

Deep-sea Coral Taxa in the Alaska Region: Depth and Geographical Distribution

by Robert P. Stone¹ and Stephen D. Cairns²

1. NOAA Fisheries, Alaska Fisheries Science Center
2. Department of Invertebrate Zoology, National Museum of Natural History, Smithsonian Institution, Washington, D.C.

This annex to the Alaska regional chapter in “State of Deep-Sea Coral Ecosystems of the United States” lists deep-sea coral species in the Phylum Cnidaria, Classes Anthozoa and Hydrozoa, known to occur in the U.S. Alaska region (Figure 1). The list covers azooxanthellate, heterotrophic coral species that occur predominantly deeper than 50 m in U.S. waters around Alaska. Details are provided on depth ranges and known geographic distribution within the region (Table 1). The list is adapted from Stone and Shotwell (2007) and has been drawn from the published literature (including species descriptions) and from recent specimen collections that have been definitively identified by experts through examination of microscopic characters. Video records collected by the senior author have also been used if considered highly reliable; that is, in situ identifications were made based on an expertly identified voucher specimen collected nearby. Taxonomic names are generally those currently accepted in the World Register of Marine Species (<http://www.marinespecies.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those principally used to establish geographic and depth distributions, and are numbered accordingly except for three unpublished reference collections as follows: A) the reference collection and video records of the senior author, B) specimen records archived at the United States National Museum of Natural History, Smithsonian Institution (2015), and C) S. Cairns (unpublished data).

In summary, we have confirmed the presence of 137 unique coral taxa in Alaskan waters. Octocorals were the most speciose (89 taxa total), followed by hydrocorals (24 taxa), antipatharians (12 taxa) and scleractinians (12 taxa). The Aleutian Islands region has the most taxa (n=96), followed by the Gulf of Alaska Seamount Province (n=42), the eastern Gulf of Alaska (n=39), the western Gulf of Alaska (n=24), and the Bering Sea (n=18 taxa). Only a single coral species is known from the Arctic Region. Black corals (Order Antipatharia) were found over a depth range of 401-4685 m throughout the Alaska Region, scleractinians (Order Scleractinia) were found over a depth range of 17-6328 m, octocorals (Orders Alcyonacea and Pennatulacea) were found over a depth range of 3-4784 m, and hydrocorals (Order Anthoathecata) had the narrowest depth range of 10-2124 m in the region.

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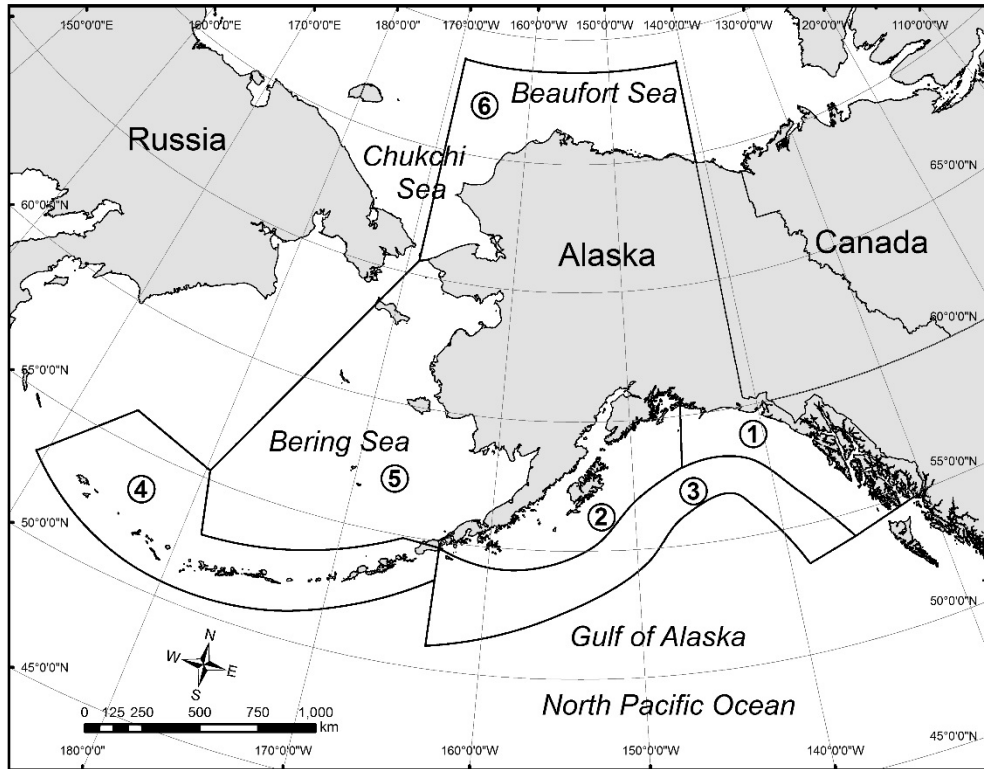


