Diversity of benthic marine mollusks of the Strait of Magellan, Chile (Polyplacophora, Gastropoda, Bivalvia): a historical review of natural history

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Abstract

An increase in richness of benthic marine mollusks towards high latitudes has been described on the Pacific coast of Chile in recent decades. This considerable increase in diversity occurs specifically at the beginning of the Magellanic Biogeographic Province. Within this province lies the Strait of Magellan, considered the most important channel because it connects the South Pacific and Atlantic Oceans. These characteristics make it an interesting area for marine research; thus, the Strait of Magellan has historically been the area with the greatest research effort within the province. However, despite efforts there is no comprehensive and updated list of the diversity of mollusks within the Strait of Magellan up to now. This study consisted of a complete bibliographic review of all available literature that included samples of mollusks in the Strait of Magellan. More than 300 articles were reviewed, covering 200 years of scientific knowledge. There were 2579 records belonging to 412 taxa, of which 347 are valid species. Of the total valid species, 44 (~13%) are considered of doubtful presence in the Strait. This work increases the known richness of mollusks of the Strait of Magellan by 228%; it is also the first report that integrates all available diversity studies of the three most speciose classes of benthic mollusks (Gastropoda, Bivalvia and Polyplacophora) from the Strait of Magellan.
Keywords
benthos, Magellanic Biogeographic Province, Mollusca, South Atlantic, South Pacific, species richness

Introduction

It has been described that mollusks show an increase in diversity towards high latitudes in the Chilean southeastern Pacific coast (Valdovinos et al. 2003). This increase in mollusk richness occurs around 42°S, coinciding with the beginning of the Magellanic Biogeographic Province (Spalding et al. 2007). The Magellanic Province has been the focus of study of several scientific expeditions that contributed to the knowledge of marine mollusks. The first reports were made by King and Broderip (1832), d’Orbigny (1835–1846) and Philippi (1845). Other reports that contributed considerably to the knowledge of mollusks of the Magellanic Province were Smith (1881), Rochebrune and Mabille (1889), Strebel (1904, 1905a, b, 1906, 1907, 1908), Odhner (1926), Marcus (1959) and Soot-Ryen (1959). Carcelles and Williamson (1951) published the first checklist of species of marine mollusks of the Magellanic Province in the 1950s, defining the province from around 37°S in the Pacific coast and 43°S in the Atlantic coast, to 56°S. In their checklist 614 species were reported. Many taxonomic revisions of specific groups have been published (e.g., McLean 1984a; Castellanos 1988; Castellanos and Landoni 1988, 1989, 1990, Castellanos 1990, 1992a, b; Castellanos and Landoni 1993a, b; Castellanos et al. 1993; Ponder and Worsfold 1994; Schrödl 1996), therefore the checklist of Carcelles and Williamson (1951) had to be updated, for species synonyms and newly found species. Linse (1999) presented a new checklist of mollusks of the Magellanic Province, defining the province from around 41°S in the Pacific and Atlantic coasts to 56°S. However, the classes Polyplacophora and Cephalopoda were excluded from this checklist, which included 397 species of mollusks.

One of the most important channels in the Magellanic Province is the Strait of Magellan, where most historical reports of mollusks are focused. This extensive channel connects the Pacific and Atlantic Oceans and is considered the most important one of the province. It is influenced by water masses of the Pacific, Atlantic and Southern Oceans, and it possess several geological characteristics derived from the last glaciation (Antezana 1999). For these reasons the Strait of Magellan offers unique characteristics for the study of biodiversity and related aspects of the biogeography of mollusks (Linse et al. 2006). Linse et al. (2006) presented the only report of mollusk richness in the Strait of Magellan, which contains 116 species. However, a list of species is not provided and only the classes Gastropoda and Bivalvia are included. Between the year 2000 and the present there have been several studies that have provided more information about the diversity of mollusks in the Strait of Magellan (e.g., Ríos et al. 2003; Ríos et al. 2005; Ríos et al. 2007; Thatje and Brown 2009; Aldea et al. 2011; Rosenfeld et al. 2013; Rosenfeld et al. 2015), presenting new records of species. Several taxonomic revisions of specific groups have been published in recent
years, where erroneous records, changes in nomenclature, synonymized species and
descriptions of new species have been made (e.g., Sirenko 2006a; Zelaya and Geiger
2007; Aranzamendi et al. 2009; Zelaya 2009; González-Wevar et al. 2011; Güller et
al. 2016; Pastorino 2016; Güller and Zelaya 2017; Korshunova et al. 2017). In order
to have a comprehensive list of species in the most important channel of the Magel-
lanic Province it is necessary to provide an updated list of records of the malacofauna
of the Strait of Magellan. The objective of this study is to provide the first list of
species of benthic marine mollusks of the three most speciose and best documented
classes (Polyplacophora, Gastropoda, Bivalvia) of the Strait of Magellan, integrating
all studies throughout history.

Materials and methods

To make the list of mollusks as complete as possible, information was gathered from all
the available scientific publications that have sampled or reviewed benthic marine mol-
lusks in the Magellanic Province, from the expedition of the HMS Beagle in the 19th
century (King and Broderip 1832) to the present. A total of 323 articles were reviewed,
of which 146 contained species within the Magellanic Province. The records and their
respective geographical positions were entered into a spreadsheet structured with the
Darwin Core Standard (Wieczorek et al. 2012), adjusted taxonomically according to
the MolluscaBase (2019) and the revisions of classification and systematics of gastro-
pods (Bouchet et al. 2017), bivalves (Neveskaja 2009) and polyplacophorans (Sirenko
2006b). The Strait of Magellan was divided into 420 quadrants of 6×6 minutes of lati-
tude and longitude. The records located within this area were analyzed (Fig. 1), taking
into account their georeference or approximate location. This analysis was developed
using tools for Google Earth (http://www.earthpoint.us), which transforms XLS ex-
tension files (Excel format) to KML (files that contains geographic data). In total, 108
articles provided records for the Strait of Magellan.

Dubious records were counted as were species that were recorded only once in his-
tory. Criteria were followed to determine doubtful species records, as follows: species
that were cited once and later questioned in taxonomic revisions or never reported
again; species that greatly exceed their distribution limit and do not appear in taxo-
nomic revisions or alpha diversity studies; and species that have a huge geographical
discontinuity and are not explained or figured in the article.

A new matrix was elaborated with the Darwin Core standard from the database,
with presence-absence data of each taxon per quadrant entered as 1 or 0, respect-
ively. The quadrants with no species were removed from the matrix and species/taxa
considered doubtful and/or with imprecise locations were not included in the
matrix. However, the above cases were considered in the quantification of total
richness. On the other hand, the records up to or above genus level (registered as
“indet.” or “sp.”) were not considered as valid species for both species richness val-
ues and estimation models, except for those in which the author commented that it
could be a new species.
Finally, to detect whether the historical sampling effort was able to estimate all the species of mollusks in the Strait of Magellan, the non-parametric species accumulation models Chao 2 and Jacknife 1 (Burnham and Overton 1978; Burnham and Overton 1979; Chao 1987; Colwell and Coddington 1994) were used to evaluate the sampling effort spatially and estimate the number of species expected theoretically in the Strait of Magellan. These methods require only presence-absence data; Chao 2 is calculated with the species that occur in only one sample (single or singleton species) and those that occur exactly in two samples (doubletons). Jacknife 1 is a more accurate and less biased estimator, since it only uses the number of singletons and the number of samples (Moreno 2001). Complementarily, parametric accumulation models were used to detect whether the historical sampling effort was able to estimate the total species of mollusks (Soberón and Llorente 1993); the linear dependence and Clench models were used. All samples were randomized so as not to affect the shape of the curve (Colwell and Coddington 1994; Moreno and Halffter 2000). The estimation of the coefficients of each nonlinear regression model was done using the Simplex and Quasi-Newton estimation methods of the statistical package STATISTICA 7. For all models, species with imprecise locations were not included.
Results

A total of 134 articles summarizing two centuries of study were entered in the spreadsheet, representing 2579 records corresponding to 412 taxa distributed in the three classes studied (Table 1, Appendix I). Of the total taxa, 65 were reported up to or above genus level (i.e., “indet.” or “sp.”), finding no evidence that they may correspond to new species. On the other hand, 44 species were considered doubtful. Of the total 303 validated species with effective distribution in the Strait of Magellan (Fig. 2), 57.1% belong to the class Gastropoda (173 species); 24.1% of these correspond to the most diverse families: Buccinidae, Muricidae, Calliostomatidae, Fissurellidae, Eateniellidae, Nassariidae, Rissoideas and Naticidae. The family Buccinidae was the most diverse in the class, with 15 species. The class Bivalvia was represented by 35.3% of the species (107 in total); 17.5% of these correspond to the most diverse families: Mytilidae, Philobryidae, Lasaeidae, Mactridae, Veneridae, Cyamiidae, Neoleptonidae, Nuculidae and Thyasiridae. The remaining 7.6% correspond to the class Polyplacophora (23 species). The family Chitonidae was the most diverse, with 2.0% of the species. In total, 106 families were recorded.

There has been a constant increase since the decade of the 1980s in the number of studies (Fig. 3a) and records (Fig. 3b). The largest number of records in history were incorporated for the Strait of Magellan in the last decade (2007–2018) (Fig. 3b).

