



As of 2016

**860** species **extinct**  
**68** species **extinct in the wild**  
**5210** species **critically endangered**  
**7781** species **endangered**  
**11316** species **near threatened**

## Government Involvement

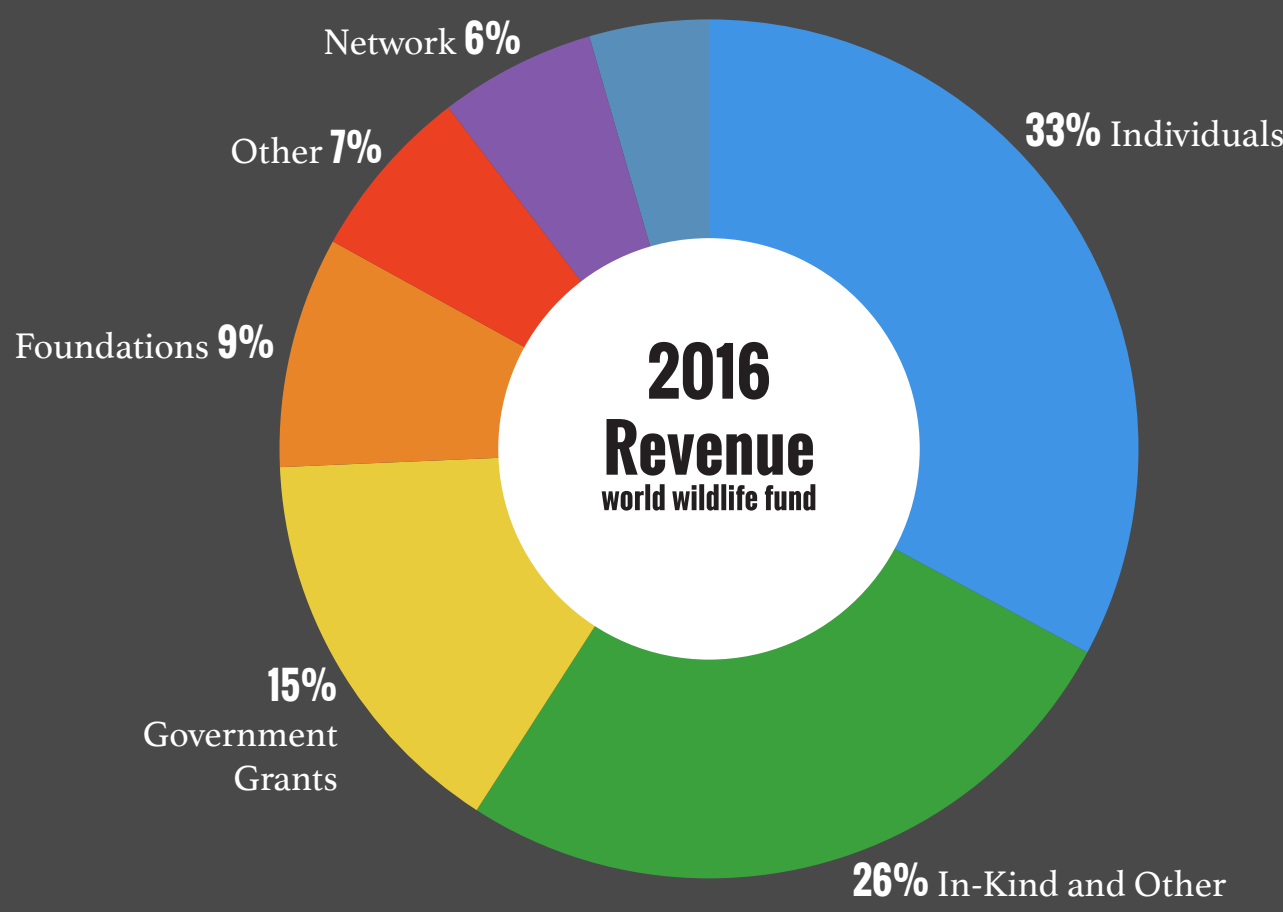
When Congress passed the Endangered Species Act (ESA) in 1973, it recognized that our rich natural heritage is of "esthetic, ecological, educational, recreational, and scientific value to our Nation and its people." It further expressed concern that many of our nation's native plants and animals were in danger of becoming extinct.

