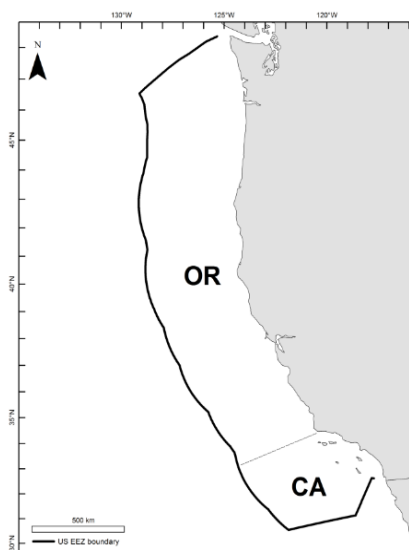


Deep-Sea Coral Taxa in the U.S. West Coast Region: Depth and Geographic Distribution

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This annex to the U.S. West Coast chapter in “The State of Deep-Sea Coral and Sponge Ecosystems of the United States” provides a list of deep-sea coral taxa in the Phylum Cnidaria, Classes Anthozoa and Hydrozoa, known to occur in U.S. waters off Washington, Oregon, and California (Figure 1). Deep-sea corals are defined as azooxanthellate, heterotrophic coral species occurring in waters 50 m deep or more. Details are provided on the vertical and geographic extent of each species (Table 1). This list is adapted from Whitmire and Clarke (2007) and has been drawn from the published literature (including species descriptions) and from records in the collections of the United States National Museum of Natural History, the California Academy of Sciences, and the Santa Barbara Museum of Natural History. Taxonomic names are generally those currently accepted in the World Register of Marine Species ([WoRMS](#)), and are arranged by order, and alphabetically within order by suborder (if applicable), family, genus, and species. Data sources (references) listed are those principally used to establish geographic and depth distribution.



Regional geographic distribution within U.S. waters is divided into two biogeographic provinces: the Oregon Province (**OR**), which extends from around the Northern tip of Vancouver Island, Canada, to around Point Arguello/Point Conception, USA; and the California Province (**CA**), which extends south from there to around Magdalena Bay, Mexico.

In summary, we have confirmed the presence of 135 unique coral taxa in U.S. waters off Washington, Oregon, and California. Octocorals were the most speciose (101 taxa total), followed by scleractinians (19 taxa), antipatharians (9 taxa), and stylasterid corals (6 taxa), some of these taxa unidentified to species.

Figure 1. U.S. West Coast region, delimiting geographic boundaries considered in this work, divided into the Oregon Province (OR) and the California Province (CA).

Recommended citation: Whitmire CE, Clarke ME, Yoklavich MM, Everett MV, Hourigan TF, Cairns SD (2017) Deep-Sea Coral Taxa in the U.S. West Coast Region: Depth and Geographical Distribution. Online resource: <https://deepseacoraldata.noaa.gov/library/2017-state-of-deep-sea-corals-report>

Table 1. List of known deep-sea coral species in the Phylum Cnidaria, Class Anthozoa and Class Hydrozoa, and their reported distributions in U.S. waters off Washington, Oregon, and California. Blue fields indicate newly described species since 2007. Bold text indicates changes to the list found in Whitmire and Clarke (2007), including additions or range extensions, with new species denoted with an asterisk (*), and changes in taxonomy since 2007, denoted with a cross (†) (e.g., species that were listed in 2007, but have since been given a new name or alternative spelling). “NR” indicates a lack of reported distribution or depth information. References are numbered to correspond with citations following the table, along with notes (in superscript letters) pertaining to individual taxa.

Distribution: OR = records from the Oregon Province; CA = records from the California Province.

