Marine biodiversity of an Eastern Tropical Pacific oceanic island, 
Isla del Coco, Costa Rica

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Abstract: Isla del Coco (also known as Cocos Island) is an oceanic island in the Eastern Tropical Pacific; it is part of the largest national park of Costa Rica and a UNESCO World Heritage Site. The island has been visited since the 16th Century due to its abundance of freshwater and wood. Marine biodiversity studies of the island started in the late 19th Century, with an intense period of research in the 1930’s, and again from the mid 1990’s to the present. The information is scattered and, in some cases, in old publications that are difficult to access. Here I have compiled published records of the marine organisms of the island. At least 1688 species are recorded, with the gastropods (383 species), bony fishes (354 spp.) and crustaceans (at least 263 spp.) being the most species-rich groups; 45 species are endemic to Isla del Coco National Park (2.7% of the total). The number of species per kilometer of coastline and by square kilometer of seabed shallower than 200m deep are the highest recorded in the Eastern Tropical Pacific. Although the marine biodiversity of Isla del Coco is relatively well known, there are regions that need more exploration, for example, the south side, the pelagic environments, and deeper waters. Also, several groups of organisms, such as the flatworms, nematodes, nemerteans, and gelatinous zooplankton, have been observed around the Island but have been poorly studied or not at all. Citation: Cortés, J. 2012. Marine biodiversity of an Eastern Tropical Pacific oceanic island, Isla del Coco, Costa Rica. Rev. Biol. Trop. 60 (Suppl. 3): 131-185. Epub 2012 Dec 01.

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Isla del Coco (Cocos Island) is an oceanic island in the Eastern Tropical Pacific Ocean, about 500km from mainland Costa Rica (Cortés 2008), and biogeographically it is part of the Ocean Island Province (sensu Robertson & Cramer 2009). It is a highly diverse area with the highest number of endemic species in Costa Rica (Cortés & Wehrtmann 2009, Cortés 2013a). It was declared a National Park in 1978, a UNESCO World Heritage Site in 1997, and a Ramsar site in 1998. It is important for Costa Rica, due to of its biological and historical richness and also because the Territorial Sea surrounding the island makes the marine area of Costa Rica more than 10 times its terrestrial area (Cortés & Wehrtmann 2009, Cortés 2013b).

Marine biodiversity studies at Isla del Coco started in the late 19th Century with the expedition of the US Fisheries Commission Steamer Albatross (see a history of marine research at what is now Parque Nacional Isla del Coco (Isla del Coco National Park) in Cortés 2008). Since then, many studies have been done but there is still more to be discovered. Hertlein (1963) compiled what was known about marine species of the Island. In this paper I update the list of marine organisms of Isla del Coco National Park, compare it with the species from the mainland, and identify areas for future research.

MATERIALS AND METHODS

Published records of marine species of Parque Nacional Isla del Coco (PNIC) were searched and species lists compiled. An
important source was the book “Marine Biodiversity of Costa Rica, Central America” edited by Wehrtmann and Cortés (2009). Here I included overlooked and newly published records. The number of species from PNIC is compared to the numbers from the rest of the Pacific of Costa Rica. Including the mainland, the Coco Volcanic Cordillera, the pelagic areas, and the Costa Rica Thermal Dome.

The perimeter of Isla del Coco is 28.8km, and it is surrounded by a platform that drops off at around 180-200m. The perimeter at 100m is 54.4km and at 200m is 71.4km. The area less than 50m deep around the island is 91.5km², less than 100m is 133km², and less than 200m deep is 318km² (O.G. Lizano, pers. comm. 2011). The Linear Biodiversity Index (LBI) and the Area Biodiversity Index (ABI) were calculated as in Wehrtmann et al. (2009). To calculate the LBI, the number of species was divided by the perimeter of the island. The ABI was calculated by dividing the number of species by the area down to the 200m isobaths; the depth within which almost all the species had been recorded.

MARINE BIODIVERSITY OF ISLA DEL COCO NATIONAL PARK

At least 1688 species of marine organisms (Appendix 1) have been reported from Isla del Coco National Park (PNIC). The most species-rich groups are the gastropods (383 species), bony fishes (354 spp.) and crustaceans (at least 263 spp.) (Table 1). Close to 4,700 species of marine organisms have been reported for Costa Rica.
TABLE 1 (Continued)
Number of marine species reported from Isla del Coco National Park (Complete list of species in Appendix 1), from Pacific Costa Rica, species found only at PNIC, and the percentage those species exclusively of PNIC represent within each taxa

| TAXA                  | Species from PNIC | Species from Pacific Costa Rica | Species found only at PNIC | % species only at PNIC | References |
|-----------------------|-------------------|--------------------------------|---------------------------|------------------------|------------|
| Crustacea             | 263+              | 888+                           | 81                        | 9.1                    |            |
| Stomatopoda           | 6                 | 29                             | 2                         | 6.9                    | 176, 177, 179 |
| Euphausiacea          | Several spp.      | 20+                            | n.k.                      | n.k.                   | 39, 130    |
| Decapoda              | 139               | 458                            | 49                        | 10.6                   | 1, 53, 73, 85, 88, 90, 91, 124, 136, 169, 177, 178, 179, 183, 184 |
| Isopoda               | 3                 | 37                             | 2                         | 5.4                    | 18, 25, 26 |
| Mysida                | Several spp.      | 5+                             | n.k.                      | n.k.                   | 130, 139   |
| Tanaidaceae           | 1                 | 6                              | 1                         | 16.7                   | 96         |
| Amphipoda             | 25                | 117                            | 11                        | 9.4                    | 11, 79, 86, 87, 130, 157, 164 |
| Cirripedia            | 14                | 40                             | 4                         | 10.0                   | 173, 188   |
| Copepoda              | 70                | 172                            | 9                         | 5.3                    | 130, 131, 165, 166, 167 |
| Branchiopoda          | 1                 | 1                              | 1                         | 100                    | 130        |
| Ostracoda             | 2                 | 2                              | 2                         | 100                    | 130        |
| Pycnogonida           | 2                 | 10                             | 2                         | 20.0                   | 9          |
| Insecta               | 1                 | 9                              | 0                         | 0                      | 162        |
| Chaetognatha          | 8                 | 27                             | 6                         | 22.2                   | 41, 130, 168 |
| Bryozoa               | 31                | 61                             | 22                        | 36.1                   | 51, 98, 133, 134, 135 |
| Brachiopoda           | 6                 | 8                              | 6                         | 75.0                   | 59, 60, 71, 98 |
| Phoronida             | 1                 | 1                              | 1                         | 100                    | 66         |
| Echinodermata         | 123               | 183                            | 78                        | 42.6                   |            |
| Crinoidea             | 2                 | 2                              | 2                         | 100                    | 5, 7       |
| Asteroidea            | 30                | 36                             | 24                        | 66.7                   | 5, 7, 117, 119, 159 |
| Ophiuroidea           | 30                | 54                             | 17                        | 31.5                   | 5, 6, 7, 159 |
| Echiuridae            | 31                | 44                             | 16                        | 36.4                   | 5, 6, 7, 42, 43, 113, 159 |
| Holothuroidea         | 30                | 47                             | 19                        | 40.4                   | 5, 6, 7, 110, 159 |
| Chordata              | 478               | 1083                           | 119                       | 11.0                   |            |
| Appendicularia        | 9                 | 10                             | 7                         | 70.0                   | 10, 40, 41, 130 |
| Thaliacea             | 3                 | 4                              | 3                         | 75.0                   | 130        |
| Leptocardii           | 1                 | 2                              | 1                         | 50.0                   | 158, 175   |
| Elasmobranchii        | 35                | 84                             | 16                        | 19.0                   | 3, 4, 34, 35, 47, 52, 115, 116, 122, 142, 143, 163 |
| Actinopterygii        | 354               | 858                            | 84                        | 9.8                    | 3, 4, 19, 27, 28, 29, 30, 31, 32, 53, 34, 35, 47, 62, 77, 83, 84, 95, 97, 104, 105, 121, 122, 123, 126, 127, 132, 138, 140, 142, 143, 151, 155, 163 |
| Reptilia              | 5                 | 5                              | 0                         | 0                      | 84, 154, 161 |
| Aves                  | 55                | 92                             | 16                        | 17.4                   | 12, 128, 187 |
| Mammalia              | 16                | 28                             | 6                         | 21.4                   | 120, 129   |
| TOTAL                 | 1688              | 4690                           | 747                       | 15.9%                  |            |

Pacific Costa Rica = mainland coast (MC), Coco Volcanic Cordillera (CVC) (also known as Cocos Ridge), Costa Rica Thermal Dome (CRTD), and Isla del Coco National Park (PNIC). + = more species than the number indicated are known, but have not been described. n.k. = not known.
 Rica (Table 1); of these species, 747 or ~16% have been only reported from PNIC but not from other areas of Costa Rica. The percentages by taxonomic group ranged from 0 to 100%. All brown algae, echiuran, marine insects, and reptiles from PNIC are also found in the rest of Costa Rica. While all reported branchiopods, ostracods, phoronids, and crinoids, represented by one or two species, known from Costa Rica are reported from PNIC. Some groups have a disproportionate percentage of known species at PNIC, scyphozoans (40%), echinoderms as a phylum (42.6%), and its classes, asteroids (66.7%) echinoids (36.4%) and holothurians (40.4%), brachiopods (75.0%), and within the chordates, cephalochordates (50%) appendicularians (70%) and thaliacians (75%).

Species of several groups have been reported from other areas of Costa Rica than PNIC (Table 2). Some of these taxa we know are absent from PNIC, for example the seagrasses and mangroves, and some of the species associated to this ecosystems. Other groups have been observed, photographed or collected but there are no published accounts of them. Within these groups we have nematodes, nemerteans, ascideans, and parasites of fishes and turtles. Free-living flat worms have been observed along the mainland coast of Costa Rica as well as at PNIC, but there are no publications. Of other taxa we do not know if they are present or not, for example, marine fungi, cumaceans and kinorhynchns (Table 2). Plus there must be other marine groups that have been reported from the Eastern Tropical Pacific, for example, loriciferans (Heiner & Neuhaus 2007) that might be present at PNIC.

Forty five species or 2.7% of the species known from PNIC are endemic (Tables 3, 4), and this represents 47.4% of all endemic marine species of Costa Rica (95 spp.). The number of endemic species is relatively low, but that is common in marine environments. The list of endemic marine species is presented in Table 3, as well as the reference to the publication where the species was described. Between 1893 and 1971, 16 species were described, while 29 were described from 1981 to 2011. Most endemic species are fishes (33.3% of all endemics from PNIC) and most were described in the last 30 years (11 of the 15 species). Crustacea is the next group with most endemism, 28.9%, followed by the mollusks, 15.5%, all very well studied groups (Table 4). Within a particular group, the brachiopods have the highest percentage of endemism, 16.7% followed by the sponges and polyplacophorans with 12.5% (Table 4).

Biodiversity indices used to compare species diversity at Isla del Coco with that at the Costa Rican coast revealed significantly higher values at PNIC than at the coast. For example,

### Table 2

Taxa reported from Pacific mainland Costa Rica, or Coco Volcanic Cordillera, but not from Isla del Coco National Park.

| Taxonomic group                                      | Number of species reported | Isla del Coco |
|------------------------------------------------------|----------------------------|---------------|
| Marine fungi (Ulken et al. 1990, Cortés 2009d)       | 5 genera                  | n.k.          |
| Seagrasses (Cortés & Salas 2009)                     | 2                         | Absent        |
| Mangroves (Silva-Benavides 2009)                    | 8                         | Absent        |
| Nematods (De la Cruz & Vargas 1986, Vargas 1988a, b) | Several species           | Present       |
| Nemerteans (Dexter 1974)                            | Several species           | Present       |
| Cumaceans (Petrescu et al. 2009)                    | 13                        | n.k.          |
| Kinorhynchns (Neuhaus 2004, Neuhaus & Blasche 2006, Cortés 2009d) | 2                         | n.k.          |
| Ascidians (van Name 1945, Tokioka 1971, 1972, Cortés 2009d, Nova-Bustos et al. 2010) | 14                        | Present       |
| Fish parasites (Cortés 2009e)                        | 46                        | Present       |
| Turtle parasites (Santoro & Mattiucci 2009)         | 34                        | Present       |

n.k. = not known; Present = have been observed or collected but there are no publications.
### TABLE 3
Endemic marine species of Isla del Coco National Park, Costa Rica

**Phylum Porifera**
Class Hexactinellida, Order Hexactinosida, Family Tretodictyidae
1) *Tretodictyum cocosensis* Reiswig, 2010

**Phylum Cnidaria**
Class Anthozoa, Order Alcyonacea, Family Gorgoniidae
2) *Leptogorgia tricorata* Breedy & Cortés, 2011
3) *Pacifigorgia curta* Breedy & Guzman, 2003

Class Anthozoa, Order Caryophylliidae
4) *Anomocora carinata* Cairns, 1991a

Class Hydrozoa, Order Filifora, Family Stylasteridae
5) *Pliobothrus fistulosus* Cairns, 1991b
6) *Stylerct coccosensis* Cairns, 1991b

**Phylum Mollusca**
Class Polyplacophora, Order Chitonida, Family Ischnochitonidae
7) *Ischnochiton victoriae* Ferreira, 1987

Class Gastropoda, Order Neogastropoda, Family Cystiscidae
8) *Gibberula achenae* Roth & Coan, 1971

Class Gastropoda, Subclass Vetigastropoda, Family Haliotidae
9) *Haliotis dalli roberti* McLean, 1970

Class Gastropoda, Order Neogastropoda, Family Muricidae
10) *Favartia shaskyi* D’Attilio & Myers, 1988

Class Gastropoda, Order Neogastropoda, Family Olividae
11) *Oliva spicata deynzerae* Petuch & Sargent, 1986

Class Bivalvia, Order Ostreoida, Family Pectinidae
13) *Leopecten coccosensis* Waller, 2007

**Phylum Arthropoda**
Subphylum Crustacea, Class Malacostraca, Order Decapoda, Family Diogenidae
14) *Allodardanus rugosus* Haig & Provenzano, 1965

Class Crustacea, Order Decapoda, Family Gecarcinidae
15) *Cancillus tanneri* Faxon, 1893
16) *Paguristes fecundus* Faxon, 1893

Subphylum Crustacea, Class Malacostraca, Order Decapoda, Family Gecarcinidae
17) *Johngarthi cocoensis* Perger, Vargas & Wall, 2011

Subphylum Crustacea, Class Malacostraca, Order Decapoda, Family Paguridae
18) *Enallopaguropsis janetiae* McLaughlin, 1982

Subphylum Crustacea, Class Malacostraca, Order Decapoda, Family Palaemonidae
19) *Macrobrachium coccosensis* Abele & Kim, 1984

Subphylum Crustacea, Class Malacostraca, Order Decapoda, Family Pinnotheridae
20) *Parapinnixa cortesi* Thoma, Heard & Vargas, 2005

Subphylum Crustacea, Class Malacostraca, Order Decapoda, Family Porcellanidae
21) *Petrostes cocoensis* Haig, 1960

Subphylum Crustacea, Class Malacostraca, Order Decapoda, Family Upogebiidae
22) *Pomatoegubia cocosia* (Williams, 1986)

Subphylum Crustacea, Class Malacostraca, Order Amphipoda, Family Isaeidae
23) *Gammaropsis dubia* (Shoemaker, 1942)

Subphylum Crustacea, Class Malacostraca, Order Amphipoda, Family Talitridae
24) *Talorchestia fritzi* Stebbing, 1903

Subphylum Crustacea, Class Maxillopoda, Order Monstrilloidea, Family Monstrillidae
25) *Cymbasoma cocosense* Suárez-Morales & Morales-Ramírez, 2009
26) *Monstrillopsis chathamensis* Suárez-Morales & Morales-Ramírez, 2009

**Phylum Brachiopoda**
Class Rhynchonellata, Order Rhynchonellida, Family Frieleiidae
27) *Hispanirynchia? craneana* (Dall, 1895)
the Linear Biodiversity Index for Isla del Coco is 58.6, which is significantly higher than the highest value (3.8) found by Wehrtmann et al. (2009) for the Costa Rican Pacific coast. The same happens when comparing the Area Biodiversity Index of continental shelves. The value for the 200m isobaths of PNIC is 5.3, compared to the highest value of 0.3 reported by Wehrtmann et al. (2009). The LBI and ABI values for the Costa Rican coastline and continental platform, respectively, were the highest when compared to other countries in the region (Wehrtmann et al. 2009). By all measures Isla del Coco is a very rich area in the eastern tropical Pacific.

