

Oil Spills Spell Disaster for Marine Ecosystems

Oil: What Is It and Where Does It Come From?



We use **petroleum**, commonly known as oil, for a wide range of purposes—from powering our cars to making plastic products. When oil first comes out of the ground, it's called **crude oil**. Believe it or not, this thick, black, sticky liquid is formed from the remains of plants and animals that lived millions of years ago.

Oil is found underground, so people have to drill deep holes to extract it. People drill for oil on land, then transport it across long distances through underground pipelines. Oil is also found under the ocean floor and extracted in a similar way. Drilling for oil in the ocean is known as **offshore drilling**. Once it's extracted, the oil is transported back to land in huge ships called oil tankers.

Before crude oil can be useful to humans, it must be processed in a refinery. **Refineries** are processing plants that turn crude oil into other products, like gasoline, jet fuel, and the substances used to make plastics.

What Causes Oil Spills?

Sometimes oil is spilled as it is being moved from the drilling site to the refinery. These spills are especially serious when they happen in the ocean. There are four main causes of oil spills. First, oil spills can be accidental—the result of human mistakes or carelessness. For example, an oil tanker might crash into a large rock or run aground, creating a hole in the part of the ship where the oil is stored. Second, oil spills can happen when the equipment used to extract oil breaks down or explodes, releasing oil into the water. Third, natural disasters like hurricanes can cause oil spills by damaging the extraction or holding equipment. A fourth way that oil gets into the ocean is through deliberate acts of vandalism or terrorism. Sometimes this is done by illegal dumpers who don't want to dispose of oil properly, and other times by countries at war with one another.



Consequences of Oil Spills



Oil spills have serious consequences for living things. Because oil floats on water, oil from a spill will spread out across the surface of the ocean to form a thin layer called an oil slick. Animals such as seabirds and sea otters are especially vulnerable during oil spills because they live on the surface of the water or along the shoreline, where the oil builds up.

You may have seen pictures of the devastating impact of oil spills on seabirds. The oil coats the birds' feathers in a sticky slime. When feathers are coated in oil, they stop being waterproof and don't insulate very well. Without this protection, birds lose body heat at a rate that can be fatal. Usually, seabird feathers also have tiny air pockets that help the birds float on top of the water. When their feathers are matted by oil, the birds can lose this buoyancy and risk drowning in the polluted water. Not only that, but birds whose feathers have been coated in oil will try to clean their feathers with their beaks. As they do so, they may unintentionally eat some of the toxic oil, which damages their internal organs.

Like seabirds, sea otters are especially vulnerable to oil spills. They can die from **hypothermia** (extreme cold) if their fur becomes coated in oil and can no longer insulate them from the cold ocean temperatures. Sea otters can also breathe in or ingest oil, which damages their lungs, kidneys, and other organs.

In addition, plants, fish, shellfish, and smaller organisms like plankton can all be contaminated by oil. The effects of the oil spill then ripple throughout the **ecosystem**, as the animals that eat these smaller organisms ingest the toxins and become ill.



Exxon Valdez: A Major Catastrophe

One of the most devastating oil spills occurred in March 1989, when an oil tanker called the Exxon Valdez struck Bligh Reef in Prince William Sound, Alaska. Over the next few days, 10.8 million gallons of crude oil spilled into the ocean. The region was a habitat for many marine creatures, including herring, salmon, otters, seabirds, and seals. It's hard to know exactly how many animals died in the immediate aftermath of the spill, but scientists estimate around 2,000 sea otters, 300 seals, and 250,000 seabirds, along with unknown numbers of fish. The population of orcas (killer whales) in the area also dropped dramatically in the year after the spill. And those are just the short-term effects. In the decades since, scientists have continued to monitor the water quality and keep track of the wildlife populations in the area. They have found long-lasting impacts on both the ecosystem and surrounding communities. People who fished for a living were affected because the number of herring in the area dropped significantly, and in some places this still hasn't bounced back. According to visitors, pockets of oil can still be found just below the surface of the beach along Prince William Sound.

Cleanup Efforts



People have developed various ways to clean up an oil spill, but none is perfect. One method is to use **booms and skimmers**. Booms are floating barriers that keep oil from spreading out. Skimmers scoop up or absorb the oil and transfer it into containment tanks. Booms and skimmers can be effective under the right conditions, but they require calm waters and daylight so that the operator can see where the oil is concentrated.

Another option is to use chemicals called **dispersants**. Dispersants work like dishwashing detergent to break up oil into smaller pieces. The smaller drops of oil can then be broken down by marine bacteria that consume crude oil as part of their diet. The advantage of dispersants is that they get oil off the surface of the sea, which is good for birds, otters, and other surface-dwelling organisms. The downside is that the bits of oil the bacteria don't eat end up sinking beneath the surface of the ocean, putting organisms on the seafloor at risk. Also, the dispersant chemicals themselves can have harmful effects on the environment, so they must be used with caution.

The final method for cleaning up an oil spill involves burning off the oil slick by lighting it on fire. Burning is often used in conjunction with booms so that the oil can be concentrated into a thicker layer that will burn consistently. The downside of burning oil spills is that the fire creates a highly toxic smoke and contributes to air pollution.

None of the methods for oil cleanup is without problems, and they all take time and resources. The best way to protect wildlife and humans from the effects of oil spills is to prevent them from happening in the first place.

Glossary

booms and skimmers—a method of cleaning up oil spills. Booms are floating barriers that keep oil from spreading out, while skimmers scoop up or absorb the oil and transfer it into containment tanks

crude oil—a thick, black, gooey liquid formed from the remains of plants and animals that lived millions of years ago

dispersants—a method of cleaning up oil spills using chemicals that work like dishwashing detergent to break up oil into smaller pieces

ecosystem—a community of animals, plants, and microorganisms, together with the habitat where they live

hypothermia—the condition of being extremely cold

offshore drilling—drilling for oil in the ocean

oil slick—oil spilled into an ocean or lake that has spread out across the surface of the water. Oil slicks occur because oil floats on water

petroleum—processed crude oil, used for a wide range of purposes including powering cars, and making plastic products

refineries—processing plants that separate crude oil into other products that can be used for different purposes