Figure 1. The Alaska region showing the five broad geographical areas that have previously been delineated for similar zoogeographical compilations (e.g. Stone and Shotwell, 2007) with the addition of a sixth area encompassing the Chukchi and Beaufort Seas. Region 1 = eastern Gulf of Alaska; Region 2 = western Gulf of Alaska; Region 3 = Gulf of Alaska Seamounts Province; Region 4 = Aleutian Islands; Region 5 = Bering Sea; and Region 6 = Arctic. Figure courtesy of Michele Masuda (NOAA Fisheries).

Table 1. List of known deep-sea coral species in Phylum Cnidaria, Class Anthozoa and Class Hydrozoa, and their reported distribution in the Alaska Region. Bold text and blue-shaded fields indicate newly described species, new list additions, or range extensions since Stone and Shotwell (2007). No symbols before bold & blue-shaded species names indicate newly described species, asterisks (*) denote new list additions, crosses (†) show name changes, and bold & blue-shaded depth and/or region fields represent range changes. “NR” indicates a lack of reported distribution or depth information. References are numbered to correspond with citations following the table.

Distribution: 1 = eastern Gulf of Alaska; 2 = western Gulf of Alaska; 3 = Gulf of Alaska Seamounts Province; 4 = Aleutian Islands; 5 = Bering Sea; and 6 = Arctic region.

Higher Taxon	Species	Distribution	Depth range (m)	References
Class Anthozoa				
Subclass Hexacorallia				
Order Antipatharia				
Family Cladopathidae	<i>Chrysopathes formosa</i> Opresko, 2003	1	417–800	A
	<i>Chrysopathes speciosa</i> Opresko, 2003	1	626–914	B,1
	† <i>Heteropathes pacifica</i> (Opresko, 2005) (= <i>Heliopathes pacifica</i>)	3	3563–4511	2
	<i>Trissopathes pseudotristicha</i> (Opresko, 2003)	3,4	2828–4477	A,B
Family Schizopathidae	† <i>Alternatipathes alternata</i> (Brook, 1889) (= <i>Bathypathes alternata</i>)	3 ⁱ	2818–4685	B
	<i>Bathypathes patula</i> Brook, 1889	1,3	401–4492	A,B
	<i>Bathypathes</i> sp. A	1,3	497–637	A
	<i>Bathypathes</i> sp. B	3,4	3274–4664	B
	<i>Dendrobathypathes boutillieri</i> Opresko, 2005	1,3,4	601–2161	A,3
	<i>Lillipathes wingi</i> Opresko, 2005	1,2,5	518–909	A,1
	<i>Parantipathes</i> sp. A	1,4 ⁱⁱ	690–1562	3
	* <i>Parantipathes</i> sp. B	3	1907–2819	B
Order Scleractinia				
Family Caryophylliidae	<i>Caryophyllia (Caryophyllia) alaskensis</i> Vaughan, 1941	1,2,4,5	27–909	A
	<i>Caryophyllia (Caryophyllia) arnoldi</i> Vaughan, 1900	1,2,3,4	17–1702	A,B
	<i>Crispatotrochus foxi</i> (Durham & Barnard, 1952)	4	82–702	A,4
	* <i>Desmophyllum dianthus</i> (Esper, 1794)	1	398	A
Family Dendrophylliidae	<i>Balanophyllia (Balanophyllia) elegans</i> Verrill, 1864	1,2,4	22–293	A,4
Family Flabellidae	† <i>Flabellum</i> sp. sensu Cairns, 1994 (= <i>Flabellum</i> sp.)	4	55–507	C,4
	<i>Javania borealis</i> Cairns, 1994	4 ⁱⁱⁱ	17–348	A,4
	<i>Javania cailleti</i> (Duchassaing & Michelotti, 1864)	4 ^{iv}	115–150	A
	* <i>Javania</i> sp.	3	1799	B
Family Fungiacyathidae	<i>Fungiacyathus marenzelleri</i> (Vaughan, 1906)	4	300–6328	4
	<i>Fungiacyathus</i> sp.	3	3274–4702	B
Family Micrabaciidae	<i>Leptopenus discus</i> Moseley, 1881	4	3599–5000	4

