

## Expected Behavior of Diesel and Biodiesel Fuels

Diesel fuels are light refined petroleum products. They are mildly volatile and have high percentages of toxic, water-soluble components, resulting in greater risks to water column organisms. These fuels readily disperse under even moderate wind conditions. Biodiesel is a mixture of mono-alkyl esters. When spilled on water, diesel oil spreads very quickly to a thin film of rainbow and silver sheens. A summary of their expected behavior when spilled on water is:

- Diesel fuels are light, refined petroleum products with a relatively narrow boiling range, meaning that, when spilled on water, most of the oil will evaporate or naturally disperse quickly (usually within a few hours to days).
- When spilled on water, diesel fuel oil spreads very quickly to a thin film. Even when the oil is described as a heavy sheen, it is 0.0004 inches thick (only a fraction of the thickness of a piece of paper) and contains about 1,000 gallons per square nautical mile of continuous coverage. Silver sheen contains about 75 gallons per square nautical mile. Thus, on-water recovery efforts are most effective where the oil is trapped against the shoreline or in booms.
- Diesel fuel oils have a very low viscosity and are readily dispersed into the water column when winds reach 5-7 knots or sea conditions are 2-4 ft waves.
- Diesel fuel oils are much lighter than water (specific gravity is about 0.85, 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.
- Diesel fuel oils are not very sticky or viscous, compared to black oils. When the oil strands on the shoreline, it tends to penetrate porous sediments quickly, but also to be washed off quickly by waves. Thus, shoreline cleanup is often not needed for small accumulations.
- Diesel fuel oils are considered to be the most acutely toxic oil types, partly because of its tendency to naturally disperse in the water column, but also because of the BTEX/PAH content. However, diesel spills in open water are so rapidly diluted that fish kills are seldom observed. Fish kills have been reported for small spills in confined, shallow water; and for large spills where the oil was released into the surf zone (e.g., *North Cape*).

Biodiesel is expected to behave similarly to diesel with the following considerations:

- Biodiesel does not have the toxicity and solvent action of diesel fuel. Biodiesel is relatively insoluble in sea water with a saturation concentration of 7 ppm.
- Biodiesel can coat animals that come into contact with it and reduce the oxygen exchange across the surface of a water body. In this respect it is similar to petroleum diesel. Treatment of oiled birds would be similar to petroleum diesel.
- Degrades more rapidly (estimated 4 times faster) than conventional diesel; high oxygen demand of biodegradation can lead to fish kills in small water bodies