Of the 420 quadrants proposed, 163 presented species (Fig. 4, Appendix II). Ordering the matrix of absence and presence of species according to these quadrants, 1229 mollusk records were counted. The eastern microbasin had 35 quadrants with records, while the central microbasin had 104. The western microbasin proved to be the least historically sampled, with only 24 quadrants with records. The total richness of the Strait of Magellan was 303 species. However, 47 species had imprecise locations, as they were described as inhabitants of the Strait of Magellan, but the site of their habitat was not defined with geographical accuracy. These species include three polyplacophorans (Leptochiton sp., Notoplast magellanica and Hemiarthrum setulosum), 25 gastropods (Fissurella nigra, Anatoma euglypta, Scissurella petermannensis, Diloma nigerrimum, Prisogaster niger, Capulus compressus, Hydrobia antarctica, Crucibulum quiriquinae, Buccinanops cochlidium, Savatieria frigida, Concholepas concholepas, Tromina dissectata, Xyomenopsis subnodosus, Mangelia martensi, Mathilda malvinarum, Atomiscala xenophyes, Doris fontainii, Gargamella immaculata, Dialulula punctuolata, Geitodoris patagonica, Thecacera darwini, Tyrinna delicata, Ancula fuegiensis, Tritonia vorax and Eubranchus fuegiensis) and 19 Bivalvia (Solemya notialis, Solemya occidentalis, Malletia chilensis, Modiolus patagonicus, Mytilus galloprovincialis, Barbatia platei, Limopsis perieri, Philobrya antarctica, Aequipecten tehuelchus, Cardium parvulum, Macoploma inornata, Lasaeia petitiana, Mulinia leviscando, Diplodonta patagonica, Proteopitar patagonicus, Netastoma darwinii, Entodesma cuneata, Entodesma soleyalis and Luzonia chilensis).

The quadrants that had species records cover ~37% of the total area of the Strait of Magellan; most of the studies are concentrated in the central microbasin. The quad-
Table 1. Species checklist of benthic marine mollusks of the Strait of Magellan (Polyplacophora, Gastropoda and Bivalvia). Those species with a single record are marked with an asterisk (*) and those which are dubious with a square (▪). Their presence is indicated (+) in the eastern (E), central (C) and western (W) microbasins. References provided at the end of the list.

