

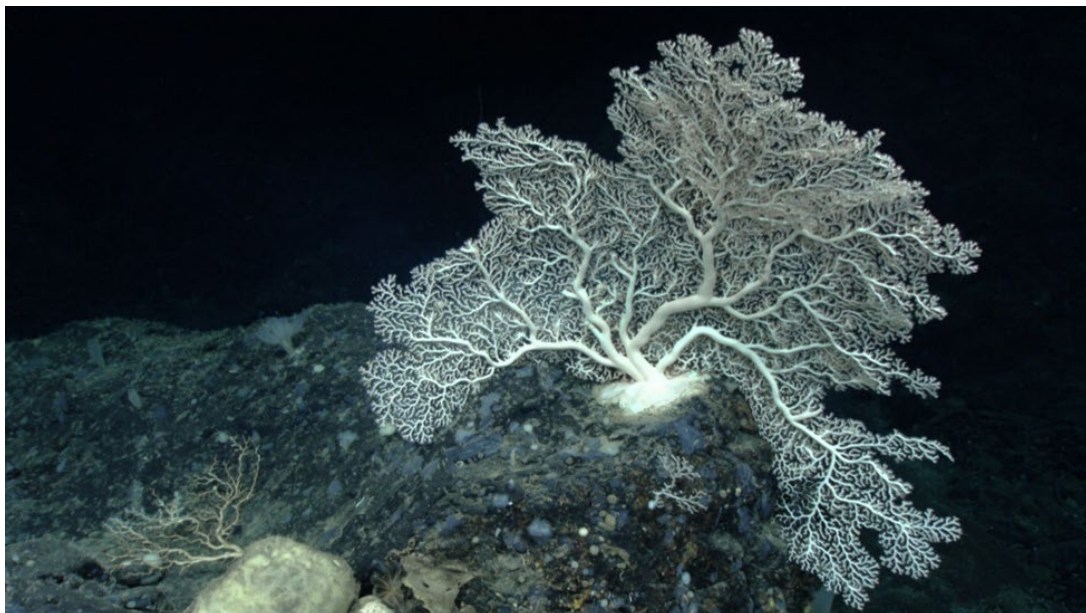


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List of Deep-Sea Coral Taxa in the U.S. Northeast Region: Depth and Geographic Distribution (v. 2021)

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List of Deep-Sea Coral Taxa in the U.S. Northeast Region: Depth and Geographic Distribution (v. 2021)

This annex to the U.S. Northeast chapter in “The State of Deep-Sea Coral and Sponge Ecosystems of the United States” provides a revised and updated list of deep-sea coral taxa in the Phylum Cnidaria, Class Anthozoa, known to occur in U.S. waters from Maine to Cape Hatteras (Figure 1). Deep-sea corals are defined as azooxanthellate, heterotrophic coral species occurring in waters 50 meters deep or more. Details are provided on the vertical and geographic extent of each species (Table 1). This list is an update of the peer-reviewed 2017 list by Packer et al. (2017a) with the addition of new species and range extensions into Northeast U.S. waters reported through 2021, along with a number of species previously not included. No new species from this region have been described since 2017. Taxonomic names are generally those currently accepted in the World Register of Marine Species ([WoRMS](https://www.marinepecies.org/)), and are arranged by order, then alphabetically by family, genus, and species. Data sources (references) listed are those principally used to establish geographic and depth distributions.

The total number of distinct deep-sea corals documented for the U.S. Northeast is 88 (15 with incomplete taxonomy). Octocorals have the highest species richness with 63 species, followed by scleractinians with 18 species.