The purpose of the ESA is to protect and recover imperiled species and the ecosystems upon which they depend. It is administered by the U.S. Fish and Wildlife Service and the Commerce Department's National Marine Fisheries Service (NMFS). The FWS has primary responsibility for terrestrial and freshwater organisms, while the responsibilities of NMFS are mainly marine wildlife such as whales and anadromous fish such as salmon.

Under the ESA, species may be listed as either endangered or threatened. "Endangered" means a species is in danger of extinction throughout all or a significant portion of its range. "Threatened" means a species is likely to become endangered within the foreseeable future. All species of plants and animals, except pest insects, are eligible for listing as endangered or threatened. For the purposes of the ESA, Congress defined species to include subspecies, varieties, and, for vertebrates, distinct population segments.

## World Wildlife Fund

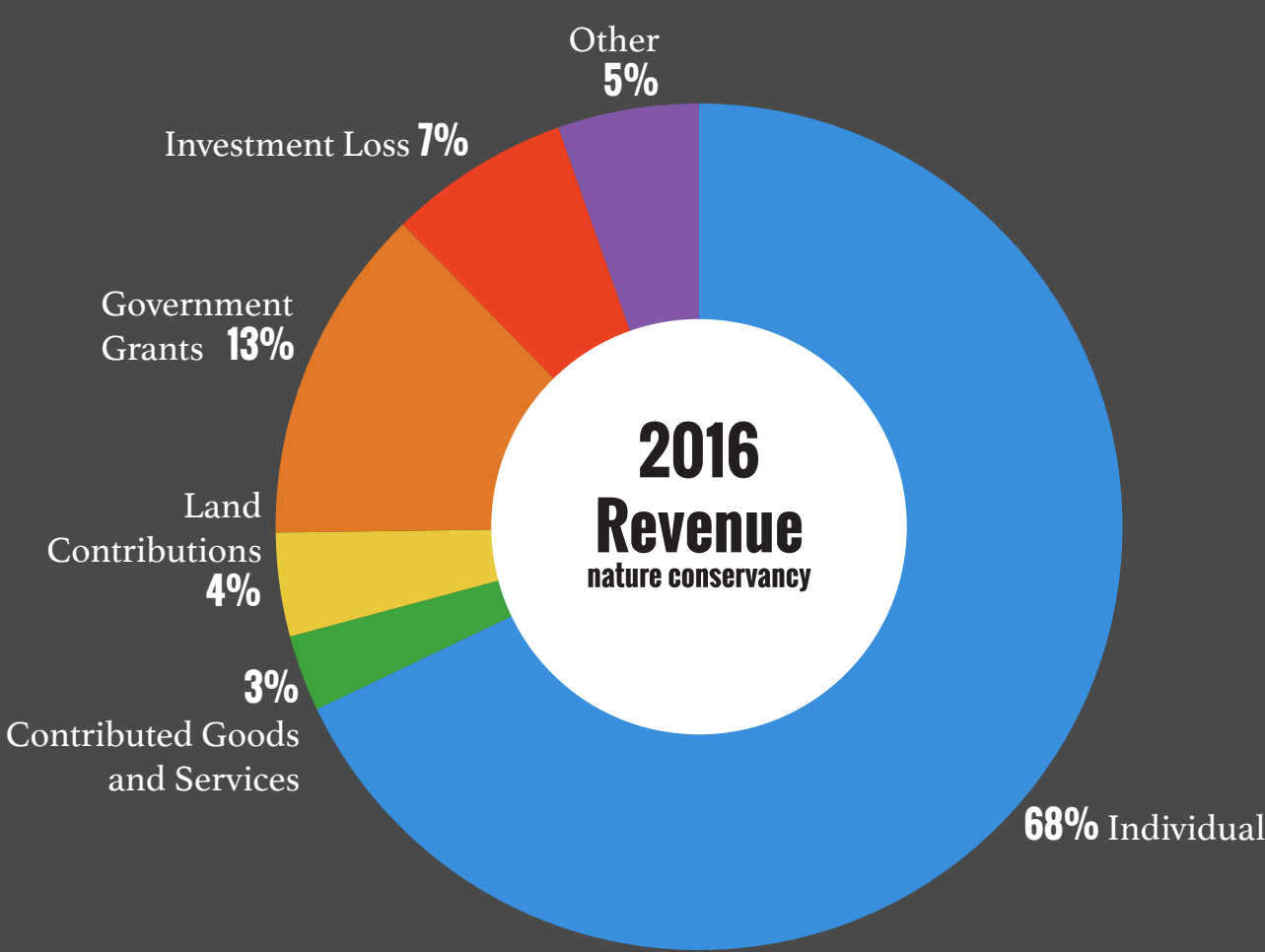
WWW.WORLDWILDLIFE.ORG



Total 2016 Revenue: \$305,208,089

## Nature Conservancy

WWW.NATURE.ORG



Total 2016 Revenue: \$732,260

## Are the efforts worth it?

For nearly two decades China has been introducing and enforcing tough logging and poaching bans, and has invested massive amounts of money in programs to encourage forest restoration. It has set up 67 reserves that are home to 1,246 pandas—about two thirds of the total wild population, according to China's Fourth National Panda Survey released in February 2015. Declaring pandas VULNERABLE after 26 years of ENDANGERED status on the Red List "is a testimony that these conservation efforts worked, and they should keep doing them," Garshelis says. "It's a really positive message."

But the IUCN announcement has not been so unanimously welcome in China. The State Forestry Administration issued an official statement saying that downgrading pandas' conservation status is "premature," and vowed to continue protecting them as an endangered species. The new designation has also divided opinions in the scientific community. Some researchers say the giant panda population has been increasing steadily