| Taxa | Reference | E | C | W |
|------|-----------|---|---|---|
| Polyplacophora indet. | ab, as, bo, cp | + |
| Order Lepidopleurida | | |
| Leptochitonidae | | |
| Leptochiton sp. | f | + |
| Leptochiton kerguelensis Hadd., 1886 | t, cd, bm, b, cq, as | + | + | + |
| Leptochiton laurae Schwabe & Sellanes, 2010 | cd | + | + |
| Leptochiton lineae Sirenko, 2015 | cd | + |
| Leptochiton medius (Plate, 1899) | as, cd, cq, bm, h | + | + | + |
| Leptochiton smirnovi ▪ Sirenko, 2016 | as | + |
| Lepidopleurus culleri ▪ Rochebrune, 1899 | as, bm | + | + |
| Order Chitonida | | |
| Ischnochitonidae | | |
| Ischnochiton sp.* | e | + |
| Ischnochiton punctulatissimus (Sowerby I, 1832) | b | + | + |
| Ischnochiton pusio (Sowerby I, 1832) | b, cq, br | + | + |
| Ischnochiton straminus (G. B. Sowerby I, 1832) | p, cq, cc, b, t, bv, am, ej | + | + | + |
| Ischnochiton striolatus ▪ (Gray, 1828) | br | |
| Sienosemus exaratus (Sars G. O., 1878) | cq | + |
| Chaetopleuridae | | |
| Chaetopleura angulata ▪ Spengler, 1797 | br | |
| Chaetopleura isablet ▪ (d’Orbigny, 1841) | br | |
| Chaetopleura peruiana ▪ Lamarck, 1819 | h, e | + |
| Callochitonidae | | |
| Callochiton bouveti Thiele, 1906 | bm, as | + | + |
| Callochiton gausi Thiele, 1908 | t, as | + |
| Callochiton punicus (Gould, 1846) | am, as, bm, ct, i, b, cq, bn, bo, e, t, br, am, bv, ej | + | + | + |
| Callochiton steinii (Pfeffer, 1886) | bm, as | + | + |
| Chitonidae | | |
| Acanthopleura granulata ▪ (Gmelin, 1791) | p | |
| Chiton sp. | bl | + |
| Chiton boweni King, 1833 | b, j, bv, cc, ct, ej | + | + |
| Chiton magnificus ▪ Gmelin, 1791 | dd | |
| Chiton magnificus ▪ Deshayes, 1827 | h, j | + |
| Chiton olivaceus ▪ Spengler, 1797 | p | |
| Tonicia sp. | b, i, j | + |
| Tonicia atrata (G. B. Sowerby II, 1840) | cq, ct, j, as, bm, bo, e, s, bu, bv, ar, ej | + | + | + |
| Tonicia calbuscae Plate, 1897 | cq, j | + | + |
| Tonicia chilensis (Fremblay, 1827) | j, as, bm, bu, bv | + | + |
| Tonicia disjuncta ▪ (Fremblay, 1827) | as | + |
| Tonicia lebruni Rochebrune, 1884 | bm, cq, ej | + | + | + |
| Tonicia smithi Leloup, 1980 | b, cc, bu, bv, b, a, am, cc | + |
| Mopaliidae | | |
| Nuttalochiton hesperus ▪ Rochebrune, 1884 | p | + |
| Nuttalochiton martialis ▪ Rochebrune, 1884 | b, cq, br, t, bv | + | + |
| Plaxisophora aurata (Spalowsky, 1795) | bu, bv, cq, bm, bo, e, j, am, a, br, ar, bk, ba, bl, t, i, b | + | + | + |
| Acanthochitonidae | | |
| Notoplax magellanica ▪ Thiele, 1909 | am | |
| Hemiarthridae | | |
| Hemiarthrus setulosus Carpenter in Dall, 1876 | br, cc | |
| Class Gastropoda | | |
| Gastropoda indet. | as, j, bo | + |
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| Taxa | Reference | E | C | W |
|------|-----------|---|---|---|
| **Order Patellida** | | | | |
| *Lottia* sp. | bl, bk, cb | + | | |
| *Lottia orbignyi* (Dall, 1909) | h | | | |
| *Scurria ceciliana* (d’Orbigny, 1841) | br, b, a, cs | + | + | |
| *Scurria ceciliana magellanica* (Strebel, 1907) | co, de | + | | |
| *Scurria plana* (Philippi, 1846) | bg | | | |
| *Scurria variabilis* (G. B. Sowerby I, 1839) | e | + | | |
| **Lepetidae** | | | | |
| Lepetidae indet.* | as | + | | |
| *Iothia enarginoloides* (Philippi, 1868) | co, bm, b, ce, bv, v, ad | + | + | + |
| **Nacellidae** | | | | |
| Nacellidae indet.* | as | + | | |
| *Nacella* sp.* | as, bv, bl | + | | |
| *Nacella* sp. juvenile | b | + | | |
| *Nacella datassata* (Gmelin, 1791) | cv, co, as, ab, aa, b, a, bm, aq, cb, bw, e, y, d, bu, bv, ba, bg, bk, bb, br, cd, j | + | + | + |
| *Nacella flammula* (Gmelin, 1791) | b, bu, bv, j, e, i, y, ar, bk, bl, aa | + | | |
| *Nacella magellanica* (Gmelin, 1791) | as, bw, an, ah, a, y, cs, aq, co, b, a, cv, bl, bk, bg, br, e, bu, aa, h, j, ar, cb, ab, d | + | + | |
| *Nacella neotima* (Helbling, 1779) | co, cv, z, bw, cs, bg, i, as, b, bv, br, x, aa, bk, at, ba, bo, cg, cp | + | + | + |
| **Order Seguenziida** | | | | |
| ~Seguenzioidae | | | | |
| *Lisostena imperiva* (Strebel, 1908) | b | + | | |
| **Order Lepetellida** | | | | |
| Fissurellidae | | | | |
| Fissurellidae indet. | as | + | + | |
| *Didora patagonica* (d’Orbigny, 1839) | bg | + | | |
| *Fissurella* sp. | as, b, e, bo, bl, ab, j | + | + | |
| *Fissurella niger* Lesson, 1831 | k | | | |
| *Fissurella orienti* G. B. Sowerby I, 1834 | co, b, bu, bv, i, br, bo, ce, ao | + | + | |
| *Fissurella picta* (Gmelin, 1791) | co, bu, e, ar, bo, bk, bl, bg | + | + | |
| *Fissurella picta picta* (Gmelin, 1791) | a, b, ao, bv | + | | |
| *Fissurella nudosa* Lesson, 1831 | b, ao, ar, e, br, bu, cr, ba | + | + | |
| *Fissurellidea patagonica* (Strebel, 1907) | bw, ap | + | | |
| *Lucapinella herzel* (Martens, 1900) | k, av | + | | |
| *Parmaparella* sp.* | as | + | | |
| *Puncturella* sp. | bm, as | + | + | |
| *Puncturella conica* (d’Orbigny, 1841) | b, f, k, cy | + | + | |
| *Puncturella mouchins* (Linneaus, 1771) | as, co | + | + | |
| **Scissurellidae** | | | | |
| *Scissurella clathrata* Strebel, 1908 | cz, b, dj, eb | + | | |
| *Scissurella petersonnensis* Lamy, 1910 | cz | | | |
| **Anatomidae** | | | | |
| *Anatoma conica* (d’Orbigny, 1841) | cz | + | | |
| *Anatoma euglypta* (Pelseneer, 1903) | df | | | |
| **Order Trochida** | | | | |
| Trochidae | | | | |
| Trochidae indet.* | as | + | | |
| *Diloma nigerrimum* (Gmelin, 1791) | h | | | |
| **Calliostomatidae** | | | | |
| *Calliostoma* sp.* | b | | + | |
| *Calliostoma iriartii* Strebel, 1905 | cl | + | + | |
| *Calliostoma modestulum* Strebel, 1908 | bv, as | + | + | |
| *Calliostoma moebiusi* Strebel, 1905 | bm, as, l | + | + | |
| *Calliostoma nudum* (Philippi, 1845) | as, bm, b, j, bv, cl, l | + | + | + |
| *Margarella* sp.* | as | + | | |
| *Margarella expansa* (G. B. Sowerby I, 1838) | a, b, bv, ci, bt | + | + | |
| Taxa                                | Reference          | E | C | W |
|-------------------------------------|--------------------|---|---|---|
| *Margarella jason*                  | Powell, 1951       | av, as | + |
| *Margarella pruinosa*               | (Rochafrance & Mabilde, 1885) | bq, l | + |
| *Margarella violacea*               | (King, 1832)       | as, cl, b, bt, av, i, bd, cg, bm, ar, bv, s, bo, bw, e, j, ak, ba | + | + | + |
| *Pbostinastoma tantiatum*           | (G. B. Sowerby I, 1825) | as, bm, bv, bq, f, av, l | + | + |
| *Pbostinula coerulescens*           | (King, 1832)       | br, av, bm, ar, i, as, bn, bk, ce, bg, s, ak, bp, cl, al | + | + |
| *Pbostinula crustibay*              | E. A. Smith, 1905  | cg | + |
| *Pbostinula roseolincta*            | (E. A. Smith, 1885) | bm, bw | + |
| Colloniidae                         |                     | | | |
| *Homalopoma cunninghami*            | (E. A. Smith, 1881) | bm, as, b, h, cl | + | + | + |
| Margaritidae                        |                     | | | |
| *Margarites sp.*                    |                     | bm | + |
| *Margarites pigeretus*               | (Sowerby I, 1838)  | ci | + |
| Tegulidae                           |                     | | | |
| *Tegula atra*                       | (Lesson, 1830)     | b, as, bw, j, o | + | + |
| *Tegula patagonica*                 | (d’Orbigny, 1835)  | bg, l | + |
| Turbinidae                          |                     | | | |
| *Frostogaster niger*                | (W. Wood, 1828)    | h | | |
| Caenogastropoda unassigned          |                     | | | |
| Turritellidae                       |                     | as | + |
| Turritellidae indet.*               |                     | | |+
| Epitonidae                          |                     | as | + | + |
| Epitonidae indet.                   |                     | | |+
| *Ceratotrema magellanicum*          | (Philippi, 1845)   | br, bh | + |
| *Ceratotrema strebeli*              | Zelaya & Güller, 2018 | cm, ed | + | + |
| Newtoniellidae                      |                     | | | |
| *Eumetula michaelseni*              | (Strebel, 1906)    | as, cm, ef | + |
| *Eumetula pulla*                    | (Philippi, 1845)   | b, bm, bv, as, sm, ce, bh | + | + | + |
| Order Littorinimorpha               |                     | | | |
| Eatoniiidae                         |                     | | | |
| *Eatoniella sp.*                    |                     | as, b, bm | + | + | + |
| *Eatoniella afronigna*              | Ponder & Worsfold, 1994 | bv, bc | + |
| *Eatoniella argentinoenius*         | Castellanos & Fernández, 1972 | bm | + |
| *Eatoniella denticularis*           | Ponder & Worsfold, 1994 | bc, h | + | + |
| *Eatoniella eberina*                | Ponder & Worsfold, 1994 | bc, h | + | + |
| *Eatoniella gloriosa*               | Ponder & Worsfold, 1994 | bc | + |
| *Eatoniella pico*                   | Ponder & Worsfold, 1994 | bc | + |
| *Eatoniella turrucula*              | Ponder & Worsfold, 1994 | bc | + |
| Capulidae                           |                     | | | |
| *Capulus compressus*                | Pelseneer, 1903    | m | | |
| *Capulus subcompressus*             | Pelseneer, 1903    | as | + |
| *Capulus ungaricoides*              | (d’Orbigny, 1841)  | av | + |
| Littorinidae                        |                     | | | |
| *Laevilitorina caliginosa*          | (Gould, 1849)      | b, ar, co, bk | + | + |
| Naticidae                           |                     | | | |
| Naticidae indet.*                   |                     | as | + |
| *Euprura constricta*                | Dall, 1908         | bh | + |
| *Falsilunatia carcellesi*           | Dell, 1990         | as, bm, al, dj | + | + |
| *Falsilunatia falklandica*          | (Preston, 1913)    | bm | + |
| *Falsilunatia patagonica*           | (Philippi, 1845)   | br, av, bw, bh, cn, b, v, i, f, dj, dz | + | + |
| *Natica sp.*                        |                     | s | + |
| *Natica limbata*                    | d’Orbigny, 1837    | cg, dz | + |
| Notocochlis isabelleana*            | (d’Orbigny, 1840)  | bm | + |
| Polinices sp.                        |                     | dz | | |
| *Tectonatica impersa*               | (Philippi, 1845)   | bh, cn, bm, v, b, o, dz | + | + | + |
| Rissoidae                           |                     | | | |
| *Onoba georgiana*                   | (Pfeffer, 1886)    | bc | + |
| *Onoba lacuniformis*                | Ponder & Worsfold, 1994 | bc | + |
| Taxa                                      | Reference                               | E | C | W |
|-------------------------------------------|-----------------------------------------|---|---|---|
| Onoba schythei (Philippi, 1868)           | b, bc, as, af                           |   |   | + |
| Onoba subincisa Ponder & Worsfold, 1994   | bc                                      |   |   | + |
| Onoba sulcula* H. Adams & A. Adams, 1852  | b                                       |   |   | + |
| Powellisetia microsrita Ponder & Worsfold, 1994 | bc, b                                   |   |   | + |
| Caeicidae                                 |                                         |   |   |   |
| Caeicum chilense* Stuardo, 1962           | b                                       |   |   | + |
| Caeicum magellanicum (di Geronimo, Privitera & Valdovinos, 1995) | dg                                      |   |   | + |
| Cochliopidae                              |                                         |   |   |   |
| Littoridina angustiarum* Preston, 1915    | bh                                      |   |   | + |
| Littoridina faminensis* Preston, 1915     | bh                                      |   |   | + |
| Littoridina limna* Preston, 1915          | bh                                      |   |   | + |
| Littoridina lioneli* Preston, 1915        | bh                                      |   |   | + |
| Caecidae                                  |                                         |   |   |   |
| Caecum chilense* Stuardo, 1962           | b                                       |   |   | + |
| Caecum magellanicum (di Geronimo, Privitera & Valdovinos, 1995) | dg                                      |   |   | + |
| Hydrobiidae                               |                                         |   |   |   |
| Hydrobia antarctica Philippi, 1868        | bh                                      |   |   | + |
| Eulimidae                                 |                                         |   |   |   |
| Eulimidae indet.                          | as                                      |   |   | + |
| Calyptraeida                              |                                         |   |   |   |
| Calyptraeida indet.*                      | as                                      |   |   | + |
| Crepitella sp.                            | dh                                      |   |   | + |
| Crepitella dilatata (Lamarck, 1822)       | b, br, ar, e, bw, as, bn, bo, cn       |   |   | + |
| Crucibulum quiriquinae (Lesson, 1830)    | di                                      |   |   | + |
| Trochita pileolus (d’Orbigny, 1841)      | as, av, bm, bn, b, f, dj, ec            |   |   | + |
| Trochita pileus (Lamarck, 1822)           | bm, bw, cn, av, as, a, bu, bv, ar, o, i, bn, bh, ce, dj, ec |   |   | + |
| Velutinidae                               |                                         |   |   |   |
| Lamellaria sp.*                           | j                                       |   |   | + |
| Lamellaria ampla Streb, 1906              | dj                                      |   |   | + |
| Lamellaria elata Streb, 1906              | dj, m                                   |   |   | + |
| Lamellaria hyadesi* Mabille & Rochebrune, 1889 | br                                      |   |   | + |
| Lamellaria mopsicolor* Ev. Marcus, 1958   | dk                                      |   |   | + |
| Lamellaria patagonica Mabille & Rochebrune, 1889 | as, cn                                 |   |   | + |
| Lamellaria perspicua (Linnaeus, 1758)    | dl                                      |   |   | + |
| Marenipiopsis pacifica* Bergh, 1886       | m                                       |   |   | + |
| Cymatiidae                                |                                         |   |   |   |
| Argobuccinum pustulosum (Lightfoot, 1786) | b, s, j                                 |   |   | + |
| Fusiatrix magellanicus (Röding, 1798)     | j, b, s                                 |   |   | + |
| Order Neogastropoda                       |                                         |   |   |   |
| Volutidae                                 |                                         |   |   |   |
| Volutidae indet.*                         | as                                      |   |   | + |
| Adelomelon ancilla (Donovan, 1824)        | cn, bi, as, bm, s, av, e, br, f, i, ba  |   |   | + |
| Adelomelon beckii (Powell, 1951)          | bi, cn                                 |   |   | + |
| Adelomelon ferusacii (Donovan, 1824)      | s, cn                                  |   |   | + |
| Odontocymbiola magellancina (Gimelin, 1791) | as, e, bi                              |   |   | + |
| Cancellariidae                            |                                         |   |   |   |
| Admete sp.*                               | f                                       |   |   | + |
| Admete magellanica (Streb, 1905)          | as, bm, cm                              |   |   | + |
| Admete philippi* Ihering, 1907            | s                                       |   |   | + |
| Admete sphybei (Philippi, 1855)           | b, bi                                   |   |   | + |
| Buccinidae                                |                                         |   |   |   |
| Buccinidae indet.                         | as, dj                                  |   |   | + |
| Anonomacme smithi Streb, 1905             | as, bm                                  |   |   | + |
| Antistreptus magellanicus Dall, 1902      | bi, as, dj                              |   |   | + |
| Argeneuthria cerealis (Rochebrune & Mabille, 1885) | b, bv                                 |   |   | + |
| Argeneuthria euthrooides* (Streb, 1905)   | cm                                      |   |   | + |
| Argeneuthria paesi (Streb, 1905)          | cm, b, bv                               |   |   | + |
| Argeneuthria philippii (Streb, 1905)      | az, cm                                  |   |   | + |
| Falsimacme koebelii (Streb, 1905)         | cm, az                                  |   |   | + |
| Glypteuthria meridionalis (E. A. Smith, 1881) | as, az, cm, ce                             |   |   | + |
| Taxa                                      | Reference                     | E | C | W |
|-------------------------------------------|-------------------------------|---|---|---|
| Meteuthria martensi (Strebel, 1905)        | cm, az, b                     | + | + | + |
| Microdeuthria michaelseni (Strebel, 1905) | as, az, b, bm, cm, bv         | + | + | + |
| Pareuthria atrata (E. A. Smith, 1881)     | as, b, cm, ak, bm, av, az, o, ce, dj | + | + | + |
| Pareuthria fuscata (Bruguère, 1789)       | az, j, bw, ar, cm, bu, bv, as, a, f, i, ab, cb, b, bd, bk, e, bn, ak, o | + | + | + |
| Savatieria areolata* Strebel, 1905        | bm                           |   |   |   |
| Savatieria coppingeri (E. A. Smith, 1881) | as, cm                       |   |   | + |
| Savatieria frigida Rochebrune & Mabille, 1885 | as, cm, dm             |   |   | + |
| Savatieria meridionalis (E. A. Smith, 1881) | b, cm, bw, ce             |   |   | + |

