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Title	MEDIN data guideline for the recording of offshore litter data
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Summary	This guideline defines good practice for recording offshore litter data for assessments
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Change history		
Version	Date	Change
1.0	08/12/09	First draft of document
1.1	18/01/10	First comments received by MEDIN standards Group
2.0	12/03/10	Comments incorporated by Clean Safe Seas Evidence Group
3.0	05/05/2010	Amended to fit into new structure
3.1	15/07/2010	Minor edits following changes to common tables and specification of .csv format for transfer of data

1.1. Background

The Marine Environmental Data and Information Network (MEDIN) is working towards creating a framework of consistent standards covering the major types of data collection undertaken in the marine environment around the UK. The principle benefits of this suite of standards are:

- Allows contracting organisations to easily specify a format that data should be returned in that can be readily used and includes all relevant attributes
- Provides a consistent format for organisations to work to (rather than a different format for each contract) thus improving assessment and interoperability
- Data can be readily exported to Data Archiving Centres and other users
- Instills good practice amongst users

Each standard defines the data and information that must be stored with a particular data type to ensure it can be readily used and reused. As this type of information is specific for different data types, guidelines are developed for each type. This document describes one such format. Other standards can be accessed through www.oceannet.org.

1.2. Scope

This guideline covers the recording of offshore litter data collected by fishing trawl or identified by cameras deployed from a benthic sledge referred to as trawl and tow respectively. It is recognized that the UK does not currently have dedicated monitoring programmes to specifically trawl for or record offshore litter data at present. This guideline is therefore designed for recording litter data which has been identified as a byproduct of the main purpose of survey such as biotope identification by benthic sledge or trawling for fish. Therefore many of the data and information specified in this guideline are collected routinely as part of the main purpose of survey.

1.3. Using this data guideline

This guideline is split into sections that refers to information that can be collated at different levels. Information that is likely to be the same for all samples (e.g. ship used, datums used) is collated in the 'Survey Information' table. Information that is common to each station is collected in the 'Trawl and Tow Information'. Tables that are common across MEDIN data guidelines can be downloaded from www.oceannet.org/standards. Sections that are specific to recording offshore litter data are specified below.

The tables below outline the data fields, a description and where available a term list and/or format given at the end of each field which should be used to store the data. Each field is either mandatory, conditional or optional as indicated by M, C or O respectively. In the absence of an existing spreadsheet or database to hold the below information, it is recommended that the template available to download from the [MEDIN website](#) is used. Instructions are provided in the template.

To submit this data to a Data Archive Centre the data must be saved and transferred in the .csv file format.

1.4. Further information on the SeaDataNet, ICES and EPSG term lists

The available catalogues of term lists used for this MEDIN data guideline are provided primarily by SeaDataNet, the International Council for the Sea (ICES) and EPSG. If a term is not available in a recommended list then please contact MEDIN to arrange for the term to be added.

The SeaDataNet list may be viewed at http://seadatanet.maris2.nl/v_bodc_vocab/welcome.aspx . By clicking on the list any term may be searched for by using the drop-down menus or all terms viewed by clicking search. The terms may be viewed in groups of 15 or may be downloaded into an excel file.

The ICES term lists are available at <http://www.ices.dk/datacentre/reco/> Select which list you require from the 'Reference Code List' drop-down box. The results are shown for the selected list and may be downloaded into MS Excel by selecting the inverted green arrow.

There are a number of ways of describing a spatial dataset. Common horizontal coordinate reference systems include WGS84 and British National Grid. Common vertical coordinate reference systems include Highest Astronomical Tide and Ordnance Datum Newlyn (ODN). It is important that which coordinate reference system used for a data set is recorded so conversions can be carried out between reference systems. The EPSG database of coordinate reference systems (<http://www.epsg.org/Geodetic.html>) provides a dictionary of reference systems. In brief, to find a code click on the OGP Online Registry and if you know the title (eg WGS84) then type this in the 'Name' field and click search. The name, code and further information is displayed. If you are looking for a specific type of reference system such as 'vertical' then click in the 'Type' box, hover over coordinate reference system and click on vertical and then click the search button and all recorded vertical reference systems are shown. If you want to search for a reference system in a particular part of the world (e.g. Northern Ireland Grid) the you may do so by submitting a term to the 'Area' box or fill out the lat and longs then click search. The website also provides a database of the reference systems and web services to access the information.

