

1.1 Activities in UK waters

Britain is an island and a natural maritime nation. The UK's geographical position and the volume of our trade make our waters some of the busiest for shipping in the world. A lot of shipping that is passing through UK waters is travelling to or from other parts of Europe. The English Channel, and in particular the Dover Strait, is one of the busiest stretches in water in the world with over 600 movements of larger vessels (over 300 gross tonnes) everyday. Other busy shipping areas are through the Minches, the South-West Approaches and the around the Humber. 95% of our trade by weight (and 77% by value) arrives or leaves by sea. UK ports handle over 550 million tonnes of freight (over 300 million tonnes inbound and over 200 million tonnes outbound) every year. The five leading ports (by tonnage); Grimsby and Immingham, Tees and Hartlepool, London, Forth and Southampton, handle over 40% of the total. 70% of tonnage of the cargoes are handled in bulk and 26% as utilised cargoes (containers or as ro-ro (roll-on / roll-off) cargo loads). Fuels dominate the bulk cargo; 76% of the total with 160 million tonnes of crude oil, 80 million tonnes of refined oil products and over 40 million tonnes of coal being handled every year.

The offshore production of crude oil, principally in the northern North Sea, but also in other areas on a smaller scale, is of major economic benefit to the UK. Although now slowly declining with time, approximately 100 million tonnes of crude oil are produced from offshore oil fields each year.

Despite reductions caused by various reasons in recent years, the UK has an important sea fish industry with one of the largest fishing fleets and fish processing industries in Europe.

1.2 Oil pollution incidents in UK waters

Pollution incidents involving the discharge of oil, chemicals or other materials into the sea in the waters around the UK happen for a variety of reasons. Almost any incident at sea that causes significant structural damage to a vessel at sea presents the potential for causing marine oil pollution.

Every year, several small fishing boats are damaged by groundings or are lost at sea. The first concern of the MCA will be for the crew and a Search And Rescue (SAR) mission will be carried out if possible. If the vessel sinks, relatively small quantities (up to a maximum of 10 tonnes or more) of distillate fuels called Marine Diesel Oil (MDO) or Marine Gas Oil (MGO) will be released from the wrecks. Because of the relatively small quantities of fuel involved and their non-persistent nature, the effects of any oil pollution caused will be limited.

Causes of oil spills from larger ships are as the result of collisions or groundings. If the fuel tanks are damaged, this may involve the loss of bunker fuel. Medium-size ships use various grades of residual fuel oils known as Intermediate Fuel Oil (IFO) 180 or Medium Fuel Oil (MFO). Depending on the vessel size and the state of fuel load, from tens to hundreds of tonnes of these bunker fuels will be carried and possibly spilled.

Larger ships use 'heavier', higher viscosity residual fuel oils and can carry much more of them. A very large cargo ship such as a container ship or bulk carrier may contain several thousand tonnes of Heavy Fuel Oil (HFO). HFOs are thick, black residual oils that are very persistent in the marine environment.

Any incident, such as a collision, grounding, hull failure or fires or explosions involving an oil tanker has the potential to cause a large volume of crude oil pollution. Oil tankers can be of a wide range of sizes. The scale of oil pollution that might be caused depends on the size and type of the vessel involved and the severity of the damage. The largest oil spills that have ever occurred in UK waters are from oil tankers that have run aground. Oil spills from the *Torrey Canyon* (1967, 113,000 tonnes of oil spilled), *Braer* (1993, 84,700 tonnes of oil spilled) and *Sea Empress* (1996, 72,000 tonnes of oil spilled) are amongst some of the biggest oil spills that have happened in the world.

Fortunately the vast majority of spills are much more minor and are often of lighter oils which usually readily disperse naturally. Since 1965 the Advisory Committee on Protection of the Sea (ACOPS) has compiled statistics and other information on different types marine pollution in the waters around the British Isles.

During the ten-year period from 1989 to 1998, there were two very large oil spills from oil tankers, from the *Braer* and *Sea Empress*, involving over 70,000 tonnes of spilled crude oil. There was only one other oil spill that involved just over 1,000 tonnes of oil and that was also from an oil tanker, the *Rose Bay*. There were 4 spills of between 100 and 1,000 tonnes, two of fuel from Russian fish factory ships. There were 12 spills of 10 to 100 tonnes of oil; 5 of these spills (those of 10 to 25 tonnes) involved fishing vessels, 3 were from general cargo ships and 2 were from tankers. Sunken or run aground fishing vessels accounted for 20 out of 27 of smaller (2 to 10 tonnes) oil spills.

ACOPS have continued to collect and analyse these statistics and more recent ACOPS reports are available on the MCA and ACOPS web-sites: www.mcga.gov.uk www.acops.org. The analysis indicates a continuing downward trend in the frequency of oil spills of all sizes.

1.3 Effects of spilled oil

Environmental impacts of spilled oil on ecological resources

Many crude oils and residual fuel oils, but not distillate oils such as MDO and MGO, become very thick and sticky as their properties change due to processes collectively known as 'weathering'. Oil drifting at sea can contaminate the plumage of seabirds and smother small shoreline creatures when it drifts ashore. Oil contaminated sea birds can drown or rapidly die of hypothermia. The spilled oil contaminates the habitats of a wide variety of organisms and will cause damage for as long as it remains there.