Nassariidae

| Buccinanops cochlidium* (Dillwyn, 1817)   | c                            |   |   |   |
| Buccinanops deformis* (King, 1832)       | c                            |   |   | + |
| Buccinanops monilifer (Kienet, 1834)     | c                            |   |   | + |
| Buccinanops paytenis (Kienet, 1834)      | c, bw,r                      |   |   | + |
| Nassarius coppingeri* (E. A. Smith, 1881) | b                            |   |   | + |
| Nassarius gayii (Kienet, 1834)           | h, r                         |   |   | + |
| Nassarius laevigatus* (Philippi, 1845)   | r                            |   |   |   |

Muricidae

| Acarinina monodon (Pallas, 1774)           | bw, e, ar, bu, bk, bl, cg    |   |   | + |
| Acanthina unicorni* (Bruguère, 1789)      | w                            |   |   | + |
| Concholepas concholepas (Bruguère, 1789)  | dn                           |   |   |   |
| Coronism acanthodes (Watson, 1882)        | ay                           |   |   | + |
| Enistrophon veronicæ* Pastorino, 1999     | ax                           |   |   | + |
| Fuegostron pallidus (Broderip, 1833)      | as, ce, bm, ar, bv, ak, a, ck, dj, eg | + | + | + |
| Tronomina sp.*                            | bm                           |   |   | + |
| Tronomina dipectata Dell, 1990             | cu, q                        |   |   |   |
| Trophon sp.                               | as, ab                       |   |   | + |
| Trophon geversianus (Pallas, 1774)         | b, e, i, j, s, ar, av, ay, ck, ce, cf, bu, bv, bw, br, bk, bl, bi | + | + | + |
| Trophon minutus* Melvill & Standen, 1907  | as                           |   |   | + |
| Trophon ohlini Strebel, 1904              | as, ck, dj, eg               |   |   | + |
| Trophon plicatus (Lightfoot, 1786)        | ar, ck, av, ce, b, ay, cu, f | + | + | + |
| Xymenopsis buccinatus (Lamarck, 1816)     | cn, ak, av, aw               | + | + | + |
| Xymenopsis muriciformis (King, 1832)      | b, ak, ar, as, av, aw, bi, bk, bl, bo, br, bv, bw, cu, ce, cn, eg, p | + | + | + |
| Xymenopsis subnodosus (Gray, 1839)        | aw                           |   |   |   |

Borsoniidae

| Typhlodaphne filiariata (Strebel, 1905)    | cm, eh                       | + | + | + |
| Typhlodaphne payeni (Rochebrune & Mabille, 1885) | b                           | + | + | + |
| Typhlodaphne strebli Powell, 1951         | b                            | + | + | + |

Cochlespiridae

| Aforia sp.                                | bm                           |   |   | + |

Drilliidae

| Agadrillia fuegiensis (Smith, 1888)        | bm, as, bi                   | + | + | + |
| Lepadrillia elio* (Dall, 1919)             | bm, as                       | + | + | + |

Mangelidae

| Belarina cunninghami* (E. A. Smith, 1881)  | b, eh                        |   |   | + |
| Lorabela sp.                              | bm                           |   |   | + |
| Mangelia martensi (Strebel, 1905)          | do                           |   |   | + |
| Mangelia michaelseni (Strebel, 1905)       | bm, cm                       |   |   | + |
| Oenopota magellanica (Martens, 1881)      | br, cm, dj                   |   |   | + |

Petudomelatomidae

| Leucocyrinx sp.*                          | as                           |   |   | + |

Raphitomidae

| Pleurotomella ohlini (Strebel, 1905)       | cm, eh                       | + | + | + |
| Thesia michaelseni (Strebel, 1905)         | cm, eh                       | + | + | + |

Turridae

| Turridae indet.                           | as                           |   |   | + |
| Taxa                          | Reference | E | C | W |
|------------------------------|-----------|---|---|---|
| **Infraclass “Lower Heterobranchia”** |           |   |   |   |
| Mathildidae                  |           |   |   |   |
| *Mathilda magellanica* Fischer, 1873 | b         |   | + |   |
| *Mathilda malvinarum* (Melvill & Standen, 1907) | df        |   |   |   |
| **Cimidae**                  |           |   |   |   |
| *Atomiscala xenophyes* (Melvill & Standen, 1912) | df        |   |   |   |
| **Infraclass Euthyneura**    |           |   |   |   |
| **Acteonidae**               |           |   |   |   |
| *Acteon biplicatus* (Strebel, 1908) | bm, bv, bj | + |   | + |
| *Acteon delicatus* ▪ Dall, 1889 | bj        |   |   |   |
| **Ringiculidae**             |           |   |   |   |
| *Microglyphis curtula* ▪ (Dall, 1890) | as        |   | + |   |
| **Order Pleurobranchida**    |           |   |   |   |
| **Pleurobranchidae**         |           |   |   |   |
| *Berthella platei* (Bergh, 1898) | bn        |   |   | + |
| **Order Nudibranchia**       |           |   |   |   |
| **Dorididae**                |           |   |   |   |
| *Doris fontainii* ▪ d’Orbigny, 1837 | by        |   |   |   |
| *Doris kerguelenensis* (Bergh, 1884) | bx, by, at | + |   | + |
| *Doris magellanica* ▪ Cunningham, 1871 | s         |   |   |   |
| **Discodorididae**           |           |   |   |   |
| *Disaulus hispida* ▪ (d’Orbigny, 1834) | by, bx     |   | + |   |
| *Disaulus punctulata* ▪ (d’Orbigny, 1837) | by        |   |   |   |
| *Gargamella immaculata* ▪ Bergh, 1894 | by        |   |   |   |
| *Geitodorus patagonica* ▪ Odhner, 1926 | by        |   |   |   |
| **Polyceridae**              |           |   |   |   |
| *Holoplacanus papposus* Odhner, 1926 | bx, by, bj | + |   | + |
| *Thecacera darwini* ▪ Pruvot-Fol, 1950 | by        |   |   |   |
| **Chromodorididae**          |           |   |   |   |
| *Tyrinna delicata* (Abraham, 1877) | dp        |   |   |   |
| **Cadlinidae**               |           |   |   |   |
| *Cadlina magellanica* Odhner, 1926 | by, bx    |   | + |   |
| **Onchidorididae**           |           |   |   |   |
| *Acanthodoris falklandica* ▪ Eliot, 1907 | by, j     |   | + |   |
| **Goniodorididae**           |           |   |   |   |
| *Ancula fuegiensis* ▪ Odhner, 1926 | by        |   |   |   |
| **Janolidae**                |           |   |   |   |
| *Janolus sp.* ▪              | j         |   | + |   |
| **Tritoniidae**              |           |   |   |   |
| *Tritonia australis* ▪ (Bergh, 1898) | h         |   | + |   |
| *Tritonia challengeriana* Bergh, 1884 | by, bx, j |   | + |   |
| *Tritonia vorax* ▪ (Odhner, 1926) | by        |   |   |   |
| **Coryphellidae**            |           |   |   |   |
| *Itaxia falklandica* (Eliot, 1907) | by, bx    |   | + |   |
| **Cuthonidae**               |           |   |   |   |
| *Cuthona valentini* ▪ (Eliot, 1907) | by, bx    |   |   | + |
| **Eubranchidae**             |           |   |   |   |
| *Eubranchus fuegiensis* ▪ Odhner, 1926 | by        |   |   |   |
| **Aeolidiidae**              |           |   |   |   |
| *Aeolidia sp.* ▪              | as, bk    | + |   | + |
| *Aeolidia campbellii* ▪ (Cunningham, 1871) | by, ar, h, dq | + |   |   |
| **Facelinidae**              |           |   |   |   |
| *Phidiana patagonica* ▪ (d’Orbigny, 1836) | bx        |   | + |   |
| **Order Cephalaspidea**      |           |   |   |   |
| **Cyllhniidae**              |           |   |   |   |
| *Cylchne gelida* ▪ (E. A. Smith, 1907) | as        |   |   | + |
| *Toledonia sp.* ▪            | as        |   | + |   |
| Taxa | Reference |
|------|-----------|
| Toledonia paretata* Dell, 1990 | bs + |
| Toledonia perplexa Dall, 1902 | cm, b, n, bj, dj + |
| Diaphanidae | |
| Diaphana paesleri (Strebel, 1905) | b, dj + |
| Superorder Sacoglossa | |
| Plakobranchidae | |
| Elysia hedgpethi Marcus, 1962 | bx + |
| Limapontiidae | |
| Ercolaniana evelinae* (Marcus, 1959) | bx + |
| Limapontia sp.* | bx + |
| Hermaeidae | |
| Aplysiopsis brattstroemi* (Marcus, 1959) | bx + |
| Order Siphonariida | |
| Siphonariidae | |
| Siphonaria fuegiensis* Güller, Zelaya & Ituarte, 2016 | a, ea + |
| Siphonaria laeviuscula* G. B. Sowerby I, 1835 | dr |
| Siphonaria lateralis Gould, 1846 | b, co, ar, bk, ab, ea + + + |
| Siphonaria lessonii Blainville, 1824 | b, bw, ab, ar, e, co, a, bu, bk, bl, ba, cb, ea + + + |
| Williamia magellanea Dall, 1927 | n + |
| Superorder Pylopulmonata | |
| Pyramidellidae | |
| Odostomia sp. | b + |
| Turbonilla sp.* | as + |
| Turbonilla sanmatiensis* Castellanos, 1982 | bm + + |
| Turbonilla smithii (Strebel, 1905) | as, bm + + |
| Turbonilla strebeli Corgan, 1969 | b + + |
| Order Systellommatophora | |
| Onchidiidae | |
| Onchidella marginata (Couthouy in Gould, 1852) | b + |
| Class Bivalvia | |
| Bivalvia indet. | as, bm + |
| Order Nuculida | |
| Nuculidae | |
| Ennucula eltanini Dell, 1990 | as, v + + |
| Ennucula grayi (d’Orbigny, 1846) | as, cw, cp, bn + |
| Ennucula puebla (d’Orbigny, 1842) | t, cw + |
| Linucula sp.* | as + |
| Linucula pisum (G. B. Sowerby I, 1833) | cw + |
| Nucula sp. | as, cp + + |
| Nucula falklandica Preston, 1912 | b, cw, dj + + |
| Order Solemyida | |
| Solemyidae | |
| Acharax patagonica (E. A. Smith, 1885) | as + + |
| Solemya notialis Simone, 2009 | du |
| Solemya occidentalis Deshayes, 1857 | dt |
| Order Nuculanida | |
| Sareptidae | |
| Aequiyoldia sp.* | i + |
| Nuculanidae | |
| Nuculana sp.* | s + |
| Propeleda longicuadata* (Thiele, 1912) | cp + |
| Mallettiidae | |
| Malletia chilensis* Desmoulins, 1832 | h |
| Malletia inequalis Dall, 1908 | ds + |
| Malletia subaequalis (G. B. Sowerby II, 1870) | as, cw, be, f + |
| Neilonellidae | |
| Neilonella sulculata (Gould, 1852) | b, f, as, br, cw + + |
### Taxa