**Phylum Echinodermata**

Class Asteroidea, Order Paxillosida, Family Asteropectinidae
- 28) *Astropecten benthophilus* Ludwig, 1905
- 29) *Persephonaster armiger* Ludwig, 1905

Class Echinoidea, Order Clypeasteroida, Family Mellitidae
- 30) *Encope cocos* Clark, 1948

**Phylum Chordata**

Subphylum Vertebrata, Class Actinopterygii, Order Gobiesiformes, Familie Gobiesocidae
- 31) *Gobiesox woodsi* (Schultz, 1944)
- 32) *Tomicodon vermiculatus* Briggs, 1955

Subphylum Vertebrata, Class Actinopterygii, Order Lophiiformes, Family Ogcocephalidae
- 33) *Ogcocephalus porrectus* Garman, 1899

Subphylum Vertebrata, Class Actinopterygii, Order Ophidiiformes, Family Bythitidae
- 34) *Ogilbia cocoensis* Müller, Schwarzhans & Nielsen, 2005

Subphylum Vertebrata, Class Actinopterygii, Order Perciformes, Family Peristidae
- 35) *Peristedon nesium* Bussing, 2010

Subphylum Vertebrata, Class Actinopterygii, Order Perciformes, Family Channidae
- 36) *Acanthemblemaria atrata* Hastings & Robertson, 1999

Subphylum Vertebrata, Class Actinopterygii, Order Perciformes, Family Dactyloscopidae
- 37) *Gillellus chathamensis* Dawson, 1977

Subphylum Vertebrata, Class Actinopterygii, Order Perciformes, Family Gobiidae
- 38) *Chirolepis atrimehlu* Bussing, 1997
- 39) *Chirolepis dialepta* Bussing, 1990
- 40) *Lythrypnus alphigena* Bussing, 1990
- 41) *Lythrypnus cobalus* Bussing, 1990
- 42) *Lythrypnus lavenbergi* Bussing, 1990
- 43) *Sicydium cocoensis* (Heller & Snodgrass, 1903)

Subphylum Vertebrata, Class Actinopterygii, Order Perciformes, Family Labridae
- 44) *Halichoeres salmofasciatus* Allen & Robertson, 2002

Subphylum Vertebrata, Class Actinopterygii, Order Perciformes, Family Tripterygiidae
- 45) *Axoclinus cocoensis* Bussing, 1991

### TABLE 3 (Continued)

| Endemic marine species of Isla del Coco National Park, Costa Rica |
|---------------------------------------------------------------|

**STATUS OF THE ENDEMIC SPECIES**

Forty five species are endemic to PNIC (Table 2). While some are abundant, such as the calcified hydrozoan *Stylaster cocoensis*, described in 1991 by Stephen D. Cairns, others have not been seen since they were described, for example, the sand dollar, *Encope cocoensis*. This species had not been found alive since it was described by H.L. Clark in 1948. However, in January 2007 a specimen recently dead was dredged from deep water. In 1986 using the research submersible *Johnson-Sea-Link* (Harbor Branch Oceanographic Institution, Fort Pierce, Florida, USA) diving to
several hundred meters, collected specimens that resulted in new species and some were endemic (Cairns 1991a, b). We don’t know the status of some of those endemics because no submersible with the depth capacity of the Johnson-Sea-Link has been back to the island. There is now another submersible operating more regularly at the island, the DeepSee (Undersea Hunter Group, Puntarenas, Costa Rica), with a depth capability of 450m (Cortés & Blum 2008). We have been able to observed several of the deepwater endemics collected in 1986, some are relatively abundant. Eleven endemic species have been described in the last decade so it’s possible that eventually they will be found in other areas. Some species of fishes which were initially classified as endemic to one of the oceanic islands of the eastern Tropical Pacific are now reported from one or more of the other oceanic islands. For example, Stegastes arcifrons which have been found in the three oceanic islands, Galápagos, Malpelo and Isla del Coco or Serranus tico and Halichoeres discolor, found in Isla del Coco and Malpelo. Starr et al. (2012) indicated in their study of deepwater fishes of Isla del Coco National Park and Las Gemelas Seamount that probably deep areas in the eastern tropical Pacific will have similar species, but more studies and collections are needed.

**DISCUSSION**

Isla del Coco National Park has a rich marine biodiversity with some groups having been studied for many years and numerous scientists. For example, fishes and mollusks, especially gastropods, are relatively well known while other groups such as cyanobacteria, gelatinous zooplankton, nematodes and flatworms have been poorly studied or never at all even though we know they are on the island. As a result of recent expeditions (2006-2012) many new records of species have been

| TAXA             | Number of endemic species | % of the total of endemics | % of endemics within the group |
|------------------|---------------------------|----------------------------|--------------------------------|
| Porifera         | 1                         | 2.2                        | 12.5                           |
| Cnidaria         | 5                         | 11.1                       | 6.1                            |
| Anthozoa        | 3                         | 6.7                        | 6.4                            |
| Hydrozoa        | 2                         | 4.4                        | 7.1                            |
| Mollusca        | 7                         | 15.5                       | 1.3                            |
| Polyplacophora  | 1                         | 2.2                        | 12.5                           |
| Gastropoda      | 5                         | 11.1                       | 1.3                            |
| Bivalvia        | 1                         | 2.2                        | 1.3                            |
| Crustacea       | 13                        | 28.9                       | 4.9                            |
| Decapoda        | 9                         | 20.0                       | 6.5                            |
| Amphipoda       | 2                         | 4.4                        | 8.0                            |
| Copepoda        | 2                         | 4.4                        | 2.9                            |
| Brachiopoda     | 1                         | 2.2                        | 16.7                           |
| Echinodermata   | 3                         | 6.7                        | 2.4                            |
| Asteroidea      | 2                         | 4.4                        | 6.7                            |
| Echinoidea      | 1                         | 2.2                        | 3.2                            |
| Chordata        | 15                        | 33.3                       | 3.1                            |
| Actinopterygii  | 15                        | 33.3                       | 4.2                            |
| **TOTAL**       | **45**                    | **2.7**                    | **4.9**                        |
reported (Dean et al. 2010a, 2012, Sibaja-Cordero et al. 2012), including a phylum, Phoronida (Dean et al. 2010b), and new species are being discovered, even of conspicuous groups such as octocorals (Breedy & Cortés 2011, Breedy et al. 2012). Reports of new records and descriptions of new species are being prepared at the present time.

Hertlein (1963) did a compilation of published marine species of Isla del Coco, and included a biogeographic analysis of the flora and fauna of the island, plus an annotated bibliography. He reported 334 species (Table 5), with the gastropods (62 species) as the most species-rich group, followed by bony fishes (59) and crustaceans (56). The number of species and of different taxonomic groups has increased significantly but the same pattern of the most species-rich groups is maintained. Wehrtmann et al. (2009) reported 1,142 marine species for Isla del Coco National Park, with the most species-rich groups, in the same order, being the same as above. Here, 546 more species were added to the list of marine species of Isla del Coco National Park, and more will be added in the near future as other groups, depths and areas of the island are being studied.

Hickman (2009), in his study of the marine invertebrate biota of the Galápagos Islands, found that while some groups of species are depauperated others displayed high diversity when compared to mainland Ecuador. Similar patterns were observed at Isla del Coco National Park. These patterns can be attributed to several possible factors likely acting in concert, both for source populations from elsewhere as well as established populations at PNIC: variation in the dispersal potential to and from PNIC, the probability of recruitment at PNIC, and the potential for survival and continued recruitment based on local environmental conditions. Species with long-lived larvae will have a chance of dispersing more than others if they find the type of environmental conditions necessary to survive and reproduce. For example, the absence of seagrasses and the low number of species of bivalves may be due to the lack of soft sediments where they can live.

### AREAS FOR FUTURE RESEARCH

The least studied area of PNIC is the south side due to the normally rough sea conditions on that side (Lizano 2008). From a few observations, several species and environments in the south are different from those in the north in species density and composition, probably due to the currents that flow there (Cortés & Blum 2008).

| TAXA             | Number of species | TAXA             | Number of species |
|------------------|-------------------|------------------|-------------------|
| Foraminifera     | 17                | Cirripedia       | 3                 |
| Cnidaria         | 24                | Copepoda         | 2                 |
| Anthozoa         | 19                | Brachiopoda      | 1                 |
| Hydrozoa         | 5                 | Bryozoa          | 20                |
| Mollusca         | 90                | Echinodermata    | 45                |
| Polyplacophora   | 4                 | Astroidea        | 6                 |
| Gastropoda       | 62                | Ophiuroidea      | 15                |
| Bivalvia         | 12                | Echinoidea       | 13                |
| Cephalopoda      | 12                | Holothuroidea    | 11                |
| Annelida         | 9                 | Chordata         | 72                |
| Crustacea        | 56                | Chondrichytes    | 13                |
| Decapoda         | 50                | Actinopterygii   | 59                |
| Amphipoda        | 1                 |                  |                   |

**TOTAL 334 species**
More sampling should be done on that side in the future in the shallow and deepwaters of the south for better understanding the biodiversity of PNIC, and the effect of currents on that biodiversity.

There are several groups of organisms which have been observed and in some cases collected but for which there are no publications. Examples include cyanobacteria, sponges, flatworms, and nematodes (Table 2). For a few groups, especially the best known, there are some publications on their biogeographic relationships. Several species of stomatopods (Manning 1972), most reef building corals (Cortés 1986, 2011, Glynn & Ault 2000), some mollusks (Montoya & Kaiser 1988), sea urchins (Lessios et al. 1998), and about one third of the shore-fishes (Robertson et al. 2004) are related western Pacific species. More molecular work is needed to discover cryptic species (e.g. Knowlton 2000, Boulay et al. in prep.), and the genetic connectivity (e.g. Lessios & Robertson 2006) of PNIC populations with other areas.

Polidoro et al. (2012) indicated the importance of species-specific information regarding population trends and extinction risks for developing conservation strategies. To do this we must first know what is there, which this paper intends to fulfill. Then we need to know what is the status of the populations, how they are changing over time, and what is affecting them. Unfortunately for most groups this information is unknown.

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RESUMEN

La Isla del Coco es una isla oceánica en el Pacífico Tropical Oriental; es parte del Parque Nacional más grande de Costa Rica y es un sitio de Patrimonio Mundial. La isla ha sido visitada desde el Siglo XVI por su abundancia de agua dulce y árboles. Estudios de biodiversidad marina de la isla empezaron a finales del Siglo XIX, con un intenso periodo de investigación en la década de 1930, y de nuevo desde mediados de la década de 1990 al presente. La información sobre organismos marinos se encuentra dispersa y en algunos casos en publicaciones antiguas. En el presente trabajo se recopilan todos los registros publicados de organismos marinos de la isla. Al menos 1688 especies han sido registradas, con los gasterópodos (383 especies), peces óseos (354 spp.) y crustáceos (al menos 263 spp.) como los grupos con más especies; de esas, 45 son especies endémicas del Parque Nacional Isla del Coco (2.7% del total). El número de especies por kilómetro de costa y por kilómetro cuadrado de lecho marino de menos de 200m de profundidad son los más altos de cualquier sitio estudiado. Aunque se conoce relativamente bien la biodiversidad marina de la Isla del Coco, hay regiones, por ejemplo, el lado sur, los ambientes pelágicos, y las zonas más profundas que requieren de más exploración. También, varios grupos de organismos han sido observados en la isla pero muy poco estudiados o no del todo, por ejemplo los gusanos planos, nemátodos y el plancton gelatinosos.

Palabras clave: Biodiversidad marina, Costa Rica, Isla del Coco, Pacífico Oriental, especies endémicas
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APPENDIX 1

Marine species reported from Isla del Coco National Park, Pacific Costa Rica

| Species                                                                 | Ref. |
|------------------------------------------------------------------------|------|
| 1. Viral taleC sequences                                               | 185  |
| 2. P-SSM4-like phages                                                 | 185  |
| 1. Possibly several species                                           | 153  |
| **Phylum CYANOBACTERIA, Class CYANOPHYCEAE**                         |      |
| Order SYNECHOCOCCALES,                                                |      |
| Family Synechococcaceae                                               |      |
| 1. *Prochlorococcus* sp.                                             | 185  |
| **Phylum MYXOZOA, InfraPhylum DINOFLAGELLATA, Class PERIDINEA, Order** |      |
| Gonyaulacida,                                                        |      |
| Order Goniodomataceae                                                 |      |
| 1. *Gambierdiscus* sp.                                               | 180  |
| 2. *Amphidinium carterae* Hulburt, 1957                               | 180  |
| 3. *Coolia tropicalis* Faust, 1995                                    | 180  |
| 4. *Coolia cf. areolata*                                              | 180  |
| 5. *Ostreopsis siamensis* Schmidt, 1901                               | 180  |
| Order Prorocentrida, Family Prorocentraceae                          |      |
| 6. *Prorocentrum compressum* (Bailey, 1850)                           | 180  |
| Abé ex Dodge, 1975                                                    |      |
| 7. *Prorocentrum concavum* Fukuyo, 1981                               | 180  |
| **Phylum CHLOROPHYTA, Class BRYOPSISIDOPHYCEAE**                     |      |
| Order BRYOPSISIDALES, Family Bryopsisidaceae                          |      |
| 1. *Bryopsis pennata* J.V. Lamouroux, 1809                            | 74, 76|
| 2. *Derbesia marina* (Lyngbye) Solier, 1846                           | 74, 76|
| Family Codiaceae                                                      |      |
| 3. *Codium picturatum* F.F. Pedroche & P.C. Silva, 1996               | 74, 76|
| Family Caulerpaceae                                                   |      |
| 4. *Caulerpa pellata* J.V. Lamouroux, 1809                            | 74, 76|
| 5. *Caulerpa racemosa* (Forsskål) J. Agardh, 1873                    | 74   |
| 6. *Caulerpa serrulata* (Forsskål) J. Agardh, 1837                   | 74, 76|
| Family Udoteaceae                                                     |      |
| 7. *Boodleopsis verticillata* E.Y. Dawson 1960                       | 14   |
| Order DASYCLADALES, Family Dasyycladaceae                            |      |
| 8. *Acetabularia parvula* Solms-Laubach, 1895                        | 74   |
| **Class ULVOPHYCEAE, Order CLADOPHORALES, Family Cladophoraceae**     |      |
| 9. *Cladophora panamensis* W.R. Taylor, 1945                          | 74, 76|
| 10. *Cladophora* sp.                                                  | 74   |
| **Order ULVALES, Family Ulvaceae**                                    |      |
| 11. *Ulva flexuosa* Wulfen, 1803                                      | 14   |
| 12. *Ulva intestinalis* Linnaeus, 1753                                | 74, 76|
| **Phylum OCHROPHYTA, Class PHAEOPHYCEAE**                            |      |
| Order DICTYOTALES, Family Dictytaceae                                 |      |
| 1. *Dictyopteris delicatula* J.V. Lamouroux, 1809                    | 74   |
| 2. *Dictyota stolonifera* Dawson, 1962                               | 74, 76|
| 3. *Dictyota* sp.                                                    | 74   |
| 4. *Lobophora variegata* (Lamouroux) Womersley ex Oliveira, 1977      | 74, 76|
| 5. *Padina crispata* Thivy, 1945                                     | 74, 76|
| Order SCYTOPHONALES, Family Scytophonoaceae                          |      |
| 6. *Rosenvingea intricata* (J. Agardh) Borgesen, 1914                  | 74, 76|
| **Phylum RHODOPHYTA, Class FLORIDOPHYCEAE**                          |      |
| Order CORALLINALES, Family Corallinaceae                             |      |
| 1. *Amphiroa* spp.                                                    | 74   |
| 2. *Amphiroa minutissima* Taylor, 1945                                | 74, 76|
| 3. *Corallina* sp.                                                   | 74   |
| Species                                                                 | Ref. |
|------------------------------------------------------------------------|------|
| 4. Dermatholithon saxicolum (Lemoine) Satchell & Mason, 1943            | 74   |
| 5. Jania spp.                                                           | 74   |
| Family Hapalidaceae                                                    |      |
| Order Gelidiales, Family Gelidiaceae                                   |      |
| 6. Lithothamnion sp.                                                   | 74   |
| Order Hildenbrandiales, Family Hildenbrandiaceae                        |      |
| 7. Gelidium sp.                                                        | 74   |
| Order Nemaliales, Family Galaxauraceae                                 |      |
| 8. Hildenbrandia sp.                                                   | 74   |
| Order Gigartinales, Family Peyssonneliaceae                            |      |
| 9. Galaxaura filamentosa R. Chou, 1945                                 | 74, 76|
| Order Ceramiales, Family Ceramiaceae                                   |      |
| 10. Peyssonella rubra J.G. Agardh, 1851                                 | 74, 76|
| Family Rhodomelaceae                                                   |      |
| 11. Ceramium sp.                                                       | 74   |
| Order Gracilariales, Family Gracilariaceae                             |      |
| 12. Polysiphonia mollis                                                | 74, 76|