in recent years and that the downgrade is a natural outcome, but critics say the change could compromise conservation efforts and push pandas to the brink of extinction.

The IUCN's decision was based on China's Fourth National Panda Survey, in which thousands of government wildlife staff, scientists and volunteers combed 4.4 million hectares of forests in Sichuan, Shaanxi and Gansu provinces from 2011 to 2014. The survey found evidence of 1,864 pandas in the wild—an increase of 16.8 percent from the previous survey conducted in 1998–2002. But many researchers and conservationists question whether these two surveys should be compared. "The searching efforts in the fourth survey were much more intense, combing an area 76 percent bigger than in the previous attempt," says Fan Zhiyong, director of the species program at the conservation group World Wide Fund for Nature (WWF) China. (The WWF is known in the U.S. as the World Wildlife Fund.) "It's not terribly surprising they found more pandas," Fan says. "But this doesn't mean that the total population is on the rise."

# Animal Extinction

## The causes and the efforts in saving our planet

### Did you know ? There are 6 major categories that are considered in the causes of animal extinction

#### Disease and Parasitism

The phenomena of disease and parasitism often weaken organisms and interfere with metabolic function. As a result, faunal species can suffer from the ability to find food, find and attract a mate, seek shelter, migrate, or engage in fertile outcome in the breeding process. The deficiencies in these basic functions may lead to premature deaths of considerable numbers of the population or in the reduced fecundity and birth rates. Correspondingly bacterial infections, viral introductions and infection by higher level parasites may be a contributory cause to species extinction.

