

## What's In the Water?

## Teacher Resource

One of the most notorious water pollutants is oil. Historic oil drilling and oil spills have caused irreparable damage to the environment. The United States' dependency upon offshore drilling methods has resulted in a large proportion of oil spills occurring in marine areas. Most oil spills are small and remain hidden to the public eye. Larger oil spills do occur less frequently, but are absolutely destructive to the ecosystem.

The main source of damage from oil spills is the oil itself. Oil will cover the surface of water, sink to various depths in the water column, and will wash ashore to land. **Spilled oil coats every surface it covers, from bird feathers to grains of sand.** For birds, oil coating the feathers can prevent them from flying. Oil may also disrupt a bird's natural waterproofing and insulation. Without their natural insulation, birds are unable to regulate their body temperature (West,


2014). Whales and dolphins coated by oil will experience trouble breathing as the oil covers their blowholes and sinks into the lungs (New England Aquarium, 2014). Ingestion and absorption of oil causes illness in both plants and animals. As oil sinks into deeper water it will cause damage to underwater plant life, fish, and the tiny organisms that play an essential role in the global food chain.

The most common methods utilized to clean up an oil spill involve (Ocean Portal, 2018):


- **Barriers** - floating booms to stop the spread of surface oil.
- **Skimming** - boats that skim water from the ocean's surface to collect oil.
- **Sorbents** - sponges, peat moss, straw, sand and other naturally

**April 20, 2010: the Deepwater Horizon Rig exploded and sank in the Gulf of Mexico**

Days after the sinking of the oil drilling ship, underwater cameras revealed that **the BP pipe was leaking oil and gas** onto the ocean floor. By the time the pipe could be capped **87 days later, 3.19 million barrels**, over 130 million gallons, of oil had leaked into the Gulf of Mexico (Ocean Portal, 2018). In the 87 days it took for engineers to cap the leaking pipe, the oil had sunk to the sea floor, dispersed in layers throughout the water column, and formed oil slicks on the surface that were easily spread further by winds. As the ominous tendrils of the leaking oil began to reach farther across the Gulf of Mexico, **hundreds of thousands of marine organisms were affected.** In the seven years prior to the Deepwater Horizon oil spill, the average number of sea turtle and dolphin strandings in the Gulf of Mexico was **63 per year.** In the **year following the oil spill alone, 335 dolphin and sea turtle strandings** were reported (Ocean Portal, 2018). Seabird losses were estimated to be in the hundreds of thousands. Crude surface oil covering their feathers reduced their ability to fly, swim, and forage for food. Fish, deepwater corals, and even shrimp populations reflected destruction.



*Oil covering sargassum seaweed in the Gulf of Mexico following the Deepwater Horizon oil spill. Sargassum is an important component in the diet of sea turtles and many large fish species (Ocean Portal, 2018).*



*Striped dolphins swimming through oil patches a few days following the Deepwater Horizon explosion (Ocean Portal, 2018).*

absorbent materials to soak up oil.

- **Dispersants** - chemicals that break oil down into smaller particles that mix with water. Oil is a *hydrophobic* solution, and does not mix with water. Thus, oil can congregate in



high concentration and form oil slicks. Dispersants break oil into small particles that are degraded much more quickly than the large particles.

Containment and cleanup **methods can remove water, plant life, and sand** from shores near the spill. **Chemicals** used to break down the oil can have **harmful effects on wildlife and the health of response teams**. Further, the disposal of oil collected during cleanup activities has lasting effects on the environment. The **oil must be reused or disposed of properly**. On many occasions, the oil is incinerated or buried in a landfill.

Oil is a key component to modern society. It is unrealistic to stop the use of petroleum completely. However, **reducing society's dependence on oil, exploring safer transport methods, and developing more efficient ways to clean up spilled oil** could all reduce the negative impact oil has on the environment.

Sources

<https://ocean.si.edu/conservation/pollution/gulf-oil-spill>

<https://www.thoughtco.com/environmental-consequences-of-oil-spills-1204088>

<https://www.neaq.org/blog/dangers-of-offshore-oil-and-gas-event/>

### The Sources of Water Pollution

Waterways such as rivers, lakes, estuaries, and the oceans are important to humans and wildlife alike. **Water provides a source of hydration, transportation, recreation, and habitat.** Despite their importance, many of our nation's rivers, lakes, estuaries and sectors of the ocean have been declared not fishable, swimmable, or potable due to pollution. Pollutants enter bodies of water from either *point* or *nonpoint* sources.

- > **Point sources** - clearly defined, localized inputs. Examples: pipes, industrial plants, sewer systems, and oil spills.
- > **Nonpoint sources** - indistinct inputs that do not have a clearly defined source. Occurs when rainfall, snowmelt, or irrigation runs over land and through the ground, picking up pollutants and depositing them into surface water or groundwater. Examples: runoff of petroleum products from roadways or pesticides from farmlands.

While federal and state governments are able to monitor and regulate pollution from point sources, nonpoint sources pose a challenge. Nonpoint sources are difficult to detect and control. Therefore, **nonpoint sources of pollution are the major cause of water quality complications.**