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Our Ref: H.4/NH/ACB/LS/av 30 January 2020

Subject: Call for data: new information on Vulnerable Marine Ecosystems (VME) in the North Atlantic from ICES member countries

Dear Reader,

Please find enclosed a document describing the rationale, scope and technical details of this data call, as well as the secure use of data.

The Joint ICES/NAFO Working Group on Deep-water Ecology (WGDEC) maintains a central database holding information on the distribution and abundance of habitats and species considered to be indicators of vulnerable marine ecosystems (VMEs) across the North Atlantic. This ICES VME database aims to store and make available all known VME indicator records in the North Atlantic (covering deep water areas inside and outside national jurisdiction) for use by ICES and the wider marine community. ICES uses the database as a basis to provide scientifically-robust advice on the distribution of Vulnerable Marine Ecosystems (VMEs) and possible management solutions.

A list of deep-water VMEs and their characteristic taxa is provided (see Annex 2). Criteria to define what constitutes a VME has been produced by the FAO (FAO, 2009) and further refined by WGDEC (ICES, 2016) to assist data providers.

Sincerely,

Anne Christine Brusendorff

General Secretary

CC: Laura Robson (Chair of WGDEC), Darius Campbell (NEAFC), DG-Mare (EC), K.V.Kolonchin (VNIRO director), O.A. Bulatov (VNIRO delegate to ICES), Lotte Worsøe Clausen (Head of Advisory Support).

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30 January 2020

Data call: new information on Vulnerable Marine Ecosystems (VMEs) in the North Atlantic from ICES member countries

1. Scope of the Data call

ICES provides annual advice to the EC and NEAFC on mapping the location of habitats sensitive to particular fishing activities, i.e. Vulnerable Marine Ecosystems (VMEs) including communities of hydrothermal vents/fields, cold water coral reefs and deep-sea sponge aggregations (CCAMLR, 2012). A list of deep-water VMEs and their characteristic taxa is provided (see Annex 2). This was updated by WGDEC 2019 to include new VME habitats, sub-types and taxa (ICES, 2019). Criteria to define what constitutes a VME has been produced by the FAO (FAO, 2009) and further refined by WGDEC (ICES, 2016) to assist data providers.

2. Rationale

The rationale for the call is that the Joint ICES/NAFO Working Group on Deep-water Ecology (WGDEC) maintains a central database holding information on the distribution and abundance of habitats and species considered to be indicators of VMEs across the North Atlantic. This ICES VME database aims to store and make available all known VME indicator records in the North Atlantic (covering deep water areas inside and outside national jurisdiction) for use by ICES and the wider marine community. ICES uses the database to underpin the provision of scientifically-robust advice on the distribution of VMEs and possible management solutions. WGDEC are also working with the ICES Working Group on Marine Habitat Mapping to test the use of Habitat Suitability Modelling for VMEs, for which absence data is required. This work will feed into responses to ICES advice requests from the European Commission. As such, absence data is also part of the data call, see further details below under 'Section 6.2 Data Types: absence data'.

3. Legal framework

All the governments and intergovernmental commissions requesting and receiving advice from ICES, and all contracting parties to OSPAR and HELCOM, have signed international agreements under UNCLOS 1995 Fish Stocks agreement article 5 and 6 (to incorporate fisheries impacts on other components of marine ecosystems) and WSSD 2002 article 30 (to implement an ecosystem approach in relation to oceans policy including fisheries). These agreements include an obligation to collect and share data to support assessment of the impacts of fisheries on non-target species and the environment (UNCLOS FSA art 6). The ICES data policy states the conditions for data use, data contribution, and data redistribution including VME data use

arrangements (http://ices.dk/marine-data/guidelines-and-policy/Pages/ICES-data-policy.aspx).

4. Deadlines

The data should be submitted by Friday 27 March 2020

5. Usage of requested data

The requested information, when ingested into the VME database, will have a number of important uses. The ICES VME database provides an essential resource for some of the core work of WGDEC. This technical work by WGDEC is the foundation on which ICES advises fisheries management, such as recommending bottom fishing closures within NEAFC (North East Atlantic Fisheries Commission) waters to protect VMEs. WGDEC also uses this extensive database of VME records to prepare the underlying technical work in response to advice requests from the European Commission to provide new information on the locations of seabed habitats sensitive to particular fishing activities.

6. Data to report

6.1 Geographic and temporal scope

Temporal scope is for data on VMEs collected between January 2014 and February 2020, although please note that older data which has not been submitted previously to ICES should also be submitted.

