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Crustaceans (Decapoda & Stomatopoda) from Golfo Dulce (Pacific, Costa Rica) in the collection of the Museum of Zoology, University of Costa Rica

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ABSTRACT. Introduction: The availability of recently updated lists of species from a particular area is an important first step to evaluate changes in species composition and abundance. Golfo Dulce is a fjord-like embayment with relatively pristine shores and relatively deep waters (200m) that have been sampled occasionally for crustaceans. **Methods**: In this study the all species from Golfo Dulce deposited in the collection of the University of Costa Rica Museum of Zoology were listed and scientific names were updated. The MZUCR catalog number, station, substrate type, and year or collection were included for each species. **Results**: A total of 106 species were listed. *Neogonodactylus zacae* was present in four of the 19 stations represented in the collections for Golfo Dulce. Nine species were present in three stations, 19 in two stations and the remaining 77 in one station each. The families with most species were Ocypodidae y Palaemonidae (7) and Porcellanidae (14). **Conclusions**: Is necessary to improve our knowledge of the decapods and stomatopods fauna from Golfo Dulce through further samplings. Intertidal sites such as Golfito and Rincón bays have been poorly sampled as well as intertidal and subtidal environment from the western and eastern shores. However, the fauna is relatively rich when it is related to the area of Golfo Dulce (750km^2) and is indicative of a relatively undisturbed environment. Updated management policies are urgently needed and this list of species is a step towards this goal.

Keywords: Biodiversity, eastern Tropical Pacific, Stomatopoda, Dendrobranchiata, Caridea, Anomura, Brachyura.

RESUMEN. "Crustáceos (Decapoda & Stomatopoda) del Golfo Dulce (Pacífico, Costa Rica) en la colección del Museo de Zoología, Universidad de Costa Rica". **Introducción**: Las listas actualizadas de especies son un primer paso para evaluar cambios temporales en composición y abundancia. Golfo Dulce es un cuerpo de agua marino semejante a un fiordo, con costas poco alteradas y aguas relativamente profundas (200m). **Métodos**: Elaboramos una lista taxonómicamente actualizada de las especies de macro-crustáceos recolectados en Golfo Dulce y depositadas en la colección del Museo de Zoología de la Universidad de Costa Rica (MZUCR). El número de catálogo del MZUCR, estación, tipo de sustrato, y año de colecta fueron anotados para cada especie. **Resultados**: Hay 106 especies en la lista. *Neogonodactylus zacae* estuvo en cuatro de las 19 estaciones representadas en las colecciones para Golfo Dulce. Nueve especies en tres estaciones, 19 en dos estaciones y las restantes 77 en una estación cada una. Las familias con más especies fueron Ocypodidae y Palaemonidae (7) y Porcellanidae (14). **Conclusiones**: Se requieren más muestreos, particularmente en sitios entre mareas como las bahías de Golfito y Rincón; y fondos de entre mareas y submareales de las costas oeste y este. La fauna es relativamente rica considerando el área de Golfo Dulce (750 km^2) y es indicadora de un ambiente relativamente inalterado. Se requiere urgentemente de políticas de manejo actualizadas y esta lista en un paso hacia ese objetivo.

Palabras clave: Biodiversidad, Pacifico Tropical Este, Stomatopoda, Dendrobranchiata, Caridea, Anomura, Brachyura.

Golfo Dulce is a deep embayment on the Pacific coast (08°30´N & 83°20'W) of Costa Rica. The water dynamics of the system were described by Svendsen, Rosland, Myking, Vargas, Lizano and Alfaro (2006). The gulf is characterized by an inner basin (200m) and a sill (70m) at the entrance (Fig. 1). The bathymetry of the gulf was described by Hebbeln, Beese and Cortés (1996). The presence of a deep basin, steep shores and a sill results in Golfo Dulce being considered essentially a tropical fjord-like embayment (Wolff, Hartmann, & Koch, 1996). Narrow shores with fringing mangrove forests, rocky outcrops, decaying coral reefs, and sandy beaches surround most of Golfo Dulce (Cortés, 1990; Samper-Villarreal & Silva-Benavides, 2015). Hypoxic and anoxic conditions are found in waters deeper than 100m (Córdoba & Vargas, 1996; Dalsgaard, Canfield, Peterson, Thamdrup, & Acuña-González, 2003), and no macrofaunal organisms have been found living in the anoxic basin sediments (León-Morales & Vargas, 1998).

