

NOAA's Oil Spill Response

Effects of Oil on Marine Mammals and Sea Turtles

Oil is a mixture of chemicals, all of which may have different effects on marine animals and the combination may be even more hazardous. In addition, some of the chemicals and methods used to clean up oil spills may also have effects on marine animals. Toxicity or harmful effects are dependent upon:

- ▶ The mixture and types of chemicals that make up the oil or are used to clean up the oil.
- ▶ The amount of exposure (dose for internal exposures or time for external exposures).
- ▶ The route of exposure (inhaled, ingested, absorbed, or external).
- ▶ The biomedical risk factors of the animal (age, sex, reproductive stage, and health status). For turtles this will include differing impacts and vulnerabilities at the different life stages such as eggs, post-hatchlings, juveniles and adults. For cetaceans this will include neonates, calves, juveniles and adults.

Research on dolphins in human care has shown that the animals avoid oil on the surface of the water, however observations of wild dolphins have documented the animals swimming in, feeding in and socializing in oiled water during previous oil spills in the Gulf of Mexico.

Several aspects of sea turtles put them at risk, including the lack of avoidance behavior of oiled waters and indiscriminate feeding in convergence zones.



Whales, dolphins, manatees and sea turtles are air breathers and all must come to the surface frequently to take a breath of air. In a large oil spill, these animals may be exposed to volatile chemicals during inhalation.

Depending on the size of a particular spill, marine mammals and sea turtles could be exposed to these chemicals for a fairly long time.

General Types of Effects on Marine Mammals and Sea Turtles

The following are generalities and would need to be specifically applied to the situation or event.



Cetaceans, manatees and sea turtles may be exposed to chemicals in oil (or used to treat oil spills like dispersants) in two ways: internally (eating or swallowing oil, consuming prey containing oil based chemicals, or inhaling of volatile oil related compounds) and externally (swimming in oil or dispersants, or oil or dispersants on skin and body).

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Additionally sea turtles may experience oiling impacts on nesting beaches and eggs through chemical exposures resulting in decreased survival to hatching and developmental defects in hatchlings.

External Effects

- ▶ Cetaceans and manatees have no fur which can be oiled and do not depend on fur for insulation. Therefore they are not susceptible to the insulation effects (hypothermia) that often puts haired marine mammals (such as fur seals or sea otters) at risk.
- ▶ Oil and other chemicals on skin and body may result in skin and eye irritation, burns to mucous membranes of eyes and mouth, and increased susceptibility to infection. For large whales, oil can foul the baleen they use to filter-feed, thereby potentially decreasing their ability to eat.

Internal Effects

- ▶ Inhalation of volatile organics from oil or dispersants may result in respiratory irritation, inflammation, emphysema, or pneumonia.
- ▶ Ingesting oil or dispersants may result in gastrointestinal inflammation, ulcers, bleeding, diarrhea, and maldigestion.
- ▶ Absorption of inhaled and ingested chemicals may damage organs such as the liver or kidney, result in anemia and immune suppression, or lead to reproductive failure or death.

Summary

- ▶ Direct contact with of petroleum compounds or dispersants with skin may cause skin irritation, chemical burns, and infections.

- ▶ Inhalation of volatile petroleum compounds or dispersants may irritate or injure the respiratory tract, which may lead to inflammation or pneumonia.



- ▶ Ingestion of petroleum compounds may cause injury to the gastrointestinal tract, which may affect the animals' ability to absorb or digest foods.
- ▶ Absorption of petroleum compounds or dispersants may damage liver, kidney, and

brain function as well as causing anemia and immune suppression.

- ▶ Long term chronic effects such as decreased survival and lowered reproductive success may occur.
- ▶ The Marine Mammal and Sea Turtle Stranding Networks have protocols and procedures in place for responding to live animals that are exposed to oil spills, and animals brought into rehabilitation facilities are provided veterinary care to remove oil and treat any related health effects.

Learn more about NOAA's response to the BP oil spill at <http://response.restoration.noaa.gov/deepwaterhorizon>.

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