

Forest Fires



Forest fires, also referred to as wildfires, can be devastating natural disasters, leveling whole forests and turning much in their wake to ash. However, simply labeling all forest fires as “disasters” is incorrect. Many forests and other natural

ecosystems need regular fires to stay healthy and vibrant. This may seem unexpected— how could a fire help anything grow? It turns out, many seeds have evolved to require intense heat in order to germinate and create new plants. Burned forests also create tremendously nutrient rich soil that is perfect for new, healthier plants to grow in. Some plants, like the Eucalyptus tree, actually contain oils which *promote* fires in order to help reduce competition from other less fire-resistant plants.

However, not all forest fires are beneficial. When fires occur too frequently, usually due to accidental ignition by humans, they can reduce biodiversity and cause the spread of invasive species. Before humans learned how to utilize fire, most forest fires were caused by lightning. Now, the National Park Service of the United States estimates that around 10% of forest fires are ignited by lightning, with the remaining 90% being caused by humans. In general, ecosystems experiencing regular fire will recover from the fires rapidly; this recovery can take a few months to a few years depending on the habitat. Fires that rage too long or come too frequently after other fires can leave ecosystems devastated for much longer.

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Floods



A flood occurs when an area of typically dry land becomes covered in water. Floods can occur for a variety of reasons: rain can make rivers overflow, earthquakes can cause the ocean to crash onto the shore (this is called a tsunami),

and even small changes like a new beaver dam can lead to flooding. For this reason, floods are one of the most common natural disasters and many scientists devote their studies to predicting when and where floods will happen. Even with advances made in flood prediction, around 140 people in the United States die annually due to floods. Unfortunately, the number of intense flooding events around the world has been increasing in recent years, likely due to the effects that global warming has on the weather.

While floods are usually bad for humans and other land animals, they can be beneficial for an ecosystem as a whole. Floods often leave behind enriched soil that will help plant life thrive. The area of land affected by a flood is called the floodplain, and many of these areas are incredibly fertile (the Mississippi floodplain, for example, is famous for its agriculture). When floods occur in ecosystems where humans are living, they can often create harmful and dangerous pools of waste products and debris.

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Gold Mining



Gold is a metal element that is commonly found in rock and other mineral deposits underneath the Earth's surface. Due to its relative rarity and its bright yellowish color, gold has become a highly valued commodity that many wear as jewelry. Around half of the gold

mined in the world today is used in the production of jewelry. Today, the most rich and easily accessible gold deposits have been mined out; in order to keep the flow of gold steady, new techniques have been created to extract more gold deposits that are harder to reach and contain less gold. The result, today, is that an estimated 20 tons of waste product is produced in the process of mining enough gold for a single 18 karat wedding ring.

What kinds of waste does gold mining produce? Most gold mining done today happens in massive open-air mining sites, where miners dig out holes in the ground where they expect gold to be buried. Most of the ore in these mines is "low-grade" ore that contains minuscule amounts of gold in proportion to other elements. This means that companies have to mine huge amounts of ore to get a small amount of gold. The leftover ground and soil from this process— called "tailing"— is full of harmful chemicals such as mercury, cyanide, and arsenic. When left to sit in the ground, these chemicals can easily spread to bodies of water and cause tremendous damage to marine ecosystems. In effect, gold mining can leave huge areas of land and water contaminated by slow-to-decay waste products.

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Land Clearing for Building Construction



Have you ever thought about what your city or town looked like before there were buildings? Although cities provide many benefits to humans, they come at the cost of the natural ecosystems which they disrupt. Unlike a fire, which can

actually rejuvenate a forest in the long run, covering the ground with concrete makes it almost impossible for ecosystems to regenerate. When plants and trees are purposefully removed, the soil becomes much less nutritious. Additionally, without plant roots soaking up groundwater, the salinity of land will increase and can lead to water that is so salty as to be undrinkable by humans.

The purposeful removal of plants and animals to make way for building projects also opens up environments to invasive species. These species, if introduced to weakened ecosystems, can spread rapidly and cause native species to go extinct in an area. Finally, when trees and other plants are removed from the ground as part of land clearing, they must be disposed of properly. When left to decay on their own, trees release large amounts of harmful greenhouse gases into the atmosphere.

