

RRT III Fact Sheet

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EFFECTS OF OIL ON WILDLIFE

MARINE LIFE

Because of the wide variety of wildlife species, seasonal variation, and the range of oil types, each oil spill will be different. The two principal causes of harm to wildlife are toxicity and coating. Oil is most toxic during the initial phases of a release, before the lighter components have dissipated. Since these lighter, more toxic elements are also usually more soluble in water, fish swimming through the area, or (if the water is sufficiently shallow) shellfish in the immediate neighborhood of the spill, will be most at risk from toxic exposure. There may be an initial "surge" of toxic effects that become less significant over time. In addition, the stress of oiling may render wildlife vulnerable to other, natural threats.

Birds. Birds are usually the most visible victims of an oil spill. One important reason is that feathers repel water but not oil. In fact, feathers readily absorb large quantities of oil immediately upon contact. This then deprives the birds of the vital functions of feathers flying, insulation, and buoyancy. When exposed to oil, birds may sink or drown or lose body heat rapidly. Birds will also ingest any oil that adheres to their body through the activity of preening, with toxic effects resulting. If heavily oiled, preening may increase enough to interrupt normal feeding. This, combined

with rapid loss of body heat due to loss of insulation may induce starvation. Oiled birds may not lay eggs as usual and oiled eggs may not hatch. Diving sea birds will generally be affected more seriously by oil spills than birds that stay on the surface, and some species are more susceptible than others. Some may avoid oily water and some may actually be attracted to it. It is usually difficult to determine precisely the number of birds killed in a spill. Most of them are never recovered, falling prey to scavengers or simply sinking. Effects will vary widely depending on the mix of species present, the time of year and relation to migration and breeding cycles. Some sea bird species have long lives and breed slowly. In such a case, a specific population may require a long time to recover from an incident. Treatment of oiled birds is still very controversial. Even with well trained handlers, wild birds experience extreme stress from human contact and from treatment procedures, which can often be as fatal as the oil itself. Few oiled birds survive treatment, and those that are eventually released, may die within a few weeks or months.

Marine Mammals. The marine mammals most commonly encountered in this region would be whales and dolphins. Manatees can be found in Chesapeake Bay. Whales and dolphins are able to detect and avoid oil slicks. They are generally hairless and use

blubber for thermoinsulation, therefore they are relatively insensitive to the effects of direct oiling. Irritation to eyes and mucous membranes is possible. Manatees are large slow moving herbivores. They are hairless and use blubber for thermoinsulation and are not at great risk to direct oiling. While at the surface breathing, oil vapors could irritate their eyes and nasal passages. During the winter months, manatees will gather in great numbers in the warm water outflows from power plants. This behavior would make large numbers susceptible to oil spills during these times. Injury caused by boat operations is a concern during response operations.

Fish. Fish may be more resistant than other marine organisms to oil because their surfaces, including gills, are coated with oil repellent mucus, although larval fish, which may concentrate at the surface may be more vulnerable. If a spill occurs during a time in the life cycle when such larval forms are present, these larvae may be killed. It is extremely difficult to determine the effect of an oil spill on fish stocks in any one area. There is already considerable variation from year to year, caused by both natural variation and by current over fishing practices and predictions of stock abundance are generally imprecise. Fish can be affected by petroleum either directly through the gills, by direct ingestion or by eating oiled prey. Many laboratory studies have

been done to determine the effects of various doses of oil on specific species. Different species have varying life cycle stages and reproductive strategies and will react differently. Embryo damage may not become apparent until after hatching of eggs into larvae. Pelagic species seem to be more tolerant than benthic (bottom dwelling) species. Water temperature may be an important factor in fish sensitivity - lower temperatures will tend to allow oil to persist longer in the water columns and also reduce the metabolic process in fish that may clear contamination. Although fish may be able to survive contact with the small amounts of oil constituents that enter the water column, and are able to metabolize hydrocarbons, even small amounts may be sufficient to make them unsuitable for market because of off flavors or the perception of "tainting".

Shellfish. A good deal of study has been done on the effects of oil on shellfish, both bottom dwelling (lobsters, crabs, etc.) and intertidal (clams, oysters, etc.) There is great variation amongst species and among the various life cycle stages of any one species. Intertidal

shellfish, although highly vulnerable to oiling, may be slightly more tolerant than offshore species. And, predictably, juvenile and molting stages tend to be more vulnerable than mature adult stages. Species living in bays, estuaries and other shallow environments are at particular risk because oil coming ashore may become concentrated in a narrow band along the shoreline and the shallow water will result in a higher concentration throughout the water column. In addition to the toxic effects, heavy oils can literally smother and immobilize some

invertebrate species. Sub lethal effects are also seen, including changes in growth, metabolism, reproduction and behaviors. As with fish, even small amounts of hydrocarbons can cause "off" flavors or tainting, with adverse commercial implications.

Sea Turtles. Sea turtles can be exposed to spilled oil when feeding, surfacing to breathe, or nesting in areas contaminated by stranded oil. Turtles are also susceptible to floating tar balls formed by weathered oil. Studies conducted in 1985 by Lutz et al, demonstrated that exposure to unweathered south Louisiana crude oil could cause changes in behavior, decreased reproduction, decreased growth, and possible death. Though oil exposure may not directly kill adult turtles, the effects may make them more vulnerable to predatory acts or disease. Oiling of the sea turtle nesting habitat poses a potential risk to adult nesting turtles, hatchlings, and eggs. Turtle embryos are particularly sensitive. However, turtles non-nally nest above the high tide line, where oiling is unlikely. The effects of oil on the development and survival of marine turtles appears to be variable, depending on such factors as stage of nesting, oil type, degree of oil weathering, and amount and location of oil deposition on the beach. Response activities to clean oil stranded on beaches may pose an additional risk of injury to eggs, hatchlings, and nesting adults.

PROTECTION OF WILDLIFE

The Endangered Species Act requires that actions that may affect endangered or threatened species be reviewed by the U.S. Fish and Wildlife Service and the National Marine Fisheries Service in order to

ensure protection of rare and valuable species. These reviews, known as Section 7 Consultations, have been completed in advance for Region IV for use of dispersants and insitu burning countermeasures. Area Contingency Plans throughout the region have pre-identified wildlife resources and addressed their protection and care during spill response.

Please contact our RRT Coordinator through the web site or at (757) 398-6620 for more information.