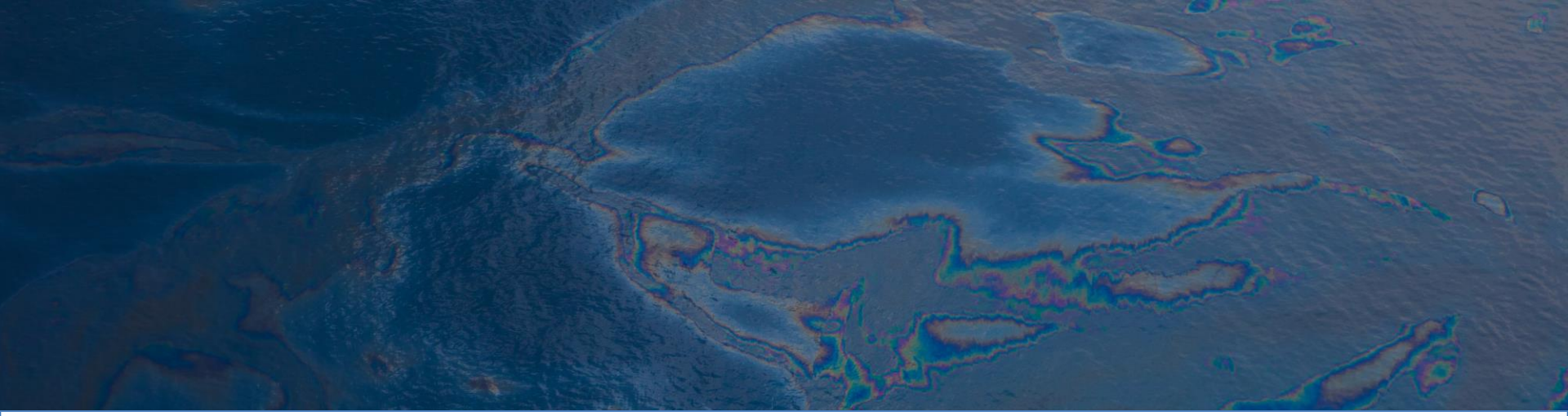
Gr. 8 Matter and Energy

SPILL THE TEA: FLUID SPILLS IN THE ENVIRONMENT

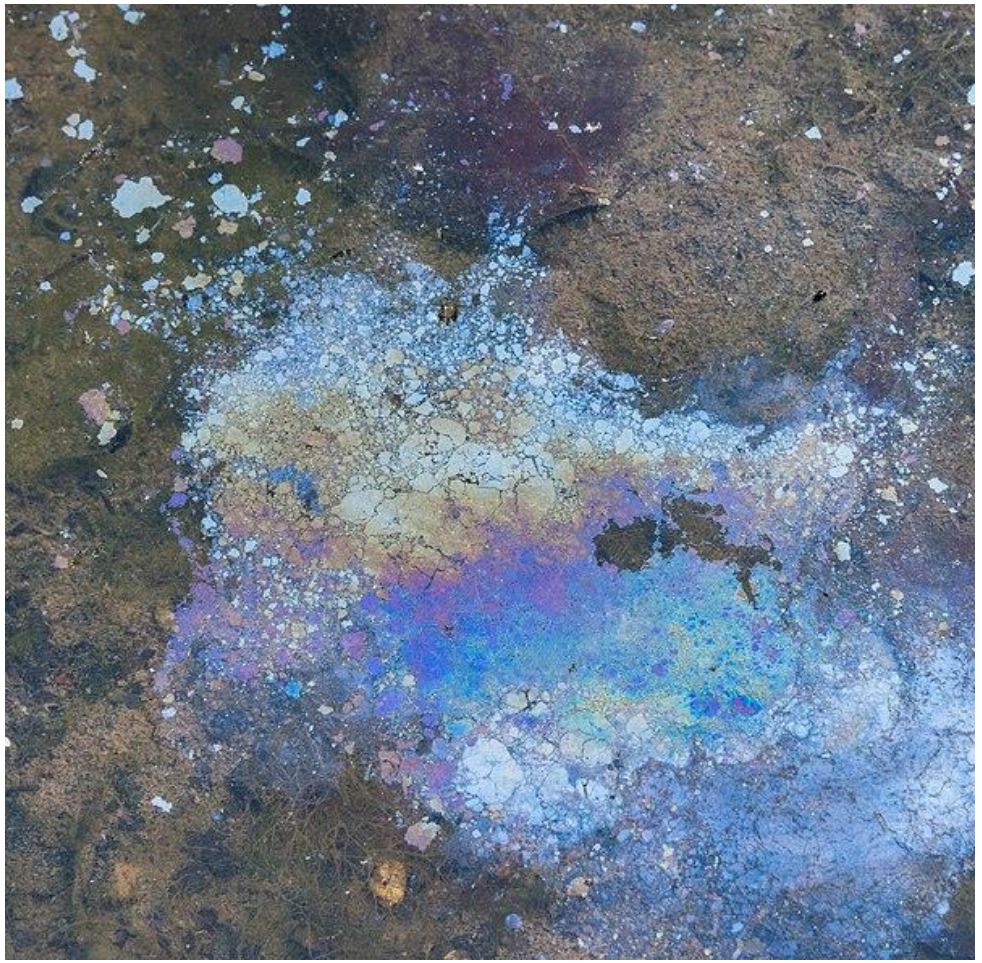


What is an oil spill?

An oil spill is the release of a liquid petroleum product into the environment. Often this is a marine environment, and it is typically the result of human activity.

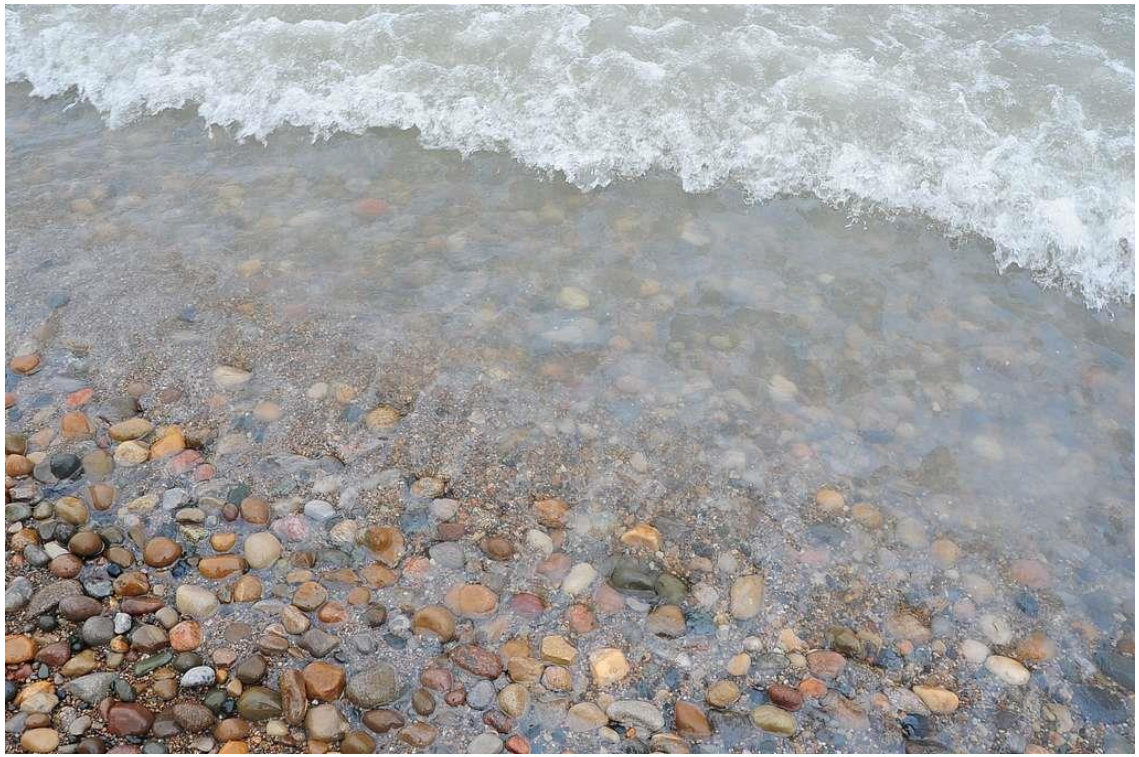
Group 1: Gasoline Products

- Highly flammable
- Very toxic



Group 2: Diesel-Like Products/Light Crude Oils

- Spread quickly into thin slicks
- Most commonly jet fuel, kerosene, or diesel fuel for vehicles



Group 3: Medium Crude Oils/Intermediate Products

- Up to 1/3 evaporates within 24 hrs.
- Smothers animals

Group 4: Heavy Crude Oils/Residual Products

- Very sticky
- Very little evaporation

Group 5: Non-floating Oils

- Difficult to clean up
- Sinks to sea floor

Canadian Oil Spills

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Some Examples

- In 1970, the tanker SS Arrow crashed near Nova Scotia and released 10 million litres of fuel.
- In 2011, 4.5 million litres of crude oil leaked from a pipeline near an Indigenous community in Alberta.
- In 2015, 5 million litres of sand-water-bitumen emulsion spilled from a pipeline in Alberta.
- In 2016, the Nathen E Stewart tugboat crashed in BC and released 110,000 litres of fuel.