Higher Taxon	Species	Distribution	Depth Range (m)	References
Class Anthozoa				
Subclass Hexacorallia				
Order Antipatharia				
Family Antipathidae	<i>Antipathes dendrochristos</i> Opresko, 2005	OR,CA	91-427	1,2,3,4
Family Cladopathidae	<i>Chrysopathes speciosa</i> Opresko, 2003	OR,CA	225-1400	5,6
	* <i>Heteropathes</i> sp. (= <i>Heliopathes</i> sp.)	OR	1700-3200	6
	<i>Trissopathes pseudotristicha</i> Opresko, 2003	OR,CA	227-2972	5
Family Schizopathidae ^a	* <i>Alternatipathes alternata</i> (Brook, 1889) (= <i>Bathypathes alternata</i> Brook, 1889)	OR	412-4881	6,7,53
	* <i>Alternatipathes bipinnata</i> (Opresko, 2005) (= <i>Umbellapathes bipinnata</i> Opresko, 2005)	OR	1205-1383	6
	* <i>Bathypathes patula</i> Brook, 1889	OR	225-4868	6
	* <i>Lillipathes wingi</i> Opresko, 2005	OR	877-904	6
	* <i>Parantipathes</i> sp.	OR,CA	490-2820	6
Order Scleractinia				
Family Caryophylliidae	<i>Caryophyllia (Caryophyllia) arnoldi</i> Vaughan, 1900	OR,CA	40-656	8
	* <i>Caryophyllia (Caryophyllia) diomedea</i> Marenzeller, 1904	CA	225-2200	10,11
	* <i>Caryophyllia (Caryophyllia) quadragenaria</i> Alcock, 1902	CA	54-1669	8,10
	<i>Coenocyathus bowersi</i> Vaughan, 1906	OR,CA	13-708	8,9
	<i>Crispatotrochus foxi</i> (Durham & Barnard, 1952)	CA	82-272	8,12
	<i>Desmophyllum dianthus</i> (Esper, 1794)	OR,CA	37-293	8,9
	<i>Labyrinthocyathus quaylei</i> (Durham, 1947)	OR,CA	37-293	8
	<i>Lophelia pertusa</i> (Linnaeus, 1758)	OR,CA	39-2775	8,9
	<i>Nomlandia californica</i> Durham & Barnard, 1952	CA	82	8,12
	<i>Paracyathus montereyensis</i> Durham, 1947	OR	75-146	8
	<i>Paracyathus stearnsii</i> Verrill, 1869	OR,CA	6-835	8,9

Higher Taxon	Species	Distribution	Depth Range (m)	References
Family Dendrophylliidae	<i>Balanophyllia (Balanophyllia) elegans</i> Verrill, 1864	OR,CA	1-1553	8,9
	<i>Dendrophyllia oldroydae</i> Oldroyd, 1924	CA	40-576	8
Family Flabellidae	<i>Javania californica</i> Cairns, 1994	OR	62-1553	8
	<i>Polymyces montereyensis</i> (Durham, 1947)	OR,CA	69-212	6,13
Family Fungiacyathidae	<i>Fungiacyathus (Bathyactis) marenzelleri</i> (Vaughan, 1906)	OR,CA	1820-6328	8
Family Micrabaciidae	<i>Leptopenus discus</i> Moseley, 1881	OR,CA	3599-5000	8
Family Oculinidae	<i>Madrepora oculata</i> Linnaeus, 1758	CA	84-490	6,8
	<i>Oculina profunda</i> Cairns, 1991	OR	119-578	6,8

Higher Taxon	Species	Distribution	Depth Range (m)	References
Class Anthozoa				
Subclass Octocorallia				
Order Alcyonacea				
Family Acanthogorgiidae	* <i>Acanthogorgia gracillima</i> Kükenthal, 1909	CA	160	26,29
	<i>Acanthogorgia</i> sp.	OR,CA	49-2301	16,18,29
	† <i>Calcigorgia beringi</i> (Nutting, 1912) (= <i>Swiftia beringi</i> Nutting, 1912)	OR,CA	39-826	18,32
	<i>Calcigorgia spiculifera</i> Broch, 1935	OR	144-1159	18
	* <i>Muricella complanata</i> Wright & Studer, 1889	OR	521-653	6,27,29
Family Alcyoniidae	* <i>Bathyalcyon robustum</i> Versluys, 1906 (= <i>Anthomastus robustum</i>)	OR	2449-3961	7,16
	* <i>Eleutherobia rubra</i> (Brundin, 1896)	OR,CA	80-905	6
	† <i>Heteropolypus ritteri</i> (Nutting, 1909) (= <i>Anthomastus ritteri</i> Nutting, 1909)	OR,CA	35-3330	7,13,17,18,19
Family Anthothelidae	* <i>Anthothela argentea</i> Studer, 1894 ^b	OR,CA	490-1050	6
	<i>Anthothela pacifica</i> (Kükenthal) ^b	OR,CA	201-350	15,26,29
Family Chrysogorgiidae	<i>Chrysogorgia monticola</i> Cairns, 2007	OR	1711-3015	23
	<i>Chrysogorgia pinnata</i> Cairns, 2007	OR	1968-3275	23
	<i>Iridogorgia</i> sp.	OR,CA	2027-2215	7,21,23
	<i>Radicipes</i> sp.	OR	NR	15
Family Clavulariidae	* <i>Clavularia grandiflora</i> (Nutting, 1908)	OR	593-1529	7,21
	<i>Clavularia</i> sp. A	OR	0-200	15
	<i>Clavularia</i> sp. H	CA	NR	9,22
	* <i>Telesto californica</i> Kükenthal, 1913	CA	55-91	6,9
	* <i>Telesto nuttingi</i> Kükenthal, 1913	CA	75-108	6,9
	<i>Telestula ambigua</i> Nutting, 1909	OR	958	15,19
Family Coralliidae	<i>Corallium</i> sp.	OR,CA	628-2447	16,21

