



## **EXECUTIVE SUMMARY**

exico is one of the world's most biologically rich nations, with diverse landscapes that are home to a treasure trove of wildlife, including plant and animal species found nowhere else. Sadly, in Mexico and around the world, species are becoming extinct because of human activities at rates never seen before.

In this report we highlight the threats facing Mexico's 10 most iconic endangered species to help illustrate the broader risks confronting the country's imperiled plants and animals.

These 10 species — which in most cases are protected only on paper — were chosen to reflect Mexico's diversity of wildlife and ecosystems and the wide range of threats to the country's biodiversity. New awareness of these unique animals and plants is critical to inspiring a nationwide demand to protect these critical components of Mexico's natural heritage.

Although the Mexican government began officially listing and protecting species as extinct, threatened, endangered, and "under special protection" in 1994 — more than 20 years ago — few species have actually recovered, and many critical threats continue unabated. In many cases, officials are failing to enforce crucial laws and regulations that would protect these species.

Additionally, the Mexican government has not updated its official list of imperiled species, referred to as NOM059, since 2010, despite new and growing risks from climate change, habitat destruction, the wildlife trade and in some cases direct killing. This failure obscures the true plight of the nation's endangered wildlife.

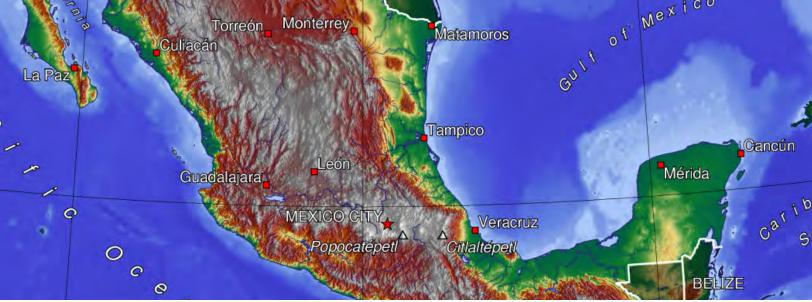
The following 10 iconic endangered species are not adequately protected by the Mexican government:

- 1. Vaquita porpoise (Phocoena sinus)
- **2.** Leatherback sea turtle (*Dermochelys coriacea*)
- 3. Mexican gray wolf (Canis lupus baileyi)
- **4. Mexican ajolote salamander** (*Ambystoma mexicanum*)
- 5. Scarlet macaw (Ara macao)
- **6. Monarch butterfly** (*Danaus plexippus*)
- 7. Elkhorn coral (Acropora palmata)
- 8. Brown sea cucumber (Isostichopus fuscus)
- **9.** White nun orchid (Lycaste skinneri)
- **10. Jaguar** (Panthera onca)

By drawing attention to these 10 rare, beautiful and sometimes bizarre animals and plants, we hope to inspire the public to demand stronger protections, increased funding, and forceful new conservation actions at the federal, state and local levels throughout Mexico.

### **Key findings and recommendations:**

- Despite having been listed as threatened or endangered for, in many cases, more than two decades, many of Mexico's most at-risk species have not recovered.
- Habitat loss, poaching and illegal trade, climate change and ocean acidification remain major threats to Mexican species.
- The Mexican government has, in many cases, failed to enforce existing laws and regulations aimed at protecting species like the vaquita.
- The official list of imperiled species, NOM059, should be updated to reflect the true status and threats to species.
- New regulations should be adopted to require Mexican authorities to list and protect species when presented with information demonstrating a need for protection.



Map courtesy Wikimeida Atlas of the World

## INTRODUCTION

Our planet is now living through its sixth mass extinction. We're currently experiencing the worst extinction rates since the loss of the dinosaurs 65 million years ago. Although extinction is a natural phenomenon on a geological timescale, experts estimate we are now losing species at between 1,000 and 10,000 times the natural rate, with literally dozens of species going extinct every day. If current trends continue, a frightening future lies ahead, with as many as 18 percent to 35 percent of all species possibly heading toward extinction by mid-century.