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Earthquakes

The earth's crust is full of many different pieces, or plates, which are constantly moving at an imperceptibly slow pace. These plates, or chunks of earth, have rough edges whose friction make it hard for two touching plates to

slip past one another. While the edges of plates are stuck on each other, the rest of the plates continue to move and eventually build up enough force to overcome the friction holding them together. When the plates finally move, all of the stored up energy between the plates is released in what we experience as an earthquake, or an event where the ground shakes.

The tremendous shaking caused by earthquakes is not particularly dangerous on its own, but it can start a chain reaction of other disasters. Trees may topple and landslides can occur. When earthquakes happen in the ocean (where there are many active fault lines), they can trigger tsunamis, or giant tidal waves which can wreak havoc on nearby bodies of land. All of these disasters are also made worse by the presence of human-made structures. Buildings which are poorly constructed may collapse, and things like fuel tanks and power lines often create fires when they are broken by the ground's shaking. An ecosystem without humans will likely recover fairly well from most earthquakes; when buildings and power lines are added to the mix, the results can be much worse.

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Nuclear Power and Accidents



Nuclear power is often described by its supporters as a form of "clean" energy—that is, energy that does not produce greenhouse gases. However, nuclear energy does produce other destructive waste products.

Nuclear energy is created through two techniques: fusion and fission. Fusion involves combining two small atoms together into a larger one, and fission is the opposite: splitting a heavy atom apart into two smaller atoms. This process generates high levels of radioactive energy as well as radioactive waste products such as long irradiated metal rods (spent nuclear fuel).

Nuclear power plants can be a huge environmental risk if they are ever damaged. In the 2011 tsunami in Japan, multiple reactors failed due to shocks from the earthquake and began emitting dangerous amounts of radiation into their environment. Radiation can alter DNA and do permanent and lethal damage to anything living. Even if a plant is never struck by disaster, the waste that these facilities produce cannot be destroyed and stays radioactive for thousands of years. As more and more waste is produced, scientists are struggling to find safe ways to store radioactive waste products while ensuring that none of their radiation leaks into the surrounding environment.

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Storms

Storms come in many different forms and can generally be described as irregular weather conditions accompanied by either high wind, some form of precipitation, or both. Wind occurs when an area of low air pressure is surrounded by an area of high pressure; the

difference in adjacent air pressures causes the high pressure air to rush into the area of lower air pressure—this speedy air is what we experience as wind.

High wind alone can cause drastic changes in an ecosystem: trees can be toppled, tides can be heightened, sand or dirt can get kicked up into the air. When high winds also combine with other inclement weather phenomena, the impact of a storm only increases. Precipitation (in the form of rain/snow/hail) is the most common accompaniment to winds. If a storm has lightning, it is termed a thunderstorm. When lightning strikes the ground it can ignite trees or other flammable materials and start major fires.

Tropical cyclones, or hurricanes, occur when a storm system begins rotating at high speeds while over the ocean. At the storm's center is an area of low pressure that moves along with the storm as it travels. Cyclones can cover huge distances and cause dramatic damage to ecosystems. When a similar (albeit less large) rotating storm occurs over an area of land, it is called a tornado.

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Invasive Species (Human Caused)



Species in the same area compete for food and shelter. A healthy ecosystem has achieved some degree of balance between species that allows them to coexist. This delicate balance

can be completely—and sometimes irrevocably—disrupted when “invasive species” are introduced.

Invasive species are any forms of life introduced to an area where they do not occur natively *and* which possess characteristics that allow them to outcompete their competition for food and/or territory. For example, when Asian Carp—a type of fish—were introduced to parts of the United States, their superior speed and strength allowed them to outcompete the native competition. If left unchecked, invasive species like Asian Carp can completely wipe out native species; 42% of all endangered species in the world are classified as such due to invasive species.

While this may sound like the “law of the wild,” the problem of invasive species is caused primarily by humans. Most invasive species end up in non-native territory because of the global shipping industry. Huge boats which sail across the entire world to bring food and other goods between continents scoop up native sea life and transpose it to new waters. Similarly, humans carrying goods between continents might inadvertently transport seeds from invasive plants.

[Invasive Kudzu in Atlanta - Public Domain Scott Ehardt - Wikimedia](#)

