B.P. Oil Spill

Smithsonian Museum of Natural History

The Gulf oil spill is recognized as the worst oil spill in U.S. history. Within days of the April 20, 2010 explosion and sinking of the Deepwater Horizon oil rig in the Gulf of Mexico that killed 11 people, underwater cameras revealed the BP pipe was leaking oil and gas on the ocean floor about 42 miles off the coast of Louisiana. By the time the well was capped on July 15, 2010 ([87 days later](http://ocean.si.edu/blog/gulfspillflashback-giving-gulf-oil-spill-consideration-it-deserves)), an estimated 3.19 million barrels of oil had leaked into the Gulf.

The well was located over 5,000 feet beneath the water’s surface in the vast frontier of the [deep sea](http://ocean.si.edu/deep-sea)—a permanently dark environment, marked by constantly cold temperatures just above freezing and extremely high pressures. Scientists [divide the ocean into at least three zones](http://ocean.si.edu/ocean-photos/zones-open-ocean), and the deep ocean accounts for about three-quarters of Earth’s total ocean volume.

Immediately after the explosion, workers from BP and Transocean (owner of the Deepwater Horizon rig), and many government agencies tried to control the spread of the oil to beaches and other coastal ecosystems using floating booms to contain surface oil and chemical oil dispersants to break it down underwater. Additionally, numerous scientists and researchers descended upon the Gulf region to gather data. Researchers are still trying to understand the spill and its impact on marine life, the Gulf coast, and human communities.

**Clean Up Methods**

**Physical Methods**

When oil spills into the ocean, it is difficult to clean up. When you have 3.19 million barrels to clean up, it is even harder.

Part of the difficulty is that no two spills are alike. The amount and type of oil (whether crude or refined) affects how it spreads, and a spill in seawater spreads differently than freshwater. Local environmental conditions also play a huge role: currents, tides, weather, wind speed and direction, air temperature, water temperature and presence of ice all affect how the oil spreads and how well cleanup workers can access the spill area. This variability makes it difficult to plan for spills ahead of time.

The most basic method of clean up is to control the spread of the oil using physical barriers. When oil spills in water, it tends to float to the surface and spread out, forming a thin slick just a few millimeters thick. (A very thin slick is called a sheen, which often looks like a rainbow and can be seen in parking lots after a rainstorm.) Cleanup workers first surround the slick with [floating booms to keep it from spreading](http://www2.epa.gov/emergency-response/booms) to harbors, beaches or biologically important areas like marshes. Then they can use different tools to remove the collected oil. Often they will drive skimmers, boats that skim spilled water from the water's surface, through the slick.

**Dispersants**

Removing spilled oil from the environment is a difficult task. Because oil is hydrophobic (doesn't mix with water), it floats to the surface when it spills into the ocean and forms large slicks. These slicks can wreak havoc on coastal ecosystems and animals, so cleanup workers use [dispersants](http://ocean.si.edu/ocean-news/building-better-dispersant)—chemicals that break down the oil into smaller particles that mix with water more easily—to prevent them from forming. Evaporation and bacteria can then degrade these tiny droplets more quickly than if they were in a large slick, or waves can wash them away from the spill site.

Dispersants are often used when workers want to stop the slick from spreading to a protected area like a harbor or marsh. This can be a boon for animals found on the surface and coast, such as seabirds, marine mammals and those found in the Gulf’s mangroves, because the oil is moved out of their habitat. But dispersants can also enter the food chain and potentially harm wildlife.

A lot of research is still needed to fully understand the long-term effects of dispersants on the region and its inhabitants—not to mention how they move through the food chain to impact larger predators, such as people. Researchers are developing [new dispersants that cause less environmental damage](http://ocean.si.edu/ocean-news/building-better-dispersant) for the next spill. ([See "Human Health Impacts."](http://ocean.si.edu/gulf-oil-spill#section_Human_Health_Risks))

**Ecosystem Health Effects**

There were some immediate impacts to the animals of the Gulf of Mexico that could be seen with the naked eye: pelicans black with oil, fish belly-up in brown sludge, smothered turtles washed up on beaches. But not much time has passed since the spill, and it will take many more years of monitoring and research to understand what happened.