Higher Taxon	Species	Distribution	Depth Range (m)	References
Family Gorgoniidae	<i>Adelogorgia phyllosclera</i> Bayer, 1958	CA	9-595	9,18,26,29
	* <i>Eugorgia daniana</i> Verrill, 1868 (= <i>Leptogorgia daniana</i> (Verrill, 1868))	CA	6-70	33
	<i>Eugorgia rubens</i> Verrill, 1868 (= <i>Leptogorgia rubens</i> (Verrill, 1868))	OR,CA	50-200+	9,18,33,29
	* <i>Eugorgia sp. nov.</i>	CA	30-98	29
	† <i>Leptogorgia chilensis</i> Verrill, 1868 (= <i>Leptogorgia caryi</i> Verrill, 1868) ^c	OR,CA	5-231	6,9,18,26,34
	<i>Leptogorgia filicrispa</i> Horvath, 2011	CA	20-87	35
	* <i>Leptogorgia sp. A</i> (likely <i>L. tricolorata</i> Breedy and Cortés, 2011)	CA	36-91	29
Family Isididae ^d	<i>Acanella sp.</i>	OR,CA	975-2844	7,16
	* <i>Bathygorgia profunda</i> (Wright, 1885)	OR	1405	21
	<i>Isidella tentaculum</i> Etnoyer, 2008	OR,CA	720-1050	24
	<i>Keratoisis flabellum</i> (Nutting, 1908)	OR	1829 -2012	13
	<i>Keratoisis philippinensis</i> (Wright and Studer, 1889)	OR	1262-1463	13
	<i>Keratoisis sp.</i>	OR,CA	436-1910	29
	<i>Lepidisis sp.</i>	OR,CA	180-3317	6,7
Family Nephtheidae	<i>Gersemia juliepackardae</i> Williams and Lundsten, 2009	OR,CA	519-2034	20
	<i>Gersemia rubiformis</i> (Ehrenberg, 1834) (= <i>Capnella rubiformis</i> , <i>Eunephthya rubiformis</i> , <i>Alcyonium sp. indet. sensu</i> Williams 2013) ^e	OR	9-137	14,15
	* <i>Neospongodes sp.</i>	OR	1600	13
Family Paragorgiidae	<i>Paragorgia arborea</i> (Linnaeus, 1758)	OR,CA	18-2936	6,26,28,29,39
	* <i>Paragorgia regalis</i> Nutting, 1912	CA	1840	6
	* <i>Paragorgia stephencairnsi</i> Sanchez, 2005	OR,CA	350-490	6,28,40
	* <i>Paragorgia yutlinux</i> Sanchez, 2005	OR,CA	487-861	6,40
	<i>Sibogorgia cauliflora</i> Herrera, Baco & Sánchez, 2010	OR,CA	2493-3042	41
	* <i>Sibogorgia sp. (poss. sp. nov.)</i>	OR,CA	255-1600	29
Family Plexauridae	*Plexaurid gen. et. sp. indet. ^f	OR	368	13
	† <i>Chromoplexaura marki</i> (Kükenthal, 1913) (= <i>Euplexaura marki</i> Kükenthal, 1913)	OR,CA	9-200	4,13,14,26,29
	<i>Heterogorgia tortuosa</i> Verrill, 1868	CA	0-130	9,13
	<i>Muricea californica</i> Aurivillius, 1931	CA	1-452	9,37
	<i>Muricea fruticosa</i> Verrill, 1869	CA	23-84	9,37
	* <i>Psammogorgia arbuscula</i> (Verrill, 1866)	CA	64-95	13
	<i>Swiftia farallonesica</i> Williams and Breedy, 2016	OR	181-190	50,51
	<i>Swiftia kofoidi</i> (Nutting, 1909)	(OR) ^g ,CA	91-2393	6,13,18,26,29
	<i>Swiftia pacifica</i> (Nutting, 1912)	OR,(CA) ^g	89-2904	6,18,26,29,32