Mexico is no exception. Under Mexican law there are officially 49 "extinct species," 475 species deemed "endangered," 896 deemed "threatened" and 1,185 "under special protection."

Each of these species of native animals and plants of Mexico is listed and regulated under the official standard NOM-059-SEMARNAT-2010 (NOM059). Once listed under NOM059, species are subject to the General Wildlife Act, as implemented by the Secretary of Environment and Natural Resources (SEMARNAT), and may not be subject to "commercial exploitation" and may be extended other protections by SEMARNAT.

Yet despite these protections, few species have recovered, and for many species, the threats of habitat destruction, poaching and climate change have only intensified.

This report describes 10 of Mexico's gravely imperiled species and the threats they continue to face. The 10 iconic species chosen reflect the diversity of flora and fauna, ecosystems and threats facing biodiversity in Mexico. Numerous additional species in Mexico are equally, if not more endangered than these 10 and also deserve more attention and better protection from the Mexican government.

By drawing attention to these 10 representative animals and plants, we hope to inspire the public to demand strengthened protections throughout Mexico.

At the outset, we note that Mexico's official list of protected species is out of date, as it has not been modified since 2010, and some of the status reviews upon which the listings were based were done many years before that, in 1994 and 2001. Thus NOM059 does not reflect the current reality for many Mexican plant and wildlife species, where each day threats grow.

Additionally, according to the Federal Law on Metrology and Standardization, Mexican official standards should be reviewed every 5 years — and that review is now three years overdue. We also urge the Mexican government to consider amending current legislation to require that SEMARNAT respond and update the NOM059 list when a valid proposal for altering a species' status is submitted by scientists or the public. That way species will not have to wait five years or more — by which time it is often too late — for the Mexican government to update NOM059 in order to be considered endangered.



Vaquita photo courtesy Paula Olson / NOAA

## 1. VAQUITA PORPOISE (Phocoena sinus)

### Status under NOM059: Endangered

The vaquita, or Gulf of California harbor porpoise, is a marine mammal endemic to the Gulf of California and is the most endangered cetacean species in the world. Vaquitas are the smallest of the seven known porpoises. Females grow up to 140 cm (4.6 feet) long, while males are slightly smaller at 135 cm (4.4 feet). The vaquita's flippers are proportionately larger, and its dorsal fin taller and more curved, than in other porpoises.

The vaquita has the smallest geographical range of any marine mammal. Found only in Mexico's upper Gulf of California near the town of San Felipe, nearly the entire vaquita population lives within a 4,000-square-kilometer (1,519-square-mile) area, about one-quarter the size of metropolitan Los Angeles.

First described by scientists in 1958, at current rates of decline, the species may be extinct by 2021 as fewer than 30 vaquita likely now remain on Earth. The vaquita faces one key threat: bycatch (or entanglement and drowning) in gillnets set to catch fish and shrimp. While the Mexican government recently banned most gillnets from the vaquita's waters, illegal shrimp fishing continues and illegal poaching for a large endangered fish called the totoaba is rampant. The totoaba's bladder is in high demand in Hong Kong and China, where it is believed to have medicinal properties, and illegal totoaba gillnetting continues daily because of corruption, enforcement failures by the Mexican government and the involvement of organized crime.

#### Recommendations

To halt totoaba trafficking and save the vaquita, the Mexican government must immediately step up enforcement and remove gillnets from the vaquita's habitat. Vaquita-safe fishing gear must be developed and implemented. GPS monitoring systems must be installed on all vessels fishing in the upper Gulf of California, and the Mexican, Chinese and U.S. governments must dedicate substantial resources to a deep investigation of the illegal trafficking of totoaba.