**Phylum FORAMINIFERA, Class POLYTHALAMEA,**

| Species                                                                 | Ref. |
|------------------------------------------------------------------------|------|
| 1. Bolivina tongi var. filacostata (Cushman & McCulloch, 1942)          | 49, 56|
| Family Buliminidae                                                     |      |
| 2. Buliminia laevigata Brady, 1881 as Bolivina laevigata                | 49, 56|
| Order Lagenida, Family Nodosariidae                                    |      |
| 3. Dentalina cf. jugosa                                                | 57, 98|
| 4. Laevidentalina filiformis (d’Orbigny, 1826) as Dentalina filiformis| 98   |
| Order Lituolida, Family Ammodiscidae                                   |      |
| 5. Ammodiscus pacificus Cushman & Valentine, 1930                      | 98   |
| Family Discamminidae                                                   |      |
| 6. Ammosclaria compressa (Cushman & McCulloch, 1939) as Ammofrondicularia compressa | 49, 55|
| Family Haplophragmoidida                                                |      |
| 7. Haplophragmoides hancocki Cushman & McCulloch, 1939                 | 57, 98|
| Family Hormosinida                                                     |      |
| 8. Reophax agglutinatus Cushman, 1913                                   | 98   |
| 9. Reophax excentricus Cushman, 1910                                   | 98   |
| Family Nouridae                                                         |      |
| 10. Nouria polymorphinoides Heron-Allen & Earland, 1914                | 98   |
| Family Verneulinida                                                    |      |
| 11. Verneulinaula advena (Cushman, 1922) as Eggerelloides advenus       | 49, 55|
| Order Textulariida, Family Textulariida                                 |      |
| 12. Textularia articulata d’Orbigny, 1846                              | 98   |
| 13. Textularia conca d’Orbigny, 1839                                   | 98   |
| 14. Textularia corrugata Herron-Allen & Earland, 1915                  | 98   |
| 15. Textularia panamensis Cushman, 1918                                 | 98   |
| 16. Textularia schencki Cushman & Valentine, 1930                      | 98, 111|
| Order Trochaminidae, Family Trochaminidae                              |      |
| 17. Deutemminna rotaliformis Heron-Allen & Earland, 1911 as Trochammina rotaliformis | 49, 55|
| 18. Polystomammina nitida (Brady, 1881) as Trochammina nitida          | 49, 55|
| 19. Trochammina charlottensis Cushman, 1925                            | 49, 55|
| Family Vaginulidae                                                     |      |
| 20. Vaginolina exilis Cushman & McCulloch, 1950                        | 49, 57|

**Phylum PORIFERA, Class HEXACTINELLIDA**

| Species                                                                 | Ref. |
|------------------------------------------------------------------------|------|
| 1. Hyalonema (Coscinonema) paterferum Wilson, 1904                     | 50, 186|
| Order Amphidiscoida, Family Hyalonematida                              |      |
| 2. Aphrocallistes vastus Schulze, 1886                                 | 50, 186|
| Order Hexactinosida, Family Aphrocallistida                            |      |
| 3. Eurete erectum Schulze, 1899                                        | 50, 186|
| Family Eurtida                                                         |      |
| 4. Eurete sp.                                                          | 50, 186|
| Family Tretodiactyida                                                  |      |
| *5. Tretodiactyx cocosensis Reiswig, 2010                              | 141   |
| Order Lyssacinosida, Family Rossellidina                               |      |
| 6. Acanthascus (Staurocalyptus) sp.                                    | 50, 186|

**Class DEMOSPONGIAE, Order SPiroPHORIDA**

| Species                                                                 | Ref. |
|------------------------------------------------------------------------|------|
| 7. Thenea fenestrata (Schmidt, 1880)                                    | 50, 186|

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| Order | Family | Species | Ref. |
|-------|--------|---------|------|
| Halichondridae, Family Axinellidae | 8. | Phakellia lamelligera Wilson, 1904 | 50, 186 |
| Phylum Cnidaria, Class Anthozoa | 1. | Ptilosarcus undulatus Verrill, 1865 | 20, 21 |
| Pennatulacea, Family Pennatulidae | 2. | Stylatula cf. elongate | 21 |
| | 3. | Stylatula sp. | 21 |
| Alcyonacea, Family Aquambridae | 4. | Aquambrula klapferi Breedy, Van Ofwegen & Vargas, 2012 | 23a |
| Clavulariidae | 5. | Rhodelinda sp. | 21 |
| Gorgoniidae | 6. | Leptogorgia alba (Duchassaing & Michelotti, 1864) | 20, 21 |
| Virgulariidae | 7. | Leptogorgia tricorata Breedy & Cortés, 2011 | 22 |
| | 8. | *Pacifigorgia curta* Breedy & Guzmán, 2003 | 21, 23 |
| Isididae | 9. | Isidella sp. | 21 |
| Nephthiedae | 10. | Anthomastus sp. | 21 |
| Plexauridae | 11. | Psammodorgia variabilis Studer, 1894 | 21 |
| Alcyonacea, Family Aquambridae | 12. | Paramuricea sp. | 21 |
| Actinaria, Family Isophelliidae | 13. | Narella sp. | 21 |
| ScleRactinia, Family Agariciidae | 14. | Telmatactis ricoides (Duchassaing, 1850) | 45 |
| | 15. | Telmatactis panamensis (Verrill, 1869) | 2 |
| Caryophylliidae | 16. | Gardineroseris planulata (Dana, 1846) | 46 |
| | 17. | Leptoseres papyracea (Dana, 1846) | 46 |
| | 18. | *Leptoseres scabra* Vaughan, 1907 | 46 |
| | 19. | Pavona chiriouensis Glynn et al., 2001 | 46 |
| | 20. | Pavona clavus (Dana, 1846) | 46 |
| | 21. | Pavona gigantea Verrill, 1869 | 46 |
| | 22. | Pavona maldivenis (Gardiner, 1905) | 46 |
| | 23. | Pavona varians Verrill, 1864 | 46 |
| | 24. | *Pavona xarifae* Scheer & Pillai, 1974 | 46 |
| Caryophylliidae | *25. | Anomocora carinata Cairns, 1991 | 36, 46 |
| | 26. | Caryophyllia diomedae Marenzeller, 1904 | 36, 46 |
| | 27. | Caryophyllia percula Cairns, 1991 | 36, 46 |
| | 28. | Coenocyathus bowersi Vaughan, 1906 | 36, 46 |
| | 29. | Desmophyllum dianthus (Esper, 1794) | 36, 46 |
| | 30. | Polycyathus hondoensis (Durham & Barnard, 1952) | 36, 46 |
| | 31. | Tethocyathus prahii Lattig & Cairns 2000 | 46, 112 |
| | 32. | Dendrophyllia oldroydii Oldroyd, 1924 | 36, 46 |
| | 33. | *Endopachys grayi* Milne Edwards & Haime, 1848 | 36, 46 |
| | 34. | Rhizopsammia verrilli Van der Horst, 1922 | 36, 46 |
| | 35. | Tubastrea coccinea Lesson, 1829 | 36, 46 |
| Faviidae | 36. | Cladocora pacifica Cairns, 1991 | 36, 46 |
| Flabellidae | 37. | Javania cailleti (Duchassaing & Michelotti, 1864) | 36, 46 |
| Fungiidae | 38. | Fungia (Cycloseris) curvata Hoeksema, 1989 | 36, 46 |
| | 39. | Fungia (Cycloseris) distorta Michelin, 1842 | 36, 46 |
| Pocilloporidae | 40. | Pocillopora damicornis (Linnaeus, 1758) | 46 |
| | 41. | Pocillopora elegans Dana, 1846 | 46 |
| | 42. | Pocillopora eydouxi Milne Edwards & Haime, 1860 | 46 |
| | 43. | Pocillopora meandrina Dana, 1846 | 46 |
| Poritidae | 44. | Porites lobata Dana, 1846 | 46 |
| Rhizangiidae | 45. | Astrangia dentata Verrill, 1866 | 36, 46 |
| | 46. | *Calicia stellata* Dana, 1846 | 36, 46 |
| Species Ref.1 | Reference |
|---------------|------------|
| 47. Psammocora stellata (Verrill, 1866) | 46 |
| 48. Psammocora superficialis Gardiner, 1898 | 46 |
| **Class SCYPHIZOA, Order CORONATAE** | |
| Family Atollidae | |
| 49. Atolla sp. | 15, 16 |
| 50. Atolla wyvillei Haeckel, 1880 | 15, 16 |
| 51. Periphyla hyacinthina (Pérèn & Lesueur, 1810) | 15, 16 |
| 52. Periphyla sp. | 15, 16 |
| Family Atorellidae | |
| 53. Atorella arcturi Bigelow, 1928 | 16 |
| Family Linuchidae | |
| 54. Linuche unguiculata (Swartz, 1788) | 16 |
| **Class HYDROZOA** | |
| Order ANTHOATHECATA, Family Polyorchidae | |
| 55. Polyorchis penicillatus (Eschscholtz, 1829) | 149 |
| 56. Errina macrogastra Marenzeller, 1904 | 37, 46 |
| *58. Pliothropsis fistulosus Cairns, 1991 | 37, 46 |
| *59. Stylaster cocosensis Cairns, 1991 | 37, 46 |
| 60. Stylaster galapagensis Cairns, 1986 | 37, 46 |
| 61. Stylaster marenzelleri Cairns, 1986 | 37, 46 |
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| 62. Clytia gracilis (Sars, 1850) as C. cylindrica and as Gonothyraea gracilis | 44, 80, 109 |
| 63. Obelia dichotoma (Linnaeus, 1758) as O. commissuralis | 44, 80, 98 |
| **Family Stylasteridae** | |
| 64. Halecium washingtoni Nutting, 1901 | 80, 81, 98 |
| 65. Thuiaria crisioides Lamouroux, 1824 | 81, 98 |
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| 66. Rhopalonema velatum Gegenbaur, 1857 | 130 |
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| **Family Abylidae** | |
| 69. Abylopsis sp. | 17, 130 |
| 70. Abylopsis tetragona (Otto, 1823) | 17, 130 |
| **Family Dyphidae** | |
| 71. Dyphes dispar (Chamisso & Eysenhardt, 1821) | 17, 130 |
| 72. Dyphes sp. | 17, 130 |
| 73. Eudoxoides mitra (Huxley, 1859) | 17, 130 |
| 74. Magnagia atlantica Cunningham, 1892 | 17, 130 |
| **Family Hippopodidae** | |
| 75. Vogtia serrata (Moser, 1925) | 17 |
| **Family Prayidae** | |
| 76. Nectadamas diomedeae (Bigelow, 1911) | 17 |
| 77. Nectopyramis natans (Bigelow, 1911) | 17 |
| 78. Praya dubia (Quoy & Gaimard, 1827) | 17 |
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| 79. Agalma okenis Eschscholtz, 1825 | 17, 147 |
| 80. Halistemma sp. | 17, 147 |
| **Family Athorybiidae** | |
| 81. Athorybia rosacea (Forskål, 1775) | 17 |
| **Family Forskaliiidae** | |
| 82. Forskalia sp. | 17 |
| **Family Physophoridae** | |
| 83. Physophora hydrostatica Forskal, 1775 | 17 |
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| 1. Acanthochiton australis Dall, 1919 | 156, 160 |
| 2. Acanthochiton hirudiniformis (Sowerby, 1832) | 156 |
| **Family Chitonidae** | |
| 3. Chiton goodallii Broderip & Sowerby, 1832 | 60, 156 |
| 4. Chiton stokesii Broderip, 1832 | 60, 78, 156 |
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|------------------------|---------|------|
|                        | *5. *Ischnochiton victoriae* Ferreira, 1987 | 78, 156 |
|                        | 6. *Lepidoeiza rotii* Ferreira, 1983 | 78, 156 |
|                        | 7. *Stenoplax boogii* (Haddon, 1886) | 78, 156 |
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| Family Aglajidae       | 10. *Navanax aenigmaticus* (Bergh, 1894) | 172 |
| Family Architectonicidae | 11. *Architectonica nobilis* Röding, 1798 | 150 |
|                        | 12. *Discotectonica placentalis* (Hinds, 1844) | 150 |
|                        | 13. *Helicus mazatlanicus* Pillsbry & Lowe, 1932 | 150 |
|                        | 14. *Pseudotorinia architae* (O.G. Costa, 1841) | 150 |
|                        | 15. *Psilaxis radiata* (Röding, 1798) | 150 |
| Family Amathinidae     | 16. *Phasianema saxicola* (C.B. Adams, 1852) | 150 |
| Family Areneidae       | 17. *Arenella ferruginosa* McLean, 1970 | 150 |
|                        | 18. *Arenella guttata* McLean, 1970 | 150 |
| Family Atlantidae      | 19. *Atlanta sp.* | 130 |
| Family Barleeiidae     | 20. *Barleeia cf. bifasciata* | 150 |
|                        | 21. *Barleeia orcussi Bartsch, 1920 | 150 |
|                        | 22. *Barleeia paupercula* (C.B. Adams, 1852) | 150 |
|                        | 23. *Barleeia polychroma* (de Folin, 1870) | 150 |
| Family Buccinidae      | 24. *Amphithalamus inclusus* Carpenter, 1864 | 150 |
|                        | 25. *Bailya anomala* (Hinds, 1844) | 150 |
|                        | 26. *Caducifer cinis* (Reeve, 1846) | 150 |
|                        | 27. *Cantharus gemmatus* (Reeve, 1846) | 150 |
|                        | 28. *Cantharus rehderi* Berry, 1962 | 150 |
|                        | 29. *Cantharus sanguinolentus* Duclos, 1833 | 150 |
|                        | 30. *Clivipollia fragaria* (Wood, 1828) | 150 |
|                        | 31. *Colubraria lucasensis* Strong & Hertlein, 1937 | 150 |
|                        | 32. *Colubraria ochsneri* Hertlein & Allison, 1968 | 150 |
|                        | 33. *Engina jugosa* (C.B. Adams, 1852) | 150 |
|                        | 34. *Phos articulatus* Hinds, 1844 | 150 |
|                        | 35. *Phos cocosensis* Dall, 1896 | 98 |
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| Family Bullidae        | 37. *Bulla punctulata A. Adams in Sowerby, 1850* | 70 |
| Family Bursidae        | 38. *Bursa calcipicta* Dall, 1908 | 150 |
|                        | 39. *Bursa corrugata* (Perry, 1811) | 150 |
|                        | 40. *Bursa granularis* (Röding, 1798) | 150 |
|                        | 41. *Marsupina nana* (Broderip & Sowerby, 1829) | 150 |
| Family Caecidae        | 42. *Caecum clathratum* Carpenter, 1857 | 150 |
|                        | 43. *Caecum cf. corrugulatum* | 150 |
|                        | 44. *Caecum laqueatum* C.B. Adams, 1852 | 150 |
|                        | 45. *Caecum lohri* (Strong & Hertlein, 1939) | 150 |
|                        | 46. *Caecum paradoxum de Folin, 1867* | 150 |
|                        | 47. *Caecum parvum* C.B. Adams, 1852 | 150 |
|                        | 48. *Elephantium heptagonum* (Carpenter, 1857) | 150 |
|                        | 49. *Elephantium liratocinctum* (Carpenter, 1857) | 150 |
|                        | 50. *Fartulum glabriforme* (Carpenter, 1857) | 150 |
| Family Calyptraeidae   | 51. *Cheilea cepacea* (Broderip, 1834) | 150 |
|                        | 52. *Cheilea corrugata* (Broderip, 1834) | 150 |
|                        | 53. *Crucibulum scutellatum* (Wood, 1928) | 150 |
| Species | Ref. |
|---------|------|
| **Family Cancellariidae** | |
| 54. *Cancellaria pulchra* Sowerby, 1832 | 150 |
| 55. *Svetia centrota* (Dall, 1896) | 150 |
| 56. *Trigonostoma breve* (Sowerby, 1832) | 150 |
| **Family Carinariidae** | |
| 57. *Cardiapoda placenta* (Lesson, 1830) | 130 |
| **Family Cassidae** | |
| 58. *Casmaria vibexmexicana* (Stearns, 1894) | 150 |
| 59. *Cypraecassis coarctata* (Sowerby, 1825) | 150 |
| 60. *Cypraecassis tenuis* (Wood, 1928) | 150 |
| 61. *Semicassis centiquadrata* (Valenciennes, 1832) | 150 |
| **Family Cavoliniiidae** | |
| 62. *Diacavolinia longirostris* (Blainville, 1821) as *Cavolina logirostris* | 98, 101 |
| **Family Cerithiidae** | |
| 63. *Clio* sp. | 130 |
| 64. *Creses virgula* Rang, 1828 as *Creses virgula* | 98, 101 |
| 65. *Cuvierina* sp. | 130 |
| 66. *Diacria quadridentata* (Lesueur, 1821) | 98, 101 |
| **Family Cerithiopsidae** | |
| 67. *Cerithium adustum* Kiener, 1841 | 60, 150 |
| 68. *Cerithium maculosum* Kiener, 1841 | 60, 150 |
| 69. *Cerithium uncinatum* (Gmelin, 1791) | 60, 150 |
| 70. *Rhinoclavis gemmata* (Hinds, 1844) | 60, 150 |
| **Family Chromodorididae** | |
| 71. *Chromodoris sphoni* Ev. Marcus, 1971 | 38 |
| 72. *Glossodoris baumanni* (Bertsch, 1970) | 38 |
| **Family Columbellidae** | |
| 73. *Aesopus chrysalloides* (Carpenter, 1864) | 150 |
| 74. *Aesopus sanctus* Dall, 1919 | 150 |
| 75. *Columbella labiosa* Sowerby, 1822 | 150 |
| 76. *Columbella sonsonatensis* (Mörch, 1860) | 150 |
| 77. *Cotonopsis deroyae* (Emerson & D’Attilio, 1969) | 150 |
| 78. *Microcithara uncinata* (Sowerby, 1832) | 150 |
| 79. *Mitrella ocellata* (Gmelin, 1791) | 150 |
| 80. *Mitrella helicoleuca* (Pilsbry & Lowe, 1932) | 150 |
| **Family Conidae** | |
| 81. *Conus brunneus* Wood, 1828 | 150 |
| 82. *Conus chaldaeus* (Röding, 1798) | 150 |
| 83. *Conus dalli* Stearns, 1873 | 150 |
| 84. *Conus diadema* Sowerby, 1834 | 150 |
| 85. *Conus ebraeus* Linnaeus, 1758 | 150 |
| 86. *Conus emarginatus* Reeve, 1844 | 150 |
| 87. *Conus gradatus* Wood, 1828 | 150 |
| 88. *Conus gradatus* Wood, 1828 | 150 |
| 89. *Conus diadema* Sowerby, 1834 | 150 |
| 90. *Conus nux* Broderip, 1833 | 150 |
| 91. *Conus recurvus* Broderip, 1833 | 150 |
| 92. *Conus tessulatus* Born, 1778 | 150 |
| 93. *Conus tigrinus* Sowerby, 1833 | 150 |
| 94. *Conus lucidus* Wood, 1828 | 150 |
| 95. *Conus mahogani* Reeve, 1843 | 150 |
| 96. *Conus nux* Broderip, 1833 | 150 |
| 97. *Conus purpurascens* Sowerby, 1833 | 150 |
| 98. *Conus recurvus* Broderip, 1833 | 150 |
| Species | Ref. |
|---------|-----|
| **Family Coralliophilidae** | |
| 101. *Babelomurex hindsii* (Carpenter, 1857) | 150 |
| 102. *Babelomurex santacruzensis* (Emerson & D’Attilio, 1970) | 150 |
| 103. *Coralliophila macleani* Shasky, 1970 | 150 |
| 104. *Coralliophila neritoidea* (Lamarck, 1816) | 150 |
| 105. *Coralliophila parva* (E.A. Smith, 1877) | 150 |
| 106. *Coralliophila rocasuciae* Myers & D’Attilio, 1990 | 150 |
| 107. *Coralliophila violeacea* (Kiener, 1836) | 69 |
| 108. *Quoyula madreporarum* (Sowerby, 1834) | 150 |
| 109. *Reliquiaecava robillardi* (Liénard, 1870) | 150 |
| 110. *Rhizochilus antipathum* Steenstrup, 1850 | 150 |
| **Family Costellariidae** | |
| 111. *Thala jeancateae* Sphon, 1969 | 150 |
| **Family Cylichnidae** | |
| 112. *Cylichna atahualpa* (Dall, 1908) | 172 |
| **Family Cypraeidae** | |
| 113. *Blasicrura alisonae* Burgess, 1983 | 150 |
| 114. *Blasicrura rashleighana* (Melvill, 1888) | 150 |
| 115. *Blasicrura teres* Gmelin, 1791 | 150 |
| 116. *Erosaria albuginosa* Gray, 1825 | 150 |
| 117. *Erosaria caputerpentis* Linnaeus, 1758 | 150 |
| 118. *Laria isabella* Stearns, 1893 | 150 |
| 119. *Macrocypraea cervineta* (Kiener, 1843) | 150 |
| 120. *Mauritia depressa* (Gray, 1824) | 150 |
| 121. *Monetaria moneta* Linnaeus, 1758 | 150 |
| 122. *Talparia talpa* Linnaeus, 1758 | 150 |
| 123. *Zonaria robertsi* (Hidalgo, 1906) | 150 |
| **Family Cystiscidae** | |
| *124. Gibberula achenea* Roth & Coan, 1971 | 150, 152 |
| 125. *Gibberula minor* (C.B. Adams, 1852) | 150 |
| 126. *Gibberula polita* (Carpenter, 1857) | 150 |
| 127. *Gibberula subtrigona* (Carpenter, 1864) | 150 |
| 128. *Persicula pulchella* (Kiener, 1834) | 150 |
| **Family Dendrodorididae** | |
| 129. *Dendrodoris fumata* (Rüpell & Leuckart, 1831) | 38 |
| **Family Desmopteridae** | |
| 130. *Desmopterus papilio* Chun, 1889 | 124 |
| **Family Elachisinidae** | |
| 131. *Elachisina johnstoni* (Baker, Hanna & Strong, 1930) | 150 |
| **Family Ellobiidae** | |
| 132. *Ellobium stagnalis* (d’Orbigny, 1835) | 60, 150 |
| 133. *Melampus carolianus* (Lesson, 1842) | 60, 150 |
| 134. *Melampus tabogensis* (C.B. Adams, 1852) | 60, 150 |
| 135. *Melampus trilineatus* (C.B. Adams, 1852) | 98 |
| 136. *Pedipes angulatus* (C.B. Adams, 1852) | 60, 150 |
| 137. *Tralia panamensis* (C.B. Adams, 1852) | 60, 150 |
| **Family Epitoniidae** | |
| 138. *Amnea deroyae* DuShane, 1970 | 150 |
| 139. *Epitonium acapulcanum* Dall, 1917 | 150, 160 |
| 140. *Epitonium aciculinum* (Hinds, 1844) | 150 |
| 141. *Epitonium billeanum* (DuShane & Bratcher, 1965) | 150 |
| 142. *Epitonium hancocki* DuShane, 1970 | 150 |
| 143. *Epitonium indistinctum* (Sowerby, 1844) | 150 |
| 144. *Epitonium replicata* (Sowerby, 1844) | 150 |
| 145. *Opalia crystallina* (Carpenter, 1864) | 150 |
| 146. *Opalia infrequens* (C.B. Adams, 1852) | 150 |
| 147. *Opalia paulula* DuShane, 1974 | 150 |
| 148. *Opalia sanjuanensis* (Lowe, 1932) | 150 |
Family Eulimidae