Higher taxon	Species	Distribution	Depth Range (m)	References
Class Anthozoa				
Subclass Octocorallia				
Order Alcyonacea				
Family Acanthogorgiidae	* <i>Acanthogorgia spissa</i> Kükenthal, 1909	4	1659–2087	3,5
	<i>Acanthogorgia</i> sp.	4	1092–1579	3
	<i>Calcigorgia beringi</i> (Nutting, 1912)	1,4	92–1913	3,6
	<i>Calcigorgia japonica</i> Dautova, 2007	4	395–2180	A
	<i>Calcigorgia spiculifera</i> Broch, 1935	1,2,4	18–512	3,7
Family Alcyoniidae	<i>Alcyonium</i> sp.	4	18–160	A
	† <i>Heteropolypus</i> cf. <i>japonicus</i> (Nutting, 1912) (= <i>Anthomastus japonicus</i>)	4	424	B
	*† <i>Heteropolypus</i> sp. (= <i>Anthomastus</i> sp.)	1,3,4,5	85–2040	3
Family Anthothelidae	<i>Anthothela</i> cf. <i>grandiflora</i> (M. Sars, 1856)	4	25–352	3,8
Family Chrysogorgiidae	<i>Chrysogorgia</i> sp. A	3	1854	B
	* <i>Chrysogorgia</i> sp. B	4	1359–2163	A
	* <i>Chrysogorgia</i> sp. C	3	3385–4328	B
	<i>Radicipes verrilli</i> (Wright, 1885)	3,4	1612–3580	B,3
Family Clavulariidae	<i>Clavularia armata</i> Thomson, 1927	3	2689–2730	B
	* <i>Clavularia eburnea</i> Kükenthal, 1906	4	882	B
	<i>Clavularia rigida</i> Broch, 1935	3	3277	B
	<i>Clavularia</i> sp.	4,5	11–591	3,8
	<i>Sarcodictyon incrustans</i> (Broch, 1935)	1,4,5	15–388	A
	<i>Sarcodictyon</i> sp.	3	2811	B
Family Coralliidae	† <i>Hemicorallium regale</i> Bayer, 1956 (= <i>Corallium</i> sp.)	3	1672–1806	B
Family Isididae	<i>Bathygorgia profunda</i> (Wright, 1885)	1,2,4	3230	B
	<i>Isidella tentaculum</i> Etnoyer, 2008 (= <i>Isidella</i> sp. A)	1,3,4,5	340–1468	B,3
	<i>Isidella</i> sp. A	4	2826	A
	* <i>Isidella</i> sp. B	3	2652–4575	B
	* <i>Isidella</i> sp. C	3	287–992	B
	<i>Keratoisis</i> sp. A	4,5	520–2031	A
	<i>Keratoisis</i> sp. B	4	1715–1717	A
	* <i>Keratoisis</i> sp. C	4	1715	A
	† <i>Keratoisis</i> sp. D (= <i>Keratoisis</i> sp. B)	3	1096–1759	B
	* <i>Keratoisis</i> sp. E	3	3574–4097	B