The geographical scope of the VME data call covers the entire North Atlantic, including:

- North-East Atlantic Fisheries Commission Regulatory Area (NEAFC) https://www.neafc.org/managing_fisheries/measures/ra_map
- Northwest Atlantic Fisheries Organisation Regulatory Area (NAFO) https://www.nafo.int/Fisheries
- ICES Fishing areas
- Adjacent deep-water areas of ICES member countries

As WGDEC focuses its work on VME in 'deep water areas', considered to be in water depths of 200 m and deeper, this thereby effectively excludes data from the following ICES areas in this data call: 27.3.a, 27.3.b, 27.3.c, 27.3.d, 27.4.b, 27.4.c, 27.7.a, 27.7.d, 27.7.e, and 27.7.f.

6.2 Data types

The VME database is comprised of:

1) '**VME habitats**' that are records for which there is unequivocal evidence for a VME, e.g. ROV observations of a coral reef;

2) '**VME indicators**' which are records that suggest the presence of a VME with varying degrees of uncertainty e.g. bycatch of gorgonians (sea fans) from a fishing vessel. For VME indicators, a weighting system of vulnerability and uncertainty is provided as part of the database to aid interpretation;

3) **'Absence of VME data'**.

Absence data on VME occurrence can be just as important as presence data, and WGDEC have worked with the ICES Data Centre to allow this data type to be submitted through the same data submission format. The VME database structure allows submission of 'absence' data through the completion of the "VME cruise" tab, with details of each survey of relevance, and the "VME sample" tab, with details of the sampling events. If no VMEs are found in these sampling events, this is all that is needed (i.e. no information is needed under 'VME data record') and absence is therefore recorded.

Please note that absence data is currently only being accepted in the following cases:

- For scientific trawl surveys only (both current and older/historical records);
- Where presence of VMEs have been recorded on the same survey (i.e. if no VMEs seen throughout the survey, do not record absences).

In addition, please follow these guiding principles before deciding on submission:

- Each tow should either be presence OR absence, it should not combine both. If VMEs are present in part of the tow, this is recorded as presence data;
- If presence data are recorded for some VME indicators, absence of others can be assumed and does not need to be recorded separately.

Re-submissions:

ICES member countries may wish to update data on VMEs previously submitted to ICES. Please note that data submitted to the VME database prior to the WGDEC Data Call 2017 cannot be automatically overwritten as it is stored in a slightly different format. If any resubmissions are made for these datasets, submitters should contact ICES Data Centre for assistance at data.call@ices.dk.

Electronic outputs:

Data will be shown as maps within ICES WGDEC reports and ICES Advice. Data will also be visible and accessible on the ICES VME data portal. On this portal, all data (public and restricted) will be displayed aggregated to a 0.05 x 0.05 degree grid using the approach of C-square reference XXXX:XXX:XXX:X (see Rees, 2003). When downloading, publically accessible data (as determined by the data provider) will be available in its 'raw' form (i.e. not aggregated).

Data classed as 'restricted' by the data provider will have some fields of information removed from the download, and the data provider contact details will be provided in the download to enable the requestor to ask for these data.

7. Instructions for data submission

ELECTRONIC SUBMISSION: To submit data, please fill in the Excel "data submission template" with your data. The template can be found here: http://ices.dk/marine-data/documents/VME/VME_Reporting_Format.zip.

- Once the Excel data submission template is completed, go to the "Export_data" sheet and press the "Export data to XML" button to create a data file in XML format, and save it onto your computer or network. Note: please do not use the Excel automatic XML conversion function, it will not produce the correct file.
- Go to the VME portal http://vme.ices.dk.
- Press the 'Submit data' link and log in with your ICES Sharepoint user credentials. If you do not have access to ICES Sharepoint please contact data.call@ices.dk for assistance.
- Select your XML data file using the 'Choose file' button to select the file.
- Press the 'Screen file' button to validate and upload the file to the ICES database. This will run a data validation process and a report of any QC issues will be generated and made available to the data submitter online. Data not complying with the correct format will not be accepted for uploading until the errors are corrected. Please ensure you review these QC issues, correct and reupload the data.
- If you have any questions or problems with submission please contact data.call@ices.dk for assistance.

When submitting data, refer to the Data call Annex 1 for the detailed VME format description and Annex 2 for what species/habitats constitute a VME.

For your reference, past VME data calls can be found here: https://tinyurl.com/vme-calls

8. Contact information

For support concerning any issues about the data call please contact the Advisory Department (advice@ices.dk).

