

A suggestive list of deep-water VMEs and their characteristic taxa – updated Sept 2020 (ICES, 2020)

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	<i>Lophelia pertusa</i> ¹ / <i>Madrepora oculata</i> reef	<i>Lophelia pertusa</i> <i>Madrepora oculata</i>	Stony coral
	<i>Solenosmilia variabilis</i> reef	<i>Solenosmilia variabilis</i>	Stony coral
Coral garden	Hard bottom coral garden	(See below)	Black coral Gorgonian Stony coral Stylasterids Soft coral Cup coral
	Hard bottom coral garden: Hard bottom gorgonian ² and black coral gardens	ACANTHOGORGIIDAE <ul style="list-style-type: none"> <i>Acanthogorgia armata</i> <i>Acanthogorgia hirsuta</i> ANTHOTHELIDAE CHRYSOGORGIIDAE CORALLIIDAE ISIDIDAE, KERATOISIDINAE <ul style="list-style-type: none"> <i>Acanella arbuscula</i> <i>Keratoisis</i> spp. <i>Lepidisis</i> spp. PARAGORGIIDAE <ul style="list-style-type: none"> <i>Paragorgia arborea</i> <i>Paragorgia johnsoni</i> ELLISELLIDAE <ul style="list-style-type: none"> <i>Viminella flagellum</i> PLEXAURIDAE	Gorgonian Soft coral Black coral

¹ The accepted name for this species in WoRMS is *Desmophyllum pertusum*. However, due to the common use of the name *Lophelia pertusa* in marine policy, this has been maintained for the VME list.

² *Gorgonian* is now not a recognised taxonomic term. However, as many deep-sea biologists are familiar with this term, this VME indicator has been retained.

- *Paramuricea* spp.
- *Swiftia* spp.
- *Swiftia dubia*
- *Dentomuricea* spp.

PRIMNOIDAE

- *Callogorgia verticillata*
- *Primnoa resedaeformis*
- *Paracalyptrophora josephinae*
- *Narella* spp.

GORGONIIDAE

- *Eunicella* 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	<i>Lophelia pertusa</i> <i>Madrepora oculata</i> <i>Solenosmilia variabilis</i>	Stony coral
Hard bottom coral garden: Non-reefal scleractinian aggregations	<i>Enallopsammia rostrata</i> <i>Lophelia pertusa</i> <i>Madrepora oculata</i> <i>Eguchipsammia</i> spp. <i>Dendrophyllia cornigera</i> <i>Dendrophyllia ramea</i>	Stony coral
Hard bottom coral garden: Stylasterid corals on hard substrata	STYLASTERIDAE <ul style="list-style-type: none"> • <i>Pliobothrus</i> spp. • <i>Stylaster</i> spp. • <i>Errina dabneyi</i> 	Stylasterids

Hard bottom coral garden: Cup-coral fields	CARYOPHYLLIIDAE • <i>Caryophyllia</i> spp.	Cup coral
Hard bottom coral garden: Cauliflower coral fields	NEPHTHEIDAE • <i>Drifa glomerata</i> • <i>Duva florida</i> • <i>Pseudodrifa groenlandicus</i> • <i>Gersemia</i> spp.	Soft coral
Soft bottom coral garden	(See below)	Gorgonian Soft coral Black coral Cup coral Stony coral
Note - you can also assign records to a more detailed sub-type		
Soft bottom coral garden: Soft bottom gorgonian ¹ and black coral gardens	ALCYONIIDAE • <i>Anthomastus grandiflorus</i> ANTIPATHIDAE • <i>Stichopathes gravieri</i> CHRYSOGORGIIDAE • <i>Radicipes</i> spp. ISIDIDAE • <i>Acanella arbuscula</i> • <i>Isidella elongata</i> • <i>Isidella lofotensis</i>	Gorgonian Soft coral Black coral
Soft bottom coral garden: Cup-coral fields	CARYOPHYLLIIDAE • <i>Caryophyllia</i> spp. • <i>Stephanocyathus moseleyanus</i>	Cup coral
Soft bottom coral garden: Cauliflower Coral Fields	NEPHTHEIDAE • <i>Duva florida</i> • <i>Drifa glomerata</i> • <i>Gersemia</i> spp.	Soft coral
Soft bottom coral garden: Non-reefal scleractinian aggregations	<i>Eguchipsammia</i> sp.	Stony coral

<p>Deep-sea sponge aggregations</p>	<p>DEMOSPONGIAE</p> <p>GEODIIDAE</p> <ul style="list-style-type: none"> • <i>Geodia barretti</i> • <i>Geodia macandrewi</i> • <i>Geodia atlantica</i> • <i>Geodia phlegraei</i> • <i>Geodia hentscheli</i> • <i>Geodia parva</i> <p>ANCORINIDAE</p> <ul style="list-style-type: none"> • <i>Stryphnus fortis</i> • <i>Stelletta normani</i> • <i>Stelletta raphidiophora</i> <p>THENEIDAE</p> <ul style="list-style-type: none"> • <i>Thenea</i> spp. <p>AZORICIDAE</p> <ul style="list-style-type: none"> • <i>Leiodermatium</i> spp. <p>CORALLISTIDAE</p> <ul style="list-style-type: none"> • <i>Neophrissospongia nolitangere</i> • <i>Neoschrammeniella</i> spp. <p>MACANDREWIIDAE</p> <ul style="list-style-type: none"> • <i>Macandrewia</i> spp. <p>TETILLIDAE</p> <ul style="list-style-type: none"> • <i>Craniella</i> spp. • <i>Tetilla longipilis</i> <p>AXINELLIDAE</p> <ul style="list-style-type: none"> • <i>Axinella infundibuliformis</i> <p>BUBARIDAE</p> <ul style="list-style-type: none"> • <i>Phakellia</i> spp. <p>COELOSPHAERIDAE</p> <ul style="list-style-type: none"> • <i>Lissodendoryx (Lissodendoryx) complicata</i> <p>MYCALIDAE</p> <ul style="list-style-type: none"> • <i>Mycale (Mycale) lingua</i> 	<p>Sponge³</p>
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³ Data providers should ensure that only sponge records of species representative of deep-sea habitats are submitted (see representative taxa)

