

Beachwatch 2008



© ANNA CARTER

Ferring Beachwatch Group • 21st September 2008

MCS Campaign for clean seas and beaches

The overarching aim of the Campaign for Clean Seas and Beaches is to see a substantial, measurable and permanent decrease in the amount of litter in our seas and on our beaches. We have set an initial challenge of halving the amount of litter on UK beaches by 2015; ultimately we want to see zero litter on UK beaches!

Achieving these aims will take concerted action on the part of government, retailers, industry, manufacturers and the general public. Although solving the problem of marine litter may seem almost insurmountable, MCS believes that by breaking this problem down into smaller, achievable goals we will see a change, not only in the quantities of litter on our beaches, but also in the attitudes and commitment of all those involved in bringing about such a change.

The first action required to solve any problem is to determine its extent. We believe that we have already achieved this vital step. Thanks to the hard work and dedication of thousands of volunteers, MCS has been monitoring the amount of litter on UK beaches through its Beachwatch and Adopt-a-Beach programmes for over 16 years. In that time we have seen a dramatic increase in the amount of litter recorded – a 110% increase compared to 1994 figures. The amount of plastic litter in the same period has increased by a staggering 146%.

As a small charity MCS is not able to tackle this problem alone. It is now time for others to start considering

the problem and helping us in our fight against the growing tide of litter. Therefore our first call is for all UK Governments to formulate a marine litter strategy to combat this form of pollution.

At present there is also no lead body in England, Wales, Scotland or Northern Ireland responsible for dealing with marine litter. We believe that it is imperative that one body within each UK country take on the responsibility for dealing with and preventing marine litter from all sources. Since our seas do not recognise political boundaries it is vital that lead agencies, once identified, work closely together.

A similar approach has been taken in the United States through the enactment of the Marine Debris Research, Prevention and Reduction Act. The U.S. Commission on Ocean Policy recognized marine debris as one of the major threats to the nation's marine resources and to human health and safety along the coasts. The act tasks the National Oceanic and Atmospheric Administration (NOAA) and the United States Coast Guard (USCG) to take on these responsibilities. The act also provides for funds to be made available, for a special programme to reduce fishing litter and for more public education campaigns and community programmes.

MCS calls for action

Litter in the marine environment comes from several distinct but different sources. Simultaneous action therefore needs to be taken in areas as diverse as shipping, fishing, public littering and waste-water treatment, so that litter inputs to the marine environment can be effectively reduced. It is essential that any plans be taken forward in a co-ordinated way through national marine litter strategies. A vital first part of these strategies should be to task Government agencies with the responsibility for dealing with marine litter. Additionally, the strategies should consider implementation of the sort of actions suggested below:

MCS calls on Governments to:

- Formulate a coherent marine litter strategy.
- Appoint a lead body to implement this strategy.
- Work with signatory countries to ensure the statutory enforcement of waste reduction measures under the OSPAR and MARPOL Conventions.
- Invest in enforcement of domestic legislation covering the proper disposal and clearance of litter from land and aquatic environments.
- Extend existing Port Waste Reception Facilities to include fishing vessels.
- Properly enforce current legislation for the protection and progressive improvement of the aquatic environment, and ensure polluters pay costs that truly reflect the damage they cause.

MCS calls on Industry to:

- Improve water treatment storage capacity and combined sewer overflows to reduce the discharge of untreated sewage and sewage related litter to rivers and the sea during heavy rainfall.
- Appropriately label all bathroom and sanitary products, particularly those that contain plastic, as non-flushable.
- Tighten packing, transport and shipping procedures to reduce the loss of plastic pellets to the marine environment.

MCS calls on everyone to:

- Reduce their use of plastic packaging, and reuse and recycle wherever possible. First steps can be as simple as avoiding plastic shopping bags, bottled drinking water and over packaged goods.
- Take responsibility for safe disposal of all litter items whether at home, work or on holiday, using bins provided, and not flushing plastic products.
- Support clean up schemes to remove litter from the environment before it reaches the sea.