1.5. Relationship between MEDIN data guidelines and MEDIN discovery metadata

The MEDIN discovery metadata format is aimed at allowing the non-informed user to discover data sets and it is likely that one 'discovery' data set record will contain a large range of data types that are in turn covered by a range of data guidelines. To enable individuals to reuse data of a specific nature (e.g. benthic invertebrate data) then related information must be collected (e.g. data owner, reference systems used etc). Some of the information which is collected at the Survey Level in a data guideline is also required to create a discovery metadata record. Who creates the MEDIN discovery record for a dataset is case specific and dependant on the organisation, and the relationship it has with a Data Archive Centre. However it is intended that the information collected at the 'Survey Information' level is reused for creating a MEDIN discovery metadata record.

2.1. Project Information.

If your collection of data forms part of a wider project or time series then the below details must be recorded.

M, C, O indicate which fields are mandatory, conditional or optional.

Heading	M, C, O	Description	Recommended Term List or Format
Project name	M	The nationally/internationally accepted version of the project name	Free text; (e.g. Rapid Climate Change)
Project website	C	If a Project website exists give the address	e.g. (http://www.noc.soton.ac.uk/rapid/rapid.php)
Project start date	M	The date that the project started	Date; yyyy-mm-dd; (e.g. 2001-01-24)
Project end date	C	The date that the project is due to finish	Date; yyyy-mm-dd; (e.g. 2007-01-24)
Project code	M	Provide a code to uniquely identify the project and allow links to be made between the tables.	Free text; (e.g. RCC)

2.2. Survey Information (Data Activity).

The survey information is a uniquely identifiable programme of data collection such as a research cruise or survey event. This information is likely to be the same for all sample events (e.g. stations) and subsamples in a given data set such as a cruise. Note that in the event that these are not common to all sample events then they should be specified for each one. These fields are common throughout many other MEDIN data guidelines and only need to be given once and referenced if your data set is composed of many data types and therefore conforms to a number of MEDIN Data Guidelines. Where data collection is undertaken on research vessels the data below can often be sourced in the Cruise Summary Report.

M, C, O indicate which fields are mandatory, optional or conditional respectively.

Heading	M, C, O	Description	Recommended Term List or Format
Survey name	M	Title of the survey	Free text; (e.g. Menai Straight Benthic Survey 2004)
Survey description	M	Brief description of the purpose of the survey and other types of measurements that were made for the survey.	Free Text
Survey code	M	A unique code for the survey to allow links to be built between this and sample event data (the cruise identifier code could be used)	Free text; (e.g. JCR3022)
Responsible organisation	M	Organisation who has funded the work	Term List; European Directory of Marine Organisations (e.g. 28: Centre for Environment, Fisheries and Aquaculture Science, Lowestoft Laboratory)
Survey start date	M	The date and time that the survey started.	Date or DateTime; yyyy-mm-dd or yyyy-mm-dd hh:mm:ss (e.g. 2009-01-24 12:33:00)
Survey end date	M	The date and time that the survey ended.	Date or DateTime; yyyy-mm-dd or yyyy-mm-dd hh:mm:ss (e.g. 2009-02-16 16:33:00)
Spatial coordinate reference system	M	Describes the system of spatial referencing. I.e. the datum used to provide details of latitude and longitude.	Term List; http://www.epsg.org/Geodetic.html (e.g. WGS84 is EPSG::7030)
Position fix	M	Give the method and source of the position	Free Text; (e.g. Differential GPS taken from

