Marine biodiversity baseline for Área de Conservación Guanacaste, Costa Rica: published records

Jorge Cortés

1 Centro de Investigación en Ciencias del Mar y Limnología (CIMAR), Universidad de Costa Rica, San Pedro, 11501 San José, Costa Rica 2 Escuela de Biología, Universidad de Costa Rica

Corresponding author: Jorge Cortés (jorge.cortes@ucr.ac.cr)

Academic editor: I. Wehrtmann | Received 7 September 2016 | Accepted 13 January 2017 | Published 6 February 2017

http://zoobank.org/36FC1015-800D-4191-A843-37D2B4151B41

Citation: Cortés J (2017) Marine biodiversity baseline for Área de Conservación Guanacaste, Costa Rica: published records. ZooKeys 652: 129–179. https://doi.org/10.3897/zookeys.652.10427

Abstract

The diversity of tropical marine organisms has not been studied as intensively as the terrestrial biota worldwide. Additionally, marine biodiversity research in the tropics lags behind other regions. The 43,000 ha Sector Marino of Área de Conservación Guanacaste (ACG, Marine Sector of Guanacaste Conservation Area), on the North Pacific coast of Costa Rica is no exception. For more than four decades, the terrestrial flora and fauna has been studied continuously. The ACG marine biodiversity was studied in the 1930’s by expeditions that passed through the area, but not much until the 1990’s, except for the marine turtles. In the mid 1990’s the Center for Research in Marine Science and Limnology (CIMAR) of the Universidad de Costa Rica (UCR) initiated the exploration of the marine environments and organisms of ACG. In 2015, ACG, in collaboration with CIMAR, started the BioMar project whose goal is to inventory the species of the marine sector of ACG (BioMar ACG project). As a baseline, here I have compiled the published records of marine ACG species, and found that 594 marine species have been reported, representing 15.5% of the known species of the Pacific coast of Costa Rica. The most diverse groups were the crustaceans, mollusks and cnidarians comprising 71.7% of the ACG species. Some taxa, such as mangroves and fish parasites are well represented in ACG when compared to the rest of the Costa Rican coast but others appear to be greatly underrepresented, for example, red algae, polychaetes, copepods, equinoderms, and marine fishes and birds, which could be due to sampling bias. Thirty species have been originally described with specimens from ACG, and 89 species are not known from other localities on the Pacific coast of Costa Rica except ACG. Most of the sampling has been concentrated in a few localities in Sector Marino, Playa Blanca and Islas Murciélago, and in the nearby waters of Bahía Santa Elena. In an effort to fill this gap, CIMAR is collaborating with ACG and a private foundation to start an inventory of the marine...
organisms of the conservation area. The project will be assisted by two marine parataxonomists, and all samples will be catalogued, photographed, bar coded and voucher specimens deposited at the Museo de Zoología, UCR. All the information will be available through Internet. It is anticipated that the BioMar project will fill many of the knowledge gaps and significantly more marine species will be encountered. This project could become a viable model for marine biodiversity inventories in other Costa Rican Conservation Areas (Áreas de Conservación) and in other countries.

**Keywords**
Marine organisms, marine ecosystems, marine biodiversity, conservation areas, Central America, compilation

**Introduction**

Marine biodiversity studies have lagged behind terrestrial research, especially in the tropics, with a few exceptions such as Australia (Chapman 2009). Some studies in the Neotropics regarding marine biodiversity have been published, most focused on coral reef areas (Cortés et al. 2017). Several taxonomic groups are fairly well known, such as mollusks and fishes, with monographs, many papers and guides, while others are poorly known, to mention a few, microorganisms and smaller phyla. The same occurs geographically: some countries in the tropics have been relatively well studied, for example, Costa Rica (Wehrtmann and Cortés 2009), while in other countries (such as Nicaragua) research and publications on marine biodiversity are scarce.

Costa Rica comprises 11 Conservation Areas (Áreas de Conservación), one of which is Área de Conservación Guanacaste (ACG) on the northwest Pacific coast of Costa Rica (Fig. 1). The ACG contains much of the last remnants of Costa Rican tropical dry forest and its terrestrial biodiversity has been and still is the subject of intensive research and restoration (Janzen and Hallwachs 2016). The ACG covers an area of 163000 hectares, 43000 of them marine, and 150 km of protected coastline (http://www.acguanacaste.ac.cr/acg/que-es-el-acg). It was declared a UNESCO World Heritage Natural Site in 1999. Compared to the terrestrial area, the marine sector (officially Sector Marino) has not been studied intensively. A new initiative, BioMar ACG (Marine Biodiversity of ACG), was started in 2015 to inventory the marine organisms of the area, and then make all the information publicly available, mainly through the Internet, but also with scientific and popular publications. This project is a 5-year collaboration between the conservation area, a private foundation and academia; all samples are being catalogued, photographed, bar coded, and vouchers deposited at the Museo de Zoología (Museum of Zoology) at the Universidad de Costa Rica (UCR).

The marine sector of ACG has a high diversity of habitats, with high species richness worthy of more study (Beebe 1942, Cortés 1996–1997b). There is a well-represented suite of coastal and marine ecosystems, such as mangrove forest of variable sizes, beaches of different composition and size, bays and coves, rocky intertidal zones with several wave regimes, mud flats, rocky subtidal sites, coral reefs, rhodolith beds and deep areas – more than 50 m, plus an archipelago (Islas Murciélago), shoals, and several more isolated islands (Cortés and Wehrtmann 2009, Cortés 2016). The main...
A nesting site in the country of the frigate bird, *Fregata magnificens*, is on one of the nearby islands, Isla Bolaños, in Bahía Salinas (Alvarado-Quesada 2006). An outstanding oceanographic feature of the region is the seasonal upwelling (the Papagayo Up-
**Table 1.** Historical account of marine studies at the Área de Conservación Guanacaste, Pacific coast of Costa Rica.

| Years       | Expedition/Project/Institutions/Individual                                                                 | Taxon/System                      | References |
|-------------|----------------------------------------------------------------------------------------------------------------|-----------------------------------|------------|
| 1932        | The Templeton Crocker Expedition of the California Academy of Sciences, aboard the SY *Zaca*                     | Algae and mollusks                | 93, 104, 184 |
| 1935        | The Allan Hancock Pacific Expeditions, aboard the MY *Velero III*                                           | Foraminifera, corals, hydroids, mollusks, crustaceans and echinoderms | 5, 28, 50, 51, 52, 53, 54, 62, 63, 68, 76, 77, 78, 79, 90, 94, 95, 96, 119, 127, 148, 152, 156, 157, 158, 180, 186, 188, 203 |
| 1937–1938   | Eastern Pacific Expeditions of the New York Zoological Society, aboard the SY *Zaca*                           | Mollusks, crustaceans and echinoderms | 44, 45, 46, 47, 61, 80, 81, 82, 91, 105, 106, 107, 108, 109, 110, 111, 112, 113, 114, 136, 189 |
| 1959        | Eastern Pacific cruise, aboard the MY *Stella Polaris*                                                     | Algae                             | 56, 57, 58  |
| 1970–present| Many individuals, for example, SE Cornelius, LG Fonseca, DA Hughes, JD Richard, DC Robinson, JR Spotila and RA Valverde | Turtle studies                    | 21         |
| 1972        | Central American Expedition/Janss Foundation, aboard the RV *Searcher*                                     | Crustacean and fish               |            |
| 1973–present| Several individuals and groups, e.g. DJ Pool, FE Putz and CIMAR, UCR                                        | Mangroves                         | 128, 170, 172, 208 |
| 1978        | Caribbean-Pacific Expedition Phase VI/Scripps Institution of Oceanography, aboard the RV *Alpha Helix*      | Mollusks and crustaceans          | 27, 129, 130 |
| 1984–present| CIMAR, UCR                                                                                                 | Coral reefs                        | 7, 39, 42, 124 |
| 1984–present| CIMAR, UCR                                                                                                 | Octocorals, corals, anemones, crustaceans, fishes, marine mammals, | 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 38, 41, 59, 60, 64, 72, 141, 142, 143, 144, 145, 151, 160, 187 |
| 1991, 2013, present| Museo de Zoología, UCR                                                                                        | Crustaceans                       | 102, 194, 195, 196, 197, 199, 201 |
| 1996, 1998  | Fish parasite studies                                                                                      | Platyhelmiths and acanthocephalans | 24, 138, 149, 159 |
| 1996, 2002  | Instituto Nacional de Biodiversidad                                                                      | Mollusks                          | 22, 23, 133, 191 |
| 2005        | Benthic survey of northern and central Costa Rica/Smithsonian Tropical Research Institute, aboard the RV *Urracá* | Crustaceans                       | 198         |
| 2005        | Museo Nacional de Costa Rica                                                                              | Birds                             | 2           |
| 2006, 2011  | Universidad Nacional, Heredia                                                                             | Ascidians and cetaceans           | 139, 154    |
| 2014–present| CIMAR, UCR                                                                                                 | Beaches and rocky shores           | 185         |
wellimg) that brings deep cold, nutrient-rich and CO\textsubscript{2}-rich waters to the surface during the trade winds season (December to April-May) (McCreary et al. 1989, Alfaro and Cortés 2012, Rixen et al. 2012). Micro- and macroalgal growth increases significantly as a consequence of the upwelling (Cortés et al. 2014).

What is now ACG’s Sector Marino (Fig. 1) was first explored, samples collected, and papers published by several marine expeditions from the United States starting in the 1930’s (Cortés 2009a, Table 1). The first expedition was the Templeton Crocker Expedition of the California Academy of Sciences in 1932 aboard the SY Zaca, when they visited Bahía Murciélago and Bahía de Santa Elena (previously known as Port Parker) (Crocker 1933). In 1935, as part of the Allan Hancock Pacific Expeditions aboard the MY Velero III, biologists visited Bahía Santa Elena and Bahía Salinas (Fraser 1943a, b). The SY Zaca was again in the region in 1937–1938, but this time in an expedition of the New York Zoological Society; they collected in Bahía Santa Elena, around Islas Murciélago and around Playa Potrero Grande (Beebe 1938, 1942). These three expeditions generated a significant number of publications on ACG marine organisms (Table 1). There were no additional expeditions until 1959, when the MY Stella Polaris visited the country (Dawson and Beaudette 1959). In 1972, the RV Searcher collected samples in the region and new species of fish were described (Bussing and Lavenberg 2003). The next expedition that visited the area was the Eastern Pacific RV Alpha Helix Expedition, in 1978 organized by the Scripps Institution of Oceanography (SIO). They collected samples that are deposited at SIO, but few papers were published (Luke 1995). Chan et al. (2016) recently published on some of the barnacles collected during that expedition. The most recent expedition was the Smithsonian Tropical Research Institute RV Urracá to the northern and central Pacific coast of Costa Rica in 2005 (Vargas-Castillo 2008).

Many individuals, groups of researchers or institutions have contributed to the knowledge of ACG marine biodiversity (Table 1). Elmer Y. Dawson published several papers on macroalgae of Costa Rica, including the ACG (Dawson 1960, 1961). Richard and Hughes (1972) and Cornelius (1975) published on marine turtles of the ACG, with the first observations in 1970–1971. In 1996, Marques et al. (1997) and Monks et al. (1997) collected and later described several fish parasites. Between 1996 and 2002, the Instituto Nacional de Biodiversidad collected mollusks in the ACG, and generated several papers on the opistobranchs (Valdés and Camacho-García 2004, Camacho-García et al. 2005, Camacho-García and Gosliner 2008). The CIMAR of the UCR has published papers on marine organisms and environments of Costa Rica that include the ACG: e.g., Cutler et al. (1992) on sipunculids, Moran and Dittel (1993) - crustaceans, Cortés and Guzmán (1998) - corals, Dean (2001, 2004) - polychaetes, Suárez-Morales and Morales-Ramírez (2001) - copepods, and Heard et al. (2009) - tanaidaceans. Also, new species have been described from the ACG: a crustacean (Vargas 2000), two octocorals (Breedy and Guzman 2003) and a fish (Del Moral-Flores et al. 2015). Cortés and Jiménez (2003) provided a description of the coral reefs of the ACG, while Loría-Naranjo et al. (2014) evaluated the main mangrove forests and Sibaja-Cordero et al. (2014) the beach fauna. Even so, our knowledge about the species diversity of the ACG is far from complete.
The objective of this contribution is to generate a baseline of the marine biodiversity of ACG’s Sector Marino and adjacent unprotected areas, some of which are in the process of being officially protected. This will serve as a starting point for the recently initiated BioMar ACG project (Marine Biodiversity of the Guanacaste Conservation Area). This five-year project (2015–2019), funded by the Guanacaste Dry Forest Conservation Fund, and with support from the Ministry of the Environment and Energy of the Costa Rican government and the UCR, will collect, identify and provide publicly accessible information about most of ACG’s species of marine macroorganisms and as many of the microorganisms as feasible.

**Materials and methods**

The study area is Sector Marino of the ACG and adjacent areas, located on the North Pacific of Costa Rica (Fig. 1, Table 2). Publications about ACG marine organisms were compiled and analyzed. A list of recorded species was created based on those publications. Later all scientific names were updated using WoRMS (World Register of Marine Species, http://www.marinespecies.org/), AlgaeBase, http://www.algaebase.org (Guiry and Guiry 2016), Encyclopedia of Life (http://eol.org/), Bryozone (http://bryozone.myspecies.info/), Integrated Digitized Biocollections (https://www.idigbio.org/), Worldwide Mollusc Species Data Base (http://www.bagniliggia.it/WMSD/Lindex_aaa.htm), SeaLifeBase (http://www.sealifebase.org/) and ZipcodeZoo (http://zipcodezoo.com/index.php/Main_Page).

The resulting list of species was compared to the remainder of the Pacific coast of Costa Rica and to available species lists from other countries in the Eastern Tropical Pacific. Knowledge gaps were identified and potential areas of future research suggested.

**Results**

Five hundred ninety four marine species have been reported so far for the ACG (Table 3, Appendix 1), which represents 15.5% of the known species of the Pacific coast of Costa Rica. The most diverse groups were crustaceans (193 spp.), mollusks (187 spp.) and cnidarians (46 spp.), comprising together 71.7% of the ACG’s marine species. These three groups represent 23.9%, 18.2% and 26.7%, respectively of the known species of the Pacific coast of the country (Table 3). Some groups are well represented in the ACG when compared to the rest of the coast (e.g., species of mangroves and fish parasites), while others are greatly underrepresented. For example, red algae, polychaetes, copepods, equinoderms, and marine fishes and birds are poorly represented in the published reports (Table 3). Other groups of organisms have been observed and identified (e.g., various species of sponges, flat worms, ophiuroids, and ascidian) but there are no published records of these species (Table 4). Other taxa (such as diatoms, nemerteans and appendicularians) undoubtedly inhabit the study area but have not been observed or collected yet (Table 4).
Table 2. Localities of the samples reported in the Appendix. # spp. = number of species reported from that site. a = Protected area, b = area in the process of being officially protected, c = marine area not protected, and d = private reserve (protected area).

| Code | Locality / area | Notes | # spp. |
|------|-----------------|-------|--------|
| ACG  | Área de Conservación Guanacaste | Entire Conservation Area | 13 |
| BEH  | Bahía El Hachal | Bay | 6 |
| Bju  | Bahía Junquillal | Bay | 5 |
| BPG  | Bahía Potrero Grande | Bay | 18 |
| BRo  | Bajo Rojo | Shoal | 2 |
| BSE  | Bahía Santa Elena | Bay | 371 |
| BVj  | Bajo Viejón | Shoal | 5 |
| CSE  | Cabo Santa Elena | Tip of PSE | 23 |
| Cua  | Cuajiniquil | Off Cuajiniquil | 6 |
| IBo  | Isla Bolaños | Island | 1 |
| IDa  | Isla David | Island | 7 |
| ILC  | Isla Los Cabros | Island | 1 |
| IMu  | Islas Murciélago | Archipelago | 103 |
| Jun  | Junquillal | Off Junquillal | 21 |
| LDa  | La Danta | Shoal | 1 |
| MCa  | Manglar de Cuajiniquil | Mangrove forest | 14 |
| MJu  | Manglar de Junquillal | Mangrove forest | 6 |
| MPG  | Manglar de Potrero Grande | Mangrove forest | 14 |
| MPN  | Manglar de Playa Naranjo | Mangrove forest | 19 |
| MSa  | Manglar Salinita | Mangrove forest | 14 |
| PBl  | Playa Blanca | Beach | 104 |
| PBr  | Peña Bruja | Islet off PNa | 2 |
| PPG  | Playa de Potrero Grande | Beach | 4 |
| PJu  | Playa Junquillal | Beach | 2 |
| PMo  | Playa Mostrencal | Beach | 3 |
| PNa  | Playa Naranjo | Beach | 10 |
| PNe  | Playa Nancite | Beach | 16 |
| PSE  | Península de Santa Elena | Península | 12 |
| SMA  | Sector Marino ACG | Marine Sector of ACG | 4 |

Over 85% of the species reported are also found in other areas of the coast of Costa Rica and in the Eastern Tropical Pacific; however, most areas, including the ACG, have not been intensively collected, and the same common species are found repeatedly by collecting expeditions. Thirty new species have been described from specimens collected in the ACG: one foraminiferan, one echinoderm, two octocorals, three parasitic flatworms, four fishes, eight crustaceans and 11 mollusks (Appendix 1). Eighty-nine species are currently known only from the ACG along the Pacific coast of Costa Rica (Table 3, Appendix 1).

Most of the sampling has been concentrated in a few localities of the marine area of the ACG and those sites therefore have the highest number of reported species. For example, Bahía Santa Elena (371 spp.), Playa Blanca (104 spp.) and in some of the
### Table 3.
Number of marine species reported from Área de Conservación Guanacaste (complete list of species in the Appendix), Pacific coast of Costa Rica (see Cortés 2012, plus references indicated as superindex) (species reported only for Isla del Coco were excluded); percentage of the species of the Pacific reported from ACG, and species only found in ACG. n.k. = not known.

| TAXA               | Species from ACG | Species from Pacific Costa Rica | % of species of the Pacific | Species only at ACG |
|--------------------|------------------|---------------------------------|----------------------------|---------------------|
| Bacteria           | 15               | >17^{103, 183}                 | 88.2                       | 15                  |
| Cyanobacteria      | 4                | 28                             | 14.3                       | 2                   |
| Chlorophyta        | 4                | 44^{73}                        | 9.1                        | 2                   |
| Phaeophyceae       | 6                | 26^{73}                        | 23.1                       | 1                   |
| Rhodophyta         | 15               | 146^{73}                       | 10.3                       | 9                   |
| Mangroves          | 7                | 8                              | 87.5                       | 0                   |
| Foraminifera       | 24               | 76                             | 31.6                       | 12                  |
| Cnidaria           | 46               | 172                            | 26.7                       | 2                   |
| Anthozoa           | 35               | 59                             | 59.3                       | 2                   |
| Hydrozoa           | 11               | 108                            | 10.2                       | 0                   |
| Platyhelminthes    | 7                | 38^{40, 178}                   | 18.4                       | 7                   |
| Trematoda          | 4                | 20^{40, 178, 182}              | 20.0                       | 4                   |
| Cestoda            | 3                | 12^{40, 178}                   | 25.0                       | 3                   |
| Acanthocephala     | 1                | 1{149}                        | 100                        | 0                   |
| Mollusca           | 187              | 1025                           | 18.2                       | 0                   |
| Gastropoda         | 85               | 631                            | 13.5                       | 0                   |
| Bivalvia           | 102              | 362                            | 28.2                       | 0                   |
| Sipuncula          | 3                | 15                             | 20.0                       | 0                   |
| Annelida           | 24               | 313                            | 7.7                        | 11                  |
| Nemertea           | 1                | Several species               | n.k.                       | n.k.                |
| Crustacea          | 193              | 807                            | 23.9                       | 13                  |
| Amphipoda          | 13               | 106                            | 12.3                       | 8                   |
| Cumacea            | 1                | 19^{161}                      | 5.3                        | 1                   |
| Decapoda           | 162              | 409                            | 39.6                       | 1                   |
| Mysida             | 1                | 5                              | 20.0                       | 0                   |
| Stomatopoda        | 10               | 27                             | 37.0                       | 0                   |
| Tanaidacea         | 1                | 5                              | 20.0                       | 1                   |
| Copepoda           | 1                | 163                            | 0.61                       | 1                   |
| Cirripedia         | 4                | 36                             | 11.1                       | 1                   |
| Bryozoa            | 9                | 39                             | 23.1                       | 8                   |
| Echinodermata      | 15               | 105                            | 14.3                       | 7                   |
| Asteroidea         | 1                | 12                             | 8.3                        | 0                   |
| Echinoidea         | 1                | 28                             | 3.6                        | 0                   |
| Holothuroidea      | 13               | 28                             | 46.4                       | 7                   |
| Chordata           | 33               | 961                            | 3.4                        | 0                   |
| Ascidiae           | 5                | 14                             | 35.7                       | 0                   |
| Cephalochordata    | 1                | 2                              | 50                         | 0                   |
| Elasmobranchii     | 3                | 68                             | 4.4                        | 0                   |
| Actinopterygii     | 11               | 774                            | 1.4                        | 0                   |
| Reptilia           | 4                | 5                              | 80.0                       | 0                   |
| Aves               | 2                | 76                             | 2.6                        | 0                   |
| Mammalia           | 7                | 22                             | 31.8                       | 0                   |
| TOTAL              | 594              | 3821+                          | 15.5                       | 89                 |

\[\text{Cortés} / \text{ZooKeys 652: 129–179 (2017)}\]
Table 4. Taxa reported from other sites of Pacific Costa Rica (see Cortés 2012, plus references indicated as superindex), but not from Área de Conservación Guanacaste. n.k. = not known; Present = have been observed or collected but there are no publications; Probably = there is a high probability that they are present but have not been observed yet.

| Taxonomic group      | Number of species reported | ACG   |
|----------------------|----------------------------|-------|
| Diatoms              | 174 [131,132,200]           | Present|
| Dinoflagellates      | 102                        | Present|
| Marine fungi         | 5 genera                   | n.k.  |
| Seagrasses           | 2                          | n.k.  |
| Porifera             | 62                         | Present|
| Pennatulaceans       | 4                          | Present|
| Scyphozoans          | 10                         | Present|
| Polyplacophorans     | 24                         | Present|
| Cephalopods          | 20                         | Present|
| Echiurians           | 1                          | Present|
| Monogeneans          | 10 [40]                    | Probably|
| Nemerteans           | Several species            | Probably|
| Kinorhynchans        | 2                          | n.k.  |
| Euphausiids          | 20                         | Present|
| Isopods              | 37                         | Present|
| Branchiopods         | 1                          | n.k.  |
| Ostracods            | 2                          | Probably|
| Pycnogonids          | 10                         | Probably|
| Marine insects       | 9                          | Probably|
| Chaetognaths         | 27                         | Present|
| Brachiopods          | 8                          | n.k.  |
| Phoronids            | 1                          | n.k.  |
| Crinoids             | 2                          | n.k.  |
| Ophiuroids           | 54                         | Present|
| Appendicularians     | 10                         | Probably|
| Thaliaceans          | 4                          | Probably|
| Turtle parasites     | 34                         | Present|

Islas Murciélago (103 spp.) seem very species-rich (Table 2, Appendix 1). Other areas within ACG have not been sampled at all, for example the northern shore of the Santa Elena Peninsula or some of the Islas Murciélago. The soft bottom substrate has not been sampled thoroughly nor most of the rocky intertidal zones.