Leatherback sea turtle photo courtesy USFWS

## 2. LEATHERBACK SEA TURTLE (Dermochelys coriacea)

### Status under NOM059: Endangered

As ancient as the dinosaurs, the leatherback sea turtle is itself threatened with extinction. The leatherback is the heaviest reptile on the planet and the largest of all living turtles, growing up to 7.2 feet long and weighing up to 1,540 pounds. It can easily be distinguished from other sea turtles by its lack of a bony carapace or shell; instead, it is covered by skin and oily flesh, which gives rise to the name "leatherback."

This champion swimmer, whose diving capabilities are unmatched by other turtles, has confounded scientists with its mammal-like ability to regulate its own body temperature. Tolerant even of the extreme temperatures of the Arctic Circle, leatherbacks cannot endure humanity's assault on the world's oceans much longer.

Human activity threatens leatherback turtles in many ways. These sea turtles subsist on a diet of jellyfish, but because of the transparent nature of their prey, they often suffocate by eating pieces of drifting transparent plastic. Dead turtles have been found with plastic bags, hard plastic parts and fishing lines in the stomach.

Eggs are collected for human consumption, coastal developments and irresponsible tourism have disrupted and destroyed their nesting beaches, and city lights confuse baby turtles who move inland towards the lights instead of out to sea. Leatherback sea turtles are also hit by boats and drowned as bycatch in fishing gillnets.

The East Pacific leatherback is the most endangered sea turtle, and these animals nest mainly in Michoacán, Guerrero and Oaxaca. This subpopulation has declined 97.4 percent during the past three generations, with no more than 1,000 individuals left.

In Mexico the direct take of sea turtles has been banned since 1990, and there is a regulation (NOM-162-SEMARNAT-2012) that sets out the specifications for the protection, recovery and management of sea turtle populations in their nesting habitat. But habitat loss, poaching and bycatch remain major threats to these highly endangered reptiles.

#### Recommendations

To recover the leatherback population, the Mexican government must regulate motor vehicles and remove sources of artificial lighting near priority leatherback nesting beaches, establish plastic removal programs, prohibit the use of gillnets and "J" form hooks in marine areas near priority nesting beaches, and increase enforcement to protect nests from poachers and natural predators.

## 3. MEXICAN GRAY WOLF (Canis lupus baileyi)

#### Status under NOM059: Extinct in the wild

The smallest gray wolf subspecies in North America, the Mexican gray wolf is also one of the rarest and most endangered mammals on the continent, with only a few dozen surviving in the wild following a reintroduction program.

Reaching only the size of a German shepherd, Mexican gray wolves weigh between 21 and 41 kg, and grow to between 140 cm and 180 cm from snout to tail. They can live up to around 8 years old in the wild.

The Mexican gray wolf was historically distributed from the south of the United States of America (the states of Arizona, New Mexico and Texas) to the basin of the Mexico City valley. In Mexico, it was historically distributed in the states of Chihuahua, Coahuila, Nuevo León, Durango, Zacatecas, Aguascalientes, San Luis Potosí, and the Bajío, and even reached Oaxaca.

Unfortunately, Mexican gray wolves were exterminated in the wild by the 1970s as a result of eradication campaigns carried out by the U.S. and Mexican governments in response to livestock predation. While both Mexico and the United States now have programs to reintroduce and repopulate the Mexican gray wolf, hunting, poisoning and habitat loss remain as threats. According to Mexico's National Commission on Protected Areas (CONANP), there are only 31 Mexican gray wolves in the wild; this population exists because of a reintroduction program. Accordingly, the Mexican gray wolf is still considered an extinct population in the wild under NOM059.

#### Recommendations

Some reintroduced wolves have been hunted and killed. To recover the Mexican gray wolf, the Mexican government has to actively protect reintroduction sites. For a successful reintroduction of the species, officials need to protect the animals' habitat and assure the conservation of a healthy, well-connected ecosystem. Reintroduction sites should be chosen based on the historical distribution of the wolf and nearby or immersed communities must be involved in conservation actions.