Higher Taxon	Species	Distribution	Depth Range (m)	References
Family Plexauridae, cont.	<i>*Swiftia pusilla</i> (Nutting, 1909) (comb. nov., Breedy and Guzmán, 2015)	CA	166-177	29,52
	<i>Swiftia simplex</i> (Nutting, 1909) (= <i>Psammogorgia simplex Euplexaura simplex</i>)	OR,CA	147-2123	6,18,21,26,29,32,38
	<i>Swiftia spauldingi</i> (Nutting, 1909)	OR	49-342	6,18,26,32
	<i>Swiftia torreyi</i> (Nutting, 1909) (= <i>Psammogorgia torreyi</i> Nutting, 1909)	OR,CA	30-1752	6,15
	<i>Thesea</i> sp. A ^h	CA	27-200	9,29
	<i>Thesea</i> sp. B ^h	CA	27-200	9,29
Family Primnoidae	<i>Callogorgia kinoshitae</i> Kükenthal, 1913	OR	99-1646	13,25,29
	<i>*Calyptrophora</i> sp. cf. of <i>C. antilla</i> Bayer, 2001	OR	1110-1763	23
	<i>Calyptrophora bayeri</i> Cairns, 2007	OR	1683	23,25
	<i>Calyptrophora laevispinosa</i> Cairns, 2007	OR	3107	23,25
	<i>Narella alaskensis</i> Cairns and Baco, 2007	OR	2192-3075	27
	<i>*Narella bowersi</i> (Nutting, 1908)	OR	1218-2600	23
	<i>Parastenella doederleini</i> (Wright and Studer, 1889)	OR	1390-2380	25
	<i>Parastenella gymnogaster</i> Cairns, 2007	OR	1962-2773	23
	<i>Parastenella pacifica</i> Cairns, 2007	OR	1498-1986	23,26,29
	<i>*Parastenella ramosa</i> (Studer, 1894)	OR,CA	619-3427	18,23,27
	<i>Plumarella longispina</i> Kinoshita, 1908	OR,CA	80-732	6,13,18,26,29
	<i>Primnoa pacifica</i> Kinoshita, 1907	OR	272-279	6,18,25
	† <i>Thouarella</i> sp. (= <i>Amphilaphis</i> sp.)	OR,CA	114-195	13,31
Family Xenidiidae	<i>*Anthelia</i> sp.	OR	1034-1107	13
Order Pennatulacea				
Family Anthoptilidae	† <i>Anthoptilum grandiflorum</i> (Verrill, 1879) (= <i>Anthoptilum thomsoni</i> Kölliker, 1880; <i>Anthoptilum simplex</i> Kölliker; <i>Benthoptilum sertum</i> Verrill, 1885)	OR,CA	72-3651	6,13,18,19,42,43
	<i>Anthoptilum lithophilum</i> Williams and Alderslade, 2011	OR,CA	669-700	44
Family Funiculinidae	<i>*Funiculina armata</i> (Verrill, 1879)	CA	611-1097	6,42
	<i>Funiculina parkeri</i> (Kükenthal, 1909)	OR,CA	200-1409	6,13,19
	<i>*Funiculina quadrangularis</i> (Pallas, 1766)	OR,CA	763-2740	13,18
Family Halipteridae	† <i>Halipteris californica</i> (Moroff, 1902) (= <i>Halipteris contorta</i> (Nutting, 1909); <i>Stachyptilum quadridentatum</i> (Nutting, 1909))	OR,CA	46-2780	6,9,13,18,19,21
	<i>*Halipteris willemoesi</i> Kölliker, 1870 (= <i>Halipteris septentrionalis</i> (Nutting, 1909))	OR	75-1164	6,13,18
Family Kophobelemnidae	<i>Kophobelemnon affine</i> (Studer, 1894)	OR	2430-2710	19
	<i>Kophobelemnon hispidum</i> Nutting, 1912	OR	NR	15,42
	† <i>Kophobelemnon macrospinosum</i> Thomson, 1927 (= <i>Kophobelemnon biflorum</i>)	OR	2434-2499	15,21