Discussion

Compared to other areas on the Pacific of Costa Rica, the ACG has fewer known marine species (594 spp.) than does Golfo Dulce (1028 spp.: Morales-Ramírez 2011) or Isla del Coco (1688 spp.: Cortés 2012), but about the same as what is currently known for Bahía Culebra (577 spp: Cortés et al. 2012). But that number will defi-
nificantly increase as more taxa, other sites and environments within the ACG are inventoried.

Cortés et al. (2017) synthesized the knowledge of marine biodiversity of the Eastern Tropical Pacific, mainly from coral reefs, where most studies have been done. For example, 857 marine species have been reported for Clipperton Atoll, France, (Charpy 2009, Payri et al. 2009, Fourrière et al. 2014), 968 spp. for El Salvador (Barraza 2000, 2014a, b), 2157 spp. for the coast of Oaxaca, México (Bastida-Zavala et al. 2013), 3536 spp. for the Galápagos Islands (Bustamante et al. 2002, Hickman 2009), 3838 spp. for the Pacific coast of Costa Rica (Table 3, this paper), and 5740 spp. for the entire Gulf of California, México (Aburto-Oropeza and Balart 2001, Reyes-Bonilla et al. 2012). In other countries, for example, Panamá and Colombia, there are detailed inventories of some higher taxa, but not a compilation of all macrotaxa (Cortés et al. 2017). None of these inventories attempted to include the microorganisms.

There are large differences in the numbers of species among different sites in the Eastern Tropical Pacific and these differences could be due to several causes. First, the number, diversity and depth of research efforts influence the extent of the knowledge of the marine biodiversity of a region. Second, the extent of each region will also have an effect on species diversity, because larger areas will probably include more habitats and environments, and thus species. The ACG marine area comprises 430 km², while the Gulf of California has about 160000 km². Third, some sites may differ in species richness and diversity because of differences in geomorphology, oceanography, geological history and biogeography. Fourth, natural disturbances such as warming or cooling events can have a long-term impact on local biodiversity.

Knowing and documenting which species occurs where is a critical first step in understanding and conserving the biodiversity of a particular area. As outlined in Tables 3 and 4, there are important gaps in our knowledge in taxonomy and geographic distribution of marine organisms in the ACG. Much more work is needed to have an even approximately complete inventory, understand the ecological role of the species, their habitats, population structure, and distribution. Researchers of the BioMar-ACG project will fill many of these gaps, and together with other researchers from Costa Rica and elsewhere, the understanding of the marine biodiversity of the ACG will increase greatly. The BioMar project incorporates several innovative aspects, including marine parataxonomists, DNA barcoding of all organisms and fast accessibility of the information. This project could serve as a viable model for marine biodiversity inventory in other Costa Rican conservation areas and in other countries.

Acknowledgements

I thank Dan Janzen, Frank Joyce, María Marta Chavarría, Winnie Hallwachs, and Roger Blanco for setting up the BioMar ACG project that inspired this paper. The CIMAR, the Escuela de Biología and the Vicerrectoría de Investigación of the UCR let me dedicate most of my time to research. I deeply appreciate the review of sections or the
entire manuscript by Arturo Angulo, Rocío Córdoba, Cindy Fernández-García, Kimberly García-Méndez, Dan Janzen, Frank Joyce, Carolina Sheridan-Rodríguez, Jeffrey Sibaja-Cordero, Rita Vargas-Castillo, and the journal’s editor and reviewers. Finally, I thank the government of Costa Rica, the Wege Foundation of Grand Rapids, Michigan, and the Guanacaste Dry Forest Conservation Fund (GDFCF; http://www.gdfcf.org) for proving the funds for the BioMar ACG project and for the publication of this paper.

References

Note: Only the references used in the Tables and Appendix 1 are numbered.

Aburto-Oropeza O, Balart EF (2001) Community structure of reef fish in several habitats of a rocky reef in the Gulf of California. Marine Ecology 22: 283–305. https://doi.org/10.1046/j.1439-0485.2001.01747.x

Acuña-Mesén RA (1992) Monosporium apiospermum Saccardo (Fungi, Deuteromycetes), asociado a los huevos de la tortuga marina Lepidochelys olivacea (Eschscholtz 1829) en Costa Rica. Brenesia 38: 159–162. [1]

Alfaro EJ, Cortés J (2012) Atmospheric forcing of cold subsurface water events in Bahía Culebra, Costa Rica. Revista de Biología Tropical 60 (Supplement 2): 173–186. https://doi.org/10.15517/rbt.v60i2.20001

Alvarado-Quesada GM (2006) Conservación de las aves acuáticas de Costa Rica. Brenesia 66: 49–68. [2]

Arnqvist G (1992) Brown pelican foraging success related to age and height of dive. The Condor 94: 521–522. https://doi.org/10.2307/1369223 [3]

Aubry U (1995) A new species of the genus Terebra Bruguière, 1789 from Costa Rica. World Shells 14: 30–31. [4]

Barnard JL (1954) Amphipoda of the Family Ampeliscidae collected in the eastern Pacific by the Velero III and Velero IV. Allan Hancock Pacific Expeditions 18: 1–137. [5]

Barnard JL (1980) Revision of Metharpinia and Microphoxus (marine phoxocephalid Amphipoda from the Americas). Proceedings of the Biological Society of Washington 93: 104–135. [6]

Barraza E (2000) Comentarios sobre la diversidad de macroinvertebrados marinos de El Salvador. Publicación ocasional Ministerio del Medio Ambiente y Recursos Naturales 2: 1–15.

Barraza E (2014a) Invertebrados marinos de El Salvador. Ministerio del Medio Ambiente y Recursos Naturales, San Salvador, El Salvador, 96 pp.

Barraza E (2014b) Peces estuarinos y marinos de El Salvador. Ministerio del Medio Ambiente y Recursos Naturales, San Salvador, El Salvador, 66 pp.

Bassey-Fallas G (2010) Evaluación ecológica de los arrecifes y comunidades coralinas de las Islas Murciélago y sección norte de la Península de Santa Elena en el Pacífico de Costa Rica. MSc thesis, Universidad Nacional, Heredia. [7]

Bastida-Zavala JR, García-Madrigal M del S, Rosas-Alquicira EF, López-Pérez RA, Benítez-Villalobos F, Meraz-Hernando JF, Torres-Huerta AM, Montoya-Márquez A, Barrientos-Luján NA
Beebe W (1938) Eastern Pacific expeditions of the New York Zoological Society, XIV. Introduction, itinerary, list of stations, nets and dredges of the eastern Pacific Zaca expedition, 1937–1938. Zoologica 23: 287–298.

Beebe W (1942) Book of Bays. Barcourt, Brace and Company, New York, 302 pp.

Bertsch H, Ferreira AJ (1974) Four new species of nudibranchs from Tropical West America. The Veliger 16: 343–353. [8]

Bouchet P, Terryn Y (2011) *Terebra moolenbeeki* Aubry, 1995 – MolluscaBase. http://www.molluscabase.org/aphia.php?p=taxdetails&id=438891 [Accessed on 28.11.2015] [9]

Bowen BW, Clark AM, Abreu-Grobois FA, Chaves A, Reichart HA, Ferl RJ (1998) Global phylogeography of the ridley sea turtles (*Lepidochelys* spp.) as inferred from mitochondrial DNA sequences. Genetic 101: 179–189. https://doi.org/10.1023/A:1018382415005 [10]

Breedy O, Cortés J (2014) Gorgonias (Anthozoa: Octocorallia: Gorgoniidae) de las aguas someras del Pacífico Norte de Costa Rica. Revista de Biología Tropical 62(Supplement 4): 43–62. https://doi.org/10.15517/rbt.v62i4.20032 [11]

Breedy O, Guzman HM (2002) A revision of the genus *Pacifigorgia* (Coelenterata: Octocorallia: Gorgoniidae). Proceedings of the Biological Society of Washington 115: 782–839. [12]

Breedy O, Guzman HM (2003) Octocorals from Costa Rica: The genus *Pacifigorgia* (Coelenterata: Octocorallia: Gorgoniidae). Zootaxa 281: 1–60. https://doi.org/10.11646/zootaxa.281.1.1 [13]

Breedy O, Guzman HM (2005) A new species of *Leptogorgia* (Coelenterata: Octocorallia: Gorgoniidae) from the shallow waters of the eastern Pacific. Zootaxa, 899: 1–11. [14]

Breedy O, Guzman HM (2007) A revision of the genus *Leptogorgia* Milne Edwards & Haime, 1857 (Coelenterata: Octocorallia: Gorgoniidae) in the eastern Pacific. Zootaxa 1407: 1–90. https://doi.org/10.11646/zootaxa.1419.1.1 [15]

Breedy O, Guzman HM (2015) A revision of the genus *Muricea* Lamouroux, 1821 (Anthozoa, Octocorallia) in the eastern Pacific. Part I: Eumuricea Verrill, 1869 revisited. ZooKeys 537: 1–32. https://doi.org/10.3897/zookeys.537.6025 [16]

Breedy O, Guzman HM (2016) A revision of the genus *Muricea* Lamouroux, 1821 (Anthozoa, Octocorallia) in the eastern Pacific. Part II. ZooKeys 581: 1–69. https://doi.org/10.3897/zookeys.581.7910 [17]

Breedy O, Guzman HM, Vargas S (2009) A revision of the genus *Eugorgia* Verrill, 1868 (Coelenterata: Octocorallia: Gorgoniidae). Zootaxa 2151: 1–46. [18]

Bussing WA (1990) New species of gobiid fishes of the genera *Lythrypnus, Elacatinus* and *Chriolepis*. Revista de Biología Tropical 38: 99–118. [19]

Bussing WA (1991) A new genus and two new species of tripterygiid fishes from Costa Rica. Revista de Biología Tropical 39: 77–85. [20]

Bussing WA, Lavenberg RJ (2003) Four new species of eastern tropical Pacific jawfishes (*Opistognathus*: Opistognathidae). Revista de Biología Tropical 51: 529–550. [21]

Bustamante RH, Wellington GM, Branch GM, Edgar GJ, Martinez P, Rivera F, Smith F, Witman J (2002) Outstanding marine features. In: Bensted-Smith R (Ed.) A Biodiversity
Vision for the Galapagos Islands. Charles Darwin Foundation and World Wildlife Fund, Puerto Ayora; Galápagos, Ecuador, 60–71.

Camacho-García YE, Gosliner TM (2008) Nudibranch dorids from the Pacific coast of Costa Rica with description of a new species. Bulletin of Marine Science 83: 367–389. [22]

Camacho-García YE, Gosliner TM, Valdés Á (2005) Guía de campo de las babosas marinasy del Pacífico Este Tropical / Field Guid to the Sea Slugs of the Tropical Eastern Pacific. California Academy of Science, San Francisco, California, 129 pp. [23]

Campbell RA, Beveridge I (1997) Pterobothrioides, a new genus of tapeworm (Cestoda: Trypanorhyncha: Pterobothriidae) from dasyatid stingrays in the Eastern Atlantic and Pacific. Systematic Parasitology 38: 81–91. https://doi.org/10.1023/A:1005805005267 [24]

Carillo E, Morera R, Wong G (1994) Depredación de tortugas lora (Lepidochelys olivacea) y de Tortuga verde (Chelonia mydas) por el jaguar (Panthera onca). Vida Silvestre Neotropical 3: 48–49. [25]

Cate CN (1969) The eastern Pacific cowries. The Veliger 12: 103–119. [26]

Chan BKK, Chen H-N, Dando PR, Southward AJ, Southward EC (2016) Biodiversity and biogeography of chthamal barnacles from the north-eastern Pacific (Crustacea Cirripedia). PLoS ONE 11(3): e0149556. https://doi.org/10.1371/journal.pone.0149556 [27]

Chapman AD (2009) Numbers of Living Species in Australia and the World (2nd edn). Australian Biological Resources Study (ABRS), Canberra, Australia, 80 pp.

Charpy L (Ed.) (2009) Clipperton, environnement et biodiversité d’un microcosme océanique. MNHN, Paris & IRD, Marseille. Patrimoines naturels 68: 1–420.

Clark HL (1940) Eastern Pacific Expeditions of the New York Zoological Society. XXI. Notes on echinoderms from the west coast of Central America. Zoologica 25: 331–352. [28]

Coan EV (2003) The tropical eastern Pacific species of the Condylocardiidae (Bivalvia). Nautilus 117: 47–61. [29]

Coan EV, Scott PV, Bernard F (2000) Bivalve seashells of western North America. Marine Mollusks from Arctic Alaska to Baja California. Santa Barbara Museum of Natural History, Monograph 2: 764 pp. [30]

Coney CC (1990) Bellascintilla parmaleeana new genus and species from the tropical eastern Pacific, with a review of the other, ventrally notched galeommatid genera (Bivalvia: Galeommatacea). The Nautilus 104: 130–144. [31]

Córdoba-Muñoz R, Romero-Araya JC, Windevoxhel-Lora NJ (Compilers) (1998) Inventario de los humedales de Costa Rica. UICN, MINAE, SINAC, Embajada Real de los Países Bajos, San José, Costa Rica, 380 pp. [32]

Cornelius SE (1975) Marine turtle mortalities along the Pacific coast of Costa Rica. Copeia 1975: 186–187. https://doi.org/10.2307/1442428 [33]

Cornelius SE (1976) Marine turtle nesting activity at Playa Naranjo, Costa Rica. Brenesia 8: 1–27. [34]

Cornelius SE (1986) The Sea Turtles of Santa Rosa National Park. Fundación de Parques Nacionales, San José, Costa Rica, 64 pp. [35]

Cornelius SE, Robinson DC (1986) Post-nesting movements of female Olive Ridley turtles tagged in Costa Rica. Vida Silvestre Neotropical 1: 12–23. [36]
Cornelius SE, Alvarado-Ulloa M, Castro JC, Mata del Valle M, Robinson DC (1991) Management of olive ridley sea turtles (Lepidochelys olivacea) nesting at playas Nancite and Ostional, Costa Rica. In: Robinson JD, Redford KH (Eds) Neotropical Wildlife Use and Conservation. University of Chicago Press, Chicago, 111–135. [37]

Cortés J (1996–1997a) Biodiversidad marina de Costa Rica: Filo Cnidaria. Revista de Biología Tropical 44(3)/45(1): 323–334. [38]

Cortés J (1996–1997b) Comunidades coralinas y arrecifes del Área de Conservación Guanacaste, Costa Rica. Revista de Biología Tropical 44(3)/45(1): 623–625. [39]

Cortés J (2009a) A history of marine biodiversity scientific research in Costa Rica. In: Wehrtmann IS, Cortés J (Eds) Marine Biodiversity of Costa Rica, Central America. Monographiae Biologicae, Volume 86. Springer & Business Media BV, Berlin, 47–80. https://doi.org/10.1007/978-1-4020-8278-8_2

Cortés J (2009b) Marine fish parasites. In: Wehrtmann IS, Cortés J (Eds) Marine Biodiversity of Costa Rica, Central America. Monographiae Biologicae, Volume 86. Springer & Business Media BV, Berlin, 501–505. [List of species, Compact Disk: 493–496] [40]

Cortés J (2012) Marine biodiversity of an Eastern Tropical Pacific oceanic island, Isla del Coco, Costa Rica. Revista de Biología Tropical 60 (Supplement 3): 131–185.

Cortés J (2016) The Pacific coastal and marine ecosystems. In: Kappelle M (Ed) Costa Rican Ecosystems. The University of Chicago Press, Chicago and London, 97–138.

Cortés J, Guzmán HM (1998) Organismos de los arrecifes coralinos de Costa Rica: Descripción, distribución geográfica e historia natural de los corales zooxantelados (Anthozoa: Scleractinia) del Pacífico. Revista de Biología Tropical 46: 55–92. [41]

Cortés J, Jiménez C (2003) Corals and coral reefs of the Pacific of Costa Rica: history, research and status. In: Cortés J (Ed) Latin American Coral Reefs. Elsevier Science, Amsterdam, 361–385. https://doi.org/10.1016/B978-044451388-5/50017-5 [42]

Cortés J, Wehrtmann IS (2009) Diversity of marine habitats of the Caribbean and Pacific of Costa Rica. In: Wehrtmann IS, Cortés J (Eds) Marine Biodiversity of Costa Rica, Central America. Monographiae Biologicae, Volume 86. Springer & Business Media BV, Berlin, 1–45. https://doi.org/10.1007/978-1-4020-8278-8_1

Cortés J, Jiménez CE, Fonseca AC, Alvarado JJ (2010) Status and conservation of coral reefs in Costa Rica. Revista de Biología Tropical 58 (Supplement 1): 33–50. https://doi.org/10.15517/rbt.v58i1.20022 [43]

Cortés J, Vargas-Castillo R, Nivia-Ruiz J (2012) Marine biodiversity of Bahía Culebra, Guanacaste, Costa Rica: published records. Revista de Biología Tropical 60 (Supplement 2): 39–71. https://doi.org/10.15517/rbt.v60i2.19962

Cortés J, Samper-Villareal J, Bernecker A (2014) Seasonal phenology of Sargassum liebmannii J. Agardh (Fucales, Heterokontophyta) in an upwelling area of the Eastern Tropical Pacific. Aquatic Botany 119: 105–110. https://doi.org/10.1016/j.aquabot.2014.08.009

Cortés J, Enochs IC, Sibaja-Cordero JA, Hernández L, Alvarado JJ, Breedy O, Cruz-Barraza JA, Esquivel-Garrote O, Fernández-García C, Hermosillo A, Kaiser KL, Medina-Rosas P, Morales-Ramírez A, Pacheco C, Pérez-Matus A, Reyes-Bonilla H, Riosmena-Rodríguez R, Sánchez-Noguera C, Wieters E, Zapata FA (2017) Marine biodiversity of Eastern Tropical Pacific coral reefs. In: Glynn PW, Manzello D, Enochs I (Eds) Coral Reefs of the Eastern
Pacific: Persistence and Loss in a Dynamic Environment. Coral Reefs of the World 8. Springer Science+Business Media, Dordrecht, 203–250. https://doi.org/10.1007/978-94-017-7499-4_7

Crane J (1940) Eastern Pacific Expeditions of the New York Zoological Society. XVIII. On the post-embryonic development of brachyuran crabs of the genus Ocypode. Zoologica 25: 65–82. [44]

Crane J (1941a) Eastern Pacific Expeditions of the New York Zoological Society. XXVI. Crabs of the genus Uca from the west coast of Central America. Zoologica 26: 145–208. [45]

Crane J (1941b) Eastern Pacific Expeditions of the New York Zoological Society. XXIX. On the growth and ecology of brachyuran crabs of the genus Ocypode. Zoologica 26: 297–310. [46]

Crane J (1947) Eastern Pacific Expeditions of the New York Zoological Society. XXXVIII. Intertidal brachygnathous crabs from the west coast of tropical America with special reference to ecology. Zoologica 32: 69–95. [47]

Crastz F (1982) Embryological stages of the marine turtle Lepidochelys olivacea (Eschscholtz). Revista de Biología Tropical 30: 113–120. [48]

Crastz-Peters F (1981) El desarrollo embrionario de la tortuga marina Lepidochelys olivacea. MSc thesis, San Pedro, Costa Rica: Universidad de Costa Rica. [49]

Crocker T (1933) The Templeton Crocker Expedition of the California Academy of Sciences, 1932, No. 2: Introductory statement. Proceedings of the California Academy of Sciences 4th Series 21: 3–9.