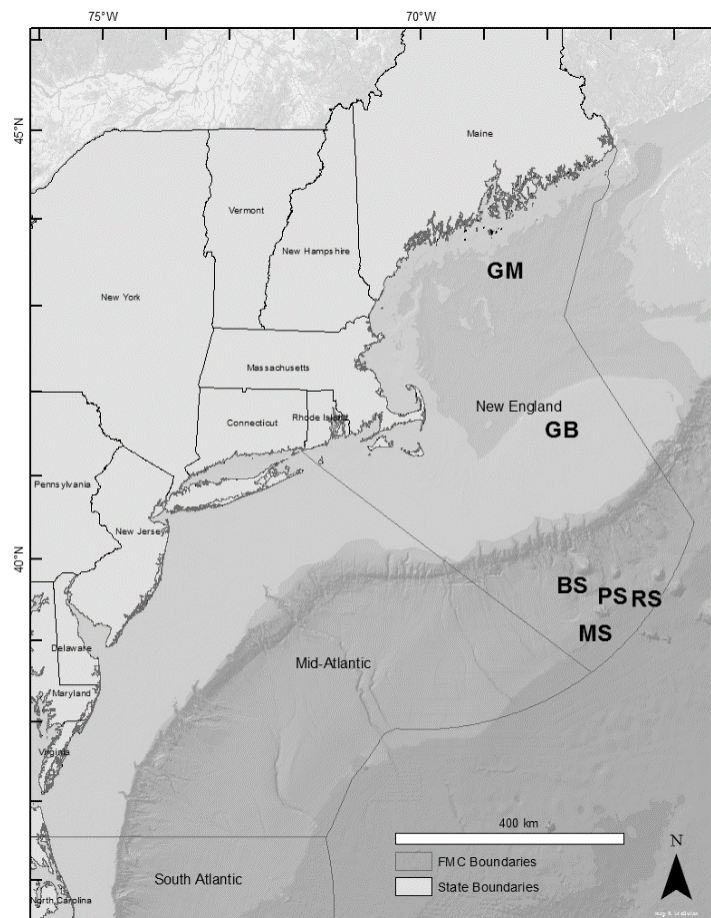


Figure 1. The U.S. Northeast region extends from Cape Hatteras north to the Canadian border, and includes the Mid-Atlantic and New England Fishery Management Council regions. The map shows the following major geographic features: GM = Gulf of Maine; GB = Georges Bank; BS = Bear Seamount; PS = Physalia Seamount; RS = Retriever Seamount; and MS = Mytilus Seamount.

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Cover Photo: A large white colony of *Hemicorallium* sp. observed in 2019 at 2,662 m depth on Retriever Seamount in the Northeast Canyons and Seamounts Marine National Monument. Image credit: NOAA Ocean Exploration

Table 1. List of known deep-sea coral species in Phylum Cnidaria, Class Anthozoa, and their reported distributions in Northeast United States waters. Bold text indicates changes to the list found in Packer et al. (2017a), including additions or range extensions, denoted with an asterisk (*), and changes in taxonomy since 2017 denoted with a cross (†) (e.g., species that were listed in 2017, but have since been given a new name or alternative spelling). References are numbered to correspond with citations following the table.

Distribution: NE = widespread in Northeast US waters; MA = off Massachusetts; RI = off Rhode Island; NY = off New York; NJ = off New Jersey; VA = off Virginia; NC = off North Carolina.

Habitat: C = Canyons; SH = Shelf; SL = Continental slope and rise; GM = Gulf of Maine; GB = Georges Bank; BS = Bear Seamount; PS = Physalia Seamount; RS = Retriever Seamount; MS = Mytilus Seamount. Additional information on the distribution of many species is found in Packer et al. (2007 and 2017b).