Recently

In 2023, 60-100 litres of oil were spilled off the coast of BC by the container vessel MV Europe.

Photo from the Canadian Coast Guard

Oil Spill Cleanup

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Oil-absorbent pads

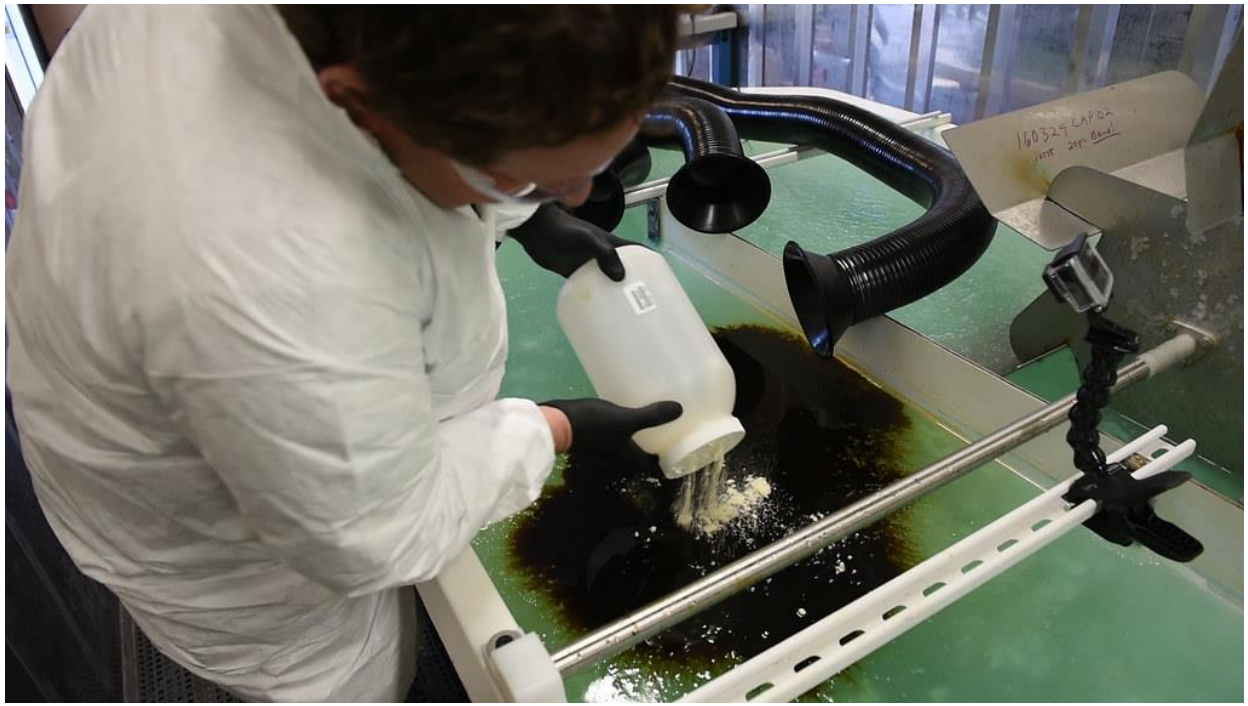
Polypropylene pads float on the water over the spill.

Polypropylene absorbs oil and repels water.

Sawdust

Sawdust is a nontoxic method best for small spills on land.

Pour sawdust over the spill, stir until the oil is absorbed, and sweep it up.



Hay

Hay works the same way sawdust does, but it can be used on water and on land.

It must be left 6-8 hours to soak, and on water, it must be carefully contained so that it does not spread and become a pollutant.