149. Eulima elegantissima de Folin, 1887
150. Melanella ogasawarana (Pilsbry, 1905)
151. Melanella townsendi Bartsch, 1917
152. Niso aeglees Bush, 1885
153. Niso interrupta (Sowerby, 1834)
154. Sabinella shaskyi Warén, 1992
155. Scalenostoma subalata (Broderip, 1832)
156. Subniso rangii (de Folin, 1867)

Family Fasciolariidae

157. Leucozonia cerata (Wood, 1828)
158. Leucozonia tuberculata (Broderip, 1833)
159. Fusinus alyni McLean, 1970
160. Fusinus dupetitthouarsi (Kiener, 1840)
161. Fusinus turris (Valenciennes, 1832)
162. Pleuroloca princeps (Sowerby, 1825)

Family Fissurellidae

163. Diodora inaequalis (Sowerby, 1835)
164. Diodora punctifissa McLean, 1970
165. Diodora saturnalis (Carpenter, 1864)
166. Fissurella deroyae McLean, 1970
167. Fissurella microtrema Sowerby, 1835
168. Fissurella virescens Sowerby, 1835
169. Lucapinella milleri Berry, 1959

Family Haliotidae

*170. Haliotis dalli roberti McLean, 1970

Family Harpidae

171. Harpa crenata Swainson, 1822
172. Morum veleroae Emerson, 1968

Family Hipponicidae

173. Hipponix antiquatus panamensis C.B. Adams, 1852
174. Hipponix grayanus Menke, 1853
175. Pilosabia pilosa (Deshayes, 1832)

Family Juliidae

176. Julia thecaphora (Carpenter, 1857)

Family Limacinidae

177. Limacina inflata (d’Orbigny, 1836)
178. Limacina trochiformis (d’Orbigny, 1836)

Family Littorinidae

179. Alaba supralirata Carpenter, 1857
180. Echinolittorina aspera (Philippi, 1846) as Littorina aspera
181. Echinolittorina modesta (Philippi, 1846) as Nodilittorina modesta
182. Littoraria cocinea (Gmelin, 1791)
183. Littoraria pintado pullata (Carpenter, 1864)
184. Littoraria undulata (Gray, 1839)
185. Littorina keenae Rosewater, 1978
186. Nodilittorina atrata (C.B. Adams, 1852)
187. Nodilittorina conspersa (Philippi, 1847)
188. Nodilittorina dubiosa (C.B. Adams, 1852)

Family Lottidae

189. Lottia mesoleuca (Menke, 1851)
190. Lottia rothi (Lindberg & McLean, 1981)
191. Lottia strigatella (Carpenter, 1864)
192. Patelloidea semirubida (Dall, 1914)
193. Tectura ubiquita (Lindberg & McLean, 1981)