method and source		fix instrument.	the ships navigation equipment.
Horizontal positional accuracy	M	How accurate the spatial positions are likely to be	Number; units = meters (e.g. 15)
Depth coordinate reference system	C	Give the reference to which the depth has been calculated e.g. Highest astronomical tide. Mandatory if seabed depths are given for each sample.	Term List http://www.epsg.org/Geodetic.html (e.g. ODN is EPSG::5701)
Vertical positional accuracy	C	How accurate the vertical resolution is. Must be provided if seabed depths are given.	Number; units = meters (e.g. 0.5)
Platform type	O	The platform type (e.g. Research Vessel) from which the sampling device was deployed.	Term list SeadataNet Platform Classes (L061) (e.g. 31)
Ship name	O	The name of the ship from which the sampling device was deployed.	Term list SHIPC at http://www.ices.dk/datacentre/reco/ (e.g. 74LG Lough Foyle)
Cruise report reference	O	Cruise report reference if applicable.	Free text; in reference format. e.g. Litt, E.J. 2009. PHiXT 4. 30 July to 2 August 2009 <i>RV Prince Madog</i> POL Coastal Observatory Liverpool Bay Cruise Report. POL Coastal Observatory, Liverpool.
Project code	M	State the code of the project given in the project table to allow links to be made between the tables.	Free text; (e.g. RCC)

2.3. Fixed Station Information.

In many cases a fixed point, transect or area is returned to on a number of occasions to form a time series. The actual sample event may not be in exactly the same location each time however due to ship movements or sampling strategy, however it is useful to record both the position which is intended to be sampled (fixed) and the actual sampling position (sample).

Therefore, the information below must be included if a fixed point, transect or area is used as the basis for replicate profiles or for repeat monitoring surveys. Actual profile coordinates should be placed in the sample event table. A fixed station may be a point, transect, or an area. If the fixed station is a transect or an area then the secondary latitude and longitude fields must be completed.

Heading	M, C, O	Description	Recommended Term List or Format
Local station identifier	M	A unique identifier for the station	Free text. e.g. Stanton Bank site 4 (point) e.g. Liverpool/Dublin transect (transect) e.g. Lagan Estuary (area)
Primary Latitude (decimal degrees)	M	The primary latitude of the fixed station given in decimal degrees. For a point this field is set to the point latitude; for a transect it is set to the latitude of the start of the transect; for an area it is set to the southern edge of the box. Units are positive north.	Decimal degrees; minimum of two and a maximum of five decimal places. e.g. 54.5837
Primary Longitude (decimal degrees)	M	The primary longitude of the sample given in decimal degrees. For a point this field is set to the point longitude; for a transect it is set to the longitude of the start of the transect; for an area it is set to the western edge of the box. Units are positive east (West is negative, East is positive).	Decimal degrees; minimum of two and a maximum of five decimal places. e.g. -5.5837
Secondary Latitude (decimal degrees)	C	The secondary latitude of the fixed station given in decimal degrees. For a point this field is not required; for a transect it is set to the latitude of the end of the transect; for an area it is set to the northern edge of the box. Units are positive north.	Decimal degrees; minimum of two and a maximum of five decimal places. e.g. 55.7393

Secondary Longitude (decimal degrees)	C	The secondary longitude of the sample given in decimal degrees. For a point this field is not required; for a transect it is set to the longitude of the end of the transect; for an area it is set to the eastern edge of the box. Units are positive east (West is negative, East is positive).	Decimal degrees; minimum of two and a maximum of five decimal places. e.g. -3.7394
Description of fixed station spatial form	M	Describe if the fixed station is a point, transect or an area.	Term list; <u>SeadataNet Geospatial Feature Type (L021)</u> (e.g. point)

2.4. Trawl or Tow Information (Sample Event). This table holds information on the location depth and time of each trawl or tow.