Higher Taxon	Species	Distribution	Depth Range (m)	References
Class Anthozoa				
Subclass Hexacorallia				
Order Antipatharia				
Family Antipathidae	<i>Stichopathes</i> sp. ^a	VA(SL)	262	1
Family Aphanipathidae	*cf. <i>Aphanostichopathes</i> sp. ^b	BS	1843-1888	1,2
Family Cladopathidae	* <i>Sibopathes</i> sp. ^c	VA(C),RS	2045	1,3
Family Leiopathidae	* <i>Leiopathes glaberrima</i> (Esper, 1788)	BS	1643, 1754	1,2,4
Family Schizopathidae	<i>Bathypathes</i> spp.	NE(C,BS,RS,MS,PS)	1195-3262	5,6,7
	* <i>Parantipathes</i> sp. cf. <i>P. hirondelle</i> Molodtsova, 2006 ^d	NE(C,BS,RS)	983-2045	1,5,6
	<i>Stauropathes</i> sp. 1 (<i>sensu</i> Quattrini et al. 2015)	NE(C,MS,RS)	1025-3262	6,7
	<i>Telopathes magnus</i> MacIsaac & Best 2013 (= <i>Telopathes magna</i> MacIsaac & Best, 2013)	NE(C,SL),BS,RS	1073-1983	6,8,9
Order Scleractinia				
Family Caryophylliidae	<i>Caryophyllia</i> (<i>Caryophyllia</i>) <i>ambrosia ambrosia</i> Alcock, 1898	MA-NY(SL,BS)	1487-2286	1,10,11
	<i>Caryophyllia</i> (<i>Caryophyllia</i>) <i>ambrosia caribbeana</i> Cairns, 1979	NY-NJ(C,SL)	1869-1975	1,10
	<i>Dasmosmilia lymani</i> (Pourtalès, 1871)	NE(C,SL)	37-700	9,10,12,13,14,15,16,17
	<i>Desmophyllum dianthus</i> (Esper, 1794)	NE(C,SL,BS,RS)	183-2250	6,9,10,11,12,13,18,19,20
	<i>Lophelia pertusa</i> (Linnaeus, 1758) ^e †[= <i>Desmophyllum pertusum</i> (Linnaeus, 1758)]	NE(C,BS)	146-1300	6,9,10,11,12,18,19,21
	* <i>Paracyathus pulchellus</i> (Philippi, 1842)	VA(C)	90-126	3
	<i>Premocyathus cornuformis</i> (Pourtalès, 1868)	NE(SL,BS)	1098-2200	1
	<i>Solenosmilia variabilis</i> Duncan, 1873	NE(C,BS)	220-1383	6,9,10,12,13,22
	<i>Vaughanella margaritata</i> (Jourdan, 1895)	BS	1100-1320	1,10,11

Higher Taxon	Species	Distribution	Depth Range (m)	References
Family Deltocyathidae	<i>Deltocyathus italicus</i> (Michelotti, 1838)	MA-NJ(SL,GM)	403-2634	10
Family Dendrophylliidae	<i>Enallopsammia profunda</i> (Pourtalès, 1867)	GB(C)	1211-1748	1,10
	<i>Enallopsammia rostrata</i> (Pourtalès, 1878)	BS	300-1646	10,22
Family Flabellidae	<i>Flabellum (Ulocyathus) alabastrum</i> Moseley, 1873	NE(C,SL),GM,BS	357-2500	9,10,11,12,13,14,18,19,22
	<i>Flabellum (Ulocyathus) angulare</i> Moseley, 1876	NE(C,SL)	2266-3186	10,11,12,13,18,19
	<i>Flabellum (Ulocyathus) macandrewi</i> Gray, 1849	NE(C,SL),GM	180-667	10,11,12,13,18,19
	<i>Javana cailleti</i> (Duchassaing & Michelotti, 1864)	NE(C)	30-1809	6,9,10,12,13
Family Fungiacyathidae	<i>Fungiacyathus (Fungiacyathus) fragilis</i> Sars, 1872	RI-NJ(C,SL)	412-460	10
Family Rhizangiidae	<i>Astrangia poculata</i> (Ellis & Solander, 1786)	MA-NC(SH)	0-263	10,23

Higher Taxon	Species	Distribution	Depth Range (m)	References
Class Anthozoa				
Subclass Octocorallia				
Order Alcyonacea				
Family Acanthogorgiidae	<i>Acanthogorgia armata</i> Verrill, 1878	NE(C,GM),RS	200-2500	1,6,7,18,19,20,24,25,26,27,28
	<i>Acanthogorgia aspera</i> Pourtalès, 1867	Norfolk Canyon	422-1341	9
Family Alcyoniidae	<i>Alcyonium digitatum</i> Linnaeus, 1758	Canada-NJ(SH,GB,GM)	40-100	24,25
	<i>Anthomastus agassizii</i> Verrill, 1922	NE(C,SL,BS)	800-3186	11,13,15,18,19,24,25,26,29
	<i>Anthomastus grandiflorus</i> Verrill, 1878	NE(C,SL,BS)	750-2637	18,19,24,25,26
	<i>*Pseudoanthomastus sp.</i>	NE(C)	928-1202	30
Family Anthothelidae	<i>Anthothela grandiflora</i> (Sars, 1856)	NE(C,GM)	100-960	1,6,9,19,24,25,26,28,31,32
	<i>Anthothela sp.</i>	Baltimore & Norfolk Canyons	474-594	31
	<i>Lateothela grandiflora</i> (Tixier-Durivault & d'Hondt, 1974) (= " <i>Alcyonium</i> " <i>grandiflorum</i> Tixier-Durivault & d'Hondt, 1974)	Baltimore & Norfolk Canyons	474-480	3,31
Family Chrysogorgiidae	<i>Chrysogorgia agassizii</i> (Verrill, 1883)	Canada-NJ(SL),PS	1928-3186	7,13,24,25

