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Nuclear Exclusion Zones

Two places on Earth where humans have been cast out.

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Fact-checked by [The Editors of Encyclopaedia Britannica](#)

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Chernobyl disaster A school in Prypyat, Ukraine, abandoned following the Chernobyl disaster.

Humans have colonized nearly every corner of planet [Earth](#), and each day more and more land once thought inhospitable or unusable is being [utilized](#) for transportation, agriculture, and buildings.

By the early 21st century, it seems only the highest [mountain](#) peaks and the most remote parts of ice caps and [deserts](#) fall into the category of areas not frequently visited by human beings. However, there are two large human-free zones that were made so intentionally—because of serious nuclear accidents. The areas around the sites of the [Chernobyl](#) and [Fukushima](#) disasters have been closed off and designated as nuclear exclusion zones because of the ongoing dangers of radiation and its effects.

The Chernobyl accident occurred on April 25–26, 1986, at the [nuclear power](#) station in Prypyat, Soviet Union (now in Ukraine), some 65 miles (104 km) north of Kiev. Uncooled control rods in a [reactor](#) core created a [chain reaction](#) that blew off the heavy steel and concrete lid of the reactor, which, along with the resulting fire in the graphite reactor core, released large amounts of radioactive material into the atmosphere. Millions of acres of nearby forest and farmland were scorched by radioactive [fallout](#). The disaster, which released more radiation than the [combined](#) load of the atom bombs dropped on [Hiroshima](#) and [Nagasaki](#), killed

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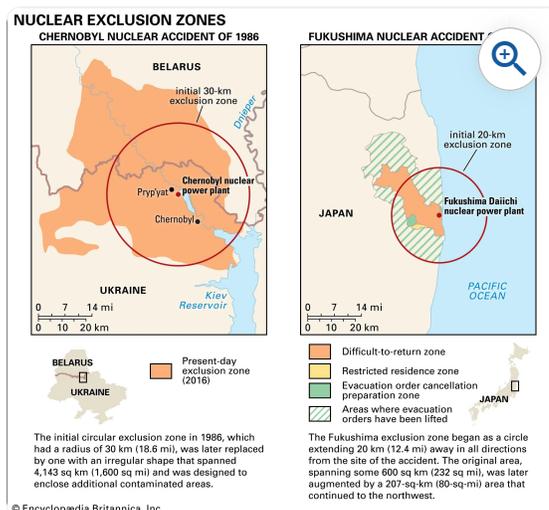
as many as 49 people outright, and dozens of others later developed [radiation sickness](#). More than 300,000 people were eventually evacuated from Pryp'yat and the surrounding area, yet hundreds of thousands more remained in nearby contaminated areas.

Following the disaster, the [Soviet Union](#) placed a circle-shaped exclusion zone with an 18-mile (about 30-km) radius around the plant. The total area of the zone was about 1,017 square miles (2,634 square km), which was later expanded to 1,600 square miles (4,143 square km) to include additional areas that were later found to be heavily radiated. While no people actually live in the exclusion zone, scientists and others can file for permits that allow them to enter for limited amounts of time. Like the [Demilitarized Zone](#) between [North Korea](#) and [South Korea](#), the Chernobyl Exclusion Zone has become a *de facto* biological reserve. Although [gamma radiation](#) can be detected in the area some 1,000 times above the background level, and birth defects and deformities have been detected in local wildlife, some of the area's flora and fauna have shown a remarkable [resilience](#). Scientists note that the geographic extent of the radiation in the region is patchy, and thus they suggest that many large mobile mammals, such as [wolves](#), [boars](#), [Przewalski's horses](#), and [foxes](#) only receive the occasional high dose of radiation. At least so far, this has not been enough to bring about declines in the populations of these species. In fact, free from human persecution, the populations of these mammals—which were visibly smaller when humans occupied the region—have multiplied. Some ecologists argue that large mammals are attracted to the area, which gives the impression of a naturally rising population, but they believe that ultimately the Chernobyl Exclusion Zone is a population sink, a region that claims more lives than it produces. Other studies note that genetic damage has occurred in many plants and animals within the zone and that some animals, namely certain species of [birds](#), have reproductive abnormalities, reduced brain size, and [cataracts](#).