Higher Taxon	Species	Distribution	Depth Range (m)	References
Family Pennatulidae	† <i>Pennatula phosphorea</i> Linnaeus, 1758 (= <i>Pennatula phosphorea</i> var. <i>californica</i> (Kükenthal, 1913); <i>Pennatula californica</i> Kükenthal 1913)	OR,CA	519-2825	6,9,13,18,19
	† <i>Ptilosarcus gurneyi</i> (Gray, 1860) (= <i>Ptilosarcus quadrangularis</i> (Moroff, 1902))	OR,CA	16-475	6,9,13,18,19,42
Family Protoptilidae	† <i>Distichoptilum gracile</i> Verrill, 1882 (= <i>Distichoptilum verrilli</i> (Studer, 1901))	OR	1881-3361	13,18,19
	† <i>Distichoptilum rigidum</i> (Nutting, 1912) (= <i>Helicoptilum rigidum</i> (Nutting, 1912))	OR	1862-1937	15,42
	* <i>Protoptilum</i> sp.	OR	150-3306	13,18,21
Family Scleroptilidae	<i>Scleroptilum</i> sp.	OR	109	42
Family Stachyptilidae	<i>Stachyptilum superbum</i> (Studer, 1894)	OR,CA	388-1244	9,18,19
Family Umbellulidae	* <i>Umbellula huxleyi</i> (Kölliker, 1880)	CA	914-927	6,45
	† <i>Umbellula lindahli</i> (Kölliker, 1880) (= <i>Umbellula carpenteri</i> (Kölliker, 1880))	OR,CA	914-927	13,15
	<i>Umbellula magniflora</i> (Kölliker, 1880)	OR,CA	854-1084	6,19,21
Family Virgularidae	<i>Acanthoptilum album</i> Nutting, 1909	OR	10-150	19
	* <i>Acanthoptilum annulatum</i> Nutting, 1909	OR	146	6,13
	<i>Acanthoptilum gracile</i> (Gabb, 1863)	OR,CA	5-1981	18,19,46
	* <i>Acanthoptilum scalpelifolium</i> Moroff, 1902	CA	79	13
	<i>Stylatula elongata</i> (Gabb, 1862)	OR,CA	2-820	19,42,47
	<i>Stylatula gracilis</i> (Gabb, 1862)	OR,CA	50-261	19,47
	† <i>Virgularia agassizi</i> Studer, 1894 (= <i>Virgularia cystiferum</i> (Nutting, 1909))	CA	30-1000	9,19
	† <i>Virgularia bromleyi</i> Kölliker, 1880 (= <i>Virgularia californica</i> Pfeffer, 1886)	CA	5-90	9

Higher Taxon	Species	Distribution	Depth Range (m)	References
Class Hydrozoa				
Subclass Hydroidolina				
Order Anthoathecata				
Family Stylasteridae	<i>Errinopora pourtalesii</i> (Dall, 1884)	OR	40-658	48
	† <i>Stylanthea papillosa</i> (Dall, 1884) (= <i>Stylanthea petrograpta</i> (Fisher, 1938); <i>Stylanthea porphyra</i> Fisher 1931)	OR	0-140	48
	<i>Stylaster californicus</i> (Verrill, 1866)	OR,CA	4-126	13,21,49
	<i>Stylaster parageus columbiensis</i> Cairns and Linder, 2011	OR	246-285	48
	<i>Stylaster venustus</i> (Verrill, 1870)	OR	10-108	48
	* <i>Stylaster verrillii</i> (Dall, 1884)	OR	21-393	48

Notes

- a. Black corals identified as belonging to the genera *Bathypathes*, *Lillipathes*, *Parantipathes*, and *Umbellapathes* have also been observed off S. California (CA province), but have not been identified to species. L. Lundsten (pers. com.).
- b. Moore et al. (2017) have placed *Anthothela argentea* in the genus *Victorgorgia* based on morphological characteristics and phylogenetic reconstructions using mitochondrial gene regions. This change has not yet been incorporated in the World Register of Marine Species. Moore KM, Alderslade P, Miller KJ (2014) A taxonomic revision of *Anthothela* (Octocorallia: Scleraxonia: Anthothelidae) and related genera, with the addition of new taxa, using morphological and molecular data. *Zootaxa* 4304(1)
- c. and *Anthothela pacifica* may represent the same species, based on examinations of material by E. Horvath (pers. com.).
- d. *Leptogorgia caryi* (included in the 2007 list) is synonymous with *Leptogorgia chilensis* Verrill, 1868. Breedy and Guzman (2007).
- e. Specimens identified as *Keratoisis* sp. were also observed and collected from Southern California (CA province; NMNH Invertebrate Zoology Collections; SBMNH Invertebrate Zoology Online Collections), but not identified to species.
- f. *Gersemia rubiformis* (Ehrenberg, 1834) was identified by Williams (2013) as belonging in the family Alcyoniidae, genus *Alcyonium*. This change has not yet been reflected in WoRMS, and here we have retained *G. rubiformis*. Ref: Williams GC (2013) New taxa and revisionary systematics of alcyonacean octocorals from the Pacific coast of North America (Cnidaria, Anthozoa). *ZooKeys*:15-42.
- g. Plexaurid gen. et. sp. indet. is based on a single specimen at CAS, originally identified as *Echinogorgia* sp. More recently, Gary Williams (CAS) described the specimen as “significantly different than other members of *Echinogorgia*, which is an Indo-Pacific genus” (G. Williams, pers. com.).
- h. *Swiftia kofoidi* (Nutting, 1909) and *Swiftia pacifica* (Nutting, 1912) are related species that exhibit geographic transitional morphology around Pt. Conception, CA, with *S. kofoidi* and *S. pacifica* seemingly limited to the CA and OR provinces, respectively (Horvath in prep).
- i. *Thesea* sp. A and *Thesea* sp. B may represent the same species (Horvath in prep).