| Taxa                                      | Reference | E | C | W |
|-------------------------------------------|-----------|---|---|---|
| **Siliculidae**                           |           |   |   |   |
| *Silicula patagonica* (Dall, 1908)        | as, v     |   |   |   |
| **Tindariidae**                           |           |   |   |   |
| *Tindaria virens* (Dall, 1890)            | as        |   |   |   |
| **Yoldiidae**                             |           |   |   |   |
| *Yoldia sp.*                              | as        |   |   |   |
| *Yoldiella chilensis* (Dall, 1908)        | as, cw    |   |   |   |
| *Yoldiella granula* (Dall, 1908)          |           |   |   |   |
| *Yoldiella indolens* (Dall, 1908)         | as, cw    |   |   |   |
| *Yoldiella valettei* (Lamy, 1906)         |           |   |   |   |
| **Order Mytilida**                        |           |   |   |   |
| *Mytilus chilensis* Hupé, 1854            |           |   |   |   |
| *Mytilus galloprovincialis* Lamarck, 1819 |           |   |   |   |
| *Mytilus platensis* d’Orbigny, 1842      |           |   |   |   |
| *Perumytilus purpuratus* (Lamarck, 1819)  |           |   |   |   |
| **Order Arcida**                          |           |   |   |   |
| *Barbatia platei* (Stempell, 1899)        |           |   |   |   |
| **Limopsidae**                            |           |   |   |   |
| *Limopsis sp.*                            |           |   |   |   |
| *Limopsis hirtella* Rochebrune & Mabille, 1889 | as, v |   |   |   |
| *Limopsis marionensis* E. A. Smith, 1885 |           |   |   |   |
| *Limopsis perieri* P. Fischer in de Folin & Périer, 1870 | as, v |   |   |   |
| **Philobryidae**                          |           |   |   |   |
| *Lissa comoara* (Philippi, 1845)          |           |   |   |   |
| *Philobrya sp.*                            |           |   |   |   |
| *Philobrya aequivalvis* (Odhner, 1922)     |           |   |   |   |
| *Philobrya antarctica* (Philippi, 1868)   |           |   |   |   |
| *Philobrya atlantica* Dall, 1896          |           |   |   |   |
| *Philobrya blakosana* (Melvill & Standen, 1914) |           |   |   |   |
| *Philobrya capillata* Dell, 1964          |           |   |   |   |
| *Philobrya crispata* Limse, 2002          |           |   |   |   |
| *Philobrya magellanica* (Stempell, 1899)  |           |   |   |   |
| *Philobrya sublaevis* Pelseneer, 1903     |           |   |   |   |
| **Order Pectinida**                        |           |   |   |   |
| **Pectinidae**                            |           |   |   |   |
| *Aequipecten tehuelucho* (d’Orbigny, 1842) |           |   |   |   |
| *Austrochlamys natanu* (Philippi, 1845)   |           |   |   |   |
| *Chlamys sp.*                             |           |   |   |   |
| *Deletempecten vitreus* Gmelin, 1791      |           |   |   |   |
| *Zygochlamys patagonica* (King & Broderip) |           |   |   |   |
| **Propeamussiidae**                       |           |   |   |   |
| *Cyclopecten sp.*                          |           |   |   |   |
| **Cyclochlamyidae**                       |           |   |   |   |
| *Cyclochlamys multistrata* Linse, 2002    |           |   |   |   |
| Taxa                                      | Reference | E | C | W |
|-------------------------------------------|-----------|---|---|---|
| Order Limida                              |           |   |   |   |
| Limidae                                   |           |   |   |   |
| Limidae indet.                            | as        | + |   |   |
| *Acosta patagonica* (Dall, 1902)          | bn        | + |   |   |
| *Linea pygmaea* (Philippi, 1845)          | as, v, t, b, bv, bm, ch | + | + | + |
| *Limatula decepcionensis* (Preston, 1916) | as        | + |   |   |
| *Limatula hodgsoni* (E. A. Smith, 1907)   | as, v     | + |   |   |
| Order Lucinida                            |           |   |   |   |
| Lucinidae                                 |           |   |   |   |
| *Epicodakia fallilandica* Dell, 1964      | as, b     | + | + |   |
| *Lucinoma lamellata* (E. A. Smith, 1881)  | as, aj, cf | + |   | + |
| *Loripes pertenuis* (E. A. Smith, 1881)   | ce, br    |   |   |   |
| Thysiridae                                |           |   |   |   |
| *Adontorbina pisum* (Dall, 1908)          | ac, be    | + | + |   |
| *Parathyasira magellanica* (Dall, 1901)   | db        | + |   |   |
| *Thyasira debili* (Thiele, 1912)          | db, cp, as | + |   |   |
| *Thyasira fuigiensis* (Dall, 1890)        | db        | + |   |   |
| *Thyasira patagonica Zelaya, 2010*        | dc        | + | + |   |
| Order Carditida                           |           |   |   |   |
| Carditidae                                |           |   |   |   |
| *Cyclocardia compresa* (Reeve, 1843)      | as, ce, b | + | + |   |
| *Cyclocardia thunarrii* (d’Orbigny, 1845) | s         |   | + |   |
| *Cyclocardia velutina* (E. A. Smith, 1881)| as, bn, f, bf | + |   |   |
| Condylocarditidae                         |           |   |   |   |
| *Carditella exulata* (E. A. Smith, 1885)  | bf        | + |   |   |
| *Carditella naviformis* (Reeve, 1843)     | ag, as, bv | + |   |   |
| *Carditella tegulata* (Reeve, 1843)       | b         | + | + |   |
| *Carditopsis flabellum* (Reeve, 1843)     | u, b, ag  | + | + |   |
| *Carditopsis malvinae* (d’Orbigny, 1845)  | as        | + | + |   |
| Astartidae                                |           |   |   |   |
| *Astarte longirostra* d’Orbigny, 1842     | as, bm, ce, bv, b, u, v | + | + | + |
| Order Cardiida                            |           |   |   |   |
| Cardiidae                                 |           |   |   |   |
| *Cardium parvulum* Dunker, 1861           | ag        |   |   |   |
| Tellinidae                                |           |   |   |   |
| *Macoploma inornata* (Hanley, 1844)       | br        |   |   |   |
| Superorder Imparidonta                    |           |   |   |   |
| Cymiiidae                                 |           |   |   |   |
| *Cymoicardium sp.*                        | as        | + |   |   |
| *Cymoicardium dabil* Soot-Ryen, 1957      | b         | + |   |   |
| *Cymoicardium denticulatum* (E. A. Smith, 1885) | v, bm, as | + | + |   |
| *Cymoicardium yokumada* Urcoila & Zelaya, 2018 | dy     | + |   |   |
| *Cymium sp.*                              | b         | + |   |   |
| *Cymium antarcticum* (Philippi, 1845)     | br        | + |   |   |
| *Kidderia pusilla* (Gould, 1850)          | br        |   |   |   |
| Gaimardiidae                              |           |   |   |   |
| *Gaimardia trapesina* (Lamarck, 1819)     | b, bw, bv, i, br, cg, ak | + | + |   |
| Order Galeommatida                        |           |   |   |   |
| Lasaetidae                                |           |   |   |   |
| *Alternaeutmahillii* (Dall, 1908)         | be, v     | + |   |   |
| *Kella bullata* Philippi, 1845            | bm, br, as | + | + |   |
| *Lasaea adamsii* (Gmelin, 1791)           | b         | + | + |   |
| *Lasaea millanii* (Philippi, 1845)        | u         | + |   |   |
| *Lasaea petigena* (Récluz, 1843)          | h         |   |   |   |
| *Mysella sp.*                             | cp, bm, b | + | + |   |
| *Mysella rochebrunzi* (Dall, 1908)        | ds        | + |   |   |
| *Pseudokellya cardiformis* (E. A. Smith, 1885) | bm, v, as | + | + |   |
## Taxa of Benthic Marine Mollusks of the Strait of Magellan, Chile