Family Marginellidae

194. Volvarina taeniolata taeniolata Mörch, 1860
| Species Ref. | Species | Ref. |
|-------------|---------|------|
| 195.        | Mitra crenata Broderip, 1836 | 60, 150, 160 |
| 196.        | Mitra effusa Broderip, 1836 | 60, 150 |
| 197.        | Mitra ferruginea Lamarck, 1811 | 60, 150 |
| 198.        | Mitra fultoni E.A. Smith, 1892 | 60, 150 |
| 199.        | Mitra inca d’Orbigny, 1841 | 60, 150 |
| 200.        | Mitra lens Wood, 1828 | 60, 150 |
| 201.        | Mitra mitra (Linnaeus, 1758) | 60, 150 |
| 202.        | Mitra papalis (Linnaeus, 1758) | 60, 150 |
| 203.        | Mitra rupicola Reeve, 1844 | 60, 150 |
| 204.        | Mitra sphoni Shasky & Campbell, 1964 | 60, 150 |
| 205.        | Mitra swainsonii swainsonii Broderip, 1836 | 60, 150 |
| 206.        | Mitra tristis Broderip, 1836 | 60, 150 |
| 207.        | Subcancilla attenuata (Broderip, 1836) | 60, 150 |
| 208.        | Subcancilla erythrogramma (Tomlin, 1931) | 60, 150 |
| 209.        | Subcancilla sulcata (Swainson in Sowerby, 1825) | 60, 150 |
| 210.        | Acanthais brevidentata (Wood, 1828) | 60, 150 |
| 211.        | Acanthotrophon sentus Berry, 1969 | 60, 150 |
| 212.        | Aspella hastula (Reeve, 1844) | 60, 150 |
| 213.        | Aspella pollux Radwin & D’Attilio, 1976 | 60, 150 |
| 214.        | Aspella pyramidalis (Broderip, 1833) | 60, 150 |
| 215.        | Bizetiella micaela Radwin & D’Attilio, 1972 | 60, 150 |
| 216.        | Chicoreus eversoni D’Attilio, Myers & Shasky, 1987 | 60, 150 |
| 217.        | Drupa ricinus (Linnaeus, 1758) | 69 |
| 218.        | Favartia cocosensis Myers & D’Attilio, 1990 | 60, 150 |
| 219.        | Favartia diomedaea (Dall, 1908) | 60, 150 |
| 220.        | Favartia humilis (Broderip, 1833) | 60, 150 |
| 221.        | Favartia incisa (Broderip, 1833) | 60, 150 |
| 222.        | Favartia laurae (Vokes, 1970) | 60, 150 |
| 223.        | Favartia mildredae (Poorman, 1980) | 60, 150 |
| 224.        | Favartia purdyae Vokes & D’Attilio, 1980 | 60, 150 |
| 225.        | Favartia radwini (Emerson & D’Attilio, 1970) | 60, 150 |
| *226.       | Favartia shaskyi D’Attilio & Myers, 1988 | 61, 150 |
| 227.        | Hexaplex princeps (Broderip, 1833) | 60, 150 |
| 228.        | Mancinella speciosa (Valenciennes, 1832) | 60, 150 |
| 229.        | Mancinella triangularis (Blainville, 1832) | 60, 150 |
| 230.        | Morula uva (Röding, 1798) | 60, 150, 160 |
| 231.        | Murexiella humilis (Broderip, 1833) | 60, 150 |
| 232.        | Muricopsis westonensis Myers & D’Attilio, 1990 | 60, 150 |
| 233.        | Muricopsis zeteki Hertlein & Strong, 1951 | 60, 150 |
| 234.        | Neorapana muricata (Broderip, 1832) | 60, 150 |
| 235.        | Pascula rufonotata (Carpenter, 1864) | 60, 150, 160 |
| 236.        | Phyllocoma scalariformis (Broderip, 1833) | 60, 150 |
| 237.        | Plicopurpura columellaris (Lamarck, 1822) | 60, 150 |
| 238.        | Plicopurpura patula pansa (Gould, 1853) | 60, 150 |
| 239.        | Pterotyphis lowei lowei (Pilsbry, 1931) | 60, 150 |
| 240.        | Stramonita biserialis (Blainville, 1832) | 60, 150 |
| 241.        | Trachypollia lugubris (C.B. Adams, 1852) | 60, 150 |
| 242.        | Tribulus planospira (Lamarck, 1822) | 60, 150 |
| Species Ref. | Species |
|-------------|---------|
| **Family Nassariidae** | |
| 60, 150 | **158.** *Vasula melones* (Duclos, 1832) |
| 60, 150 | **159.** *Vitularia salebrosa* (King & Broderip, 1832) |
| 150 | **245.** *Nassarius nassiformis* Leson, 1842 |
| 150 | **246.** *Nassarius nodicinctus* (A. Adams, 1852) |
| 150 | **250.** *Natica idiopoma* Pilsbry & Lowe, 1932 |
| 150 | **251.** *Polinices helicoides* (Gray, 1825) |
| 150 | **252.** *Polinices otis* (Broderip & Sowerby, 1829) |
| 150 | **253.** *Polinices pardoanus* Dall, 1908 |
| 100, 107, 150 | **260.** *Mammilla simiae* (Deshayes, 1838) as *Polinices siiae* |
| 150 | **257.** *Nerita funiculata* Menke, 1851 |
| 60, 150 | **258.** *Nerita scabricosta* Lamarck, 1822 |
| 60, 150 | **259.** *Neritina latissima* Broderip, 1833 |
| 150 | **265.** *Pseudocypraea adamsonii* (Sowerby, 1832) |
| 150 | **266.** *Simnialena rufa* (Sowerby, 1832) |
| 150 | **267.** *Turbovula lenoreae* (Cardin & Walls, 1980) |
| 150 | **268.** *Pelycidion kelseyi* (Bartsch, 1911) |
| 150 | **269.** *Distorsio constricta constricta* (Broderip, 1833) |
| 150 | **270.** *Distorsio decussata* (Valenciennes, 1832) |
| 150 | **271.** *Distorsio jenniernestae* Emerson & Piech, 1992 |
| 150 | **272.** *Plesiothyreus osculans* (C.B. Adams, 1852) |
| 130 | **273.** *Phylliroë bucephala* Péron & Lesueur, 1810 |
| 150 | **274.** *Fossaroides angulatus* Carpenter, 1857 |
| 150 | **275.** *Fossaroides tuberosus* Carpenter, 1857 |
| 98 | **276.** *Planaxis planaxis* (a) |
| 150 | **277.** *Planaxis planicostatus* Sowerby, 1825 |
| 38 | **278.** *Berthellina ilisima* Marcus & Marcus, 1967 |
| 38 | **279.** *Pleurobranchus areolatus* (Mörch, 1863) |
| 130 | **280.** *Pneumodermopsis* sp. |
| 38 | **281.** *Tambja adbere* Farmer, 1978 |
| 150 | **282.** *Modulus cerodes* (A. Adams, 1851) |
| 130 | **283.** *Pterotricha coronata* Forsskål, 1775 |
| 150 | **284.** *Herviera gliriella* (Melvill & Standen, 1896) |
| 150 | **285.** *Menestho aequisculpta* (Carpenter, 1864) |
| 150 | **286.** *Menestho grijalvae* (Baker, Hanna & Strong, 1928) |
| 150 | **287.** *Miralda armata* (Carpenter, 1857) |
| 150 | **288.** *Miralda terebellum* (C.B. Adams, 1852) |
| 150 | **289.** *Triptychus incantatus* (Hertlein & Strong, 1939) |
| 150 | **290.** *Turbonilla paucilirata* (Carpenter, 1857) |
| Family          | Species                                                                 | Ref. |
|----------------|--------------------------------------------------------------------------|------|
| Ranellidae     | 291. *Charonia tritonis* Linnaeus, 1758                                   | 150  |
|                | 292. *Cymatium anichtum* (Reeve, 1844)                                   | 150  |
|                | 293. *Cymatium aquatile* (Reeve, 1844)                                   | 150  |
|                | 294. *Cymatium cf. keenae*                                               |      |
|                | 295. *Cymatium macrodon* (Valenciennes, 1832)                            |      |
|                | 296. *Cymatium muricinum* (Röding, 1798)                                 |      |
|                | 297. *Cymatium nicobaricum* (Röding, 1798)                               |      |
|                | 298. *Cymatium succincta* (Linnaeus, 1771)                               |      |
|                | 299. *Cymatium vestitum* (Hinds 1844)                                    |      |
| Retusidae      | 300. *Volvallella catharia* Dall, 1919                                   | 38   |
| Rissoellidae   | 301. *Rissoella tumens* (Carpenter, 1857)                                | 150, 160 |
| Rissoidea      | 302. *Alvania inconspicua* C.B. Adams, 1852                              | 150, 160 |
|                | 303. *Folinia ericana* (Hertlein & Strong, 1951)                         |      |
|                | 304. *Rissoina burragei* Bartsch, 1915                                   |      |
| Scissurellidae | 307. *Sinezona rimuloides* (Carpenter, 1865)                             | 150  |
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| 388. | *Cyclostremiscus trigonatus* (Carpenter, 1857) | Vitrinellidae | Cyclostremiscus | trigonatus | 1857 |
| 389. | *Parviturboides monilifer* (Carpenter, 1857) | Vitrinellidae | Parviturboides | monilifer | 1857 |
| 390. | *Solariorbis allomphalus* Pillsby & Olsson, 1952 | Vitrinellidae | Solariorbis | allomphalus | 1952 |
| 391. | *Solariorbis regularis* (C.B. Adams, 1852) | Vitrinellidae | Solariorbis | regularis | 1852 |
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| 393. | *Acar gradata* (Broderip & Sowerby, 1829) | Arcidae | Acar | gradata | 1829 |
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| 395. | *Anadara* (*Grandiarca*) *grandis* (Broderip & Sowerby, 1829) | Arcidae | Anadara | grandis | 1829 |
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| 400. | *Axinactis inaequalis* (Sowerby, 1833) | Glycymerididae | Axinactis | inaequalis | 1833 |
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| 403. | *Glycymeris (Tucetona) strigilata* (Sowerby, 1833) | Glycymerididae | Glycymeris | strigilata | 1833 |
| 404. | *Arcopsis solida* (Sowerby, 1833) | Noetiidae | Arcopsis | solida | 1833 |
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| 406. | *Crenella divaricata* (Orbigny in Sagra, 1853) | Mytilidae | Crenella | divaricata | 1853 |
| 407. | *Lithophaga (Diberus) plumula* (Hanley, 1843) | Mytilidae | Lithophaga | plumula | 1843 |
| 408. | *Lithophaga (Labis) attenuata* (Deshayes, 1836) | Mytilidae | Lithophaga | attenuata | 1836 |
| 409. | *Lithophaga (Myoforceps) aristata* (Dillwyn, 1817) | Mytilidae | Lithophaga | aristata | 1817 |
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| 411. | *Septifer zeteki* Hertlein & Strong, 1946 | Mytilidae | Septifer | zeteki | 1946 |
| 412. | *Isognomon bicolor* (Adams, 1845) as *I. chmnitzianum* | Isognomonidae | Isognomon | bicolor | 1845 |
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| 414. | *Isognomon (Melina) recognitus* (Mabille, 1895) | Isognomonidae | Isognomon | recognitus | 1895 |
| 415. | *Isognomon quadrangularis* (a) | Isognomonidae | Isognomon | quadrangularis | a |
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| 417. | *Atrina (Servatrina) tuberculosa* (Sowerby, 1835) | Malleidae | Atrina | tuberculosa | 1835 |
| 418. | *Steptopina saccula* (Linneaus, 1758) | Malleidae | Steptopina | saccula | 1758 |
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| 430. | *Euvola hancocki* (Grau, 1959) | Pectinidae | Euvola | hancocki | 1959 |
| 431. | *Envola perulus* (Olsson, 1961) | Pectinidae | Envola | perulus | 1961 |
| 432. | *Euvola vogdesi* (Arnold, 1906) | Pectinidae | Euvola | vogdesi | 1906 |
| 433. | *Leopecten cocosensis* Waller, 2007 | Pectinidae | Leopecten | cocosensis | 2007 |

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| Family Paraphronimidae | 167. *Paraphronina gracilis* Claus, 1879 |
| Family Phronimidae | 168. *Phronima edwardsi* Claus, 1879 |
| Family Phrosinidae | 169. *Phronima bowmani* Shi, 1991 |
| Family Platycecididae | 170. *Phronima semilunata* Risso, 1822 |
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| Family Oxycephalidae | 172. *Phrosina bowmani* Shi, 1991 |
| Family Oxycephalidae | 173. *Tetraphryus forcipatus* Claus, 1879 |
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| Family Lepadidae | 175. *Conchoderma virgata* (Spengler, 1790) |
| | 176. *Lepas anatifera* Linnaeus, 1758 |
| | 177. *Lepas anserifera* Linnaeus, 1767 |
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| | 179. *Megalbalanus galapaganus* Pilsbr, 1916 |
| | 180. *Megalbalanus peninsularis* (Pilsbr, 1916) |
| Family Chthamalidae | 181. *Chthamalus cf. anisopoma* |
| Family Coronulidae | 182. *Chelonibia testudinaria* (Linnaeus, 1757) |
| | 183. *Coronula diadema* Darwin, 1854 |
| | 184. *Coronula reginae* Darwin, 1854 |
| | 185. *Stomatolepas elegans* (Costa, 1838) |
| | 186. *Xenobalanus globicipitis* Steenstrup, 1851 |
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| | 188. *Tetraclita stalactifera* (Lamarck, 1818) |
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| Family Calocalanidae | 190. One species |
| Family Calocalanidae | 191-196. Four species |
| Family Clausocalanidae | 202. *Clausocalanus furcatus* (Brady, 1883) |
| Family Clausocalanidae | 203. *Rhincalanus nasutus* Giesbrecht, 1888 |
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| Family Euchetaeidae | 207. *Euchaeta rimana* Bradford, 1974 |
| Family Euchetaeidae | 208. One species |
| Family Euchetaeidae | 209. One species |
| Family Paracalanidae | 210. *Acrocalanus gracilis* Giesbrecht, 1888 |
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| Lepraliellidae      | 22. *Rogicka biserialis* (Hincks, 1885) as *Dakaria biserialis* | 134 |
| Mamilloporidae      | 24. *Mamillipora cupula* Smitt, 1873         | 51, 134 |
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| Microporidae        | 26. *Microporella marsupiata* (Busk, 1860)   | 98   |
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| Terebratulidae      | 3. *Gryphus clarkeana* (Dall, 1920) as *Liothyrella clarkeana* | 71   |
| Zeilleriidae        | 5. *Macandrevia americana* Dall, 1895 as *M. craniella* | 71   |
|                     | 6. *Macandrevia diamantina* (Dall, 1895)     | 71   |

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| Order               | Species                                      | Ref. |
|---------------------|----------------------------------------------|------|
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| Thalassometridae    | 2. *Thalassometra agassizii* (Hartlaub, 1895) | 7    |

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| Family               | Species                                      | Ref. |
|---------------------|----------------------------------------------|------|
| Astropentidae        | 3. *Astropecten benthophilus* Ludwig, 1905   | 7    |
|                     | 4. *Astropecten sulcatus* Ludwig, 1905       | 7    |
|                     | 5. *Leptychaster inermis* (Ludwig, 1905)     | 7    |
|                     | *6. *Persephonaster armiger* Ludwig, 1905    | 7    |
| Luididae            | 7. *Luidia armata* Ludwig, 1905              | 7    |
| Porcellanasteridae  | 8. *Eremicaster pacificus* (Ludwig, 1905)    | 7    |
|                     | 9. *Porcellanaster ceruleus* Wyville-Thomson, 1877 | 7    |
| Notomyotida         | 10. *Benthoplecten spinuliger* (Ludwig, 1905) as *Parachroactis spinuliger* | 7, 159 |
| Valvatida           | 11. *Pectinaster agassizii* Ludwig, 1905     | 7    |
| Acanthasteridae     | 12. *Acanthaster planci* (Linnaeus, 1758) also as *A. ellisii* | 5, 6, 7, 159 |
| Astrodiscidae       | 13. *Paulia horrida* Gray, 1840 as *Pauliella aenigma* | 7, 119 |
| Astropsideae        | 14. *Asteropsis carinifera* (Lamarck, 1816)  | 6, 159 |
| Goniasteridae       | 15. *Mediaster elegans* Ludwig, 1905         | 7    |
|                     | 16. *Nymphaster diomedeae* Ludwig, 1905      | 7    |
|                     | 17. *Philosburiaster ernesti* (Ludwig, 1905) | 7    |
| Mithrodiidae        | 18. *Mithrodia bradleyi* Verrill, 1867       | 5, 6 |
| Ophiasteridae       | 19. *Linckia columbae* Gray, 1840            | 5, 6, 7 |
|                     | 20. *Narcissia gracilis* A.H. Clark, 1916   | 5, 7 |
|                     | 21. *Phataria unifascialis* (Gray, 1840) as *Phataria sp.* | 5, 7, 159 |
|                     | 22. *Tamaria obstipia* Ziesenhenne, 1942     | 5, 7, 159 |

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| Nidorella armata (Gray, 1840) | 5, 6, 7 |
| Pentaceraster cumingi (Gray, 1840) as Oreaster occidentales | 5, 6, 7, 42, 159 |
| Hymenaster quadrispinosus Fisher, 1905 as H. purpureus | 7, 159 |
| Pteraster cf. diaphanous (Ludwig, 1905) | 7, 159 |
| Hymenaster quadrispinosus Fisher, 1905 as H. purpureus | 7, 159 |
| Pteraster cf. diaphanous (Ludwig, 1905) | 7, 159 |
| Corinaster marchenus Ziesenhenne, 1942 | 7 |
| Hymenaster quadrispinosus Fisher, 1905 as H. purpureus | 7, 159 |
| Pteraster cf. diaphanous (Ludwig, 1905) | 7 |
| Amphiura arcystata (Gray, 1840) | 7, 159 |
| Oreaster occidentales 5, 6, 7, 42, 159 |
| Species Ref.1 |
| Family Oreasteridae | 23. |
| Order SPinUloSida, Family Pterasteridae | 24. |
| Family Oreasteridae | 25. Hymenaster quadrispinosus Fisher, 1905 as H. purpureus |
| Order FORCIPULATIDA, Family Asteriidae | 26. Pteraster cf. diaphanous (Ludwig, 1905) |
| Order BRiSingida, Family Brisingidae | 27. Hymenaster quadrispinosus Fisher, 1905 as H. purpureus |
| Class OPHIUROIDEA, Order PhRynoPhiURida | 28. Pteraster cf. diaphanous (Ludwig, 1905) |
| Family Ophiomyxidae | 29. Pteraster cf. diaphanous (Ludwig, 1905) |
| Order oPhURida, Family Amphiuridae | 30. Pteraster cf. diaphanous (Ludwig, 1905) |
| Family Ophiomyxidae | 31. Pteraster cf. diaphanous (Ludwig, 1905) |
| Family Ophiactidae | 32. Pteraster cf. diaphanous (Ludwig, 1905) |
| Family Ophiocomidae | 33. Pteraster cf. diaphanous (Ludwig, 1905) |
| Family Ophiocanthidae | 34. Pteraster cf. diaphanous (Ludwig, 1905) |
| Family Ophiodermatidae | 35. Pteraster cf. diaphanous (Ludwig, 1905) |
| Class ECHINOIDEA, Order Cidaroida | 36. Pteraster cf. diaphanous (Ludwig, 1905) |
| Family Cidaridae | 37. Pteraster cf. diaphanous (Ludwig, 1905) |