Cushman JA, McCulloch I (1939) A report on some arenaceous Foraminifera. Allan Hancock Pacific Expeditions 6: 1–113. [50]

Cushman JA, McCulloch I (1940) Some Nonionidae in the collections of the Allan Hancock Foundation. Allan Hancock Pacific Expeditions 6: 145–178. [51]

Cushman JA, McCulloch I (1942) Some Virgulininae in the collections of the Allan Hancock Foundation. Allan Hancock Pacific Expeditions 6: 179–230. [52]

Cushman JA, McCulloch I (1948) The species of Bulimina and related genera in the collections of the Allan Hancock Foundation. Allan Hancock Pacific Expeditions 6: 231–294. [53]

Cushman JA, McCulloch I (1950) Some Lagenidae in the collections of the Allan Hancock Foundation. Allan Hancock Pacific Expeditions 6: 295–364. [54]

Cutler N, Cutler E, Vargas JA (1992) Peanut worms (Phylum Sipuncula) from Costa Rica. Revista de Biología Tropical 40: 153–158. [55]

Dawson EY (1960) New records of marine algae from Pacific Mexico and Central America. Pacific Naturalist 1(20): 31–52. [56]

Dawson EY (1961) A guide to the literature and distributions of Pacific benthic algae from Alaska to the Galapagos Islands. Pacific Science 15: 370–461. [57]

Dawson EY, Beaudette PT (1959) Field notes from the 1959 eastern Pacific cruise of the Stella Polaris. Pacific Naturalist 1(13): 1–24. [58]

Dean HK (2001) Marine biodiversity of Costa Rica: The phyla Sipuncula and Echiura. Revista de Biología Tropical 49(Suplemento 2): 85–90. [59]

Dean HK (2004) Marine biodiversity of Costa Rica: Class Polychaeta (Annelida). Revista de Biología Tropical 52(Suplemento 2): 131–181. [60]
Deichmann E (1938) Eastern Pacific Expeditions of the New York Zoological Society. XVI. Holothurians from the western coast of Lower California and Central America, and from the Galapagos Islands. Zoologica 23: 361–387. [61]

Deichmann E (1941) The Holothuroidea collected by the Velero III during the years 1932 to 1938. Part I. Dendrochirotida. Allan Hancock Pacific Expeditions 8: 61–195. [62]

Deichmann E (1958) The Holothuroidea collected by the Velero III and IV during the years 1932 to 1954. Part II. Aspidochirota. Allan Hancock Pacific Expeditions 11: 253–349. [63]

Del Moral-Flores LF, Angulo A, López MI, Bussing WA (2015) Nueva especie del género Urobatis (Myliobatiformes: Urotrygonidae) del Pacífico oriental tropical. Revista de Biología Tropical 63: 501–514. https://doi.org/10.15517/rbt.v63i2.15746 [64]

Drake DL, Spotila JR (2002) Thermal tolerances and the timing of the sea turtle hatching emergence. The Journal of Thermal Biology 27: 71–81. https://doi.org/10.1016/S0306-4565(01)00017-1 [65]

Drake DL, Hagerty MA, Behm J, Goldenburg SJ (2001) Lepidochelys olivacea (Olive Ridley sea turtle) predation. Herpetological Review 32: 104. [66]

Drake DL, Behm J, Hagerty MA, Mayor PA, Goldenberg S, Spotila JR (2003) Marine turtle nesting activity at Playa Naranjo, Santa Rosa National Park, Costa Rica, for the 1998–1999 season. Chelonian Conservation and Biology 4: 675–678. [67]

Durham JW, Barnard JL (1952) Stony corals of the Eastern Pacific collected by the Velero III and the Velero IV. Allan Hancock Pacific Expeditions 16: 1–110. [68]

Dushane H, Draper BC (1975) The genus Seila in the eastern Pacific (Mollusca: Gastropoda). The Veliger 17: 335–345. [69]

Eckrich CE, Owens DW (1995) Solitary versus arribada nesting in the Olive Ridley sea turtles (Lepidochelys olivacea): A test of the predation-satiation hypothesis. Herpetologica 51: 349–354. [70]

Escobar-Lasso S, Fonseca LG, Villachica WN, Herrera H, Valverde RA, Quirós-Pereira W, Pesquero M, Plotkin PT (2016) First field observation of the predation by Jaguar (Panthera onca) on Olive Ridley sea turtle (Lepidochelys olivacea) at Nancite Beach, Santa Rosa National Park, Costa Rica. Mammalogy Notes | Notas Mastozoológicas 3: 20–23. [71]

Excoffon AC, Acuña FH, Cortés J (2009) The sea anemone Nemanthus californicus (Cnidaria, Actiniaria, Nemanthidae) from Costa Rica: re-description and first record outside the type locality. Marine Biodiversity Records 2, e142. https://doi.org/10.1017/S17552672099990601 [72]

Fernández-García C, Riosmena-Rodríguez R, Wysor B, Tejada OL, Cortés J (2011) Checklist of the Pacific marine macroalgae of Central America. Botanica Marina 54: 53–73. https://doi.org/10.1515/bot.2011.001 [73]

Fonseca LG, Murillo GA, Guadamuz L, Spínola RM, Valverde RA (2009) Downward but stable trend in the abundance of arribada olive ridley sea turtles (Lepidochelys olivacea) at Nancite Beach, Costa Rica (1971–2007). Chelonian Conservation and Biology 8: 19–27. https://doi.org/10.2744/CCB-0739.1 [74]

Foster JM, LeCroy SE, Heard RW, Vargas R (2009) Gammaridean amphipods. In: Wehrtmann IS, Cortés J (Eds) Marine Biodiversity of Costa Rica, Central America. Monographiae Biologicae, Volume 86. Springer & Business Media BV, Berlin, 265–274. https://doi.org/10.1007/978-1-4020-8278-8_24 [List of species, Compact Disk: 212–216] [75]
Fourriére M, Reyes-Bonilla H, Rodríguez-Zaragoza FA, Crane N (2014) Fishes of Clipperton Atoll, Eastern Pacific: Checklist, endemism, and analysis of completeness of the inventory. Pacific Science 68: 375–395. https://doi.org/10.2984/68.3.7

Fraser CM (1943a) General account of the scientific work of the Velero III in the eastern Pacific, 1931–1941, Part II: Geographic and biological associations. Allan Hancock Pacific Expeditions 1(2): 49–258.

Fraser CM (1943b) General account of the scientific work of the Velero III in the eastern Pacific, 1931–1941, Part III: a ten-year list of the Velero III collecting stations (Charts 1–115). With an appendix of collecting stations of the Allan Hancock Foundation for the year 1942. Allan Hancock Pacific Expeditions 1(3): 259–431.

Fraser CM (1948a) Hydroids of the 1932, 1933, 1935, and 1938 Allan Hancock Pacific Expeditions. Allan Hancock Pacific Expeditions 4(3): 129–153. [76]

Fraser CM (1948b) Hydroids of the Allan Hancock Pacific Expeditions since March, 1938. Allan Hancock Pacific Expeditions 4(5): 179–335. [77]

Garth JS (1940) Some new species of brachyuran crabs from Mexico and the Central and South American mainland. Allan Hancock Pacific Expeditions 5(3): 53–127. [78]

Garth JS (1958) Brachyura of the Pacific coast of America. Oxyrhynchia. Tables and Plates. Allan Hancock Pacific Expeditions 21(2): 501–854. [79]

Garth JS (1959) Eastern Pacific Expeditions of the New York Zoological Society. XLIV. Non-intertidal brachygnathous crabs from the west coast of Tropical America. Part 1: Brachygnatha, Oxyrhyncha. Zoologica 44: 105–126. [80]

Garth JS (1961) Eastern Pacific Expeditions of the New York Zoological Society. XV. Non-intertidal brachygnathous crabs from the west coast of Tropical America. Part 2: Brachygnatha Brachyrhyncha. Zoologica 46: 133–160. [81]

Garth JS (1966) Eastern Pacific Expeditions of the New York Zoological Society. XLVI. Oxystomatous and allied crabs from the west coast of Tropical America. Zoologica 51: 1–16. [82]

Garth JS (1974) On the occurrence in the eastern tropical Pacific of Indo-West Pacific decapod crustaceans commensal with reef-building corals. Proceedings 2nd International Coral Reef Symposium, Brisbane 1: 397–404. [83]

Gates CE, Valverde RA, Mo CL, Chaves AC, Ballesteros J, Pesk J (1996) Estimating Arribada size using a modified instantaneous count procedure. Journal of Agricultural, Biological, and Environmental Statistics 1: 275–287. https://doi.org/10.2307/1400519 [84]

Geiger DL (2006) Eight new species of Scissurellidae and Anatomidae (Mollusca: Gastropoda: Vetigastropoda) from around the world, with discussion of two new senior synonyms. Zootaxa 1128: 1–33. [85]

Glynn PW (1999) Pocillopora inflata, a new species of scleractinian coral (Cnidaria: Anthozoa) from the tropical eastern Pacific. Pacific Science 53: 168–180. [86]

Gore RH, Abele LG (1973) Three new species of porcellanid crabs (Crustacea, Decapoda, Porcellanidae) from the Bay of Panama and adjacent Caribbean waters. Bulletin of Marine Science 23: 559–573. [87]

Grove JS, Lavenberg RJ (1997) The Fishes of the Galápagos Islands. Stanford University Press, Stanford, California, 863 pp. [88]
Guiry MD, Guiry GM (2016) AlgaeBase. World-wide electronic publication, National University of Ireland, Galway. http://www.algaebase.org; searched on 11 January 2016.

Hahn AT (2011) Filogeografia global da tartaruga oliva (Lepidochelys olivacea). PhD thesis, Porto Alegre, Rio Grande do Sul, Brasil: Pontificia Universidade Católica do Rio Grande do Sul. [89]

Haig J (1960) The Porcellanidae (Crustacea: Anomura) of the eastern Pacific. Allan Hancock Pacific Expeditions 24: 1–440. [90]

Haig J (1968) Eastern Pacific expeditions of the New York Zoological Society. Porcellanid crabs (Crustacea: Anomura) from the west coast of Tropical America. Zoologica 53: 57–74. [91]

Haig J, Harvey AW (1991) Three new species of the Pagurus lepidus complex (Decapoda, Anomura, Paguridae) from the eastern Pacific. Natural History Museum of Los Angeles County, Contributions in Science 430: 1–11. [92]

Hanna GD, Strong AM (1949) West American mollusks of the genus Conus. Proceedings of the California Academy of Sciences 4th Series 26: 247–322. [93]

Hartman O (1939) Polychaetous annelids. Part I. Aphroditidae to Pisionidae. Allan Hancock Pacific Expeditions 7(1): 1–155. [94]

Hartman O (1940) Polychaetous annelids. Part II. Chrysopetalidae to Goniadidae. Allan Hancock Pacific Expeditions 7(2): 173–287. [95]

Hartman O (1944) Polychaetous annelids. Part V. Eunicea. Allan Hancock Pacific Expeditions 10: 1–238. [96]

Harvey AW, McLaughlin P (1991) Two new hermit crabs of the genus Pagurus (Provenza-noi group) (Crustacea, Anomura, Paguridae) from the eastern Pacific, with notes on their ecology. Natural History Museum of Los Angeles County, Contributions in Science 425: 13–21. [97]

Heard RW, Price WW (2006) Revision of Bowmaniella sensu Bacescu, 1968 (Crustacea: Mysida: Gastroscinaceae): a taxonomic conundrum. Zootaxa 1269: 1–29. [98]

Heard RW, Breedy O, Vargas R (2009) Tanaidaceans. In: Wehrmann IS, Cortés J (Eds) Marine Biodiversity of Costa Rica, Central America. Monographiae Biologicae, Volume 86. Springer & Business Media BV, Berlin, 245–256. https://doi.org/10.1007/978-1-4020-8278-8_22 [List of species, Compact Disk: 204–205] [99]

Hendrickx ME (1993) Distribution of Petrolisthes lewisi (Crustacea: Porcellanidae) in the Eastern Tropical Pacific. Revista de Biología Tropical 41: 287–290. [100]

Hendrickx ME, Harvey AW (1999) Checklist of anomuran crabs (Crustacea: Decapoda) from the eastern tropical Pacific. Belgian Journal of Zoology 129: 363–389. [101]

Hernáez P, Vargas R (2013) A new species of Callianidea H. Milne Edwards, 1837 (Decapoda, Axidea, Callianideidae) from the Pacific coast of Central America, with key to the genus. Zootaxa 3681: 147–154. https://doi.org/10.11646/zootaxa.3681.2.3 [102]

Hernández-Mora G, González-Barrientos R, Morales JA, Chaves-Olarte E, Guzmán-Verri C, Baquero-Calvo E, De-Miguel MJ, Marín CM, Blasco JM, Moreno E (2008) Neurobrucellosis in stranded dolphins, Costa Rica. Emerging Infectious Diseases 14: 1430–1433. https://doi.org/10.3201/eid1409.071056 [103]
Hertlein LG (1935) The Templeton Crocker Expedition of the California Academy of Sciences, 1932. No. 25: The Recent Pectinidae. Proceedings of the California Academy of Sciences 4th Series 21: 301–328. [104]
Hertlein LG, Strong AM (1940) Eastern Pacific Expeditions of the New York Zoological Society. XXII. Mollusks from the west coast of Mexico and Central America. Part I. [105]
Hertlein LG, Strong AM (1943) Eastern Pacific Expeditions of the New York Zoological Society. XXXII. Mollusks from the west coast of Mexico and Central America. Part II. Zoologica 28: 149–168. [106]
Hertlein LG, Strong AM (1946a) Eastern Pacific Expeditions of the New York Zoological Society. XXXIV. Mollusks from the west coast of Mexico and Central America. Part III. Zoologica 31: 53–76. [107]
Hertlein LG, Strong AM (1946b) Eastern Pacific Expeditions of the New York Zoological Society. XXXV. Mollusks from the west coast of Mexico and Central America. Part IV. Zoologica 31: 93–120. [108]
Hertlein LG, Strong AM (1947) Eastern Pacific Expeditions of the New York Zoological Society. XXXVI. Mollusks from the west coast of Mexico and Central America. Part V. Zoologica 31: 129–150. [109]
Hertlein LG, Strong AM (1948) Eastern Pacific Expeditions of the New York Zoological Society. XXXIX. Mollusks from the west coast of Mexico and Central America. Part VI. Zoologica 33: 163–198. [110]
Hertlein LG, Strong AM (1949a) Eastern Pacific Expeditions of the New York Zoological Society. XL. Mollusks from the west coast of Mexico and Central America. Part VII. Zoologica 34: 63–97. [111]
Hertlein LG, Strong AM (1949b) Eastern Pacific Expeditions of the New York Zoological Society. XLI. Mollusks from the west coast of Mexico and Central America. Part VIII. Zoologica 34: 239–258. [112]
Hertlein LG, Strong AM (1950) Eastern Pacific Expeditions of the New York Zoological Society. XLII. Mollusks from the west coast of Mexico and Central America. Part IX. Zoologica 35: 217–252. [113]
Hertlein LG, Strong AM (1951) Eastern Pacific Expeditions of the New York Zoological Society. XLIII. Mollusks from the west coast of Mexico and Central America. Part X. Zoologica 36: 66–120. [114]
Hickman CP (2009) Evolutionary responses of marine invertebrates to insular isolation in Galápagos. Galapagos Research 66: 32–42.
Hirtch HF (1980) Some aspects of the nesting behavior and reproductive biology of sea turtles. American Zoologist 20: 507–523. https://doi.org/10.1093/icb/20.3.507 [115]
Hodkinson ID (1992) Telmasylla gen. n., an unusual psyllid from black mangrove in Florida and Costa Rica (Insecta, Homoptera, Psylloidea). Zoologica Scripta 21: 307–309. https://doi.org/10.1111/j.1463-6409.1992.tb00332.x [116]
Hoese DF, Reader S (2001) A preliminary review of the Eastern Pacific species of Elacatinus (Perciformes: Gobiidae). Revista de Biología Tropical 49(Supplement 1): 157–167. [117]
Holthuis LB (1951) A general revision of the Palaemonidae (Crustacea Decapoda Natantia) of the Americas. I. The subfamilies Euryrhynchidae and Pontoniinae. Occasional Papers of the Allan Hancock Foundation 11: 1–332. [118]

Holthuis LB (1952) A general revision of the Palaemonidae (Crustacea: Decapoda: Natantia) of the Americas. II. The subfamily Palaemoninae. Allan Hancock Foundation Publication, Occasional Papers 12: 1–396. [119]

Honarvar S, O’Connor MP, Spotila JR (2008) Density-dependent effects on hatching success of the olive ridley turtle, *Lepidochelys olivacea*. Oecologia 157: 221–230. https://doi.org/10.1007/s00442-008-1065-3 [120]

Hope RA (2000) Egg harvesting of the olive ridley marine turtle (*Lepidochelys olivacea*) along the Pacific coast of Nicaragua and Costa Rica: an arribada sustainability analysis. MA Thesis, University of Manchester, Manchester. [121]

Hope RA (2002) Wildlife harvesting, conservation and poverty: the economics of olive ridley egg exploitation. Environmental Conservation 29: 375–384. https://doi.org/10.1017/S0376892902000255 [122]

Hughes DA, Richard JD (1974) The nesting of the Pacific ridley *Lepidochelys olivacea* on Playa Nancite, Costa Rica. Marine Biology 24: 97–107. https://doi.org/10.1007/BF00389343 [123]

Janzen DH, Hallwachs W (2016) Biodiversity conservation history and future in Costa Rica: The case of Área de Conservación Guanacaste (ACG). In: Kappelle M (Ed) Costa Rican Ecosystems. The University of Chicago Press, Chicago and London, 290–341.

Jiménez C, Cortés J, León A, Ruiz E (2001) Coral bleaching and mortality associated with the 1997–98 El Niño in an upwelling environment in the eastern Pacific (Gulf of Papagayo, Costa Rica). Bulletin of Marine Science 69: 151–169. [124]

Jung P (1989) Revision of the Strombina-Group (Gastropoda: Columbellidae), fossil and living: distribution, biostratigraphy and systematics. Schweizerische Paläontologische Abhandlungen 111: 1–298. [125]

Kim W, Abele LG (1988) The snapping shrimp genus *Alpheus* from the eastern Pacific (Decapoda: Caridea: Alpheidae). Smithsonian Contributions to Zoology 454: 1–119. https://doi.org/10.5479/si.00810282.454 [126]

Lalicker CG, McCulloch I (1940) Some Textulariidae of the Pacific Ocean. Allan Hancock Pacific Expeditions 6(2): 115–143. [127]

Loria-Naranjo M, Samper-Villarreal J, Cortés J (2014) Potrero Grande and Santa Elena mangrove forest structure, Santa Rosa National Park, North Pacific, Costa Rica. Revista de Biología Tropical 62 (Supplement 4): 33–41. https://doi.org/10.15517/rbt.v62i4.20030 [128]

Luke SR (1977) Catalog of the benthic invertebrate collections. I. Decapod Crustacea and Stomatopoda. Scripps Institution of Oceanography Reference Series No. 77–9: 72 pp. [129]

Luke SR (1995) Catalog of the benthic invertebrate collections of the Scripps Institution of Oceanography. Mollusca. Scripps Institution of Oceanography Reference Series No. 95–24: 477 pp. [130]

Majewska R, Santoro M, Bolaños F, Chaves G, De Stefano M (2015a) Diatoms and other epibionts associated with olive ridley (*Lepidochelys olivacea*) sea turtles from the Pacific coast of Costa Rica. PLoS ONE 10(6): e0130351. https://doi.org/10.1371/journal.pone.0130351 [131]
Majewska R, Kociolek JP, Thomas EW, De Stefano M, Santoro M, Bolaños F, Van De Vijver B (2015b) *Chelonicola* and *Poulinea*, two new gomphonemoid diatom genera (Bacillariophyta) living on marine turtles from Costa Rica. Phytotaxa 233: 236–250. https://doi.org/10.11646/phytotaxa.233.3.2 [132]

Magaña J, Espinosa J, Ortea J (2003) Description of two new species *Prunum* Herrmannsen, 1852 (Mollusca: Gastropoda: Marginellidae) from the Caribbean and Pacific coast of Costa Rica. Avicennia 16: 121–128. [133]

Malaquias MAE, Reid DG (2008) Systematic revision of the living species of Bullidae (Mollusca: Gastropoda: Cephalaspidea), with a molecular phylogenetic analysis. Zoological Journal of the Linnean Society, 153: 453–543. https://doi.org/10.1111/j.1096-3642.2008.00369.x [134]

Manning RB (1961) A new *Lysiosquilla* (Crustacea: Stomatopoda) from the Gulf of California, with a rediscription of *L. decemspinosa* Rathbun. Proceedings of the Biological Society of Washington 74: 29–35. [135]

Manning RB (1972) Stomatopod Crustacea. Eastern Pacific Expeditions of the New York Zoological Society. Zoologica 56: 95–113. [136]

Manning RB, Reaka ML (1979) Three new stomatopod crustaceans from the Pacific coast of Costa Rica. Proceedings of the Biological Society of Washington 92: 634–639. [137]

Marques F, Centritto R, Stewart SA (1997) Two new species of *Acanthobothrium in Narcine entemedor* (Rajiformes: Narcinidae) from the northwest coast of Guanacaste Peninsula, Costa Rica. The Journal of Parasitology 83: 927–931. https://doi.org/10.2307/3284291 [138]

Martínez-Fernández D, Montero-Cordero A, May-Collado L (2011) Cetáceos de las aguas costeras del Pacífico norte y sur de Costa Rica. Revista de Biología Tropical 59: 283–290. [139]

Mauger LA, Velez E, Cherkiss MS, Brien ML, Boston M, Mazzotti FJ, Spotila JR (2012) Population assessment of the American crocodile, *Crocodylus acutus* (Crocodilia: Crocodylidae) on the Pacific coast of Costa Rica. Revista de Biología Tropical 60: 1889–1901. https://doi.org/10.15517/rbt.v60i4.2188 [140]

May-Collado LJ (2001) Abundancia, ocurrencia, movimiento y comportamiento del delfín pan tropical manchado costero *Stenella attenuata* del Pacífico Norte de Costa Rica. MSc thesis, Universidad de Costa Rica, San Pedro. [141]

May-Collado L (2009) Marine mammals. In: Wehrtmann IS, Cortés J (Eds) Marine Biodiversity of Costa Rica, Central America. Monographiae Biologicae, Volume 86. Springer & Business Media BV, Berlin, 479–495. https://doi.org/10.1007/978-1-4020-8278-8_45 [List of species, Compact Disk: 485–490] [142]

May-Collado LJ, Forcada J (2012) Small-scale estimation of relative abundance for the coastal spotted dolphins (*Stenella attenuata*) in Costa Rica: the effect of habitat and seasonality. Revista de Biología Tropical 60(Supplement 2): 133–142. https://doi.org/10.15517/rbt.v60i2.19997 [143]

May-Collado L, Morales-Ramírez A (2005) Presencia y patrones de comportamiento del delfín manchado costero, *Stenella attenuata* (Cetacea: Delphinidae) en el Golfo de Papagayo, Costa Rica. Revista de Biología Tropical 53: 265–276. [144]
May-Collado L, Gerrodette T, Calambokidis J, Rasmussen K, Sereg I (2005) Patterns of cetacean sighting distribution in the Pacific Exclusive Economic Zone of Costa Rica based on data collected from 1979–2001. Revista de Biología Tropical 53: 249–263. [145]

McCauley DJ, Joyce FJ, Lowenstein JH (2008) Effects of the aquarium fish industry in Costa Rica on populations of the Cortez rainbow wrasse Thalassoma lucasanum. Ciencias Marinas 34: 445–451. [146]

McCoy CJ, Vogt RC, Censky EJ (1983) Temperature-controlled sex determination in the sea turtle Lepidochelys olivacea. Journal of Herpetology 7: 404–406. https://doi.org/10.2307/1563594 [147]

McCreary JP, Lee HS, Enfield DB (1989) The response of the coastal ocean to strong offshore winds: with application to circulations in the Gulfs of Tehuantepec and Papagayo. Journal of Marine Research 47: 81–109. https://doi.org/10.1357/002224089785076343

Menzies RJ (1953) The apseudid Chelifera of the eastern tropical and north temperate Pacific Ocean. Bulletin of the Museum of Comparative Zoology 107: 441–496. [148]

Monks S, Marques F, León-Regagnon V, Pérez-Ponce de León G (1997) Koronacanthapectinaria n. comb. (Acanthocephala: Illiosentidae) from Microlepidotus brevipinnis (Haemulidae) and redescription of Tegorhynchus brevis. The Journal of Parasitology 83: 485–494. https://doi.org/10.2307/3284415 [149]

Mora JM, Robinson DC (1984) Predation of sea turtle eggs (Lepidochelys) by the snake Loxocemusbicolor. Revista de Biología Tropical 32: 161–162. [150]

Morales-Ramírez A (2011) La diversidad marina del Golfo Dulce, Pacífico sur de Costa Rica: amenazas a su conservación. Biocenosis 24: 9–20.

