproductive rates are extremely low. Even if an immediate end to Ebola deaths and drastic reduction in hunting were possible, population recovery would require 75 years or more. Further, habitat loss and degradation from agriculture, timber extraction, mining, and possibly climate change are increasing threats. Extinction of the species in the wild is a very real possibility and will require drastic conservation measures to avert.

*Skull of a male western gorilla (also known as lowland gorilla). The NSRL obtained this specimen in 1987 from the San Antonio Zoo*



## **Brown Pelican**

**Least Concern – IUCN; Delisted - USFWS**

**Population Trend – Increasing**



The brown pelican (*Pelecanus occidentalis*) is common and widespread throughout most of its range and currently is not listed by the USFWS or the IUCN Red List as an at risk species. So why is this species in this exhibit? Because it represents a success story of the Endangered Species Act.

The brown pelican was formerly listed as Endangered in the United States by the USFWS. It was listed as such in 1970, under a law that preceded the Endangered Species Act of 1973. In November 2009, however, the species was “delisted due to recovery” from the USFWS Endangered Species List.

With the advent and widespread use of the pesticide DDT in the 1940s through the 1960s, pelican populations rapidly declined due to lack of breeding success. Pelicans are fish-eaters, and when they ate fish that were contaminated with DDT, the shells of their eggs became so thin that they broke during incubation.

In 1972, the Environmental Protection Agency banned the use of DDT in the United States (U.S.). As a result of the ban, as well as recovery efforts such as reintroduction programs and the protection and restoration of nesting habitats, the brown pelican has made a strong comeback. Throughout its range along the eastern and western coasts of the U.S., Central America, and northern South America, the brown pelican population now is estimated to number more than 650,000 individuals and is continuing to increase.



## Bald Eagle

**Least Concern – IUCN; Delisted – USFWS**

**Population Trend – Increasing**

Similar to the brown pelican, the bald eagle (*Haliaeetus leucocephalus*) is another success story of the Endangered Species Act.



When the bald eagle was adopted as the nation’s symbol in 1782, as many as 100,000 nesting pairs of bald eagles were in this country. By the mid to late 1800s, bald eagle populations began to decline as the result of the birds being shot to protect livestock, as well as the loss of nesting habitat. By 1940, Congress recognized that the species was “threatened with extinction,” and passed the Bald Eagle Protection Act that prohibited killing, selling, or possessing the species. This Act, however, did not put in place any efforts to protect habitat or otherwise restore the species’ numbers.

The use of DDT, beginning in the 1940s, quickly erased any recovery that may have begun after the passage of the Bald Eagle Protection Act. DDT sprayed to control insects washed into nearby water supplies, where aquatic plants and fish absorbed it. The eagles then were contaminated when they ate the fish that caused the shells of their eggs to be so thin that they broke during incubation. By 1963, only 417 nesting pairs of bald eagles remained in the U.S.

Banning the use of DDT in 1972 was the critical first step on the road to recovery for the bald eagle. In 1978, the species was listed as Endangered and a recovery plan was implemented that included captive breeding programs, reintroduction efforts, law enforcement to control illegal shooting, and nest site protection. By 1995, populations had recovered enough to elevate the species from Endangered to Threatened, and in 2007 the species was “delisted due to recovery.” The most recent information available indicates at least 9,789 nesting pairs are in the lower 48 states.

## African Lion

**Vulnerable – IUCN**

**Population Trend – Decreasing**



*Male lion in Namibia, Africa.*

African lions (*Panthera leo*) are found in most countries in sub-Saharan Africa, particularly in eastern and southern Africa. They are extinct in North Africa, and regionally endangered in West Africa.

Within the last 20 years, the species has been reduced in population by approximately 30%. The primary causes of this reduction are indiscriminate retaliatory or pre-emptive killing by humans to protect life and livestock, as well as depletion of the lion's natural prey. In addition, habitat loss and land conversion have led to a number of populations becoming small and isolated.

Trophy hunting still is permitted in some countries where healthy lion populations remain, and this practice can be an important management tool for providing financial resources for lion conservation.

## Cheetah

**Vulnerable – IUCN**

**Population Trend – Decreasing**



Once widespread across Africa and Asia, cheetahs (*Acinonyx jubatus*) have disappeared from more than 75% of their historic range in Africa, and almost all of their historic range in Asia. They are estimated to number only 7,500-10,000 across their entire range on the continent of Africa. Asiatic cheetahs remain only in Iran, where the species is Critically Endangered.