Ajolote photo by Isaí Domínguez Guerrero

# 4. MEXICAN AJOLOTE SALAMANDER (Ambystoma mexicanum)

### Status under NOM059: Endangered

The Mexican ajolote is a long, dark, cylindrical salamander, reaching up to 30 cm (12 inches) long. This distinctive-looking and highly endangered creature has large, appendage-like gills extending from the back of its wide head.

The Mexican ajolote historically lived in the lakes of Texcoco, Xochimilco and Chalco in Mexico City. However, in the wild, ajolote can only now be found in the channels and wetlands of Xochimilco. Humans who settled on the shores of these wetlands called the animal axolotl, or "water monster" in Náhuatl. But in another pre-Hispanic tradition, the name comes from the Aztec God of deformations and death called Xolotl, brother of Quetzalcoatl. The God Xolotl is also associated with the idea of movement and life.

Once a common food source, the ajolote was also used for folk remedies that supposedly could treat respiratory diseases like asthma and bronchitis. Belief in its therapeutic properties still exists in some places, and until recently, it was possible to find balms and syrups in the Sonora market in Mexico City that purported to contain ajolote as the main ingredient. It is also consumed in infusions believed to have curative effects, although these products have neither been proven effective nor safe. As food, ajolote was traditionally prepared in soups, stews, and even tamales. With so many purported benefits attributed to the ajolote, it suffered substantial overexploitation.

Other threats to the species include land drainage and habitat loss caused by the growth of Mexico City. Sewage disposal has seriously polluted what remains of the ajolotes' native lakes. The Texcoco Lake has been greatly diminished in size and has shrunk even more with the construction of the new Mexico City international airport, while Lake Chalco has disappeared entirely. Xochimilco has likewise suffered a decline in size and water quality, and introduced fish like tilapias are a threat to the salamander.

In captivity ajolotes can live up to 30 years but only survive between three and six years in the wild. In 1996, the species' population density was calculated at 1,000 ajolotes per square kilometer; but in 2014, only 36 ajolotes were calculated for the same area.

#### Recommendations

Local and federal government must develop well-budgeted reintroduction programs that consider habitat restoration and the creation of refuges to guarantee the species' survival. The Xochimilco wetlands must be sanitized and restored, exotic fauna eradicated, and the water quality coming from the sewage systems must also be improved.



Scarlet macaw photo by Ben Lunsford, CC-BY-SA

# **5. SCARLET MACAW** (Ara macao macao)

### Status under NOM059: Endangered

Scarlet macaws are birds distinguished by their colorful plumage, with scarlet red bodies, yellow wing feathers and light blue tail feathers.

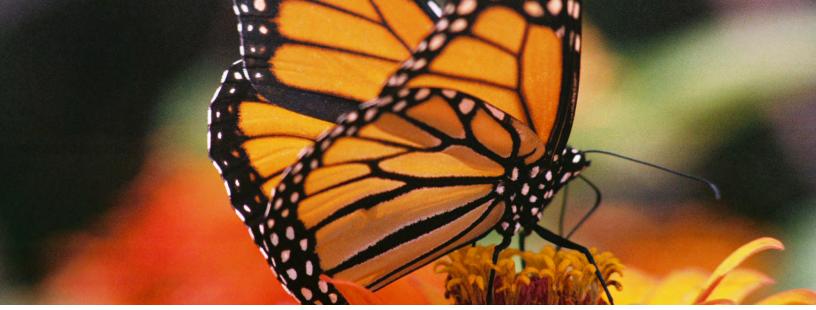
In Mexico the red macaw has been completely exterminated in the states of Tamaulipas, Veracruz, Oaxaca, Tabasco and Campeche. Currently, there are only two known populations that inhabit less than 5 percent of the Mexican territory. These populations are found in the Lacandona jungle on the eastern side of Chiapas and in Los Chimalapas, Oaxaca.