Information about the macro-crustacean fauna of Golfo Dulce is scarce. The most important survey was conducted by the R.V. Victor Hensen (1993-1994) which collected crustaceans over a depth range of 15 to 200m using Otter and beam trawls. A preliminary list of 50 macro-crustaceans from Golfo Dulce collected during the R.V. Victor Hensen survey was published by Vargas, Jesse and Castro (1996). In addition, Castro and Vargas (1996) listed 68 species of macro-crustaceans reported in the literature for Golfo Dulce and included additional data for those collected during the survey. The spatial distributions of the species collected by the research vessel were analysed by Jesse (1996). Voucher specimens from most of the survey were deposited in the collection of the Museum of Zoology, University of Costa Rica (MZUCR). Other specimens deposited in the MZUCR were obtained over the years during occasional visits to different sites around the estuary, but a planned inventory of the crustacean fauna of the estuary is yet to be conducted.

Golfo Dulce is under the increasing pressure of local, regional and global stressors, such as pollution, coastal development, extraction of resources, and climate change (Morales-Ramírez, 2011, Morales-Ramírez, Acuña-González, Lizano, Alfaro, & Gómez, 2015). A trophic model in Golfo Dulce considering the key roles of the crustaceans and other groups was developed by Woff et al. (1996), but it needs to be updated. In this context, information on the biodiversity of Golfo Dulce is urgently needed as input in order to improve the trophic model and to develop of new management policies at the ecosystem level. Data on the previously recorded species from the gulf is important to evaluate changes in biodiversity over time and to identify sites of relevance for future surveys. Thus, the objective of this report is to provide an updated list of species of macro-crustaceans (Decapoda and Stomatopoda) from Golfo Dulce deposited in the collection of the UCR-Museum of Zoology, identify gaps of information, and make suggestions for a future survey of the fauna.

MATERIALS AND METHODS

The crustacean collection of the Museum of Zoology of the University of Costa Rica (MZUCR) is composed with three components. First, the collection of specimens preserved in 70% ethanol in labeled glass jars. Second, a dossier of handwritten catalog cards, with data for each collecting site. Third, a digital file filled with data obtained from the catalog cards. All catalog entries of marine macro-crustacean species belonging to Golfo Dulce were selected from the digital file. The handwritten cards and the specimen collection were reviewed when sampling data was not clear and/or the species identification was necessary to double-check records. A list of species was assembled, arranged in alphabetical order, and a code number assigned to each one. The list includes the presently accepted species name, authority, catalog number, station and year of collection. Other information such as depth (intertidal, subtidal) and substrate description (rocks, coral, sediment, other) was also included, when available. Two Golfo Dulce species are listed in the cards with no other station data. Most of the

specimens in the collection were collected by hand and occasionally by SCUBA while those from the R.V. Victor Hensen expedition were captured with otter and beam trawl nets. All species names were verified for their currently accepted name based in the web page World Register of Marine Species (WORMS).

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RESULTS

In total, there were 19 stations for which information was available (Fig. 1). Intertidal and SCUBA diving stations were assigned a code number, while those from trawl nets were identified with capital letters. A total of 106 species of macrocrustaceans with 173 entries was available for Golfo Dulce and catalogued in the collection of the Museum of Zoology (Appendix 1). Of this total, 102 are decapods and four are stomatopods. The earliest collection records are from 1969, followed by a time gap, until 1990 and 1993-1995 when 83 (48%) new entries were listed, many as the result of the R.V. Victor Hensen survey. The next intensive sampling effort took place during 2012-2013. Thirty-nine of the collecting sites were coral rocks, while 32 stations were from sediments. Most of the collecting sites were intertidal. The maximum depth sampled was 200m (Appendix 1).