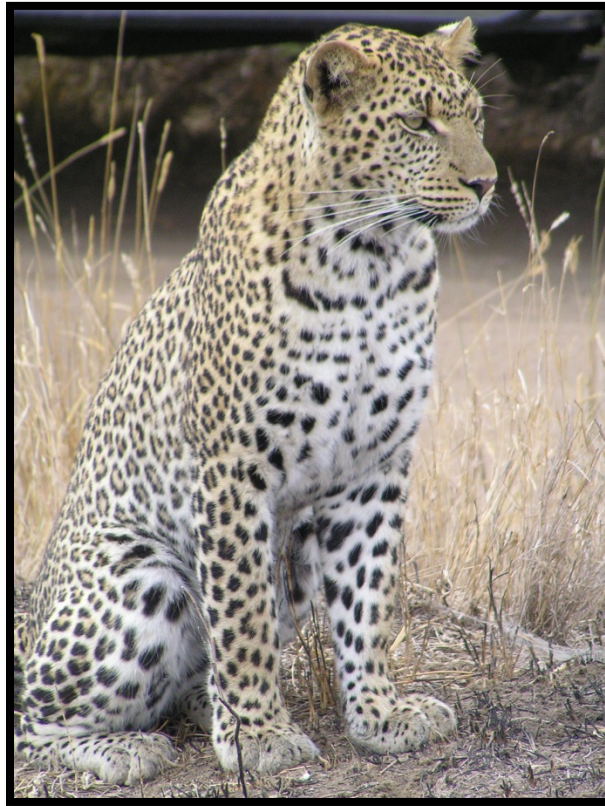
Wild ungulate populations in most of Africa as well as Asia have been depleted due to over-hunting and competition with livestock. With their natural prey base depleted, cheetah reproduction and survival are reduced, and in many areas, cheetahs have turned to livestock as prey. A large proportion of the remaining cheetahs in Africa exist outside of protected areas, in lands that are ranched for livestock, and a number of countries permit cheetahs to be killed in defense of life and livestock. Thus, conflicts with farmers and ranchers pose a major threat to the species. Habitat loss and fragmentation is also a threat to the survival of the cheetah in Africa. Most existing protected areas are not large enough to ensure the long-term survival of the species.

Conservation practices that are being promoted to save this species include livestock management plans that minimize conflict with cheetahs, livestock herd protection using guard dogs, and improvements to the availability of wild prey.

## Leopard

**Near Threatened – IUCN**

**Population Trend – Decreasing**



Leopards (*Panthera pardus*) are locally common in some parts of Africa and tropical Asia. However, they are declining in large parts of their range, and have disappeared from at least one-third of their historic range in Africa. They are on the verge of extinction in North Africa.

Primary threats to the leopard are habitat loss and fragmentation, and poaching. There are high levels of human-leopard conflict in some areas of Africa, where they are persecuted for real and perceived livestock losses. A rapidly increasing threat is the poisoning of carcasses as a mean of predator control. In rainforest regions near human populations, they compete with humans for many of the prey animals that make up the diet of both the leopard and man. To a lesser degree, leopards are killed for the illegal trade of skins and for body parts that are used in traditional rituals.

The majority of leopards occur outside of protected areas, and improved measures for protecting livestock and mitigating conflicts with leopard are needed to protect the species. Although some leopards occur in protected areas, many of these areas are too small to support viable populations.

## Tiger

**Endangered – IUCN**

**Population Trend – Decreasing**



*Siberian tiger*



*Sumatran tiger*

Tigers (*Panthera tigris*) once ranged widely across Asia, from Turkey in the west to the coast of Russia in the east. During the last century, they have lost over 93% of their historic range, and they have disappeared from large areas of southwestern, southeastern, eastern, and central Asia. They are currently found in 13 Asian range states.

Tiger populations have declined at least 50% since just the 1990s. It is estimated that just 3,000 remain in the wild. This downward trend in tiger populations is likely to persist. In some areas, the causes of their reduction may not be reversible.

Poaching and illegal trade of tiger skins, bones, meat, and “tonics” (traditional medicines) are the primary threat to tigers. Habitat loss and competition with humans for a rapidly declining ungulate prey base are also threats.

In 2010, the Year of the Tiger on the Asian lunar calendar, a Tiger Summit was held by the 13 tiger range countries and a Global Tiger Recovery Program was adopted. The goal is to double the number of wild tigers by 2022 (the next Year of the Tiger). The Recovery Program is an ambitious and unprecedented plan between the range countries to cooperatively preserve, protect, and restore tiger habitats, to eradicate poaching and trade, and ultimately to restore tigers to their former range.

## Clouded Leopard

**Vulnerable – IUCN**

**Population Trend – Decreasing**



The clouded leopard (*Neofelis nebulosa*) is found from the Himalayan foothills in Nepal through mainland Southeast Asia into China. The species once had a wide distribution in China, but the animals are disappearing from many areas as the result of habitat loss and illegal hunting. These reclusive animals are difficult to trap and monitor. It is estimated that there are less than 10,000 remaining in the wild, in scattered, isolated populations of no more than 1,000 each.

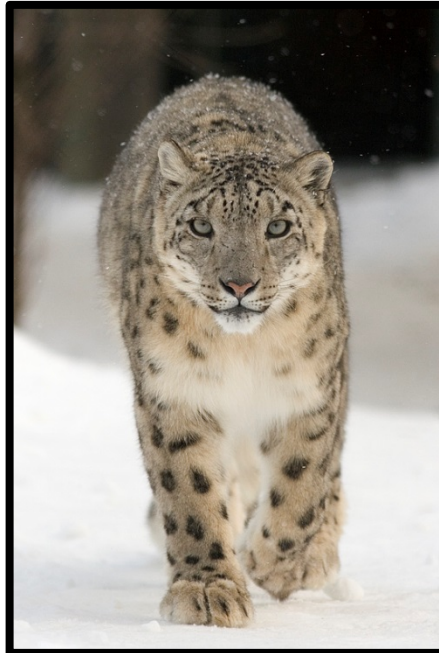
The clouded leopard is strongly associated with dense tropical forest, which is disappearing across most of its range. In fact, their habitat in Southeast Asia is undergoing the world's fastest deforestation rate (1.2-1.3% per year since 1990).

Hunting for the trade of clouded leopard skins, bones, meat, and live animals for the pet trade also are significant and increasing threats, despite national legislation protecting the species throughout most of its range.