For support concerning other data-submission issues, please contact: data.call@ices.dk.

9. References

CCAMLR, 2012. Commission for the Conservation of Antarctic Marine Living Resources. CONSERVATION MEASURE 22-06 (2012)1,2 Bottom fishing in the Convention Area

FAO, 2009. The FAO International Guidelines for the Management of Deep-sea Fisheries in the High Seas. Activities pages. In: FAO Fisheries and Aquaculture

Department [online]. Rome. Updated 30 April 2013. http://www.fao.org/fishery/topic/166308/en

ICES. 2016. Report of the Workshop on Vulnerable Marine Ecosystem Database (WKVME), 10–11 December 2015, Peterborough, UK. ICES CM 2015/ACOM:62. 42 pp.

ICES. 2017. Report of the ICES/NAFO Joint Working Group on Deep-water Ecology (WGDEC) 20–24 March 2017 Copenhagen, Denmark. ICES CM 2017/ACOM:25. 121pp.

ICES. 2019. ICES/NAFO Joint Working Group on Deep-water Ecology (WGDEC). ICES Scientific Reports. 1:56. 119 pp. http://doi.org/10.17895/ices.pub.5567

Rees, T. 2003. "C-square s", a new spatial indexing system and its applicability to the description of oceanographic datasets. Oceanography, 16(1): 11–19.

Annex 1 VME Format Description

The VME format consists of 4 separate records for File Information, VME Cruise, VME Sample, and VME Data Record.
File Information records are created automatically in the template.
To report 'absence' data (for example if you are reporting a research trawl survey where there was no VME by-catch), the VME Data Record should be left empty, and only VME Cruise and VME Sample should be completed.
Note: in the 'Obligation' column, M stands for mandatory, O stands for optional and C stands for conditional (i.e. conditional on information being provided in the previous fields)
In case of questions about data reporting format, vocabulary codes, etc., please contact data.call@ices.dk

1. File Information (Mandatory record, created automatically from the data submission template)

FIELD NAME	FIELD TYPE	OBLIGATION	DESCRIPTION	GUIDANCE
RecordType	Text	M	Record Type code 'FI'	The field will be autofilled during data export to xml.
Country	Text	M	Survey country 2-alpha ISO code	The field will be autofilled from the Cruise record
EntryDateTime	Date	M	Data entry date time	The field will be autofilled during data export to xml.

2. VME Cruise (Mandatory record)

FIELD NAME	FIELD TYPE	OBLIGATION	DESCRIPTION	GUIDANCE
RecordType	Text	M	Record Type code 'VC'	The field will be autofilled during data export to xml.
SurveyName	Text	M	Survey name	Survey (campaign) name and acronym.
Country	Text	M	Survey country 2-alpha ISO code	Use codes from the list: http://vocab.ices.dk/?ref=337
VesselType	Text	M	Vessel type from which the sample was collected.	Choose from the list: http://vocab.ices.dk/?ref=57
Ship	Text	O	Code of vessel on which sample was collected (for ROV or AUV, provide reference to the parent vessel).	Field is strongly recommended for reporting. Report vessel code from the list at http://vocab.ices.dk/?ref=315
CruiseID	Text	M	Local Cruise ID	To be provided by the data supplier – cruise reference code. If CSR exists, report the CSR cruise reference for traceability http://seadata.bsh.de/csr/retrieve/sdn2_index.html
StartDate	Date	M	Cruise start date	All dates must be supplied as text in the format YYYY-MM-DD (ISO date format).
EndDate	Date	M	Cruise end date	All dates must be supplied as text in the format YYYY-MM-DD (ISO date format).
PlaceName	Text	O	Name of place in reference to the data collection.	Free text; e.g. "Rockall Bank"
ShipPositionPrecision	Integer	O	An estimate of the precision of the lat/long	Calculated or estimated precision of the vessel/ROV position in metres. Take into account whether position is determined from the