Indiscriminate logging, illegal hunting, theft of offspring — just 1 in 10 newborn birds survives to adulthood in nature — and animal trafficking have put this bird on the list of endangered species. Additionally, the macaw has naturally low reproductive success rates, and African bees can displace macaw couples from their nests or even kill chicks and adults.

The capture and trade of any wild parrot in Mexico has been banned since of 2008. A reintroduction program has increased red macaw populations in jungles in Chiapas and Veracruz; the population nearly doubled in 2013 when 226 birds were introduced to the area. However, habitat loss and illegal trafficking remain as threats.

### Recommendations

The Mexican government must prioritize the underused and budget-less Program for the Conservation of Species at Risk (PROCER) and must halt logging in the tropical forest to protect the red macaw's habitat for the reintroduction programs to be successful.



Monarch photo by Debbie Long, CC-BY

# 6. MONARCH BUTTERFLY (Danaus plexippus)

### Status under NOM059: Special protection

The monarch may be the world's best-known butterfly, but that status has not warded off profound threats to its survival. This butterfly's long migration from the United States and southern Canada to Mexico and California to winter is one of the planet's most spectacular and extraordinary natural spectacles.

Monarchs are relatively large butterflies, measuring around 10 cm from wingtip to wingtip. Their wings are easy to recognize — bright orange with black stripes and white spots. The underside of their wings is paler orange, so when they fold their wings on trees and other plants, the butterflies appear camouflaged. Monarch larvae subsist on milkweed plants, which contain a substance absorbed by the butterfly that makes it poisonous to some predators.

There are still many mysteries about this wonderful insect and its incredible journey: How do those fragile winged bodies survive a path of 4,500 kilometers, often through adverse winds and weather?

But there may not be much time left to answer such questions. Last year's population was down by 27 percent from the previous year's count, and down by more than 80 percent from the mid-1990s.

This dramatic decline has been driven in large part by the widespread planting of genetically engineered crops. The vast majority of U.S. corn and soybeans are genetically engineered for resistance to Monsanto's Roundup herbicide, a potent killer of milkweed, the monarch caterpillar's only food. The dramatic surge in the use of Roundup and other herbicides with the same active ingredient (glyphosate) on Roundup Ready crops has virtually wiped out milkweed plants in the Midwest's corn and soybean fields.

In the past 20 years, scientists estimate, these once-common butterflies may have lost more than 165 million acres of habitat — an area about the size of Texas — including nearly a third of their summer breeding grounds. More recently, legalized salvage timber-harvesting operations have become a threat inside and outside the reserve in Michoacán's Oyamel forests, which are essential for sheltering the overwintering migrant population. Scientists have also identified threats to the monarch during their fall migration, including lack of nectaring habitat and insecticides.

#### Recommendations

Illegal logging must be stopped through effective surveillance and enforcement, and the use of plants genetically engineered for pesticide resistance should be halted. If we're going to save this beloved orange-and-black wonder for future generations, serious action from both Mexico and the United States is needed to ensure the monarch's habitat is preserved on each side of the border.



Elkhorn coral photo courtesy USFWS

# 7. ELKHORN CORAL (Acropora palmata)

### Status under NOM059: Special protection

Elkhorn coral is easy to recognize with its large, flat, thick branches that form fronds reaching more than 50 cm wide. Elkhorn coral forms colonies that can become very large, measuring up to 2 meters high and 4 meters wide. This species inhabits shallow waters, and live colonies exhibit a yellow, brown or golden coloration.

Elkhorn corals are one of the primary coral reef-forming species in the Caribbean. They provide refuge for a huge variety of living species that interact and shape the ecosystem. If elkhorn coral and other horn corals disappear, the entire reef ecosystem as we know it could disappear, affecting the food chain for thousands of marine species.