## Snow Leopard

**Endangered – IUCN**

**Population Trend – Decreasing**



The snow leopard (*Panthera uncia*) is restricted to the high mountains of Central Asia, with a known range in 12 countries. Although there is a lack of information about current snow leopard status across much of its potential distribution, they are estimated to number somewhere between 4,000 and 6,000 animals in the wild.

A primary threat to the snow leopard is depletion of its natural prey base (various species of wild sheep and goats, ibex, deer, boar, and smaller prey) due to hunting by humans as well as competition with livestock. The declining natural prey base escalates livestock depredation by snow leopards, and puts them at increased risk of being killed in retribution. Human population growth, habitat fragmentation, poaching and illegal trade, and a lack of conservation capacity, policy, and awareness in its range countries also contribute to the threats faced by the snow leopard.

Up to a third of the snow leopards range falls along politically sensitive international borders, complicating conservation initiatives. Military conflict is taking place across much of its range, causing damage to many wildlife species in the region through destruction of habitat, direct killing of wildlife, losses to land mines, and increased poaching and trade.

Numerous conservation agencies are working to conserve the snow leopard and its threatened mountain ecosystems. These agencies have been working with many of the national governments from the snow leopard's range to promote research, community programs, and education programs.

## Southern Long-nosed Bat

**Vulnerable – IUCN; Endangered - USFWS**

**Population Trend – Decreasing**



The southern long-nosed bat (*Leptonycteris curacoae*) is a nectar-feeding, migratory bat. This highly specialized species feeds on the nectar and pollen of agave and cactus, and is recognized as a “keystone” species in its ecosystem for its role as a pollinator and seed disperser of these desert plants.

One subspecies of this bat occurs in the South American countries of Colombia, Venezuela, Margarita Island, Curaçao, Bonaire, and Aruba. A second subspecies occurs in North America in Mexico and in the states of New Mexico and Arizona. Some populations of this subspecies migrate north to maternity roosts from southern Mexico, and give birth in spring. Other bats of this subspecies migrate to maternity roosts in central and southern Mexico and give birth in the winter after mating in the summer.

In all parts of its range, it is an uncommon species and is restricted to habitat types that are rare and dispersed. Further, it depends upon a limited number of caves for breeding colonies, and these caves are vulnerable to vandalism.

The species is threatened by habitat destruction and degradation, and has suffered a population decline of more than 30% over the last three generations.



## Indiana Bat

**Endangered – IUCN; Endangered - USFWS**

**Population Trend – Decreasing**



The Indiana bat (*Myotis sodalis*) occurs exclusively in the United States and is known primarily from eastern and mid-western states, westward to Oklahoma, and southward into Alabama and Arkansas. The species has disappeared from or greatly declined in most of its former range in the northeastern United States. Overall, the species has suffered a population decline of more than 50% in just the last 10 years.

This insect-eating bat lives in forest habitats as well as agricultural and grassland areas. In winter, the bats come together to hibernate in only a few caves within its range that provide the necessary conditions for hibernation. Its dependence on these caves makes the population especially vulnerable.

During winter hibernation, human threats to the colonies include the rousing of the hibernating bats, direct handling of the bats, vandalism of caves, indiscriminate killing or complete elimination of colonies, and commercialization of caves that lead to increased disturbance by humans. Other threats to the species include exclusion from caves by poorly designed gates, and changes in cave temperatures or humidity as the result of opening additional entrances or otherwise changing air flow.

During summer, the loss of habitat and roost sites due to impoundment, stream channelization, housing development, clear cutting for agriculture, or forest management practices that eliminate maternity roosts are factors that contribute to population declines.

## Saltmarsh Harvest Mouse

**Endangered – IUCN; Endangered - USFWS**

**Population Trend – Decreasing**



The saltmarsh harvest mouse (*Reithrodontomys raviventris*) is restricted to an exceptionally small range. It occurs only in tidal marsh habitats bordering San Francisco Bay in California. This habitat is becoming increasingly fragmented into small and isolated patches.

Most of the historical tidal marsh habitat for this species has been lost as a result of filling for urban development and conversion to agricultural uses and commercial salt production. Upland vegetation adjoining tidal marshes is important cover for harvest mice during high tides and storms, but much of the upland habitat surrounding the marshes also has been lost due to development.

Other threats to the species include pollution, intrusion of fresh water into the salt marshes, and the invasive spread of exotic plant species that are not suitable habitat for these mice. Over the long term, the potential rise in sea levels due to global climate change could result in major losses of tidal marsh habitat for this endangered mouse.

## American Bison

**Near Threatened – IUCN**

**Population Trend – Stable**



The IUCN lists the American bison (*Bison bison*) as Near Threatened based on its dependence on an ongoing conservation program, a limited number of viable populations, and small population sizes. There are two recognized subspecies, the plains bison and the wood bison.

Bison once ranged in massive herds across the North American continent, from northern Mexico to Alaska. The species was nearly wiped out by overhunting in the 19<sup>th</sup> century, however. Today, bison occupy less than 1% of their original range in North America.



*Original bison range*



*Current bison range (managed herds)*

Although the species has partially recovered, all current populations occur within active management programs, and most are managed as private captive commercial herds. Very few herds are managed strictly for species conservation. Although the species is not in decline, it is vulnerable to potential changes in management and is completely dependent on continued conservation efforts.