The 102 species of decapods were distributed into 32 families, while the four species of stomatopods were represented by two (Table 1). The most specious family was the Porcellanidae, with 14 species. Other families, represented by five or more species, are: Ocypodidae (7), Palaemonidae (7), Alpheidae (6), Diogenidae (6), Xanthidae (6), Mithracidae (5), and Portunidae (5). Eleven families were represented by only one species (Table 1). There were ten most frequently species collected in the 19 stations (Table 2). Only one species, the stomatopod *Neogonodactylus zacae,* was collected at four stations. Nine species were found in three stations, 19 in two stations and the remaining 77 in only one station each. Station 12 had the most species (21), followed by stations 7 (17), 10 (16), 9 (15), and 3 (14). The other stations had less than 10 species each. Stations 1, 13, had one species each (Table 2). The R.V. Victor Hensen stations located near the sill and at the mouth of Golfo Dulce (F, H, and G, I) included 10, 5, 6, and 6 species, respectively. Those stations in deeper waters inside the gulf had 1 (L) and 3 (M) species.

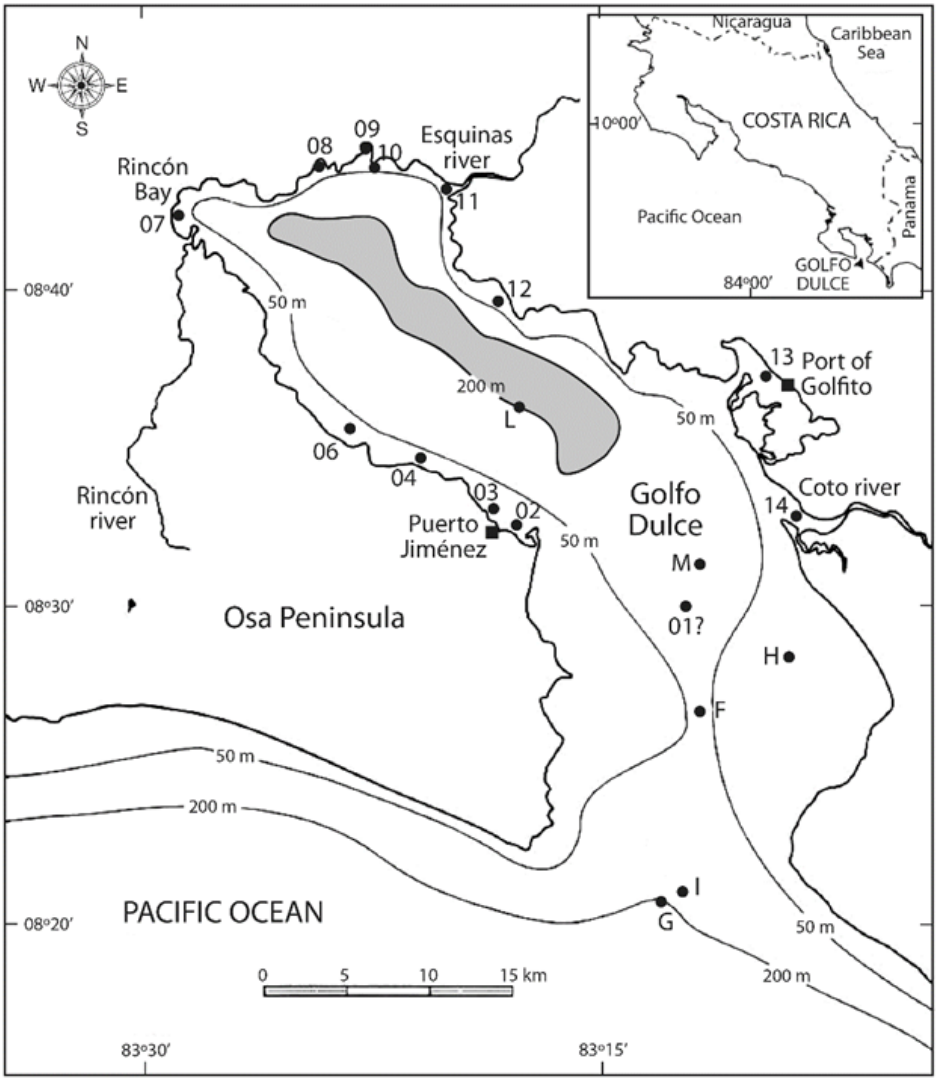

Fig. 1. Location of the stations reported in this study in Golfo Dulce. 2-14, intertidal and shallow water; F, G, H, I, M, deep-water stations from the R.V. Victor Hensen survey (1993 / 1994). The gray shaded area encloses basin depths of 200 to 215m. Station F is located at the sill (70m).

