



Sea Pollution



It seems that almost every day there is another story about pollution of one form or another, in the food we eat, the water we drink and the air we breathe. Very often our own actions lead to that pollution and in many cases we can do something about it. These notes explain how you can investigate sea pollution and advise on positive action to improve our seas and the beaches.

Polluting the seas

The seas and oceans receive the brunt of human waste, whether it is by deliberate dumping or by natural runoff from the land. In fact over 80% of all marine pollution comes from land-based activities and many pollutants are deposited in estuaries and coastal waters. Here the pollutants enter marine food chains, building up their concentrations until they reach toxic levels. It often takes human casualties to alert us to pollution and such was the case in Minimata Bay in Japan when many people died as a result of a pollutant building up in food chains. A factory was discharging waste containing methyl mercury in low concentrations into the sea and as this pollutant passed through food chains it became more concentrated in the tissues of marine organisms until it reached toxic levels. As a consequence 649 people died from eating fish and shellfish contaminated with mercury and 3500 people suffered from mercury poisoning.

Investigating sea pollution

Rubbish discarded at sea is often washed ashore onto our beaches polluting the coastline, but what kind of

litter is thrown away and where does it come from? Very often the tide brings in such a lot of debris that it would be impossible to record each item of litter. A way of overcoming this problem is to examine selected areas of the beach and to set up a line transect enabling a survey of the litter to be carried out. Stretch a line, marked at regular intervals, from the sea across the beach and record the litter that you find at each point on the transect. Make a note of the composition of the litter stating whether it is made of plastic, wood, metal, glass, paper, rope or cardboard. Also record the identity of each item such as fishing line, nets, containers or wire. Containers of plastic and metal are the most frequently reported litter. Drinks containers are common, mostly of the pull-tab type probably thrown away by holidaymakers. There is more rubbish on the beach in the winter, probably because of the prevailing winds and large waves which force the litter ashore.

Oil pollution



Black tar-like oil is sometimes washed onto beaches not only causing a nuisance to holidaymakers but also killing many sea-birds. The oil mainly comes from tankers which wash out their holds while out at sea to save time in port. Enforcement of laws concerning the dumping of oil is difficult and responsibility rests with the captain of each tanker to obey the law. Once oil is in the sea and the tanker has sailed on, it is difficult to prove that an offence has been committed and unless the culprit can be identified the cost of clearing up is the responsibility of the local council. If you find that oil has been washed ashore report it at once to your local council who will arrange for the beach to be cleaned up. Local volunteers can also begin the task of trying to save the lives of sea-birds contaminated with oil.

In 1992, more than 4 million tonnes of oil were released into the world's oceans. Recent research by The US National Science Foundation has found that only 2 per cent of hydrocarbon pollution finding its way into the sea each year comes from tanker accidents. Eleven per cent comes from natural sources - tar sands and oil seeps, 13 per cent comes from the atmosphere, 24 per cent from all forms of transport, and an astounding 50 per cent comes down drains and rivers to the sea from cities and industries. Anyone who has tipped old engine oil down the drain, or 'buried' it in the soil instead of taking it to a recycling point is responsible for some oil pollution at sea.

Significant oil pollution is caused by tankers illegally cleaning their tanks while out at sea and dumping the dirty water overboard. Airborne surveillance spotted 64 vessels discharging their tanks in the Dutch sector of the North Sea during 1985. 72 per cent of oil pollution caused by shipping is estimated to be deliberate and illegal. Only 28 per cent is caused by tanker accidents. There is obviously a need for better monitoring of ships at sea by all countries, and the owners of ships illegally cleaning their tanks at sea should be

prosecuted. Over 100,000 tonnes of oil is dumped in the North Sea by ships.

In 1992, there were 611 incidents of oil pollution in UK coastal waters alone. Many of the major oil spillages during the last 20 years have been caused, or made worse by human error. Human error can mean carelessness, but it also includes continuing to use old, unsafe ships and employing crews with inadequate training.

In the last thirty years, there have been a number of serious oil spillages caused by oil tanker accidents. The first was in 1967, when the Torrey Canyon ran aground on the Seven Stones Rocks, off Land's End, leaking 106,000 tonnes of oil onto rocks and beaches on both side of the English Channel. British guillemots and razorbills were badly affected, and the population of puffins on the Sept Isles in France was virtually wiped out.

In 1978, The Amoco Cadiz was wrecked following engine failure on the coast of Brittany, releasing 223,000 tonnes of oil into the sea. Thousands of migrating seabirds were killed when they landed on the oily waters, and many French oyster fisheries and beaches were completely ruined.

The Exxon Valdez was accidentally steered into a reef in Prince William Sound, Alaska in 1989. Emergency equipment did not arrive quickly, and this allowed the 37 million litres of spilled oil to form a slick covering 6,700 square kilometres. The delay in providing equipment, both by the oil company, Exxon, and by the State of Alaska, was unforgivable, and caused the needless death of thousands of animals, including 350,000 sea otters.