Higher taxon	Species	Distribution	Depth Range (m)	References
Family Isididae, cont.	<i>Lepidisis</i> sp. A	3	1130–1924	B
	<i>Lepidisis</i> sp. B	3	3501–4784	B
Family Nidaliidae	* <i>Siphonogorgia</i> sp.	3	1094	B
Family Nephtheidae	* <i>Gersemia fruticosa</i> Sars, 1860	2,4	1143	B
	† <i>Gersemia rubiformis</i> (Ehrenberg, 1834) (= <i>Eunephtea rubiformis</i>)	1,2,4,5,6	3–90	B
	† <i>Gersemia</i> sp. (= <i>Eunephtea</i> sp. A)	4	804–2845	A
Family Paragorgiidae	<i>Paragorgia arborea</i> (Linnaeus, 1758)	1,2,4,5	21–2022	B,3
	† <i>Paragorgia arborea forma pacifica</i> (Linnaeus, 1758) (= <i>Paragorgia pacifica</i>)	1,2	417–746	A
	<i>Paragorgia</i> sp.	3	718–1376	B
	<i>Sibogagorgia cauliflora</i> Herrera, Baco & Sánchez,	3	2766	B
Family Plexauridae	<i>Alaskagorgia aleutiana</i> Sánchez & Cairns, 2004	4	91–614	3
	<i>Cryogorgia koolsae</i> Williams, 2005	4	26–406	A,9
	<i>Muriceides cylindrica</i> Nutting, 1912	4	174–881	6
	<i>Muriceides nigra</i> Nutting, 1912	4	87–1195	A,3
	† <i>Psammogorgia simplex</i> Nutting, 1909 (= <i>Swiftia simplex</i>)	1,3,4	497–1285	A,B
	<i>Swiftia pacifica</i> (Nutting, 1912)	1,2,3,4,5	210–2779	A,B
	† <i>Swiftia</i> sp. (= <i>Swiftia beringi</i>)	4	274–342	3
Family Primnoidae	<i>Arthrogorgia kinoshitae</i> Bayer, 1952	4 ^v	150–1309	A,10
	<i>Arthrogorgia otsukai</i> Bayer, 1952	4 ^{vi}	1332–1348	A
	<i>Arthrogorgia utinomii</i> Bayer, 1996	4	163–882	11
	† <i>Calyptrophora laevispinosa</i> Cairns, 2007 (= <i>Calyptrophora japonica</i>)	3	1806–2795	B,10
	<i>Fanellia compressa</i> (Verrill, 1865)	4 ^{vi}	82–1341	A,10
	<i>Fanellia fraseri</i> (Hickson, 1915)	2,4	54–1341	A,10
	<i>Narella abyssalis</i> Cairns & Baco, 2007 (= <i>Narella</i> sp. A)	3	4594	12
	<i>Narella alaskensis</i> Cairns & Baco, 2007 (= <i>Narella</i> sp. B)	3	2254–3075	B,12
	<i>Narella arbuscula</i> Cairns & Baco, 2007 (= <i>Narella</i> sp. C)	3	2775–3465	12
	<i>Narella bayeri</i> Cairns & Baco, 2007 (= <i>Narella</i> sp. D)	3	3277–4091	12
	<i>Narella cristata</i> Cairns & Baco, 2007 (= <i>Narella</i> sp. E)	3	3385	12

Higher taxon	Species	Distribution	Depth Range (m)	References
Family Primnoidae, cont.	<i>Parastenella doederleini</i> (Wright & Studer, 1889) (= <i>Parastenella</i> sp. B)	4 ⁱⁱ	400–3423	10
	<i>Parastenella gymnogaster</i> Cairns, 2007	3	2417–2869	B
	† <i>Parastenella ramosa</i> (Studer, 1894) (= <i>Parastenella</i> sp. A)	1,3,4	750–1937	B
	<i>Plumarella aleutiana</i> Cairns, 2011	3,4,5	79–2828	A,10
	<i>Plumarella echinata</i> Cairns, 2011	4	150–1692	10
	<i>Plumarella hapala</i> Cairns, 2011	4	120–402	A,10
	<i>Plumarella nuttingi</i> Cairns, 2011	4	492–888	10
	<i>Plumarella profunda</i> Cairns, 2011	4	2514	10
	<i>Plumarella robusta</i> Cairns, 2011	4	115–1061	A,10
	<i>Plumarella spicata</i> Nutting, 1912	4	712–1912	10
	† <i>Plumarella superba</i> (Nutting, 1912) (= <i>Thouarella superba</i>)	4	40–1258	10
	<i>Primnoa pacifica</i> Kinoshita, 1907	1,2,4,5	6–573	A
	<i>Primnoa pacifica</i> var. <i>willeyi</i> Hickson, 1915	1,2,3,4	27–863	10
	<i>Primnoa wingi</i> Cairns & Bayer, 2005	4,5	110–1280	A,10
	<i>Thouarella cristata</i> Cairns, 2011	4	94–768	10
<i>Thouarella trilineata</i> Cairns, 2011	4	97–1267	A,10	
Order Pennatulacea				
Family Anthoptilidae	<i>Anthoptilum grandiflorum</i> (Verrill, 1879)	4,5	2153–2511	3
	<i>Anthoptilum murrayi</i> (Verrill, 1879)	4 ^{vi}	1068–2226	B
Family Halipteridae	<i>Halipterus californica</i> (Moroff, 1902)	1,2	1143	B
	<i>Halipterus willemoesi</i> Kölliker, 1870	1,2,4,5	21–488	13,14
	* <i>Halipterus</i> sp. A	4,5	284–1381	3
	* <i>Halipterus</i> sp. B	4	1667–2707	3
Family Pennatulidae	* <i>Pennatula</i> sp.	4	2239–2930	3
	<i>Ptilosarcus gurneyi</i> (Gray, 1860)	1,2,4	3–195	A,3
Family Protoptilidae	<i>Protoptilum</i> sp.	1,2,5	105–529	11,15
Family Umbellulidae	<i>Umbellula lindahli</i> Kölliker, 1875	1,2,3,4,5	840–4656	A,B
Family Veretillidae	<i>Cavernularia vansyoci</i> Williams, 2005	4	86–93	9
Family Virgulariidae	* <i>Virgularia bromleyi</i> Kölliker, 1880	4	1889	B
	* <i>Virgularia glacialis</i> Kölliker, 1870	4	122	B
	<i>Virgularia</i> sp.	1,2,4	20–187	A,B