			provided by the spatial positioning systems of the vessel/ROV	ship position or from ROV. For example when two separate spatial reference systems are in use such as vessel position GPS (+/- 10m) and ROV USBL (+/- 20m) position, the precision of both the vessel and ROV systems should be added together to give a precision of +/- 30m.
ResponsibleOrganisation	Text	M	EDMO code of the organization responsible for the data.	Please select the organization from the list at https://vocab.ices.dk/?ref=1398
ResponsibleOrganisationRole	Text	M	Role of the responsible organization for the data.	Choose from the list: https://vocab.ices.dk/?ref=1434
ScientistInCharge	Text	O	Name of SIC (Scientist in Charge) or PI (Principle Investigator.	Free text. Name of the scientist with overall responsibility for data collection and achieving science objectives during survey.
FundingProject	Text	O	Project name	Free text. Name of the funding project
PointOfContact	Text	M	Name of the point of contact for queries about the data.	Free text. Who should be contacted about the data
ContactEmail	Text	M	E-mail address for the point of contact about the data.	Valid e-mail address
Reference	Text	O	A reference to the data source.	Complete citation for the data source e.g. “Mortensen et al., 2006“
FileName	Text	O	Name of the excel or shape file submitted.	Link to the related metadata files, if available. The files should be sent to data.call@ices.dk
DataAccess	Text	M	Data access constraints.	e.g. "public" or "restricted". Please use "public" if you are content with the data being downloaded in its raw form from the ICES data portal. Alternatively, the data will not be downloadable if you select "restricted". Subset of the controlled vocabulary: http://vocab.ices.dk/?ref=1435

3. VME Sample (Mandatory record)

FIELD NAME	FIELD TYPE	OBLIGATION	DESCRIPTION	GUIDANCE
RecordType	Text	M	Record Type code 'VS'	The field will be autofilled during data export to xml.
CruiseID	Text	M	Local Cruise ID	To be provided by the data supplier – cruise reference code. If CSR exists, report the CSR cruise reference
StationID	Text	O	ID of the survey station, if known.	May be numeric, text or a combination of numbers and text.
SampleKey	Text	M	Key for each discernible sampling/analysis event.	A unique key for each sampling event like: • A single trawl • A single long line set • A single photograph from a photographic tow • A segment of analysed video from a video tow • A video tow, if video is unanalyzed • A sediment grab or core. To be created by data supplier. May be numeric, text or a combination of numbers and text, which may relate back to original data management convention for traceability.
ObservationDate	Date	C	Date the species or habitat was recorded.	Report the date of observation, if available. All dates must be supplied as text in the format YYYY-MM-DD (ISO date format).
ObservationDateType	Text	M	Precision of the reported ObservationDate	A one or two character code that identifies the types of dates used in ObservationDate. Explicitly stating the code avoids any ambiguity, which might lead to subtly different interpretations. Choose from the list: http://vocab.ices.dk/?ref=1429
DataCollectionMethod	Text	M	Reference to the data collection method used.	Specify the data collection method for the sample based on the vocabulary list **N.B. If several samples were taken on site by the variety of methods, report them separately with different sample keys** Choose from: • Multibeam echo sounder (unknown platform) • Multibeam echo sounder (vessel mounted) • Multibeam echo sounder (AUV mounted) • Multibeam echo sounder (ROV mounted)

FIELD NAME	FIELD TYPE	OBLIGATION	DESCRIPTION	GUIDANCE
				• Single beam echo sounder • Side scan sonar (Unknown platform) • Side scan sonar (AUV mounted) • Sub-bottom profiler • CTD • Grab (please specify type from link below) • Core (please specify type from link below) • Trawl (please specify type from link below) • Dredge (please specify type from link below) • Longline • Seabed imagery - towed camera system • Seabed imagery - drop camera system • Seabed imagery – ROV system This list is a subset of the ICES Sampler Type vocabulary. If your survey method is not listed, please select from: http://vocab.ices.dk/?ref=152
StartLatitude	Double	C	Start latitude of the record, if line (if point, use MidLatitude and leave this blank).	Use World Geodetic System 1984 (WGS84) geographic coordinate system, and decimal degrees.
StartLongitude	Double	C	Start longitude of the record, if line (if point, use MidLongitude and leave this blank).	Use World Geodetic System 1984 (WGS84) geographic coordinate system, and decimal degrees.
MiddleLatitude	Double	M	Midpoint latitude of the record if line (if point, use this field for position).	Use World Geodetic System 1984 (WGS84) geographic coordinate system, and decimal degrees.
MiddleLongitude	Double	M	Midpoint longitude of the record if line (if point, use this field for position).	Use World Geodetic System 1984 (WGS84) geographic coordinate system, and decimal degrees.
EndLatitude	Double	C	End latitude of the record (if point, use MidLatitude and leave this blank).	Use World Geodetic System 1984 (WGS84) geographic coordinate system, and decimal degrees.
EndLongitude	Double	C	End longitude of the record (if point, use MidLongitude and leave this blank).	Use World Geodetic System 1984 (WGS84) geographic coordinate system, and decimal degrees.
GeometryType	Text	M	Sampling geometry type	Point or line - subset of the controlled vocabulary http://vocab.ices.dk/?ref=1430
SamplePositionAccuracy	Integer	O	Accuracy of spatial position of record in metres.	For example, trawl by-catch of coral along a 5km trawl track would have a RecordPositionAccuracy of 5000 metres **whereas** an observation of a cold-water coral reef observed on an ROV/drop-camera frame transect may be have a RecordPositionAccuracy of 20 metres (this being the