Heading	M, C, O	Description	Recommended Term List or Format
Local station identifier	M	A unique identifier for the station under consideration.	Free text; (e.g. Stanton Bank site 4 e.g. PS74926:
Trawl or tow identifier	M	A unique identifier for the trawl or tow under Consideration at each station. If replicates tows are made at each station this information should be recorded here.	Free text; (e.g. SB4_A)
Start latitude of trawl/tow given in original recorded format	M	The start latitude of the trawl/tow given in whichever format was used to record at the time of sampling. Units are positive north. The latitude should be given at which it is estimated the trawl/tow reached the required depth or seabed.	Free text; (e.g. 50°47'24")
Start longitude of trawl/tow given in original recorded format	M	The start longitude of the sample given in whichever format was used to record at the time of sampling. Units are positive east. The longitude should be given at which it is estimated the trawl/tow reached the required depth or seabed.	Free Text; (e.g. -4°21'53")
Start latitude of trawl/tow (decimal degrees)	O	The start latitude of the trawl/tow given in decimal degrees. Units are positive north. 5 decimal places is recommended.	Decimal degrees; minimum of four and a maximum of seven decimal places. (e.g. 54.5837)
Start longitude of trawl/tow	O	The start longitude of the trawl/tow given in decimal degrees. Units are positive east. 5 decimal places is recommended.	Decimal degrees; minimum of four and a maximum of seven decimal places. (e.g. -3.4764)

(decimal degrees)			
Start Date and time	M	The date and time of that the trawl/tow started (from the time it reached the required depth or seabed).	Date or DateTime ; yyyy-mm-dd or yyyy-mm-dd hh:mm:ss (e.g. 2009-01-24 13:33:00)
Start Depth	M	The depth that the trawl/tow started.	Number; units = meters (e.g. 15)
End latitude of trawl/tow given in original recorded format	M	The end latitude of the trawl/tow given in whichever format was used to record at the time of sampling. Units are positive north. The latitude should be given at which it is estimated the trawl/tow was raised from the required depth or seabed.	Free text; (e.g. 50°47'24")
End longitude of trawl/tow given in original recorded format	M	The end longitude of the sample given in whichever format was used to record at the time of sampling. Units are positive east. The longitude should be given at which it is estimated the trawl/tow was raised from the required depth or seabed.	Free text; (e.g. -4°21'53")
End latitude of trawl/tow (decimal degrees)	O	The start latitude of the trawl/tow given in decimal degrees. Units are positive north. 5 decimal places is recommended.	Decimal degrees; minimum of four and a maximum of seven decimal places. (e.g. 54.5837)
End longitude of trawl/tow (decimal degrees)	O	The start longitude of the trawl/tow given in decimal degrees. Units are positive east. 5 decimal places is recommended.	Decimal degrees; minimum of four and a maximum of seven decimal places. (e.g. -3.4764)
End date and time	M	The date and time of that the trawl/tow ended (from the time it was raised from the required depth or seabed).	Date or DateTime yyyy-mm-dd or yyyy-mm-dd hh:mm:ss (e.g. 2009-01-24 13:33:00)
End depth	M	The depth that the trawl/tow ended.	Number; units = meters (e.g. 15)
Current direction	M	Give the direction of the current in relation to the trawl/tow	Free Text; (e.g. 'Against', 'With' or 'Across')

Current velocity	M	The velocity of the current	Number; units = knots (e.g. 3.5)
Ship speed	C	The speed of the ship during the tow if a ship based trawl or dredge.	Number; units = knots (e.g. 3.5)
Tide state	C	Mandatory for beach based trawls or dredges, optional for ship based trawls.	(e.g. Low neap, high spring)
Tow shape	O	Shape of the tow track.	Free text; (e.g. Straight line or curve/loop)
Distance travelled	C	Total distance over ground between start and finish, specifying units (need to know this to calculate swept area for tows that are not a straight line)	Decimal; units = kilometres (e.g. 2.4)
Tow notes	O	Any further notes that may be of relevance.	Free text; (e.g. Due to heavy weather the tow was not a direct line between shoot and haul, Tow shape was a loop/straight/curved)

2.5. Sampling Method (Data Production Tools). If the information in this category is the same for all trawls within a data set the Survey Name must be stated to allow links to the sample information. If the sampling methods are different for each sample then the fields in this table should be appended to the sample information and be completed for each sample. Information in this table may also be used to complete fields in the discovery metadata.