## Grey Wolf

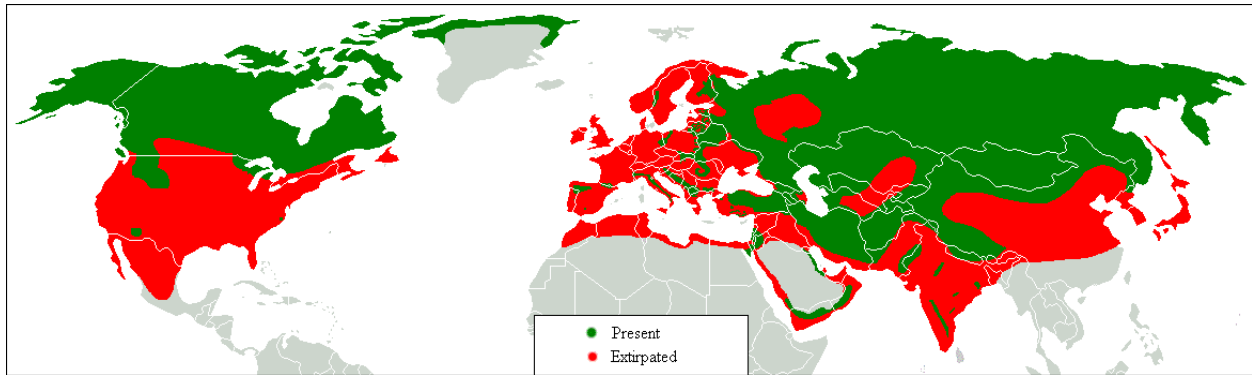
**Least Concern – IUCN; Partially Delisted – USFWS**

**Population Trend – Stable**



The grey wolf (*Canis lupus*) was once the world's most widely distributed mammal. Poisoning and other forms of persecution by humans in order to protect livestock from depredation, and out of unwarranted fear of attacks on man, has reduced their original worldwide range by more than one-third. It is now gone from much of its former range in Western Europe, Mexico, and the United States, and is generally restricted to wilderness and remote areas.

In the western United States, grey wolf populations were extirpated by the 1930s. However, legal protection since the passage of the Endangered Species Act in 1973, changes in public attitudes, and land-use changes led to natural re-colonization in parts of its range as wolves moved southward from Canada into Montana. The species also has been reintroduced in Yellowstone National Park (Wyoming), and parts of Montana and Idaho.



*Former and current worldwide distribution of the Grey wolf.*

In May 2011, the USFWS delisted wolves as an Endangered or Threatened species in Idaho, Montana and parts of Oregon, Washington, and Utah. Estimates in 2012 indicated minimum wolf populations of 625 in Montana; 683 in Idaho; 277 in Wyoming; 43 in Washington; and 46 in Oregon.

Although it still faces some threats, at a global level the grey wolf does not qualify as Threatened due to its relatively widespread range and stable population trend. Regionally, some populations remain seriously threatened. These threats include competition with humans for livestock and increasingly fragmented habitats that are becoming too small to maintain long-term viability.

## Red Wolf

**Critically Endangered – IUCN; Endangered – USFWS**

**Population Trend – Increasing**



Historically, the red wolf (*Canis rufus*) occurred in the eastern and southeastern United States from Texas to Florida and northward into New England. The species was extinct in the wild by 1980, but captive breeding programs that began in 1976 have successfully maintained the species. In 1987, the U.S. Fish and Wildlife Service began a reintroduction program, and established an experimental population on a peninsula in eastern North Carolina. The species is now common within the reintroduction area, but its abundance outside the reintroduction area is unknown.

In 1991, a second reintroduction project was initiated at the Great Smoky Mountains National Park in Tennessee. Despite the release of 37 red wolves from 1992 to 1998, the wolves failed to establish a successful breeding population. Many of the adults died or left the protected boundaries of the park and were recaptured, and most of the pups known to have been born in the wild died of disease, predation, malnutrition, or parasites. The U.S. Fish and Wildlife Service terminated the Tennessee restoration effort in 1998.

*U.S. Fish and Wildlife staff with two red wolf pups bred in captivity for potential release into the wild.*



The primary threat to the survival of the species is hybridization with coyotes. Hybridization was a factor in the red wolf's initial demise in the wild, and an increase in the abundance of coyotes within the reintroduction area in eastern North Carolina threatens the genetic integrity of the red wolves there.

## Marbled Murrelet

**Endangered – IUCN; Threatened (except Alaska) – USFWS  
Population Trend – Decreasing**



The marbled murrelet (*Brachyramphus marmoratus*) occurs in the northwestern United States (California, Oregon, Washington, Alaska) and in British Columbia, Canada. Nearly 85% of the population occurs in Alaska. This species is dependent on both old-growth forest habitats for nesting and near-shore ocean waters for feeding.

While the species is still abundant, its total population is estimated to have undergone a very rapid reduction in recent years. The greatest declines have been in Washington, Oregon, and California. In 1992, the U.S. Fish and Wildlife Service listed the species as Threatened in Washington and Oregon and Endangered in California. It is believed that the species will likely become extinct in California within the next 40 years. Even in Alaska, the population has undergone a 71% decline since the early 1990's, dropping from nearly a million birds to about 271,000 today.

The primary threats to the species are loss of old-growth forests for nesting habitat, declines in prey quality and abundance due to global climate change, the use of nylon monofilament gill-nets in shallow waters where the birds feed, and oil spills.