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| 66. Hesperocidaris dubia (H.L. Clark, 1907) as Stylocidaris dubia       | 5, 7 |
| 67. Hesperocidaris panamensis (A. Agassiz, 1898)                        | 5, 7 |
| Order ECHINOThURiOIDEA, Family Echinothuriididae                       |      |
| 68. Tromikosoma hispidum (A. Agassiz, 1898)                            | 5, 7 |
| Order DIADEMATOIDEA, Family Aspidodiadematidae                         |      |
| 69. Plesiadiema horridum (A. Agassiz, 1898)                            | 5, 7 |
| Family Diadematidae                                                    |      |
| 70. Astropyga pulvinata (Lamarck, 1816)                                 | 159  |
| 71. Centrostephanus coronatus (Verrill, 1867)                          | 5, 7 |
| 72. Diadema mexicanum A. Agassiz, 1863                                 | 5, 6, 7, 160 |
| 73. Echinolithus calamaris (Pallas, 1774)                               | 5, 6, 7 |
| 74. Echinolithus diadema (Linnaeus, 1758)                              | 5, 6, 7, 113 |
| Order SAleniOIDEA, Family Saleniidae                                   |      |
| 75. Salenocidaris miliaris (A. Agassiz, 1898)                           | 5, 7 |
| Order TEMNOPLEuROIDEA, Family Toxopneustidae                           |      |
| 76. Toxopneustes robus (A. Agassiz, 1863)                              | 5, 6, 7 |
| 77. Tripneustes depressus A. Agassiz, 1863                            | 5, 6, 7 |
| Order ECHINOIDEA, Family Echinometridae                                |      |
| 78. Clypeaster europacicus H.L. Clark, 1914                             | 5, 7, 159 |
| 79. Clypeaster ophius H.L. Clark, 1914                                 | 5, 7, 159 |
| 80. Clypeaster rotundus (A. Agassiz, 1863)                             | 5, 7 |
| Family Mellitidae                                                       |      |
| 81. Encope cocosi H.L. Clark, 1948                                     | 5, 7 |
| 82. Encope microproa L. Agassiz, 1841                                   | 5, 7 |
| Order SPATANGOIDEA, Family Aeropsida                                    |      |
| 83. Aeropsis fulva (A. Agassiz, 1898)                                   | 5, 7 |
| Family Brissidae                                                        |      |
| 84. Clypeaster speciosus Verrill, 1870                                   | 5, 7 |
| Class HOLOTHUROIDEA, Order DENDROCHIROTIDA                             |      |
| Family Psolidae                                                         |      |
| 85. Lissothuria ornata Verrill, 1867 as Thyonepselus beebei             | 5, 7, 159 |
| 86. Psolus diomedaeae Ludwig, 1894                                      | 5, 7 |
| Family Cucumariidae                                                    |      |
| 87. Abyssocucumis abyssorum (Théel, 1886)                              | 159  |
| Order DACtyLOCRiOTIDA, Family Ypsilothuriidae                          |      |
| 88. Argopatagus aculeata (Agassiz, 1898)                               | 5, 7 |
| 89. Brissopsis pacifica (A. Agassiz, 1898)                             | 5, 7, 159 |
| 90. Meoma ventricosa grandis Gray, 1851                                | 5, 7, 159 |
| 91. Rhabdobrissus pacificus H.L. Clark, 1940 as Plagiobrissus pacificus | 5, 7, 159 |
| Family Loveniidae                                                       |      |
| 92. Homolampas hastata A. Agassiz, 1879                                | 5, 7 |
| 93. Lovenia cordiformis A. Agassiz, 1872                                | 5, 7 |
| Order DENDROCHIROTIDA                                                  |      |
| 94. Holothuria (Cystipus) casoae Laguarda-Figuera & Solis-Marín, 2009  | 110  |
| 95. Holothuria (Cystipus) inhabilis Selenka, 1867                       | 5, 7 |
| 96. Holothuria (Halodeima) atra Jaeger, 1833                           | 5, 6, 7 |
| 97. Holothuria (Halodeima) kefersteini (Selenka, 1867)                 | 5, 6, 7 |
| 98. Holothuria (Lessonothuria) pardinis Selenka, 1867                  | 5, 7 |
| 99. Holothuria (Mertensiorthia) fuscinerea (Jaeger, 1833)               | 5, 7 |
| 100. Holothuria (Mertensiorthia) hilla Lesson, 1830                    | 5, 6, 7, 159 |
| 101. Holothuria (Mertensiorthia) leucospiola (Brandt, 1835)            | 5, 7 |
| 102. Holothuria (Platyperona) difficilis Semper, 1868                   | 5, 7, 159 |
| 103. Holothuria (Selenkothuria) theeli (Deichmann, 1938)               | 5, 7 |
| 104. Holothuria (Selenkothuria) imitans Ludwig, 1875                    | 5, 7 |
| Species                                                                 | Ref. |
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| 109. Holothuria (*Theelothuria*) paraprinceps Deichmann, 1937         | 5, 7 |
| 110. Holothuria (*Thymiosycia*) arenicola Semper, 1868                  | 5, 7 |
| 111. Holothuria (*Thymiosycia*) impatiens (Forskål, 1775)              | 5, 7 |
| 112. Labidodemas americanum Deichmann, 1938                            | 5, 7 |
| Family Stichopodida                                                    |      |
| 113. Isostichopus fuscus (Ludwig, 1875)                                | 5, 6, 7 |
| 114. Stichopus horrens Selenka, 1867                                   | 5, 6, 7 |
| Family Synallactida                                                    |      |
| 115. Mesothuria (*Mesothuria*) multipes Ludwig, 1894 as *M. multiples*  | 5, 7, 159 |
| 116. Pseudostichopus macdonaldi (Ludwig, 1894)                         | 5, 7 |
| 117. Pseudostichopus mollis Théel, 1886                                | 5, 7 |
| Order APOIDIA, Family Chiridotida                                      |      |
| 118. Chiridota pacifica Heding, 1928                                   | 5, 7 |
| Order ELASPIDIDAE, Family Deimatida                                    |      |
| 119. Deima validum pacificum Ludwig, 1894                              | 5, 7 |
| Family Elpidiida                                                       |      |
| 120. Peniagone vitrea Théel, 1882                                      | 5, 7 |
| Family Pelagothurida                                                   |      |
| 121. Pelagothuria natatrix Ludwig, 1894                                | 5, 7 |
| Family Psychropotida                                                   |      |
| 122. Benthodytes sanguinolenta Théel, 1882                             | 5, 7 |
| Order MOLPADIDA, Family Molpadida                                      |      |
| 123. Molpadia musculus Risso, 1826                                     | 159 |

Phylum CHORDATA,
Class APPENDICULARIA
Family Oikopleuridae

| Species                                                                 | Ref. |
|------------------------------------------------------------------------|------|
| 1. Oikopleura cophocerca (Gegenbaur, 1855)                             | 41   |
| 2. Oikopleura dioica Fol, 1872                                         | 41   |
| 3. Oikopleura fusiiformis Fol, 1872                                    | 41, 130 |
| 4. Oikopleura gracilis (Lohmann, 1896)                                 | 41   |
| 5. Oikopleura longicauda (Vogt, 1854)                                 | 41   |
| 6. Oikopleura rufescens Fol, 1872                                     | 41, 130 |
| 7. Stegosoma magnum (Langerhans, 1880)                                 | 41   |
| Family Fritillariida                                                  |      |
| 8. Fritillaria formica (Lohmann in Lohmann & Büchmann, 1926)           | 41   |
| 9. Fritillaria haplostoma (Fol, 1872; emend. Fol, 1874)                | 41   |

Class THALIACEA, Order SALPIDA
Family Salpida

| Species                                                                 | Ref. |
|------------------------------------------------------------------------|------|
| 10. Salpa sp.                                                          | 130  |
| 11. Doliolum sp.                                                       | 130  |

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Class LEPTOCARDII, Order AMPHIOXIFORMES
Family Branchiostomidae

Class ELASMOBRANCHII
Order CARCHARHINIFORMES, Family Carcharhinidae

| Species                                                                 | Ref. |
|------------------------------------------------------------------------|------|
| 14. Carcharhinus albimarginatus (Rüppell, 1837)                        | 34, 35 |
| 15. Carcharhinus falciformis (Müller & Henle, 1839)                    | 34, 35, 163 |
| 16. Carcharhinus galapagensis (Snodgrass & Heller, 1905)              | 34, 35 |
| 17. Carcharhinus limbatus (Muller & Henle, 1839)                       | 34, 35 |
| 18. Carcharhinus longimanus (Poey, 1861)                               | 143  |
| 19. Carcharhinus melanopterus (Quoy & Gaimard, 1824)                   | 116  |
| 20. Galeocerdo cuvier (Peron & Lesueur en Lesueur, 1822)               | 34, 35 |
| 21. Prionace glauca (Linnaeus, 1758)                                   | 142  |
| 22. Rhizoprionodon longurio (Jordan & Gilbert, 1882)                   | 34, 35 |
| 23. Triaenodon obesus (Rüppell, 1837)                                  | 34, 35 |

Family Lamnidae

| Species                                                                 | Ref. |
|------------------------------------------------------------------------|------|
| 24. Cararcharodon carcharias (Linnaeus, 1758)                           | 35   |

Family Sphyridae

| Species                                                                 | Ref. |
|------------------------------------------------------------------------|------|
| 25. Sphyrina lewini (Griffith & Smith, 1834)                            | 34, 35, 163 |
| Species Ref. | Species |
|-------------|---------|
| 26. Sphyra mokarran (Rüppell, 1837) | 34, 35 |
| 27. Sphyra tiburo (Linnaeus, 1758) | 142 |

**Order Chimaeriformes, Family Chimaeridae**

| Species Ref. | Species |
|-------------|---------|
| 28. Hydrologus sp. | |

**Order Lamniformes, Family Alopiidae**

| Species Ref. | Species |
|-------------|---------|
| 29. Alopias vulpinus (Bonaterre, 1788) | 35 |

**Family Lamnidae**

| Species Ref. | Species |
|-------------|---------|
| 30. Isurus oxyrinchus Rafinesque, 1810 | 142 |

**Family Odontaspididae**

| Species Ref. | Species |
|-------------|---------|
| 31. Odontaspis ferox (Risso, 1810) | 47, 52 |

**Family Pseudocarchariidae**

| Species Ref. | Species |
|-------------|---------|
| 32. Pseudocarcharias kamoharai (Matsubara, 1936) | 142 |

**Order Orectolobiformes, Family Rhincodontidae**

| Species Ref. | Species |
|-------------|---------|
| 33. Rhincodon typus Smith, 1828 | 35, 52 |

**Order Rajiformes, Family Dasyatidae**

| Species Ref. | Species |
|-------------|---------|
| 34. Dasyatis sp. | 52 |

| Species Ref. | Species |
|-------------|---------|
| 35. Pteroplatytrygon violacea (Bonaparte, 1832) | 142 |
| 36. Taeniura meyeni Muller & Henle, 1841 | 35, 52 |

**Family Mobulidae**

| Species Ref. | Species |
|-------------|---------|
| 37. Manta birostris (Walbaum, 1792) | 34, 35, 52 |
| 38. Mobula japanica (Müller & Henle, 1841) | 142 |
| 39. Mobula munkiana Notobartolo di Sciara, 1987 | 34, 35 |
| 40. Mobula tarapacana (Philippi, 1893) | 35, 52, 163 |

**Family Myliobatidae**

| Species Ref. | Species |
|-------------|---------|
| 41. Aetobatus narinari (Euphrasen, 1790) | 34, 35, 52 |
| 42. Myliobatis peruvianus Garman, 1913 | 122 |
| 43. Rhinoptera steindachneri Evermann & Jenkins, 1892 | 34, 35 |
| 44. Bathyraja spinosissima (Beebe & Tee-Van, 1941) | 122 |
| 45. Raja equatorialis Jordan & Bollman, 1890 | 142 |
| 46. Rhinobatos planiceps Garman, 1880 | 34, 35 |

**Order Squaliformes, Family Echinorhinidae**

| Species Ref. | Species |
|-------------|---------|
| 47. Echinorhinus cookei Pietschmann, 1928 | 35, 47, 52, 115, 122 |

**Order Torpediniformes, Family Torpedinidae**

| Species Ref. | Species |
|-------------|---------|
| 48. Torpedo peruanus Chirichigno, 1963 | 52 |

**Class Actinopterygii, Order Anguilliformes**

**Family Congridae**

| Species Ref. | Species |
|-------------|---------|
| 49. Ariosoma gilberti (Ogilby, 1898) | 34, 35 |
| 50. Bathycrongus variens (Garman, 1899) | 163 |
| 51. Heteroconger klausewitzi (Eibl-Eibesfeldt & Köster, 1983) | 34, 35, 122 |

**Family Muraenidae**

| Species Ref. | Species |
|-------------|---------|
| 52. Ophisoma sp. | |
| 53. Paraconger californiensis Kanazawa, 1961 | 34, 35 |
| 54. Anarchias galapagensis (Seale, 1940) | 34, 35 |
| 55. Echidna nebulosa (Ahl, 1789) | 3, 34, 35 |
| 56. Echidna nocturna (Cope, 1872) | 34, 35 |
| 57. Enchelycore octaviana (Myers & Wade, 1941) | 34, 35 |
| 58. Gymnomuraena zebra (Shaw, 1797) | 34, 35 |
| 59. Gymnothorax angusticeps (Hildebrand & Barton, 1949) | 122 |
| 60. Gymnothorax bunoensis (Bleeker, 1857) | 34, 35 |
| 61. Gymnothorax castaneus (Jordan & Gilbert, 1883) | 34, 35 |
| 62. Gymnothorax dovii (Günther, 1870) | 34, 35 |
| 63. Gymnothorax eurostus (Abbott, 1860) | 140 |
| 64. Gymnothorax flavimarginatus (Rüppell, 1830) | 34, 35 |
| 65. Gymnothorax javanicus (Bleeker, 1859) | 34, 35 |
| 66. Gymnothorax meleagris (Shaw & Nodder, 1795) | 34, 35 |
| 67. Gymnothorax panamensis (Steindachner, 1876) | 34, 35 |
| 68. Gymnothorax pictus (Ahl, 1789) | 84 |
| 69. Muraena argus (Steindachner, 1870) | 34, 35 |
| 70. Muraena cepesydra Gilbert, 1898 | 34, 35 |
| Species Ref. | Species |
|-------------|---------|
| 71. | *Muraena lentiginosa* Jenyns, 1842 |
| 72. | *Scauticaria tigrina* (Lesson, 1828) |
| 73. | *Sideria picta* (Ahl, 1789) |
| 74. | *Uropterygius macrocephalus* (Bleeker, 1865) |
| 75. | *Uropterygius versutus* Bussing, 1991 |
| Family Myrocongridae | |
| 76. | *Myroconger nigrodentatus* Castle & Béarez, 1995 |
| Family Ophichthidae | |
| 77. | *Bascanichthys bascanoides* Osborn & Nichols, 1916 |
| 78. | *Callechelys eristigma* McCosker & Rosenblatt, 1972 |
| 79. | *Gordiichthys combibus* McCosker & Lavenberg, 2001 |
| 80. | *Herpetoichthys fossatus* (Myers & Wade, 1941) |
| 81. | *Ichthyapus selachops* (Jordan & Gilbert, 1882) |
| 82. | *Myrichthys tigrinus* Girard, 1859 |
| 83. | *Myrichthys aspetocheiros* McCosker & Rosenblatt, 1993 |
| 84. | *Ophichthus rugifer* Jordan & Bollman, 1882 |
| 85. | *Ophichthus triserialis* (Kaup, 1856) |
| 86. | *Paraletharchus opercularis* (Myers & Wade, 1941) |
| 87. | *Paraletharchus pacificus* (Osburn & Nichols, 1916) |
| 88. | *Quassiremus evionthas* (Jordan & Bollman, 1889) |
| 89. | *Scytalichthys miurus* (Jordan & Gilbert, 1882) |
| Order Ateleopodiformes, Family Ateleopodidae | |
| 90. | *Guentherus altivela* Osório, 1917 |
| Order Aulopiformes, Family Aulopidae | |
| 91. | *Aulopus bajacali* Parin & Kotlyar, 1984 |
| Family Chlorophthalmidae | |
| 92. | *Chlorophthalmus mento* Garman, 1899 |
| Family Synodontidae | |
| 93. | *Symodus lacertinus* Gilbert, 1890 |
| Order Clupeiformes, Family Engraulidae | |
| 94. | *Anchoa ischana* (Jordan & Gilbert, 1882) |
| Order Elopiformes, Family Elopidae | |
| 95. | *Elops affinis* Regan, 1909 |
| Order Gonorynchiformes, Family Chanidae | |
| 96. | *Chanos chanos* (Forsskål, 1775) |
| Order Gobiesociformes, Family Gobiesocidae | |
| 97. | *Arcos poecilophthalmos* (Jenyns, 1842) |
| 98. | *Arcos rhodospilus* (Günther, 1864) |
| 99. | *Gobiesox adustus* Jordan & Gilbert, 1882 |
| 100. | *Gobiesox woodsi* (Schultz, 1944) |
| Order Aulopiformes, Family Aulopidae | |
| 101. | *Tomicodon chilensis* Brisout de Barneville, 1846 |
| 102. | *Tomicodon petersii* (Garman, 1875) |
| Order Gobiiformes, Family Gobiidae | |
| 103. | *Tomicodon vermiculatus* Briggs, 1955 |
| Order Lophiiformes, Family Antennariidae | |
| 104. | *Antennarius avalonis* Jordan & Starks, 1907 |
| 105. | *Antennarius coccinus* (Lesson, 1831) |
| 106. | *Antennarius commersoni* (Latreille, 1804) as *A. commersoni* |
| 107. | *Antennarius sanguineus* Gill, 1863 |
| 108. | *Antennatus striatus* Gill, 1863) |
| Order Lophiidae | |
| 109. | *Lophiodes caulinaris* Garman, 1899 |
| 110. | *Lophiodes spilurus* (Garman, 1899) |
| Family Ogcocephalidae | |
| 111. | *Dibranchus erinaceus* (Garman, 1889) |
| Order Ophidiiformes, Family Bythitidae | |
| 112. | *Ogilbia cocoensis* Møller, Schwarz & Nielsen, 2005 |
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Family Carapidae
118. *Carapus dubius* (Putnam 1874) as *Encheliophis dubius* 35
119. *Encheliophis vermicularis* Müller, 1842 34, 35, 143
120. *Echiodon exilium* Rosenblatt, 1961 34, 35