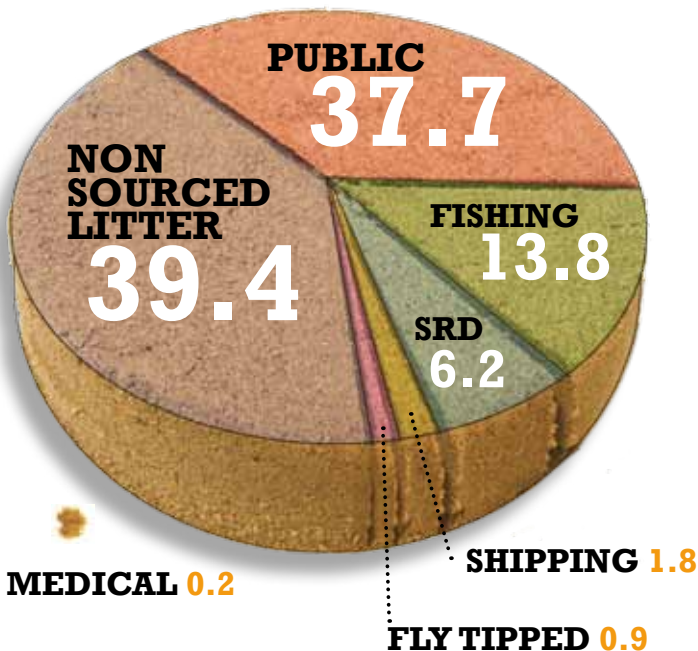
The Evidence

The United Nations Environment Programme states that 'Marine litter poses a dire, vast and growing threat to the marine and coastal environment.' If no action is taken litter will continue to accumulate and increase in the marine environment and on our beaches. This will affect wildlife, ecosystems, the tourism and fishing industries and the UK taxpayer.

Despite increasing legislation aimed at preventing the dumping of litter at sea such as the MARPOL convention and the Port Waste Reception Facilities regulations, together with increasing public awareness of waste and recycling, quantities of litter on UK beaches have shown no appreciable decrease over the last 16 years. Average litter densities on UK beaches are now over 2,000 litter items/km surveyed.

Litter enters the marine environment and is deposited on beaches from a variety of sources, including direct littering on land, lost or discarded fishing gear from fishing vessels, illegal dumping by ships and small marine craft and discharges from sewage works or combined sewer overflows (CSOs). Rivers and streams can also carry litter into coastal waters, so littering in urban areas can make a significant contribution to marine litter.

WHERE DOES IT ALL COME FROM?



ALUN AP RHISIART

Cotton bud sticks are one of the most common items of Sewage Related Debris on UK beaches.

Identification of the sources of litter is vital to ensure that preventative measures are directed effectively. The proportion of litter on an individual beach that can be attributed to different sources varies according to local inputs. However, large amounts of litter carried by prevailing winds and currents can affect even beaches that are remote from direct inputs.

Lost or discarded fishing gear is one of the most hazardous forms of litter for wildlife through entanglement and ingestion, and also poses a threat to fishermen and other seafarers through fouling of active fishing gear and ship propellers.

The incidences of deliberate dumping of shipboard waste are unfortunately unknown. However, the amount of waste attributable to shipping does not seem to have changed appreciably since the introduction of the MARPOL regulations and there have been only 3 UK prosecutions for illegal dumping of waste at sea.

The occurrence of sewage related debris (SRD) on UK beaches is often the result of the UK public using the toilet as a 'wet bin' for everything used in the bathroom. An estimated 1.5 to 2 billion items of sanitary protection are flushed every year in the UK, in addition to 61-100 million condoms (National Bag It and Bin It Group, 1997). Many items flushed down the toilet will find their way onto our beaches through the sewage system particularly CSOs. This is an attitude not shared by many other European countries, consequently sanitary items are found in much lower numbers on other European beaches (Flanders Marine Institute, 2006).

Almost 60% of all the litter found during MCS Beachwatch 2008 could be attributed to a source. The remainder was classified as 'non sourced'.