## Aplomado Falcon

**Least Concern – IUCN; Endangered (northern subspecies) –  
USFWS**

**Population Trend – Increasing**

The Aplomado falcon (*Falco femoralis*) has a very large distribution throughout much of South America and Central America, and its population trend appears to be increasing. For these reasons, it is not considered by the International Union for Conservation of Nature as a threatened species.

In the United States, however, the northern subspecies of this falcon, *Falco femoralis septentrionalis*, has been listed as Endangered by the U.S. Fish and Wildlife Service since 1986. This subspecies once occurred from Mexico into extreme southeastern Arizona, southern New Mexico, and southern and western Texas, but had disappeared from the U.S. and northern Mexico by the 1950s. The reasons for its decline in the United States are linked to habitat changes resulting from overgrazing by cattle, shrub encroachment due to control of range fires, and agricultural development.



Although a remnant population of northern Aplomado falcon remains in Chihuahua, Mexico, natural re-colonization of its former U.S. habitats by these birds is unlikely due to long-term drought, continued shrub encroachment, and the species' slow reproductive rate.

In cooperative arrangements between the USFWS, the Bureau of Land Management, the Department of Defense, the wildlife agencies of Texas and New Mexico, and several private conservation groups, several reintroduction efforts and habitat conservation plans for the northern Aplomado falcon are underway in Texas and New Mexico. These efforts serve as prime examples of cooperative conservation among federal, state, and private entities to recover a species from the brink of extinction.



## Red-cockaded Woodpecker

**Vulnerable – IUCN; Endangered – USFWS**

**Population Trend – Decreasing**



The red-cockaded woodpecker (*Picoides borealis*) was once distributed throughout the southeastern United States. Between 1980 and 1990, the population declined by at least 23%, and by 1999, it was limited to approximately 11,000 birds in 30 isolated populations.

This species relies on open pine-forest habitats. It is a cooperative breeder, nesting in large groups that require at least 200 acres of habitat per group. It nests in the cavities of old-growth trees (100+ years old).

The primary cause of this species' decline has been habitat loss due to excessive cutting of old-growth forests and other forestry practices that have fragmented the habitat, often into patches too small to support the group nesting behavior of the species.

Conservation actions to preserve this species have included the translocation of young females to improve breeding success, the construction of artificial cavities, and burning of understory vegetation to improve habitat. Additional efforts to protect, conserve, and enhance habitat for this species will be necessary to ensure its survival.

## Tree Pangolin

**Near Threatened – IUCN**

**Population Trend – Decreasing**



*Captive tree pangolin in Central Democratic Republic of the Congo.*

The tree pangolin (*Phataginus tricuspis*), also known as the scaly anteater, is native to the forests of central Africa. This species is thought to have declined in number by 20-25% over the past 15 years.

The tree pangolin is widely, and often intensively, harvested by native peoples for meat. It is commonly found in African bush meat markets. The scales also are used to make boots and shoes and are used as indigenous ornaments and in traditional medicines. The IUCN assessment indicates that current levels of harvest are unsustainable, and the species could soon be elevated to the Threatened level.

While the species is present in a number of protected areas in Africa, there is a need to develop and enforce protective legislation within its range.

**The three species discussed here illustrate the varying population status and use of fur-bearing species.**

### **Eastern Cottontail**

**Least Concern – IUCN**

**Population Trend – Increasing**



The eastern cottontail (*Sylvilagus floridanus*) is widely distributed and abundant throughout its range from southern Canada, the United States, Central America, and into northern South America. It can survive in many habitats, and has been introduced in some areas outside its range. Where it has been introduced, it sometimes displaces native species of rabbits. Although historically trapped and hunted for its fur as well as its meat, it has little value as a fur-bearer today.

### **American Mink**

**Least Concern – IUCN**

**Population Trend – Stable**



The American mink (*Neovison vison*) also has a wide distribution and is relatively common across its range in Canada and the United States. Its fur is among the most valuable of all fur-bearing animals, and it is the most important species in fur-tanning operations. Although wild populations are still hunted for fur, most mink fur production today comes from farm-raised animals.

## Long-tailed Chinchilla

**Critically Endangered – IUCN**

**Population Trend – Decreasing**



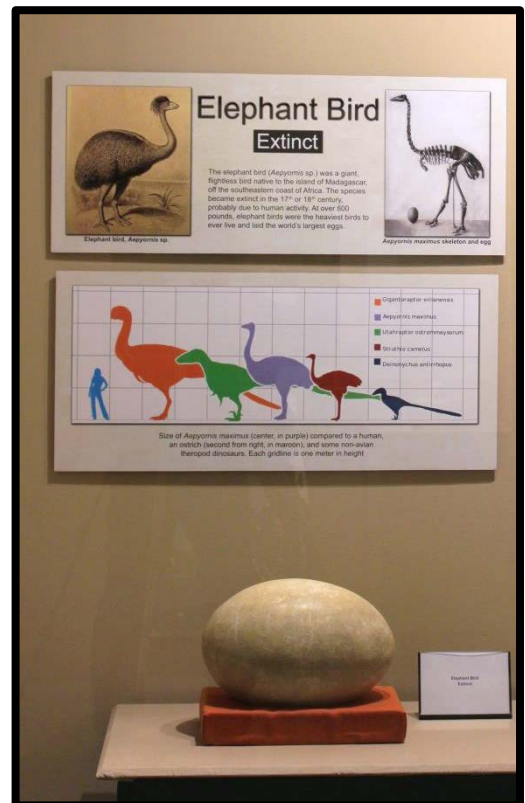
*Captive (pet) chinchilla.*

The long-tailed chinchilla (*Chinchilla lanigera*) is native to the Andes Mountains of Chile in South America. Once widespread, the species is now Critically Endangered in the wild. The primary threats to the species are illegal hunting for its fur and reduction of habitat quality due to overgrazing by livestock, mining, and firewood extraction. Despite current protection measures, its population has declined more than 90% in just the last 15 years. Similar to the mink, chinchilla today are raised on farms for fur production, as well as for the pet industry.