Family Ophidiidae
121. *Brotula ordwayi* Hildebrand & Barton, 1949 163
122. *Otophidium indefatigabile* Jordan & Bollman, 1890 as *O. indefatigable* 34, 35
123. *Petrotx hopkinsi* Heller & Snodgrass, 1903 34, 35

Order Beloniformes, Family Belonidae
124. *Ablennes hians* (valenciennes, 1846) 142
125. *Platybelone argalus pterura* (Osburn & Nichols, 1916) 34, 35
126. *Strongylura exilis* (Girard, 1854) 34, 35

Family Exocoetidae
130. *Cheilopogon furcatus* (Mitchill, 1815) 143
131. *Cheilopogon spilonotopterus* (Bleeker, 1865) 143
132. *Cheilopogon xenopterus* (Gilbert, 1890) 142
133. *Exocoetus monocirrhus* Richardson, 1846 34, 35
134. *Exocoetus volitans* Linnaeus, 1758 34, 35
135. *Hirundichthys marginatus* (Nichols & Breder, 1928) 142

Order Atheriniformes, Family Atherinopsidae
144. *Atherinella eriarcha* (Jordan & Gilbert, 1881) 34, 35
145. *Melanorhinus cyanellus* (Meek & Hildebrand, 1863) 34, 35

Family Hemiramphidae
141. *Euleptorhamphus viridis* (van Hasselt, 1823) 34, 35
142. *Hemiramphus saltator* Gilbert & Starks, 1904 142

Order Beryciformes, Family Holocentridae
146. *Myripristis berndti* Jordan & Evermann, 1903 34, 35
147. *Myripristis leiognathus* Valenciennes, 1846 34, 35

Order Gasterosteiformes, Family Aulostomidae
150. *Aulostomus chinensis* (Linnaeus, 1766) 34, 35

Family Fistulariidae
151. *Fistularia commersonii* Rüppell, 1838 35

Family Syngnathidae
152. *Bryx veleronis* Herald, 1940 34, 35
153. *Cosmocampus arctus* (Jenkins & Evermann, 1889) 142
154. *Doryrhamphus excisus* Kaup, 1856 34, 35
155. *Hippocampus ingens* Girard, 1858 34, 35

Order Scorpaeniformes, Family Peristediidae
156. *Peristedion crustosum* Garman, 1899 34, 35

*157. Peristedion nesium* Bussing, 2010 33

Family Scorpaenidae
158. *Pontinus clemensi* Fitch, 1955 34, 35
159. *Pontinus sierra* Gilbert, 1890 34, 35
160. *Pontinus striatus* Heller & Snodgrass, 1903 34, 35, 122
161. *Pontinus furcifrons* Garman, 1899 142
162. *Scorpaena africana* Hildebrand, 1946 34, 35

163. *Scorpaena cocosensis* Motomura, 2004 122, 132
164. *Scorpaena histrio* Jenyns, 1840 34, 35
| Species                                                                 | Ref. |
|------------------------------------------------------------------------|------|
| 165. Scorpaena mystes Jordan & Starks en Jordan, 1895                  | 34, 35 |
| 166. Scorpaena russula Jordan & Bollman, 1890                          | 34, 35 |
| 167. Scorpaena new species                                             | 34, 35 |
| 168. Scorpaenodes rubrivinctus Poss, McCosker & Baldwin 2010           | 122, 138, 163 |
| 169. Scorpaenodes syris (Jordan & Gilbert, 1882)                       | 34, 35 |
| 170. Bellator loxias (Jordan, 1897)                                    | 34, 35, 163 |
| 171. Bellator new species                                              | 34, 35 |
| 172. Prionotus new species                                             | 34, 35 |
| 173. Acanthurus nigricans (Linnaeus, 1758)                             | 34, 35 |
| 174. Acanthurus triostegus Linnaeus, 1758                              | 34, 35 |
| 175. Acanthurus xanthopterus Valenciennes, 1835                        | 34, 35 |
| 176. Ctenochaetus marginatus (Valenciennes, 1835)                      | 34, 35 |
| 177. Naso annulatus (Quoy & Gaimard, 1825)                             | 142 |
| 178. Naso hexacanthus (Bleeker, 1855)                                  | 142 |
| 179. Prionurus laticlavius (Valenciennes, 1846)                        | 34, 35 |
| 180. Apogon atradorsatus Heller & Snodgrass, 1903                      | 34, 35, 122 |
| 181. Apogon dovii Günther, 1861                                        | 34, 35 |
| 182. Entomacrodus chioicticus (Jordan & Gilbert, 1882)                 | 34, 35 |
| 183. Hypsoblennius brevipinnis (Günther, 1861)                         | 34, 35 |
| 184. Ophioblennius steindachneri Jordan & Evermann, 1898               | 34, 35 |
| 185. Plagiotremus azureus (Jordan & Bollman, 1890)                     | 34, 35 |
| 186. Brama dussumieri Cuvier, 1831                                     | 142 |
| 187. Synchropus atrilabiatus (Garman, 1899)                            | 35 |
| 188. Alectis ciliaris (Bloch, 1787)                                    | 34, 35 |
| 189. Carangoides orthogrammus Jordan & Gilbert, 1882                   | 34, 35 |
| 190. Caranx caballus (Günther, 1868)                                   | 34, 35 |
| 191. Caranx caninus Günther, 1867                                      | 34, 35 |
| 192. Caranx lugubris Poey, 1860                                        | 34, 35 |
| 193. Caranx melampygus Cuvier, 1833                                   | 34, 35 |
| 194. Caranx sexfasciatus Quay & Gaimard, 1825                          | 34, 35 |
| 195. Decapterus macarellus (Cuvier, 1833)                              | 34, 35 |
| 196. Eligatis bipinnulata (Quoy & Gaimard, 1825)                       | 34, 35 |
| 197. Gnathanodon speciosus (Forskål, 1775)                             | 34, 35 |
| 198. Naukrates ductor (Linnaeus, 1758)                                 | 34, 35 |
| 199. Selar crumenophthalmus (Bloch, 1793)                              | 34, 35 |
| 200. Seriola lalandi Valenciennes, 1833                                | 34, 35 |
| 201. Seriola peruana Steindachner, 1881                                | 34, 35 |
| 202. Seriola rivoliana Valenciennes, 1833                              | 34, 35 |
| 203. Trachinotus rhodopus Gill, 1863                                   | 142 |
| 204. Trachinotus stilde (Jordan & McGregor, 1898)                      | 34, 35 |
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| 206. Uraspis helvola (Forster, 1801)                                   | 34, 35 |
| 207. Serioëlla violacea Guichenot, 1848                                | 122 |
| 208. Acanthemblemaria atrata Hastings & Robertson, 1999                | 34, 35, 95 |
| 209. Acanthemblemaria macrospilus Brock, 1940                         | 151 |
| 210. Chaenopsis new species                                            | 34, 35 |
| 211. Coralliozetus boehlkee Stephens, 1963                             | 34, 35 |
| 212. Coralliozetus springeri Stephens & Johnson, 1966                  | 34, 35 |
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| 213.        | *Ekemblemaria myersi* Stephens, 1963 | 142 |
| 214.        | *Emblemaria nivipes* Jordan & Gilbert, 1883 | 34, 35, 160 |
| 215.        | *Stathmonotus culebrai* Seale, 1940 | 142 |
| 216.        | *Chaetodon humeralis* Günther, 1860 | 34, 35 |
| 217.        | *Chaetodon lunula* (Lacepéde, 1802) | 34, 35 |
| 218.        | *Forcipiger flavissimus* Jordan & McGregor, 1898 | 34, 35 |
| 219.        | *Johnrandallia nigrirostris* (Gill, 1862) | 34, 35 |
| 220.        | *Prognathodes carlhubbsi* Nalbant, 1995 | 142 |
| 221.        | *Prognathodes falcifer* (Hubbs & Rechnitzer, 1958) | 34, 35 |
| 222.        | *Cirrhitichthys oxycephalus* (Bleeker, 1855) | 34, 35, 160 |
| 223.        | *Cirrhitus rivulatus* Valenciennes, 1846 | 34, 35 |
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| 228.        | *Coryphaena hippurus* Linnaeus, 1758 | 34, 35 |
| 229.        | *Dactylusculus lacteus* (Myers & Wade, 1946) | 142 |
| 230.        | *Dactylusculus pectoralis fallax* Gill, 1861 | 34, 35 |
| 231.        | *Gillellus chathamensis* Dawson, 1977 | 34, 35, 62 |
| 232.        | *Echeneis naucrates* Linnaeus, 1758 | 142 |
| 233.        | *Phtheirichthys lineatus* Menzies, 1791 | 142 |
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| 236.        | *Remora osteochir* (Cuvier, 1829) | 34, 35 |
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| 238.        | *Chriolepis atrimelum* Bussing, 1997 | 32, 34, 35 |
| 239.        | *Chriolepis dialepta* Bussing, 1990 | 29, 34 |
| 240.        | *Chriolepis flavobrunneum* (Gilbert, 1892) | 34, 35 |
| 241.        | *Gobius serpens* (Cuvier, 1829) | 142 |
| 242.        | *Gobius flavobrunneum* (Smith, 1843) | 142 |
| 243.        | *Eucinostomus curranii* Zahiraneec, 1980 | 35 |
| 244.        | *Bathygobius ramosus* Ginsburg, 1947 | 34, 35 |
| 245.        | *Barbus coccoensis* Heller & Snodgrass, 1903 | 34, 35, 122 |
| 246.        | *Lythrypnus alpigena* Bussing, 1990 | 29, 34 |
| 247.        | *Lythrypnus calabarus* Bussing, 1990 | 29, 34 |
| 248.        | *Lythrypnus lavenbergii* Bussing, 1990 | 29, 34 |
| 249.        | *Lythrypnus rhizophora* (Heller & Snodgrass, 1903) | 34, 35, 122 |
| 250.        | *Lythrypnus coccoensis* (Heller & Snodgrass, 1903) | 34, 35 |
| 251.        | *Anisotremus caesius* (Jordan & Gilbert, 1882) | 34, 35 |
| 252.        | *Anisotremus interruptus* (Gill, 1862) | 34, 35 |
| 253.        | *Anisotremus taeniatus* Gill, 1861 | 34, 35 |
| 254.        | *Anisotremus interruptus* (Gill, 1862) | 34, 35 |
| 255.        | *Anisotremus taeniatus* Gill, 1861 | 34, 35 |
| 256.        | *Istiopomax indica* (Cuvier, 1832) | 142 |
| 257.        | *Kuhlia mugil* (Forster, 1801) | 35 |
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| 263. *Kyphosus elegans* (Peters, 1869)       | 34, 35 |
| 264. *Sectator ocyrus* (Jordan & Gilbert, 1882) | 34, 35 |
| **Family Labridae**                         |        |
| 265. *Bodianus diploaenia* (Gill, 1862)      | 34, 35 |
| 266. *Decodon melasma* Gomon, 1974           | 28, 34, 35, 163 |
| 267. *Halichoeres adustus* (Gilbert, 1890) as *Pseudojulis adustus* | 28, 34, 35, 122 |
| 268. *Halichoeres discolor* Bussing, 1983    | 27, 34, 35 |
| 269. *Halichoeres dispilus* (Günther, 1864)  | 34, 35 |
| 270. *Halichoeres nicholsi* (Jordan & Gilbert, 1882) | 34, 35 |
| 271. *Halichoeres notospilus* (Günther, 1864) | 142    |
| 272. *Halichoeres raisneri* Baldwin & McCosker, 2001 | 97    |
| *273. *Halichoeres salmonfasciatus* Allen & Robertson, 2002* | 4    |
| 274. *Inistiurus pavo* (Valenciennes, 1840)  | 34, 35 |
| 275. *Novaculichthys taeniourus* (Lacepède, 1801) | 34, 35 |
| 276. *Polyplectron cruentum* Gomon, 1977     | 34, 35 |
| 277. *Stethojulis bandanensis* (Bleeker, 1851) | 34, 35 |
| 278. *Thalassoma grammaticum* Gilbert, 1890  | 34, 35 |
| 279. *Thalassoma lucasanum* (Gill, 1862)     | 34, 35 |
| 280. *Thalassoma purpureum* (Forskål, 1775) | 34    |
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| 281. *Xyrichtys victori* Wellington, 1992 as *Xyrichtys victori* | 34, 35, 122 |
| **Family Lutjanidae**                        |        |
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| 284. *Starksia new species*                  | 34, 35 |
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| 286. *Hoplopagrus guentherii* Gill, 1862 as *H. guntheri* | 34, 35 |
| 287. *Lutjanus aratus* (Günther, 1864)       | 34, 35 |
| 288. *Lutjanus argentiventris* (Peters, 1869) | 34, 35 |
| 289. *Lutjanus colorado* Jordan & Gilbert, 1882 | 142    |
| 290. *Lutjanus guttatus* (Steindachner, 1869) | 142    |
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| 292. *Lutjanus jordani* (Gilbert, 1898)      | 34, 35 |
| 293. *Lutjanus novemfasciatus* Gill, 1862    | 34, 35 |
| 294. *Lutjanus viridis* (Valenciennes, 1846) | 34, 35 |
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| 295. *Luvarus imperialis* Rafinesque, 1810   | 142    |
| **Family Malacanthidae**                     |        |
| 296. *Caulolatilus affinis* Gill, 1865       | 34, 35 |
| 297. *Caulolatilus hubbsi* Dooley, 1978      | 34, 35 |
| 298. *Caulolatilus princeps* (Jenyns, 1840) | 142    |
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| 300. *Clarkichthys bilineatus* (Clark, 1936) | 35    |
| **Family Mugilidae**                         |        |
| 301. *Agonostomus monticola* (Brancucci, 1834) | 34, 35 |
| 302. *Chaenomugil proboscideus* (Günther, 1861) as *C. proboscideus* | 34, 35 |
| 303. *Mugil cephalus* Linnaeus, 1758         | 142    |
| 304. *Mugil curema* Valenciennes, 1836       | 34, 35 |
| **Family Mullidae**                          |        |
| 305. *Malloidichthys dentatus* (Gill, 1862)  | 35    |
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| 306. *Cubiceps pauciradiatus* Günther, 1872  | 142    |
| 307. *Nomeus Gronovii* (Gmelin, 1789)        | 142    |
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| 308. *Psenes cyanophrys* Valenciennes, 1833                            | 142  |
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| 309. *Opistognathus panamaensis* Allen & Robertson, 1991               | 35   |
| Family Polynemidae                                                     |      |
| 310. *Polyactylus approximans* (Lay & Bennett, 1839)                  | 35   |
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| 311. *Holacanthus passer* Valenciennes, 1846                           | 34, 35|
| 312. *Pomacanthus zonipectus* (Gill, 1862)                            | 34, 35|
| 313. *Abudefduf concolor* (Gill, 1862)                                 | 34, 35|
| 314. *Abudefduf troscheli* (Gill, 1862) as *A. troshelli*             | 34, 35|
| 315. *Chromis alta* Greenfield & Woods, 1980                           | 34, 35|
| 316. *Chromis atrilobata* Gill, 1862                                   | 34, 35|
| 317. *Microspathodon bairdii* (Gill, 1862)                             | 34, 35|
| 318. *Microspathodon dorsalis* (Gill, 1862)                            | 34, 35|
| 319. *Stegastes acupalcoensis* (Fowler, 1944)                          | 34, 35|
| 320. *Stegastes arcifrons* (Heller & Snodgrass, 1903)                 | 34, 35|
| 321. *Stegastes beebei* (Nichols, 1924)                                | 34, 35, 122|
| 322. *Stegastes flavidus* (Gill, 1862)                                 | 34, 35|
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| 323. *Cookeolus japonicus* (Cuvier, 1829)                             | 34, 35, 47|
| 324. *Heteropriacanthus cruentatus* (Lacepède, 1801)                  | 34, 35|
| 325. *Pristigenys serrula* (Gilbert, 1891)                             | 142  |
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| 326. *Scarus rubroviolaceus* Bleeker, 1847                              | 35   |
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| 327. *Corvula macrops* (Steindachner, 1876)                            | 142  |
| 328. *Odontoscion eurymesops* (Heller & Snodgrass, 1903)              | 142  |
| 329. *Umbrina galapagorum* Steindachner, 1878                           | 142  |
| 330. *Umbrina xanti* Gill, 1862                                        | 35   |
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| 331. *Acanthocybium solandri* (Cuvier, 1832)                           | 34, 35|
| 332. *Auxis rochei* (Risso, 1810)                                      | 34, 35|
| 333. *Auxis thazard* (Lacepède, 1800)                                  | 34, 35|
| 334. *Euthynnus lineatus* Kishinouye, 1920                             | 34, 35|
| 335. *Katsuwonus pelamis* (Linnaeus, 1758)                             | 34, 35|
| 336. *Sarda orientalis* Temminck & Schlegel, 1844                     | 34, 35|
| 337. *Scomber japonicus* Houttuyn, 1782                                | 142  |
| 338. *Scomberomorus sierra* Jordan & Starks, 1895                     | 34, 35|
| 339. *Thunnus albacares* (Bonnetarre, 1788)                            | 34, 35|
| 340. *Thunnus obesus* (Lowe, 1839)                                    | 142  |
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| 341. *Alphestes immaculatus* Breder, 1936                               | 34, 35|
| 342. *Anthias noelli* Anderson & Baldwin, 2000                         | Retal12|
| 343. *Cephalopholis panamensis* (Steindachner, 1877)                   | 34, 35|
| 344. *Cratinus agassizii* Steindachner, 1878                           | 122  |
| 345. *Dermatolepis dermatolepis* (Boulenger, 1895)                    | 34, 35|
| 346. *Epinephelus cefsuntesi* Lavenberg & Groove, 1993                | 34, 35, 47, 163|
| 347. *Epinephelus itajara* (Lichtenstein, 1822)                       | 34, 35|
| 348. *Epinephelus labroformis* (Jenyns, 1840)                         | 34, 35|
| 349. *Epinephelus nipobolus* Gilbert & Starks, 1897                    | 34, 35, 163|
| 350. *Liopropoma fasciatum* Bussing, 1980                              | 142  |
| 351. *Liopropoma longisepia* Garman, 1899                              | 97   |
| 352. *Mycteroperca olfax* (Jenyns, 1840)                               | 34, 35, 122, 163|
| 353. *Paranthias colonus* Valenciennes, 1846                           | 34, 35|
| 354. *Pronotogrammus eos* Gilbert, 1890                                | 34, 35|
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355. *Pronotogrammus multifasciatus* Gill, 1863 34, 35, 163