POLYMASTIIDAE

- *Polymastia* spp.

PETROSIIDAE

- *Petrosia* spp.

HEXACTINELLIDA

HYALONEMATIDAE

- *Hyalonema* spp.

ROSSELLIDAE

- *Caulophacus arcticus*
- *Asconema setubalense*
- *Asconema foliatum*
- *Schaudinnia rosea*
- *Scyphidium septentrionale*
- *Trichasterina borealis*

PERONEMATIDAE

- *Pheronema carpenteri*
- *Poliopogon amadou*

Seapen fields

ANTHOPTILIDAE

- *Anthoptilum murrayi*
- *Anthoptilum grandiflorum*

Sea-pen

CHUNELLIDAE

- *Porcupinella profunda*

PENNATULIDAE

- *Pennatula phosphorea*
- *Pennatula aculeata*
- *Pteroeides spinosum*
- *Pennatula grandis*
- *Ptilella grayi*

FUNICULINIDAE

- *Funiculina quadrangularis*

HALIPTERIDAE

- *Halipteris finmarchica*
- *Halipteris christii*

KOPHOBELEMNIDAE

- *Kophobelemnnon stelliferum*
- *Kophobelemnnon macrospinosum*

PROTOPTILIDAE

- *Distichoptilum gracile*
- *Protoptilum carpenterii*
- *Protoptilum thomsonii*

SCLEROPTILIDAE

- *Scleroptilum grandiflorum*

UMBELLULIDAE

- *Umbellula encrinus*
- *Umbellula huxleyi*
- *Umbellula lindhali*
- *Umbellula monocephalus*
- *Umbellula thomsoni*
- *Umbellula durissima*

VIRGULARIDAE

- *Virgularia mirabilis*
- *Virgularia glacialis*
- *Virgularia tuberculata*
- *Stylatula elegans*

VERETILLIDAE

- *Cavernularia pusilla*
- *Veretillum cynomorium*

CERANTHIDAE

Anemones

Tube-dwelling
aggregations anemone

RHIZOCRINIDAE

Stalked crinoids

Stalked crinoid
aggregations

- *Democrinus cabiochi*
- *Cherbonniercrinus cherbonnieri*
- *Democrinus parfaiti*
- *Rhizocrinus lofotensis*

BATHYCRINIDAE

- *Bathycrinus carpenterii*
- *Bathycrinus gracilis*
- *Monachocrinus recuperates*

SEPTOCRINIDAE

- *Zeuctocrinus gisleni*

PHRYNOCRINIDAE

		<ul style="list-style-type: none"> • <i>Porphyrocrinus thalassae</i> • <i>Porphyrocrinus incrassatus</i> 	
		ISSELICRINIDAE <ul style="list-style-type: none"> • <i>Endoxocrinus (Diplocrinus) wyvillethomsoni</i> HYOCRINIDAE <ul style="list-style-type: none"> • <i>Gephyrocrinus grimaldii</i> • <i>Anachalypsicrinus nefertiti</i> 	
Xenophyophore aggregations		SYRINGAMMINIDAE <ul style="list-style-type: none"> • <i>Syringammina fragilissima</i> PSAMMINIDAE <ul style="list-style-type: none"> • <i>Reticulammina plicata</i> 	Xenophyophores
Bryozoan patches		<i>Eucratea loricata</i>	
Hydrothermal vents/fields	Active vents	KADOSACTINIDAE <ul style="list-style-type: none"> • <i>Maractis rimicarivora</i> MYTILIDAE <ul style="list-style-type: none"> • <i>Bathymodiolus sp.</i> • <i>Bathymodiolus azoricu</i> ALVINOCARIDAE <ul style="list-style-type: none"> • <i>Rimicaris exoculata</i> • <i>Chorocaris chacei</i> • <i>Mirocaris fortunata</i> BYTHOGRAEIDAE <ul style="list-style-type: none"> • <i>Segonzacia mesatlantica</i> BYTHITIDAE <ul style="list-style-type: none"> • <i>Cataetyx laticeps</i> ZOARCIDAE <ul style="list-style-type: none"> • <i>Pachycara sp.</i> 	Chemosynthetic species (seeps and vents)
	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 <ul style="list-style-type: none"> • <i>Lucinoma sp.</i> VESICOMYIDAE	

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- *Isorropodon mackayi*
- 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*
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References:

ICES. 2020. ICES/NAFO Joint Working Group on Deep-water Ecology (WGDEC). ICES Scientific Reports. 2:62. 188 pp. <https://doi.org/10.17895/ices.pub.7503>