TABLE 1

Families of crustaceans and number of species for each family catalogued in the collection of the Museum of Zoology. Golfo Dulce, Pacific coast of Costa Rica

DECAPODA	No. species
Alpheidae	6
Calappidae	1
Callianideidae	1
Cancridae	1
Chasmocarcinidae	1
Diogenidae	6
Dynomenidae	1
Gecarcinidae	1
Grapsidae	2
Hippidae	1
Hippolytidae	2
Leucosiidae	3
Mithracidae	5
Munididae	2
Ocypodidae	7
Oziidae	3
Paguridae	3
Palaemonidae	7
Pandalidae	2
Panopeidae	4
Penaeidae	3
Pilumnidae	2
Pinnotheridae	1
Porcellanidae	14
Portunidae	5
Processidae	1
Pseudorhombilidae	1
Sesarmidae	3
Sicyonidae	2
Solenoceridae	2
Upogebiidae	3
Xanthidae	6
STOMATOPODA	
Gonodactylidae	1
Squillidae	3
TOTAL	106

TABLE 2

Species of crustaceans most frequently listed for the 19 stations, and stations where these were found; B. Total number of species reported at each station.

A. Species	Total	Station codes
Neogonodactylus zacae	4	6 - 8 - 10 - 12
Alpheus rostratus	3	6 - 8 - 12
Clibanarius lineatus	3	3 - 7 - 9
Goniopsis pulchra	3	3 - 7 - 9
Hemus finneganae	3	6 - 10 - 12
Munida gracilipes	3	1 - G - I
Palaemonella holmesi	3	6 - 8 - 10
Playpodiella rotundata	3	6 - 8 - 12
Pomatogebia rugosa	3	6 - 8 - 12
Processa peruviana	3	8 - 12 - I
B. Station		**1 (1 sp), 2 (2), 3 (14), 4 (3), 6 (9), 7 (17), 8 (9), 9 (15), 10 (16), 11 (2), 12 (21), 13 (1),14 (2), F (10), G (6), H (5), I (6), L (1) M (3)**

DISCUSSION

Because almost all the specimens of macrocrustaceans from Golfo Dulce were collected during occasional visits, there is yet to be an intensive sampling effort covering most of the diverse habitats around its shores and in deep waters. The specimens came from a wide variety of habitats. The northern shore is characterized by decaying coral reefs and steep walls while the southern shore has mostly sandy beaches and mangrove swamps. The eastern shore has sandy beaches and a more extense shallow sandy platform. The only survey of deep waters was performed by the R.V. Victor Hensen expedition and it was restricted to a few stations.

Although sampling effort in Golfo Dulce has been relatively important, there is still much additional sampling needed to reach a reliable picture of the invertebrate biodiversity of the embayment. Of relevance are future collections in the area of Golfito Bay where only one entry is reported in the UCR Museum catalogue despite the relatively easy access to many of the environments around this shallow bay. Other relatively unexplored regions are intertidal and subtidal areas near Rincon Bay, the tip of the Osa peninsula, and the sandy beaches and shallow bottoms on the eastern shore. The fact that 77 species were found at only one station each supports the idea that each type of substrate appears to host a characteristic assemblage of species and emphasize the need to explore other sites characterized by different types of substrates.

According to Morales-Ramírez (2011), Golfo Dulce contains 21,5% of the marine biodiversity of the Pacific coast of Costa Rica in an area of about 750km^2. He also reported a total of 1022 species of different animal groups (invertebrates and vertebrates) for Golfo Dulce. This total represents nearly 1,36 species per km^2, a figure considered by Morales-Ramírez (2011) to be nearly double than that of the larger (1 990km^2) and shallower Gulf of Nicoya estuary, where a more intensive sampling effort has been conducted (Vargas, 2016; Vargas-Zamora, Vargas-Castillo, & Sibaja-Cordero, 2019)

Despite of some local pollution problems (Spongberg & Davis, 1998; Spongberg, 2004; García, Acuña-González, Vargas-Zamora, & García-Céspedes, 2006; Spongberg et al., 2011), the biodiversity of Golfo Dulce appears to indicate a relatively healthy ecosystem (Morales-Ramírez et al., 2015). In this context updated information on the biodiversity of the estuary may contribute to a

better management of its resources and attract interested visitors. In addition, updated lists are a first step to evaluate structural community changes due to local, regional or global stressors such as coastal development, pollution, and climate change. This list of selected groups of macrocrustaceans presented herein is a step towards these goals.