Climate change is one of the main threats to elkhorn and other corals. Global warming is increasing the average ocean temperature over time, and these incredible organisms are very sensitive to temperature increments. Additionally, coral diseases appear to have increased significantly in the last decade, killing off elkhorn and other reef-forming corals. Scientists believe that deterioration of water quality by various pollutants and the sudden increase in sea surface temperature has caused the recent disease outbreak. Both factors are the result of human activities.

Elkhorn corals were once very abundant in shallow areas of the Caribbean, forming dense and beautiful forests. Its populations along the Mesoamerican Reef have not recovered the distribution and abundance they had before the 1980s.

#### Recommendations

Well-managed marine reserves in the Gulf of Mexico and the Caribbean are necessary to preserve reef corals. A management plan with coral habitat restoration for the Mexican Caribbean Biosphere marine reserve should be considered. Climate change has to be urgently addressed to decrease sea surface temperature and disease prevalence.



Brown sea cucumber photo by Rein Ketelaars, CC-BY-SA

## 8. BROWN SEA CUCUMBER (Isostichopus fuscus)

### Status under NOM059: Special protection

The brown sea cucumber is an echinoderm with an elongated, soft body. The mouth is surrounded by a crown of oral tentacles that take up food. This species lives in rocky, sandy and shallow water reefs throughout the eastern tropical Pacific, from the northern Gulf of California to Ecuador, including the Galapagos Islands. It is a long-lived, slow-growing species that can reach 28 cm in length and weigh 960 grams. Brown sea cucumbers are more active at night and have no natural predators.

Despite their appearance, sea cucumbers are fished and eaten. Their whole bodies can be eaten raw or boiled; however, the most important product is the dehydrated body wall, which is known as "bêche-de-mer" or "trepang." A kilogram of bêche-de-mer can bring in \$80 U.S., depending on the size and overall appearance. About 90 percent of the global production of sea cucumber is consumed in the southeast of Asia, with China and Hong Kong as the primary import markets. Demand is increasing for this and other sea cucumber species around the world, creating a risk of overexploitation for all sea cucumber populations.

The brown sea cucumber has been listed under NOM059. A commercial fishery for brown sea cucumber began in 1987 but fishing was banned in 1994 when the species was protected under NOM059.

However, the population's status is currently unknown, and despite signs of overexploitation and its prohibition for commercial fisheries, SEMARNAT has been issuing permits each year allowing the take of tens of thousands of sea cucumbers, essentially establishing quotas using "population assessments as conservation projects" as a disguise for commercial exploitation.

This is an example of one of several species included in NOM059 for more than a decade that are subject to commercial exploitation, despite an unknown population status. According to the precautionary principle, SEMARNAT should prohibit all catches until completing a full population assessment and management plan.

#### Recommendations

Until the population status is known, Mexico should implement a ban on sea cucumber fisheries. Given the growing interest in the exploitation of sea cucumbers, basic information regarding local sea cucumber populations' status and biology is needed prior to any further fisheries management and aquaculture development.



White nun orchid photo by Orchi, CC-BY-SA

## 9. WHITE NUN ORCHID (Lycaste skinneri)

### Status under NOM059: Endangered

Of the world's 30,000 identified orchid species, 1,200 can be found in Mexico, with more than 200 of these species currently listed as endangered. More than half of Mexico's orchids grow in mist forests, an ecosystem that only covers 1 percent of the nation.

The elegant white nun orchid can be found in southern Mexico, in the state of Chiapas — as well as in Guatemala, Honduras and El Salvador — at altitudes of about 1,400 to 2,200 meters. Its habitat has been intensely logged for coffee plantations, rice and beans farming and urban development, and the species is now only reported on forested hillsides with inaccessible slopes. The white nun orchid has been harvested to depletion, and despite being the national flower of Guatemala, the species' current status and distribution is unknown. Most of the species' current genetic diversity is held in private collections or greenhouses.