| Taxa                             | Reference                  | E  | C  | W  |
|----------------------------------|----------------------------|----|----|----|
| *Galeommatoidea*                 |                            |    |    |    |
| Montacutidae indet.*             | f                          |    |    |    |
| Order Venerida                   |                            |    |    |    |
| Mactridae                        |                            |    |    |    |
| *Darina solenoides* (King, 1832) | ca, s, br, al, cg          |    |    |    |
| Mactra fuegiensis E. A. Smith, 1905 | ca                        |    |    |    |
| *Mulinia byronensis* Gray, 1837  | ca                        |    |    |    |
| *Mulinia edulis* (King, 1832)    | w, s, bw, bf, bm, al, br   |    |    |    |
| *Mulinia exalbida* (King, 1832)  | s, ca                      |    |    |    |
| *Mulinia levicardo* (E. A. Smith, 1881) | br, ca              |    |    |    |
| Ungulinidae                      |                            |    |    |    |
| *Diplodonta patagonica* (d'Orbigny, 1842) | o                        |    |    |    |
| *Diplodonta punctata* (Sav, 1822) | dx                        |    |    |    |
| Veneridae                        |                            |    |    |    |
| Veneridae indet.*                |                            |    |    |    |
| *Eurhomalea exalbida* (Dillwyn, 1817) | as, b, bf, i, bm, f, bp, cj. |    |    |    |
| *Leukoma antiqua* (King, 1832)   | b, bw, cj, o              |    |    |    |
| *Petricola dactylus* G. B. Sowerby I, 1823 | dw          |    |    |    |
| *Pitar rostratus* (Philippi, 1844) | h, bf                     |    |    |    |
| *Proteopitar patagonicus* (d'Orbigny, 1842) | br                  |    |    |    |
| *Tawera elliptica* (Lamarck, 1818) | bw, cp, bl, b, as, ce, cg |    |    |    |
| *Venus inflata* King & Broderip, 1832 | al                        |    |    |    |
| Neoleptonidae                    |                            |    |    |    |
| Neolepton sp.                    |                            |    |    |    |
| Neolepton amatia* Zelaya & Ituarte, 2004 | b                      |    |    |    |
| Neolepton cobbi* (Cooper & Preston, 1910) | as                     |    |    |    |
| Neolepton concentricum (Preston, 1912) | b, da, bm, as         |    |    |    |
| Neolepton hupe Soot-Ryen, 1957    | as                        |    |    |    |
| Neolepton yagan Zelaya & Ituarte, 2004 | b, da                                       |    |    |    |
| Order Myida                      |                            |    |    |    |
| Myida                            |                            |    |    |    |
| *Sphonia batcher* Pilsbry, 1899  |                            |    |    |    |
| Pholadidae                       |                            |    |    |    |
| *Netastoma darwinii* (G. B. Sowerby II, 1849) | dt                          |    |    |    |
| Teredinidae                      |                            |    |    |    |
| Bankia martensi (Stempell, 1899) |                            |    |    |    |
| Order Adapedonta                 |                            |    |    |    |
| Hiatellidae                      |                            |    |    |    |
| Hiatellidae indet.*              | as                        |    |    |    |
| *Hiatella sp.*                   | bv, as, ce                |    |    |    |
| *Hiatella antarctica* (Philippi, 1845) | b                       |    |    |    |
| *Hiatella arctica* (Linnaeus, 1767) | as, bu, e, i, u, ar, f, bm, bo, ch |    |    |    |
| Pharidae                         |                            |    |    |    |
| *Ensis macha* (Molina, 1782)     |                            |    |    |    |
| Superorder Anomalodesmata        |                            |    |    |    |
| Pandoridae                       |                            |    |    |    |
| *Pandora braziliensis* G. B. Sowerby II, 1874 | br, bm, as, f, ae           |    |    |    |
| *Pandora cistula* Gould, 1850    | as, br                    |    |    |    |
| Lyonsiidae                       |                            |    |    |    |
| *Entodermus cuneata* (Gray, 1828) |                            |    |    |    |
| *Entodermus elongatus* Soot-Ryen, 1957 | bm, as                   |    |    |    |
| *Entodermus angulatulus* (Lamarck, 1818) | bf                       |    |    |    |
| Laternulidae                     |                            |    |    |    |
| *Laternula elliptica* (King, 1832) |                            |    |    |    |
| Cupidaridae                      |                            |    |    |    |
| *Cupidaria sp.*                  | as                        |    |    |    |
| *Cupidaria patagonica* (E. A. Smith, 1885) | as, bm, cp, bf       |    |    |    |
| *Cupidaria tenella* (E. A. Smith, 1907) | as                        |    |    |    |
rant with the highest richness was Punta Santa Ana and Fuerte Bulnes (C59), 60 km south of Punta Arenas with 112 nominal taxa, greatly exceeding the diversity of other quadrants (Fig. 4). The most common species was the gastropod *Nacella magellanica*, present in 33 quadrants, followed by *Pareuthria fuscata* (25 quadrants), *Callochiton punicus* (23), *Nacella deaurata* (23), *Margarella violacea* (23), *Nacella mytilina* (22), *Trophon geversianus* (22), *Aulacomya atra* (22), *Trochita pileus* (21), *Plaxiphora aurata* (20), *Zygochlamys patagonica* (20), *Mytilus chilensis* (19), *Pareuthria atrata* (18), *Leptoehiton kerguelensis* (17), and *Xyomenis muriciformis* (17).

The estimated prediction for the richness of species associated with the sampling effort for the Strait of Magellan determined by the Clench model showed that the values of the constants were \(a = 5.664075\) and \(b = 0.014764\). The relation of these values (\(a / b\)) obtained a maximum expected richness of 383.6 species (value of the asymptote of the species accumulation curve with \(R^2 = 0.97\), higher than the 270 species observed. The constants of the linear dependence model were \(a = 4.953160\) and \(b = 0.017756\), thus the maximum expected richness (\(a / b\)) was 279 species with \(R^2 = 0.97\), obtaining a higher value in 9 species than observed in this study (Fig. 5a).
Figure 2. Species richness of mollusks from the Strait of Magellan, highlighting the families with higher diversity. The numbers of species and their percentages are indicated in parentheses.

Figure 3. A number of studies per decade of the Strait of Magellan mentioned in this study B number of mollusk records per decade reported in the Strait of Magellan.
Therefore, neither of the two theoretical models predicted exactly the observed number of mollusk species for the Strait of Magellan. Both non-parametric models estimated an expected richness much higher than that observed empirically (Chao 2 = 353.49; Jacknife 1 = 360.39), and both curves were above that of observed richness (Fig. 5b).

Discussion

According to Valdovinos (1999), the Chilean coast has about 959 species of the three most diverse classes of benthic marine mollusks (671 gastropods, 226 bivalves and 62 polyplacophorans), including Antarctic and oceanic island species. The Magellan Biogeographic Province (41°S to 56°S) is one of the geographical areas with the highest diversity of mollusks on the Chilean coast (Valdovinos et al. 2003). Taking into account this database, the 303 mollusk species recorded in this study correspond to ~31.6% of the species cited for the Chilean coast (Fig. 6). About 400 species of marine mollusks, 250 gastropods, 131 bivalves (Linse 1999) and 19 polyplacophorans (Sirenko 2006a) have been reported for the Magellan Province. Therefore, the 303 species recorded for the Strait of Magellan represent 75% of the mollusks reported for the MBP. However, comparing the value of richness found in this study (303 species) to the 116 species of gastropods and bivalves reported for the Strait of Magellan by Linse et al. (2006), plus 17 species of polyplacophorans by Sirenko (2006a), the richness of mollusks for the Strait of Magellan was increased by 228% (Fig. 6). Most of the records were reported in the last 70 years. However, records of the late 19th century and early 20th century
greatly increased the knowledge of the zone, surpassing previous reports (see Fig. 3). This is mainly due to the publications of Rochebrune and Mabille (1889) and Strebel (1904, 1905a, b, 1906, 1907) which reported 267 records in the Strait. The number of

Figure 5. a accumulation curves of mollusk species according to the parametric estimators Clench and linear dependence, and b according to the non-parametric estimators Chao 2 and Jack 1 for the Strait of Magellan.
studies has increased in the last 40 years, and therefore the records (see Fig. 3). However, some of these records belong to reviews of biological collections and older studies. One criterion was followed to determine doubtful species; those records that were cited in the past and have been questioned in taxonomic reviews. Species such as *Carditella exulata* or *Pandora cistula* were identified as dubious according to these criteria (Güller and Zelaya 2013; Güller and Zelaya 2016b). Other criteria included records in which the same taxonomist discussed the species described such as the case of *Doris magellanica* (Cunningham, 1871), records that considerably exceed their distribution limit and do not appear in taxonomic revisions or alpha diversity studies or are simply dismissed, such as *Lottia orbignyi*, *Leptochiton smirnovi*, *Falsilunatia falklandica*, etc. (Espoz et al. 2004; Pastorino 2005b; Sirenko 2016), and records that have a huge biogeographical discontinuity and are not explained or figured in the article, is the case of *Ischnochiton striolatus*, *Puncturella noachina* and *Acteon delicatus* (Rochebrune and Mabille 1889; Strebel 1907; Ramírez 2000). On the other hand, of the taxa reported up to or above genus level (“indet.” or “sp.”), only two could correspond to new species, according to the authors’ remarks: *Leptochiton* sp. (Sirenko 2006a) and *Crepipatella* sp. (Nuñez et al. 2012).