Moran DA, Dittel AI (1993) Anomura and brachyuran crabs of Costa Rica: annotated list of species. Revista de Biología Tropical 41: 599–617. [151]

Myers AA (1968) Some Aoridae (Amphipoda: Gammaridae) collected by the Hancock Expeditions to the eastern Pacific, 1931–1941. Pacific Science 22: 497–506. [152]

Nelson K, Mo CL (1996) Olive Ridley (Lepidochelys olivacea) nests excavated by Caracaras (Polyborusplancus) at Nancite Beach. Marine Turtle Newsletter 74: 10–11. [153]

Nova-Bustos N, Hernández-Zanuy AC, Viquez-Portuguez R (2010) Distribución y abundancia de las ascidias de los fondos rocosos de la Bahía de Cuajiniquil, Costa Rica. Boletín de Investigaciones Marinas y Costeras 39: 57–66. [154]

Ortiz RM, Plotkin PT, Owens DW (1997) Predation upon Olive Ridley sea turtles (Lepidochelys olivacea) by the American crocodile (Crocodylus acutus) at Playa Nancite, Costa Rica. Chelonian Conservation and Biology 2: 585–587. [155]

Osburn RC (1950) Bryozoa of the Pacific coast of America – Part 1, Cheilostomata–Anasca. Allan Hancock Pacific Expeditions 14: 1–269. [156]

Osburn RC (1952) Bryozoa of the Pacific coast of America – Part 2, Cheilostomata–Ascophosta. Allan Hancock Pacific Expeditions 14: 271–611. [157]

Osburn RC (1953) Bryozoa of the Pacific coast of America. Part 3, Cycllostomata, Ctenostomata, Entoprocta, and Addenda. Allan Hancock Pacific Expeditions 14: 613–725. [158]

Payri C, Menou J-L, N’Yeurt A (2009) La flore marine du complexe récifal et quelques aspects de la biodiversité et de la géomorphologie de l’île. In: Charpy L (Ed.) Clipperton, environnement et biodiversité d’un microcosme océanique. Patrimoines naturels 68: 129–141.
Paz-García DA, Hellberg ME, García-de-León FJ, Balart EF (2015) Switch between morphospecies of *Pocillopora* corals. The American Naturalist 186: 434–440. https://doi.org/10.1086/682363

Pérez-Ponce de León G, León-Regagnon V, Monks S (1998) *Theletrum lamothei* sp. nov. (Digenea), parasite of *Echidna nocturna* from Cuajiniquil, Guanacaste, and other digenes of marine fishes from Costa Rica. Revista de Biología Tropical 46: 345–354. [159]

Perger R, Cortés J, Pacheco C (2013) Closing a distributional gap of over 3000 km and encountering an invisible barrier: new presence/absence data for *Johngarthia planata* Stimpson, 1860 (Decapoda, Brachyura, Gecarcinidae) for Central America and biogeographic notes on East Pacific Gecarcinidae. Crustaceana 86: 268–277. https://doi.org/10.1163/15685403-00003172 [160]

Petrescu I, Heard RW (2004) Three new Cumacea (Crustacea: Peracarida) from Costa Rica. Zootaxa 721: 1–12. [161]

Petrescu I, Heard RW, Vargas R, Breedy O (2009) Cumaceans. In: Wehrtmann IS, Cortés J (Eds) Marine Biodiversity of Costa Rica, Central America. Monographiae Biologicae, Volume 86. Springer & Business Media BV, Berlin, 237–244. https://doi.org/10.1007/978-1-4020-8278-8_21 [List of species, Compact Disk: 201–203] [162]

Pitombo FB, Burton R (2007) Systematics and biogeography of Tropical Eastern Pacific *Chthamalus* with descriptions of two new species (Cirripedia, Thoracica). Zootaxa 1574: 1–30. [163]

Plotkin P (2010) Nomadic behaviour of the highly migratory olive ridley sea turtle *Lepidochelys olivacea* in the eastern tropical Pacific Ocean. Endangered Species Research 13: 33–40. https://doi.org/10.3354/esr00314 [164]

Plotkin P, Polar M, Owens DW (1991) Observations on olive ridley sea turtle behavior prior to an arribada at Playa Nancite, Costa Rica. Marine Turtle Newsletter 53: 9–10. [165]

Plotkin PT, Byles RA, Rostal DC, Owens DW (1995) Independent versus socially facilitated oceanic migrations of the olive ridley, *Lepidochelys olivacea*. Marine Biology 122: 137–143. https://doi.org/10.1007/BF00349287 [166]

Plotkin PT, Owens DW, Byles RA, Patterson R (1996) Departure of male Olive Ridley turtles (*Lepidochelys olivacea*) from a nearshore breeding ground. Herpetologica 52: 1–7. [167]

Plotkin PT, Rostal DC, Byles RA, Owens DW (1997) Reproductive and developmental synchrony in female *Lepidochelys olivacea*. Journal of Herpetology 31: 17–22. https://doi.org/10.2307/1565323 [168]

Plotkin PT, Briceño-Dueñas R, Abreu-Grobois FA (2012) Interpreting signs of olive ridley recovery in the Eastern Pacific. In: Seminoff JA, Wallace BP (Eds) Sea Turtles of the Eastern Pacific: Advances in Research and Conservation. The University of Arizona Press, Tucson, 302–335. [169]

Pool DJ, Snedaker SC, Lugo AE (1977) Structure of mangrove forests in Florida, Puerto Rico, Mexico, and Costa Rica. Biotropica 9: 195–212. https://doi.org/10.2307/2387881 [170]

Price WW, Heard RW, Vargas R (2009) Shallow water mysids. In: Wehrtmann IS, Cortés J (Eds) Marine Biodiversity of Costa Rica, Central America. Monographiae Biologicae, Volume 86. Springer & Business Media BV, Berlin, 229–236. https://doi.org/10.1007/978-1-4020-8278-8_20 [List of species, Compact Disk: 199–200] [171]
Putz FE, Parker GG, Archibald RM (1984) Mechanical abrasion and intercrown spacing. American Midland Naturalist 112: 24–28. https://doi.org/10.2307/2425452 [172]

Reid DG (1999) The genus *Littoraria* Griffith & Pidgeon, 1834 (Gastropoda: Littorinidae) in the tropical eastern Pacific. The Veliger 42: 21–53. [173]

Reid DG (2002) The genus *Nodilittorina* von Martens, 1897 (Gastropoda: Littorinidae) in the eastern Pacific Ocean, with a discussion of biogeographic provinces of the rocky-shore fauna. The Veliger 45: 85–170. [174]

Reyes-Bonilla H, Walther-Mendoza M, Ramírez-Ortiz G (2012) Biodiversidad y turismo ecológico. In: Ibáñez-Pérez RM, Ivanova-Boncheva A (Eds) Medio ambiente y política turística en México. Instituto Nacional de Ecología, México, 135–148.

Richard JD, Hughes DA (1972) Some observations of sea turtle nesting activity in Costa Rica. Marine Biology 16: 297–309. https://doi.org/10.1007/BF00347753 [175]

Rixen T, Jiménez C, Cortés J (2012) Impact of upwelling events on the sea water chemistry in the Gulf of Papagayo (Culebra Bay), Costa Rica. Revista de Biología Tropical 60(Supplement 2): 187–195.

Roders III JC, Horn SP (1996) Modern pollen spectra form Costa Rica. Palaeoecography Palaeoecology Palaeoclimatology, Palaeoecology 124: 53–71. https://doi.org/10.1016/0031-0182(96)00004-1 [176]

Rodríguez-Fonseca J, Cubero-Pardo P (2001) Cetacean strandings in Costa Rica (1966–1999). Revista de Biología Tropical 49: 667–672. [177]

Rodríguez-Ortiz B, García-Prieto L, Pérez-Ponce de León G (2004) Checklist of the helminth parasites of vertebrates in Costa Rica. Revista de Biología Tropical 52: 313–354. https://doi.org/10.15517/rbt.v52i2.15249 [178]

Rosenblatt RH, Parr TD (1969) The Pacific species of the clinid fish genus *Paraclinus*. Copeia 1969: 1–20. https://doi.org/10.2307/1441691 [179]

Rost H (1955) A report on the Family Arcidae (Pelecypoda). Allan Hancock Pacific Expeditions 20: 177–249. [180]

Roth B (1978) New species and records of tropical west American Marginellidae (Mollusca: Neogastropoda). Natural History Museum of Los Angeles County, Contributions in Science 292: 1–18. [181]

Santoro M, Morales JA (2007) Some digenetic trematodes of the olive ridley sea turtle, *Lepidochelys olivacea* (Testudines, Cheloniidae) in Costa Rica. Helminthologia 44: 25–28. https://doi.org/10.2478/s11687-006-0052-7 [182]

Santoro M, Orrego CM, Hernández-Gómez G (2006) Flora bacteriana cloacal y nasal de *Lepidochelys olivacea* (Testudines: Cheloniidae) en el pacífico norte de Costa Rica. Revista de Biología Tropical 54: 43–48. https://doi.org/10.15517/rbt.v54i1.13990 [183]

Setchell WA (1937) The Templeton Crocker Expedition of the California Academy of Sciences, 1932. Number 34. Reports on the Sargassum. Proceedings of the California Academy of Sciences Series 4, 22: 127–158. [184]

Sibaja-Cordero JA, Camacho-García YE, Vargas-Castillo R (2014) Riqueza de especies de invertibados en playas de arena y costas rocosas del Pacífico Norte de Costa Rica. Revista de Biología Tropical 62 (Supplement 4): 63–84. https://doi.org/10.15517/rbt.v62i4.20033 [185]
Soot-Ryen T (1955) A report on the Family Mytilidae (Pelecypoda). Allan Hancock Pacific Expeditions 20: 1–175. [186]

Suárez-Morales E, Morales-Ramírez A (2001) Nuevo registro de Acartia (Planktacartia) negli-gens (Copepoda, Calanoida) en el Pacífico Tropical Oriental. Revista de Biología Tropical 49: 1286. [187]

Taylor WR (1945) Pacific marine algae of the Allan Hancock expeditions to the Galapagos Islands. Allan Hancock Pacific Expeditions 12: 1–528. [188]

Treadwell AL (1941) Eastern Pacific expeditions of the New York Zoological Society. XXIII. Polychaetous annelids from the west coast of Mexico and Central America. Zoologica 26: 17–24. [189]

Trullas SC, Paladino FV (2007) Micro-environment of Olive Ridley turtle nests deposited during an aggregated nesting event. Journal of Zoology 272: 367–376. https://doi.org/10.1111/j.1469-7998.2006.00277.x [190]

Valdés Á, Camacho-García YE (2004) “Cephalaspidean” heterobranchs (Gastropoda) from the Pacific coast of Costa Rica. Proceedings of the California Academy of Sciences 55: 459–497. [191]

Valverde RA, Cornelius SE, Mo CL (1998) Decline of the olive ridley sea turtle (Lepidochelys olivacea) nesting assemblage at Nancite beach, Santa Rosa National Park, Costa Rica. Chelonian Conservation and Biology 3: 58–63. [192]

Valverde RA, Owens DW, Mackenzie DS, Amoss MS (1999) Basal and stress-induced corticosterone levels in olive ridley sea turtles (Lepidochelys olivacea) in relation to their mass nesting behavior. Journal of Experimental Zoology 284: 652–662. https://doi.org/10.1002/(SICI)1097-010X(19991101)284:6<652::AID-JEZ7>3.0.CO;2-U [193]

Vargas R (2000) Periclimenes murcielagensis, a new species of shrimp (Crustacea: Decapoda: Palaemonidae) living on black coral from the Pacific coast of Costa Rica. Proceedings of the Biological Society of Washington 113: 17–23. [194]

Vargas R, Cortés J (1997) Biodiversidad marina de Costa Rica: Orden Stomatopoda (Crustaceae: Hoplocarida). Revista de Biología Tropical 45: 1531–1539. [195]

Vargas R, Cortés J (1999) Biodiversidad marina de Costa Rica: Crustacea. Decapoda (Penaecidea, Sergestoidea, Caridea, Astacidea, Thalassinidea, Palinura) del Pacífico. Revista de Biología Tropical 47: 887–911. [196]

Vargas R, Cortés J (2006) Biodiversidad marina de Costa Rica: Crustacea: Infraorden Anomura. Revista de Biología Tropical 54: 461–488. https://doi.org/10.15517/rbt.v54i2.13894 [197]

Vargas-Castillo R (2008) Estomatópodos y decápodos (Crustacea), de la expedición RV Urraci-STRI (2005) en las costas del Pacífico central y norte de Costa Rica. Revista de Biología Tropical 56(Supplement 4): 105–112. [198]

Villalobos-Rojas F, Guzmán-Mora AG, Camacho-García YE (2008) Catalogue of the type material of mollusks deposited at the Zoology Museum, University of Costa Rica. The Nautilus 122: 155–165. [199]

Víquez R, Hargraves PE (2009) Phytoplankton. In: Wehrtmann IS, Cortés J (Eds) Marine Biodiversity of Costa Rica, Central America. Monographiae Biologicae, Volume 86. Spring-
Wehrtmann IS, Cortés J (Eds) (2009) Marine Biodiversity of Costa Rica, Central America. Monographiae Biologicae, Volume 86. Springer & Business Media BV, Berlin, 538 pp.
[List of species in accompanying Compact Disc: 500 pp]
Wehrtmann IS, Vargas R (2003) New records and range extensions of shrimps (Decapoda: Penaeoidea, Caridea) from the Pacific and Caribbean coasts of Costa Rica, Central America. Revista de Biología Tropical 51: 268–274. [201]
Wibbels T, Rostal DC, Byles R (1998) High pivotal temperature in the sex determination of the olive ridley sea turtle, Lepidochelys olivacea, from Playa Nancite, Costa Rica. Copeia 1998: 1086–1088. https://doi.org/10.2307/1447364 [202]
Wicksten MK (1983) Shallow water caridean shrimps of the Gulf of California, México. Allan Hancock Monographs on Marine Biology 13: 1–59. [203]
Wicksten MK, Hendrickx ME (2003) An updated checklist of benthic marine and brackish water shrimps (Decapoda: Penaeoidea, Stenopodidea, Caridea) from the Eastern Tropical Pacific. In: Hendrickx ME (Ed) Contributions to the Study of East Pacific Crustaceans, 2. [Contribuciones al estudio de los Crustáceos del Pacífico Este, 2]. Instituto de Ciencias del Mar y Limnología, UNAM, México DF, 49–76. [204]
Williams AB (1986) Mud shrimps, Upogebia, from the Eastern Pacific (Thalassinidea: Upogebiidae). San Diego Society of Natural History Memoir 14: 1–60. [205]
Woodcork J, Woodcork M (2007) Diversidad de especies, fidelidad al sitio de migración, y ecología de aves migratorias terrestres en los manglares de Costa Rica. Zeledonia 11: 1–13. [206]
Wynne MJ, Norris JN (1976) The genus Colpomenia Derbès et Solier (Phaeophyta) in the Gulf of California. Smithsonian Contributions to Botany 35: 1–18. https://doi.org/10.5479/si.0081024X.35 [207]
Zamora-Trejos P, Cortés J (2009) Los manglares de Costa Rica: Pacífico norte. Revista de Biología Tropical 57: 473–488. [208]
## Appendix

Marine species reported from Área de Conservación Guanacaste (ACG). Species in bold type reported only for the ACG in Costa Rica (in the case of bacteria some have been reported in people but not in marine organisms). Localities as in Figure 1 and Table 1. Localities in bold type = 1) Type locality, 2) Paratype locality and 3) Neotype specimen. References numbered as in the reference list.

| Phylum ACTINOBACTERIA, Class Actinobacteria, Order Actinomycetales, Family Corynebacteriaceae | Corynebacterium spp. | PNc | 183 |
|---|---|---|---|
| Phylum FIRMICUTES, Class Bacilli, Order Bacillales, Family Bacillaceae | Bacillus spp. | PNc | 183 |
| Order Lactobacillales, Family Enterococcaceae | Enterococcus faecalis (Orla-Jensen 1919) Schleifer & Kilpper-Bälz 1984 | PNc | 183 |
| Order Lactobacillales, Family Lactobacillaceae | Lactobacillus spp. | PNc | 183 |
| Order Bacillales, Family Staphylococcaceae | Staphylococcus aureus Rosenbach, 1884 | PNc | 183 |
| Phylum PROTEOBACTERIA, Class Betaproteobacteria, Order Burkholderiales, Family Alcaligenaceae | Alcaligenes faecalis Castellani & Chalmers, 1919 | PNc | 183 |
| Class Gammaproteobacteria, Order Aeromonadales, Family Aeromonadaceae | Aeromonas spp. | PNc | 183 |
| Order Enterobacteriales, Family Enterobacteriaceae | Citrobacter freundii (Braak 1928) Werkman & Gillen, 1932 | PNc | 183 |
| | Pantoea agglomerans (Ewing & Fife, 1972) as Enterobacter agglomerans | PNc | 183 |
| | Escherichia coli Castellani & Chalmers, 1919 | PNc | 183 |
| | Proteus mirabilis Hauser, 1885 | PNc | 183 |
| | Salmonella spp. | PNc | 183 |
| Order Pseudomonadales, Family Moraxellaceae | Acinetobacter spp. | PNc | 183 |
| Order Pseudomonadales, Family Pseudomonadaceae | Pseudomonas aeruginosa (Schroeter, 1872) Migula, 1900 | PNc | 183 |
| Phylum CYANOBACTERIA, Class Cyanophyceae, Order Chroococcales, Family Dermocarpellaceae | Cyanocystis violacea (P.L. Crouan & H.M. Crouan) Komárek & Anagnostidis, 1986 as Dermocarpa violacea | BSE | 188 |
| Order Chroococcales, Family Entophysalidaceae | Entophysalis granulosa Kützing, 1843 | BSE | 188 |
| Order Oscillatoriales, Family Oscillatoriaceae | Lyngbya semiplena J. Agardh ex Gomont, 1892 | BSE | 188 |
| Class Cyanophyceae | One species | BEH | 185 |
| Phylum CHLOROPHYTA, Class Ulvophyceae, Order Cladophorales, Family Cladophoraceae | Cladophora lehmanniana (Lindenberg) Kützing, 1843 as Cladophora utriculosa | BPG | 56, 57 |
| | Cladophora sp. | BSE | 128 |
### Species

| Species | Locality | References |
|---------|----------|------------|
| **Order Ulvales, Family Ulvaceae** | | |
| *Ulva flexuosa* Wulfen, 1803 as *Enteromorpha flexuosa* and as *Enteromorpha lingulata* | BSE | 57, 188 |
| *Ulva lactuca* Linnaeus, 1753 | BSE | 188 |
| *Ulva prolifera* O.F. Müller 1778 as *Enteromorpha prolifera var. flexuosa* | BSE | 57, 128 |
| *Ulva sp.* | Jun | 185 |

| Phylum OCHROPHYTA, Class Phaeophyceae | | |
| --- | --- | --- |
| **Order Dictyotales, Family Dictyotaceae** | *Padina sp.* | BPG | 58 |
| *Colpomenia durvillei* (Bory de Saint-Vincent) M.E. Ramírez, 1991 as *Colpomenia phaeodactyla* | BSE | 207 |
| *Colpomenia ramosa* W.R. Taylor, 1945 | BSE | 57, 188 |
| *Colpomenia sinuosa* (Mertens ex Roth) Derbès & Solier, 1851 | BSE | 57 |
| *Rovenvingea orientalis* (J. Agardh) Bergesen, 1914 | BPG | 56, 57 |

| Phylum RHODOPHYTA, Class Bangiophyceae, | | |
| --- | --- | --- |
| **Order Ectocarpales, Family Scytosiphonaceae** | *Sargassum liebmannii* J. Agardh 1847 | BSE | 184 |
| *Sargassum sp.* | BPG | 58 |
| *Bangia fuscopurpurea* (Dillwyn) Lyngbye, 1819 | BSE | 188 |
| *Pyropia thuretii* (Setchell & E.Y.Dawson) J.E. Sutherland, L.E. Aguilar Rosas & R. Aguilar Rosas, 2011 | BSE | 57 |

| Class Compsopogonophyceae, Order Erythropeltidales, Family Erythrotrichiaceae | | |
| --- | --- | --- |
| *Bostrychia sp.* | Jun | 185 |

| Class Florideophyceae, Order Acrochaetiaceae, | | |
| --- | --- | --- |
| **Order Ceramiales, Family Rhodomelaceae** | *Bostrychia sp.* | BPG | 58 |
| *Chondria dangeardii* E.Y. Dawson, 1949 as *Chondria platyclada* | BPG | 58 |
| *Ceramium avalonae* E.Y. Dawson, 1949 | BPG | 57 |
| *Ceramium personatum* | | |
| *Smithora naiadum* (G.L. Anderson) Hollenberg, 1959 as *Porphyra naiadum* | BSE | 188 |
| *Acrochaetium arcuatum* (K.M. Drew) C.K. Tseng, 1945 as *Acrochaetium penetrale* | BSE | 57, 188 |