356. *Pseudogramma thaumasium* (Gilbert, 1900) 34, 35

357. *Serranus aequidens* Gilbert, 1890 34, 35

358. *Serranus tico* Meisler & Lavenberg in Allen & Robertson, 1998 34, 35, 126

359. *Rypticus bicolor* Valenciennes, 1846 34, 35

360. *Sphyraena idiastes* Heller & Snodgrass, 1903 35

361. *Axoclinus cocoensis* Bussing, 1991 30, 35

362. *Istiophorus platypterus* (Shaw in Shaw & Nodder, 1792) 34, 35

363. *Makaira indica* Cuvier, 1832 34

364. *Makaira mazara* Jordan & Snyder, 1901 34, 35

365. *Tetrapturus anguillrostris* Tanaka, 1915 34

366. *Tetrapturus audax* (Philippi, 1887) 34, 35

367. *Xiphias gladius* Linnaeus, 1758 34

368. *Zanclus cornutus* (Linnaeus, 1758) 34

369. *Bothus leopardinus* (Günther, 1862) 34, 35

370. *Bothus mancus* (Broussonet, 1782) 34, 35

371. *Symphurus atramentatus* Jordan & Bollman, 1890 142

372. *Symphurus oligomerus* Mahadeva & Munroe, 1990 142

373. *Symphurus varius* Garman, 1899 35

374. *Citharichthys platypterus* Gilbert, 1891 142

375. *Hipposcolia bolmani* Gilbert, 1890 34, 35

376. *Syacium latifrons* (Jordan & Gilbert, 1882) 34, 35

377. *Symphurus variegatus* Garman, 1899 34, 35, 142

378. *Aseraggodes herrei* Seale, 1940 35

379. *Balistes polypterus* Steindachner, 1876 34, 35

380. *Canthidermis maculata* (Bloch, 1786) as *C. maculatus* 34, 35

381. *Melichthys niger* (Bloch, 1786) 34, 35

382. *Melichthys avidus* (Richardson, 1845) 34, 35

383. *Pseudobalistes naufragium* (Jordan & Starks, 1895) 34, 35

384. *Sufflamen verres* (Gilbert & Starks, 1904) 34, 35

385. *Xanthichthys caeruleolineatus* Randall, Matsuura & Zama, 1978 34, 35, 84

386. *Xanthichthys mento* (Jordan & Gilbert, 1882) 34, 35

387. *Chilomycterus reticulatus* (Linnaeus, 1758) as *C. reticulatus* 34, 35

388. *Diodon eydouxii* Brisout de Barneville, 1846 142

389. *Diodon holocanthus* Linnaeus, 1758 34, 35

390. *Diodon hystrix* Linnaeus, 1758 34, 35

391. *Mola mola* (Linnaeus, 1758) 143

392. *Ranzania laevis* (Pennant, 1776) 143

393. *Aluterus monoceros* (Linnaeus, 1758) 34, 35

394. *Aluterus scriptus* (Osbeck, 1765) 34, 35

395. *Cantherhines dumerilii* (Hollard, 1854) 34, 35

396. *Ostracion meleagris* Shaw, 1796 35

397. *Arothron hispidus* (Linnaeus, 1758) 34, 35

398. *Arothron meleagris* (Lacepède, 1798) 34, 35

399. *Canthigaster punctatissima* (Günther, 1870) 34, 35
| Species                                                                 | Ref. |
|-----------------------------------------------------------------------|------|
| 400. Lagocephalus lagocephalus (Linnaeus, 1758)                       | 142  |
| 401. Sphoeroides angusticeps (Jenyns, 1842)                           | 34, 35|
| 402. Sphoeroides lobatus (Steindachner, 1870)                         | 34, 35|

**Class REPTILIA, Order TESTUDINATA**

**Family Cheloniidae**

| Species                                                                 | Ref. |
|-----------------------------------------------------------------------|------|
| 403. Lepidochelys olivacea (Eschscholtz, 1829)                         | 84   |
| 404. Eretmochelys imbricata (Linné, 1766)                              | 84   |
| 405. Chelonia agassizi Bocourt, 1868                                   | 84   |

**Family Dermochelyidae**

| Species                                                                 | Ref. |
|-----------------------------------------------------------------------|------|
| 406. Dermochelys coriacea (Vandelli, 1761)                             | 84   |

**Order SQUAMATA, Family Elapidae**

| Species                                                                 | Ref. |
|-----------------------------------------------------------------------|------|
| 407. Pelamis platurus (Linné, 1766)                                    | 161  |

**Class AVES, Order PROCURVIFORMES,**

**Family Diomedaeidae**

| Species                                                                 | Ref. |
|-----------------------------------------------------------------------|------|
| 408. Phoebastria irrorata (Salvin, 1883)                               | 128  |

**Family Hydrobatidae**

| Species                                                                 | Ref. |
|-----------------------------------------------------------------------|------|
| 409. Oceanodroma castro (Harcourt, 1851)                               | 12, 128|
| 410. Oceanodroma leucorhoa (Vieillot, 1818)                            | 12, 128|
| 411. Oceanodroma markhami (Salvin, 1883)                               | 12, 128|
| 412. Oceanodroma melan island (Bonaparte, 1854)                        | 12, 128|
| 413. Oceanodroma tethys (Bonaparte, 1852)                              | 12, 128|

**Family Procellariidae**

| Species                                                                 | Ref. |
|-----------------------------------------------------------------------|------|
| 414. Pelagodroma marina (Latham, 1790)                                 | 12, 128|

**Order PELECANIFORMES, Family Fregatidae**

| Species                                                                 | Ref. |
|-----------------------------------------------------------------------|------|
| 415. Pterodroma phaeopygia (Salvin, 1876)                              | 12, 128|
| 416. Puffinus creatopus Coues, 1864                                    | 12, 128|
| 417. Puffinus herminieri Lesson, 1839                                  | 12, 128|
| 418. Puffinus pacificus (J.F. Gmelin, 1789)                            | 12, 128|

**Family Pelecanidae**

| Species                                                                 | Ref. |
|-----------------------------------------------------------------------|------|
| 419. Fregata magnificens Mathews, 1914                                 | 12, 128|
| 420. Fregata minor (J.F. Gmelin, 1789)                                 | 12, 128|

**Family Phalaropodidae**

| Species                                                                 | Ref. |
|-----------------------------------------------------------------------|------|
| 421. Phalaropus fulicarius (Linnaeus, 1758)                            | 12   |

**Family Scolopacidae**

| Species                                                                 | Ref. |
|-----------------------------------------------------------------------|------|
| 422. Phalaropus fulicarius (Linnaeus, 1758)                            | 12   |

**Family Charadriiformes, Family Charadridae**

| Species                                                                 | Ref. |
|-----------------------------------------------------------------------|------|
| 427. Charadrius semipalmatus Bonaparte, 1825                           | 12   |
| 428. Charadrius wilsonia Ord, 1814                                     | 12   |
| 429. Pluvialis dominica (Status Mülller, 1776)                         | 12   |
| 430. Pluvialis squatarola (Linnaeus, 1758)                             | 12   |

**Family Laridae**

| Species                                                                 | Ref. |
|-----------------------------------------------------------------------|------|
| 431. Anous minutus Boie, 1844                                          | 12, 128|
| 432. Anous stolidus (Linnaeus, 1758)                                   | 12, 128|
| 433. Creagrus furcatus (Neboux, 1846)                                 | 12, 128, 187|

**Family Phalaropodidae**

| Species                                                                 | Ref. |
|-----------------------------------------------------------------------|------|
| 434. Gygis alba (Sparrman, 1786)                                       | 12, 128|
| 435. Larus argentatus Pontoppidan, 1763                                | 12, 128|
| 436. Larus atricilla Linnaeus, 1758                                    | 12, 128|
| 437. Larus modestus Tschudi, 1843                                      | 12, 128|
| 438. Larus pipixcan Wagler, 1831                                       | 12, 128|
| 439. Onychoprion fuscatus Linnaeus, 1766                               | 12, 128|
| 440. Thalasseus elegans (Gambel, 1849)                                 | 12, 128|
| 441. Thalasseus sandvicensis Latham, 1787                              | 12, 128|
| 442. Xema sabini (Sabine, 1819)                                       | 12, 128|

**Family Phalaropodidae**

| Species                                                                 | Ref. |
|-----------------------------------------------------------------------|------|
| 443. Phalaropus fulicarius (Linnaeus, 1758)                            | 12   |
| 444. ? Steganopus tricolor (Vieillot, 1819)                            | 12   |
| 445. Actitis macularia (Linnaeus, 1766)                                | 12   |
| 446. Arenaria interpres (Linnaeus, 1758)                               | 12   |
| Species Ref. | Species | Ref. |
|-------------|---------|------|
| 447.       | *Calidris alba* (Pallas, 1764) | 12   |
| 448.       | *Calidris bairdii* (Coues, 1861) | 12   |
| 449.       | *Calidris fuscicollis* (Vieillot, 1819) | 12   |
| 450.       | *Calidris himantopus* (Bonaparte, 1826) | 12   |
| 451.       | *Calidris mauri* (Cabanis, 1857) | 12   |
| 452.       | *Calidris melanotos* (Vieillot, 1819) | 12   |
| 453.       | *Calidris minutilla* (Vieillot, 1819) | 12   |
| 454.       | *Calidris pusilla* (Linnaeus, 1766) | 12   |
| 455.       | *Catoptrophorus semipalmatus* (J.F. Gmelin, 1789) | 12   |
| 456.       | *Heteroscelus incanus* (J.F. Gmelin, 1789) | 12   |
| 457.       | *Numenius phaeopus* (Linnaeus, 1758) | 12   |
| 458.       | *Tringa flavipes* (J.F. Gmelin, 1789) | 12   |
| 459.       | *Tringa melanoleuca* (J.F. Gmelin, 1789) | 12   |
| 460.       | *Tringa solitaria* A. Wilson, 1813 | 12   |
| 461.       | *Stercorarius parasiticus* (Linnaeus, 1758) | 12, 128 |
| 462.       | *Stercorarius pomarinus* (Temminck, 1815) | 12, 128 |
| 463.       | *Zalophus californianus* Lesson, 1828 | 120, 129 |
| 464.       | *Zalophus wollebaeki* Sivertsen, 1953 | 120, 129 |
| 465.       | *Balaenoptera borealis* Lesson, 1828 | 120 |
| 466.       | *Balaenoptera edeni* Anderson, 1878 | 120 |
| 467.       | *Balaenoptera physalus*, *Linnaeus, 1758* | 120 |
| 468.       | *Megaptera novaeangliae* Borowski, 1781 | 120 |
| 469.       | *Globicephala macrocephalus* Gray, 1846 | 120 |
| 470.       | *Grampus griseus* Cuvier, 1812 | 120 |
| 471.       | *Orcinus orca* Linnaeus, 1758 | 120 |
| 472.       | *Stenella longirostris* Gray, 1828 | 120 |
| 473.       | *Stenella coerulealba* Meyen, 1833 | 120 |
| 474.       | *Tursiops truncatus* Montagu, 1821 | 120 |
| 475.       | *Physeter macrocephalus* Linnaeus, 1766 | 120 |
| 476.       | *Mesoplodon densirostris* Blainville, 1817 | 120 |
| 477.       | *Mesoplodon sp.* | 120 |
| 478.       | *Ziphius cavirostris* Cuvier, 1823 | 120 |

(1) References are indicated by numbers according to the reference list
* = Endemic
Species/Genus in bold type = present at Isla del Coco but not on the Pacific coast of mainland Costa Rica
? = doubts about the identification
(a) Reported by Hertlein (1963) but not found in any database.
(b) Species described in: Suárez-Morales, E. & R. Gasca. 2012. A new *Lepeophtheirus* (Copepoda: Siphonostomatoida: Caligidae) from Isla del Coco, Costa Rica, Eastern Tropical Pacific. Rev. Biol. Trop. 60 (Suppl. 3): 235-242.