Plastics

The increasing use of plastics for the manufacture of goods and packaging and increasing use of synthetic fishing nets has only exacerbated the problem of beach litter. Plastic items now make up the bulk of the litter found on MCS beach litter surveys and account for around 60% of all litter. The density of plastic litter found on UK beaches has increased by 146% since 1994 and small plastic pieces have been the number one item found in every Beachwatch survey since 1998.

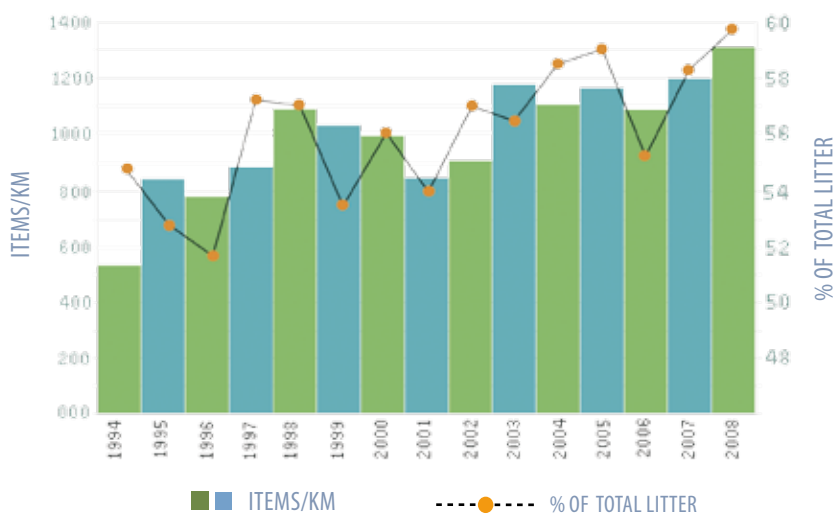
Some of the qualities that make plastic such a useful material e.g. its durability and light weight also make it a menace when disposed of in the marine environment and on beaches. Plastic litter can take hundreds if not thousands of years to break down and in fact may never fully degrade. It merely breaks down into smaller and smaller pieces and ultimately into microscopic plastic pieces or dust. This microscopic plastic may still pose a significant threat to wildlife. Laboratory studies have shown that amphipods, lugworms and barnacles kept in aquaria with microscopic plastic present will ingest the plastics within a few days (Thompson *et al*, 2004).



Plastics in the marine environment are broken and weathered by water and wave action and break down into smaller and smaller fragments.

Microscopic plastics have also been found in plankton samples and show a significant increase in abundance from the 1960s to the present day (Thompson *et al*, 2004). In Northumbrian sand samples, microscopic fibres (0.1 mm - several mm in length) were found in 100% of 45 samples collected, some with more than 10,000 fibres per litre of sand (Hoare and Thompson, 1997). Even beaches that seemed visually clean had up to 5,000 plastic fibres per litre of sand.

Billions of small plastic pellets are produced for use by the plastics manufacturing industry every year. Many of these end up in the oceans via effluent, accidental spills or from ship leakages (Ananthaswamy, 2000). These pellets are commonplace on many beaches around the UK, but their small size means they often go unnoticed.



Plastic pellets in the marine environment can carry two types of organic micropollutants. Firstly, plastic additives and their degraded products such as nonylphenols (an endocrine disruptor), and secondly pollutants adsorbed from seawater such as PCBs and DDEs (Takada *et al*, 2006). Pellets can concentrate PCBs and DDEs from seawater to levels up to a million times greater than in the surrounding seawater, posing a potential hazard for birds and fish which mistake the pellets for food such as fish eggs (Ananthaswamy, 2000). Ultimately, these pollutants may then be passed up the food chain to fish and to human consumers.

Results from MCS Beachwatch surveys since 1994 have shown the rise and rise of plastic as one of the major litter types on UK beaches.

Impacts on Wildlife

Entanglement

A variety of litter items can entangle marine species. Items such as fishing nets, fishing line, plastic bags, strapping bands and four/six-pack yokes can reduce movement and potentially result in serious injury, death by starvation, drowning or suffocation.