| Division MAGNOLIOPHYTA, Class Magnoliopsida, Order Ericales, Family Tetrameristaceae | | |
| --- | --- | --- |
| *Pelliciera rhizophoreae* Triana & Planchon, 1862 | BSE | 128 |
| *Pelliciera rhizophoreae* Triana & Planchon, 1862 | MPG | 32, 128, 208 |
| *Pelliciera rhizophoreae* Triana & Planchon, 1862 | MPN | 176 |
| Species | Locality | References |
|---------|----------|------------|
| Avicennia bicolor Standley, 1923 | MJu | 32 |
| Avicennia bicolor Standley, 1923 | MCa | 32 |
| Avicennia bicolor Standley, 1923 | MSa | 32 |
| Avicennia bicolor Standley, 1923 | BSE | 128 |
| Avicennia bicolor Standley, 1923 | MPG | 32, 208 |
| Avicennia bicolor Standley, 1923 | MPN | 32, 208 |
| Avicennia germinans Linnaeus, 1764 | MJu | 32 |
| Avicennia germinans Linnaeus, 1764 | MCa | 32 |
| Avicennia germinans Linnaeus, 1764 | MSa | 32 |
| Avicennia germinans Linnaeus, 1764 | BSE | 128 |
| Avicennia germinans Linnaeus, 1764 | MPG | 32, 128, 208 |
| Avicennia germinans Linnaeus, 1764 as Avicennia tonduzii in reference 172 | MPN | 32, 116, 172, 206 |
| Avicennia spp. | MPN | 176 |
| Conocarpus erectus Linnaeus, 1753 | MJu | 32 |
| Conocarpus erectus Linnaeus, 1753 | MCa | 32 |
| Conocarpus erectus Linnaeus, 1753 | MSa | 32 |
| Conocarpus erectus Linnaeus, 1753 as Conocarpus erecta in reference 176 | MPN | 172, 176, 206 |
| Laguncularia racemosa (L.) Gärtnert, 1807 | MJu | 32 |
| Laguncularia racemosa (L.) Gärtnert, 1807 | MSa | 32 |
| Laguncularia racemosa (L.) Gärtnert, 1807 | BSE | 128 |
| Laguncularia racemosa (L.) Gärtnert, 1807 | MPG | 128, 208 |
| Laguncularia racemosa (L.) Gärtnert, 1807 | MPN | 172, 176, 206 |
| Rhizophora mangle Linnaeus, 1753 | MJu | 32 |
| Rhizophora mangle Linnaeus, 1753 | MCa | 32 |
| Rhizophora mangle Linnaeus, 1753 | MSa | 32 |
| Rhizophora mangle Linnaeus, 1753 | BSE | 128 |
| Rhizophora mangle Linnaeus, 1753 | MPG | 32, 128, 208 |
| Rhizophora mangle Linnaeus, 1753 | MPN | 32, 170, 208 |
| Rhizophora racemosa Meyer, 1818 | MJu | 32 |
| Rhizophora racemosa Meyer, 1818 | MCa | 32 |
| Rhizophora racemosa Meyer, 1818 | MSa | 32 |
| Rhizophora racemosa Meyer, 1818 | BSE | 128 |
| Rhizophora racemosa Meyer, 1818 | MPG | 32, 128, 208 |
| Rhizophora racemosa Meyer, 1818 | MPN | 32, 206, 208 |
| Rhizophora spp. | MPN | 176 |
| Ammoscalaria compressa (Cushman & McCulloch, 1939) as Ammodiscinctaria compressa | PBl | 50 |
| Haplophragmoides planissima Cushman, 1927 as Haplophragmoides planissimum | BSE | 50 |
| Labrospira columbiensis (Cushman, 1925) as Haplophragmoides columbiensis | PBl | 50 |
| Labrospira columbiensis (Cushman, 1925) as Haplophragmoides columbiensis | BSE | 50 |
| Order | Family | Species | Locality | References |
|-------|--------|---------|----------|------------|
| Order Lituolida, Family Lituolidae | | *Eratidus foliaceus* (Brady, 1881) as *Ammobaculites foliaceus* | PBl | 50 |
| | Order Lituolida, Family Reophacidae | *Reophax curtus* Cushman, 1920 | PBl | 50 |
| | | *Reophax scoriarius de Montfort, 1808* | BSE | 50 |
| | Order Lituolida, Family Nouriidae | *Nouria polymorphinoides* Heron-Allen & Earland, 1914 | BSE | 50 |
| | | *Nouria polymorphinoides* Heron-Allen & Earland, 1914 | PBl | 50 |
| | Order Lituolida, Family Remaneicidae | *Remaneica kellettae* (Thalmann, 1932) as *Trochammina kellettae* | BSE | 50 |
| | Order Lituolida, Family Remaneicidae | *Portatrochammina pacifica* (Cushman, 1925) as *Trochammina pacifica* | BSE | 50 |
| | Order Rotaliida, Family Bolivinitidae | *Bolivina pygmaea* (Brady, 1881) | PBl | 52 |
| | | *Loxostomina limbata* (Brady, 1881) as *Loxostoma limbatum* | BSE | 52 |
| | Order Rotaliida, Family Buliminellidae | *Buliminella elegantissima* (d’Orbigny, 1839) | PBl | 53 |
| | Order Rotaliida, Family Elphidiidae | *Elphidium seymourense* McCulloch, 1977 as *Elphidium crispum* var. *subcrispum* | PBl | 51 |
| | Order Rotaliida, Family Heterohelicidae | *Bifarina pacifica* Cushman & McCulloch, 1942 | BSE | 52 |
| | | *Sabula conica* (d’Orbigny, 1839) as *Textularia conica* | BSE | 127 |
| | | *Textularia calva* Lalicker, 1940 | BSE | 127 |
| | | *Textularia candeiiana d’Orbigny, 1839* | BSE | 127 |
| | | *Textularia candeiiana d’Orbigny, 1839* as *Loxostoma limbatum* | PBl | 127 |
| | | *Textularia corrugata* Herron-Allen & Earland, 1915 | PBl | 127 |
| | | *Textularia foliacea* Heron-Allen & Earland, 1915 | PBl | 127 |
| | | *Textularia panamensis* Cushman, 1918 | PBl | 127 |
| | | *Textularia secasesensis* Lalicker & McCulloch, 1940 | BSE | 127 |
| | | *Textularia secasesensis* Lalicker & McCulloch, 1940 | PBl | 127 |
| | Order Textulariida, Family Textulariidae | *Glomospira gordialis* (Jones & Parker, 1860) | BSE | 50 |
| | Class Tubothalamea, Order Spirilliniida, Family Ammodiscidae | *Lagenaria amphora* Reuss, 1863 | PBl | 54 |
| | | *Lagenari a striata* (d’Orbigny, 1839) | PBl | 54 |
| | Class incerta sedis, Order Lagenida, Family Lagenidae | *Antipathes* sp. | IMu | 7 |
| | Phylum CNIDARIA, Class Anthozoa, Orden Antipatharia, Family Antipathidae | *Eugorgia aurantiaca* (Horn, 1860) | IMu | 38 |
| | | *Eugorgia damiana* Verrill, 1868 | BSE | 11 |
| | | *Eugorgia rubens* Verrill, 1868 | IMu | 11, 18 |
| | Order Alcyonacea, Family Gorgoniidae | *Leptogorgia alba* (Duchassaing & Michelotti, 1864) | IBo | 11, 15, 38 |
| | | *Leptogorgia alba* (Duchassaing & Michelotti, 1864) | BSE | 11, 15, 38 |
| | | *Leptogorgia alba* (Duchassaing & Michelotti, 1864) | PBl | 7 |
| | | *Leptogorgia cofrini* Breedy & Guzman, 2005 | IMu | 7, 11, 15, 38 |
| | | *Leptogorgia foliacea* (Brady, 1881) | PBl | 50 |
| Order Alcyonacea, Family Gorgoniidae | Species | Locality | References |
|-------------------------------------|---------|----------|------------|
|                                     | Leptogorgia cupidata Verrill, 1865 | IMu 15    |            |
|                                     | Leptogorgia regis Hickson, 1928  | BSE 11, 15|            |
|                                     | Leptogorgia regis Hickson, 1928  | IMu 11, 15|            |
|                                     | Pacificgorgia firma Breedy & Guzman, 2003 | IMu 7, 11, 12, 13 |
| Order Alcyonacea, Family Plexauridae | Muricea austera Verrill, 1869 | PBr 17    |            |
|                                     | Muricea plantaginea (Valenciennes, 1846) | BSE 17   |            |
|                                     | Muricea squarrosa Verrill, 1869  | LDa 16    |            |
|                                     | Muricea sp.                       | ACG 38    |            |
| Order Actiniaria, Family Nemanthidae | Nemanthus californicus Carlgren, 1940 | IMu 72    |            |
|                                     | Gardineroseris planulata (Dana, 1846) | IMu 7, 42, 124 | |
|                                     | Pavona clavus (Dana, 1846)        | PSE 38, 39|            |
|                                     | Pavona clavus (Dana, 1846)        | PBl 7     |            |
|                                     | Pavona clavus (Dana, 1846)        | IMu 7, 41, 42, 124 | |
| Order Scleractinia, Family Agariciidae | Pavona gigantea Verrill, 1869 | PSE 38, 39, 43 | |
|                                     | Pavona gigantea Verrill, 1869     | PBl 7     |            |
|                                     | Pavona gigantea Verrill, 1869     | IMu 7, 42, 124 | |
|                                     | Pavona gigantea Verrill, 1869     | ACG 39, 41, 42 | |
|                                     | Pavona maldive (Gardiner, 1905)   | ACG 41    |            |
|                                     | Pavona varians Verrill, 1864       | IMu 7, 41 |            |
|                                     | Pavona varians Verrill, 1864       | ACG 41    |            |
| Order Scleractinia, Family Dendrophylliidae | Cladopsammia eguchii (Wells, 1982) | IMu 38    |            |
|                                     | Tubastreae coccinea Lesson, 1829 as Tubastrea tenuilamellosa | PBl 68 | |
|                                     | Tubastrea coccinea Lesson, 1829  | IDa 154   |            |
|                                     | Tubastrea coccinea Lesson, 1829  | BVi 154   |            |
|                                     | Tubastrea coccinea Lesson, 1829 as Tubastrea coccinea | PSE 38 | |
|                                     | Tubastrea coccinea Lesson, 1829 as Tubastrea coccinea | IMu 7, 42, 124 | |
|                                     | Tubastrea coccinea Lesson, 1829 as Tubastrea coccinea | ACG 39, 42 | |
| Order Scleractinia, Family Pocilloporidae | Pocillopora damicornis (Linnaeus, 1758) | PSE 43 | |
|                                     | Pocillopora damicornis (Linnaeus, 1758) | IMu 7, 41, 42, 124 | |
|                                     | Pocillopora damicornis (Linnaeus, 1758) | ACG 39, 41 | |
|                                     | Pocillopora elegans Dana, 1846     | BSE 7     |            |
|                                     | Pocillopora elegans Dana, 1846     | PBl 7     |            |
|                                     | Pocillopora elegans Dana, 1846     | IMu 41, 42, 124 | |
|                                     | Pocillopora elegans Dana, 1846     | ACG 39    |            |
| Order Scleractinia, Family Pocilloporidae | **Species** | **Locality** | **References** |
|----------------------------------------|-------------|--------------|---------------|
|                                       | *Pocillopora eydouxi* Milne Edwards & Haime, 1860 | ILC | 7, 39 |
|                                       | *Pocillopora eydouxi* Milne Edwards & Haime, 1860 | PSE | 41, 43 |
|                                       | *Pocillopora eydouxi* Milne Edwards & Haime, 1860 | IMu | 7, 41, 42, 124 |
|                                       | *Pocillopora eydouxi* Milne Edwards & Haime, 1860 | ACG | 39 |
| *Pocillopora inflata* Glynn, 1999, but see Paz-García et al. 2015 | *Pocillopora inflata* Glynn, 1999 | IMu | 42, 86 |
|                                       | *Pocillopora meandrina* Dana, 1846 | BSE | 38 |
|                                       | *Pocillopora meandrina* Dana, 1846 | PSE | 41 |
|                                       | *Pocillopora meandrina* Dana, 1846 | IMu | 7, 41 |
|                                       | *Pocillopora meandrina* Dana, 1846 | ACG | 39 |

| Order Scleractinia, Family Poritidae | **Species** | **Locality** | **References** |
|-------------------------------------|-------------|--------------|---------------|
|                                       | *Porites lobata* Dana, 1846 | PBl | 7 |
|                                       | *Porites lobata* Dana, 1846 | IMu | 7, 42, 124 |
|                                       | *Porites lobata* Dana, 1846 | ACG | 39 |
|                                       | *Porites panamensis* Verrill, 1866 | IMu | 42, 124 |
|                                       | *Porites panamensis* Verrill, 1866 | ACG | 39, 41, 42 |

| Order Scleractinia, Family Rhizangiidae | **Species** | **Locality** | **References** |
|---------------------------------------|-------------|--------------|---------------|
|                                       | *Oulangia bradleyi* Verrill, 1866 | ACG | 39 |

| Order Scleractinia, Family Siderastreidae | **Species** | **Locality** | **References** |
|------------------------------------------|-------------|--------------|---------------|
|                                       | *Psammocora stellata* (Verrill, 1866) | BSE | 7 |
|                                       | *Psammocora stellata* (Verrill, 1866) | PSE | 43 |
|                                       | *Psammocora stellata* (Verrill, 1866) | IMu | 7, 41, 42 |
|                                       | *Psammocora profundacella* Gardiner, 1898 as *Psammocora superficialis* | BSE | 7 |

| Class Hydrozoa, Order Anthothecata, Family Bougainvilliidae | **Species** | **Locality** | **References** |
|------------------------------------------------------------|-------------|--------------|---------------|
| *Garveia gracilis* (Clark, 1876) as *Bimeria gracilis* | *Garveia gracilis* (Clark, 1876) as *Bimeria gracilis* | BSE | 38, 76, 77 |

| Order Leptothecata, Family Aglaopheniidae | **Species** | **Locality** | **References** |
|------------------------------------------|-------------|--------------|---------------|
| *Aglaoaphenia trifida* Agassiz, 1862 as *Aglaoaphenia rigida* | *Aglaoaphenia trifida* Agassiz, 1862 as *Aglaoaphenia rigida* | PBl | 38, 76 |

| Order Leptothecata, Family Campanulariidae | **Species** | **Locality** | **References** |
|-------------------------------------------|-------------|--------------|---------------|
| *Clytia fasicularis* Fraser, 1938 | *Clytia fasicularis* Fraser, 1938 | PBl | 38, 77 |
| *Clytia gracilis* (Sars, 1850) as *Clytia cylindraria* and *Gonothyraea gracilis* | *Clytia gracilis* (Sars, 1850) as *Clytia cylindraria* and *Gonothyraea gracilis* | BSE | 38, 77 |
| *Clytia universitatis* Torrey, 1904 | *Clytia universitatis* Torrey, 1904 | BSE | 38, 77 |

| Order Leptothecata, Family Haleciidae | **Species** | **Locality** | **References** |
|--------------------------------------|-------------|--------------|---------------|
| *Halecium washingtoni* Nutting, 1901 | *Halecium washingtoni* Nutting, 1901 | BSE | 38, 77 |

| Order Leptothecata, Family Plumulariidae | **Species** | **Locality** | **References** |
|----------------------------------------|-------------|--------------|---------------|
| *Plumularia micronema* Fraser, 1938 as *Plummularia micronema* | *Plumularia micronema* Fraser, 1938 as *Plummularia micronema* | BSE | 38, 76 |
| *Plumularia micronema* Fraser, 1938 as *Plummularia micronema* | *Plumularia micronema* Fraser, 1938 as *Plummularia micronema* | PBl | 38, 76 |

| Order Leptothecata, Family Sertulariidae | **Species** | **Locality** | **References** |
|----------------------------------------|-------------|--------------|---------------|
| *Amphisbetia furcata* (Trask, 1857) as *Sertularia furcata* | *Amphisbetia furcata* (Trask, 1857) as *Sertularia furcata* | CSE | 76 |
| *Dynamena crisioides* Lamouroux, 1824 as *Thiaria tubuliformis* | *Dynamena crisioides* Lamouroux, 1824 as *Thiaria tubuliformis* | BSE | 38, 76, 77 |
| *Dynamena crisioides* Lamouroux, 1824 as *Thiaria tubuliformis* | *Dynamena crisioides* Lamouroux, 1824 as *Thiaria tubuliformis* | PBl | 38, 77 |
| *Sertularia distans* (Lamouroux, 1816) as *Sertularia stookeyi* | *Sertularia distans* (Lamouroux, 1816) as *Sertularia stookeyi* | CSE | 76 |

| Orden Siphonophorae, Familia Physaliidae | **Species** | **Locality** | **References** |
|----------------------------------------|-------------|--------------|---------------|
| *Physalia physalis* (Linnaeus, 1758) as *Physalia physalis* | *Physalia physalis* (Linnaeus, 1758) as *Physalia physalis* | IMu | 38 |

| Phylum PLATYHELMINTHES, Class Trematoda, Order Plagiorchiida, Family Acanthocolpidae | **Species** | **Locality** | **References** |
|-------------------------------------------------------------------------------------|-------------|--------------|---------------|
| *Stephanostomum casum* (Linton, 1910) | *Stephanostomum casum* (Linton, 1910) | Jun | 40, 159 |
| Order Plagiortchiida, Family Lecithasteridae | Species | Locality | References |
|---------------------------------------------|---------|----------|------------|
| Order Plagiortchiida, Family Hemiuridae | *Trifoliovum sp.* Yamaguti, 1940 as *Pseudelecithaster* | Cua | 159, 178 |
| Order Plagiortchiida, Family Lepocreadiidae | *Theletrum lamoothi* Pérez-Ponce de León, León-Régagnon & Monks, 1998 | Cua | 159, 178 |
| Class Cestoda, Order Onchoproteocephalidea, Family Onchobothriidae | *Hypocreadium myohelicatum* Bravo-Hollis & Manter, 1957 | Jun | 159 |
| Order Trypanorhyncha, Family Pterobothriidae | *Acanthobothrium franus* Marques, Centritto & Stewart, 1997 | Cua | 159, 178 |
| Phylum ACANTHOCEPHALA, Class Palaeacanthocephala, Order Illiosentidae | *Koronathula pectinaria* (Van Cleave, 1940) | Jun | 149, 178 |
| Phylum MOLLUSCA, Class Gastropoda, Subclass Heterobranchia, Order Unassigned, Family Acteonidae | *Acteon traskii* Stearns, 1897 | BSE | 191 |
| Order Cephalaspidea, Family Aglajidae | *Navanax aenigmaticus* Bergh, 1894 | BJu | 191 |
| Order Cephalaspidea, Family Bullidae | *Bulla punctulata* A. Adams in Sowerby, 1850 | Jun | 134 |
| Order Cephalaspidea, Family Cylchnidae | *Glychina atahualpa* (Dall, 1908) | BSE | 191 |
| Order Cephalaspidea, Family Haminoeidae | *Alys defuncta* (Baker & Hanna, 1927) | IDa | 191 |
| Order Cephalaspidea, Family Retusidae | *Retusa paziana* Dall, 1919 | IDa | 191 |

**Infraclass Opisthobranchia, Order Cephalaspidea, Family Acteociidae**

| Species | Locality | References |
|---------|----------|------------|
| *Acteocina carinata* (Carpenter, 1857) | IDa | 191 |
| *Acteocina carinata* (Carpenter, 1857) | IDa | 191 |
| *Acteocina carinata* (Carpenter, 1857) | BSE | 191 |
| *Acteocina carinata* (Carpenter, 1857) | BSE | 191 |
| *Acteocina infrequens* (C. B. Adams, 1852) | BJu | 191 |
| *Acteocina infrequens* (C. B. Adams, 1852) | BSE | 191 |
| *Acteocina infrequens* (C. B. Adams, 1852) | BSE | 191 |
| *Acteocina inbiorium* Marques, Centritto & Stewart, 1997 | BSE | 191 |

**Order Trypanorhyncha, Family Pterobothriidae**

| Species | Locality | References |
|---------|----------|------------|
| *Acanthobothrium franus* Marques, Centritto & Stewart, 1997 | Cua | 159, 178 |
| *Acanthobothrium inbiorium* Marques, Centritto & Stewart, 1997 | Cua | 159, 178 |
| *Acteon traskii* Stearns, 1897 | BSE | 191 |
| *Koronathula pectinaria* (Van Cleave, 1940) | Jun | 149, 178 |
| *Acteon traskii* Stearns, 1897 | BSE | 191 |
| *Acteon traskii* Stearns, 1897 | BSE | 191 |
| *Acteon traskii* Stearns, 1897 | BSE | 191 |
| *Acteon traskii* Stearns, 1897 | BSE | 191 |
| *Acteon traskii* Stearns, 1897 | BSE | 191 |
| *Acteon traskii* Stearns, 1897 | BSE | 191 |
| *Acteocina sp.* | BEH | 191 |
| *Navanax aenigmaticus* Bergh, 1894 | BJu | 191 |
| *Bulla punctulata* A. Adams in Sowerby, 1850 | Jun | 134 |
| Order Cephalaspidea, Family Rhizoridae | Species | Locality | References |
|---------------------------------------|---------|----------|------------|
|                                       | Volvulella cylindrica (Carpenter, 1864) | PJu | 191 |
|                                       | Volvulella cylindrica (Carpenter, 1864) | BSE | 191 |
|                                       | Volvulella cylindrica (Carpenter, 1864) | PBl | 191 |
|                                       | Volvulella cylindrica (Carpenter, 1864) | IMu | 191 |
|                                       | Volvulella cylindrica (Carpenter, 1864) | BPG | 191 |
|                                       | Volvulella cylindrica (Carpenter, 1864) | PNa | 191 |

| Order Nudibranchia, Family Discodorididae | Species | Locality | References |
|------------------------------------------|---------|----------|------------|
| Atagema notacristata Camacho-García & Gosliner 2008 | IMu | 22 |

| Order Nudibranchia, Family Fionidae | Species | Locality | References |
|------------------------------------|---------|----------|------------|
| Fiona pinnata (Eschscholtz, 1831) | BSE | 130 |

| Order Nudibranchia, Family Polyceridae | Species | Locality | References |
|---------------------------------------|---------|----------|------------|
| Limacia janssi (Bertsch & Ferreira, 1974) as Laila janssi | BSE | a, b | 8 |

| Order Sacoglossa, Family Plakobranchiadae | Species | Locality | References |
|------------------------------------------|---------|----------|------------|
| Elysia sp. | IMu | 23 |

| Infraclass Pulmonata, Order Unassigned, Family Siphonariidae | Species | Locality | References |
|-------------------------------------------------------------|---------|----------|------------|
| Siphonaria gigas Sowerby, 1825 | CSE | 130 |
| Siphonaria gigas Sowerby, 1825 | Jun | 185 |