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APPENDIX 1

List of species of Decapoda and Stomatopoda collected in Golfo Dulce and deposited in the collection of the Museum of Zoology (MZUCR), University of Costa Rica: E = endosymbiont in a clam, I = intertidal, CR = coral rock, GD = Golfo Dulce, S = sediment, SC = soft coral, M = mangrove, PT = polychaete tubes, R = rocks, WR = worm reef. No data =?

	Species	**Catalog code, station, depth, substrate, year of collection**
	DECAPODA	
01.	*Acantholobulus mirafloresensis* Abele & Kim, 1989	1455-01 / 3 / 0 m / ? / 1990
02.	*Achelous asper* (A. Milne-Edwards, 1861)	2104-06 / F / 70 m / S / 1994 207-01 / 14 / 18 m / S / 1969
03.	*Achelous iridescens* (Rathbun, 1894)	2005-06 / I / 160-200 m / S /1993
04.	*Ala cornuta* (Stimpson, 1860)	3162-17 / 12 / 1-2 m / CR / 2013 3483-01 / 12 / ? / CR / 2013
05.	*Alpheus bellimanus* Lockington, 1877	3204-01 / 10 / 27 m / CR / 2012
06.	*Alpheus floridanus* Kingsley, 1878	2006-02 / G / 200 m / S /1994
07.	*Alpheus hebes* W. Kim & Abele, 1988	2929-02 / 10 / 0 m / I / 2012
08.	*Alpheus pacificus* Dana, 1852	2929-03 / 10 / 0 m / I / 2012
09.	*Alpheus panamensis* Kingsley, 1878	3162-03 / 12 / 1-2 m / CR / 2013
10.	*Alpheus rostratus* W. Kim & Abele, 1988	3405-06 / 6 / 8-10 m / CR / 2013 3185-08 / 8 / 1-2 m / CR / 2013 3162-04 / 12 / 1-2 m / CR / 2013
11.	*Aratus pacificus* Thiercelin & Schubart, 2014	499-01 / 7 / 0 m / M / 1969
12.	*Calcinus obscurus* Stimpson, 1859	1370-06 / 3 / 0 m / I, R, M /1990 1368-06 / 9 / 0 m / M / 1990
13.	*Callianidea mariamartae* Hernaez & Vargas, 2013	2928-01-02 / 10 / 0 m / I, R / 2012 2929-01 / 10 / 0 m / I, R / 2012 2957-01 / 10 / 0 m / I, R / 2012
14.	*Callinectes arcuatus* Ordway, 1863	2104-05 / F / 70 m / S / 1994 502-01 / 7 / ? / ? / 1969
15.	*Cancer johngarthi* Carvacho, 1984	2005-00 / I /160-200 m / S /1993