In the case of flora, diseases and parasitism can also interfere with metabolic processes, although there are countless examples of symbioses, which manifest morphological changes to the plant, but do not significantly alter plant development. In cases where metabolic functions are altered severely, the plant height may be compromised, prohibiting many individuals to attain heights to gather sufficient light. Correspondingly there may be interference with leaf, stem or root development, such that the roles of these structures are insufficient to allow the plant to reach maturity and optimum seed development. In other cases the disease or parasite may compromise the reproductive and seed dispersal vigor, such that the overt population dynamics are affected.

Often, disease and parasitism are synergistic causes of extinction, as in the case of the Hawaiian Islands, where human-caused habitat destruction, habitat fragmentation, human introduction of alien species and human introduction of diseases have combined to produce a pernicious cocktail for eradication of most of the indigenous species of these islands.

#### Alien Species

The introduction of alien species to a new environment can have major dissociative effects to an entire ecosystem and be a key driver in species extinctions. Moreover, the introduction of a foreign species to a new habitat can cause a number of distinct and pronounced adverse ecological impacts. For example, the introduced species could be a predator of certain of the resident species. In particular, the introduction of rats, weasels and other mammalian predators (Hogan, 2009) to most of New Zealand has been the instrument of decimation for the kiwi species and numerous other birds, who evolved in the absence of terrestrial mammalian predators, and thus who are unarmed with defensive strategies or adaptations. The predation of the local species may diminish prey populations and potentially drive certain local populations of prey below their minimum viable population size. Similarly, the introduced species could be a competitor with the existing species within the given habitat. Limited resources are always a constraint, and when a new taxon arrives, certain limited resources may become prominent constraints to ecosystem function. In certain cases faunal species have been introduced to increase agricultural or fishery productivity.

The Signal Crayfish, *Pacifastacus leniusculus*, an aquatic feeding machine has been unleashed in western Europe and many parts of Asia, under the guise of increasing the crayfish harvest beyond that available from native crayfish biomass productivity. The experiment was successful from a food production perspective; however, the outcome has been an ecological disaster from the standpoint of numerous prey species, whose populations have been severely degraded by the presence of the aggressive Signal Crayfish. (Nystrom, 1999)

#### Cryptic Habitats

A special problem arises in the case of cryptic habitats, defined as portions of an ecosystem that are largely hidden from normal investigative view of scientists, or which have components that are not readily discoverable with state of the art research techniques. In these cases substantial habitat degradation and associated biodiversity loss may have occurred before researchers have intercepted the ecological data substantiating the loss. Cryptic habitats represent a very large reservoir of the Earth's biota, since many of these are micro-habitats such as reef cavities and burrows, where vast numbers of species inhabit very small enclosed and virtually hidden spaces. (Flugel, 2004) Deep ocean environments represent other massive extents of the planet, which environments are not only cryptic habitats, but also effectively an unexplored domain. Arthropods and micro-organisms represent a vast number of the species within cryptic habitats, since many of these species require special tools of observation or capture techniques (Jamieson and Campbell, 1998) to invade the realm of their environment; these aspects of the worlds ecosystems are quite noteworthy, since arthropods as a class make up the majority of faunal biomass of the Earth. Furthermore, these minute species are over-represented in the organisms which are currently undescribed. Hence, these are the very species that are currently passing into extinction prior to their recording. (Wilson, 2005)