| Infraclass Unassigned, Family Pyramidellidae | Species | Locality | References |
|---------------------------------------------|---------|----------|------------|
| Eulimastoma dotella (Dall & Bartsch, 1909) as Odostomia (Tellod) subdotella | BSE | 114 |
| Odostomia costaricana Hertlein & Strong, 1951 as Odostomia (Chrysalida) costaricana | BSE | 114 |
| Odostomia nicoyana Hertlein & Strong, 1951 as Odostomia (Menestha) nicoyana | BSE | 114 |
| Odostomia woodbridgei Hertlein & Strong, 1951 as Odostomia (Chrysalida) woodbridgei | BSE | 114 |
| Odostomia (Besle) caneloensis Hertlein & Strong, 1951 | BSE | a | 114 |
| Turbonilla amiriana Hertlein & Strong, 1951 as Turbonilla (Pyrgiscus) amiriana | BSE | 114 |
| Turbonilla ayamana Hertlein & Strong, 1951 as Turbonilla (Pyrgiscus) ayamana | BSE | 114 |
| Turbonilla biolleyi Hertlein & Strong, 1951 as Turbonilla (Pyrgiscus) biolleyi | BSE | 114 |
| Turbonilla ekidana Hertlein & Strong, 1951 as Turbonilla (Pyrgiscus) ekidana | BSE | 114 |
| Turbonilla guanacastensis Hertlein & Strong, 1951 as Turbonilla (Pyrgiscus) guanacastensis | BSE | 114 |
| Turbonilla nicoyana Hertlein & Strong, 1951 as Turbonilla (Pyrgiscus) nicoyana | BSE | 114 |
| Turbonilla portoparkerensis Hertlein & Strong, 1951 as Turbonilla (Pycheulimella) portoparkerensis | BSE | 114 |
| Turbonilla sulacana Hertlein & Strong, 1951 as Turbonilla (Pyrgiscus) sulacana | BSE | 114 |
| Turbonilla templetonis Hertlein & Strong, 1951 as Turbonilla (Pyrgiscus) templetonis | BSE | 114 |
| Turbonilla utuana Hertlein & Strong, 1951 as Turbonilla (Pyrgiscus) utuana | BSE | 114 |
| Turbonilla zacae Hertlein & Strong, 1951 as Turbonilla (Pyrgiscus) zacae | BSE | 114 |

| Subclass Caenogastropoda, Order Littorinimorpha, Family Cypraeidae | Species | Locality | References |
|------------------------------------------------------------------|---------|----------|------------|
| Pseudozonaria arabicula (Lamarck, 1810) as Zonaria (Zonaria) arabicula | IMu | 26 |

| Order Littorinimorpha, Family Ficidae | Species | Locality | References |
|-------------------------------------|---------|----------|------------|
| Ficus ventricosa (G. B. Sowerby I, 1825) | IMu | 130 |
| Order Littorinimorpha, Family Littorinidae | Species | Locality | References |
|------------------------------------------|---------|----------|------------|
| Echinolittorina atrata (C. B. Adams, 1852) as Nodilittorina atrata | PSE | 174 |
| Echinolittorina fuscolineata (Reid, 2002) as Nodilittorina fuscolineata | IMu | 174 |
| Echinolittorina modesta (Philippi, 1846) as Littorina modesta | IMu | 130 |
| Echinolittorina peruviana (Lamarck, 1822) as Littoraria zebra | MCa | 32 |
| Echinolittorina peruviana (Lamarck, 1822) as Littoraria (Littoraria) zebra | MSa | 32 |
| Echinolittorina peruviana (Lamarck, 1822) as Littoraria zebra | BSE | 173 |
| Echinolittorina peruviana (Lamarck, 1822) as Littoraria zebra | PPG | 32, 208 |
| Echinolittorina peruviana (Lamarck, 1822) as Littoraria zebra | MPN | 32, 208 |

| Order Littorinimorpha, Family Personidae | Species | Locality | References |
|-----------------------------------------|---------|----------|------------|
| Distorsio decusata (Valenciennes, 1832) | IMu | 130 |

| Order Littorinimorpha, Family Rissoinidae | Species | Locality | References |
|------------------------------------------|---------|----------|------------|
| Zebinella alarconi (Hertlein & Strong, 1951) as Rissoina alarconi | BSE | 114 |

| Order Littorinimorpha, Family Strombidae | Species | Locality | References |
|----------------------------------------|---------|----------|------------|
| Persististrombus granulatus (Swainson, 1822) as Strombus granulatus Swainson, 1822 | IMu | 130 |
| Anticlimax willetti Hertlein & Strong, 1951 as Anticlimax (Subclimax) willetti | BSE | 114 |
| Aorotrema humboldti (Hertlein & Strong, 1951) as Cyclostremiscus humboldti | BSE | 114 |
| Teinostoma herbertianum Hertlein & Strong, 1951 as Teinostoma herbertiana | BSE | 114 |
| Teinostoma zacae Hertlein & Strong, 1951 | BSE | 114 |
| Anachis fluctuata (G. B. Sowerby I, 1832) as Anachis (Parvanachis) fluctuata | IMu | 130 |
| Anachis pardalis (Hinds, 1843) as Anachis (Parvanachis) carmen | IMu | 130 |
| Clavistrombina clavulus (G. B. Sowerby I, 1834) | BSE | 125 |
| Cosmosconcha rehderi (Hertlein & Strong, 1951) as Anachis rehderi | BSE | 114 |
| Cotonopsis hirundo (Gaskoin, 1852) as Cotonopsis (Turrina) hirundo | BSE | 125 |
| Mazatlania fulgurata (Philippi, 1846) as Terebra moorenbeeki | PNa | 4, 9 |
| Sincola dorsata (G. B. Sowerby I, 1832) as Sincola (Dorsina) dorsata | BSE | 125 |
| Strombina elegans (G. B. Sowerby I, 1832) as Strombina (Spinatia) elegans | BSE | 125 |
| Sincola gibberula (G. B. Sowerby I, 1832) as Sincola (Dorsina) gibberula | BSE | 125 |
| Strombina elegans (G. B. Sowerby I, 1832) as Strombina (Spinatia) elegans | PBI | 125 |
| Strombina elegans (G. B. Sowerby I, 1832) as Strombina (Spinatia) elegans | IMu | 125 |
| Strombina maculosa (G. B. Sowerby I, 1832) as Strombina (Spinatia) maculosa | BSE | 125 |
| Strombina maculosa (G. B. Sowerby I, 1832) as Strombina (Spinatia) maculosa | IMu | 125 |

| Order Neogastropoda, Family Columbellidiae | Species | Locality | References |
|-------------------------------------------|---------|----------|------------|
| Sincola gibberula (G. B. Sowerby I, 1832) as Strombina (Spinatia) gibberula | BSE | 125 |
| Strombina maculosa (G. B. Sowerby I, 1832) as Strombina (Spinatia) maculosa | IMu | 125 |
| Species | Locality | References |
|---------|----------|------------|
| **Order Neogastropoda, Family Columbellidae** | | |
| *Strombina pulcherrima* (G. B. Sowerby I, 1832) as *Strombina* (*Linastrombina*) *pulcherrima* | BSE | 125 |
| *Strombina pulcherrima* (G. B. Sowerby I, 1832) as *Strombina* (*Linastrombina*) *pulcherrima* | IMu | 125 |
| *Strombina recurva* (G. B. Sowerby I, 1832) as *Strombina* (*Recurvina*) *recurva* | BSE | 125 |
| *Strombina recurva* (G. B. Sowerby I, 1832) as *Strombina* (*Recurvina*) *recurva* | PBl | 125 |
| *Strombina recurva* (G. B. Sowerby I, 1832) as *Strombina* (*Recurvina*) *recurva* | BPG | 125 |
| *Strombina solidula* (Reeve, 1859) as *Strombina* (*Linastrombina*) *solidula* – doubtful record | BSE | 125 |

| Species | Locality | References |
|---------|----------|------------|
| **Order Neogastropoda, Family Conidae** | | |
| *Conasprella lucida* (W. Wood, 1828) as *Conus lucidus* Wood, 1828 | BSE | 93 |
| *Conasprella perplexa* (G. B. Sowerby II, 1857) as *Conus perplexus* | BSE | 93 |
| *Conasprella tornata* (G. B. Sowerby I, 1833) as *Conus tornatus* | BSE | 93 |
| *Conus brunneus* Wood, 1828 | IMu | 93 |
| *Conus dalli* Stearns, 1873 | BSE | 93 |
| *Conus fergusoni* G. B. Sowerby II, 1873 | BSE | 93 |
| *Conus gladiator* Broderip, 1833 | BSE | 93 |
| *Conus recurvus* Broderip, 1833 | BSE | 93 |
| *Conus vittatus* Hwass in Bruguière, 1792 | BSE | 93 |

| Species | Locality | References |
|---------|----------|------------|
| **Order Neogastropoda, Family Fasciolariidae** | | |
| *Fusinus dupetitthouarsi* (Kiener, 1840) | IMu | 130 |
| *Opeatostoma pseudodon* (Burrow, 1815) | IMu | 130 |
| *Pustulatirus hemphilli* (Hertlein & Strong, 1951) as *Latirus hemphilli* | BSE | 114 |
| *Pustulatirus mediamericanus* (Hertlein & Strong, 1951) as *Latirus mediamericanus* | BSE | 114 |

| Species | Locality | References |
|---------|----------|------------|
| **Order Neogastropoda, Family Marginellidae** | | |
| *Dentinargo zetetes* Roth, 1978 | BSE | 181 |
| *Prunum aletes* Roth, 1978 as *Prunum* (*microspira*) *aletes* | BSE | 181 |
| *Prunum aletes* Roth, 1978 as *Prunum* (*microspira*) *aletes* | CSE | 181 |
| *Prunum aletes* Roth, 1978 as *Prunum* (*microspira*) *aletes* | IMu | 181 |
| *Prunum lizanoi* Magaña, Espinosa & Ortea, 2003 | BJu | 133, 199 |

| Species | Locality | References |
|---------|----------|------------|
| **Order Neogastropoda, Family Muricidae** | | |
| *Acanthina sp.* | CSE | 130 |
| *Murexul zeteki* (Hertlein & Strong, 1951) as *Muricopsis zeteki* | BSE | 114 |
| *Plicopurpura columellaris* (Lamarck, 1816) as *Purpura pansa* | CSE | 130 |
| *Vasula melones* (Duclos, 1832) | BEH | 185 |

| Species | Locality | References |
|---------|----------|------------|
| **Order Neogastropoda, Family Pseudomelatomidae** | | |
| *Crassispira xanti* Hertlein & Strong, 1951 | BSE | 114 |

| Species | Locality | References |
|---------|----------|------------|
| **Order Neogastropoda, Family Cerithiopsidae** | | |
| *Cerithiopsis guanacastensis* Hertlein & Strong, 1951 | BSE | 114 |
| *Seila kanoni* (de Folin, 1867) | BSE | 69 |
| *Seila montereyensis* Bartsch, 1907 | CSE | 69 |

| Species | Locality | References |
|---------|----------|------------|
| **Order Neogastropoda, Family Potamididae** | | |
| *Cerithideopsis californica* (Haldeman, 1840) as *Cerithidea valida* | MCa | 32 |
| Order Unassigned, Family Potamididae | Species | Locality | References |
|--------------------------------------|---------|----------|------------|
|                                      | *Cerithideopsis californica* (Haldeman, 1840) **as** *Cerithidea valida* | MSa | 32 |
|                                      | *Cerithideopsis californica* (Haldeman, 1840) **as** *Cerithidea valida* | PPG | 32, 203 |
|                                      | *Cerithideopsis californica* (Haldeman, 1840) **as** *Cerithidea valida* | MPN | 30, 208 |
| Subclass Neritimorpha, Order Cycloneritimorpha, Family Neritidae | *Nerita costata* Gmelin, 1791 **as** *Nerita scabricosta* | BSE | 128 |
|                                      | *Nerita costata* Gmelin, 1791 **as** *Nerita scabricosta* | IMu | 130 |
| Subclass Vetigastropoda, Order Unassigned, Family Scissurellidae | *Scissurella kaiserii* Geiger, 2006 | CSE | 85 |
| Class Bivalvia, Subclass Heterodonta, Order Cardiida, Family Cardiidae | *Americardia biangulata* (Broderip & G. B. Sowerby I, 1829) **as** *Cardium biangulatum* | BSE | 109 |
|                                      | *Laevicardium substriatum* (Conrad, 1837) **as** *Cardium alenense* | BSE | 109 |
|                                      | *Lophocardium annectae* (Dall, 1889) **as** *Cardium annectae* | BSE | 109 |
|                                      | *Microcardium paxianum* (Dall, 1916) **as** *Cardium paxianum* | BSE | 109 |
|                                      | *Trachycardium consors* (G. B. Sowerby I, 1833) **as** *Cardium consors* | BSE | 109 |
|                                      | *Trachycardium procerum* (G. B. Sowerby I, 1833) **as** *Cardium procerum* | BSE | 109 |
|                                      | *Trigoniocardia granifera* (Broderip & G. B. Sowerby I, 1829) **as** *Cardium graniferum* | BSE | 109 |
| Order Cardiida, Family Psammobilidae | *Heterodonax bimaculatus* (Linnaeus, 1758) **as** *Heterodonax bimaculata* | BSE | 113 |
|                                      | *Cumingia lamellosa* G. B. Sowerby I, 1833 | BSE | 112 |
| Order Cardiida, Family Semelidae | *Semele jovis* (Reeve, 1853) | BSE | 112 |
|                                      | *Semele pallida* (G. B. Sowerby I, 1833) **as** *Semele simplicissima* | BSE | 112 |
|                                      | *Semele verrucosa* Mörch, 1860 as *Semele pacifica* | BSE | 112 |
| Order Cardiida, Family Solecurtidae | *Tagelus affinis* (C. B. Adams, 1852) **as** *Tagelus* (*Tagelus*) *affinis* | BSE | 113 |
|                                      | *Tagelus politus* (Carpenter, 1857) **as** *Tagelus* (*Mesopleura*) *politus* | BSE | 113 |
|                                      | *Gymatoica undulata* (Hanley, 1844) **as** *Macoma* (*Gymatoica*) *undulata* | BSE | 111 |
|                                      | *Macoma panamensis* Dall, 1900 **as** *Macoma* (*Psammacoma*) *panamensis* | BSE | 111 |
|                                      | *Tellina amianta* Dall, 1900 **as** *Tellina* (*Moerella*) *amianta* | BSE | 111 |
| Order Cardiida, Family Tellinidae | *Tellina inaequisstriata* Donovan, 1802 **as** *Tellina* (*Eurytellina*) *inaequilaterata* | BSE | 111 |
|                                      | *Tellina marticenise* d’Orbigny, 1853 **as** *Tellina* (*Merisca*) *proclivis* | BSE | 111 |
|                                      | *Tellina pristiphora* Dall, 1900 **as** *Tellina* (*Phyllophora*) *pristiphora* | BSE | 111 |
|                                      | *Tellina pruna* Hanley, 1844 **as** *Tellina* (*Eurytellina*) *pruna* | BSE | 111 |
|                                      | *Tellina rubescens* Hanley, 1844 **as** *Tellina* (*Eurytellina*) *rubescens* | BSE | 111 |
|                                      | *Tellina tabagensis* Salisbury, 1934 **as** *Tellina* (*Moerella*) *recursa* | BSE | 111 |
| Order Carditida, Family Carditidae | Species | Locality | References |
|----------------------------------|---------|----------|------------|
| Carditamera affinis (G. B. Sowerby I, 1833) as Cardita (Carditamera) affinis | BSE | 108 |
| Carditamera radiata (G. B. Sowerby I, 1833) as Cardita (Carditamera) radiata | BSE | 108 |
| Cardites laticostatus (G. B. Sowerby I, 1833) as Cardita tricolor | BSE | 108 |
| Strophocardia megastrophata (J.E. Gray, 1825) as Cardita megastrophata | BSE | 108 |
| Order Carditida, Family Condylocolardiidae | Condylocardia sparsa Coan, 2003 | CSE | 29 |
| Order Carditida, Family Crassatellidae | Crassinella pacifica (C. B. Adams, 1852) | BSE | 108 |
| Eucrassatella antillarum (Reeve, 1842) as Crassatellites (Hybolophus) digueti | BSE | 108 |
| Eucrassatella gibbosa (G. B. Sowerby I, 1832) as Crassatellites (Hybolophus) gibbosus | BSE | 108 |
| Order Lucinida, Family Lucinidae | Codakia distinguenda (Tryon, 1872) | BSE | 108 |
| Ctena mexicana (Dall, 1901) | BSE | 108 |
| Liralucina approximata (Dall, 1901) as Lucina (Parvilucina) approximata | BSE | 108 |
| Radiolucina cancellaris (Philippi, 1846) as Lucina (Bellucina) cancellaris | BSE | 108 |
| Order Myida, Family Corbulidae | Caryocorbula biradiata (G. B. Sowerby I, 1833) as Aloidis (Caryocorbula) biradiata | BSE | 113 |
| Caryocorbula marmorata (Hinds, 1843) as Aloidis (Caryocorbula) marmorata | BSE | 113 |
| Caryocorbula nasuta (G. B. Sowerby I, 1833) as Aloidis (Caryocorbula) nasuta | BSE | 113 |
| Order Myida, Family Pholadidae | Jouannetia pectinata (Conrad, 1849) as Jouannetia (Triomphalia) pectinata | BSE | 113 |
| Agriopoma catharium (Dall, 1902) as Pitar (Pitarella) mexicanus | BSE | 110 |
| Anomalocardia subimbricata (Sowerby, 1835) | BSE | 110 |
| Chione compta (Broderip, 1835) as Chione (Chione) compta | BSE | 110 |
| Cyclinella subquadrita (Hanley, 1844) | BSE | 110 |
| Dosinia dunkeri (Philippi, 1844) as Dosinia (Dosinidia) dunkeri | BSE | 110 |
| Dosinia ponderosa (Gray, 1838) as Dosinia (Dosinidia) ponderosa | BSE | 110 |
| Gouldia Californica Dall, 1917 | BSE | 110 |
| Order Venerida, Family Veneridae | Iliochnoe subrugosa (W. Wood, 1828) as Anomalocardia subrugosa | BSE | 110 |
| Leukoma asperrima (G. B. Sowerby I, 1835) as Chione (Nioche) asperrima | BSE | 110 |
| Lirophora mariae (d’Orbigny, 1846) as Chione (Lirophora) mariae | BSE | 110 |
| Megapitaria aurantiaca (G. B. Sowerby I, 1831) | BSE | 110 |
| Megapitaria squalida (G. B. Sowerby I, 1835) | BSE | 110 |
| Periglypta multicostata (G. B. Sowerby I, 1835) as Antigona (Periglypta) multicostata | BSE | 110 |
| Pitar consanguineus (C. B. Adams, 1852) as Pitar (Pitar) consanguineous | BSE | 110 |
| Pitar unicolor (Sowerby, 1835) | IMu | 130 |
| Protothaca grata (Say, 1830) | MCa | 32 |
| Species                                      | Locality | References |
|----------------------------------------------|----------|------------|
| **Order Venerida, Family Veneridae**          |          |            |
| *Protothaca grata* (Say, 1830)               | MSa      | 32         |
| *Protothaca grata* (Say, 1830) as *Protothaca* (Callithaca) grata | BSE  | 110        |
| *Protothaca grata* (Say, 1830)               | MPG      | 32         |
| *Protothaca grata* (Say, 1830)               | MPN      | 32         |
| **Order Unassigned, Family Chamidae**         |          |            |
| *Arcinella californica* (Dall, 1903) as *Echinochama californica* | BSE  | 108        |
| *Chama echinata* Broderip, 1835               | Jun      | 185        |
| **Order Unassigned, Family Galeommatidae**    |          |            |
| *Bellascintilla parmaleaeana* Coney, 1990    | PNa      | 31         |
| **Order Unassigned, Family Ungulinidae**     |          |            |
| *Diplodonta semirugosa* Dall, 1899 as *Taras semirugosus* | BSE  | 109        |
| *Diplodonta subquadrata* Carpenter, 1856 as *Taras subquadratus* | BSE  | 109        |
| **Subclass Protobranchia, Order Nuculanida, Family Nuculanidae** | | |
| *Saccella elenensis* (G. B. Sowerby I, 1833) as *Nuculana* (Saccella) elenensis | BSE  | 105        |
| *Saccella impar* (Pilsbry & Lowe, 1932) as *Nuculana* (Saccella) impar | BSE  | 105        |
| *Saccella laeviradius* (Pilsbry & Lowe, 1932) as *Nuculana* (Saccella) laeviradius | BSE  | 105        |
| **Subclass Pteriomorphia, Order Arcida, Family Arcidae** | | |
| *Acar gradata* (Broderip & Sowerby, 1829) as *Arca* (Arca) gradata | BSE  | 105        |
| *Acar gradata* (Broderip & Sowerby, 1829) as *Arca* (Arca) gradata | PBl    | 180        |
| *Anadara biangulata* (G. B. Sowerby I, 1833) as *Arca* (Anadara) biangulata | BSE  | 106        |
| *Anadara nux* (G. B. Sowerby I, 1833) as *Arca* (Cunearca) nux | BSE  | 106, 180   |
| *Anadara perlabiata* (Grant & Gale, 1931) as *Arca* (Cunearca) perlabiata | BSE  | 106        |
| *Anadara reihartii* (Lowe, 1935) as *Arca* (Anadara) reihartii | BSE  | 106        |
| *Anadara reihartii* (Lowe, 1935) as *Arca* (Scapharca) reihartii | BSE  | 180        |
| *Anadara tuberculosa* (G. B. Sowerby I, 1833) | MCa     | 32         |
| *Anadara tuberculosa* (G. B. Sowerby I, 1833) | MSa     | 32         |
| *Anadara tuberculosa* (G. B. Sowerby I, 1833) | PPG     | 32, 208    |
| *Anadara tuberculosa* (G. B. Sowerby I, 1833) | MPN     | 32         |
| *Arca mutabilis* (G. B. Sowerby I, 1833) as *Arca* (Arca) mutabilis | BSE  | 106, 180   |
| *Arca mutabilis* (G. B. Sowerby I, 1833) as *Arca* (Arca) mutabilis | PBl    | 180        |
| *Barbatia illota* (G. B. Sowerby I, 1833) as *Arca* (Fugleria) illota | PBl    | 180        |
| *Calloarca alternata* (G. B. Sowerby I, 1833) as *Arca* (Calloarca) alternata | BSE  | 106        |
| *Larkinia grandis* (Broderip & G. B. Sowerby I, 1829) as *Grandiarca grandis* | MCa  | 32         |
| *Larkinia grandis* (Broderip & G. B. Sowerby I, 1829) as *Arca* (Larkinia) grandis | BSE  | 106        |
| *Larkinia grandis* (Broderip & G. B. Sowerby I, 1829) as *Grandiarca grandis* | MPG    | 32, 208    |
| *Larkinia grandis* (Broderip & G. B. Sowerby I, 1829) as *Grandiarca grandis* | MPN    | 32         |
| Species | Locality | References |
|---------|----------|------------|
| *Larkinia multicostata* (G. B. Sowerby I, 1833) as *Anadara multicostata* | MCa | 32 |
| *Larkinia multicostata* (G. B. Sowerby I, 1833) as *Anadara multicostata* | MSa | 32 |
| *Larkinia multicostata* (G. B. Sowerby I, 1833) as *Arca* (*Larkinia*) *multicostata* | BSE | 106 |
| *Larkinia multicostata* (G. B. Sowerby I, 1833) as *Anadara multicostata* | MPG | 32, 204 |
| *Larkinia multicostata* (G. B. Sowerby I, 1833) as *Anadara multicostata* | MPN | 32 |

