



OIL SPILL SCIENCE

SEA GRANT PROGRAMS OF THE GULF OF MEXICO

FREQUENTLY ASKED QUESTIONS: DISPERSANTS EDITION

Chemical dispersants break oil into smaller droplets, limiting the amount of oil that comes into contact with wildlife and shorelines. Many people question how they work and whether they are safe for people and animals.

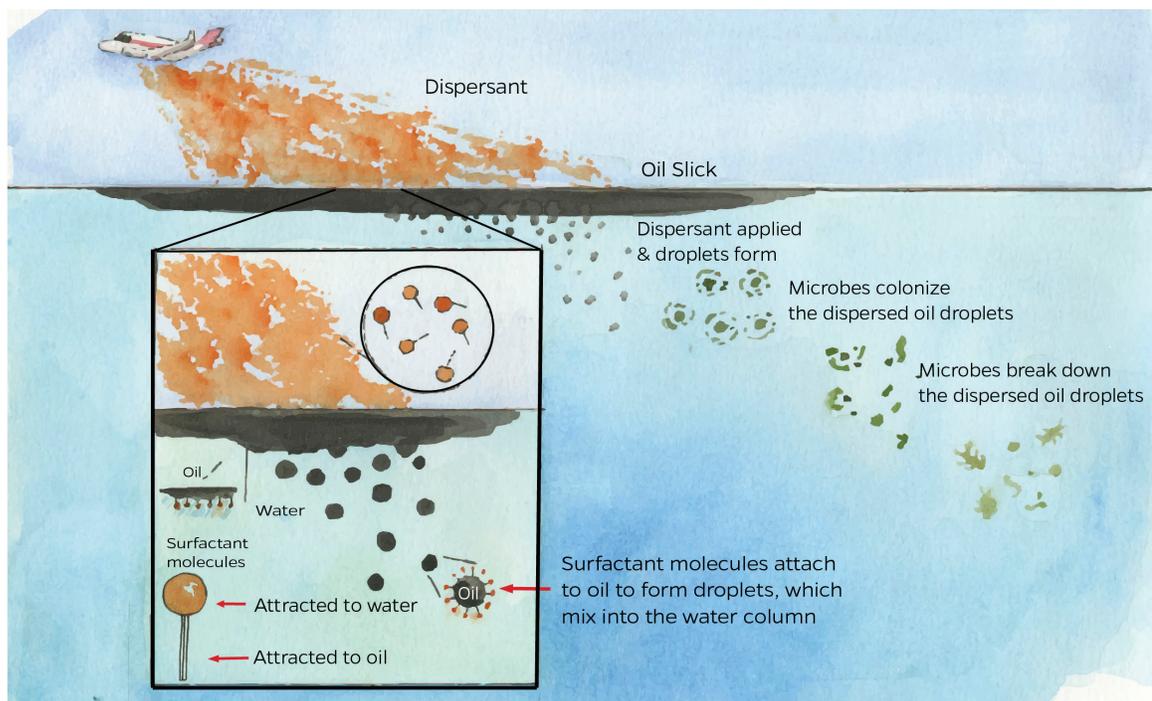


FIGURE 1. Dispersants, though rarely used, can be applied to oil spills. The surfactant molecules in dispersants help oil and water mix, creating small oil droplets that are more easily broken down by microbes than an oil slick. (Florida Sea Grant/Anna Hinkeldey)

WHAT ARE DISPERSANTS AND WHAT DO THEY DO?

Dispersants are a mixture of compounds whose components work together to break oil slicks into small oil droplets (Figure 1). The small droplets are then broken down by evaporation, sunlight, microbes, and other natural processes.¹ Dispersants work under a wide range of temperature conditions. Their components and dispersed oil can be broken down by microbes as well.²

WHEN AND WHERE ARE DISPERSANTS USED?

There is no 'one-size-fits-all' technique for oil spill response.³ Decision-makers must weigh the environmental costs of each technique depending upon the scenario. Typically, responders use combinations of clean-up tools — including sorbents, booms, skimmers,

burning, and dispersants — depending upon the incident.^{3,4} For example, booms can concentrate oil in an area for removal by skimmers, but they often fail in rough sea conditions and are less effective in open water. Where dispersant use is permitted, and environmental conditions (e.g., waves) indicate it could be effective, dispersants may better protect animals and habitats. Dispersants are rarely used; but when they are, they are typically applied at the water's surface. However, during the Deepwater Horizon oil spill, responders also used dispersants directly at the source of the underwater blowout.⁵

WHAT IMPACTS DO DISPERSANTS HAVE ON SEA LIFE?

For sea life, oil can cause problems, including damage to internal organs and blood cells, difficulty with body

temperature regulation, loss of habitat, and death.⁶ Dispersants protect sea life and their habitats from being oiled by reducing large oil slicks to small droplets.¹ Lab studies show that high levels of dispersants can lower the survival rate of aquatic life who encounter them.^{7,8} However, scientists found that the levels of dispersant that can harm animals or people are not found in the environment, even after incidents like the Deepwater Horizon oil spill.⁴ Dispersants alone are unlikely to pose risk for sea life.

While dispersant prevents some sea life from being oiled, it may increase exposure for others tens to hundreds of times by moving oil compounds into the water.^{7,9,10} In lab studies, oil-dispersant mixtures cause a variety of negative impacts to marine life,

HOW WERE DISPERSANTS USED DURING DEEPWATER HORIZON?

After receiving federal authorization, emergency responders applied 1.8 million gallons of dispersants Corexit 9500A and 9527A to the water's surface and underwater at the point of the blowout.^{3,5} Airplanes sprayed dispersants only in daylight. Application could not occur in areas less than 33 feet deep, within 2.3 miles of any vessel, or within 3.45 miles of shoreline or visible marine life.^{3,5}

including problems with egg hatching, heart health, growth, and early development.⁹ These studies in the laboratory show that impacts can vary depending on the species, age at time of exposure, oil and dispersant concentrations, and environmental factors like water temperature and salinity.⁹ While oil-dispersant mixtures can be problematic to sea life in lab studies, scientists see population declines in some wild animal populations but not others.^{4,6,9} Scientists continue investigating the differences between studies done in the lab and the ever-changing conditions in the wild.

WHAT ARE EXISTING POLICIES?

The National Contingency Plan, as mandated by the Clean Water Act, describes which dispersants may be considered for oil spill clean-up, the types of waters where they may be used, and how much may be applied in those waters.^{11,12} Only products that have undergone effectiveness and toxicity testing may be listed.^{11,12}

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SUGGESTED CITATION

Maung-Douglass, E., Graham, L., Hale, C., Sempier, S., Skelton, T., Swann, L., and Wilson, M. (2019). *Frequently asked questions: Dispersants edition*. GOMSG-G-19-001.

ACKNOWLEDGMENT

Special thanks to the many external reviewers who contributed to the betterment of this oil spill science outreach publication.

gulfseagrants.org/oilspilloutreach



This work was made possible in part by a grant from the Gulf of Mexico Research Initiative, and in part by the Sea Grant programs of Texas, Louisiana, Florida, and Mississippi-Alabama. The statements, findings, conclusions, and recommendations do not necessarily reflect the views of these organizations. GOMSG-G-19-001