16.	*Cardisoma crassum* Smith, 1870	434-01 / 7 / 0 m / ? / 1969 515-01 / 7 / 0 m / ? / 1969 1365-02 / 7 / 0 m / M / 1990
17.	*Chasmocarcinus latipes* Rathbun, 1898	1995-04 / F / 70 m / S /1993 2006-03 / G / 200 m / 1994
18.	*Clibanarius albidigitus* Nobili, 1901	1370-05 / 3 / 0 m / I, R, M /1990
19.	*Clibanarius lineatus* (H. Milne Edwards, 1848)	870-01 / 7 / 0 m / ? / 1969 1370-04 / 3 / 0 m / I, R, M /1990 1368-07 / 9 / 0 m / M / 1990
20.	*Cronius ruber* Lamarck, 1818	2846-02 / 6 / ? / ? / 2011
21.	*Cyrtoplax schmitti* Rathbun, 1935	1446-01 / 9 / 0 m / ? / 1990 1447-01 / 9 / 0 m / ? / 1990 1454-01 / 11 / 0 m / M / 1990 1456-02 / 11 / 0 m / ? / 1990
22.	*Dardanus nudus* Ayón-Parente & Hendrickx, 2009	1995-05 / F / 70 m / S /1993
23.	*Dardanus sinistripes* (Stimpson, 1858)	2007-03 / H / 15-20 m / S / 1993
24.	*Emerita rathbunae* Schmitt, 1935	2794-01 / GD / 0 m / ? / 1995
25.	*Epixanthus tenuidactylus* (Lockington, 1877)	1370-02 / 3 / 0 m / I, R, M /1990
26.	*Eurypanopeus canalensis* Abele & Kim, 1989	1453-02 / 9 / 0 m / ? / 1990 1466-04 / 9 / 0 m / ? / 1990
27.	*Eurypanopeus transversus* (Stimpson, 1860)	448-01 / 7 / 0 m / M / 1969 1452-02 / 3 / 0 m / ? / 1990
28.	*Eurytium tristani* Rathbun, 1906	501-01 / 7 / 0 m / ? /1969 1369-02 / 7 / 0 m / M / 1990
29.	*Gnathophyllum panamense* (Faxon, 1893)	3162-06 / 12 / 1-2 m / CR / 2013
30.	*Goniopsis pulchra* Lockington, 1877	498-01 / 7 / 0 m / M / 1969 1362-05 / 7 / 0 m / M / 1990 1366-02 / 9 / 0 m / M / 1990

		1368-04 / 9 / 0 m / M / 1990 1452-01 / 3 / 0 m / ? / 1990
31.	*Hemus finneganae* Garth, 1958	3077-03 / 10 / 27 m / R / 2012 3162-18 / 12 / 1-2 m / CR / 2013 3405-08 / 6 / 8-10 m / CR / 2013
32.	*Hepatus kossmanni* Neumann, 1878	266-01 / 14 / 18 m / S / 1969
33.	*Heterocarpus vicarius* Faxon, 1893	2005-02 / I / 160-200 m / S /1993
34.	*Hirsutodynomene ursula* (Stimpson, 1860)	1995-02 / F / 70 m / S / 1993
35,	*Leptuca oerstedi* (Ratbun, 1904)	1362-04 / 7 / 0 m /1990
36.	*Leptuca terpsichores* (Crane, 1941)	1463-01 / 3 / 0 m / S / 1990
37.	*Leucosilia jurinii* (de Saussure, 1853)	500-01 / 7 / 0 m / M /1969
38.	*Lysmata californica* (Stimpson, 1856)	2007-02 / H / 15-20 m / S /1993
39.	*Megalobrachium erosum* (Glassell, 1936)	3162-14 / 12 / 1-2 m / CR / 2013
40.	*Megalobrachium pacificum* (Gore & Abele, 1974)	1966-01 / 3 / ? / ? / 1990 2402-01 /10 / ? / WR / 1997
41.	*Microcassiope xantusii* Stimpson, 1871	3405-09 / 6 / 8-10 m / CR / 2013
42.	*Munida gracilipes* Faxon, 1893	2005-03 / I / 160-200 m / S /1993 2006-01 / G / 200 m / S / 1994 3578-01 / 01 / ? / S / 2004
43.	*Ocypode gaudichaudii* H. Milne Edwards & Lucas,1843	1370-03 / 3 / 0 m / I, R, M /1990
44.	*Orthochela pumila* Glassell, 1936	3312-01 / 2 / 11,3 m / SC / 2013
45.	*Ozius perlatus* Stimpson, 1860	2402-03 /10 / ? / WR / 1997
46.	*Ozius verreauxii* Saussure, 1853	1368-05 / 9 / 0 m / M / 1990 2131-01 / 9 / 0 m / ? / 1990 1367-01 / 10 / 0 m / R / 1990
47.	*Pachygrapsus transversus* (Gibbes, 1850)	1368-02 / 9 / 0 m / M / 1990 1362-06 / 7 / 0 m / M /1990
48.	*Paguristes holmesi* Glassell, 1937	1970-01 / G / 200 m / S /1994