Some chemical compounds in crude oils and refined oil products such as distillate and residual fuels are toxic. The toxic effects of crude oil can be lethal or sub-lethal, causing other, less severe negative effects. Toxic effects are also divided into acute (rapid onset or short-term) or chronic (longer-term and cumulative). The extent of the effects caused will depend on the chemical compounds in oils (the type of oil), the exposure regime

(concentration of the oil and duration that the organism that is exposed to it) and the species exposed. Some species are much more sensitive to oil compounds than other species.

The marine ecosystem is complex with many interrelationships between different species and an impact on one species can have a 'knock-on' affect to other species. There are natural fluctuations in species abundance and distribution as a result of seasonal changes in climate or other effects. Human activities such as costal development or commercial fishing can alter the balance of the species in a particular location.

Shorelines are most exposed to the effects of spilled oil as this is where the oil tends to eventually accumulate. Localised areas may be contaminated with large quantities of oil. In these areas the resident species may suffer a high degree of damage due to the physical effects of oiling such as smothering and, in the longer-term, the toxic effects of oil that persists in these habitats. The amount of damage caused by the oil and the time for which the area remains affected varies, principally as a function of the shoreline type.

Oil spills can cause changes in the balances between the different species present in a particular habitat, but experience from major oil spills has shown that they rarely cause long-term environmental damage and that the ecosystem will eventually recover. The period for natural recovery may be a few weeks or many years. Many marine organisms produce vast numbers of eggs and larvae which are released as plankton and widely distributed by currents and this strategy has evolved to overcome high natural mortality rates. This provides a considerable reservoir for the rapid re-colonisation of an area where individual organisms have been killed by an oil spill. This is not the case for long-lived, larger species such as some species of seabirds, but even these can overcome damaging natural events such as severe storms that occasionally drastically reduce local populations. They will normally slowly recover from the damaging effects of an oil spill.

Economic effects of oil spills

The economic effects of oil spills are often more obvious than the environmental or ecological effects. As well as interfering with the activities of tourists present at the time of an oil spill, the presence of large quantities of spilled oil on beaches will be a powerful disincentive to impending tourists, especially with the rapid spread of news and pictures by television, newspapers and the Internet. Hotels, restaurants and other that depend on tourism for their livelihood can be badly affected. Recovery will depend on restoring public confidence.

Spilled oil on the water can contaminate the boats and gear used for fishing. The ban on fishing that will probably be temporarily imposed by Defra, if a large oil spill occurs as a precaution in order to safeguard the human food-chain, will cause hardship for the fishermen who cannot earn their living during this period. Fish in the open sea are not generally affected by oil spills; fish that are free to swim away will do so to avoid the 'smell' of oil components in the water. Cultivated stocks such as caged fish or shellfish are much more likely to be damaged.

1.4 Sensitivity of shoreline types and habitats to oil pollution

Shorelines can be classified on a relative scale of vulnerability or sensitivity to oil pollution on the basis of shoreline type. The classification is only approximate, but combines the probability of the oil being cleaned away by natural processes with the likelihood of the habitats present being occupied by typical populations. The classification is also a rough guide to the difficulty of shoreline clean-up.

LEAST SENSITIVE TO OIL POLLUTION	
Exposed rocky headlands	Wave reflection can keep most of the oil offshore and intense wave action will often clean any oil that does contaminate the rocks off fairly quickly.
Eroding wave-cut platforms	Intense wave action will often remove stranded oil within a matter of weeks.
Man-made solid structures	Often of little ecological significance, being an artificial intrusion into the natural environment. Access for clean-up is often good and clean-up may be for aesthetic or economic reasons.
Fine-grained sand beaches	Oil does not penetrate into water saturated sand and can be removed from surface when tide falls.
Coarse-grained beaches	Oil may sink into beach making removal difficult or impossible. In moderate to high-energy wave conditions the oil will eventually be removed from much of the beach.
Exposed compacted tidal flats	These tidal flats are an important ecological habitat for organisms such as invertebrates that support feeding bird populations, but most oil will not adhere to or penetrate into the substrate and will be carried away on the rising tide.
Mixed sand and pebble beaches	Oil may rapidly penetrate into the beach and become buried. Oil may persist for years under moderate or low energy conditions or may be liberated by winter storms.
Pebble beaches	Oil may rapidly penetrate into the beach and become buried. Very difficult to get at the oil to remove it without disrupting the beach structure.
Sheltered rocky coasts	Areas of reduced wave action such as coves that are often difficult to access. May provide rich habitat for some species in rock pools. Oil may persist for years.
Sheltered tidal flats	Areas of great biological activity – a combination of high productivity and biomass, typically with invertebrates providing a valuable food source for wading birds - and low wave energy. Oil may persist for years. Any attempts at clean-up are likely to drive oil into the mud and so the main priority should be to prevent these areas from becoming contaminated with oil.
Salt marshes	Most productive of all aquatic environments. Many oil-sensitive species present and oil will persist for years. Main priority should be to prevent oil from contaminating salt marshes. If heavily contaminated with oil vegetation may need to be cut off or burnt to allow oil to be cleaned away.
MOST SENSITIVE TO OIL POLLUTION	