More recently, the tanker Braer broke up off Shetland having run aground, and in February 1996, the Sea Empress spilled around 70,000 tonnes of crude oil off the Pembrokeshire coast in Wales. For further details, see the sheet 'Oil Pollution Case Study - the Sea Empress', also available from YPTENC.

The effects of this oil pollution on wildlife can be terrible. Between January 1971 and June 1979, 36,000 birds were found dead around the British coast as a result of oiling. Migrating species like the puffin, guillemot and razorbill are especially at risk, as they look for areas of calm water on which to rest or catch fish. Oil-covered seas look calm, but if a bird land in a slick, the oil coats its feathers, affects its buoyancy and the insulating power of its feathers and makes it unable to fly away. Even slightly oiled birds sometimes die because they preen their feathers, and in doing so, ingest oily substances which are poisonous to them. An animal killed by

oil may then be eaten by fish or birds, who in turn are poisoned by the oil.

Cleaning up after an oil spill is a complicated business, and depends on weather conditions and water temperature. In calm waters, long floating booms can be used to help to contain oil, which can then be pumped off the surface of the sea. Chemical dispersants are often sprayed on oil to break up slicks into droplets which can be broken down by marine bacteria. Dispersants are quite toxic, however, so whilst they reduce damage to beaches and save seabird colonies from destruction by oil, they also add more poisons to the sea. Rough seas can break up slicks, but they can also spread oil right through the marine environment.

Crude oil is made up of over 1,000 chemicals. Of these, the light hydrocarbons, which are used to make petrol and aviation fuel are the most toxic. In warm conditions, these usually evaporate quite quickly, making a foul smell, but reducing the danger to wildlife. In cold seas, however, the process of evaporation can be very slow, and this means the risk to wildlife lasts longer. To prevent this, the light hydrocarbons are often burned off the surface of the sea.

In this country, we have a group of patrol aircraft whose job it is to search for oil floating on the surface of our seas. The spotter planes are able to distinguish different types of oil, and work alongside dispersant-spraying aircraft so that oil can be treated quickly and in the most effective way possible.

Sewage



Many sewage pipelines were built years ago when little was known about the effects of pollution and it was thought that the sea would dilute the sewage. Since then the amount of sewage has increased considerably and very often organic matter is washed ashore by the incoming tide. The quality of the water around our coasts is assessed against standards set up by the European Community and over 350 British resorts are subject to

inspection. At the moment these standards only apply to major resorts but public demand may eventually lead to other bathing beaches being inspected too.

There are no official signs to warn the public of sewage pollution but there are some useful booklists available which give details of polluted beaches. The list of British Blue Flag beaches indicates the bathing waters

which have passed certain standards of cleanliness.

If you suspect that the water at a resort is unfit for bathing you should report the matter to the local council. If the public outcry is loud enough the authorities will be forced to consider further treatment of the sewage before releasing it into the sea. If you wish to do more about sea pollution the Marine Conservation Society would welcome your support.

Radioactive Waste



Radioactive waste is stored in water ponds next to nuclear power stations until it is considered safe enough for disposal. The waste is then released directly into the sea about 2km from the coast.

The ocean bed is used for the dumping of high level nuclear waste. The liquid waste is sealed into glass, a process called vitrification, and stored in steel canisters containing concrete. These containers are dumped in the sediment on the ocean floor.

Greenpeace is a group working to protect the environment by direct action and in November 1983 they tried to block the waste pipeline at Sellafield. They were fined £40,000 for breaking the law but had focused public attention on the dumping of nuclear waste.

In December 1983 large amounts of highly contaminated seaweed were washed up on the beaches near Sellafield and many kilometres of beach were officially closed to the public. The Government's Director of Public Prosecutions decided that BNFL could be prosecuted for allowing excessive radioactive leaks from the pipelines. When the Sellafield reprocessing plant was started it was thought that the radioactive waste would attach itself to the muddy silt at the bottom of the Ravensglass estuary and remain out of harm's way. However, the silt has gradually shifted towards the western coast of Scotland and has polluted many islands with its radiation. Some of the radioactive silt has even been found in Greenland, Norway and part of the northern tip of Ireland. The report of an all-party select committee looking into the UK's nuclear industry, published in 1986, stated that Sellafield produces the largest recorded source of radioactive discharge in the world.

Here are some addresses to write to for further information:-

Marine Conservation Society

9 Gloucester Road Ross-on-Wye Herefordshire HR9 5BU

Tel: 01989 566017

Marine Information and Advisory Service

Southampton Oceanography Centre, Empress Dock Southampton SO14 3ZH

Tel: 01703 595000

Surfers Against Sewage Ltd

The Old Counthouse Warehouse, Wheal Kitty St Agnes, Cornwall TR5 0RE

Tel: 01872 553001

Further information produced by YPTENC on sea pollution can be found in the topic sheets 'Oil pollution case study - The Sea Empress' and 'Pollution'

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