49.	*Pagurus virgulatus* (Haig & Harvey, 1991)	3185-11 / 8 / 1-2 m / CR / 2013
50.	*Palaemon gracilis* (Smith, 1871)	1145-01 / 11 / 0.5 m / S / 1979
51.	*Palaemonella holmesi* (Nobili, 1907)	3077-06 / 10 / 27 m / R / 2012 2846-01 / 6 / ? / ? / 2011 3405-07 / 6 / 8-10 m / CR / 2013 3185-02 / 8 / 1-2 m / CR / 2013
52.	*Panopeus purpureus* Lockington, 1877	503-01 / 7 / 0 m / ? / 1969 1368-03 / 9 / 0 m / M / 1990 1369-01 / 7 / 0 m / M / 1990
53.	*Pantomus affinis* Chace, 1937	2005-01 / I / 200 m / S /1993 2009-01 / I / 160-200 m / S /1993
54.	*Penaeus brevirostris* Kingsley, 1878	2008-01 / M / 80-110 m / S /1993
55.	*Penaeus californiensis* Holmes, 1900	2008-01 / M / 110 m / S /1993
56.	*Periclimenaeus spinosus* Holthuis, 1951	3405-05 / 6 / 8-10 m / CR / 2013
57.	*Periclimenes infraspinis* (Rathbun, 1902)	2243-1-2-3 / 10 / 9.5 m / SC / 1997 3187-03 / 10 / ? / SC /1997
58.	*Persephona subovata* (Rathbun, 1894)	262-01 / GD / 90 m / ? /1969
59.	*Petramithrax pygmaeus* Bell, 1835	3162-01 / 12 / 1-2 m / CR / 2013 3478-01 /12 / ? / CR / 2013
60.	*Petrolisthes agassizii* Faxon, 1895	3162-13 / 12 / 1-2 m / CR / 2013
61.	*Petrolisthes armatus* (Gibbes, 1850)	1465-01 / 9 / 0 m / ? / 1990 1466-05 / 9 / 0 m / ? / 1990 1817-01 / 3 / 0 m / S / 1990 2194-02 / 3 / 0 m / ? / 1997
62.	*Petrolisthes glasselli* Haig, 1957	3162-16 / 12 / 1-2 m / CR / 2013
63.	*Petrolisthes robsonae* Glassell, 1945	2194-03 / 3 / 0 m / ? / 1997
64.	*Petrolisthes tonsorius* Haig, 1960	1466-01 / 9 / 0 m / ? / 1990
65.	*Petrolisthes tridentatus* Stimpson, 1859	1466-02 / 9 / 0 m / ? / 1990

66.	*Petrolisthes zacae* Haig, 1968	2227-01 / 7 / 0 m / M / 1990 2232-01 / 7 / 0 m / M / 1990
67.	*Pilumnus limosus* Smith, 1869	3162-21 / 12 / 1-2 m / CR / 2013 3185-05 / 8 / 1-2 m / CR / 2013
68.	*Pilumnus townsendi* Rathbun, 1923	3077-02 / 10 / 27 m / R / 2012 3108-01 / 4 / 12-22 m / CR / 2012
69.	*Pinnixa longipes* (Lockington, 1876)	3413-01 / 10 / 10 m / PT / 2014
70.	*Pisidia magdalenensis* (Glassell, 1936)	3162-15 / 12 / 1-2 m / CR / 2013
71.	*Pitho quinquedentata* Bell, 1835	3162-11 / 12 / 1-2 m / CR / 2013
72.	*Platyactaea dovii* (Stimpson, 1871)	3162-08 / 12 / 1-2 m / CR / 2013
73.	*Platypodiella rotundata* (Stimpson, 1860)	3405-03 / 6 / 8-10 m / CR / 2013 3162-09 / 12 / 1-2 m / CR / 2013 3185-06 / 8 / 1-2 m / CR / 2013
74.	*Pleuroncodes monodon* (A. Milne Edwards, 1837)	2005-07 / I / 160-200 m / S /1993
75.	*Polyonyx nitidus* Lockington, 1878	3108-05 / 4 / 12-22 m / CR / 2012
76.	*Polyonyx quadriungulatus* Chace, 1956	3413-02 / 10 / 10 m / PT/ 2014
77.	*Pomatogebia rugosa* (Lockington, 1878)	2200-01 / 6 / ? / ? / 1996 3162-23 / 12 / 1-2 m / CR / 2013 3405-04 / 6 / 8-10 m / CR / 2013 3185-03 / 8 / 1-2 m / CR / 2013
78.	*Pontonia margarita* Verrill, 1869	3186-01 / 8 / 1-2/ E / 2013 3188-01 / 8 / 1-2 / E / 2013
79.	*Portunus xantusii* (Faxon, 1893)	2104-02 / F / 70 m / S /1994
80.	*Processa peruviana* Wicksten, 1983	2005-06 / I / 160-200 m / 1993 3162-05 / 12 / 1-2 m / CR / 2013 3185-04 / 8 / 1-2 m / CR / 2013
81.	*Pseudoveleronia laevifrons* (Holthuis, 1951)	3434-03 / 2 / 11. m / SC / 2013
82.	*Rimapenaeus pacificus* Burkenroad, 1934	2008-02 / M / 80-110 m / 1993