FIELD NAME	FIELD TYPE	OBLIGATION	DESCRIPTION	GUIDANCE
				accuracy of the USBL positioning being used on the ROV/drop-frame) Value in metres; e.g. "10" means the given position of the record is accurate to ± 10 metres.
DepthUpper	Double	O	Upper depth in metres	For transect data (video or trawl) indicate the shallowest depth in metres. e.g. 110
DepthLower	Double	O	Lower depth in metres	For transect data (video or trawl) indicate the deepest depth in metres. e.g. 150
DepthShoot	Double	O	Depth at the beginning of the tow in metres	For trawling data, report depth in metres at the beginning of the tow
DepthHaul	Double	O	Depth at the end of the tow in metres	For trawling data, report depth in metres at the end of the tow

4. VME Data Record (Optional record – If you wish to report 'absence' data (for example if you are reporting a research trawl survey where there was no VME by-catch), this record should be left empty).

FIELD NAME	FIELD TYPE	OBLIGATION	DESCRIPTION	GUIDANCE
RecordType	Text	M	Record Type code 'VD'	The field will be autofilled during data export to xml.
SampleKey	Text	M	Key for each discernible sampling/analysis event.	A unique key for each sampling event like: • A single trawl • A single long line set • A single photograph from a photographic tow • A segment of analysed video from a video tow • A video tow, if video is unanalyzed • A sediment grab or core. To be created by data supplier. May be numeric, text or a combination of numbers and text, which may relate back to original data management convention for traceability.
RecordKey	Text	M	Unique key for each data record (row) within a submitted dataset.	To be created by data supplier. May be numeric, text or a combination of numbers and text, which may relate back to original data management convention for traceability. If no original data management key exists, this can be added as a sequential numeric list (1,2,3, etc.)
VME_Indicator	Text	C	Grouping of species/habitats used by WGDEC.	A VME indicator must be chosen if no *bona fide* VME habitat type is known to occur, e.g. a sponge from trawl by-catch. This field can also be used to record species records as additional detail for records of VME habitats. To do this, the VME indicator record(s) should be on a separate line from the VME habitat record, and should have the same VMEKey. VME indicators should match the list shown below. Controlled vocabulary http://vocab.ices.dk/?ref=1409 Choose from: • Black coral • Cup coral • Gorgonian • Stylasterids • Sea-pen • Soft coral • Sponge

FIELD NAME	FIELD TYPE	OBLIGATION	DESCRIPTION	GUIDANCE
				• Stony coral • Anemones • Xenophyophores • Stalked crinoids • Chemosynthetic species (seeps and vents)
VME_IndicatorSubtype	Text	O	Indicator subtype code	These are additional VME Indicator types used by NAFO Working Groups, and are not represented in VME Indicator field above. Controlled vocabulary: http://vocab.ices.dk/?ref=1492
VME_HabitatType	Text	C	VME habitat types used by WGDEC.	A VME habitat type should be chosen if the record occurs within a *bona fide* VME habitat e.g. From an ROV transect surveying a cold water coral reef. All datapoints representing the known extent of a VME habitat type along a transect or tow should be recorded within one line of the database (e.g. a video tow split into sections of cold-water coral reef; bathyal rock; cold-water coral reef, would represent two VME habitat records of cold-water coral reef in the database). Controlled vocabulary http://vocab.ices.dk/?ref=1410 Choose from: • Cold-water coral reef • Coral garden • Deep-sea sponge aggregations • Sea-pen fields • Anemone aggregations • Mud and sand emergent fauna • Bryozoan patches • Hydrothermal vents/fields • Cold seeps
VME_HabitatSubtype	Text	O	VME sub habitat types used by WGDEC.	If no VME_habitat_type is filled in, this field should be left blank. If VME_habitat_type is filled in, this field is optional. Controlled vocabulary http://vocab.ices.dk/?ref=1411 Choose from: • *Lophelia pertusa/Madrepora oculata* reef • *Solenosmilia variabilis* reef • Hard-bottom coral garden *Note that these records can be further classified as one of*

