

Effects of Oil in the Marine Environment

The environmental impacts of spilled oil can be severe. The damage caused by a spill depends on location, volume and type of oil spilled, weather conditions, season, and many other factors. Large spills cause widespread immediate impacts, and potential long-term damage to parts of affected ecosystems. However, chronic discharges such as from street runoff and improper oil disposal are also damaging. Cumulative chronic discharges far exceed major spills in volume. Cleanup operations remove some, but not all, oil from the environment; the oil that remains naturally degrades over time. Everyone can help reduce impacts of oil spills. Immediately report oil or chemical spills (800-424-8802), properly recycle used motor oil, carefully fuel cars or boats, promptly repair leaks, and reduce your consumption. As a voter and consumer, your opinion is valued by your elected officials and companies you patronize.



Dead sea life after the January 1996 *North Cape* spill

Effects of Oil on Coastal Habitats

Coastal areas are particularly susceptible to oil pollution. When a large spill drifts ashore, some of the oil may become trapped and remain for years. This is in contrast to the open sea where currents and diffusion rapidly reduce the concentration of oil.

The immediate effects of heavy oiling of the shoreline can be evident by the death of plants and animals due to smothering and toxicity. Long-term oil presence can also continue to impact the growth of vegetation.

In **rocky shore areas**, stranded oil may coat the rocks and gradually harden by weathering into a tough tarry "skin." This oil is gradually removed by wave erosion, but pools of oil that collect in form a skin of weathered oil and may remain for a long time.

On **cobble and sandy beaches**, oil can sink more deeply into the sediments and can remain longer than on bare rocks. Tidal pumping and sediment grain size effect the rate of penetration. In muddy sediments, penetration is minimal.

Tidal flats are broad low-tide zones, usually containing rich plant, animal and bird communities. Oil may seep into the muddy bottoms and have long term impacts.

Salt Marshes have a wide variety of plant and animal species. Effects of oil in such systems may include severe reduction in population and growth rate. There is usually some degree of recovery within one generation: one year for most marsh grasses.

Effects of Oil on Marine Life

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. These more toxic portions are also usually more soluble in water putting fish and shellfish at risk.

Birds: Birds are usually the most visible victims of an oil spill. Birds have a high likelihood of exposure, as they float on the water's surface with the oil. Bird feathers repel water but not oil, so they lose body heat rapidly, or may sink or drown. Birds will also ingest any oil that adheres to their body through the activity of preening. This, combined with rapid loss of body heat due to loss of insulation may induce starvation. Oiled wildlife rehabilitation is possible, but survival rates vary based on the oil, species, time, and location. Usually only a fraction of oiled birds are captured for treatment.

Marine mammals: The most common marine mammals at risk in oil spills in U.S. waters are 13 species of seals and sea lions (several are endangered or threatened species). Effects include suffocation or respiratory damage by oil, loss of insulation, and poisoning. Most vulnerable are animals that have fur for insulation such as fur seals and sea otters.

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 (with the oil) may be more vulnerable. Fish can be affected by through the gills, by ingestion or by eating oiled prey.

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.) Species living in bays, estuaries and other shallow environments are at particular risk because oil coming ashore may become concentrated. 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.