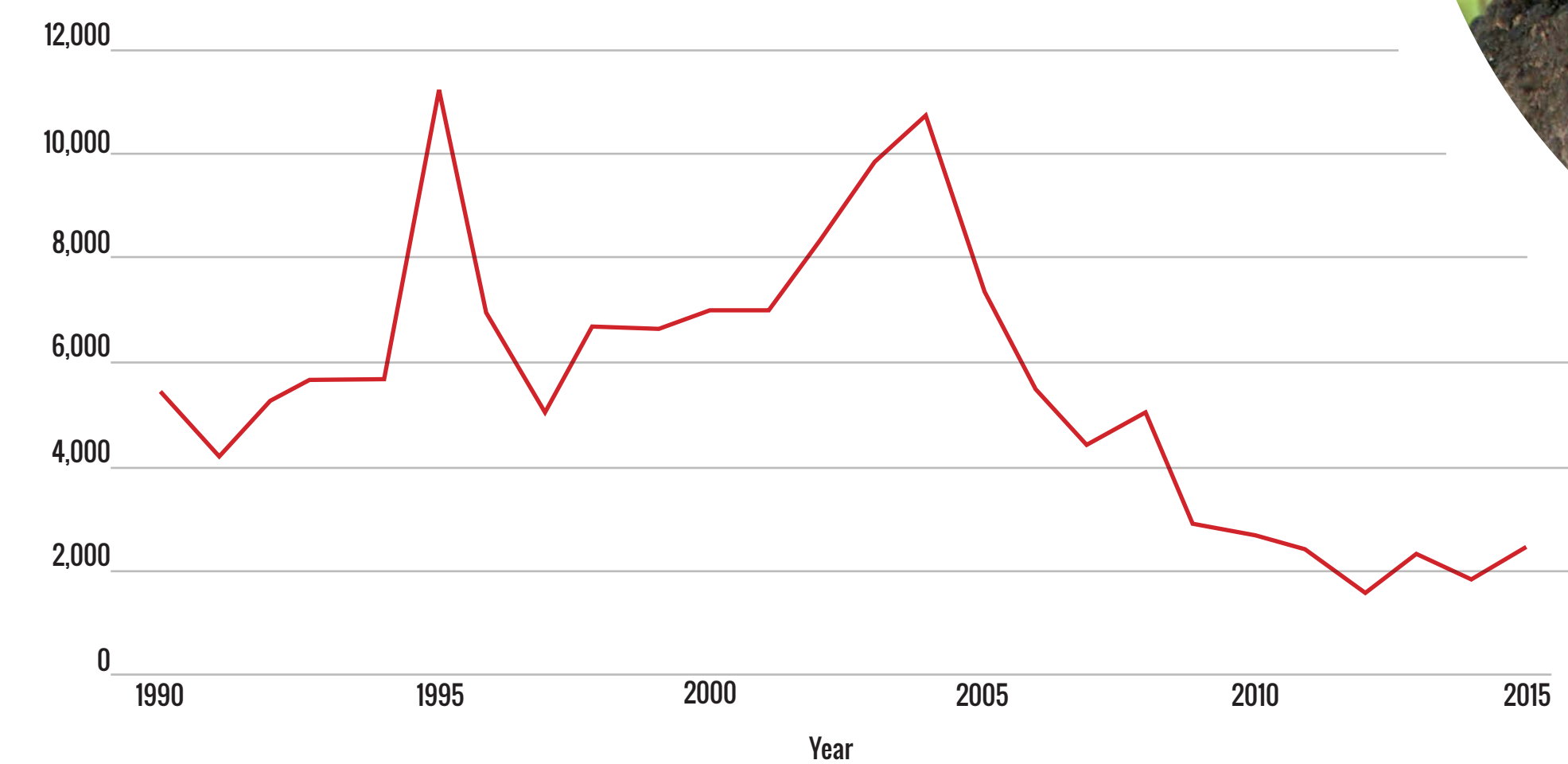
**Fishable Pacific Bluefin Tuna Population is estimated to be a low 17,000 tons.**

If the population of Pacific bluefins drops much further, it may no longer be economically feasible to fish for them. At that point, "Pacific bluefin would be considered commercially extinct," Nickson said.