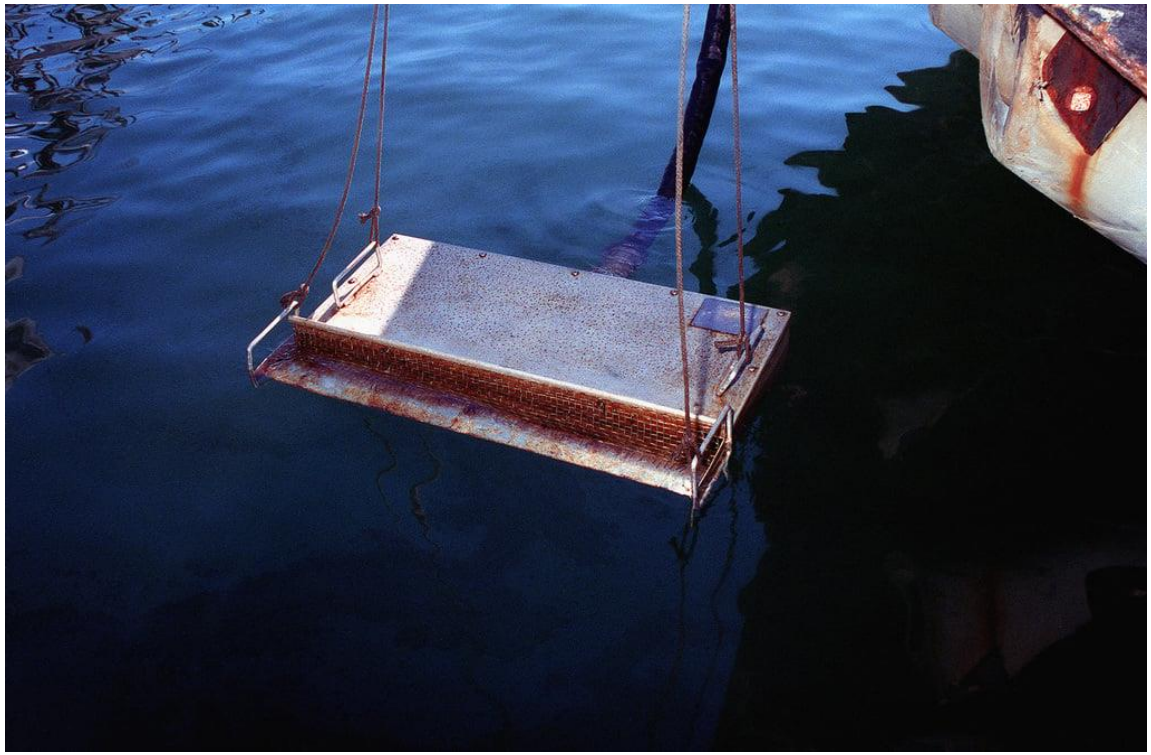
Photo from Getty Images

Oil Spill Dispersant

A mix of emulsifiers and solvents are sprayed on a spill to break it into smaller droplets. This makes it harder to skim up, and more likely to impact deep-sea life, but less likely to make it to shore and effect wildlife there. It also makes it easier to break down over time.

Skimmers

Skimmers are a mechanical solution which can be attached to a boat. They skim the surface of the water, scooping up the oil but not the water. This works best on calm water.



Oil Boom

Oil booms are floating devices which contain a spill and keep it from spreading.

Oil-absorbent powder and granules

These can be deployed where a spill needs to be cleaned up more quickly. The granules absorb oil and repel water and can be used on land or on water.

Bioremediation

Microbial organisms can be deployed where a dispersant has been used to quickly consume the oil. These may be aerobic or anaerobic microorganisms or fungi.