FIELD NAME	FIELD TYPE	OBLIGATION	DESCRIPTION	GUIDANCE
				the following: o Hard-bottom coral garden: Hard-bottom gorgonian and black coral gardens o Hard-bottom coral garden: Colonial scleractinians on rocky outcrops o Hard-bottom coral garden: Non-reefal scleractinian aggregations o Hard-bottom coral garden: Stylasterid corals on hard substrata • Soft-bottom coral garden *Note that these records can be further classified as one of the following:* o Soft-bottom coral garden: Soft-bottom gorgonian and black coral gardens o Soft-bottom coral garden: Cup-coral fields o Soft-bottom coral garden: Cauliflower Coral Fields • Soft-bottom sponge aggregations • Hard-bottom sponge aggregations • Soft-bottom anemone aggregations • Hard-bottom anemone aggregations
VMEKey	Double	C	Key to identify VME habitat and VME indicator records belonging to a single habitat patch.	Sequential number to identify records that come from the same block of habitat, e.g. Consecutive points on an ROV or video transect that are on the same coral reef. This is mandatory for any records of VME habitats. If each record comes from a separate habitat patch, or if this is not known, use a different number for each record. Also optional for records of VME indicator species, where it can be used to show that these come from a patch of VME habitat. See guidance on the VME_indicator field for more details.
GeneralTaxonDescriptor	Text	O	Most detailed name of taxon (according to HighestTaxonomicResolution).	e.g. Porifera, *Lophelia pertusa*, soft coral
TaxonLatinName	Text	C	Latin name of the most detailed taxon identified.	Report the taxon Latin name whenever possible. Report the taxon Latin name whenever possible. If reported in the Excel template, the AphiaID would be matched automatically. In case of ambiguities in the results, the data submitter should specify

FIELD NAME	FIELD TYPE	OBLIGATION	DESCRIPTION	GUIDANCE
				the AphiaID instead.
AphiaID	Integer	C	WoRMS Species reference code	We strongly recommend reporting of valid species AphiaIDs as in http://www.marinespecies.org/. In the excel template, either AphiaID or TaxonLatinName should be reported (same field). If the field is left blank, AphiaID=2 (Animalia) would be automatically assigned.
DeadAlive	Text	O	Indication of whether most of sample was dead or alive.	Choose either "Dead" or "Alive". Subset of the controlled vocabulary: http://vocab.ices.dk/?ref=64
Number	Double	O	Number of individuals associated with the record.	If not known, use "Null".
Weight	Double	O	Mass of indicator, in kg, associated with the record.	Weight in kilograms. This is likely to be relevant to by-catch/ data. If not known or not relevant, use "Null". Do not include if the record is a VME habitat type.
Density	Double	O	Number of individuals per square metre (m^2).	If not known or not relevant, use "Null".
PercentCover	Double	O	Percentage cover of indicator (relevant to underwater imagery data, e.g. ROV or drop down video).	If not known or not relevant, use "Null".
SACFOR	Text	O	Semi-quantitative abundance scale (relevant to underwater imagery data, e.g. ROV or drop down video).	Controlled vocabulary http://vocab.ices.dk/?ref=1491. Scale description: http://jncc.defra.gov.uk/page-2684 If not known or not relevant, use "Null".
TaxonDeterminer	Text	O	Name of organization that identified the GeneralTaxonDescriptor.	Please select the organization from the list at https://vocab.ices.dk/?ref=1398
TaxonDeterminationDate	Date	O	Date of identification of the GeneralTaxonDescriptor.	All dates must be supplied as text in the format YYYY-MM-DD (ISO date format).
Comments	Text	O	Any other relevant comments or information.	e.g. “sample was 60% live coral and 40% dead”

Annex 2: A suggestive list of deep-water VMEs and their characteristic taxa[1] – updated Jan 2020 (ICES, 2019)