| Species | Locality | References |
|---------|----------|------------|
| *Tucetona strigilata* (G. B. Sowerby I, 1833) as *Glycymeris* (*Tuceta*) *tessellata strigilata* and as *Glycymeris* (*Tuceta*) *tessellata* | BSE | 106 |

| Species | Locality | References |
|---------|----------|------------|
| *Arcopsis solida* (G. B. Sowerby I, 1833) as *Arca* (*Arcopsis*) *solida* | BSE | 106 |
| *Arcopsis solida* (G. B. Sowerby I, 1833) | PBl | 180 |

| Species | Locality | References |
|---------|----------|------------|
| *Limaria orbignyi* (Lamy, 1930) as *Lima* (*Limaria*) *orbignyi* | BSE | 107 |

| Species | Locality | References |
|---------|----------|------------|
| *Amygdalum americanum* Soot-Ryen, 1955 | PBl | 186 |
| *Brachidontes adamiensis* (Dunker, 1856) as *Hormomya adamiiana* | BSE | 186 |
| *Brachidontes punctarensis* (Pilsbry & Lowe, 1932) | BSE | 186 |
| *Brachidontes* sp. | Jun | 185 |
| *Crenella divaricata* (Orbigny, 1853) | BSE | 107, 186 |
| *Leiosolenus aristatus* (Dillwyn, 1817) as *Lithophaga* (*Myoforceps*) *aristata* | BSE | 107, 186 |
| *Leiosolenus aristatus* (Dillwyn, 1817) as *Lithophaga* (*Myoforceps*) *aristata* | PBl | 186 |
| *Leiosolenus attenuatus* (Deshayes, 1836) as *Lithophaga* (*Labis*) *attenuata* | BSE | 107, 186 |
| *Leiosolenus attenuatus* (Deshayes, 1836) as *Lithophaga* (*Labis*) *attenuata* | PBl | 186 |
| *Leiosolenus plumula* (Hanley, 1843) as *Lithophaga* (*Diberus*) *plumula* | BSE | 107, 186 |
| *Leiosolenus plumula* (Hanley, 1843) as *Lithophaga* (*Diberus*) *plumula* | PBl | 186 |
| *Modiolus capax* (Conrad, 1837) as *Volsella* (*Volsella*) *capax* in reference 107 | BSE | 107, 186 |
| *Modiolus capax* (Conrad, 1837) | PBl | 186 |
| *Mytilus* sp. | MCa | 32 |
| *Mytilus* sp. | MSa | 32 |
| *Mytilus* sp. | MPG | 32 |
| *Mytilus* sp. | MPN | 32 |
| *Septifer zeteki* Hertlein & Strong, 1946 | BSE | 186 |
| *Crassostrea corteziensis* (Hertlein, 1951) | MPG | 208 |
| *Saccostrea palmula* (Carpenter, 1857) | Jun | 185 |
| *Saccostrea palmula* (Carpenter, 1857) | BSE | 107 |
| *Pinna rugosa* G. B. Sowerby I, 1835 | BSE | 106 |
| *Pinctada mazatlanica* (Hanley, 1856) | BSE | 106 |
| *Pinctada mazatlanica* (Hanley, 1856) | IMu | 7 |
| *Pteria sterna* (Gould, 1851) | IMu | 7 |
| Order Pectinida, Family Anomiidae | Species | Locality | References |
|----------------------------------|---------|----------|------------|
|                                  | Placunomia cumingii, Broderip, 1832 | BSE | 107 |
| Order Pectinida, Family Pectinidae | Argopecten irradians concentricus (Say, 1822) as Pecten (Plagiopecten) circularis | BSE | 107 |
|                                  | Euvola vogdesi (Arnold, 1906) as Pecten (Pecten) vogdesi | BSE | 107 |
|                                  | Leopecten sericeus (Hinds, 1845) as Pecten (Pecten) sericeus | BSE | 107 |
|                                  | Leptopecten biolleyi (Hertlein & Strong, 1946) as Pecten (Leptopecten) velero biolleyi | BSE | 107 |
| Order Pectinida, Family Pectinidae | Nodipecten subnodosus (G. B. Sowerby I, 1835) as Pecten (Lyropecten) subnodosus | BSE | 104, 107 |
| Order Pectinida, Family Pectinidae | Cyclopecten pernomus, Hertlein, 1935 | BSE | 107 |
| Order Eunicida, Family Eunicidae | Antillesoma antillarum (Grube & Oersted 1858) | Jun | 185 |
| Order Eunicida, Family Eunicidae | Antillesoma antillarum (Grube & Oersted 1858) | IMu | 55, 59 |
| Order Eunicida, Family Eunicidae | Phascolosoma (Phascolosoma) perlucens, Baird, 1868 | IMu | 59 |
| Order Eunicida, Family Eunicidae | Phascolosoma sp. | Jun | 185 |
| Order Eunicida, Family Eunicidae | Sipunculus (Sipunculus) nudus, Linnaeus, 1766 | Jun | 185 |
| Order Eunicida, Family Eunicidae | Eurythoe complanata (Pallas, 1776) in reference 95 | BSE | 60, 95, 189 |
| Order Eunicida, Family Eunicidae | Notoppygos ornata, Grube, 1856 | BSE | 189 |
| Order Eunicida, Family Eunicidae | Notoppygos ornata, Grube, 1856 | PBl | 60, 95 |
| Order Eunicida, Family Eunicidae | Hermodice carunculata (Pallas, 1766) | BSE | 60, 189 |
| Order Eunicida, Family Eunicidae | Nicidion mutilata (Webster, 1884) as Eunice mutilata | BSE | 60, 96 |
| Order Eunicida, Family Eunicidae | Palola siciliensis (Grube, 1840) | BSE | 60, 96, 94 |
| Order Eunicida, Family Lumbrineridae | Scolotoma tetrata (Schmarda, 1861) as Lumbrineris tetrata | BSE | 60, 96 |
| Order Eunicida, Family Oenonidae | Oenone fulgida (Savigny in Lamarck, 1818) as Aglaura fulgida in reference 96 | BSE | 60, 96 |
| Order Eunicida, Family Oenonidae | Oenone fulgida (Savigny in Lamarck, 1818) as Aglaura fulgida in reference 96 | PBl | 60, 96 |
| Order Eunicida, Family Onuphidae | Diopatra tridentata, Hartman, 1944 | BSE | 60, 96 |
| Order Eunicida, Family Onuphidae | Hyalinoeciajuvenalis, Moore, 1911 | BSE | 60, 96, 189 |
| Order Eunicida, Family Onuphidae | Hyalinoecia juvenalis, Moore, 1911 | PBl | 60 |
| Order Phyllodocida, Family Glyceraeidae | One species | PJu | 185 |
| Order Phyllodocida, Family Iphionidae | Iphione ovata, Kinberg, 1855 | BSE | 60, 94 |
| Order Phyllodocida, Family Nereididae | One species | PJu | 185 |
| Order Phyllodocida, Family Polynoidae | Lepidasthenia varius, Treadwell, 1917 as Lepidasthenia picta in reference 189 | BSE | 60, 189 |
| Order Phyllodocida, Family Sigalionidae | Pelogenia antipoda, Schmarda, 1861 as Psammodocia antipoda (Schmarda) anoculata | PBl | 60, 94 |
| Order Phyllodocida, Family Sigalionidae | Sigalion lewisii, Berkeley & Berkeley, 1939 as Thalenissa lewisii | BSE | 94 |
| Order Phyllodocida, Family Sigalionidae | Sthenelais fusca, Johnson 1897 as Stenelais variabilis colorata | BSE | 94 |
| Subclass Sedentaria, Order Spionida, Family Magelonidae | Species | Locality | References |
|--------------------------------------------------------|---------|----------|------------|
|                                                        | Magelona sp. | PJu | 185 |
| Order Terebellida, Family Terebellidae                  | One species | PJu | 185 |
|                                                        | Lanicola guillermoi Capa & Hutchings, 2006 | BEH | 185 |
|                                                        | Terebella gorgonae Monro, 1933 | BSE | 60, 189 |
| Order Unassigned, Family Chaetopteridae                 | One species | PJu | 185 |
| Order Unassigned, Family Opheliidae                     | Armandia maculata (Webster, 1884) as Ammotrypane bermudensis | BSE | 60, 189 |
| Phylum NEMERTEA                                        | One species | PJu | 185 |
|                                                        | Ampelisca brevisimulata Barnard, 1954 | BSE | 5 |
|                                                        | Ampelisca cristata Holmes, 1908 | BSE | 5 |
|                                                        | Ampelisca hancocki Barnard, 1954 | BSE | 5 |
|                                                        | Ampelisca lobata Holmes, 1908 | BSE | 5 |
|                                                        | Ampelisca milleri Barnard, 1954 | BSE | 5 |
|                                                        | Ampelisca milleri Barnard, 1954 | PBl | 5 |
|                                                        | Ampelisca pugetica Stimpson, 1864 as Ampelisca pugetica forma macrodentata | BSE | 5 |
|                                                        | Ampelisca romigi Barnard, 1954 as Ampelisca isocornea | BSE | 5 |
|                                                        | Ampelisca schellenbergi Shoemaker, 1933 | PBl | 5 |
|                                                        | Ampelisca venetiensis Shoemaker, 1916 | BSE | 5 |
| Order Amphipoda, Family Aoridae                         | Paramicrodeutopus schmitti (Shoemaker, 1942) as Microdeutopus schmitti | PBl | 152 |
| Order Amphipoda, Family Neomegamphopidae               | Neomegamphopus roosevelti Shoemaker, 1942 | PBl | 152 |
| Order Amphipoda, Family Phoxocephalidae                | Microphoxus minimus Barnard, 1954 | PBl* | 5, 6 |
| Order Amphipoda, Family Unciolidae                     | Acuminodendopodites periculosus Barnard, 1969 as Acuminodendopodites heteruropus | PBl | 152 |
| Order Cumacea, Family Bodotriidae                      | Several unidentifed species | IMu | 75 |
| Order Decapoda, Family Albuneidae                      | Lepidopa mearnsi Benedict, 1904 | PNa | 197 |
|                                                        | Alpheus aequus Kim & Abele, 1988 | PBl* | 126, 204 |
|                                                        | Alpheus cylindricus Kingsley, 1878 | BSE | 126 |
|                                                        | Alpheus galapagensis Sivertsen, 1933 as Alpheus canalis Kim & Abele, 1988 | BSE | 126 |
|                                                        | Alpheus galapagensis Sivertsen, 1933 as Alpheus canalis Kim & Abele, 1988 | PBl | 126 |
|                                                        | Alpheus hebes Kim & Abele, 1988 | BSE | 126 |
|                                                        | Alpheus hebes Kim & Abele, 1988 | PBl | 126 |
|                                                        | Alpheus longinquis Kim & Abele, 1988 | BSE | 126 |
|                                                        | Alpheus longinquis Kim & Abele, 1988 | PBl | 126 |
|                                                        | Alpheus normanni Kingsley, 1878 | BSE | 126 |
|                                                        | Alpheus panamensis Kingsley, 1878 | CSE | 196 |
|                                                        | Alpheus paracrinus Miers, 1881 | PBl | 126 |
|                                                        | Alpheus rostratus Kim & Abele, 1988 | BSE | 126, 204 |
|                                                        | Alpheus sulcatus Kingsley, 1870 | CSE | 196 |
|                                                        | Alpheus umbro Kim & Abele, 1988 | BSE | 126 |
|                                                        | Alpheus sp. | BEH | 185 |
|                                                        | Pomagnathus corallinus Chace, 1962 | BSE | 196 |
|                                                        | Pomagnathus corallinus Chace, 1962 | PBl | 202 |
|                                                        | Synalpheus digueti Coutière, 1909 | BSE | 202 |
| Order Decapoda, Family Axiidae | Species | Locality | References |
|-------------------------------|---------|----------|------------|
|                               | Axiopsis serratifrons (H. Milne-Edwards, 1873) | IMu | 196 |
|                               | Calappa convexa Saussure, 1853 | BSE | 81 |
|                               | Calappa saussurei (Rathbun, 1898) | BSE | 198 |
|                               | Cryptosoma bairdii (Stimpson, 1860) as Cycloes bairdii | BSE | 82 |
|                               | Cryptosoma bairdii (Stimpson, 1860) as Cycloes bairdii | IMu | 82 |
|                               | Platymera gaudichaudii H. Milne-Edwards, 1837 as Mursia gaudichaudii | CSE | 129 |
|                               | Platymera gaudichaudii H. Milne-Edwards, 1837 | IMu | 198 |
| Order Decapoda, Family Calappidae | Callianidei mariamartae Hernáez & Vargas, 2013 | IMu | 102 |
|                               | Paracallianide laevicauda (Gill, 1859) as Callianidea laevicauda | PBl | 196 |
| Order Decapoda, Family Coenobitidae | Coenobita compressus H. Milne Edwards, 1837 | IMu | 197 |
| Order Decapoda, Family Dairidae | Dairia americana Stimpson, 1860 | BSE | 47 |
| Order Decapoda, Family Daldorfiidae | Daldorfa trigona (A. Milne-Edwards, 1869) as Daldorfa garthi | BSE | 47 |
|                               | Aniculus elegans Stimpson, 1858 | IMu | 197 |
| Order Decapoda, Family Domeciidae | Cherusius triungulatus (Borradaile, 1902) as Maldivia galapagensis | BSE | 83 |
| Order Decapoda, Family Dromiidae | Hypoconcha panamensis Smith, 1869 | BSE | 82 |
|                               | Moreinadromia sarraburei (Rathbun, 1910) | BSE | 198 |
| Order Decapoda, Family Dynomenidae | Hirsutodynomene ursula (Stimpson, 1860) as Dynomena ursula Stimpson, 1860 | IMu | 151 |
|                               | Herbstia pubescens Stimpson, 1871 | BSE | 80 |
|                               | Herbstia pubescens Stimpson, 1871 | PBl | 79 |
|                               | Macrocoeloma maccullochae Garth, 1940 | BSE | 79, 80 |
| Order Decapoda, Family Epialtidae | Microlissa aurivilliusi (Rathbun, 1898) as Lissa aurivilliusi | BSE | 80 |
|                               | Pelia tumida (Lockington, 1877) | PBl | 79 |
| Order Decapoda, Family Eriphiidae | Eriphia squamata Stimpson, 1859 | BSE | 47 |
|                               | Eriphides hispida (Stimpson, 1860) | BSE | 47 |
| Order Decapoda, Family Ethusidae | Ethusa lata Rathbun, 1893 | BSE | 81 |
| Order Decapoda, Family Geocarcinidae | Geocarcinus lividus (Milne Edwards, 1837) | BSE | 160 |
| Order Decapoda, Family Grapsidae | Pachygrapsus transversus (Gibbes, 1850) | BSE | 47 |
| Order Decapoda, Family Hippidae | Species | Locality | References |
|--------------------------------|---------|----------|------------|
|                                | Emerita rathbunae Schmitt, 1935 | Jun | 197 |
| Order Decapoda, Family Hippolytidae | Hippolyte williamsi Schmitt, 1924 | IMu | 201 |
|                                | Lysmata argentiopunctata Wicksten, 2000 | IMu | 201, 204 |
|                                | Trachycaris restricta (Milne-Edwards, 1878) | BSE | 196 |
| Order Decapoda, Family Hippolytidae | Eriocerodes angulatus (Finnegan, 1931) as Podochela angulata | BSE | 79 |
|                                | Eriocerodes angulatus (Finnegan, 1931) as Podochela angulata | BSE | 80 |
| Order Decapoda, Family Inachidae | Eriocerodes veleronis (Garth, 1948) as Podochela veleronis | PBl | 79 |
| Order Decapoda, Family Inachidae | Eucinetops panamensis Rathbun, 1923 | BSE | 47 |
| Order Decapoda, Family Inachidae | Eucinetops panamensis Rathbun, 1923 | PBl | 79 |
| Order Decapoda, Family Inachidae | Podochela ziesenhennei Garth, 1940 | PBl | 79 |
| Order Decapoda, Family Inachoididae | Podochela ziesenhennei Garth, 1940 | PBl | 79 |
| Order Decapoda, Family Leucosiidae | Collodes teniurostris Rathbun, 1894 | IMu | 198 |
| Order Decapoda, Family Leucosiidae | Euprognatha bifida Rathbun, 1893 | BSE | 80 |
| Order Decapoda, Family Leucosiidae | Inachoides laevis Stimpson, 1860 | BSE | 79 |
| Order Decapoda, Family Leucosiidae | Inachoides laevis Stimpson, 1860 | BSE | 80 |
| Order Decapoda, Family Leucosiidae | Inachoides laevis Stimpson, 1860 | BSE | 80 |
| Order Decapoda, Family Leucosiidae | Paradasygus depressus (Bell, 1835) | BSE | 79 |
| Order Decapoda, Family Leucosiidae | Pyromaia tuberculata (Lockington, 1877) | IMu | 198 |
| Order Decapoda, Family Leucosiidae | Stenobrychus debilis (Smith, 1871) | BSE | 79 |
| Order Decapoda, Family Leucosiidae | Stenobrychus debilis (Smith, 1871) | PBl | 79 |
| Order Decapoda, Family Leucosiidae | Stenobrychus debilis (Smith, 1871) | BSE | 80 |
| Order Decapoda, Family Majidae | Eba die magdaleneensis Rathbun, 1933 | BSE | 82 |
| Order Decapoda, Family Majidae | Leuconula jurinii (Saussure, 1853) | BSE | 82 |
| Order Decapoda, Family Majidae | Lithadia cumingii Bell, 1855 | BSE | 82 |
| Order Decapoda, Family Majidae | Persephona subovata (Rathbun, 1894) as Llaccantha hancocki | BSE | 82 |
| Order Decapoda, Family Majidae | Randallia aparicaria Rathbun, 1898 | BSE | 82 |
| Order Decapoda, Family Majidae | Maiopsis panamensis Faxon, 1893 | IMu | 198 |
| Order Decapoda, Family Mithracidae | Ala cornuta (Stimpson, 1860) as Anaptychus cornutus | BSE | 47 |
| Order Decapoda, Family Mithracidae | Ala cornuta (Stimpson, 1860) | BSE | 79, 80 |
| Order Decapoda, Family Mithracidae | Ala cornuta (Stimpson, 1860) | PBl | 79 |
| Order Decapoda, Family Mithracidae | Hemus finneganae Garth, 1958 | BSE | 80 |
| Order Decapoda, Family Mithracidae | Microphrys branchialis Rathbun, 1898 | BSE | 79 |
| Order Decapoda, Family Mithracidae | Microphrys platysoma (Stimpson, 1860) | BSE | 47 |
| Order Decapoda, Family Mithracidae | Mithraculus denticulatus (Bell, 1835) as Mithrax denticulatus | BSE | 47 |
| Order Decapoda, Family Mithracidae | Mithraculus denticulatus (Bell, 1835) as Mithrax denticulatus | PBl | 79 |
| Order Decapoda, Family Mithracidae | Mithrax tuberculatus Stimpson, 1860 | PBl | 79 |
| Order Decapoda, Family Mithracidae | Petramithrax pygmaeus Bell, 1836 as Mithrax pygmaeus | BSE | 47, 80 |
| Order Decapoda, Family Mithracidae | Pitho picteti (Saussure, 1853) | PBl | 79 |
| Order Decapoda, Family Mithracidae | Pitho picteti (Saussure, 1853) | BSE | 80 |
| Order Decapoda, Family Mithracidae | Pitho quinquedentata Bell, 1835 | BSE | 80 |
| Order Decapoda, Family Mithracidae | Pitho sexdentata Bell, 1835 | BSE | 47 |
| Order Decapoda, Family Mithracidae | Telephrys cristulipes Stimpson, 1860 | BSE | 47, 79 |
| Order Decapoda, Family Mithracidae | Telephrys cristulipes Stimpson, 1860 | PBl | 79 |
| Order Decapoda, Family Mithracidae | Thoe eroa Bell, 1835 as Thoe sulcata panamensis | BSE | 47, 79 |
| Order Decapoda, Family Mithracidae | Thoe eroa Bell, 1835 as Thoe sulcata panamensis | PBl | 79 |
| Order Decapoda, Family Munididae | Species | Locality | References |
|----------------------------------|---------|----------|------------|
|                                   | Pleuroncodes planipes Stimpson, 1860 | CSE | 129 |
|                                   | Ocypode gaudichaudi Milne Edwards & Lucas, 1843 | BPG | 44, 46 |
|                                   | Uca (Leptuca) deichmanni Rathbun, 1935 as Uca deichmanni | BSE | 45 |
|                                   | Uca (Leptuca) latimanus (Rathbun, 1894) as Uca latimanus | BSE | 45 |
|                                   | Uca (Leptuca) panamensis (Stimpson, 1859) as Uca panamensis | BSE | 45 |
|                                   | Uca (Leptuca) sternodactyla (H. Milne Edwards & Lucas, 1843) as Uca sternodactyla | BSE | 45 |
|                                   | Uca (Leptuca) terpsichores Crane, 1941 as Uca terpsichores | BSE | 45 |
|                                   | Uca (Minuca) brevifrons (Stimpson, 1860) as Uca brevifrons | BSE | 45 |
|                                   | Uca sp. | MCa | 32 |
|                                   | Uca sp. | MSa | 32 |
|                                   | Uca sp. | MPG | 32, 208 |
|                                   | Uca sp. | MPN | 32 |

| Orden Decapoda, Family Ocypodidae | Species | References |
|----------------------------------|---------|------------|
|                                   | Epixanthus tenuidactylus (Lockington, 1877) as Ozius tenuidactylus | BSE | 47 |
|                                   | Ozius verreauxii Saussure, 1853 | BSE | 47 |

| Order Decapoda, Family Paguridae | Species | References |
|----------------------------------|---------|------------|
| Pagurus vetaultae Harvey & McLaughlin, 1991 | BSE | 97 |
| Pagurus virgulatus Haig & Harvey, 1991 | BSE | 92, 197 |