Higher Taxon	Species	Distribution	Depth Range (m)	References
Family Chrysogorgiidae cont.	<i>Chrysogorgia tricaulis</i> Pante and Watling, 2011	BS, RS	BS: 1559; RS: 3860	2,5,33
	†* <i>Iridogorgia magnispiralis</i> Watling, 2007 [†]	RS	1980-2100	7
	<i>Metallogorgia melanotrichos</i> (Wright and Studer, 1889)	BS,PS,RS, NE(C)	1491-2131	5,6,7,25,34
	<i>Radicipes gracilis</i> (Verrill, 1884)	BS,NE(C,SL)	1431-1650	5,6,22,24,25
Family Clavulariidae	<i>Clavularia modesta</i> (Verrill, 1874)	GM	30-125	1,24,25
	† <i>Trachythela rudis</i> Verrill, 1922 (= <i>Clavularia rudis</i> (Verrill, 1922))	NE(C),BS	750-1610	6,18,19,24, 25,26
Family Coralliidae	<i>Hemicorallium</i> sp. cf. <i>H. bathyrubrum</i> (Simpson & Watling, 2011) (= <i>Corallium</i> cf. <i>bathyrubrum</i> Simpson & Watling, 2011)	MS,RS	2000-3270	6,30,35
	* <i>Hemicorallium</i> sp. [§]	RS	1970-2662	30
Family Gorgoniidae	<i>Leptogorgia virgulata</i> (Lamarck, 1815) ^h	NY-NC(SH)	2-59	1,36,37
Family Keratoisididae ⁱ (formerly Isididae, in part)	<i>Acanella arbuscula</i> (Johnson, 1862) (= <i>Acanella eburnea</i> (Pourtalès, 1868))	RS,NE(C,SL)	411-3236	1,2,5,6,9,13, 14,15,18,19, 23,24,25,26,38
	<i>Acanella scarletae</i> Saucier & France, 2017	Norfolk Canyon	1670-1694	39
	<i>Jasonisis</i> sp.	MS,NE(C)	700-3000 (approx.)	6
	* <i>Keratoisid flexibilis</i> (Portalès, 1868)	Norfolk Canyon, RS	1219-1982	1,40
	<i>Keratoisid grayi</i> Wright, 1869	NE(C,SL),BS	320-3236	22,24,25
	* <i>Keratoisid</i> sp. 5 (<i>sensu</i> Watling et al. 2022)	BS	1415-1690	2,40
	<i>Lepidisis caryophyllia</i> Verrill, 1883	NE	646-3316	6,11,24,25,41
* <i>Lepidisis</i> sp. 9 (<i>sensu</i> Watling et al. 2022)	BS	1428-1639	40	
Family Nephtheidae	<i>Drifa glomerata</i> Verrill, 1869 (= <i>Capnella glomerata</i> (Verrill, 1869))	Lydonia Canyon	200-561	19,24,25,26
	<i>Duva florida</i> (Rathke, 1806) (= <i>Capnella florida</i> ; <i>Alcyonium multiflorum</i>)	Canada- VA(C,SL)	350-1500	9,14,15,18,19, 22,23,24
	<i>Gersemia fruticosa</i> (Sars, 1860)	NE(C,SL)	600-3100	18,24,26
	<i>Gersemia rubiformis</i> (Ehrenberg, 1834)	MA(SH,GM), VA(SH)	48-227	24,25
Family Paragorgiidae	<i>Paragorgia arborea</i> (Linnaeus, 1758)	NE(C),GM	176-1100	6,9,11,18,19, 23,24,25,26, 42,43,44
	<i>Paragorgia johnsoni</i> Gray, 1862	BS,MS,RS	1428-1650	2,7,30