Strandings of both [dolphins](https://usresponserestoration.wordpress.com/2015/04/03/in-the-wake-of-the-deepwater-horizon-oil-spill-gulf-dolphins-found-sick-and-dying-in-larger-numbers-than-ever-before/) and sea turtles increased significantly in the years following the spill. "From 2002 to 2009, the Gulf averaged 63 dolphin deaths a year. That rose to 125 in the seven months after the spill in 2010 and 335 in all of 2011, averaging more than 200 a year since April 2010," [reported *Reuters* in 2015](http://abcnews.go.com/Technology/wireStory/gulf-health-years-bp-spill-resilient-scarred-30387390?page=2). Since then, dolphin deaths have declined, and long-term impacts on the population are not yet known. Kemp's ridley sea turtle nests have gone down in the years since the spill, and long-term effects are not yet known.

Seabirds were initially harmed by crude surface oil—even a small bit of oil on their feathers impeded their ability to fly, swim and find food by diving. [Seabird losses may have numbered in the hundreds of thousands](http://news.sciencemag.org/environment/2014/10/seabird-losses-deepwater-horizon-oil-spill-estimated-hundreds-thousands), but reliable estimates are hard to come by. Looking beyond the sea, researchers are currently studying how oil may have affected land birds that [live in the marshes along the Gulf coast](http://ocean.si.edu/ocean-news/beyond-sea-how-oil-spills-ocean-affect-birds-land).

Invertebrates in the Gulf were hard hit by the Deepwater Horizon spill—both in coastal areas and in the deep. Shrimp fisheries were closed for much of the year following the spill, but these commercially-important species now seem to have recovered. [Deep-water corals](http://ocean.si.edu/deep-sea-corals) grow very slowly and can live for many centuries. Found as deep as 4,000 feet below the surface, [corals near the blowout showed signs of tissue damage](http://ocean.si.edu/slideshow/oil-invades-coral-communities-deep) and were covered by an unknown brown substance, later identified as oil from the spill. Laboratory studies conducted with coral species showed that baby coral exposed to oil and dispersant had lower survival rates and difficulty settling on a hard surface to grow.

The impact of the spill on fish communities is still largely unknown. Lab studies have shown that [oil can cause heart defects in the developing larvae of bluefin tuna and other fish](http://www.fisheries.noaa.gov/stories/2014/03/3_24_14oil_spill_effects_large_marine_fish.html), but we won't know if this occurred in the wild until after those larvae would have grown up. [Some fish larvae populations actually grew after the spill](http://ocean.si.edu/ocean-news/how-methane-fueled-food-web-after-gulf-oil-spill), as they had more food in the form of oil-eating microbes.

There were some reports of deformed wildlife after the spill. For years following the spill there were reports of fish with lesions and deformities, and some [reports of eyeless and deformed shrimp](http://www.cbsnews.com/news/sick-deformed-fish-spotted-after-bp-gulf-of-mexico-oil-spill/) after the spill. However, consuming Gulf seafood is now completely safe.

Over [1,000 miles of shoreline on the Gulf of Mexico](http://gulfresearchinitiative.org/bps-oiled-animals-where-are-they-now/), from Texas to Florida, was impacted by oil from the Deepwater Horizon blowout. Much of this area has been cleaned, but [eroded shorelines are taking longer to recover](http://gulfresearchinitiative.org/study-reveals-recovery-loss-oiled-louisiana-marshes/) and erosion rates have accelerated in these areas.

Questions:

1. What are two environmental effects of the B.P. oil spill?
2. What are two economic effects of the B.P. oil spill?
3. What is one advantage and one disadvantage of using dispersants to clean up oil spills?
4. Describe one physical method to clean up oil spills.
5. Describe a biological method used to clean up oil spills.
6. How else can oil enter marine waters besides oil spills?

Answer the following questions on a separate sheet of paper. Research the answers either through the internet or your textbook.

1. What are two pollutants from storm water runoff that could negatively affect the quality of surface of surface water?
2. How can storm water runoff be reduced?
3. What is one environmental problem that results form having large paved areas (i.e. sidewalks and streets).