Literature Cited

Whitmire CE, Clarke ME (2007) State of Deep Coral Ecosystems of the U.S. Pacific Coast: California to Washington. In: Lumsden SE, Hourigan TF, Bruckner AW, Dorr G (eds) [The State of Deep Coral Ecosystems of the United States](#). NOAA Technical Memorandum CRCP-3. Silver Spring, MD

References

1. Opresko DM (2005) A new species of antipatharian coral (Cnidaria: Anthozoa: Antipatharia) from the southern California Bight. *Zootaxa* 852:1-10
2. Tissot BN, Yoklavich MM, Love MS, York K, Amend M (2006) Benthic invertebrates that form habitat on deep banks off southern California, with special reference to deep sea coral. *Fisheries Bulletin* 104
3. Huff DD, Yoklavich MM, Love MS, Watters DL, Chai F, Lindley ST (2013) Environmental factors that influence the distribution, size, and biotic relationships of the Christmas tree coral *Antipathes dendrochristos* in the Southern California Bight. *Mar Ecol Prog Ser* 494:159-177

4. Etnoyer PJ, Cochrane G, Salgado E, Graiff K, Roletto J, Williams G, Reyna K, Hyland J (2014) Characterization of deep coral and sponge communities in the Gulf of the Farallones National Marine Sanctuary: Rittenburg Bank, Cochrane Bank and the Farallon Escarpment. NOAA Technical Memorandum NOS NCCOS 190. NOAA National Centers for Coastal Ocean Science, Charleston, SC, 32 p
5. Opresko DM (2003) Revision of the Antipatharia (Cnidaria: Anthozoa). Part III. Cladopathidae. Zoologische Mededelingen (Leiden) 77:495-536
6. National Museum of Natural History (NMNH) (2016) NMNH Invertebrate Zoology Collections - Online Collection Database; Accessed 11/19/2016. U.S. National Museum of Natural History, Smithsonian Institution, Washington DC
7. Jacobsen Stout N, Kuhnz L, Lundsten L, Schlining B, Schlining K, von Thun S (eds.). The Deep-Sea Guide (DSG). Monterey Bay Aquarium Research Institute (MBARI). Accessed 08/08/2016 (and associated VARS (Video Annotation and Reference System) Records)
8. Cairns SD (1994) Scleractinia of the temperate North Pacific. Smithsonian Contributions to Zoology No. 557
9. Cadien DB, Lovell LL (2016) A Taxonomic Listing of Benthic Macro- and Megainvertebrates from Infaunal & Epifaunal Monitoring and Research Programs in the Southern California Bight. Edition 11. Southern California Association of Marine Invertebrate Taxonomists; Natural History Museum of Los Angeles County Research & Collections. Los Angeles, CA 173 p
10. González-Romero S, Reyes-Bonilla H, Cairns SD (2009) Range extensions of three species of the Family Caryophylliidae (Scleractinia) in the eastern Pacific Ocean. JMBA2 - Biodiversity Records
11. Kitahara MV, Cairns SD, Stolarski J, Blair D, Miller DJ (2010) A comprehensive phylogenetic analysis of the Scleractinia (Cnidaria, Anthozoa) based on mitochondrial CO1 sequence data. Plos One 5:e11490
12. Durham JW, Barnard JL (1952) Stony corals of the eastern Pacific collected by *Velero III* and *Velero IV*. Allan Hancock Pacific Expedition. 16(1):1-110
13. California Academy of Sciences (CAS) (2017) CAS Online Invertebrate Zoology Collection (Accessed 1/07/2017). California Academy of Sciences
14. Williams GC (2013) New taxa and revisionary systematics of alcyonacean octocorals from the Pacific coast of North America (Cnidaria, Anthozoa). ZooKeys:15-42
15. Austin WC (1985) An annotated checklist of marine invertebrates in the cold temperate northeast Pacific. Khoyatan Marine Laboratory
16. Burton E, Lundsten L (2008) Davidson Seamount taxonomic guide. Marine Sanctuaries Conservation Series ONMS-08-08. 145 pp. <http://sanctuaries.noaa.gov/science/conservation/pdfs/taxonomic.pdf>
17. Molodtsova TN (2013) Deep-sea mushroom soft corals (Octocorallia: Alcyonacea: Alcyoniidae) of the Northern Mid-Atlantic Ridge. Mar Biol Res 9:488-515