Higher Taxon	Species	Distribution	Depth Range (m)	References
Family Plexauridae	<i>Paramuricea biscaya</i> Grasshoff, 1977	BS,RS,NE(C)	1218-2155	25,45
	<i>Paramuricea grandis</i> Verrill, 1883	GM,NE(C)	400-2200	5,13,18,19,24,25,26,29,45
	<i>Paramuricea</i> sp. cf. <i>P. grayi</i> (Johnson, 1861)	GM	220	45
	<i>Paramuricea placomus</i> (Linnaeus, 1758)	NE(C),GM	159-517	9,24,25,27,28,44,45
	<i>Swiftia casta</i> (Verrill, 1883)	GB(SL)	1836-2233	11,24,25
	*<i>Swiftia koreni</i> (Wright & Studer, 1889)	Lydonia Canyon	858	1
	<i>Swiftia pallida</i> Madsen, 1970 ^j	BS,NE(C)	580-1794	1,2,6
Family Primnoidae	<i>Calyptrophora antilla</i> Bayer, 2001	BS,NE(C)	1308-1684	1,7,25,46
	<i>Convexella</i> sp. cf. <i>C. jungersenii</i> (Madsen, 1944)	MS	2592-3271	6,7
	<i>Narella laxa</i> Deichmann, 1936	GB(SL)	3186	1,24,25,47
	*<i>Narella versluysi</i> (Hickson, 1909)	RS	2633	30
	<i>Paranarella watlingi</i> Cairns, 2007	MS,RS	3855	6,25,46
	<i>Parastenella atlantica</i> Cairns, 2007	RS	1984	25,46
	<i>Primnoa resedaeformis</i> (Gunnerus, 1763)	NE(C),GM	91-548	6,9,11,13,18,19,23,24,25,26,27,28,29,42,48,49
	† <i>Thouarella</i> (<i>Euthouarella</i>) <i>hilgendorfi</i> (Studer, 1879) ^k (= <i>Thouarella</i> (<i>E.</i>) <i>grasshoffi</i> Cairns, 2006)	NE(C),BS	720-1760	6,24,25,46,50
Order Pennatulacea				
Family Anthoptilidae	<i>Anthoptilum grandiflorum</i> (Verrill, 1879) (= <i>Benthoptilum sertum</i> Verrill 1885 (in part))	NE(SL, BS,RS)	559-3316	1,18,26
	<i>Anthoptilum murrayi</i> Kölliker, 1880	NE(SL)	314, 1538 - 2387	1
Family Balticinidae ¹ (=Halopteridae)	† <i>Balticina finmarchica</i> (Sars, 1851) (= <i>Halopteris finmarchica</i>)	Canada-MA(GM, SL)	229-2249	1,18,23,26
Family Funiculinidae	<i>Funiculina armata</i> Verrill, 1879	Canada-NJ(SL)	1538-2601	1
	*<i>Funiculina quadrangularis</i> (Pallas, 1766)	Norfolk Canyon	1504-1694	3
Family Kophobelemnidae	<i>Kophobelemnon stelliferum</i> (Müller, 1776) (= <i>Kophobelemnon scabrum</i> Verrill, 1883; <i>K. tenue</i> Verrill, 1885)	NE(SL)	393-2199, 2491-4332	1,6,13,19,26,38
Family Pennatulidae	<i>Pennatula aculeata</i> Danielssen, 1860	NE(SH,GM, SL,C),BS	119-3316	1,3,13,18,19,22,26
	† <i>Ptilella grandis</i> (Ehrenberg, 1834) (= <i>Pennatula grandis</i> Ehrenberg, 1834; <i>Pennatula borealis</i> M. Sars, 1846)	NE(SL)	1850-2140	13
Family Protoptilidae	<i>Distichoptilum gracile</i> Verrill, 1882	NE(SL,C)	600-2844	1,6,13,14,15,19,26

Higher Taxon	Species	Distribution	Depth Range (m)	References
Family Protoptilidae cont.	<i>Protoptilum carpenteri</i> Kölliker, 1872 (= <i>Protoptilum aberrans</i> Kölliker 1880)	NE(SL)	1334-2359	1
Family Scleroptilidae	<i>Scleroptilum grandiflorum</i> Kölliker, 1880 (= <i>Scleroptilum gracile</i> Verrill 1884)	NE(SL)	1502-4332	1
Family Umbellulidae	<i>Umbellula guentheri</i> Kölliker, 1880 (= <i>Umbellula guntheri</i> – alternate spelling)	NJ-VA(SL)	2683-3740	1
	<i>Umbellula lindahli</i> Kölliker, 1875 (= <i>Umbellula bairdii</i> Verrill, 1884)	NE(SL)	549-3338	1,2
Family Virgulariidae	<i>Stylatula elegans</i> (Danielssen, 1860)	NY- NC(SH,C,SL)	20-440	1,13,16,17, 19,26
	<i>Virgularia</i> sp.	NJ-DE(SH)	65-91, 360- 410, 942	1