PROPOSED VME HABITAT TYPE (VME DATABASE FIELD: "VME_HABITATTYPE")	PROPOSED VME HABITAT SUBTYPE (VME DATABASE FIELD: "VME_HABITATSUBTYPE")	REPRESENTATIVE TAXA	CORRESPONDING VME INDICATOR (VME DATABASE FIELD: "VME_INDICATOR")
Cold-water coral reef	*Lophelia pertusa/Madrepora oculata* reef	*Lophelia pertusa* *Madrepora oculata*	Stony coral
	Solenosmilia variabilis reef	*Solenosmilia variabilis*	Stony coral
Coral garden	Hard bottom coral garden **Note** - you can also assign records to a more detailed sub- type	(See below)	Black coral Gorgonian Stony coral Stylasterids
	Hard bottom coral garden: Hard bottom gorgonian[2] and black coral gardens	ACANTHOGORGIIDAE • *Acanthogorgia armata* • *Acanthogorgia hirsuta* ANTHOTHELIDAE CHRYSOGORGIIDAE CORALLIIDAE ISIDIDAE, KERATOISIDINAE • *Acanella arbuscula* • *Isidella spp.* • *Keratoisis spp.* • *Lepidisis spp.* PARAGORGIIDAE • *Paragorgia arborea* • *Paragorgia johnsoni* ELLISELLIDAE • *Viminella flagellum* PLEXAURIDAE	Gorgonian Soft coral Black coral

[1] NB – VME habitat sub-types and lists of representative taxa to be finalised at WGDEC 2020 (May 2020)

[2] *Gorgonian* is now not a recognised taxonomic term. However, as many deep-sea biologists are familiar with this term, this VME Indicator was retained.

	• *Paramuricea spp.* • *Swiftia spp.* • *Swiftia dubia* • *Dentomuricea* spp. PRIMNOIDAE • *Callogorgia verticillata* • *Candidella imbricata* • *Primnoa resedaeformis* • *Paracalypthrophora josephinae* • *Narella spp.* ALCYONIIDAE • *Anthomastus grandiflorus* • *Pseudoanthomastus agaricus* ANTIPATHIDAE • *Stichopathes gravieri* LEIOPATHIDAE • *Leiopathes* spp. SCHIZOPATHIDAE • *Bathypathes* spp. • *Parantipathes hirondelle* • *Parantipathes* spp. • *Stauropathes arctica*	
Hard bottom coral garden: Colonial scleractinians on rocky outcrops	*Lophelia pertusa* *Madrepora oculata* *Solenosmilia variabilis*	Stony coral
Hard bottom coral garden: Non-reefal scleractinian aggregations	*Enallopsammia rostrata* *Lophelia pertusa* *Madrepora oculata* *Egularachipsammia* spp. *Dendrophyllia cornigera* *Dendrophyllia ramea*	Stony coral
Hard bottom coral garden: Stylasterid corals on hard substrata	STYLASTERIDAE • *Pliobothrus spp.* • *Stylaster spp.* • *Errina* spp • *Crypthelia* spp.	Stylasterids
Hard bottom coral garden: Cup coral fields	CARYOPHYLLIIDAE • *Caryophyllia* spp.	

	Soft bottom coral garden **Note** - you can also assign records to a more detailed sub-type	(See below)	Gorgonian Soft coral Black coral Cup coral
	Soft bottom coral garden: Soft bottom gorgonian[1] and black coral gardens	ALCYONIIDAE • *Anthomastus grandiflorus* ANTIPATHIDAE • *Stichopathes gravieri* CHRYSOGORGIIDAE • *Radicipes spp.* ISIDIDAE • *Acanella arbuscula* • *Isidella spp.* • *Isidella elongata* • *Isidella lofotensis*	Gorgonian Soft coral Black coral
	Soft bottom coral garden: Cup-coral fields	CARYOPHYLLIIDAE • *Caryophyllia* spp. • *Stephanocyathus moseleyanus*	
	Soft bottom coral garden: Cauliflower Coral Fields	NEPHTHEIDAE • *Duva florida* • *Drifa glomerata* • *Gersemia spp.*	Soft coral
Deep-sea sponge aggregations	Soft bottom sponge aggregations	GEODIIDAE • *Geodia barretti* • *Geodia macandrewi* • *Geodia atlantica* • *Geodia phlegraei* ANCORINIDAE • *Stryphnus fortis* • *Steletta normani* PACHASTRELLIDAE • *Thenea spp.* ROSSELLIDAE • *Caulophacus arcticus* PHERONEMATIDAE • *Pheronema carpenteri* HYALONEMATIDAE • *Hyalonema* spp.	Sponge