Higher taxon	Species	Distribution	Depth range (m)	Reference(s)
Class Hydrozoa				
Order Anthoathecata				
Family Stylasteridae	<i>Crypthelia trophostega</i> Fisher, 1938	4,5 ^{vii}	146–1913	16
	<i>Cyclohelia lamellata</i> Cairns, 1991	4,5 ^{vii}	27–691	3,16
	<i>Distichopora borealis</i> Fisher, 1938	1,4	143–1361	3,16
	<i>Errinopora dichotoma</i> Lindner & Cairns, 2011	4	175–300	16
	<i>Errinopora disticha</i> Lindner & Cairns, 2011	4	175–536	16
	<i>Errinopora fisheri</i> Lindner & Cairns, 2011	4	455–458	16
	<i>Errinopora nanneca</i> Fisher, 1938	4	21–517	A,16
	<i>Errinopora undulata</i> Lindner & Cairns, 2011	4	350–640	16
	<i>Errinopora zarhyncha</i> Fisher, 1938	4	115–1520	A,3
	<i>Stylanthea papillosa</i> (Dall, 1884) (= <i>Stylanthea porphyra</i> , <i>S. petrograpta</i>)	1,2	11–18	16
	<i>Stylaster alaskanus</i> Fisher, 1938 (= <i>S. cancellatus</i>)	4	146–2124	3,16
	<i>Stylaster brochi</i> (Fisher, 1938)	1,2,4	22–374	A,16
	† <i>Stylaster campylecus</i> (Fisher, 1938) (= <i>Stylaster campylecus campylecus</i> , <i>S. polyorchis</i> , <i>S. c. tylota</i> , <i>S. moseleyanaus</i>)	1,2,4	82–1260	3,16
	<i>Stylaster crassiseptum</i> Lindner & Cairns, 2011	4	291–531	16
	<i>Stylaster elassotomus</i> Fisher, 1938	4	882	16
	* <i>Stylaster leptostylus</i> (Fisher, 1938)	4	518	16
	<i>Stylaster parageus columbiensis</i> Lindner & Cairns, 2011	1	92–212	A
	† <i>Stylaster parageus parageus</i> (Fisher, 1938) (= <i>Stylaster campylecus parageus</i>)	1,2	26–401	A,16
	<i>Stylaster repandus</i> Lindner & Cairns, 2011	4	375–475	16
	* <i>Stylaster stejnegeri</i> (Fisher, 1938)	4	87	16
	* <i>Stylaster trachystomus</i> (Fisher, 1938)	4	115–366	16
	<i>Stylaster</i> sp.	4	1260–1327	A
	<i>Stylaster venustus</i> (Verrill, 1870)	1	20	A
<i>Stylaster verrillii</i> (Dall, 1884) (= <i>S. moseleyi</i> f. <i>pacifica</i>)	1,4	10–393	A,16	

Notes

- i. This species is reported from fewer specific localities than in 2007: it is no longer reported from region 1.
- ii. This species is reported from fewer specific localities than in 2007: it is no longer reported from region 3.
- iii. This species is reported from fewer specific localities than in 2007: it is no longer reported from regions 2 or 3.
- iv. This species is reported from fewer specific localities than in 2007: it is no longer reported from regions 1 or 2.
- v. This species is reported from fewer specific localities than in 2007: it is no longer reported from regions 1, 2, or 5.
- vi. This species is reported from fewer specific localities than in 2007: it is no longer reported from region 5.
- vii. Both records are based on single samples that were likely translocated by vessels fishing in the Aleutian Islands.

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