During the 2008 International Coastal Cleanup 99 birds, 197 fish, 122 invertebrates, 8 mammals, 10 reptiles and 7 amphibians were found entangled. Lost or discarded fishing gear including fishing line, nets, rope, lures, light sticks, and crab/lobster/fish traps were responsible for 62% of all entanglements (Ocean Conservancy, 2009).

At least 136 species of marine vertebrate and eight invertebrate species have been entangled in marine debris, including six of the seven marine turtle species, 11 cetacean species (whales and dolphins), 19 pin-niped species (seals and sea lions), 51 species of seabird and 34 fish species (Laist, 1997).

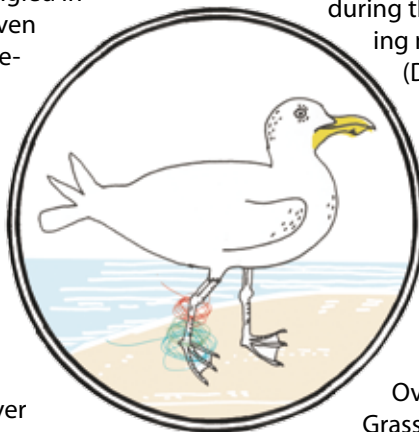
Discarded or lost fishing nets are a particular problem as they can continue 'ghost fishing' i.e. catching and killing fish and marine animals, long after the nets have been lost or discarded at sea or on the seabed. Over



PHILLIP BRANDWOOD

Once around its neck plastic yokes are almost impossible for a bird to remove.

200 dead salmon and 99 dead seabirds were counted during the retrieval of a 1,500-metre ghost fishing net south of the Aleutian Islands in 1978 (DeGange and Newby, 1980).



Seals, particularly young seals, are at risk of entanglement due to their curiosity, approaching objects such as can yokes and nets in the water and poking their heads through loops and holes; once around the seal it is difficult for it to get rid of the entangling debris.

Over 90% of the 30,000 gannet nests on Grassholm Island (in the Bristol Channel) now contain plastic (Bullock, pers. comm.). As gannets collect almost all of their nest material at sea this indicates the extent of plastic pollution in surrounding waters. Young gannets' feet can often become entangled, resulting in serious injuries, and each Autumn RSPB staff travel to the island to cut free birds entangled in netting and plastic. In 2008, 43 birds were cut free. At this time the young birds were still being fed by adults which would have shortly left the island, when this happened the entangled young would have starved to death if they had not been freed (Morgan, pers. comm.).

It is difficult to assess the true rate of entanglement caused to marine animals by litter as many animals that die as a result of entanglement may sink to the seafloor, or be consumed by predators before being found and only a minority of animals will be washed up on our shores. Therefore entanglement records represent an unknown proportion of all entanglements that occur and present a conservative estimate of the actual scale of the problem.



SALKODE WOLF - ECOMARE

Lost or discarded fishing gear pose a serious and long lasting threat to marine wildlife.

Ingestion

At least 177 marine species have ingested litter items and 111 of the world's 312 species of seabird are known to have accidentally eaten plastic. Ingestion of litter can cause physical damage and mechanical blockage of the oesophagus and digestive system, leading to internal infections, starvation and death (Laist, 1997).

Whole plastic bags, gallon drums and balloons are just some of the items that have been mistakenly identified as food and eaten by mammal, turtle and shark species. Turtles, particularly leatherback turtles, the most commonly seen turtles in UK waters, are prone to plastic bag ingestion, as these bags closely resemble jellyfish, their primary prey, when suspended in the water column. Studies around the world have shown that debris particularly plastic litter is being found in the majority of autopsied turtle stomachs (Bugoni *et al*, 2001 Balazs 1985; Tomas *et al.*, (2002).

A number of turtles, including the largest Leatherback ever recorded, have been found washed up on UK shores. Autopsies showed that they had litter in their guts. One Leatherback found in Galloway had 1 white plastic bag, 1 black plastic bin liner, 3 transparent plastic bags, 1 green plastic bag, and 1 transparent plastic bag for chicken meat packaged by a US company in its stomach.