The white nun orchid was listed on NOM059 in 2001 and thus harvest and trade in wild plants is generally banned. However, legal trade of this and other listed orchid species can continue through artificial propagation of plants that are sourced from an environmental management unit (UMA, for its acronym in Spanish) authorized by SEMARNAT. In Mexico there are only a few nurseries authorized for the propagation of these plants, and the illegal harvest and trade of this delicate orchid for decorative purposes continues.

#### Recommendations

To protect this beautiful flowered plant and others of its kind, the Mexican government must dismantle the illegal orchid trade and stop logging of its habitat in Chiapas. A national reintroduction program should be established.



Jaguar photo by Eric Kilby, CC-BY-SA

## 10. JAGUAR (Panthera onca)

### Status under NOM059: Endangered

Known as "Ocelotl" in Nahuatl and "balam" in Mayan, the jaguar has long been associated in the diverse cultures of Mexico with courage, power, the night, the underworld, the fertility of the earth and death.

Males can weigh 150 kilograms; females are smaller. In contrast to the other big cats, the jaguar grunts but rarely roars. As top predators, they control the population densities of their prey, thus the disappearance of jaguars can alter entire ecosystems.

Today the species faces numerous threats: loss and fragmentation of its habitat, agriculture and livestock, hunting, reduction of its prey (mammals, birds, reptiles and fish) and the expansion of human settlements.

While jaguar hunting has been banned since 1987, not enough has been done to ensure the species' preservation. In Mexico, more than 40 percent of the jaguar's habitat has been lost, and it is now limited to the most isolated and inaccessible areas on the Pacific and Gulf coasts, the eastern and eastern Sierras, and the south-southeast of Mexico. The best-preserved populations are found in the Yucatan peninsula, Oaxaca and Chiapas, with about 1,800 individuals. In Sonora and Sinaloa, there may be around 400; in the middle Pacific coast, in Nayarit, Jalisco and Colima, approximately 300; and from Michoacán to Chiapas, 650.

The continued survival of the jaguar in Mexico is uncertain. The population could decline in the next 10 or 15 years if officials do not develop a solid and established conservation policy. If populations are not secured, we could lose them.

#### Recommendations

To reinforce jaguar protections, the government must protect its critical habitat in the states of Sonora, Sinaloa, Nuevo León, Tamaulipas, San Luis Potosí, Queretaro, Hidalgo, Puebla, Nayarit, Jalisco, Colima, Michoacán, Guerrero, Oaxaca, Chiapas, Tabasco, Campeche, Quintana Roo and Yucatán. Each region is essential to maintain long-term populations in Mexico. The construction of roads in protected areas should be avoided, and responsible cattle management including insurance for ranchers should be promoted.

The future of the jaguar requires the conservation of a healthy ecosystem and indirectly, the protection of a large number of species of plants and wildlife. Thus the designation and diligent enforcement of new protected areas of jaguar habitat is vital.

	Species	NOM059 status	IUCN status	CITES appendix	Habitat restriction/ Population
1	Vaquita porpoise	Endangered	Critically Endangered	I	<30 individuals
2	Leatherback sea turtle	Endangered	Critically Endangered	-	633 individuals (2010) (East Pacific Ocean subpopulation)
3	Mexican Gray Wolf	Extinct in the wild	Not listed	II	21 individuals
4	Ajolote salamander	Endangered	Critically Endangered	II	<100 individuals
5	Scarlet macaw	Endangered	Least Concern	I	<300 couples (Chiapas and Oaxaca)
6	Monarch butterfly	Special Protection	Not listed	Not listed	109 million
7	Elkhorn coral	Special Protection	Critically Endangered	II	Population reduction exceeding 80% over the past 30 years
8	Brown sea cucumber	Special Protection	Endangered	II	Population decline across the entire range of this species is calculated to be at least 60% over the past 30-50 years
9	White nun orchid	Endangered	Not listed	II	Unknown, small range
10	Jaguar	Endangered	Near Threatened	_	<4,000