

## Information sheet

### FAQs on marine oil spills (accidents involving tankers, oil rigs, etc.)

- How was oil formed? Around 20–350 million years ago, thick layers of sediment containing organic materials (algae, plankton) were deposited in shallow seas. As a result of high levels of heat and pressure over millions of years, these materials gave rise to a complex mixture of hydrocarbons – petroleum – in sedimentary rocks.
- What is oil? Oil (petroleum) is a complex mixture of thousands of compounds, particularly hydrocarbons (e.g. paraffins, naphthenes, aromatics). These include toxic components (notably polycyclic aromatic hydrocarbons, or PAHs).
- What are the impacts of oil on ecosystems? One litre of oil can make a million litres of freshwater unfit to drink. In the sea, oil can coat birds' feathers and mammals' fur, causing animals to drown or freeze to death. It can contaminate corals and plants (leaves and roots), disrupting photosynthesis, and clog up fish gills, leading to asphyxiation. Oil is acutely toxic if it is ingested or inhaled, or absorbed by filter feeders (e.g. some crustaceans).
- Is oil also toxic to humans? Yes. This is why workers cleaning up beaches wear protective suits and gloves. In contact with skin, certain components of oil can cause allergic reactions (rash, irritation). Volatile components (e.g. benzene, toluene) can cause irritation of the eyes and respiratory tract and lead to nausea and headache if they are inhaled. Lipophilic compounds accumulate in the food chain and may be ingested by humans, e.g. in fish. In the case of the Gulf of Mexico, fish and other seafood products are being monitored for possible contamination.
- What should I do if I come into contact with oil? Skin contaminated with oil should be cleaned thoroughly with soap and water; do not use solvents (e.g. surgical spirit); do not touch oil-fouled animals. Oil found in water, or tar and sludge on beaches, should be reported to the local authorities. If a small amount of oil (less than a coffee cup) is swallowed, do not induce vomiting – there is a risk of aspiration of oil into the lungs. If in any doubt, seek medical advice immediately or contact a poison information centre.
- How long-lasting are the environmental effects? Effects are still observed even decades after tanker accidents, especially in organisms which live in or on sediments and are exposed via food intake to oil substances deposited in the sediments – for example, microcrustaceans and young fish exhibiting growth disturbances, malformations or impaired reproduction. Apart from the loss of biodiversity, the environmental impacts of oil spills are costly for society – for example, reduced fish yields, losses in the tourism sector, decreased coastal erosion control (e.g. mangrove forest depletion), etc.
- How harmful are man-made spills compared with natural releases of oil? With natural releases, oil enters the sea at a much slower rate and is distributed across a much wider area. Here, specialized communities of bacteria, bivalves and tube worms have developed, which is not the case when accidents occur.
- How is oil broken down in the natural environment? Oil is degraded by bacteria – it is "eaten up" and decomposed into carbon dioxide and water.
- What measures can be taken to limit or remediate damage?
  - Dispersants (e.g. Corexit 9500) can break up an oil slick, forming small droplets which can be more readily broken down by bacteria. However, the adverse effects of these chemicals in natural environments have not been extensively investigated. This also applies to plant-derived dispersants which are claimed to be "greener". In addition, the disadvantage of finely dispersed oil droplets is that they can also be more readily absorbed by other organisms.
  - Booms can be used to protect the coastline from oil slicks, unless the waves are too high.
  - Adsorbents have a large surface area to which oil is bound; it can then be removed from the water.
  - Controlled burning can only be used if oil has not yet reached the shore. The gases produced by combustion (including carbon dioxide) pollute the atmosphere.
  - Oil skimmers act as floating water treatment plants. However, experience with this method is limited, and only surface oil can be recovered.

- What precautionary measures can be taken? The principle "Prevention is better than cure" applies for oil spills just as much as for other environmental risks. Protection against accidents can only be provided by effective preventive measures, e.g. the use of double-hull tankers and high safety standards on oil rigs. Prevention also includes the avoidance of high-risk extraction methods, the promotion of alternative sources of energy and the provision of a global rapid response infrastructure for disaster management.

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### **General information on oil and oil spills**

Ross JP (2010): An introduction to marine oil spills. IFAS, University of Florida, Department of Wildlife Ecology and Conservation: <http://www.wec.ufl.edu/Introduction%20to%20Marine%20oil%20spills.pdf>

Michel J: Oil behavior and toxicity: [http://response.restoration.noaa.gov/book\\_shelf/678\\_Chapter2.pdf](http://response.restoration.noaa.gov/book_shelf/678_Chapter2.pdf)

Australian Maritime Safety Authority (AMSA): The effects of maritime oil spills on wildlife including non-avian marine life:

[http://www.amsa.gov.au/Marine\\_Environment\\_Protection/National\\_plan/General\\_Information/Oiled\\_Wildlife/Oil\\_Spill\\_Effects\\_on\\_Wildlife\\_and\\_Non-Avian\\_Marine\\_Life.asp](http://www.amsa.gov.au/Marine_Environment_Protection/National_plan/General_Information/Oiled_Wildlife/Oil_Spill_Effects_on_Wildlife_and_Non-Avian_Marine_Life.asp)

Ober, HK: Effects of oil spills on marine and coastal wildlife. University of Florida, Department of Wildlife Ecology and Conservation:

<http://www.wec.ufl.edu/Effects%20of%20oil%20spills%20on%20wildlife.pdf>

SINTEF (2008) Oil spill dispersants: <http://documents.plant.wur.nl/imares/dispersants/08sintef.pdf>

### **Other information resources for the Gulf of Mexico oil spill**

<http://www.rsmas.miami.edu/oil-spill/> Includes a useful presentation on oil spill impacts on coral reefs and hardbottom communities

<http://www.whoi.edu/dwhresponse/page.do?pid=43715> The involvement of the Woods Hole Oceanographic Institution in the response to the Deepwater Horizon oil spill

[http://www.eoearth.org/article/Deepwater\\_Horizon\\_oil\\_spill](http://www.eoearth.org/article/Deepwater_Horizon_oil_spill) Encyclopedia of earth website on the Deepwater Horizon oil spill

[http://answers.usa.gov/cgi-bin/gsa\\_ict.cfg/php/enduser/std\\_adp.php?p\\_faqid=7961](http://answers.usa.gov/cgi-bin/gsa_ict.cfg/php/enduser/std_adp.php?p_faqid=7961) US Government FAQs page on marine oil spills, including numerous links

<http://emergency.cdc.gov/gulfoilspill2010/> Public health information

<http://www.epa.gov/bpspill/> US Environmental Protection Agency website

<http://oils.gpa.unep.org/facts/economy-health.htm> Effects of marine oil pollution on economy and human health

<http://oceanworld.tamu.edu/resources/oceanography-book/oilspills.htm> Comparison of spills from tankers with pollution from other sources (consumption, natural seeps, etc.)