

Small Diesel Spills (500-5000 gallons)



Small Diesel Spills (500-5000 gallons)

Diesel fuel is most often a light, refined petroleum product. Small diesel spills will usually evaporate and disperse within a day or less. This is particularly true for typical spills from a fishing vessel (500-5,000 gallons), even in cold water. Thus, seldom is there any oil on the surface for responders to recover. However, what is commonly referred to as "marine diesel" is often a heavier intermediate fuel oil that will persist longer when spilled. When spilled on water, diesel oil spreads very quickly to a thin film of rainbow and silver sheens except for marine diesel, which may form a thicker film of dull or dark colors.

Characteristics of Small Diesel Spills (500-5000 gallons)

- Diesel oil has a very low viscosity and is readily dispersed into the water column when winds reach 5-7 knots or with breaking waves.
- Diesel oil is much lighter than water (specific gravity is between 0.83 and 0.88), compared to 1.03 for seawater). It is not possible for this oil to sink and accumulate on the seafloor as pooled or free oil unless adsorption occurs with sediment.
- However, it is possible for the diesel oil that is dispersed by wave action, to form droplets that are small enough to be kept in suspension and moved by the currents.
- Oil dispersed in the water column can adhere to fine-grained suspended sediments (adsorption) which then settle out and get deposited on the seafloor. This process is more likely to occur near river mouths where fine-grained sediment is carried in by rivers. It is less likely to occur in open marine settings. This process is not likely to result in measurable sediment contamination for small spills.
- Diesel oil is not very sticky or viscous, compared to black oils. When small spills do strand on the shoreline, the oil tends to penetrate porous sediments quickly, but also tends to be washed off quickly by waves and tidal flushing. Thus, shoreline cleanup is usually not needed.
- Diesel oil is readily and completely degraded by naturally occurring microbes, under time frames of one to two months.
- In terms of toxicity to water-column organisms, diesel is considered to be one of the most acutely toxic oil types. Fish, invertebrates and seaweed that come in direct contact with a diesel spill may be killed. However, small spills in open water are so rapidly diluted that fish kills have never been reported. Fish kills have been reported for small spills in confined, shallow water.
- Crabs and shellfish can be tainted from small diesel spills in shallow, nearshore areas. These organisms bioaccumulate the oil, but will also depurate the oil, usually over a period of several weeks after exposure.
- Small diesel spills can affect marine birds by direct contact, though the number of birds affected is usually small because of the short time the oil is on the water surface. Mortality is caused by ingestion during preening as well as to hypothermia from matted feathers. Experience over the last 10 years in Alaska, with hundreds of small diesel spills, is that few birds are directly affected by diesel spills from fishing vessels. However, small spills could result in serious impacts to birds under the "wrong" conditions, such as a grounding right next to a large nesting colony or transport of sheens into a high bird concentration area.

Small Diesel Spills (500-5000 gallons)

Over 90% of the diesel in a small spill incident into the marine environment is either evaporated or naturally dispersed into the water column in time frames of a couple of hours to a couple of days. Percent ranges, in parentheses above, represent effects of winds ranging from 5 to 30 knots.

Adsorption (sedimentation) The process by which one substance is attracted to and adheres to the surface of another substance without actually penetrating its internal structure

Biodegradation The degradation of substances resulting from their use as food energy sources by certain micro-organisms including bacteria, fungi, and yeasts

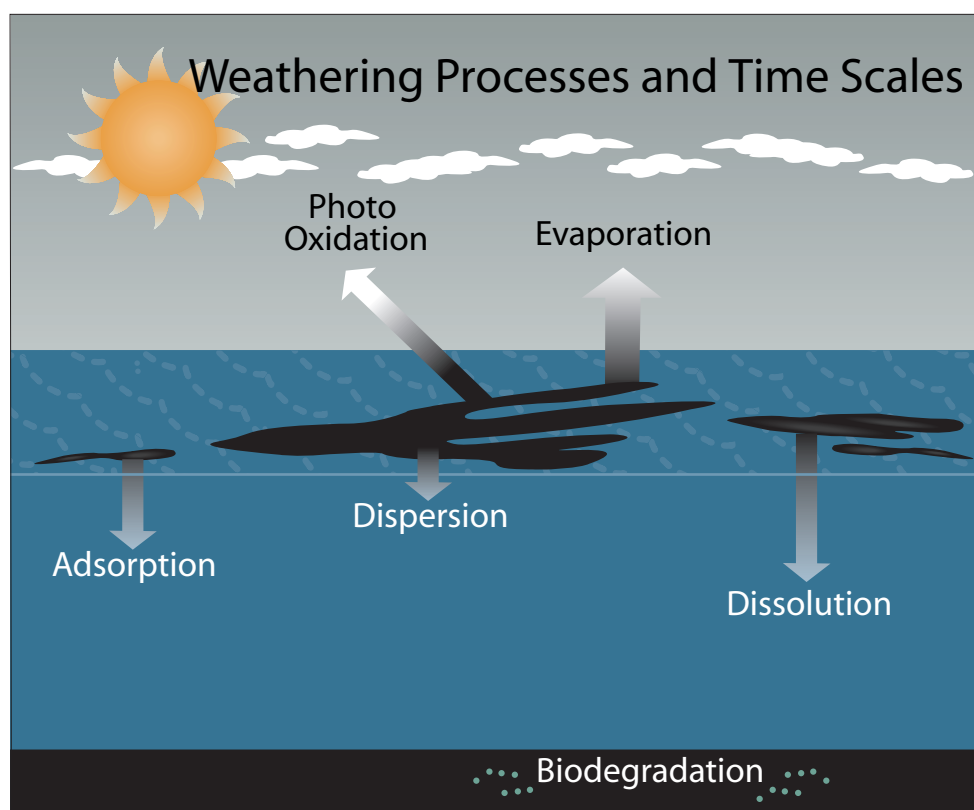
Dispersion The distribution of spilled oil into the upper layers of the water column by natural wave action or application of chemical dispersants

Dissolution The act or process of dissolving one substance in another

Emulsification The process whereby one liquid is dispersed into another liquid in the form of small droplets

Evaporation The process whereby any substance is converted from a liquid state to become part of the surrounding atmosphere in the form of a vapor

Photo Oxidation Sunlight-promoted chemical reaction of oxygen in the air and oil



For more information:
NOAA's Office of Response and Restoration
Emergency Response Division
7600 Sand Point Way NE
Seattle, Washington 98115
206.526.6317