The Fukushima nuclear accident, a disaster which [rivaled](#) the magnitude of Chernobyl, began on March 11, 2011, after a [massive offshore earthquake](#) produced a tsunami that washed ashore and damaged the backup generators of the Fukushima Daiichi nuclear power plant, a facility located on the eastern shore

of Japan's [Honsu](#) island. The loss of power caused cooling systems to fail in each of the facility's four reactors. Days later, before power could be restored, the uncooled reactor cores melted through their containment vessels. Several smaller releases of radiation, coupled with explosions in the containment buildings housing three of the facility's reactors, over the next four days expelled radioactive material from the plant, which contaminated the surrounding countryside. Water used in an attempt to cool the reactors became radioactive in the process and mixed with water from the nearby [Pacific Ocean](#). Over the following days, due to concerns about possible radiation exposure, government officials established an 18-mile no-fly zone around the facility, and the land area within a radius of 12.5 miles (20 km) around the plant, covering an area of 230 square miles (600 square km), was evacuated. In a third area that extended to a radius of 30 km around the plant, residents were asked to remain indoors. Ultimately, nearly 165,000 people left their homes and the area.

As more information about the path of [fallout](#) emerged, 80 square miles (207 square km) of land northwest of the initial exclusion zone were also declared dangerous by the Fukushima prefectural government and included in the greater exclusion zone (which increased the total area off-limits to 311.5 square miles [807 square km]). However, starting in August 2015, some areas in the greater exclusion zone that earlier had been declared contaminated were considered safe enough for former residents to either visit their homes and businesses for short periods or return to them permanently. By 2017 the exclusion zone had declined to 143 square miles (371 square km). Despite this seemingly good news, few people have returned so far, most of them elderly. Some studies investigating the effects of the Fukushima nuclear disaster on birds and insects have reported population declines in some species, as well as declines in overall biodiversity among these groups in the exclusion zones. However, as in



Nuclear Exclusion Zones The map shows the nuclear exclusion zones around Chernobyl and Fukushima.

Chernobyl, some populations of persecuted wild animals, such as wild boar, have increased.

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John P. Rafferty

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U.S. Death Toll During Major Events

Explore an infographic that compares the number of deaths caused by major events in United States history.

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This infographic shows the death [toll](#) caused by major events during the history of the [United States](#), including the [COVID-19](#) pandemic, in the form of a bar chart that compares the magnitude of each number.

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The [attack on Pearl Harbor](#) killed 2,404 Americans.

[Hurricane Maria](#) in 2017 killed 2,982 Americans.

The [September 11 attacks](#) killed 2,977 Americans.

The [American Revolution](#) killed 4,435 Americans.

The [war on terrorism](#) started after the September 11 attacks killed 7,024 Americans.

An estimated 8,000 Americans were killed [in 1900 when a hurricane struck Galveston, Texas](#).



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The [H1N1 flu pandemic](#) killed 12,469 Americans.

The [Korean War](#) killed 36,568 Americans.

The [Vietnam War](#) killed 58,200 Americans.

An estimated 100,000 Americans were killed during the [1968 flu pandemic](#).

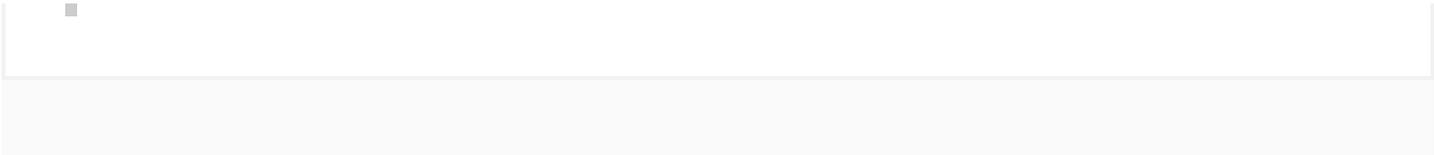
An estimated 116,000 Americans were killed during the [1957–58 flu pandemic](#).

[World War I](#) killed 116,516 Americans.

[World War II](#) killed 405,399 Americans.

An estimated 675,000 Americans were killed during the [1918–19 flu pandemic](#).

An estimated 752,000 Americans were killed during the [Civil War](#).



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