18. Everett MV (Unpublished – Specimens with morphological and genetic taxonomic identification) Records available in NOAA’s National Database of Deep-Sea Corals and Sponges
19. Hochberg FG, Ljubenkov JC (1998) Class Anthozoa: Subclass Octocorallia - Orders Stolonifera and Pennatulacea. In: Scott, P.V. and Blake, J.A. (eds.), Taxonomic atlas of the benthic fauna of the Santa Maria Basin and the western Santa Barbara Channel, Vol. 3, The Cnidaria. Santa Barbara Museum of Natural History, Santa Barbara, California
20. Williams GC, Lundsten L (2009) The nephtheid soft coral genus *Gersemia* Marenzeller, 1878, with the description of a new species from the northeast Pacific and a review of two additional species (Octocorallia; Alcyonacea). *Zoologische Mededelingen, Leiden* 83:1067–1081
21. Monterey Bay Aquarium Research Institute (MBARI) Video Annotation and Reference System Records (VARS) accessed 8/28/2012
22. Hochberg 1979 (reported in Cadien & Lovell 2016)
23. Cairns SD (2007) Calcaxonian octocorals (Cnidaria; Anthozoa) from Eastern Pacific seamounts. *Proceedings of the California Academy of Sciences* 58:511-541
24. Etnoyer PJ (2008) A new species of *Isidella* bamboo coral (Octocorallia: Alcyonacea: Isididae) from northeast Pacific Seamounts. *Proceedings of the Biological Society of Washington* 121:541-553
25. Cairns SD, Bayer FM (2009) A generic revision and phylogenetic analysis of the Primnoidae (Cnidaria: Octocorallia). *Smithsonian Contributions to Zoology* 629:1-79
26. Santa Barbara Museum of Natural History (SBMNH) (2016) SBMNH Invertebrate Zoology Online Collections Search (Accessed 11/19/2016). Santa Barbara Museum of Natural History
27. Cairns SD, Baco A (2007) Review and five new Alaskan species of the deep-water octocoral *Narella* (Octocorallia: Primnoidae). *Systematics and Biodiversity* 5:391-407
28. Yoklavich MM, Laidig T, Kringsman L, Taylor A, Watters D, Love MS, Lundsten L, Negrete B (2011) A characterization of the coral and sponge community on Piggy Bank seamount in southern California from a survey using a remotely operated vehicle. A report to NOAA Deep-Sea Coral Research and Technology Program. 63 p
29. Horvath, EA (resubmission to ZooKeys imminent). An overview of gorgonian coral species (Cnidaria, Anthozoa, Octocorallia, Alcyonacea) from the Northeastern Pacific Ocean (California Bight and immediately adjacent areas): The Santa Barbara Museum of Natural History research collection
30. Cairns SD (2011) A Revision of the Primnoidae (Octocorallia: Alcyonacea) from the Aleutian Islands and Bering Sea. *Smithsonian Contributions to Zoology* 634:1-55
31. Yoklavich MM, Laidig T, Taylor A, Watters D, Kringsman L, Love MS (2013) A characterization of the Christmas tree coral (*Antipathes dendrochristos*) community on three seamounts in the Southern California Bight from a survey using a manned submersible. A report to NOAA Deep-Sea Coral Research and Technology Program. 82p. <http://swfsc.noaa.gov/HabitatEcology>