# Elephant Bird Extinct



The elephant bird (*Aepyornis* sp.) was a giant, flightless bird native to the island of Madagascar, off the southeastern coast of Africa. The species became extinct in the 17<sup>th</sup> or 18<sup>th</sup> century, probably due to human activity. At over 800 pounds, elephant birds were the heaviest birds to ever live and laid the world's largest eggs.



*An elephant bird egg from the Ornithology Collection of the Natural Science Research Laboratory.*

## Southern Rockhopper Penguin

**Vulnerable – IUCN**

**Population Trend – Decreasing**



The southern rockhopper penguin (*Eudyptes chrysocome*) breeds on islands in the South Atlantic, Indian, and Pacific Oceans. Many of the subpopulations of this species have undergone drastic declines, some by as much as 94%. Overall, the number of these birds has declined 34% over the past 37 years. Research is ongoing to determine what is causing these population declines, but there appear to be a variety of factors effecting the various subpopulations. These include human depredation, overgrazing by introduced animals, algae blooms, oil exploration, and effects of climate change.

## Bell's Vireo

Near Threatened – *IUCN*

Population Trend – Decreasing



The Bell's vireo (*Vireo bellii*) is a small North American songbird that occurs in summer in the central and southwestern United States and northern Mexico. Its range in winter occurs from south Baja California southward through Central America. It has undergone moderate population declines due to habitat loss. Brood parasitism by the cowbird (*Molothrus ater*) also is contributing to its decline in the southwestern U.S. A subspecies in southern California is listed as Endangered.

## Greater Prairie Chicken

Vulnerable - *IUCN*

Population Trend – Decreasing



The greater prairie chicken (*Tympanuchus cupido*) occurs in prairie and mixed prairie-cropland habitats of the United States. There are three subspecies, which vary in status: the heath hen of the eastern U.S. has been extinct since 1932; the Attwater's prairie chicken is restricted to small portions of coastal prairie in southeastern Texas, and is considered one of the most critically endangered bird species in the United States; and the greater prairie chicken subspecies is extinct or nearly extinct in 15 states, but numerous enough to be legally harvested in four states.

Overall, the species has been in long-term decline. Habitat loss and fragmentation due to the conversion of native prairie to cropland, overgrazing by livestock, and development are the most significant causes of their decline. Studies also suggest the species is sensitive to human disturbance, and the birds will not nest near power lines, roads, and farms. Climate change and drought also are detrimental to the birds' ability to successfully rear young.



## Egyptian Vulture

**Endangered – IUCN**

**Population Trend – Decreasing**

The Egyptian vulture (*Neophron percnopterus*) is known from a large range encompassing parts of Africa, Europe, and Asia. Despite its wide distribution, resident populations are isolated and many have suffered drastic declines in recent years. Overall, the species has undergone dramatic population declines in India, Europe, and West Africa.

This species faces a number of threats, including direct disturbance, lead poisoning, direct poisoning, electrocution by power lines, collisions with wind turbines, reduced food availability, and habitat loss.



## **Reeve's Pheasant**

**Vulnerable – IUCN**

**Population Trend – Decreasing**

Reeve's pheasant (*Syrnaticus reevesii*) is native only to central and eastern China. Its population is declining primarily due to loss and fragmentation of its evergreen forest habitats. Other threats include hunting for food and for the collection of its long tail plumes, and collection of its eggs. It has already been extirpated from some provinces.



## Ostrich

**Least Concern – *IUCN***

**Population Trend – Decreasing**

The ostrich (*Struthio camelus*) has an extremely large range encompassing much of Africa. Although the overall population trend appears to be decreasing, it does not meet the criteria for listing as Vulnerable by the IUCN. It is still considered to be abundant throughout most of its range.



## Emu

**Least Concern – IUCN**

**Population Trend – Stable**

The emu (*Dromaius novaehollandiae*) is a large, flightless bird common throughout most of mainland Australia. Its population is large and stable. Wild emus are formally protected in Australia under the Environment Protection and Biodiversity Conservation Act 1999.



## Gerenuk

**Near Threatened – IUCN**

**Population Trend – Decreasing**

The gerenuk (*Litocranius walleri*) formerly occurred widely in the semiarid bushland of northeastern Africa. It still occupies large parts of its historical range in Ethiopia, Kenya, and Tanzania, but it has been severely reduced in Somalia.



Also known as the “giraffe-necked antelope,” the total current population of gerenuk is estimated at 95,000, but only 10% of those animals occur in protected areas. Outside of these protected areas, the populations are declining due to over-hunting, livestock grazing, and habitat loss and fragmentation. It is predicted that it may eventually disappear from large parts of its current distribution.

## Przewalski's Horse

**Endangered – IUCN**

**Population Trend – Increasing**

Przewalski's horse is a rare subspecies, *Equus ferus przewalskii*, of wild horse. It once ranged from Germany and the Russian Steppes east to Mongolia and northern China.