Recent studies using molecular tools have observed that several species co-distributed in the Antarctic Peninsula and South America actually belong to different lineages, with evolutionary units separated by millions of years (Poulin et al. 2014). This has been mainly observed in species of the genus *Aequiyoldia* Soot-Ryen, 1951 (González-Wevar et al. 2019).
Finally, there are species in the list that do not qualify as doubtful, but which have been classified as unknown species due to their low number of records or due to its small body size, which makes it difficult to identify the species, with poor ecological or descriptive information (Castellanos 1979; Geiger 2012; Rosenfeld et al. 2017), e.g., Notoplax magellanica, Lissotesta impervia, Onoba sulcula, Onoba georgiana, Microglyphis curtula, Cylichna gelida, Turbonilla sanmatiensis, Philobrya atlantica. In this sense, it should be noted that much of the mollusk information that was collected in this work comes from manual collections and various types of sampling gears, trawl and grabs (e.g., Watson 1886; Rochebrune and Mabille 1889; Strebel 1907; Linse 2002; Ríos et al. 2003). However, taxonomic works on specific groups have allowed a good representation of unknown micromollusks (Ponder and Worsfold 1994; Geiger 2012; Pastorino 2016; Di Luca and Pastorino 2018). Despite the aforementioned contributions, micromollusks could continue to be underestimated, since the comparative morphology of various species is only beginning to be illustrated and described in detail (Di Luca and Pastorino 2018).

This historical compilation of the richness of benthic mollusks of the Strait of Magellan promotes the need and urgency for the management of coastal environments. Despite the historical sampling effort and about 192 years of records, the Strait of Magellan has a high diversity of mollusk species which is not yet fully known. The richness estimated by the parametric models was greater than that observed. Two reasons may explain this: i) the sampling effort along the Strait of Magellan has been low (only about 36% of the total area is recorded), and ii) there is still a lack of knowledge about the taxonomy of many mollusk groups, since many species remain undetermined and are not included in the listings or are not recognized in the field. According to Soberón and Llorente (1993), the probability of finding a new species in the Clench model will increase according to experience in the field. Therefore, the Clench model suggests increasing the sampling effort but at a broader spatial and temporal scale to reach the asymptote in the estimation of mollusk species from the Strait of Magellan.

The richness estimated by non-parametric models was higher than the observed. These non-parametric models work based on the number of unique (number of species that occur only in one sample) and duplicate (number of species that occur in exactly two samples). This is based on the assumption that individuals of a species do not live alone in ecosystems, but in populations (Magurran 1988), therefore many unique species in a sample may be indicating that a sufficient number of sampling units has not been used. This historical compilation showed that there are many places in the Strait of Magellan that only have one or two records, which was reflected in both estimators.

However, it is important to consider that in order to evaluate the behavior of the different estimators, it is necessary to know the number of species in the community (Walther and Moore 2005; González-Oreja et al. 2010). Unless the community has been thoroughly sampled, these curves may not work properly (Magurran 2004). Therefore, some authors recommend not working with only one estimator, but testing several models to see how they behave with the data (González-Oreja et al. 2010), since these may vary depending on the situation or for a specific group of organisms.
The results of the four models used in this study allows us to infer that greater sampling effort is needed in the Strait of Magellan, mainly because the largest number of records and species richness are concentrated at the same points within the Strait of Magellan, in the central microbasin.

**Conclusion**

This study provides a clearer idea of the diversity of mollusks in the Strait of Magellan, identifying erroneous records and those that need verification, encouraging other researchers to sample less-studied areas of the strait. This will update knowledge of the diversity of mollusks of the Strait of Magellan, contributing to Chile’s biodiversity heritage and future studies of biogeographical models that are currently based on the 116 species of gastropods and bivalves cited by Linse et al. (2006) and the 17 species of polyplacophorans cited by Sirenko (2006a) for the Strait of Magellan. Finally, with this information of all the records, it will be possible to identify the hotspots of diversity for study and gaps in knowledge, among other things.

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Appendix I

Registration in GBIF database.
Publication date: June 9, 2020
Hosted by: Ministerio del Medio Ambiente de Chile
License: CC BY-NC 4.0
Endpoints: http://gbif-chile.mma.gob.cl/ipt/archive.do?r=moluscos-estrecho-magallanes (Darwin Core Archive), http://gbif-chile.mma.gob.cl/ipt/eml.do?r=moluscos-estrecho-magallanes (EML)
Preferred identifier, DOI: https://doi.org/10.15468/znrbm9
Alternative identifiers: http://gbif-chile.mma.gob.cl/ipt/resource?r=moluscos-estrecho-magallanes

Appendix II

Quadrants of the Strait of Magellan in which mollusks are recorded.