32. Brancato MS, Bowlby CE, Hyland J, Intelmann SS, and Brenkman K (2007) Observations of deep coral and sponge assemblages in Olympic Coast National Marine Sanctuary, Washington. Cruise Report: NOAA Ship McArthur II Cruise AR06-07/07. Silver Spring, MD, NOAA/National Ocean Service/National Marine Sanctuary Program, (Marine Sanctuaries Conservation Series, NMSP-0).
33. Breedy O, Guzman HM, Vargas S (2009) A revision of the genus *Eugorgia* Verrill, 1868 (Coelenterata: Octocorallia: Gorgoniidae). *Zootaxa* 2151:1-46
34. Breedy O, Guzman HM (2007) A revision of the genus *Leptogorgia* Milne Edwards & Haime, 1857 (Coelenterata: Octocorallia: Gorgoniidae) in the eastern Pacific. *Zootaxa* 1419:1-90
35. Horvath EA (2011) An unusual new “sea fan” from the northeastern Pacific Ocean (Cnidaria: Octocorallia: Gorgoniidae). *Proceedings of the Biological Society of Washington* 124:45-52
36. Breedy O, Guzman HM (2002) A revision of the genus *Pacifigorgia* (Coelenterata: Octocorallia: Gorgoniidae). *Proceedings of the Biological Society of Washington*, 115, 782- 839
37. Grigg RW (1970) Ecology and population dynamics of the gorgonians, *Muricea californica* and *Muricea fruticosa*. Ph.D. thesis, Univ. Calif., San Diego. 261 p
38. Everett MV, Park LK, Berntson EA, Elz AE, Whitmire CE, Keller AA, Clarke ME (2016) Large-Scale Genotyping-by-Sequencing Indicates High Levels of Gene Flow in the Deep-Sea Octocoral *Swiftia simplex* (Nutting 1909) on the West Coast of the United States. *Plos One* 11:e0165279
39. Herrera S, Shank TM, Sanchez JA (2012) Spatial and temporal patterns of genetic variation in the widespread antitropical deep-sea coral *Paragorgia arborea*. *Molecular ecology* 21:6053-6067
40. Sanchez JA (2005) Systematics of the bubblegum corals (Cnidaria: Octocorallia: Paragorgiidae) with description of new species from New Zealand and the Eastern Pacific. *Zootaxa*:1-72
41. Herrera S, Baco A, Sánchez JA (2010) Molecular systematics of the bubblegum coral genera (Paragorgiidae, Octocorallia) and description of a new deep-sea species. *Molecular phylogenetics and evolution* 55:123-135
42. Belcik FP (1977) A distribution study of the Octocorallia of Oregon. *Publications of the Seto Marine Biological Laboratory* 24(1/3):49-52
43. Williams GC (2011) The global diversity of sea pens (Cnidaria: Octocorallia: Pennatulacea). *PLoS-One* 6(7): e22747
44. Williams GC, Alderslade P (2011) Three new species of pennatulacean octocorals with the ability to attach to rocky substrata (Cnidaria: Anthozoa: Pennatulacea). *Zootaxa* 3001:33-48
45. Kükenthal W (1913) Über die Alcyonarienfauna Californiens und ihre tiergeographischen Beziehungen. *Zoologische Jahrbücher (Systematik)* 35(2):219- 270
46. Nutting CC (1909) 1909. Alcyonaria of the California Coast. *Proceedings of the United States National Museum* 35:681- 727

47. Williams GC, Matsumoto AK (2015) A review of the pennatulacean Genus *Stylatula*, with the description of a new species from Japan (Cnidaria: Octocorallia). Proceedings of the California Academy of Sciences Series 4, Volume 62:257-266
48. Cairns SD, Lindner A (2011) A revision of the Stylasteridae (Cnidaria, Hydrozoa, Filifera) from Alaska and adjacent waters. ZooKeys: 1-8
49. Fisher WK (1938) Hydrocorals of the North Pacific Ocean. Proceedings of the United States National Museum 84:493-554
50. Williams GC, Breedy O (2016) A new species of whip-like gorgonian coral in the genus *Swiftia* from the Gulf of the Farallones in central California, with a key to eastern Pacific species in California (Cnidaria, Octocorallia, Plexauridae). Proceedings of the California Academy of Sciences 63(1):1-14
51. Graiff K, Lipski D, Etnoyer P, Cochran G, Williams G, Salgado E (2016) Benthic Characterization of Deep-Water Habitat in the Newly Expanded Areas of Cordell Bank and Greater Farallones National Marine Sanctuaries. Marine Sanctuaries Conservation Series ONMS-16-01. U.S. Department of Commerce, National Oceanic and Atmospheric Administration, Office of National Marine Sanctuaries, Silver Spring, MD. 38 p
52. Breedy O, Guzman HM (2016) Corrigenda: Breedy O, Guzman HM (2015) A revision of the genus *Muricea* Lamouroux, 1821 (Anthozoa, Octocorallia) in the eastern Pacific. Part I: *Eumuricea* Verrill, 1869 revisited. ZooKeys 537: 1–32
53. Molodtsova TN, Opresko DM (2017) Black corals (Anthozoa: Antipatharia) of the Clarion-Clipperton Fracture Zone. Marine Biodiversity