Litter also causes problems for marine mammals; in 2004 a dead Cuvier's Beaked whale was found washed ashore on the west coast of the Isle of Mull, Scotland. Cuvier's beaked whales are rarely seen in coastal waters, as they are predominantly a deep-water species. A large amount of corded and knotted black sheet plastic was found in its small intestine (HWDT pers. comm.).



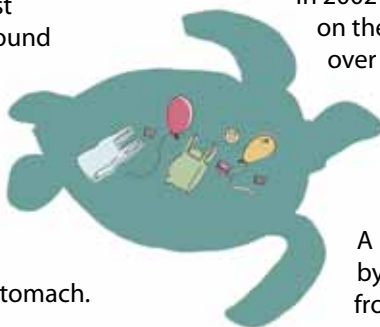
ANDRES ESTRADES/KARUMBE PHOTO BANK

Leatherback turtles are physiologically adapted to ingest slippery jellyfish - the backward pointing spines in their digestive tract make it impossible for them to get rid of plastics once swallowed.



OWEN ELIAS - MARPHOTOGRAPHICS

The impacts of marine litter are not only felt by marine wildlife.



In 2002 a small Minke whale (4m) washed up on the Normandy coast. The autopsy found over 800g (wet weight) of plastic bags and packaging in its stomach, including an English foil crisp wrapper and two English supermarket plastic bags (GECC, 2002).

A large adult grey seal, rescued in 2004 by British Divers for Marine Life Rescue from a beach in Kent died whilst receiving treatment at an RSPCA hospital. The post mortem revealed the seal had swallowed a plastic sea angling line splitter, which had lacerated the seal's gut and prevented it from feeding.

Seabirds can confuse small plastic pellets and pieces with fish eggs, plankton or other food and will often feed plastics to their chicks. The birds most susceptible to ingestion of plastic particles are surface-feeders (albatrosses, shearwaters, petrels, gulls) and plankton-feeders (auklets, puffins) (Day, 1985). The majority of debris found in the stomachs of Laysan Albatross chicks on Midway Island is plastic fed to them instead of food by the parent birds.

Research into the stomach contents of dead Fulmars from the North Sea has been carried out since 1979. From this work an Ecological Quality Objective (EcoQO) for the North Sea has been suggested: "There should be less than 10% of Northern Fulmars having 0.1 gram or more plastic in the stomach in samples of 50-100 beach washed fulmars from each of 5 different regions of the North Sea over a period of at least 5 years".

Averaged for the whole North Sea, 94% of bird's stomachs contain plastic; comprising, on average, 34 pieces and weighing 0.30g, and 55% of all birds exceed the EcoQO level of 0.1g of plastic in the stomach (Van Franeker *et al.* 2008).



Socio-Economic costs

Coastal communities, many of which rely on the marine environment for their livelihood (through tourism, fishing and recreational water sports), continue to pay the price for marine and coastal litter. Revenue is lost through spoilt fish catches and damage to property. Sewage related debris on beaches can have adverse effects on tourism, and the cost of repeated beach cleaning operations runs into millions of pounds annually.

Local authorities, and ultimately local taxpayers, bear the huge financial burden of clearing litter from UK beaches. In a survey of 56 coastal Local Authorities the total cost of beach cleaning was reported to be just under £2 million for England, Scotland and Wales (KIMO, 2000). As this does not represent the total number of local authorities it is likely that the total cost to the UK is greater than £2 million.

The fishing industry suffers lost earnings due to contamination of catches by litter, and damage to fishing gear. Fouled propellers and pierced hulls caused by litter can also endanger human life if vessels cannot be operated.

Summary

Beach and marine litter would seem on the surface to be an easily preventable problem. All litter is a result of either accidental loss or, more often than not, deliberate littering. However, one of the main stumbling blocks to effectively preventing marine litter is that this form of pollution comes from so many different sources e.g. the public, fishing, shipping and the sewerage systems. Each of these categories of litter requires a different set of actions to be enacted in order to put appropriate controls in place. This kind of coordinated and concerted action can only really be effective if a lead is given by National Governments. Industry, retailers, and the general public must all then play a part to ensure that we can finally turn the tide on marine litter.