Hard bottom sponge aggregations	GEODIIDAE • *Geodia hentscheli* • *Geodia parva* ANCORINIDAE • *Steletta rhaphidiophora* AZORICIDAE • *Leiodermatium* spp. CORALLISTIDAE • *Neophrissospongia nolitangere* • *Neoschrammeniella* spp. MACANDREWIIDAE • *Macandrewia* spp. AXINELLIDAE • *Axinella* spp. • *Phakellia* spp. MYCALIDAE • *Mycale lingua* POLYMASTIIDAE • *Polymastia* spp. TETILLIDAE PETROSIIDAE • *Petrosia* spp. ROSSELLIDAE • *Caulophacus arcticus* • *Asconema setubalense* • *Asconema foliatum* • *Schaudinnia rosea* • *Scyphidium septentrionale* • *Trichasterina borealis* PHERONEMATIDAE • *Pheronema carpenteri* • *Poliopogon amadou*	Sponge[2]
Seapen fields	ANTHOPTILIDAE • *Anthoptilum murrayi* • *Anthoptilum grandiflorum* CHUNELLIDAE • *Porcupinella profunda*	Sea-pen

		PENNATULIDAE • *Pennatula phosphorea* • *Pennatula aculeata* • *Pteroeides spinosum* • *Ptilella grandis* • *Ptilella grayi* FUNICULINIDAE • *Funiculina quadrangularis* HALIPTERIDAE • *Halipteris finmarchica* • *Halipteris christii* KOPHOBELEMNIDAE • *Kophobelemnon stelliferum* • *Kophobelemnon macrospinosum* PROTOPTILIDAE • *Distichoptilum gracile* • *Protoptilum carpenteri* • *Protoptilum thomsoni* SCLEROPTILIDAE • *Scleroptilum grandiflorum* UMBELLULIDAE • *Umbellula encrinus* • *Umbellula huxleyi* • *Umbellula lindhali* • *Umbellula monocephalus* • *Umbellula thomsoni* • *Umbellula durrisma* VIRGULARIDAE • *Virgularia mirabilis* • *Virgularia glacialis* • *Virgularia tuberculata* • *Stylatula elegans* VERETILLIDAE • *Cavernularia pusilla* • *Veretillum cynomorium*	
Tube-dwelling anemone aggregations		CERIANTHIDAE	Anemones

Stalked Crinoid aggregations		RHIZOCRINIDAE • *Democrinus(?) cabiochi* • *Cherbonniericrinus cherbonnieri* • *Democrinus parfaiti* • *Rhizocrinus lofotensis* BATHYCRINIDAE • *Bathycrinus carpenterii* • *Bathycrinus gracilis* • *Monachocrinus recuperatus* SEPTOCRINDAE • *Zeuctocrinus gisleni* PHRYNOCRINIDAE • *Porphyrocrinus thalassae* • *Porphyrocrinus incrassatus* ISOCRINIDAE • *Endoxocrinus (Diplocrinus) wyvillethomsoni* HYOCRINIDAE • *Gephyrocrinus grimaldii* • *Anachalypsicrinus nefertiti*	Stalked crinoids
Xenophyophore aggregations		SYRINGAMMINIDAE • *Syringammina fragilissima* PSAMMINIDAE • *Reticulammina plicata*	
Bryozoan patches		*Eucratea loricata*	
Hydrothermal vents/fields	Active vents	KADOSACTINIDAE • *Maractis rimicarivora* MYTILIDAE • *Bathymodiolus sp.* • *Bathymodiolus azoricu* TURRIDAE • *Phymorynchus sp.* ALVINOCARIDAE • *Rimicaris exoculata* • *Chorocaris chacei* • *Mirocaris fortunata* BYTHOGRAEIDAE	Chemosynthetic species (seeps and vents)

	• *Segonzacia mesatlantica* • *Ophidiiformes* BYTHITIDAE • *Cataetyx laticeps* ZOARCIDAE • *Pachycara* sp.	
Inactive vents	Generally colonized by sponges and corals, some identified as VME indicators species under 'coral gardens' and 'deep-sea sponge aggregations'	
Cold Seeps	LUCINIDAE • *Lucinoma* sp. THYASIRIDAE • *Thyasira* sp. MYTILIDAE • *Bathymodiolus* sp. SOLEMYDAE • *Acharax sp.* SIBOGLINIDAE • *Siboglinum* sp. • *Polybrachia* sp. • *Spirobrachia* sp. • *Bobmarleya* sp. • *Lamellisabella* sp. • *Sclerolinum* sp. • *Oligobrachia* sp. ZOARCIDAE • *Lycodes squamiventer*	Chemosynthetic species (seeps and vents)

References:

ICES. 2019. ICES/NAFO Joint Working Group on Deep-water Ecology (WGDEC). ICES Scientific Reports. 1:56. 119 pp. http://doi.org/10.17895/ices.pub.5567