| Quadrant | Location          | Latitude (S) / Longitude (W) |
|----------|-------------------|------------------------------|
| E1       | Dungeness Point 1 | 52°24'12"S, 68°23'40"W     |
| E10      | Dungeness Point 2 | 52°24'11"S, 68°26'35"W     |
| E11      | Dungeness Point 3 | 52°21'58"S, 68°26'50"W     |
| E12      | Dungeness Point 4 | 52°20'59"S, 68°28'23"W     |
| E22      | Point Catalina   | 52°27'55"S, 68°46'17"W     |
| E26      | Cape Possession 1| 52°19'40"S, 68°51'5"W      |
| E27      | Cape Possession 2| 52°19'3"S, 68°56'50"W      |
| E28      | Cape Possession 3| 52°16'20"S, 69°0'33"W      |
| E40      | Possession Bay 1  | 52°14'25"S, 69°12'30"W     |
| E48      | Possession Bay 2  | 52°17'8"S, 69°12'30"W      |
| E49      | Possession Bay 3  | 52°13'30"S, 69°17'12"W     |
| E50      | Tandy Point      | 52°15'20"S, 69°21'58"W     |
| E51      | Possession Bay 4  | 52°17'8"S, 69°17'17"W      |
| E54      | Punta Anegada    | 52°25'59"S, 69°25'26"W     |
| E55      | Nunciación Bay   | 52°20'09"S, 69°26'38"W     |
| E57      | Punta Delgada    | 53°27'12"S, 69°32'7"W      |
| E58      | First Narrow 1   | 52°32'25"S, 69°34'10"W     |
| E59      | Punta Remo       | 52°38'20"S, 69°39'27"W     |
| E61      | First Narrow 2   | 52°32'55"S, 69°40'31"W     |
| E63      | Punta Barranca 1 | 52°32'28"S, 69°43'12"W     |
| E64      | Punta Barranca 2 | 52°37'7"S, 69°43'53"W      |
| E66      | Punta Piedras 1  | 52°44'48"S, 69°50'40"W     |
| E67      | Punta Piedras 2  | 52°38'58"S, 69°50'43"W     |
| E68      | Santiago Bay 1   | 52°34'6"S, 69°50'40"W      |
| E69      | Santiago Bay 2   | 52°29'33"S, 69°51'3"W      |
| E70      | Santiago Bay 3   | 52°31'44"S, 69°55'33"W     |
| E71      | Triton Bank 1    | 52°36'52"S, 69°55'39"W     |
| E72      | Triton Bank 2    | 52°41'44"S, 69°56'6"W      |
| E78      | Gregorio Bay 1   | 52°34'34"S, 70°04'47"W     |
| E79      | Gregorio Bay 2   | 52°35'00"S, 70°08'23"W     |
| E80      | Gregorio Bay 3   | 52°38'13"S, 70°07'58"W     |
| E82      | Cape Gregorio    | 52°39'27"S, 70°14'25"W     |
| E83      | Second Narrow 1  | 52°43'5"S, 70°14'48"W      |
| Quadrant | Location | Latitude (S) / Longitude (W) |
|----------|----------|----------------------------|
| E86      | Second Narrow 2 | 52°41'44"S, 70°26'17"W |
| E90      | Punta Remo       | 52°42'43"S, 69°40'28"W |
| C5       | Cabo Negro 1     | 52°56'30"S, 70°47'46"W |
| C6       | Río Seco         | 53°22'27"S, 70°49'50"W |
| C7       | Punta Arenas 1   | 53°8'8"S, 70°51'30"W  |
| C8       | Punta Arenas 2   | 53°11'47"S, 70°55'52"W |
| C9       | Leñadura 1       | 53°15'24"S, 70°51'35"W |
| C10      | Leñadura 2       | 53°15'46"S, 70°56'32"W |
| C11      | Santa María Point 1 | 53°21'57"S, 70°57'37"W |
| C12      | Colorado River 1 | 53°29'10"S, 70°56'49"W |
| C13      | Colorado River 2 | 53°28'47"S, 70°51'4"W  |
| C14      | Santa María Point 2 | 53°21'53"S, 70°51'16"W |
| C16      | Paso Ancho 1     | 53°8'53"S, 70°43'11"W  |
| C17      | Paso Ancho 2     | 53°4'5"S, 70°42'43"W  |
| C18      | Cabo Negro 2     | 52°56'29"S, 70°44'50"W |
| C21      | Marta Island     | 52°52'57"S, 70°34'48"W |
| C23      | Paso Ancho 3     | 52°58'19"S, 70°39'54"W |
| C24      | Paso Ancho 4     | 53°2'11"S, 70°40'1"W   |
| C25      | Paso Ancho 5     | 53°7'34"S, 70°41'34"W  |
| C26      | Paso Ancho 6     | 53°13'4"S, 70°42'24"W  |
| C28      | Paso Ancho 7     | 53°23'35"S, 70°48'47"W  |
| C32      | Paso Ancho 8     | 53°2'15"S, 70°32'49"W  |
| C33      | Paso Ancho 9     | 52°56'34"S, 70°32'5"W   |
| C34      | Paso Ancho 10    | 52°56'19"S, 70°27'31"W |
| C36      | Zegers Point     | 52°56'20"S, 70°18'52"W |
| C37      | Gente Grande Bay 1 | 52°55'44"S, 70°12'33"W |
| C38      | Gente Grande Bay 2 | 52°55'40"S, 70°7'41"W  |
| C42      | Gente Point      | 53°3'13"S, 70°25'45"W  |
| C43      | Paso Ancho 10    | 53°9'47"S, 70°26'17"W  |
| C44      | Paso Ancho 11    | 53°16'46"S, 70°28'16"W |
| C45      | Porvenir Bay 1   | 53°20'57"S, 70°27'33"W |
| C49      | Paso Boquerón    | 53°25'59"S, 70°19'40"W |
| C50      | Porvenir Bay 2   | 53°18'29"S, 70°22'45"W |
| C52      | Carrera Bay      | 53°33'53"S, 70°54'57"W |
| C53      | Paso del Hambre 1 | 53°32'47"S, 70°49'20"W |
| C55      | Paso del Hambre 2 | 53°32'30"S, 70°39'57"W |
| C57      | Cape Valentin 1  | 53°32'12"S, 70°24'51"W |
| C58      | Inútil Bay 1     | 53°32'8"S, 70°17'0"W   |
| C59      | Santa Ana Point  | 53°37'55"S, 70°54'11"W |
| C60      | Paso del Hambre 3 | 53°37'51"S, 70°49'53"W |
| C64      | Cape Valentin 2  | 53°39'16"S, 70°27'59"W |
| C65      | Inútil Bay 2     | 53°39'4"S, 70°19'33"W  |
| C66      | Inútil Bay 3     | 53°38'40"S, 70°14'8"W  |
| C67      | Cape Boquerón    | 53°32'26"S, 70°13'43"W |
| C68      | Inútil Bay 4     | 53°31'49"S, 70°09'20"W |
| C78      | Puerto Nuevo     | 53°22'23"S, 69°22'14"W |
| C81      | Inútil Bay 5     | 53°31'36"S, 69°23'42"W |
| C82      | Inútil Bay 6     | 53°26'59"S, 69°23'58"W |
| C84      | Inútil Bay 7     | 53°31'5"S, 69°30'41"W  |
| C85      | Inútil Bay 8     | 53°25'58"S, 69°35'25"W |
| C86      | Inútil Bay 9     | 53°29'40"S, 69°35'4"W  |
| C87      | Inútil Bay 10    | 53°26'28"S, 69°44'32"W |
| C88      | Inútil Bay 11    | 53°32'24"S, 69°44'48"W |
| C89      | Inútil Bay 12    | 53°37'18"S, 69°39'42"W |
| C91      | Inútil Bay 13    | 53°39'9"S, 69°45'59"W  |
| C93      | Inútil Bay 14    | 53°33'13"S, 69°52'27"W |
| C94      | Inútil Bay 15    | 53°27'20"S, 69°52'32"W |
| Quadrant | Location            | Latitude (S) / Longitude (W)         |
|----------|---------------------|-------------------------------------|
| C95      | Inútil Bay 16       | 53°33'38"S, 69°59'57"W             |
| C96      | Cameron Point 1     | 53°39'3"S, 69°59'10"W              |
| C97      | Inútil Bay 17       | 53°35'41"S, 70°7'51"W              |
| C98      | Inútil Bay 18       | 53°40'22"S, 70°8'39"W              |
| C99      | Inútil Bay 19       | 53°40'23"S, 70°15'42"W             |
| C100     | Cameron Point 2     | 53°43'38"S, 69°59'20"W             |
| C101     | Cape Nose 1         | 53°44'21"S, 70°5'37"W              |
| C102     | Cape Nose 2         | 53°45'22"S, 70°10'58"W             |
| C104     | Whiteside Channel 1 | 53°45'35"S, 70°2'24"W              |
| C105     | Kelp Point          | 53°47'10"S, 70°25'49"W             |
| C106     | Chown Point         | 53°52'8"S, 70'10'17"W              |
| C107     | Whiteside Channel 2 | 53°52'7"S, 70°14'29"W              |
| C108     | Whiteside Channel 3 | 53°52'12"S, 70°18'59"W             |
| C109     | Harris Bay          | 53°51'18"S, 70°25'33"W             |
| C111     | Cóndor River        | 53°56'44"S, 70°7'46"W              |
| C113     | No Entres Bay       | 53°58'37"S, 70°21'2"W              |
| C115     | Owen Sound 1        | 53°59'9"S, 70°35'16"W              |
| C116     | Owen Sound 2        | 53°59'14"S, 70°38'46"W             |
| C117     | Karukinka Point     | 53°47'37"S, 70°5'17"W              |
| C118     | Whiteside Channel 4 | 54°4'10"S, 70°32'47"W              |
| C122     | Owen Sound 3        | 54°48'3"S, 70°32'47"W              |
| C124     | Port Castillo       | 54°9'47"S, 69°54'58"W              |
| C134     | Alta Island         | 54°16'21"S, 69°55'49"W             |
| C165     | Árbol Point         | 53°45'50"S, 70°57'51"W             |
| C166     | Paso del Hambre 4   | 53°45'57"S, 70°51'16"W             |
| C167     | Lomas Bay 1         | 53°45'50"S, 70°44'45"W             |
| C169     | Lomas Bay 2         | 53°50'6"S, 70°39'51"W              |
| C171     | Amigo Bay           | 53°51'3"S, 70°52'12"W              |
| C172     | Paso del Hambre 5   | 53°52'12"S, 70°57'27"W             |
| C173     | Glascott Point      | 53°51'45"S, 71°5'25"W              |
| C175     | Valdés Point        | 53°55'9"S, 70°52'54"W              |
| C183     | Magdalena Channel   | 53°55'36"S, 70°56'51"W             |
| C184     | Magdalena Sound 1   | 54°5'5"S, 70°57'30"W               |
| C185     | Magdalena Sound 2   | 54°3'8"S, 71°45'31"W               |
| C189     | Paso Froward 1      | 53°58'35"S, 71°13'35"W             |
| C193     | Paso Froward 2      | 53°51'23"S, 71°31'58"W             |
| C200     | Cape Holland        | 53°50'34"S, 71°37'16"W             |
| C204     | Andrés Bay          | 53°45'50"S, 71°49'0"W              |
| C207     | West Point          | 53°44'38"S, 71°55'28"W             |
| C210     | Fortescue Bay       | 53°42'25"S, 72°1'36"W              |
| C211     | Charles Island 1    | 53°44'22"S, 72°4'14"W              |
| C214     | Bárbara Bay         | 53°48'42"S, 72°9'6"W               |
| C217     | Charles Island 2    | 53°45'25"S, 72°8'42"W              |
| C219     | Choiseul Bay        | 53°45'14"S, 72°19'21"W             |
| C220     | Charles Island 3    | 53°40'56"S, 72°8'34"W              |
| C221     | Rupert Island       | 53°39'55"S, 72°14'14"W             |
| C222     | Ballena Sound 1     | 53°40'38"S, 72°19'31"W             |
| C223     | Ballena Sound 2     | 53°40'9"S, 72°25'25"W              |
| C226     | Cape Froward        | 53°53'52"S, 71°5'9"W               |
| W2       | Carlos III Island   | 53°34'32"S, 72°20'6"W              |
| W3       | Paso Tortuoso       | 53°32'25"S, 72°26'20"W             |
| W4       | Jerónimo Channel    | 53°30'13"S, 72°25'4"W              |
| W13      | Spider Island       | 53°31'14"S, 72°40'26"W             |
| W15      | Glacier Bay         | 53°22'9"S, 72°55'35"W              |
| W17      | Paso Largo          | 53°20'52"S, 73°2'12"W              |
| W23      | Lewis Bay           | 53°15'0"S, 73°19'51"W              |
| W37      | Chapman Isles       | 53°3'18"S, 73°45'13"W              |
| Quadrant | Location        | Latitude (S) / Longitude (W) |
|----------|----------------|-------------------------------|
| W40      | Cape Tamar     | 52°56'38"S, 73°44'54"W       |
| W41      | Brazo Damián   | 53°1'31"S, 73°55'23"W        |
| W42      | Tamar Island   | 52°55'31"S, 73°50'14"W       |
| W46      | Sholl Bay      | 52°43'42"S, 73°50'16"W       |
| W49      | Patranca Island| 52°56'46"S, 74°1'59"W        |
| W50      | Félix Point    | 52°56'6"S, 74°8'12"W         |
| W53      | Tuesday Bay    | 52°50'43"S, 74°24'40"W       |
| W55      | Paso Tamar 1   | 52°50'27"S, 74°14'40"W       |
| W56      | Paso Tamar 2   | 52°50'43"S, 74°7'21"W        |
| W57      | Paso Tamar 3   | 52°50'24"S, 74°1'10"W        |
| W60      | Paso Tamar 4   | 52°44'34"S, 74°0'41"W        |
| W65      | Cape Pilar 1   | 52°43'29"S, 74°33'11"W       |
| W67      | Cape Pilar 2   | 52°41'56"S, 74°38'45"W       |
| W69      | Western entrance| 52°37'40"S, 74°33'38"W    |
| W85      | Western entrance| 52°33'27"S, 74°45'44"W    |
| W102     | Victoria Island| 52°18'31"S, 74°50'16"W       |