#### Overexploitation

Since prehistoric times, humans have used the earth's resources to enrich their own lives. However, there is a point when the resources are being overexploited, and this exploitation begins to threaten the existence of other species. Overexploitation presents itself in many forms: exhausting a species as a supply of food or hunting a species for trophies, clothing, medicine or souvenir. In the aquatic biomes, overfishing is a worldwide manifestation of over-exploitation. In the case of terrestrial ecosystems, overgrazing and intensive cropping systems are the chief elements of over-exploitation. Hunting for trophy or medicinal extracts comprises a smaller biomass destruction, but is specifically targeted at some of the most threatened fauna of the planet. These practices are generally overtly mercenary, rather than being motivated by subsistence or hunger, as most of the farming exploitation. For example, tigers have been an integral part of traditional Chinese medicine for over 1000 years and as such, they have been hunted to the brink of extinction as a product of the lucrative trade in tiger body parts.

### Annual Loss of Amazon Rainforest (square miles)



August 2015 to July 2016, the Amazon rainforest was deforested at an estimated rate of 7,989 square kilometers (more than 3,000 square miles).

#### Habitat Destruction

is the greatest contributor to the extinction of many species; moreover, impacts to biota from habitat fragmentation is a critical mechanism of driving species to extinction. This destruction is ongoing in both terrestrial and aquatic biomes, with approximately 80% of all extinctions being attributed to human caused habitat destruction. Terrestrially the destruction includes forests, deserts and grasslands, but the latter may account for the greatest losses due to the attractiveness to humans of agricultural and urban conversion. In fact, it is agricultural rather than urban loss that is the greater cause for species extinctions. (Ehrlich and Ehrlich, 1980) Most of the habitat reduction is due to conversion of natural habitat to agricultural or logging uses, chiefly driven by the expanding human population. The effects of habitat destruction are especially prevalent in areas of the world with a formerly rich biodiversity that are being converted into land to be utilized commercially or agriculturally. For example, rainforests are being destroyed chiefly to expand agricultural production to feed an undernourished human

population; such massive deforestation destroys and fragments the habitat for innumerable species. Such agricultural land conversion is amplified because many previously productive tracts such as the North China Plain have suffered great reductions in crop yield due to unsustainable agricultural practices. In terms of the marine environment, water pollution and trawling (a form of fishing in which a net weighted by anchors is dragged across the ocean floor) have contributed significantly to habitat destruction; marine ocean pollution consists not only of introduced chemicals, but also thermal pollution and excess turbidity, the latter of which leads to sedimentation and destruction to coral reefs among other marine biotic impacts

**1,175 rhinos were poached in South Africa during 2015**

a slight decrease on the previous year when a record 1,215 rhinos were illegally killed.