Notes

- a. Specimen previously identified as *Cirrhopathes* sp. and included as such in Packer et al. (2007), has been subsequently identified as *Stichopathes* sp. (likely *Stichopathes gravieri* Molodtsova, 2006 – D. Opresko, pers. comm.).
- b. YPM IZ 036789.A – This specimen from deep water on Bear seamount, previously identified as “*Stichopathes* sp.,” likely belongs to the genus *Aphanostichopathes* in the Family Aphanipathidae, recently described by Opresko et al. (2021). A number of other unbranched black corals observed in U.S. northeast canyons at depths between 1300 and 1900 m and identified as “*Stichopathes* sp.,” may also belong to this genus.
- c. USNM 1204039 – Retriever Seamount (*Sibopathes* cf. *macrospina*). Also reported in CSA (2017).
- d. A number of black corals in the genus *Parantipathes* have been observed in the region. At least on specimen (USNM 1596679) identified as *Parantipathes* sp. cf. *P. hirondelle* Molodtsova, 2006 was collected from a New England canyon at a depth of 1092m. LaPointe et al. (2020) reported observations of *Parantipathes larix* (Esper, 1788) at depths between 2100-2132m; however we were not able to ascertain that any specimens of this eastern Atlantic and Mediterranean species had been identified from the western Atlantic.
- e. Transfer of *Lophelia pertusa* to the genus *Desmophyllum* has been proposed recently based on genetic similarity of mitochondrial genomes and microsatellites (Addamo et al., 2016), and this change has been accepted by WoRMS. However, because of the significant morphological difference between these two genera and a difference of opinion even among molecular scientists, we suggest delaying this transfer until additional molecular studies are done on more genes.
- f. LaPointe et al. (2020) identify Retriever Seamount as the westernmost seamount where *I magnispiralis* was observed. The 2007 and 2017 lists included *Iridogorgia pourtalesii* Verrill, 1883, based on Watling & Auster (2005). Watling (2007) reviewed the genus and concluded that *I. pourtalesii* differed from specimens collected elsewhere in the Atlantic. *Iridogorgia pourtalesii* may be confined to the Caribbean, although it is difficult to ascertain since only fragments remain of the holotype (Watling, pers. comm.).
- g. White species of *Hemicorallium*, i.e., not *H. bathyrubrum*, potentially *Hemicorallium bayeri* (Simpson & Watling, 2011).
- h. *Leptogorgia virgulata* is primarily a shallow-water species with nearly all specimens recorded at depths less than 50 m. In the mid-Atlantic, it is often found on artificial reefs.
- i. Saucier et al. (2021) have revised the phylogeny of the bamboo corals (formerly Isididae), resulting in five families. The bamboo corals described from the NE U.S. all belong in the new family Keratoisididae. Watling et al. (2022) reevaluated the Family Keratoisididae, including numerous specimens collected from the New England Seamounts. The taxa with incomplete taxonomy (e.g., *Keratoisid* sp.5 and *Lepidisis* sp. 9) may end up in different genera.

- j. Grasshoff (1985) proposed that *Swiftia pallida* was a junior synonym of the Mediterranean and E. Atlantic species *Swiftia dubia* (Thomson, 1929), based on specimens collected from North Atlantic seamounts off the Azores. However, based on western Atlantic records of *S. pallida* in museums and online databases, for the present we have retained *S. pallida* as a distinct species pending further genetic and morphological comparisons.
- k. Cairns (2021) reported the synonymy of *Thouarella grasshoffi* to *T. hilgendorfi*.
- l. Pérez et al. (2021) established Balticinidae and *Balticina* as the valid family and genus names for the sea pens most commonly identified as Halipteridae and *Halipteris*. *Balticina finmarchica* has been recorded as bycatch in or near Wilkinson Basin, in the Gulf of Maine.

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