Vacuum Pump

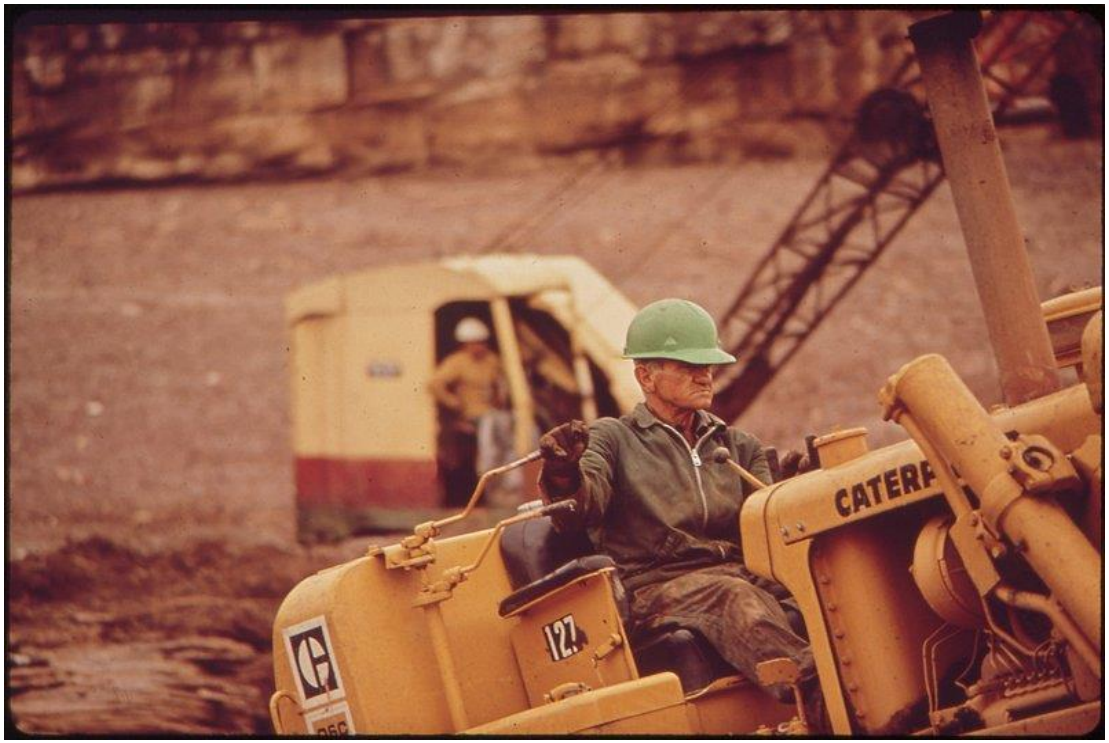
A vacuum may be used in conjunction with a skimmer, sucking up with more precision leftover oil on the water's surface, or for smaller land spills.

Manual Removal

Manual removal is the use of rakes and buckets to manually remove oil from a shoreline which cannot be reached or cleaned with heavy machinery.

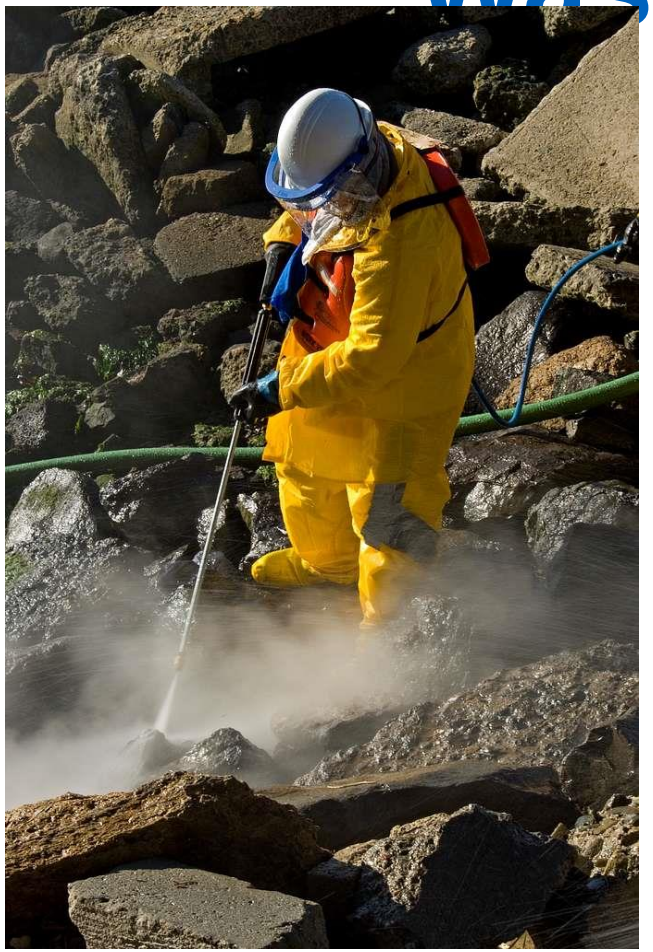
Mechanical Removal

Mechanical removal is used in shoreline cleanups where the polluted sand and dirt can be removed with heavy machinery.



High-Pressure Hot Water Washing

High-pressure hot water washing can remove traces of oil left on shorelines, but it also kills microbial life, and is less effective on gravelly or sandy shores compared to rocky ones.



Gelatin Treatment

A material is dropped on oil which becomes gelatinous on contact. The gelatin can be more easily skimmed, and with heat, the gelatin can be separated from the oil and reused.

In-Situ Burning

Burning can remove almost all of the oil, as long as it has been effectively contained. However, it results in significant air pollution, and residues may sink to the ocean floor. Residues are also much more difficult to remove. The conditions must also be just right – the oil must be sufficiently thick, and the weather must not put the fire out.