83.	*Sesarma rhizophorae* Rathbun, 1906	1368-01 / 9 / 0 m / M / 1990 1366-03 / 7 / 0 m / M / 1990 1365-06 / 7 / 0 m / M / 1990
84.	*Sesarma rubinofforum* Abele, 1973	1365-08 / 7 / 0 m / M / 1990
85.	*Sesarma sulcatum* Smith, 1870	1365-01 / 7 / 0 m / M / 1990
86.	*Sicyonia disedwardsi* (Burkenroad, 1934)	1995-01 / F / 70 m / S /1993
87.	*Sicyonia picta* Faxon, 1893	2005-04 / I / 160-200 m / S /1993
88.	*Solenocera agassizii* (Faxon, 1893)	2006-04 / G / 200 m / S /1994 2007-01 / H / 15-20 m / S /1994
89.	*Solenocera mutator* Burkenroad, 1934	2105-01 / L / 200 m / S /1993
90.	*Teleophrys cristulipes* Stimpson, 1860	3162-22 / 12 / 1-2 m / CR / 2013 3478-02 /12 / ? / CR / 2013
91.	*Tomopagurus merimaculosus* (Glassell, 1937)	2104-03 / F /70 m / S /1994
92.	*Tomopagurus purpuratus* (Benedict, 1892)	1995-03 / F / 70 m / S / 1993 2104-04 / F / 70 m / S / 994
93.	*Trachycaris restricta* (A. Milne-Edwards, 1878)	3108-03 / 4 / 12-22 m / CR / 2012
94.	*Uca heteropleura* (Smith, 1870)	1445-01 / 9 / 0 m / ? / 1990
95.	*Uca princeps* (Smith, 1870)	1362-03 / 7 / 0 m / S / 1990
96.	*Uca stylifera* (H. Milne Edwards, 1852)	1364-01 / 9 / 0 m / M / 1990
97.	*Ucides occidentalis* (Ortmann, 1897)	413-01 / 7 / 0 m / ? / 1969 1399-01 / 7 / 0 m / M / 1990
98.	*Uhlias ellipticus* Stimpson, 1871	3162-10 / 12 / 1-2 m / CR / 2013
		3077-07 / 10 / 27 m / R / 2012
99.	*Upogebia longipollex* (Street, 1851)	3112-01 / 10 / 0 m / I / 2012 2402-02 / 10 / ? / WR / 1997 3210-01 / 10 / 0 m / I / 2012
100.	*Upogebia spinigera* (Smith, 1871)	1727-01 / 9 / 0 m / ? / 1990 2194-01 / 3 / 0 m / ? / 1997

101.	*Williamstimpsonia stimpsoni* (A. Milne-Edwards, 1879)	3162-19 / 12 / 1-2 m /CR / 2013
102.	*Xanthodius sternberghii* (Stimpson,1859)	1370-01 / 3 / 0 m / I, R, M /1990
	STOMATOPODA	
103.	*Neogonodactylus zacae* (Manning, 1972)	3077-10 / 10 / 27 m / R / 2012 3162-12 / 12 / 1-2 m / CR / 2013 3185-07 / 8 / 1-2 m / CR / 2013 3405-11 / 6 / 8-10 m / CR / 2013
104.	*Squilla biformis* Biguelow, 1891	2006-05 / G / 200 m / S / 1994
105.	*Squilla hancocki* Schmitt, 1940	195-02 / GD / 101 m / ? / 1969
106.	*Squilla panamensis* Bigelow, 1891	2104-01 / F / 70 m / S / 1994