References

- Ananthaswamy, A. (2000).** *Junk Food - a diet of plastic pellets plays havoc with animals' immunity.* New Scientist, 20/01/01.
- Balazs, G.H. (1985).** *Impact of ocean debris on marine turtles: Entanglement and ingestion.* Pp. 387-429 in Shomura, R.S., and H.O. Yoshida (Eds.), Proceedings of the Workshop on the Fate and Impact of Marine Debris, November 27-29, 1984, Honolulu, HI. NOAA Tech. Mem. NOAA-TM-NMFS-SWFC-54. Department of Commerce, National Oceanic and Atmospheric Administration, National Marine Fisheries Service, Washington, DC. .
- Bugoni, L., Krause, L., Petry, M.V. (2001).** *Marine debris and human impacts on sea turtles in Southern Brazil.* Marine Pollution Bulletin 42: 13330-1334.
- DeGange, A.R. and Newby, T.C. (1980).** *Mortality of seabirds and fish in a lost salmon driftnet.* Marine Pollution Bulletin 11: 322-323
- Environment Agency, 2002.** *The Impacts of Marine Litter.* Marine Pollution Monitoring Management Group. Report of the Marine Litter Task Team (MaLiTT) May 2002. <http://www.marlab.ac.uk/FRS.Web/Uploads/Documents/Impacts%20of%20Marine%20Litter.pdf>.
- GECC - Groupe d'Etude des Cétacés du Cotentin (2002).** <http://perso.wanadoo.fr/gecc>
- Hoare, C., and Thompson, R.C. (1997).** *Microscopic plastic: a shore thing.* Marine Conservation 3 (11):4.
- KIMO, 2000.** *Impacts of Marine Debris and Oil : Economic and Social costs to Coastal Communities.* KIMO, Shetland.
- Laist, D.W. (1997).** *Impacts of Marine Debris: Entanglement of marine life in marine debris including a comprehensive list of species with entanglement and ingestion records.* In Coe, J. and Rogers, D.B. (Eds.) *Marine Debris: Sources, Impacts and Solutions.* Springer Series on Environmental Management.
- Ocean Conservancy (2009).** *A Rising Tide Of Ocean Debris and What We Can Do About It.* International Coastal Cleanup Results 2008. The Ocean Conservancy.
- Takada H, Mato Y, Endo S, Yamashita R, Zakaria M (2006).** *Pellet Watch: Global monitoring of persistent organic pollutants using beached plastic resin pellets.*
- Thompson, R.C., Olsen, Y., Mitchell, R.P., Davis, A., Rowland, S.J., John, A.W.G., McGonigle, D. and Russell, A.E. (2004).** *Lost at sea: Where does all the plastic go?* Science 304, 838.
- Tomas, J., Guitart, R., Mateo, R., Raga, J.A. (2002).** *Marine debris ingestion in loggerhead sea turtles, Caretta caretta, from the Western Mediterranean.* Marine Pollution Bulletin 44: 211-216.
- Van Franeker, J.A. and S.N.S. Fulmar Study Group (2008).** *Fulmar Litter EcoQO Monitoring in the North Sea - results to 2006* Wageningen IMARES Report No. C033/08, IMARES Texel, 53 pp

© Marine Conservation Society, 2009
Prepared by Dr Sue Kinsey • Pollution Programme Manager

MARINE CONSERVATION SOCIETY

Unit 3, Wolf Business Park
Alton Road
Ross on Wye
HR9 5NB

Tel: 01989 566017
Fax: 01989 567815
e-mail: info@mcsuk.org

MCS IN SCOTLAND

3 Coates Place
Edinburgh
EH3 7AA

Tel: 0131 2266360
Fax: 0131 2262391
e-mail: scotland@mcsuk.org



www.mcsuk.org

Working for our seas, shores and wildlife.
Now and for future generations.

President HRH The Prince of Wales

Registered charity no (England & Wales): 1004005
Registered charity no (Scotland): SC037480
Company Limited by guarantee no. 2550966
Registered in England VAT no. 489 1505 17