| Order Decapoda, Family Palaemonidae | Species | References |
|-------------------------------------|---------|------------|
| Ancylomenes lucasi (Chace, 1937) as Periclimenes lucasi | PBl | 118 |
| Brachycarpus biunguiculatus (Lucas, 1846) | BSE | 119 |
| Brachycarpus biunguiculatus (Lucas, 1846) | BSE | 119 |
| Brachycarpus biunguiculatus (Lucas, 1846) | IMu | 196 |
| Fennera chacei Holthuis, 1951 | BSE | 118 |
| Periclimenes infraspinis (Rathbun, 1902) as Periclimenaeus infraspinis | BSE | 118, 202, 204 |
| Periclimenes marcielagensis Vargas, 2000 | IMu | 194, 204 |
| Pontonia margarita Smith, 1869 | BSE | 118 |
| Pontonia margarita Smith, 1869 | PBl | 118 |
| Pontonia margarita Smith, 1869 | IMu | 196 |
| Pontonia simplex Holthuis, 1951 | BSE | 196 |
| Waldola schmitti Holthuis, 1951 | IMu | 196 |

| Order Decapoda, Family Panopeidae | Species | References |
|-----------------------------------|---------|------------|
| Eurypanopeus planus (Smith, 1869) | BSE | 47 |
| Eurypanopeus transversus (Stimpson, 1860) | BSE | 47 |
| Hexapanopecus costaricensis Garth, 1940 | BSE | 78, 81 |
| Hexapanopecus ornatus Rathbun, 1930 | BSE | 81 |
| Hexapanopecus sinaloensis Rathbun, 1930 | BSE | 81 |
| Malacoplax californiensis (Lockington, 1877) as Sprocarcinus californiensis | BSE | 81 |
| Species | Locality | References |
|---------|----------|------------|
| Celatopesia hassleri (Rathbun, 1925) as Cryptopodia hassleri | BSE | 79, 80 |
| Celatopesia hassleri (Rathbun, 1925) as Cryptopodia hassleri | PBl | 79 |
| Heterocrypta macrobrachia Stimpson, 1871 | BSE | 79 |
| Hypolambrus hyponcus (Stimpson, 1871) as Pathenope (Pathenope) hyponca | PBl | 79 |
| Mesorhoa bellii (A. Milne-Edwards, 1878) | BSE | 198 |
| Solenolambrus arcuatus Stimpson, 1871 | BSE | 79, 80 |
| Solenolambrus arcuatus Stimpson, 1871 | PBl | 79 |
| Spinolambrus exilipes (Rathbun, 1893) as Parthenope exilipes | IMu | 198 |
| Leptochela (Leptochela) serratorbita Spence Bate, 1888 as Leptochela serratorbita | BSE | 202, 204 |
| Metapenaeopsis beebei (Burkenroad, 1938) | BSE | 198 |
| Penaeus sp. as Pennaeus | MCa | 32 |
| Penaeus sp. as Pennaeus | MSa | 32 |
| Penaeus sp. as Pennaeus | MPG | 32, 208 |
| Penaeus sp. as Pennaeus | MPN | 32 |
| Pilumnus pygmaeus Boone, 1927 | BSE | 47, 81 |
| Glassella costaricana (Wicksten, 1982) | BEH | 185 |
| Euceramus transversilineatus (Lockington, 1878) | PMo | 197 |
| Euceramus transversilineatus (Lockington, 1878) | BSE | 90 |
| Megalobrachium pacificum Gore & Abele, 1973 | BEH | 197 |
| Megalobrachium pacificum Gore & Abele, 1973 | PBl | 87 |
| Pachycheles biocellatus (Lockington, 1878) | BSE | 90 |
| Pachycheles vicarius Nobili, 1901 | BSE | 90 |
| Petrolisthes agassizii Faxon, 1893 | PJu | 197 |
| Petrolisthes agassizii Faxon, 1893 | BSE | 91 |
| Petrolisthes armatus (Gibbes, 1850) | Jun | 197 |
| Petrolisthes armatus (Gibbes, 1850) | BSE | 91 |
| Petrolisthes artifrons Haig, 1960 | BSE | 90 |
| Petrolisthes edwardsii (de Saussure, 1853) | Jun | 197 |
| Petrolisthes edwardsii (de Saussure, 1853) | BSE | 90 |
| Petrolisthes edwardsii (de Saussure, 1853) | PBl | 90 |
| Petrolisthes glasselli Haig, 1957 | BSE | 90, 91 |
| Petrolisthes haige Chace, 1962 | Jun | 197 |
| Petrolisthes haige Chace, 1962 | BSE | 91 |
| Petrolisthes haige Chace, 1962 | PSE | 197 |
| Petrolisthes hians Nobili, 1902 | BSE | 90, 91 |
| Petrolisthes holotrichus Nobili, 1901 | BSE | 90 |
| Petrolisthes lewisi Glassell, 1936 as Petrolisthes lewisi australinus | BSE | 90, 100 |
| Petrolisthes lewisi Glassell, 1936 | PBl | 197 |
| Petrolisthes nobili Haig, 1960 | BSE | 90 |
| Petrolisthes nobili Haig, 1960 | PBl | 197 |
| Petrolisthes ortmanni Nobili, 1901 | BSE | 90, 91 |
| Petrolisthes ortmanni Nobili, 1901 | PBl | 90 |
| Petrolisthes platymerus Haig, 1960 | BSE | 90, 101 |
### Order Decapoda, Family Porcellanidae

| Species                                      | Locality | References |
|----------------------------------------------|----------|------------|
| *Petrolisthes platymerus* Haig, 1960         | PBl      | 197        |
| *Petrolisthes polymitus* Glassell, 1937      | PBl      | 90         |
| *Petrolisthes tonsorius* Haig, 1960          | BSE      | 90         |
| *Petrolisthes tridentatus* Stimpson, 1859    | BSE      | 90, 91     |
| *Petrolisthes magdalenensis* (Glassell, 1936) | Jun     | 197        |
| *Petrolisthes magdalenensis* (Glassell, 1936) | BSE      | 90, 91     |
| *Petrolisthes magdalenensis* (Glassell, 1936) | PBl      | 90         |
| *Polyonyx nitidus* Lockington, 1878         | BJu      | 197        |
| *Porcellana cancrisocialis* Glassell, 1936   | BSE      | 90, 91     |

| Species                                      | Locality | References |
|----------------------------------------------|----------|------------|
| *Porcellana pugilicornis* Glassell, 1936     | BSE      | 90, 91     |

### Order Decapoda, Family Portunidae

| Species                                      | Locality | References |
|----------------------------------------------|----------|------------|
| *Achelous asper* (A. Milne-Edwards, 1861)    | BSE      | 81         |
| as *Portunus (Portunus) panamensis*          |          |            |
| *Achelous tuberculatus* Stimpson, 1860       | BSE      | 81         |
| as *Portunus (Acheolus) tuberculatus*        |          |            |
| *Arenaeus mexicanus* (Gerstaecker, 1856)     | IMu      | 81         |
| *Arenaeus mexicanus* (Gerstaecker, 1856)     | BPg      | 81         |
| *Callinectes arcuatus* Ordway, 1863          | BSE      | 81         |
| *Cronius ruber* (Lamarck, 1818)              | BSE      | 81         |
| *Portunus (Portunus) acuminatus* (Stimpson, 1871) | BSE | 78, 81, 198 |
| *Portunus (Portunus) asper* (A. Milne-Edwards, 1861) | IMu | 81 |
| *Portunus (Portunus) asper* (A. Milne-Edwards, 1861) | IMu | 81 |

### Order Decapoda, Family Pseudorhomobilidae

| Species                                      | Locality | References |
|----------------------------------------------|----------|------------|
| *Lophoxanthus lamellipes* (Stimpson, 1869)   | BSE      | 47         |

### Order Decapoda, Family Sesarmidae

| Species                                      | Locality | References |
|----------------------------------------------|----------|------------|
| *Aratus pisonii* (H. Milne Edwards, 1837)    | BSE      | 47         |
| *Sicyonia diadorsalis* (Burkenroad, 1934)    | PNa      | 196        |
| *Sicyonia disedwardsi* (Burkenroad, 1934)    | PMo      | 196        |

### Order Decapoda, Family Sicyoniidae

| Species                                      | Locality | References |
|----------------------------------------------|----------|------------|
| *Sicyonia laevigata* Stimpson, 1871          | BSE      | 196        |
| *Sicyonia laevigata* Stimpson, 1871          | IMu      | 196        |
| *Sicyonia martini* Pérez-Farfante & Boothe, 1981 | IDa     | 196        |
| *Sicyonia martini* Pérez-Farfante & Boothe, 1981 | IMu     | 198        |
| *Sicyonia martini* Pérez-Farfante & Boothe, 1981 | PNa     | 196        |
| *Sicyonia picta* Faxon, 1893                 | PNa      | 196        |

### Order Decapoda, Family Solenoceridae

| Species                                      | Locality | References |
|----------------------------------------------|----------|------------|
| *Solenocera florae* Burkenroad, 1938         | PBr      | 196        |

### Order Decapoda, Family Trapezidae

| Species                                      | Locality | References |
|----------------------------------------------|----------|------------|
| *Trapezia bidentata* (Forskål, 1775) as *Trapezia cymodoce ferruginea* | BSE | 47 |

### Order Decapoda, Family Upogebiidae

| Species                                      | Locality | References |
|----------------------------------------------|----------|------------|
| *Upogebia dawsoni* Williams, 1986            | BPG      | 205        |

### Order Decapoda, Family Xanthidae

| Species                                      | Locality | References |
|----------------------------------------------|----------|------------|
| *Cataleptodius taboganus* Rathbun, 1912 as *Leptodius taboganus* | BSE | 47 |
| *Cycloanthops vitatus* (Stimpson, 1860)      | BSE      | 47         |
| *Edwardsium lobipes* Rathbun, 1898 as *Medeus lobipes* in reference 81 | BSE | 81, 198 |
| *Heteractaea lunata* (Lucas, in H. Milne Edwards & Lucas, 1844) | BSE | 47 |
| *Liomer cinetimans* (White, 1847) as *Carpilodes cinetimans* | BSE | 47 |
| *Microcassiope xantusii* (Stimpson, 1871) as *Micropanope xantusii* | BSE | 47 |
| *Penactaea sulcata* (Stimpson, 1860) as *Actaea sulcata* | BSE | 47 |

**Marine biodiversity baseline for Área de Conservación Guanacaste, Costa Rica...**
| Order                      | Species                                                                 | Locality | References |
|---------------------------|-------------------------------------------------------------------------|----------|------------|
| Order Decapoda, Family Xanthidae | *Platyactaea dovii* (Stimpson, 1871) as *Actaea dovii*                  | BSE      | 47, 81     |
|                           | *Williamstimpsonia stimpsoni* (Milne Edwards, 1879) as *Xanthodius stimpsoni* | BSE      | 47         |
|                           | *Xanthodius sternberghii* Stimpson, 1859                                 | BSE      | 47         |
| Order Mysida, Family Mysidae  | *Chlamydopleon banneri* (Bacescu, 1968) as *Boumaniella banneri*       | IMu      | 98         |
|                           | Several species                                                          | IMu      | 171        |
| Order Stomatopoda, Family Xanthidae  | *Neogonodactylus bahiabondensis* (Schmitt, 1940) as *Lysiosquilla decemspinosa* | PSE      | 195        |
|                           | *Neogonodactylus bahiabondensis* (Schmitt, 1940)                        | IMu      | 195        |
| Order Stomatopoda, Family Gonodactylidae | *Neogonodactylus costaricensis* (Manning & Reaka, 1979)     | BSE      | 136        |
|                           | *Neogonodactylus festae* (Nobili, 1901)                                 | BSE      | 136        |
|                           | *Neogonodactylus zacae* (Manning, 1972)                                 | PMo      | 195        |
| Order Stomatopoda, Family Nannosquillidae | *Nannosquilla decemspinosa* (Rathbun, 1910)    | PBl      | 135        |
| Order Stomatopoda, Family Pseudosquillidae | *Pseudosquillisma adiastalta* Manning, 1964                        | CSE      | 195        |
| Order Stomatopoda, Family Squillidae | *Crenatosquilla ocellinova* (Glassell, 1942)                        | CSE      | 195        |
|                           | *Squilla biformis* Bigelow, 1891                                        | CSE      | 129, 195   |
|                           | *Squilla panamensis* Bigelow, 1891                                      | CSE      | 195        |
| Order Tanaidacea, Family Leptochoeliidae | Several species                                                        | IMu      | 99         |
| Order Tanaidacea, Family Parapseudidae | *Parapseudes latifrons* (Grube, 1864) as *Parapseudes pedispinus* | BSE      | 148        |
|                           | *Parapseudes latifrons* (Grube, 1864) as *Parapseudes pedispinus*     | PBl      | 148        |
| Order Tanaidacea, Family Tanaididae | Several species                                                         | IMu      | 99         |
| Class Maxillopoda, Subclass | *Acartia (Acartia) negilignes* Dana, 1849 as *Acartia (Planktacartia) negilignes* | IMu      | 187        |
| Copepoda, Family Acartiidae | *Amphibalanus inexpectatus* Pilsbry, 1916 as *Balanus inexpectatus*   | Jun      | 185        |
| Class Maxillopoda, Infraclass | *Chthamalus panamensis* Pilsbry, 1916                                | CSE      | 27, 163    |
| Cirripedia, Order Sessilia, Family Balanidae | *Microeuraphia imperatrix* Pilsbry, 1916                             | CSE      | 27         |
| Order Sessilia, Family Tetaclitidae | *Tetraclita stalactifera* Lamarch, 1818                             | Jun      | 185        |
| Phylum BRYOZOA, Class Gymnolaemata, Order Chelostomatida, Family Bugulidae | *Sessibugula translucens* Osburn, 1950                              | BSE      | 156        |
| Order Chelostomatida, Family Exechonellidae | *Anexechona ancorata* Osburn, 1950                                   | BSE      | 156        |
| Order Chelostomatida, Family Phidoloporidae | *Rhynchozoon rostratum* Busk, 1855                                   | PBl      | 157        |
| Order Chelostomatida, Family Schizoporellidae | *Schizoporella inarmata* Hincks, 1884 as *Schizoporella linearis var. inarmata* | BSE      | 157        |
| Class Stenolaemata, Order Cyclostomatida, Family Crisiidae | Species | Locality | References |
|-------------|-------------|-----------|------------|
| Order Cyclostomatida, Family Lichenoporididae | *Crisia occidentalis* Trask, 1857 | BSE | 158 |
| Order Cyclostomatida, Family Tubuliporididae | *Diaperoforma californica* (d’Orbigny, 1853) as *Diaperoecia californica* | PBl | 158 |
| Order Cyclostomatida, Family Unassigned | *Disporella californica* (d’Orbigny, 1853) as *Diaperoecia californica* | BSE | 158 |
| Order Cyclostomatida, Family Lichenoporididae | *Disporella californica* (d’Orbigny, 1853) | BSE | 158 |
| Order Cyclostomatida, Family Unassigned | *Tubulipora pulchra* MacGillivray, 1885 | BSE | 158 |

| Phylum ECHINODERMATA, Class Asteroidea, Order Valvatida, Family Orestasteridae | *Pentaceraster cumingi* (Gray, 1840) as *Oreaster occidentalis* | BSE | 28 |
| Phylum ECHINODERMATA, Class Echinoidea, Order Camarodonta, Family Holothuridae | *Echinometra vanbrunti* A. Agassiz, 1863 | BSE | 157 |
| Phylum ECHINODERMATA, Class Echinoidea, Order Dendrochirotida, Family Cucumariidae | *Afrocucumis ovulum* (Selenka, 1867) as *Euthyonidium ovulum* | BSE | 61 |
| Order Aspidochirotida, Family Holothuridae | *Holothuria* (Cystipus) rigida (Selenka, 1867) as *Fossoburia rigida* | PBl | 63 |
| Order Aspidochirotida, Family Holothuridae | *Holothuria* (Haloeilla) kefersteini (Selenka, 1867) as *Ludwigothuria kefersteini* | PBl | 63 |
| Order Dendrochirotida, Family Cucumariidae | *Holothuria* (Selenkothuria) lubrica Selenka, 1867 | BSE | 63 |
| Order Dendrochirotida, Family Cucumariidae | *Holothuria* (Semperothuria) languens Selenka, 1867 as *Semperothuria languens* | PBl | 63 |
| Order Dendrochirotida, Family Cucumariidae | *Holothuria* (Thymiosycia) arenicola Semper, 1868 as *Brandothuria arenicola* | BSE | 63 |
| Order Dendrochirotida, Family Cucumariidae | *Holothuria* (Thymiosycia) arenicola Semper, 1868 as *Brandothuria arenicola* | PBl | 63 |
| Order Dendrochirotida, Family Cucumariidae | *Holothuria* (Thymiosycia) impatiens (Forskal, 1775) as *Brandothuria impatiens* | BSE | 63 |

| Order Dendrochirotida, Family Sclerodactylidae | *Afrocucumis ovulum* (Selenka, 1867) as *Euthyonidium ovulum* | BSE | 61 |
| Order Dendrochirotida, Family Sclerodactylidae | *Neothyone gibber* (Selenka, 1867) | BSE | 62 |
| Order Dendrochirotida, Family Sclerodactylidae | *Neothyone gibber* (Selenka, 1867) | BSE | 62 |
| Order Phlebobranchia, Family Ascidiidae | *Didemnum mosselii* (Herdman, 1886) as *Didemnum mosseleyi* | IDa | 154 |
| Order Phlebobranchia, Family Ascidiidae | *Didemnum mosselii* (Herdman, 1886) as *Didemnum mosseleyi* | BVi | 154 |
| Order Aplousobranchia, Family Didemmidae | *Lissoclinum caulleryi* (Ritter & Forsyth, 1917) | IDa | 154 |
| Order Aplousobranchia, Family Didemmidae | *Lissoclinum caulleryi* (Ritter & Forsyth, 1917) | BVi | 154 |
| Order Phlebobranchia, Family Ascididae | *Ascidia ceratodes* (Huntsman, 1912) | IDa | 154 |
| Order Phlebobranchia, Family Ascididae | *Ascidia ceratodes* (Huntsman, 1912) | BRo | 154 |
| Order Phlebobranchia, Family Ascididae | *Ascidia ceratodes* (Huntsman, 1912) | BVi | 154 |

*References: BSE = W. R. Coker 1950; PBl = W. R. Coker 1951; BVi = W. R. Coker 1952; IDa = W. R. Coker 1953; BRo = W. R. Coker 1954*
| Species | References |
|---------|------------|
| **Order Aplousobranchia, Family Diazonidae** | *Rhopalaea birkelandi* Tokioka, 1971 IDa 154 |
| | *Rhopalaea birkelandi* Tokioka, 1971 BRo 154 |
| | *Rhopalaea birkelandi* Tokioka, 1971 BVič 154 |
| **Order Stolidobranchia, Family Styelidae** | *Eusynystela tincta* (Van Name, 1902) IDa 154 |
| | as *Polyandrocarpa tincta* BVič 154 |
| **Subphylum Cephalochordata, Class Leptocardii, Order Unassigned, Family Branchiostomatidae** | *Branchiostoma californiae* Andrews, 1893 PJi 185 |
| **Subphylum Vertebrata, Superclass Pisces, Class Elasmobranchii, Order Myliobatiformes, Family Dasyatidae** | *Dasyatis longa* (Garman, 1880) as *Dasyatis longus* Cua 24, 178 |
| **Order Myliobatiformes, Family Urotrygonidae** | *Urobatis pardalis* Del Moral-Flores, Angulo, López & Bussing, 2015 IMub 64 |
| **Order Torpediniformes, Family Narcinidae** | *Narcine entemedor* Jordan & Starks, 1895 Cua 40, 138, 178 |
| **Order Perciformes, Family Gobiidae** | *Chriolepis cuneata* Bussing, 1990 IMu 19 |
| | as *Elacatinus digueti* (Pellegrin, 1901) IMu 19, 117 |
| **Order Perciformes, Family Labrisomidae** | *Dialommus fuscus* (Gilbert, 1891) IMu 88 |
| | *Paraclinus monophthalmus* Günther, 1861 BSE 179 |
| **Order Perciformes, Family Opistognathidae** | *Opistognathus fowleri* Bussing & Lavenberg, 2003 IMub 21 |
| **Order Perciformes, Family Tripterygiidae** | *Lepidonectes clarkhubbi* Bussing, 1991 BSEb 20 |
| | *Lepidonectes clarkhubbi* Bussing, 1991 CSe 20 |
| | *Lepidonectes clarkhubbi* Bussing, 1991 IMub 20 |
| **Order Syngnathiformes, Family Syngnathidae** | *Bryx veleronis* Herald, 1940 IMu 88 |
| **Class Reptilia, Order Crocodylia, Family Crocodylidae** | *Crocodylus acutus* (Cuvier, 1807) MPG 128 |
| | *Crocodylus acutus* (Cuvier, 1807) MPN 140 |
| Species | Locality | References |
|---------|----------|------------|
| *Chelonia mydas agasizi* Bocourt, 1868 | PNa | 33, 34, 35, 65, 67, 115 |
| *Lepidochelys olivacea* (Eschscholtz, 1829) | PNa | 1, 10, 25, 33, 35, 36, 37, 48, 49, 70, 71, 74, 84, 89, 120, 121, 122, 123, 147, 148, 150, 153, 155, 164, 165, 166, 167, 168, 169, 175, 183, 190, 192, 193, 202 |
| *Lepidochelys olivacea* (Eschscholtz, 1829) | PNa | 1, 34, 35, 65, 66, 67 |
| *Dermochelys coriacea* (Vandelli, 1761) | PNa | 34, 35, 65 |
| *Fregata magnificens* Mathews, 1914 | IBo | 2 |
| *Pelecanus occidentalis* Linnaeus, 1766 | PNa | 3 |
| *Megaptera novaeangliae* Borowski, 1781 | SMa | 139 |
| *Globicephala macrocephus* Gray, 1846 | IMu | 145 |
| *Orcinus orca* Linnaeus, 1758 | IMu | 145 |
| *Orcinus orca* Linnaeus, 1758 | SMa | 139 |
| *Stenella attenuata graffmani* (Lönnberg, 1934) | Cua | 145 |
| *Senella attenuata graffmani* (Lönnberg, 1934) | IMu | 141, 142, 143, 144 |
| *Stenella attenuata* (Gray, 1846) | SMa | 139 |
| *Tursiops truncatus* Montagu, 1821 | SMa | 139 |
| *Kogia breviceps* (de Blainville, 1838) | IMu | 145 |
| *Pseuder macrocephalus Linnaeus, 1758* \textit{as Physyter catodon} | PSE | 177 |