The subspecies was at one time extinct in the wild, having last been seen in 1969. Reintroduction efforts from captive breeding programs began in the 1990s, and a small population of about 300 individuals is now free-living in their native Mongolia. This small population is vulnerable, however, to disease, loss of genetic diversity, and hybridization with domestic horses.

Other animals have been released in China, Hungary, and in the Ukraine into the area evacuated after the Chernobyl nuclear accident. This area, permanently off-limits for human habitation, has become a natural preserve and supports the largest herd of Przewalski's horse outside of Mongolia.



## Asiatic Wild Ass

Endangered – *IUCN*

Population Trend – Decreasing



The Asiatic wild ass (*Equus hemionus*) once ranged through much of Mongolia and parts of Russia, China, Central Asia, and the Middle East. By the 19<sup>th</sup> Century, its range had declined significantly. Its total population is estimated to have declined by more 50% over the past 16 years, and is predicted to continue declining by more than 50% over the next 10-20 years.

Threats to the species include loss of habitat as a result of human settlement, cultivation, overgrazing, conflicts with humans over crops, competition for water, competition with domestic livestock, and poaching. Fragmented habitats, which result in small and isolated population put these animals at greater risk for due to disease, drought, or other catastrophic events.

## Mountain Zebra

**Vulnerable – IUCN**

**Population Trend – Unknown**



The mountain zebra (*Equus zebra*) is native to the rugged mountain slopes and grasslands of Namibia and South Africa. Today, natural populations have been reduced largely to protected areas (parks and reserves). The species is dependent upon the availability of perennial water sources. In Namibia, the establishment of artificial waterpoints has allowed some populations to occupy previously unsuitable habitat. The species is considered threatened due to its total population size of just 9,000 mature individuals and indications that their numbers may be declining. More research is needed, however, to determine their current population trend.

The two subspecies, the Cape Mountain zebra and the Hartmann's mountain zebra, historically have been separated by unsuitable habitat and may actually constitute two distinct species. Introduced populations, however, have led to overlaps in their distribution and interbreeding of the subspecies.

The primary threats to the species are loss of habitat to agriculture, livestock production, and fencing that prevents access to water. Harvesting of the species for the commercial trade of pelts also may be a threat, as the harvest may exceed the rate of population growth in some areas.



## Polar Bear

**Vulnerable – IUCN**

**Threatened – USFWS**

**Population Trend – Decreasing**



Polar bears (*Ursus maritimus*) are found throughout the ice-covered waters of the Arctic in Alaska, Canada, Greenland, Denmark, Norway, and Russia. They depend upon sea ice to hunt seals and other marine mammals, their primary prey. When the sea ice melts in the summer, they must spend time on land, fasting and depending upon their stored fat reserves until the ice re-freezes.

Global climate change poses a substantial threat to the habitat of polar bears. The sea ice is melting sooner and freezing later, and expanding in range, to the point that some polar bears are starving. With less food, those that survive are failing to reproduce as often, and those that do reproduce give birth to smaller young which have higher mortality rates.

There are currently 20-25,000 polar bears worldwide. The latest research indicates that if climatic trends continue, polar bears may become extirpated from most of their range within 100 years.

## Brown Bear

**Least Concern – IUCN**

**Threatened (lower 48 states) – USFWS**

**Population Trend – Stable**



The brown bear (*Ursus arctos*) is the most widely distributed species of bear. It once ranged throughout Europe, Asia, the Middle East, northern Africa, and a large portion of North America, southward into Mexico. It now occurs in northwestern North America, with healthy populations in Alaska and Canada, as well as parts of Europe and northern Asia. Although the species' range has declined, on a global scale the population remains large (more than 200,000) and is not significantly declining in numbers.

The subspecies that occurs in North America, *Ursus arctos horribilis*, is known as the grizzly bear. In the lower 48 states, the subspecies is listed as Threatened due to highly fragmented habitats that have resulted in small and isolated populations in Idaho, Montana, Washington, and Wyoming. The grizzly is known from just five isolated areas in the lower 48 states today, and they number less than 1,700 bears.

Although the grizzly bear is a protected species, the process of the species repopulating its former range is hampered by the bear's slow reproductive rate, the reintroduction of competing predators such as grey wolves to some of these areas, and conflicts with humans over livestock protection and human safety.

## Asiatic Black Bear

**Vulnerable – IUCN**

**Population Trend – Decreasing**



The Asiatic black bear (*Ursus thibetanus*), also known at the moon bear because of the white crescent moon shape on its chest, is native to much of southeastern Asia, a narrow band through the Himalayan Mountains, and parts of western Asia. The species relies upon forested habitats. Although no rigorous population estimates are available for the species, it is likely that the species is declining in most parts of its range.

One of the threats to this species is loss and degradation of forest habitats due to logging, expansion of human settlements, roadways, and hydroelectric power stations. Deforestation is a growing problem and has resulted in the isolation of some bear populations into forest fragments that are too small to maintain healthy populations.

The primary threat to the Asiatic black bear is the illegal commercial trade in live bears and widespread killing of bears for bear parts. The bears are hunted

for their skins, paws (a delicacy in some Asian cultures), and especially their gall bladders for bile. The bile is used in traditional Chinese medicine and traditional Korean medicine.

In China, commercial bear farming was initiated in 1984 to harvest bile from live, captive bears. It was hoped that this practice would reduce the taking of wild bears. Most of the bears for the farms, however, are captured from wild populations. Further, the increased availability of legal bile from these bear farms has fueled an increase in demand for bile. This situation has resulted in increases in the capture of live bears for farms as well as the killing of wild bears for their bile.

