

How does oil affect the environment?



Crude oil is used to make petroleum products used to fuel airplanes, cars, and trucks; to heat homes; and to make products like medicines and plastics. Although petroleum products make life easier, finding, producing, and moving crude oil may have negative effects on the environment. Technological advances in exploration, production, and transportation of oil and enforcement of safety and environmental laws and regulations help to avoid and reduce these effects.

Technology helps reduce the effects of drilling and producing oil

Exploring and drilling for oil may disturb land and marine ecosystems. Seismic techniques used to explore for oil under the ocean floor may harm fish and marine mammals. Drilling an oil well on land often requires clearing an area of vegetation. These impacts are reduced by technologies that greatly increase the efficiency of exploration and drilling activities. Satellites, global positioning systems, remote sensing devices, and 3-D and 4-D seismic technologies make it possible to discover oil reserves while drilling fewer exploratory wells. Mobile and smaller *slimhole* drilling rigs reduce the size of the area disturbed by drilling activities. The use of horizontal and directional drilling makes it possible for a single well to produce oil from a much larger area, which reduces the number of wells required to develop an oil field.

Hydraulic fracturing

An oil production technique known as hydraulic fracturing is used to produce oil from shale and other *tight* geologic formations. This technique has allowed the United States to increase domestic oil production significantly and reduce the amount of oil that the country imports.

There are environmental concerns associated with hydraulic fracturing. Fracturing rock requires large amounts of water, and it uses potentially hazardous chemicals to release the oil from the rock strata. In some areas of the country, significant use of water for oil production may affect the availability of water for other uses and can potentially affect aquatic habitats. Faulty well construction or improper handling may result in leaks and spills of fracturing fluids.

Hydraulic fracturing also produces large amounts of wastewater that may contain dissolved chemicals and other contaminants, which may require treatment before disposal or reuse. Because of the quantities of water used, and because of the complexity of treating some of the wastewater components, treatment and disposal are important and challenging issues. Wastewater is frequently disposed of by injection into deep wells, typically into nonpotable saltwater aquifers. The injection of wastewater can cause earthquakes that are large enough to be felt and that may cause damage.

Oil spills

Most oil spills are the result of accidents at oil wells or with the pipelines, ships, trains, and trucks that move oil from wells to refineries. Oil spills contaminate soil and water and may cause devastating explosions and fires. The federal government and industry are involved in developing standards and regulations to reduce the potential for accidents and spills along with effective responses to clean up spills when they occur.

After the Exxon Valdez oil spill in Prince William Sound, Alaska, in 1989, the U.S. Congress passed the Oil Pollution Act of 1990, which required all new oil tankers built for use between U.S. ports to have a full double hull. This act led the [International Maritime Organization](#) to also establish double-hull standards for new oil tankers in 1992 in the International Convention for the Prevention of Pollution from Ships (MARPOL). The amount of oil spilled from ships dropped significantly during the 1990s partly because of these double-hull standards.

The Deep Horizon drilling rig explosion and oil spill in the Gulf of Mexico in 2010 caused the U.S. government and the oil industry to review drilling technologies, procedures, and regulations to reduce the potential for similar accidents to occur. The U.S. government also replaced the Minerals Management Service (MMS), which administered offshore oil and natural gas leases, with the [Bureau of Ocean Energy Management \(BOEM\)](#) and the [Bureau of Safety and Environmental Enforcement \(BSEE\)](#) to provide more effective oversight and enforcement of environmental regulations related to offshore energy development.

In response to several major accidents involving trains carrying crude oil, the U.S. Department of Transportation has proposed new standards for railroad tank cars, braking controls, and speed restrictions to reduce the potential for railroad accidents and oil spills.

Fish swimming through Rigs-to-Reefs project



Source: Courtesy of the Mississippi Department of Marine Resources

Restoring old well sites and creating artificial reefs

Oil wells are plugged when they become uneconomic, and the area around the well may be restored. Some old offshore oil rigs are tipped over and left on the sea floor in a [Rigs-to-Reefs](#) program. Within a year after a rig is toppled, it is often covered with barnacles, coral, sponges, clams, and other sea creatures. These artificial reefs attract fish and other marine life, and they have increased fish populations and recreational diving opportunities.

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