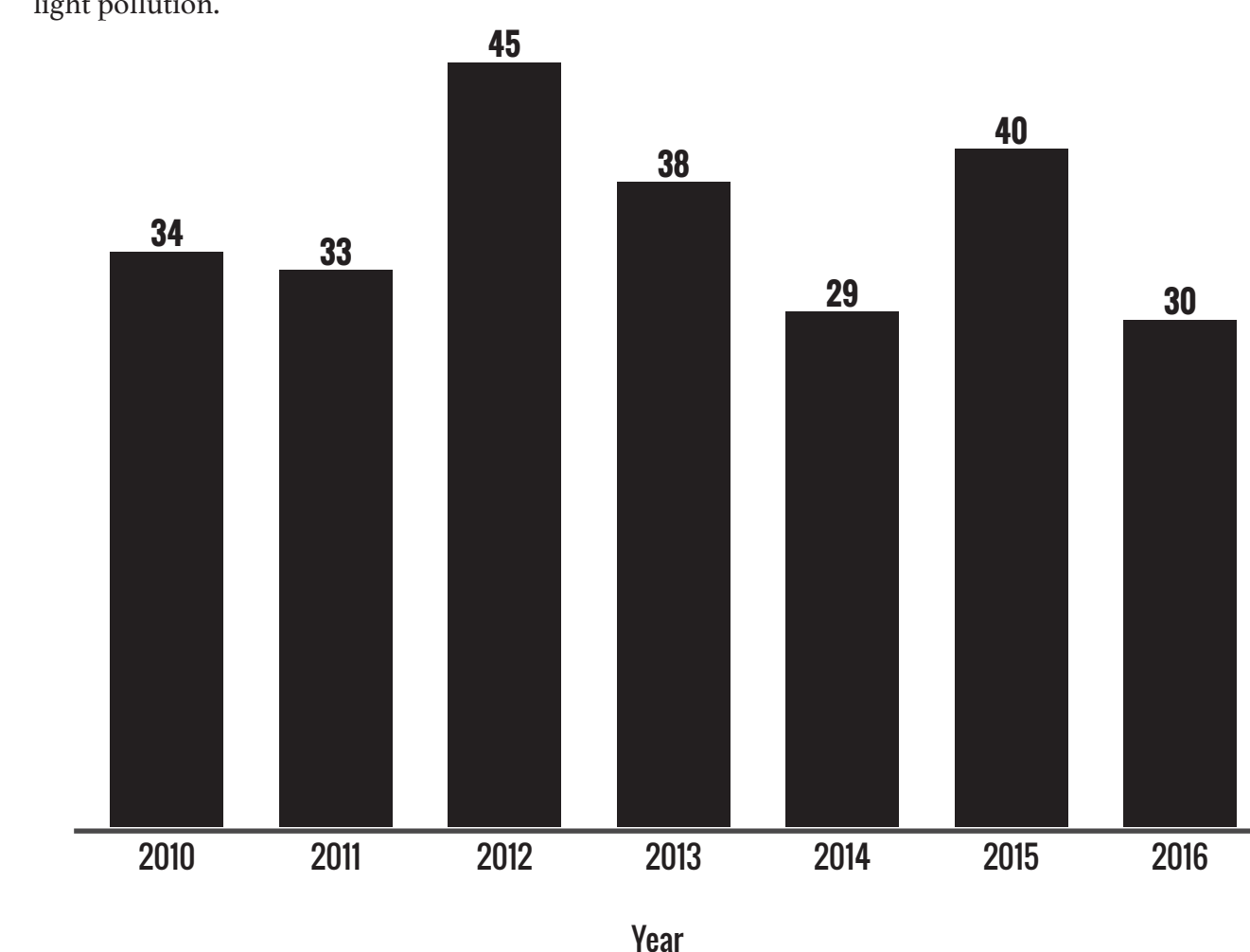
**Compared to 13 in 2007**

#### Pollution

is the introduction of potentially harmful chemical or physical constituents into the environment, which substances substantially harm individual species metabolisms, or which strongly and rapidly alter a stable historic ecosystem composition. This introduction usually enters the atmosphere, soil or natural water systems of the Earth. Chemical pollutants may interfere with metabolic functions, causing functional impairment or death of organisms. Reduction in species numbers anywhere within a given food chain, of course, have ramifications to other members of the ecosystem. Pollution is often a contributing factor along with habitat degradation in extinction processes. Widespread air

pollutants are sulfur dioxide, carbon monoxide, and oxides of nitrogen. Water and soil pollutants of concern are heavy metals and a large category of pesticide and herbicide compounds. Pollutants uniquely associated with surface waters are thermal sources (generated from power plants and other industrial facilities) and silt (arising from intensive agriculture and urban runoff (Surface runoff). Widespread, but less pernicious pollutants, are noise pollution and light pollution.

There are cases, particularly involving nutrient introductions of phosphate or nitrate compounds, where water pollutant additions may promote the metabolism of a selective number of component species (e.g. algae blooms), but impair or alter the fundamental dynamics of the ecosystem as a whole. Thus in the case of human accelerated lake eutrophication, massive short term gains in bioproductivity of algae is derived at the expense of fish and amphibian species as well as benthic and lower water column biota, which species experience light level reduction and other chemical imbalances induced by algal blooms.



Number of pipeline accidents in and around the United States