Although the species has protected status in almost all countries within its range, the laws often are not enforced. Efforts are underway in some countries to reduce habitat degradation, establish more protected areas, and reintroduce bears from captive breeding programs to protected parts of their former range. But the most beneficial conservation measure for the species would be to lessen the demand for bear products substantially, thereby reducing hunting and trade. That complex cultural issue, however, has no simple solution.

# Blue Morpho Butterflies

## Potentially threatened by over-collecting

Collecting specimens (of any species) from the wild can result in dramatic impacts on populations. Removing large numbers of individuals for hobby/art, folk remedies/medical purposes, or culinary reasons can threaten species. Numerous large or brightly colored insects (especially butterflies and beetles) are threatened or endangered from over-harvesting in fragile habitats. Some insects are now being legally farmed in tropical countries to ease the pressure from wild collecting.



Blue morpho butterflies (genus *Morpho*) are large and showy butterflies and are highly sought by collectors. In 1996, two boxes of blue morpho butterflies that had been illegally collected in South America and sold for profit to a collector were confiscated by U.S. Fish and Wildlife Service agents. After the legal case against the collector was closed, the U.S. Fish and Wildlife Service donated the specimens to the NSRL's Invertebrate Zoology Collection.

The "Customs" document from the box of imported butterflies clearly stated the contents were "for Scientific Study" and of "No Commercial Value" (= N.C.V. on label). Yet, the enclosed letter/invoice clearly showed the specimens were for commercial purposes. The insects were collected in the forests of Guyana (South America) and mailed to Fort Davis, Texas.

12/1/76

Dear Sir,

I would like to thank you very much for the letter you received from me on 10/24/76. I am sorry that I cannot get catches to you in the past with me, as I intend the price of up to 1000 per lot. I have a very small stock of 1000 per lot. I am always looking for you, not only to buy specimens and receive me, but also to buy all the specimens for me. I just learned a little bit from you that you have a lot of butterflies. I would like to buy some of them. I would like to buy some of them. I would like to buy some of them.

I am sorry that I cannot get catches to you in the past with me, as I intend the price of up to 1000 per lot. I have a very small stock of 1000 per lot. I am always looking for you, not only to buy specimens and receive me, but also to buy all the specimens for me. I just learned a little bit from you that you have a lot of butterflies. I would like to buy some of them. I would like to buy some of them. I would like to buy some of them.

POSTAL ADMINISTRATION OF GUYANA CUSTOMS DECLARATION CP-38 (new)

(1) Name and address of sender: [redacted] (2) Sender's reference, if any: [redacted]

(3) Name and address of addressee: [redacted] (4) Place a cross (x) here, if the contents of the item are a gift:  for Scientific Study

(5) The undersigned certifies that the particulars given in this declaration are correct: YES

(6) Place and date: Fort Davis, Texas, U.S.A., 79724

(7) Observations: Air Mail

(8) Signature: [redacted]

(9) Country of origin of the goods: Guyana

(10) Country of destination: U.S.A.

(11) Total gross weight: [redacted]

(12) Number of items: 3

(13) Detailed description of contents: Dead Dry Preserved Insects

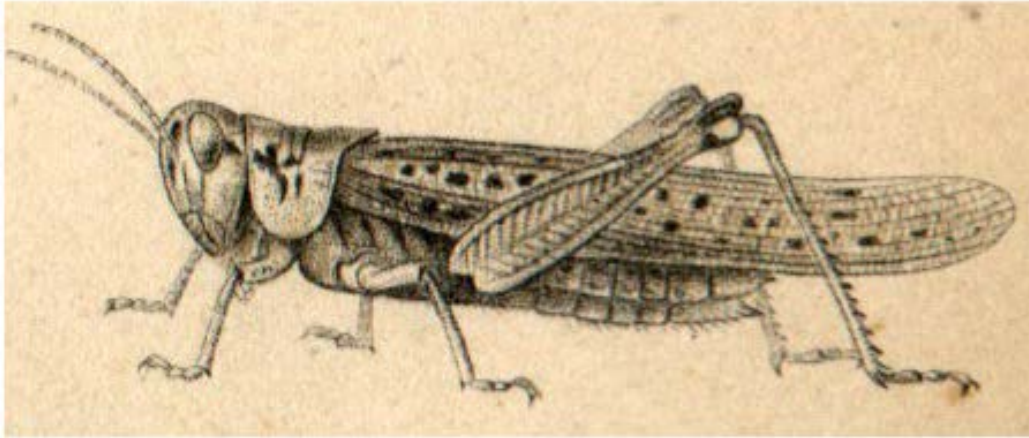
(14) Net weight: [redacted]

(15) Value: N.C.V.

Stamp: Fort Davis, Texas, Dec 1 1976

## Rocky Mountain Locust

**Extinct**



The Rocky Mountain locust (*Melanoplus spretus*) was the most important pest that ranged throughout most of western North America until the end of the 1800s. Sightings often placed their swarms in numbers far larger than any other species of locust. One swarm in particular, in 1875, covered 198,000 square miles (about  $\frac{3}{4}$  the size of Texas), weighed 27.5 million tons, and consisted of some 12.5 trillion locusts.

The last living example of this locust died in 1912. Its extinction represents the only major pest species that has been driven into extinction as a result of human activity. It has been suggested that the breeding grounds of the insect came under continued agricultural development (by homesteaders and by gold miners) the underground eggs of the locust were destroyed.