Heading	M, C, O	Description	Recommended Term List or Format
Survey name	M	Title of the Survey	Free text; (e.g. Menai Straight Benthic Survey 2004)
Storage medium	O	The storage medium used if relevant	Text; (e.g. 50% Formalin)
Methodology	M	Any written methodology used should be referenced and linked. If the methodology is not referenced then provide a description here.	Text; (e.g. Methodology follows the Green Book http://www.cefas.co.uk/publications/scientific-series/green-book.aspx)
Trawl type or sledge	M	The type of trawl should be specified and described or if the recording is from a benthic sledge this should be specified.	Free Text; (e.g. 2 meter beam trawl with tickler chains, man-based beach trawl)
Trawl or sledge width	M	The width of the trawl net between the shoes or across the headline. If a benthic sledge is used give the width or the camera view.	Number; units = meters (e.g. 3.5)
Trawl height	C	The height of the beam or maximum height of the headline	Number; units = meters (e.g. 2.1)
Trawl mesh size	C	The width of the net mesh from knot to knot.	Number; units = um (e.g. 5)
Liner	C	If a liner was used what was the size of the liner	Number; units = um (e.g. 2)
Analytical laboratory or organisation	M	The laboratory/organisation that analysed the samples	Reference Code list RLABO at http://www.ices.dk/datacentre/reco/ (e.g. UNIC Unicomarine Ltd, Letchworth Laboratory)
Analytical personnel	O	Names or the personnel who were involved in analysing the samples	Text, personnel initials given and separated by semi-colon if more than one personnel used; (e.g. J. Bloggs analysed all samples).

Sampling analysis notes	O	Any further notes on sample analysis that may be of relevance	Text; (e.g. 10% of samples were checked by B. Begger for QC purposes)
Quality control scheme	M	Description of any quality control scheme that the laboratory participated in during the analysis.	Text; (e.g. National Marine Biological Analytical Quality Control Scheme)

2.6. Sample Data. UK organisations collecting offshore litter data have primarily held data in 2 formats. The first method is the number of items of litter in categories (e.g. plastics, household waste etc) and the second is by describing each litter item (e.g. Kestrel larger drink can 330ml) and then at a later date converting this data to the number of items per category for assessment purposes. Both are acceptable, however if each litter item is described then those data should also be converted to number of items per category. The categories to be used in the UK and within the ICES community are currently under consideration, however a proposed list is given in Appendix 1. Table 1 gives the minimum data requirements for a litter survey with data recorded as a matrix with the litter categories as one axis and the trawl identification number the other. Table 2 gives an example of a table that may be used to record each litter item.

Table 1 – the minimum requirement for recording litter data.

	Trawl 6726	Trawl 6749	Trawl 6783	Trawl etc
Cloth	0	2	1	
Hard Plastic	4	6	2	
Metal	0	0	1	
Paper and Cardboard	3	0	0	
Glass&Ceramics	0	0	1	
Foam	0	1	0	
Soft Plastic	3	1	1	
Rubber	2	2	1	
Wood	0	0	0	
Sewage Related	4	1	1	
Fishing Gear	5	2	3	
Other	3	0	0	

Table 2. A table structure that may be used to record each litter item and details of that item including state of degradation, colonising organisms, possible sources etc.

	Wood (no. of items)	Wood Size	Wood Description	Wood Comment	Soft Plastic (no. of items)	Soft Plastic Size	Soft Plastic Description	Etc etc
Trawl 6726	1	2*4 inches and approx 3 foot long	Machined Hard wood, well worn and degraded	Colonised by <i>Mytilus edulis</i> . No obvious source	2	30cm*5cm	Mr Freeze ice lolly wrapper	
						1m*30cm	Thin Poly Sheet	
Trawl 6749	1	1m long 50cm diameter	Natural hard wood log, cut at both ends	Colonised by bryozoa	0			

Appendix 1

There are a number of litter categories in use in the UK and also recommended by UNEP. These categories are currently being examined in the UK and ICES to agree a definitive list which can be used. Once this list is made available, this page will be updated with those categories and further definitions given. In the meantime a proposed list is shown below:

- Cloth
- Hard Plastic
- Metal
- Paper and Cardboard
- Glass&Ceramics
- Foam
- Soft Plastic
- Rubber
- Wood
- Sewage Related
- Fishing Gear
- Other