

Management of Marine Litter data in the UK

1. Background

The Marine Strategy Framework Directive (MSFD) requires member states to manage their seas to achieve Good Environmental Status (GES) by 2020. MSFD Descriptor 10 requires litter to be at levels where the *'properties and quantities of marine litter do not cause harm to the coastal and marine environments'*. The Marine Strategy Coordination Group report (MSCG/10/2013/5rev) recommends that *'Data and information, resulting from the monitoring programmes, should be made available for interoperable use, and feed into the "Marine Knowledge 2020" process'*.

The UK initial assessment for the MSFD (<http://cdr.eionet.europa.eu/gb/eu/msfd8910>), which was based on the "Charting Progress 2" report, was not able to provide an assessment of marine litter and its impacts because of "a limited understanding of current levels, properties and impacts of marine litter. As such marine litter experts were unable to propose quantitative targets indicating the point at which GES would be achieved. Instead a trend based target for litter on coastlines has been developed which requires an absolute reduction in visible litter items on coastlines within specific categories".

MSFD Descriptor 10:

MSFD criteria and indicators require understanding and monitoring of:

- The characteristics of litter in the marine and coastal environment – including:
 - Trends in the amount of litter washed ashore and/or deposited on coastlines, including analysis of its composition, spatial distribution and, where possible, source (10.1.1)
 - Trends in the amount of litter in the water column (including floating at the surface) and deposited on the sea- floor, including analysis of its composition, spatial distribution and, where possible, source (10.1.2)
 - Trends in the amount, distribution and, where possible, composition of micro-particles (in particular micro- plastics)
- The impacts of litter on marine life – trends in the amount and composition of litter ingested by marine animals

2. Aims

The aim of this paper is to provide a summary of the current status of marine litter data management in the UK, to enable MEDIN to assess whether:

- current protocols, data collection and data management regimes are fit for purpose (satisfactory and secure), and whether the data guidelines need modifying
- a high level of national (UK) coordination for litter data collection and management is required, and if so, what MEDIN can contribute

There is also a need to establish a process for publishing metadata to MEDIN.

3. Current arrangements

In the UK there has been a concerted effort to coordinate UK monitoring programmes with those of other States sharing the North East Atlantic. This has been done both through OSPAR (primarily the Intersessional Correspondence Group on Marine Litter), and through the EU Technical Sub-Group on Marine Litter.

The following sections outline some of the national, European and international organisations and initiatives involved in marine litter data and information management. The list is not exhaustive, but covers the main data collection activities that have generated marine litter data sets.

3.1 UK initiatives

Centre for Fisheries and Aquatic Science (Cefas)

Cefas have been collecting and cataloguing marine litter data since 1992. Offshore and benthic marine litter data are collected and held, through an addendum to the fisheries data collection protocols and formats. They also have data on microplastics (floating, biota, sediment and sewage) mostly resulting from discrete projects (e.g. MICRO) rather than monitoring programmes.

Marine Scotland Science (MSS)

Litter data are collected throughout the year from International Bottom Trawl Survey (IBTS) research cruises. MSS also began a 3 year microplastics project in April 2013 to assess where future monitoring may need to take place. MSS are the only group who are making metadata records for marine litter data available to the MEDIN portal.

Marine Scotland have established the Scottish Microplastics Research Group to co-ordinate the research activity between groups working within this field, including method development, sampling strategies & locations and quality control. By doing this, all data produced will be suitable for submission under the relevant legislative frameworks (e.g. the EU Marine Strategy Framework Directive (MSFD)).

Department of Environment Northern Ireland (DOENI)

Fish stock and scientific survey data (collected in spring and autumn) has formed the basis of benthic litter monitoring programmes. Data has been collected annually for approximately the last 4 years.

Agri-Food and Biosciences institute (AFBI)

AFBI have collected seabed litter data twice a year from 65 stations for approximately the last 4yrs. They hold a large archive of plankton samples and are interested in outcome of SAHFOS research into use of archived samples for assessing microplastic contamination.

The Sir Alister Hardy Foundation for Ocean Science (SAHFOS)

A North Atlantic basin-scale plankton monitoring programme, has regularly identified and enumerated microplastic on its plankton samples since the early 2000s. Research is currently being carried out to assess how much is from the environment, and how much is from contamination before the samples were taken. They have a large archive of historical samples that could potentially be analysed for historical microplastic contamination.

Marine Biological Station Millport/Glasgow University

The Station runs research projects on microplastics.

Marine Conservation Society (MCS)

MCS collect and manage beach litter data for England, Wales, Scotland, the Channel Islands and to a lesser extent Northern Ireland and the Isle of Man. They hold approximately 20 years' worth of beach litter monitoring data, with 300 - 400 beaches taking part each year. Defra has commissioned MCS to do surveys four times a year at 10-12 beaches to fulfil the requirements of MSFD monitoring for three years (starting September 2015).

MCS launched the Marine Litter Action Network (MLAN) in June 2014 in Birmingham, which included a session on microplastics.

Keep Northern Ireland Beautiful

A survey of litter on 14 reference beaches took place between September 2012 and January 2015, totalling 10 surveys. Keep Northern Ireland Beautiful submit all marine litter data to DOE who submit to MCS as UK clearing authority for OSPAR.

Surfers Against Sewage (SAS)

SAS runs hundreds of beach cleans across the UK every year and, starting in 2015, plan to submit data from beach cleans to DEFRA. Their survey is being done using the EEA litter app. Defra has not requested this information, but SAS are proactively sending the data.

DEFRA & IMARES

Monitoring in the North Sea UK locations has been commissioned by DEFRA to IMARES in the Netherlands since 2008 and reports have been provided on levels and trends up to year 2012. The project looks at processing UK fulmars data in order to monitor the quantities of plastic present in their stomachs. Within the current project, this dataset will be updated for years 2013, 2014 and 2015 for at least the standard locations Shetland, Orkney and East England.

DEFRA, CEFAS and the University of Plymouth:

There are several projects that have been instigated to look into the distribution and quantities, effects and input ways of microplastics. However, they are investigative case studies, and therefore no database exists yet.

DEFRA and the Institute of Zoology

The presence of any plastic ingested by cetaceans is being recorded as part of the UK Cetacean Strandings Investigation Programme (CSIP), to characterise whether plastic ingestion is a problem in marine mammals.

CEFAS and DEFRA

A 1yr project on microplastics in sewage sludge, effluents and sediments ended in March 2014

3.2 EU initiatives

The OSPAR EcoQO Fulmar Programme

This programme forms the basis of the proposed surveillance indicator for marine litter in the water column.

Institute for Marine Resources and Ecosystems (IMARES)

The Institute, associated with the University of Wageningen, is carrying out work on the impacts of litter on marine life.

The European Environment Agency (EEA)

The EEA runs Marine Litter Watch (http://www.eea.europa.eu/themes/coast_sea/marine-litterwatch) The European Environment Agency developed Marine Litter Watch, which combines citizen engagement and modern technology to help tackle marine litter. Marine Litter Watch offers tools – a mobile app, a web portal and a public database - to collect and share comparable data on marine litter on beaches.

The Interreg MICRO project

The MICRO project ran from July 2012 to September 2014 and involved five scientific institutes studying the occurrence and impact of microplastics in the Interreg 2 Seas area and the Channel region.

EMODnet Human Activities

This initiative started in 2013 and aims to make available information on the geographical position, spatial extent and attributes of a wide array of marine and maritime human activities throughout Europe. Users can view, query, and download datasets or subsets of them, via web GIS. Metadata are also available for download. The portal doesn't specify marine litter data in particular, but has a category for data from waste disposal activity (solids, including dredge material, dumped munitions, marine constructions).

The EU Technical Sub-Group on Marine Litter

This group was set up in 2010 and is looking to develop and agree suitable litter monitoring methods and standards. The EU Technical Subgroup 10 has produced a number of reports that also give overviews of activities on marine litter in Europe in the annexes:

- <http://ec.europa.eu/environment/marine/pdf/9-Task-Group-10.pdf>
- http://publications.jrc.ec.europa.eu/repository/bitstream/111111111/22826/2/msfd_ges_tsg_marine_litter_report_eur_25009_en_online_version.pdf
- <http://publications.jrc.ec.europa.eu/repository/bitstream/111111111/30681/1/lb-na-26113-en.pdf>
- <http://www.marlisco.eu>

3.3 International initiatives

ICES

ICES initiatives include:

- Development of marine litter data collection reporting in surveys;
- Collection of marine litter information in fisheries surveys in the Baltic Sea, the North Sea and other ecoregions
- Ongoing work on evaluation of the ecological impacts of marine litter on mortality (and sub-lethality) of plants and animals.

Ocean Conservancy

Established in 1972, this group deals with beach litter data through the International Coastal Cleanup (ICC), though their data may not be compatible with that of MCS and OSPAR - see <http://www.oceanconservancy.org/our-work/international-coastal-cleanup/> . Marine Conservation Society's annual Great British Beach Clean, which follows standard MCS methodology, is timed to coincide with the International Coastal Cleanup. MCS is responsible for submitting data to this initiative on behalf of the UK.

G7

There is a G7 marine litter action plan for developing countries. The plan is heavily based on the OSPAR Regional Action Plan to tackle marine litter, and lays out priority actions to address land based sources, sea based sources, removal actions and education. The plan recognises that in order to tackle marine litter globally, international development assistance and investment needs to be utilised, along with economic incentives and market-based instruments. It is hoped that that these commitments will lead to better waste management in developing countries that are currently a significant source of marine litter globally.

There is a priority action to reduce single use plastic items, which always feature in top 10 lists of marine litter found on beaches worldwide.

3.4 Data Management systems for marine litter data/information

Existing systems for management of marine litter data and information include:

Continuous Plankton Recorder (CPR) Database

SAHFOS microplastics data are integrated into the CPR database managed by SAHFOS and are freely available to individual researchers. The database is partly funded by DEFRA.

European Marine Ecosystem Observatory (EMECO)

EMECO has developed a suite of web-based tools that enable rapid integration and visualisation of multi-platform, multi-parameter, and multi-national data. CEFAS offshore and benthic marine litter data are currently being passed to EMECO for collation and publication.

OSPAR Ecological Quality Objectives (EcoQO) database

The EcoQO database includes data on plastic particles in the stomachs of seabirds, and mercury and organohalogens in seabird eggs. The EcoQO on fulmars is a common indicator across the Greater North Sea area. DEFRA/IMARES fulmar data are reported to OSPAR.

MCS/OSPAR European beach litter monitoring databases

Designated Member State users are able to input data directly, and extract data. The general public is able to access data signed off by OSPAR. The OSPAR beach litter monitoring programme has already been identified as a common indicator across the OSPAR Region. The data is being used to form the intermediate assessment for 2017.

ICES

ICES has developed two databases, one under DATRAS to capture marine litter data from fisheries surveys and one under DOME to collect the marine litter data from environmental surveys.

MCS and Keep Britain Tidy

MCS and Keep Britain Tidy have marine litter metadata records held in UKDMOS but the information may not be up to date.